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Github Actions CI

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Github Actions



- CI system developed by Github
- Fully hosted, including runner
- Uses yaml based configuration
- Well documented
- Community-driven plugins, so-called "actions"
 - ▶ integrated marketplace

Advantages

- Well documented
- Known by many developers
- Premade actions for almost everything
- No hosting required
- Free for non-commercial open source

Disadvantages

- Vendor lockin
 - ▶ Closed source runner
 - ▶ pre made options only available on github
- High pricing for large scale
- Requires code to be hosted on Github
- Runner runs on Github servers
 - ▶ Possible compliance problems (GDPR)
 - ▶ US Company ⇒ CLOUD Act

High Level Workflow

- 1 Create yml file
 - ▶ `mkdir -p .github/workflows`
 - ▶ `touch .github/workflows/ci.yml`
- 2 Define when to run
- 3 define jobs with different steps. Including:
 - ▶ Checking out (getting) the code
 - ▶ Setting up the Environment
 - ▶ The actual work

Config Breakdown: When to Run

```
1 name: PCST Pipeline on Github
  1 on:
    2 push:
      3   branches: [ master ]
      4 pull_request:
      5   branches: [ master ]
```

- Defined by on:
- in our case:
 - ▶ On every master commit
 - ▶ On every pull request against master
- Is a list, can contain multiple branches

Config Breakdown: Build Job

```
jobs:
  build:
    name: Build Works
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v3
      - name: Setup Maven Action
        uses: s4u/setup-maven-action@v1.13.0
      - name: Build with mvn
        run: mvn clean install
```

- Each bullet point is a step that runs one after another
- actions/checkout is a pre-made action by Github
 - ▶ git checkouts the newest version of the repo
- s4u/setup-maven-action is a community action to install maven
- run: allows for arbitrary shell code execution

Config Breakdown: Test Job

```
test:
  name: Tests
  runs-on: ubuntu-latest
  steps:
    - uses: actions/checkout@v3
    - name: Setup Maven Action
      uses: s4u/setup-maven-action@v1.13.0
    - name: Run Junit tests (including integration tests and jacoco coverage)
      run: mvn test
    - name: Upload jacoco report
      uses: actions/upload-artifact@v3
      with:
        name: jacoco
        path: target/site/jacoco
    - name: Create Mutation coverage (pit)
      run: "mvn test compile org.pitest:pitest-maven:mutationCoverage"
    - name: Upload pit report
      uses: actions/upload-artifact@v3
      with:
        name: pit
        path: target/pit-reports
```

- Again: Checkout and Maven setup
- Run unit and integration test suite
 - ▶ Like in Terminal: `mvn test`
- Run Mutation test coverage with terminal command
- `actions/upload-artifact` is official action by GitHub
 - ▶ `with:` can be used to configure actions
 - ▶ `name:` defines name of the zip file
 - ▶ `path:` defines where the to-be-zipped files are located

Artifacts

GitHub Actions interface for PCSTProject. The 'Actions' tab is selected. The left sidebar shows 'All workflows' under 'Actions'. The main area shows a list of 5 workflow runs.

1. Points to the 'All workflows' link in the sidebar.

2. Points to the 'add actions for artifacts' workflow run.

Workflow	Event	Status	Branch	Actor
add actions for artifacts PCST Pipeline on Github #5: Commit 5bad77 pushed by lquenti		33 minutes ago 2m 24s	master	...
remove "failing" test (works when you run mvn test only!) PCST Pipeline on Github #4: Commit 3f81b31 pushed by lquenti		41 minutes ago 2m 18s	master	...
run test commands PCST Pipeline on Github #3: Commit 8161c8a pushed by lquenti		44 minutes ago 1m 10s	master	...
add command for mvn build PCST Pipeline on Github #2: Commit 0ddc1db pushed by lquenti		50 minutes ago 49s	master	...
initial CI pipeline PCST Pipeline on Github #1: Commit b5a2da0 pushed by lquenti		1 hour ago 28s	master	...

Artifacts

PCST Pipeline on Github

add actions for artifacts #5

Summary

Jobs

- Build Works
- Tests

Run details

- Usage
- Workflow file

Triggered via push 34 minutes ago

kuerni pushed → bbad77 master

Status: Success

Total duration: 2m 24s

Artifacts: 2

Re-run all jobs

build.yml

on: push

Build Works 33s

Tests 2m 15s

Annotations

3 warnings

Build Works

Node.js 16 actions are deprecated. Please update the following actions to use Node.js 20: actions/checkout@v3. For more information see: <https://github.blog/changelog/2023-09-22-github-actions-transitioning-from-node-16-to-node-20/>.

Tests

Node.js 16 actions are deprecated. Please update the following actions to use Node.js 20: actions/checkout@v3, actions/upload-artifact@v3. For more information see: <https://github.blog/changelog/2023-09-22-github-actions-transitioning-from-node-16-to-node-20/>.

Deprecation notice: v1, v2, and v3 of the artifact actions

The following artifacts were uploaded using a version of actions/upload-artifact that is scheduled for deprecation: "jacoco", "pit". Please update your workflow to use v4 of the artifact actions. Learn more: <https://github.blog/changelog/2024-04-18-deprecation-notice-v->

Show more

Artifacts

Produced during runtime

Name	Size		
jacoco	1.17 MB		
pit	351 KB		


Artifacts

Artifacts

Produced during runtime

Name

Size

 **jacoco**

1.17 MB



 **pit**

351 KB



Thanks for your attention!