CI/CD foundation for JavaScript engineers

# QUALITY PRE-CHECK WITH AWS CODEBUILD

**EPAM Systems Inc.**

Learn & Development
CI/CD foundation for JavaScript engineers
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# Contents

## 1. GENERAL OVERVIEW

To run code quality checks, we somehow need to get the code from a remote repository. We can't execute neither our code nor external tools directly in the repository, so that we need some service or environment that will automatically get the latest code of our app, perform all necessary actions and, perhaps, and run it. **AWS CodeBuild** is our way to go. **AWS CodeBuild** is designed to execute various tools, build given code, and create built artifacts on its way.

However, in this tutorial we don't want to go into details of the entire artifact building process, but we'll use the **AWS CodeBuild** as a tool for launching code quality checks (tests) on every pull request is created or updated.

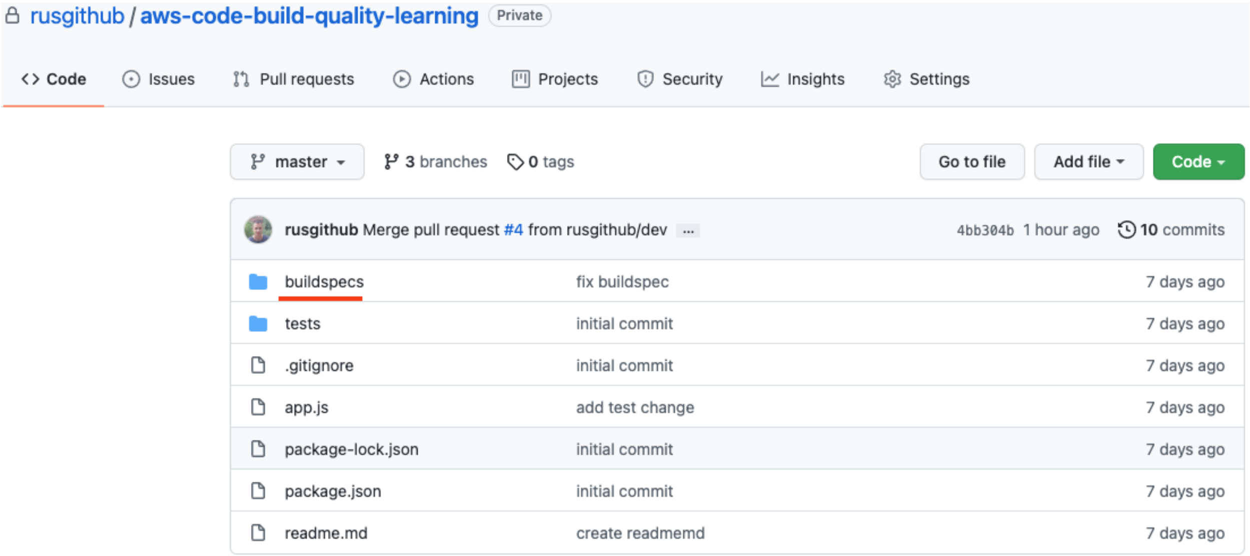
## 2. GITHUB REPOSITORY OVERVIEW

We will use the following repository:

https://github.com/EPAM-JS-Competency-center/aws-code-build-quality-learning

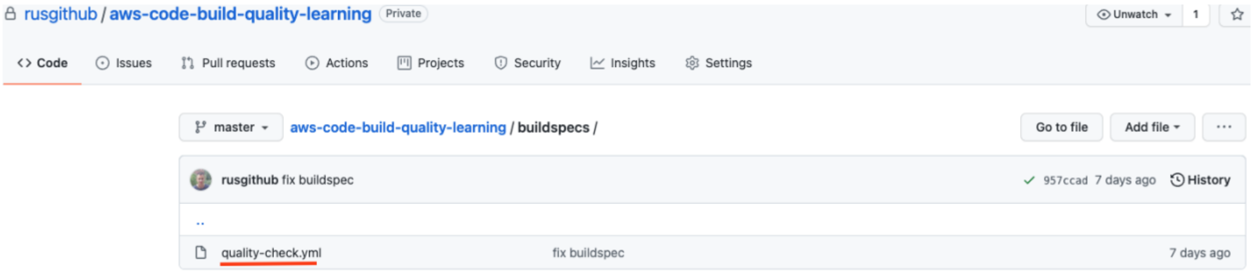
You'll need to fork it to your personal GitHub account. Inside the repo, there is a simple app with a very basic sample of test. And there are some samples of AWS CodeBuild configuration files with commands to be executed.

Let's take a look at **quality-check.yml:**



rusgithub Merge pull request #4 from rusgithub/dev … 4bb304b 1 hour ago 10 commits

| | | |
|---|---|---|
| buildspecs | fix buildspec | 7 days ago |
| tests | initial commit | 7 days ago |
| .gitignore | initial commit | 7 days ago |
| app.js | add test change | 7 days ago |
| package-lock.json | initial commit | 7 days ago |
| package.json | initial commit | 7 days ago |
| readme.md | create readmemd | 7 days ago |



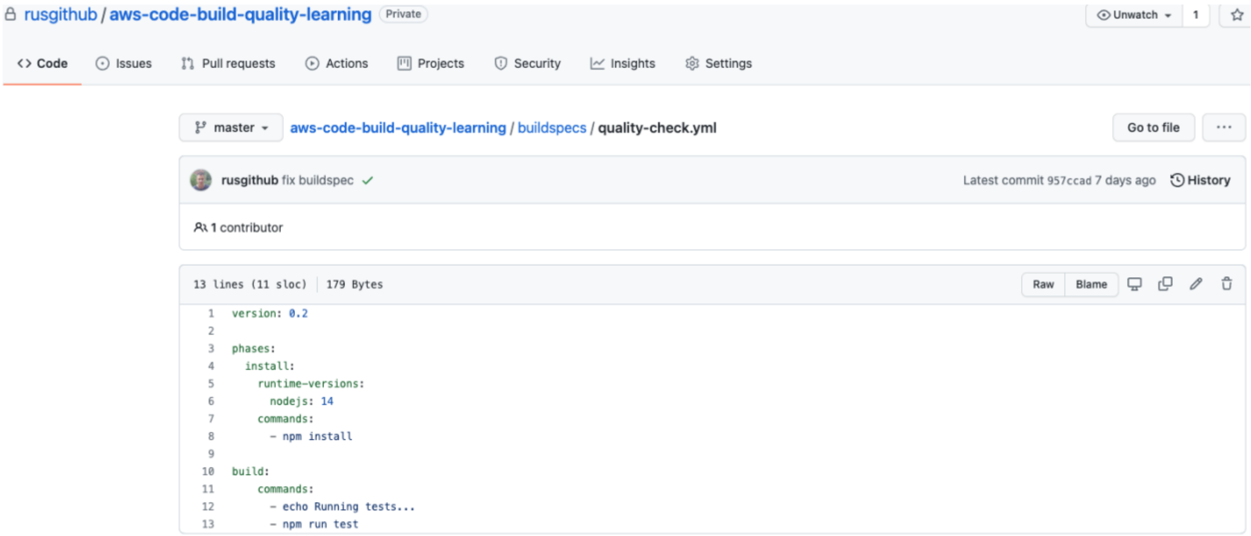
aws-code-build-quality-learning / buildspecs /

rusgithub fix buildspec ✓ 957ccad 7 days ago History

..

quality-check.yml fix buildspec 7 days ago

Here is just some simple instructions for AWS CodeBuild to automate process of code quality check.



aws-code-build-quality-learning / buildspecs / quality-check.yml

rusgithub fix buildspec ✓ Latest commit 957ccad 7 days ago History

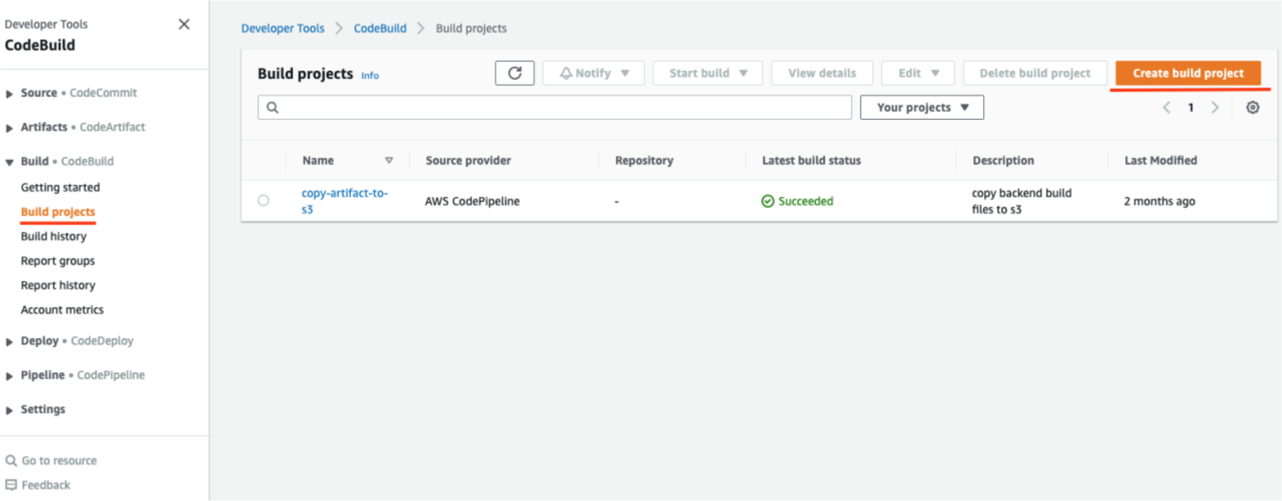
1 contributor

13 lines (11 sloc) 179 Bytes

```yaml
version: 0.2

phases:
  install:
    runtime-versions:
      nodejs: 14
    commands:
      - npm install

build:
    commands:
      - echo Running tests...
      - npm run test
```

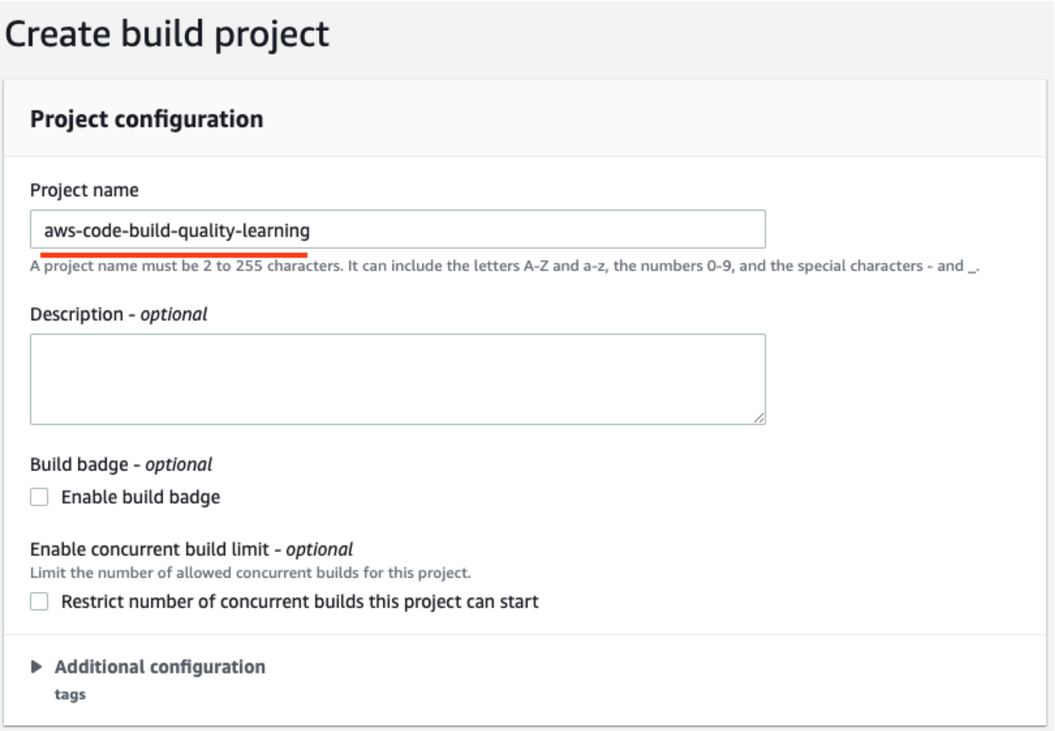
## 3. AWS CodeBuild configuration

To create build project, you need to follow the screens below:



| | Name | Source provider | Repository | Latest build status | Description | Last Modified |
|---|---|---|---|---|---|---|
| ○ | copy-artifact-to-s3 | AWS CodePipeline | - | ✓ Succeeded | copy backend build files to s3 | 2 months ago |

Go to AWS Console > Developer Tools > CodeBuild and press **Create build project** button.



## Create build project

### Project configuration

Project name

aws-code-build-quality-learning

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

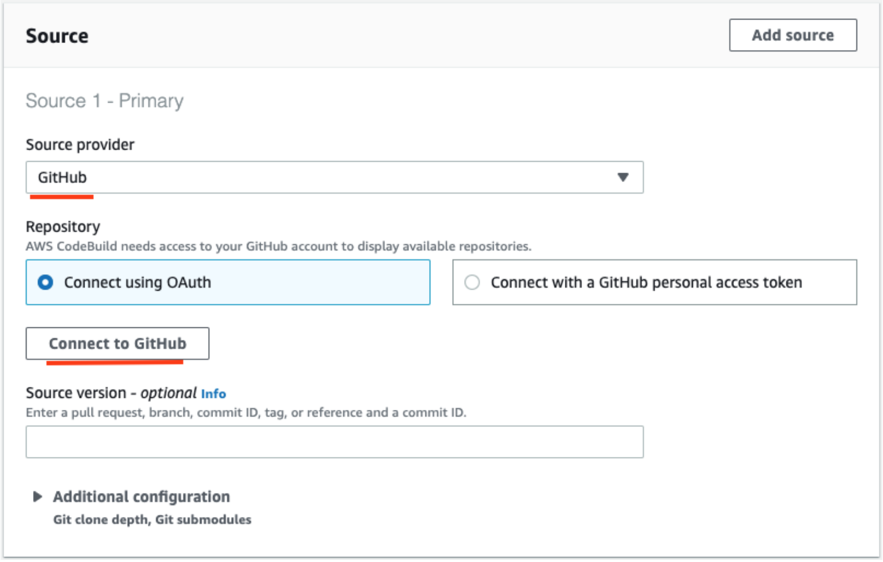
Enable concurrent build limit - *optional*

Limit the number of allowed concurrent builds for this project.

□ Restrict number of concurrent builds this project can start

In the Project name field put a name for your build project (e.g.: ***aws-code-build-quality-learning***)

Connecting via **OAuth** to your code base is a simple thing, but it may not work in some occasions. In this case you'll have to go to you GitHub repo settings and issue a personal access token.



**Source**

Add source

Source 1 - Primary

Source provider

GitHub ▼

Repository

AWS CodeBuild needs access to your GitHub account to display available repositories.

● Connect using OAuth

○ Connect with a GitHub personal access token

Connect to GitHub

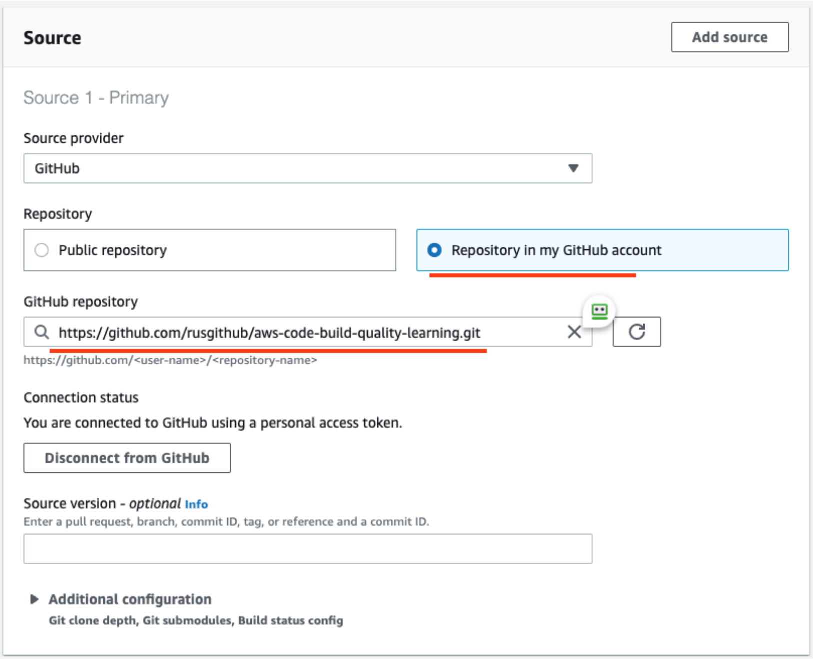
Source version - *optional* Info

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

▶ Additional configuration

Git clone depth, Git submodules

Then select a necessary repository. All existing repositories of you GitHub account will be listed in the dropdown.



**Source**

Add source

Source 1 - Primary

Source provider

GitHub ▼

Repository

○ Public repository

● Repository in my GitHub account

GitHub repository

https://github.com/rusgithub/aws-code-build-quality-learning.git

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

Connection status

You are connected to GitHub using a personal access token.

Disconnect from GitHub

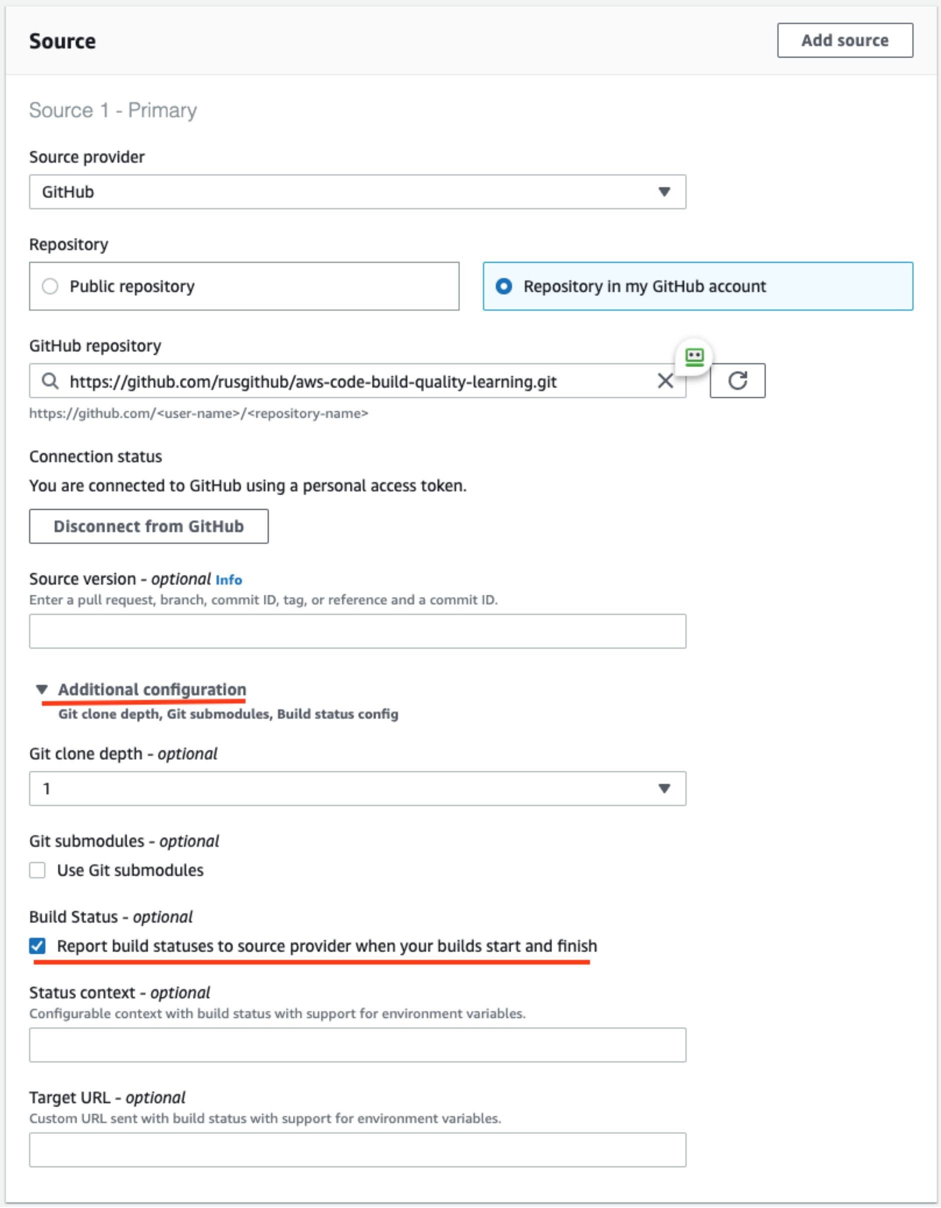
Source version - *optional* Info

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

▶ Additional configuration

Git clone depth, Git submodules, Build status config

The next step is an important one. We need to check **Report build statuses** in order to see build status in our pull request. Otherwise, quality check process won't be displayed in a pull request.



**Source**

Add source

Source 1 - Primary

Source provider

GitHub ▼

Repository

○ Public repository

● Repository in my GitHub account

GitHub repository

https://github.com/rusgithub/aws-code-build-quality-learning.git

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

Connection status

You are connected to GitHub using a personal access token.

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

Git clone depth - *optional*

1 ▼

Git submodules - *optional*

□ Use Git submodules

Build Status - *optional*

☑ Report build statuses to source provider when your builds start and finish

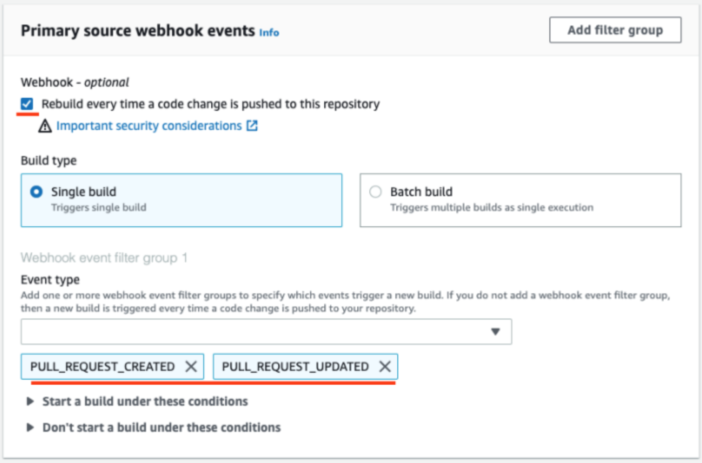
Status context - *optional*

Configurable context with build status with support for environment variables.

Target URL - *optional*

Custom URL sent with build status with support for environment variables.

Then we must specify how to trigger our build project with necessary code quality checks.



**Primary source webhook events** Info

Add filter group

Webhook - *optional*

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

⚠ Important security considerations

Build type

● Single build
Triggers single build

○ Batch build
Triggers multiple builds as single execution

Webhook event filter group 1

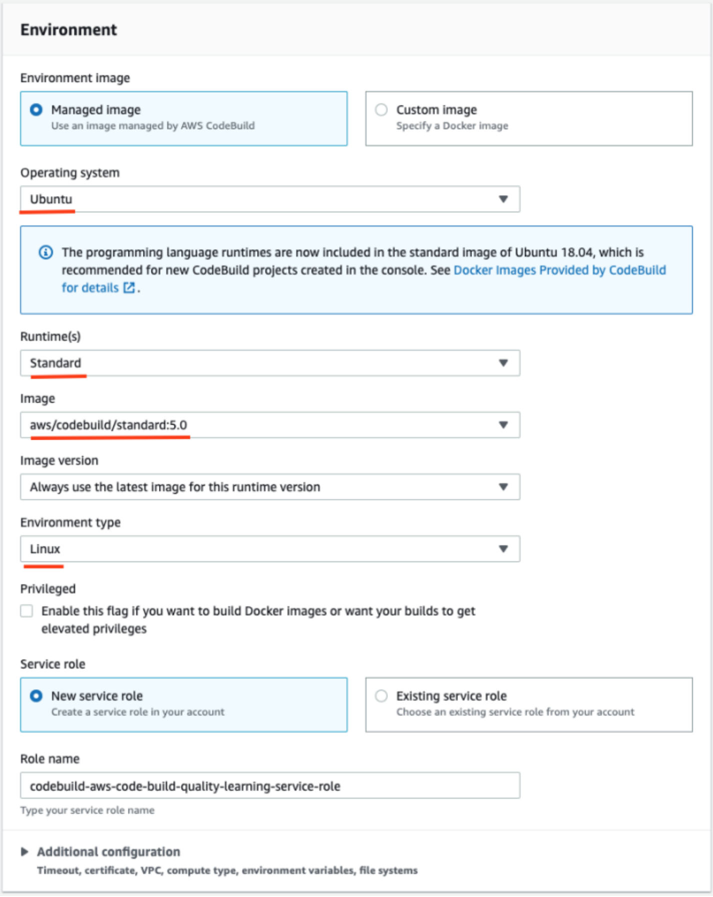
Event type
Add one or more webhook event filter groups to specify which events trigger a new build. If you do not add a webhook event filter group, then a new build is triggered every time a code change is pushed to your repository.

PULL_REQUEST_CREATED ✕ PULL_REQUEST_UPDATED ✕

▶ Start a build under these conditions

▶ Don't start a build under these conditions

The following environment settings must be specified. It doesn’t require extra explanations here:



**Environment**

Environment image

● Managed image
Use an image managed by AWS CodeBuild

○ Custom image
Specify a Docker image

Operating system
Ubuntu

ⓘ 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/standard:5.0

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

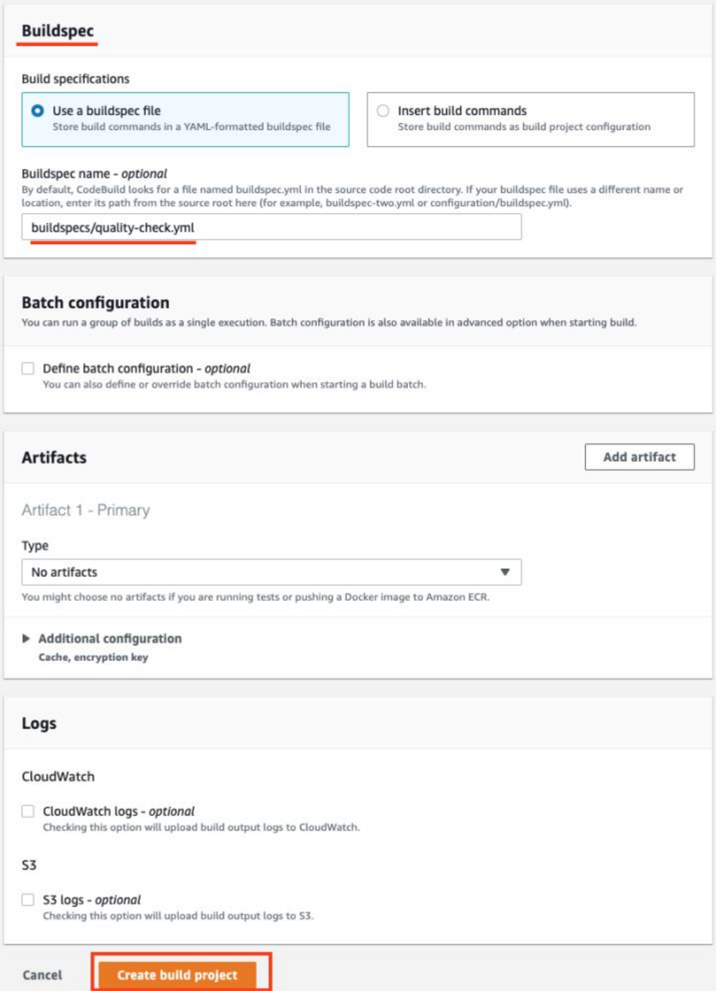
● New service role
Create a service role in your account

○ Existing service role
Choose an existing service role from your account

Role name
codebuild-aws-code-build-quality-learning-service-role
Type your service role name

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

Now we need to reference the ***buildspec.yml*** file that we have already created:



**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).

buildspecs/quality-check.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**

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**

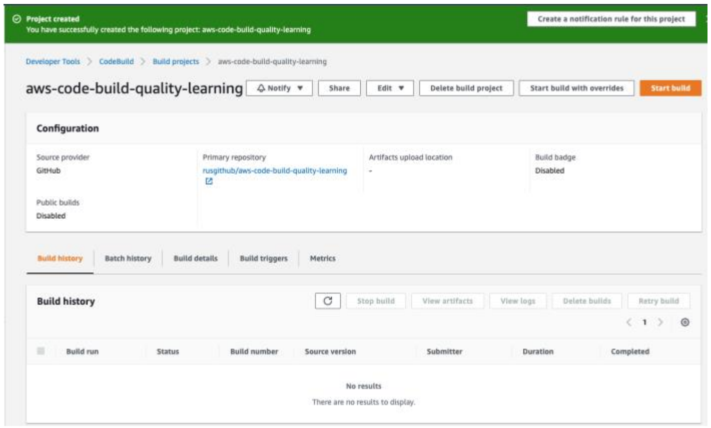
CloudWatch

□ 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.

That's it. Configuration is done. Your build project is ready to be executed. Let's check it.



Project created
You have successfully created the following project: aws-code-build-quality-learning

Developer Tools > CodeBuild > Build projects > aws-code-build-quality-learning

**aws-code-build-quality-learning**

**Configuration**

Source provider
GitHub

Primary repository
rusgithub/aws-code-build-quality-learning

Artifacts upload location
-

Build badge
Disabled

Public builds
Disabled

**Build history**

| ☐ | Build run | Status | Build number | Source version | Submitter | Duration | Completed |
|---|---|---|---|---|---|---|---|

No results
There are no results to display.

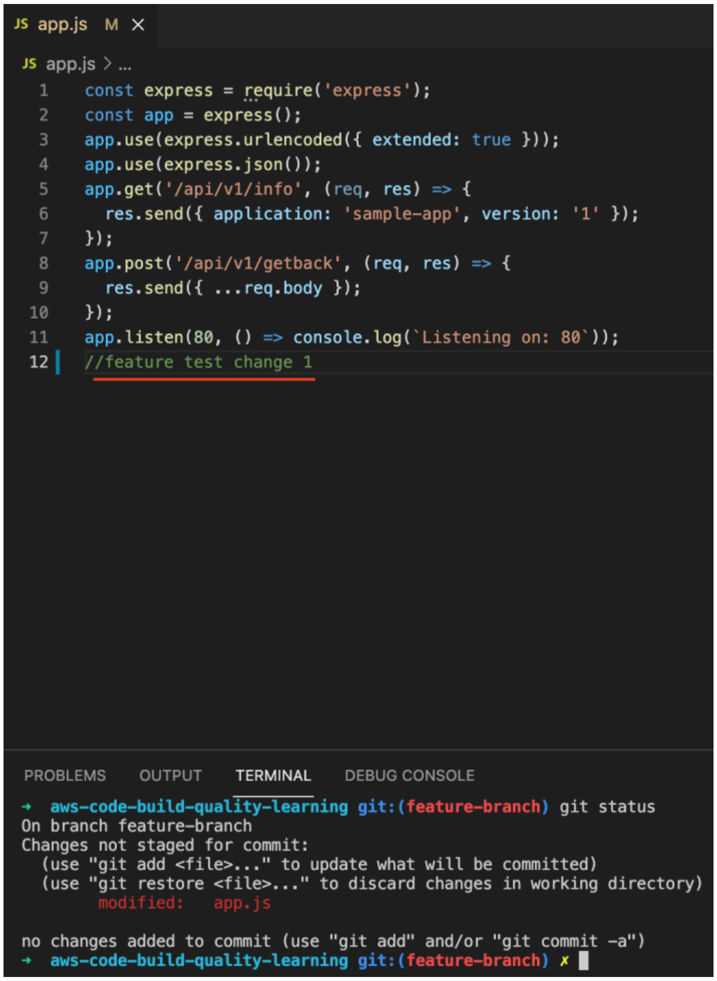
To trigger execution of build project we need to submit a new pull request.

## 4. CREATING PULL REQUEST TO TRIGGER QUALITY CHECK.

Let’s create a new feature branch with some simple changes just for a sake of testing.

```
git checkout -b feature-branch
```

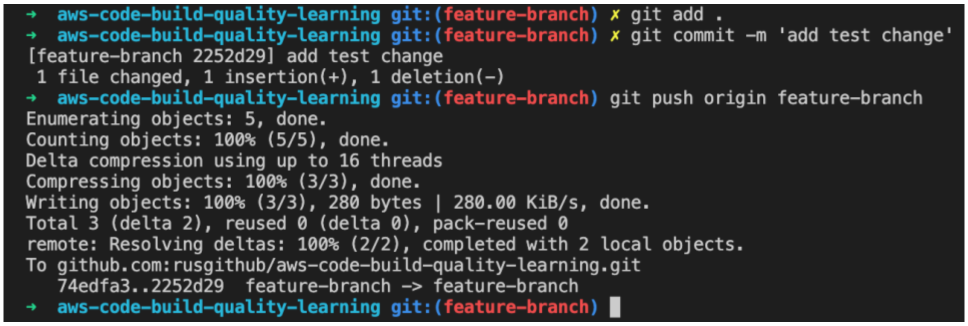
A single comment line can help us to see if quality check is triggered on pull request update.



```
const express = require('express');
const app = express();
app.use(express.urlencoded({ extended: true }));
app.use(express.json());
app.get('/api/v1/info', (req, res) => {
  res.send({ application: 'sample-app', version: '1' });
});
app.post('/api/v1/getback', (req, res) => {
  res.send({ ...req.body });
});
app.listen(80, () => console.log(`Listening on: 80`));
//feature test change 1
```

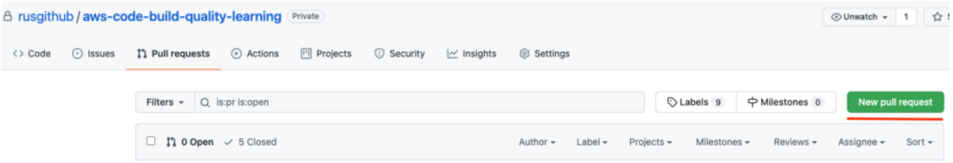
```
➜  aws-code-build-quality-learning git:(feature-branch) git status
On branch feature-branch
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   app.js

no changes added to commit (use "git add" and/or "git commit -a")
➜  aws-code-build-quality-learning git:(feature-branch) ✗ 
```

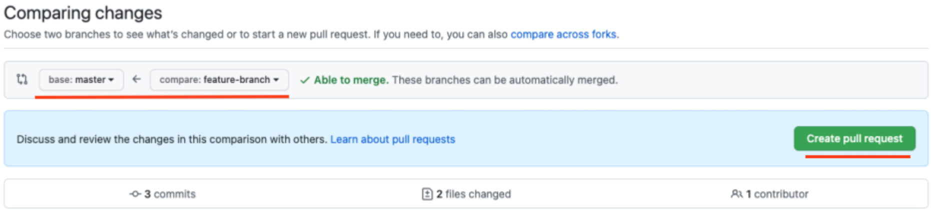
Commit and push changes to your repository:



```
➜  aws-code-build-quality-learning git:(feature-branch) ✗ git add .
➜  aws-code-build-quality-learning git:(feature-branch) ✗ git commit -m 'add test change'
[feature-branch 2252d29] add test change
 1 file changed, 1 insertion(+), 1 deletion(-)
➜  aws-code-build-quality-learning git:(feature-branch) git push origin feature-branch
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 16 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 280 bytes | 280.00 KiB/s, done.
Total 3 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To github.com:rusgithub/aws-code-build-quality-learning.git
   74edfa3..2252d29  feature-branch -> feature-branch
➜  aws-code-build-quality-learning git:(feature-branch) 
```

Then create a pull request as follows:



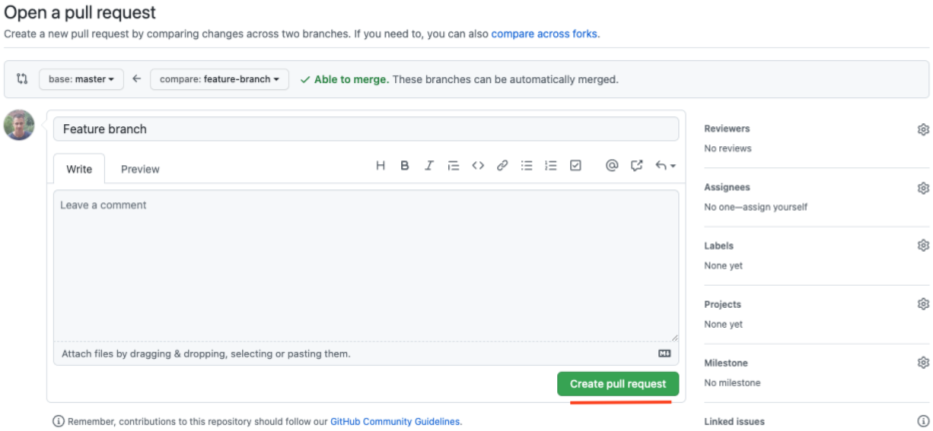


Comparing changes

Choose two branches to see what's changed or to start a new pull request. If you need to, you can also compare across forks.

✓ Able to merge. These branches can be automatically merged.

Discuss and review the changes in this comparison with others. Learn about pull requests



Open a pull request

Create a new pull request by comparing changes across two branches. If you need to, you can also compare across forks.

✓ Able to merge. These branches can be automatically merged.

Feature branch

Write
Preview
Leave a comment
Attach files by dragging & dropping, selecting or pasting them.
Create pull request

Remember, contributions to this repository should follow our GitHub Community Guidelines.

Reviewers: No reviews

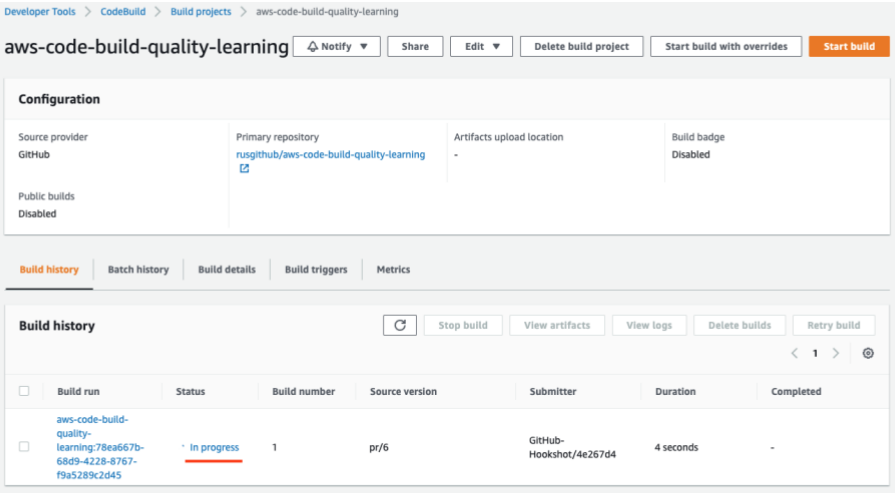
Assignees: No one—assign yourself

Labels: None yet

Projects: None yet

Milestone: No milestone

In AWS console you will see the CodeBuild project running:


Developer Tools > CodeBuild > Build projects > aws-code-build-quality-learning
aws-code-build-quality-learning
Notify
Share
Edit
Delete build project
Start build with overrides
Start build
Configuration

Source provider: GitHub

Primary repository: rusgithub/aws-code-build-quality-learning

Artifacts upload location: -

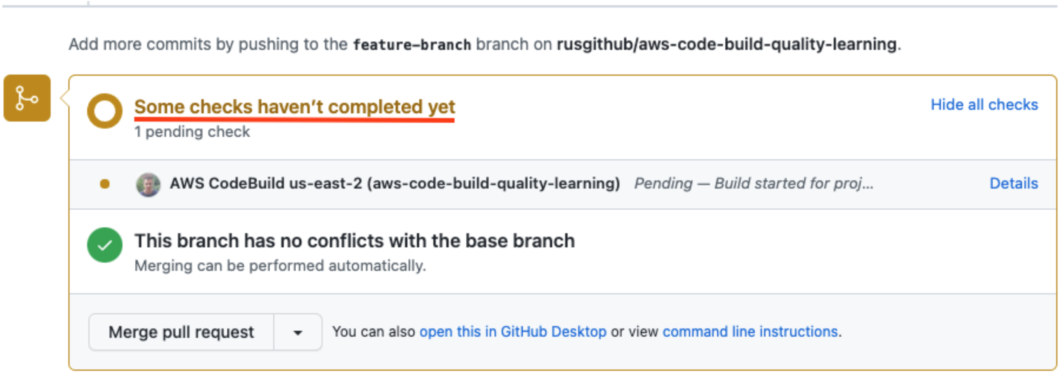
Build badge: Disabled

Public builds: Disabled

| Build run | Status | Build number | Source version | Submitter | Duration | Completed |
|---|---|---|---|---|---|---|
| aws-code-build-quality-learning:78ea667b-68d9-4228-8767-f9a5289c2d45 | In progress | 1 | pr/6 | GitHub-Hookshot/4e267d4 | 4 seconds | - |

The thing is that we can merge pull request while quality check is still running. This happens because we haven't set branch protection. Branch protection is only available in the corporate GitHub subscription. For the sake of example we will leave it as is.

You'll need to wait until the build is completed:



Add more commits by pushing to the **feature-branch** branch on **rusgithub/aws-code-build-quality-learning**.

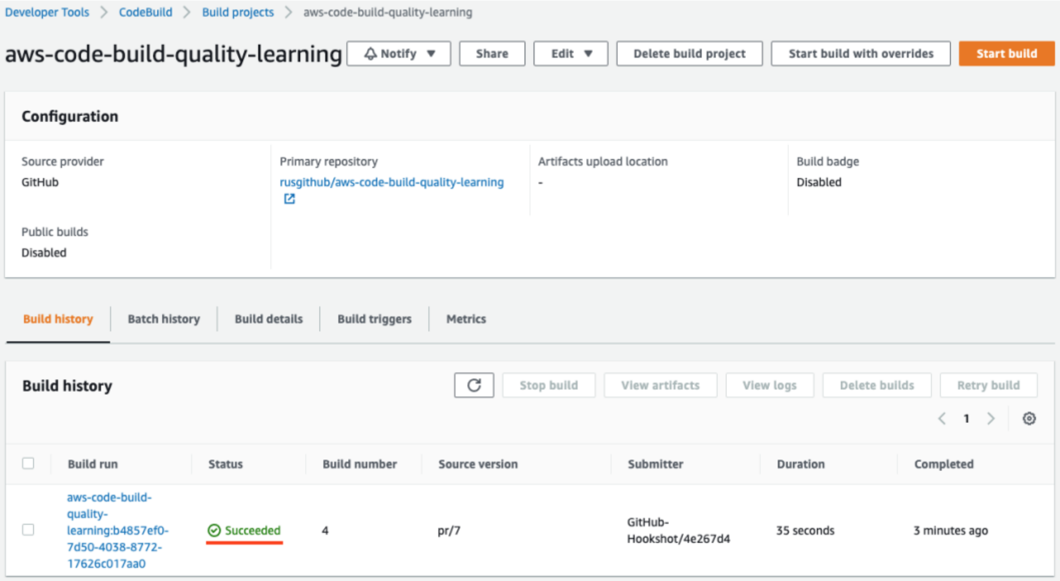
**Some checks haven't completed yet**
1 pending check

● AWS CodeBuild us-east-2 (aws-code-build-quality-learning) *Pending — Build started for proj…*

**This branch has no conflicts with the base branch**
Merging can be performed automatically.

You can also open this in GitHub Desktop or view command line instructions.

Then you should see your CodeBuild project completed with **Succeeded** (or **Failed**) status in AWS Console:



Developer Tools > CodeBuild > Build projects > aws-code-build-quality-learning

aws-code-build-quality-learning

**Configuration**

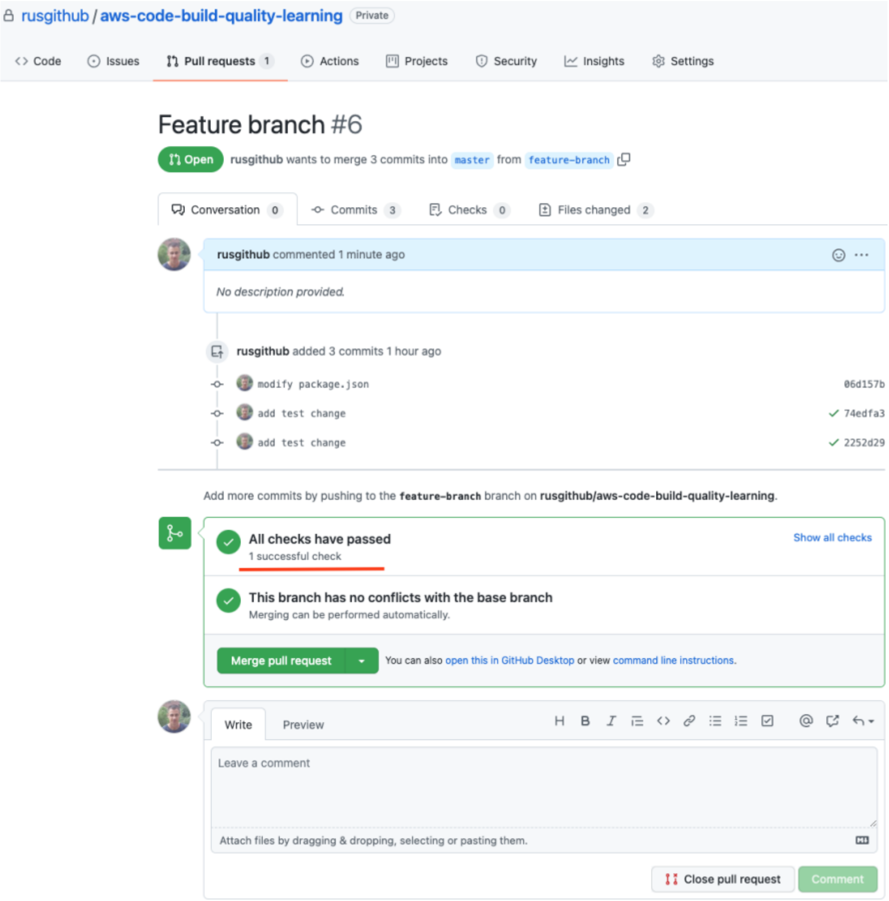
| Source provider | Primary repository | Artifacts upload location | Build badge |
|---|---|---|---|
| GitHub | rusgithub/aws-code-build-quality-learning | - | Disabled |

Public builds
Disabled

**Build history**

| □ | Build run | Status | Build number | Source version | Submitter | Duration | Completed |
|---|---|---|---|---|---|---|---|
| □ | aws-code-build-quality-learning:b4857ef0-7d50-4038-8772-17626c017aa0 | ✓ Succeeded | 4 | pr/7 | GitHub-Hookshot/4e267d4 | 35 seconds | 3 minutes ago |

After successful execution of code quality tools over yours app source code, you should see the **'All checks have passed'** status on PR's page as follows:



rusgithub / aws-code-build-quality-learning Private

Feature branch #6

Open rusgithub wants to merge 3 commits into `master` from `feature-branch`

rusgithub commented 1 minute ago

*No description provided.*

rusgithub added 3 commits 1 hour ago

| | |
|---|---|
| `modify package.json` | 06d157b |
| `add test change` | ✓ 74edfa3 |
| `add test change` | ✓ 2252d29 |

Add more commits by pushing to the **feature-branch** branch on **rusgithub/aws-code-build-quality-learning**.

**All checks have passed**
1 successful check

Show all checks

**This branch has no conflicts with the base branch**
Merging can be performed automatically.

You can also open this in GitHub Desktop or view command line instructions.

Write
Preview
Leave a comment
Attach files by dragging & dropping, selecting or pasting them.
Close pull request
Comment

Having that done you will be able to enhance code quality checks of your application as it is needed (e.g.: adding static code analyzer and/or executing eslint, etc.).