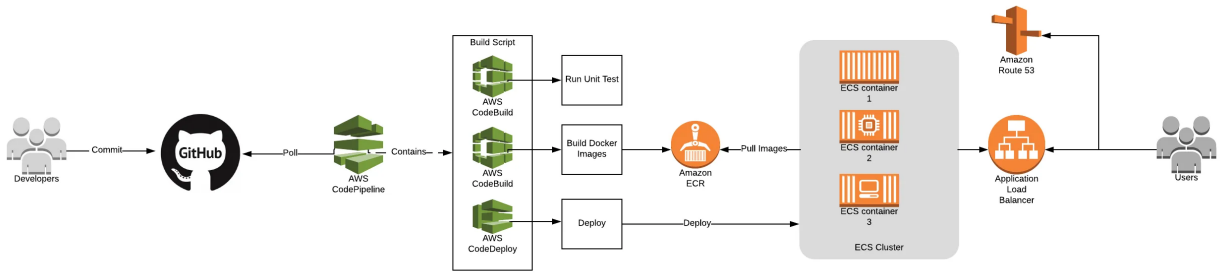
Setup CI/CD for a GitHub repository with Codebuild + Codepipeline



Pre-requisites

- You are having knowledge of the Containers concept (Docker)
- You have a GitHub repository for which you want to set up the CI/CD
- Optionally, have a Dockerfile present (preferably in the root of the repository)

Set up an ECR Repository:

- Open the Amazon ECR console at https://console.aws.amazon.com/ecr/repositories.
- If you are a new user, you will see a **Get Started** Button, click that; Otherwise on the **Repositories** page, choose the **Private** tab and then choose **Create repository**.
- For **Visibility settings**, verify that **Private** is selected.
- For the **Repository name**, enter a unique name for your repository.

- The repository name must start with a letter and can only contain lowercase letters, numbers, hyphens, underscores, and forward slashes
- Choose **Create repository**.

Amazon ECR > Repositories > Create repository

Create repository

General settings

Visibility settings Info

Choose the visibility setting for the repository.

- (●) Private
  Access is managed by IAM and repository policy permissions.
- ( ) Public
  Publicly visible and accessible for image pulls.

Repository name

Provide a concise name. A developer should be able to identify the repository contents by the name.

241973884176.dkr.ecr.us-east-1.amazonaws.com/ my-awesome-react-app

20 out of 256 characters maximum (2 minimum). The name must start with a letter and can only contain lowercase letters, numbers, hyphens, underscores, periods and forward slashes.

Tag immutability Info

Enable tag immutability to prevent image tags from being overwritten by subsequent image pushes using the same tag. Disable tag immutability to allow image tags to be overwritten.

[ ] Disabled

Once a repository has been created, the visibility setting of the repository can't be changed.

Language

Deprecation warning
The ScanOnPush configuration at the repository level has been deprecated in favour of registry-level scan filters.

Scan on push

Enable scan on push to have each image automatically scanned after being pushed to a repository. If disabled, each image scan must be manually started to get scan results.

[ ] Disabled

Encryption settings

KMS encryption

You can use AWS Key Management Service (KMS) to encrypt images stored in this repository instead of using the default encryption settings.

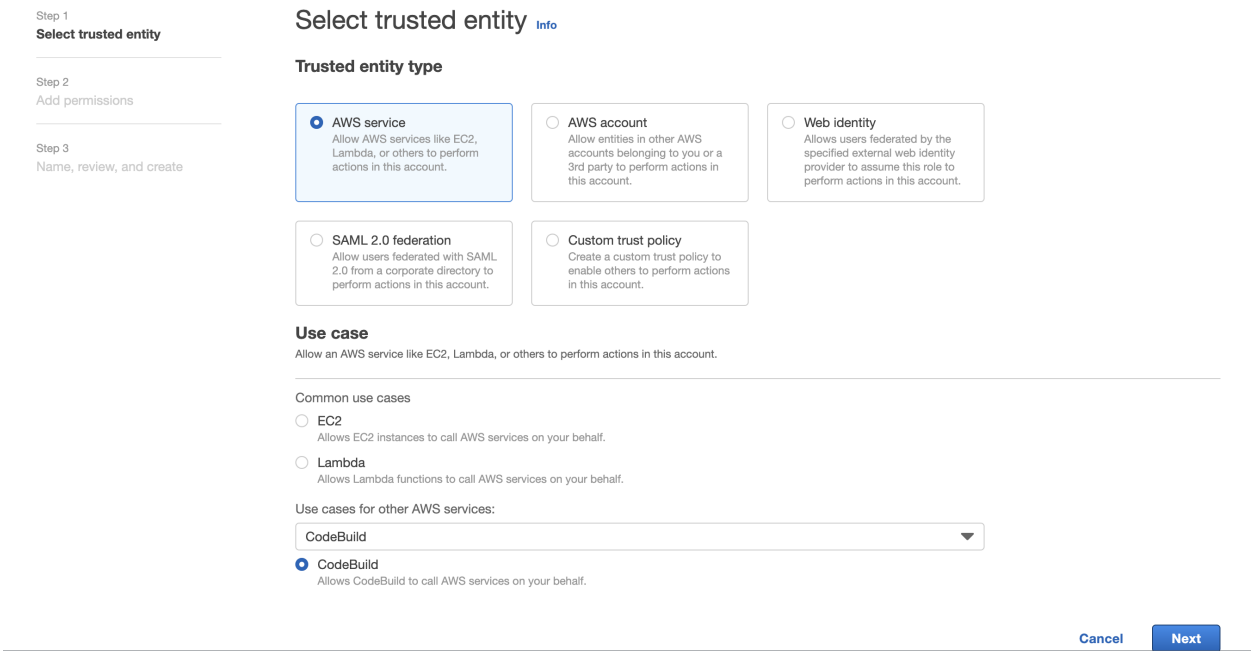
[ ] Disabled

The KMS encryption settings cannot be changed or disabled after the repository has been created.

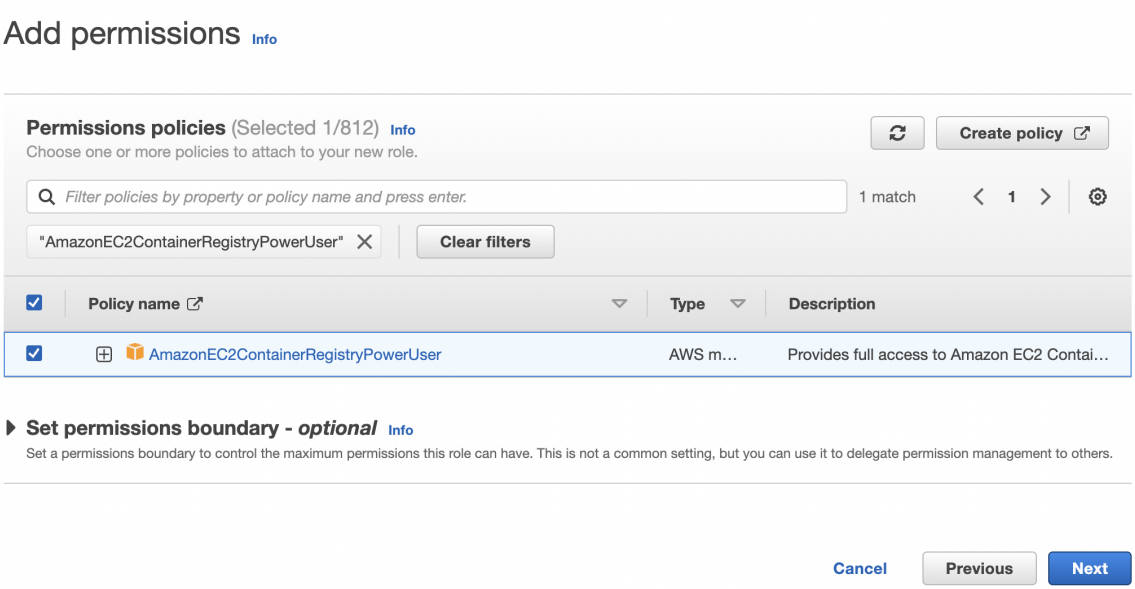
Cancel | Create repository

Create an IAM Role for CodeBuild:

- Open the IAM console at https://console.aws.amazon.com/iam/
- Click on the "Roles" menu from the sidebar
- In the **Trusted entity type**, choose **AWS Service,** For **Use case,** choose AWS Codebuild, Click **Next**



- In the **Add permissions** step, Search for and select "AmazonEC2ContainerRegistryPowerUser", Click **Next**
- In the Role Details, set Role Name (eg: TestCodeBuildRole) and click **Create Role**



Create an AWS CodeBuild project:

- Open the AWS CodeBuild console
- If a CodeBuild information page is displayed, choose **Create build project**. Otherwise, on the navigation pane, expand **Build**, choose **Build projects**, and then choose **Create build project**.
- On the **Create build project** page, in **Project configuration**, for the **Project name**, enter a name for this build project
- In **Source**, for **Source provider**, choose "GitHub".

Developer Tools > CodeBuild > Build projects > Create build project

Create build project

Project configuration

Project name

test-project

A project name must be 2 to 255 characters. It can include the letters A-Z and a-z, the numbers 0-9, and the special characters - and _.

Description - *optional*

Build badge - *optional*

☐ Enable build badge

Enable concurrent build limit - *optional*

Limit the number of allowed concurrent builds for this project.

☐ Restrict number of concurrent builds this project can start

▶ **Additional configuration**

tags

Source

Add source

Source 1 - Primary

Source provider

GitHub

Repository

○ Public repository

◉ Repository in my GitHub account

GitHub repository

https://github.com/kylegalbraith/aws-ecr-codepipeline-demo

https://github.com/<user-name>/<repository-name>

Connection status

You are connected to GitHub using OAuth.

Disconnect from GitHub

Source version - *optional* Info

Enter a pull request, branch, commit ID, tag, or reference and a commit ID.

▶ **Additional configuration**

Git clone depth, Git submodules, Build status config

Primary source webhook events

Webhook - *optional*

☐ Rebuild every time a code change is pushed to this repository

⚠ Important security considerations

- Connect to your GitHub account and select the repository that you want to use for CI/CD.
- In **Environment**, for **Environment image**, leave **Managed image** selected.
- For the **Operating system**, choose **Amazon Linux 2**.
- For **Runtime(s)**, choose **Standard**.
- For **Image**, choose **aws/codebuild/amazonlinux2-x86_64-standard:3.0**.
- IMPORTANT: Check **Privileged section** box (Enable this flag if you want to build Docker images or want your builds to get elevated privileges) if you are building a docker image
- In **Service role**, choose **Existing service role**, and select the role we created in previous step.
- For **Buildspec**, leave **Use a buildspec file** selected.
- In **Artifacts**, for **Type**, choose **No Artifacts**.
- Choose **Create build project**.

The programming language runtimes are now included in the standard image of Ubuntu 18.04, which is recommended for new CodeBuild projects created in the console. See Docker Images Provided by CodeBuild for details.

Runtime(s)

Standard

Image

aws/codebuild/amazonlinux2-x86_64-standard:3.0

Image version

Always use the latest image for this runtime version

Environment type

Linux

Privileged

Enable this flag if you want to build Docker images or want your builds to get elevated privileges

Service role

New service role
Create a service role in your account

Existing service role
Choose an existing service role from your account

Role ARN

arn:aws:iam::241973884176:role/TestCodeBuild

Allow AWS CodeBuild to modify this service role so it can be used with this build project

Additional configuration
Timeout, certificate, VPC, compute type, environment variables, file systems

Buildspec

Build specifications

Use a buildspec file
Store build commands in a YAML-formatted buildspec file

Insert build commands
Store build commands as build project configuration

Buildspec name - *optional*
By default, CodeBuild looks for a file named buildspec.yml in the source code root directory. If your buildspec file uses a different name or location, enter its path from the source root here (for example, buildspec-two.yml or configuration/buildspec.yml).

Batch configuration

You can run a group of builds as a single execution. Batch configuration is also available in advanced option when starting build.

Define batch configuration - *optional*
You can also define or override batch configuration when starting a build batch.

Artifacts

Add artifact

Artifact 1 - Primary

Type

No artifacts

You might choose no artifacts if you are running tests or pushing a Docker image to Amazon ECR.

Additional configuration
Cache, encryption key

Logs

CloudWatch

CloudWatch logs - *optional*
Checking this option will upload build output logs to CloudWatch.

S3

S3 logs - *optional*
Checking this option will upload build output logs to S3.

Cancel

Create build project

Create a buildspec file:

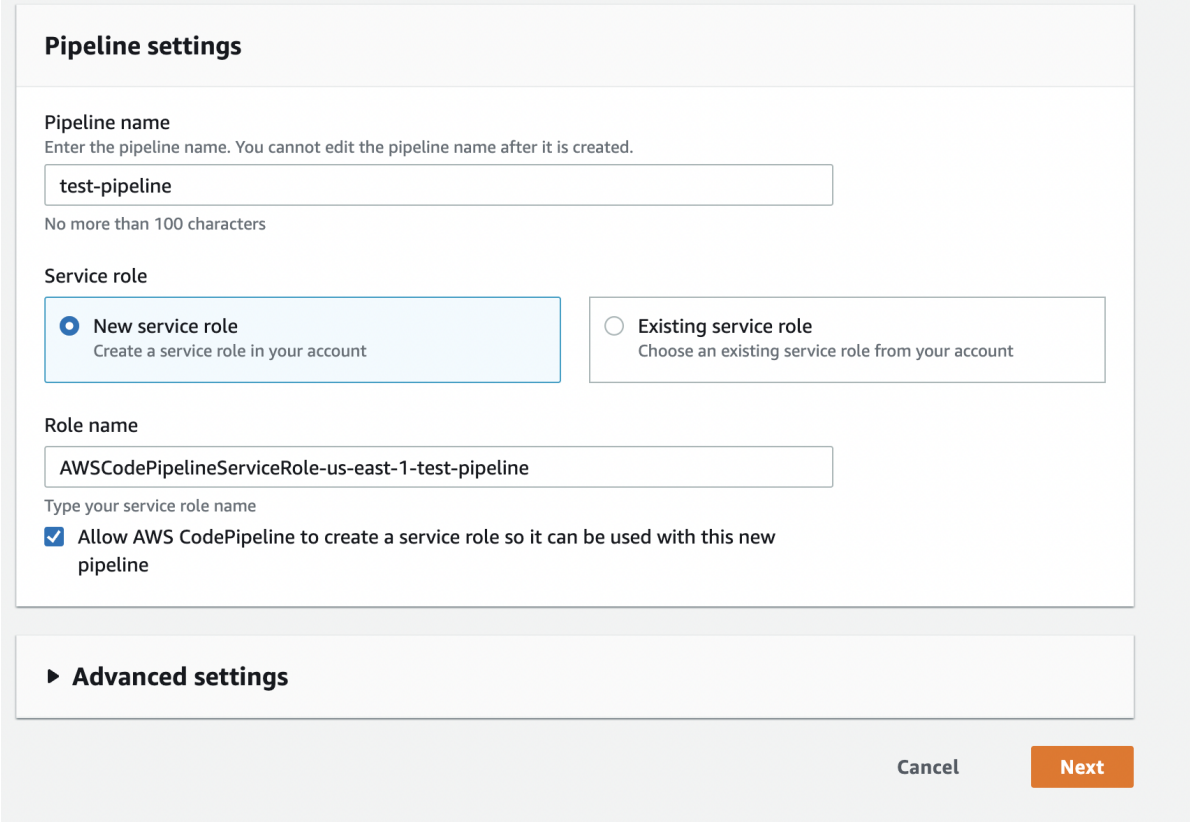
- Create a file named "buildspec.yml" in the root of your GitHub repository.
- Paste the following code into the buildspec file, which builds the Docker image and pushes it to the ECR repository:

```
version: 0.2
phases:
  install:
    commands:
      - echo install step...
  pre_build:
    commands:
      - echo logging in to AWS ECR...
      - $(aws ecr get-login --no-include-email --region us-east-1)
  build:
    commands:
      - echo build Docker image on `date`
      - cd src
      - docker build -t <image name>:latest .
      - docker tag <image name>:latest <ECR repository URI>:latest
  post_build:
    commands:
      - echo build Docker image complete `date`
      - echo push latest Docker images to ECR...
      - docker push <ECR repository URI>:latest
```

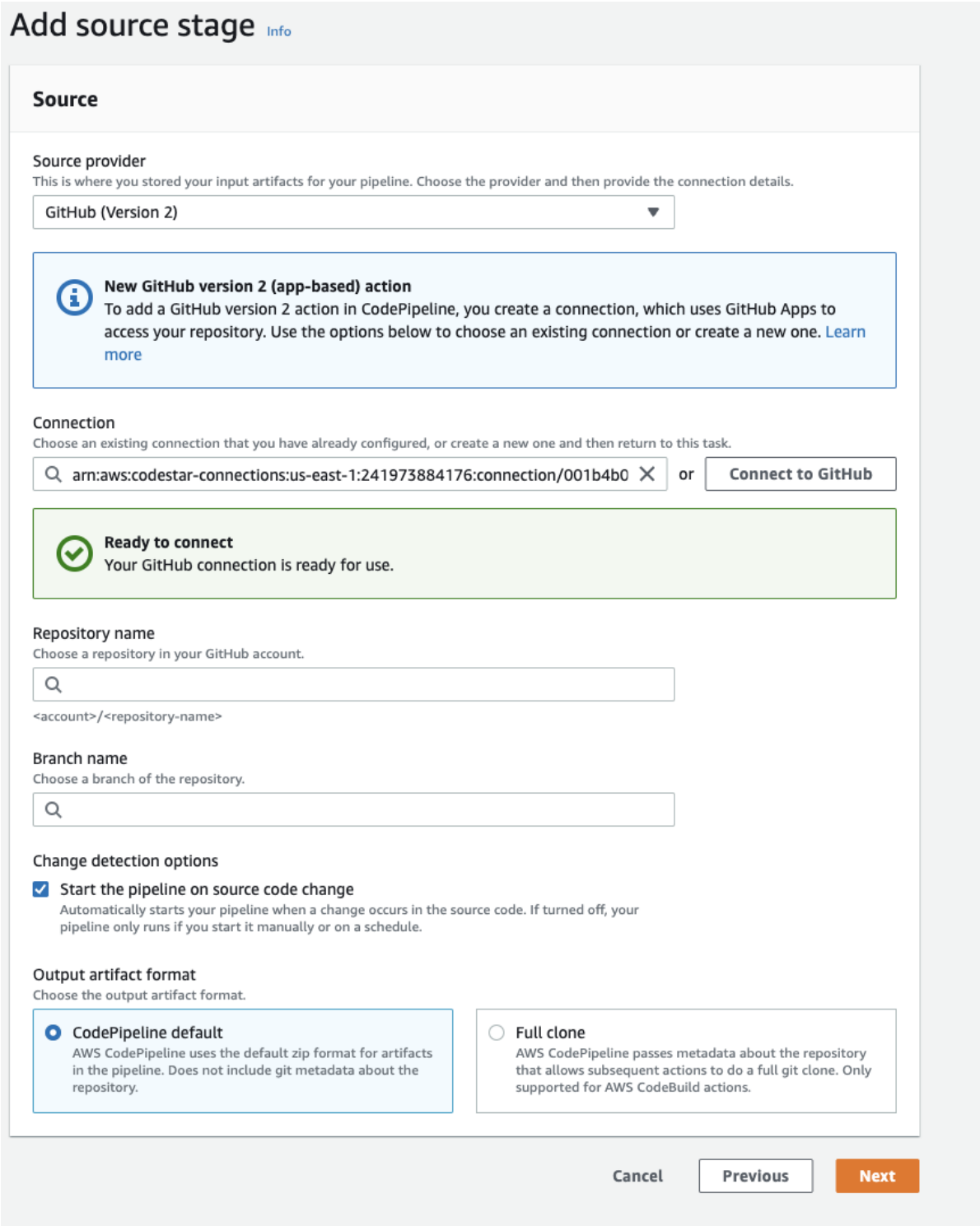
- Replace <image name> and <ECR repository URI> with the actual values.
- Run `git add buildspec.yml` and `git push` to commit the file

Create an AWS CodePipeline pipeline:

- Click here to open the AWS CodePipeline console.
- On the Welcome page, click **Create pipeline**. If this is your first time using AWS CodePipeline, an introductory page appears instead of Welcome. Click **Get Started**.
- Enter the name for your pipeline, Choose **New service role**, and in **Role Name**, enter the name for your new service role. Click **Next**



- On the **Add source stage** page, for the **Source provider,** choose **GitHub (v2) ,** Click on **Connect To Github** and follow the instructions
- Set the **repository** and **branch name** and set **Output artifact format** to **CodePipeline default**

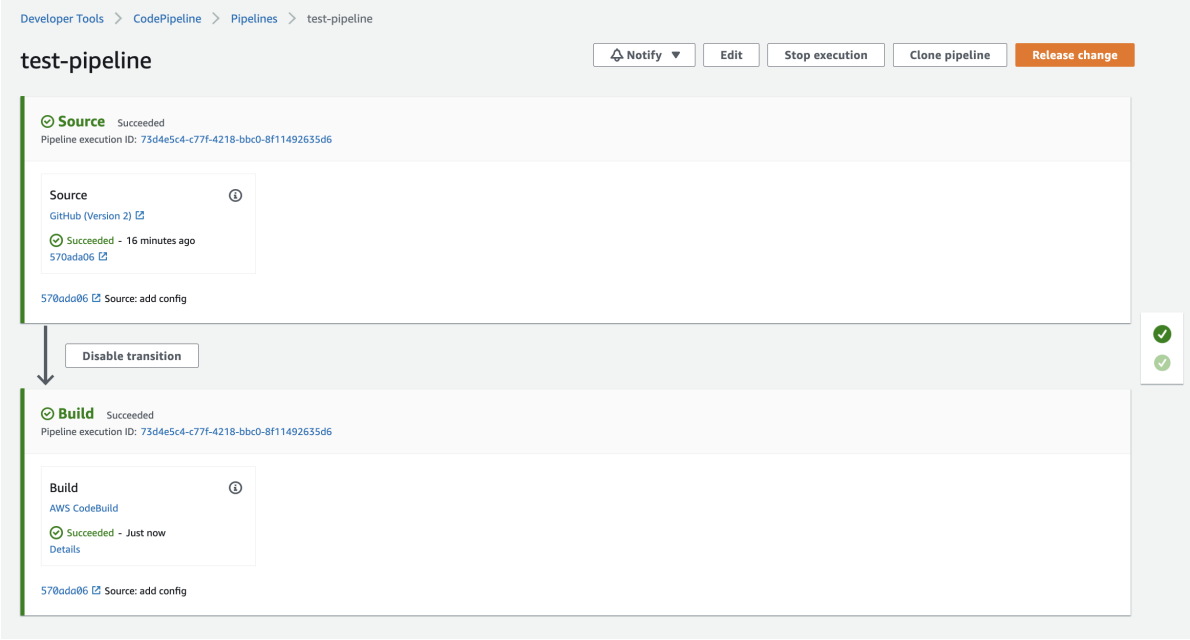


- For **the build stage**, select **AWS CodeBuild** and choose the CodeBuild project created in the previous step
- For the **Add deploy stage,** choose to **skip deploy stage.** Click OK on the warning

- Go to the bottom of the review page and click **Create Pipeline**

Test the Pipeline:

- Go to your GitHub repository and make some changes to the code.
- Commit and push the changes to the repository.
- Go to the AWS CodePipeline service and check the status of your pipeline.
- You should see that the pipeline has detected the changes, started a new build, and deployed the new image to the ECR repository you added.



And that's it! You now have a fully functional CI/CD pipeline for your GitHub repository using AWS CodeBuild and CodePipeline. Every time you update your GitHub repository, the Docker image will be rebuilt and redeployed to the ECR repository