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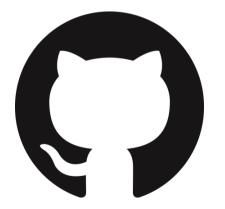
Github Actions CI

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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 \Rightarrow CLOUD Act

High Level Workflow

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

Config Breakdown: When to Run

```
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
```

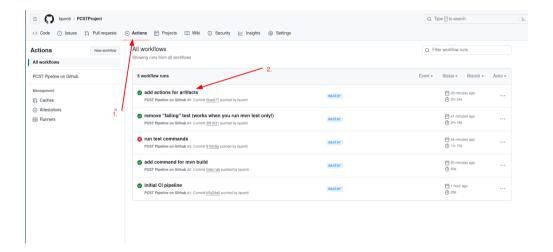
- Each bullet point is a step that runs one after another
- actions/checkout is a pre-made action by Github
 - git checkouts the newest version of the repo
- s4u/setup-maven-action is a community action to install maven
- run: allows for arbitrary shell code execution

Config Breakdown: Test Job

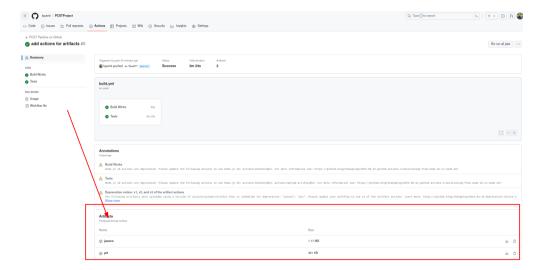
```
name: Tests
runs-on: ubuntu-latest
 - uses: actions/checkout@v3
 - name: Setup Mayen Action
   uses: s4u/setup-mayen-action@v1.13.0
 - name: Run Junit tests (including integration tests and jacoco coverage
   run: myn test
 - name: Upload jacoco report
   uses: actions/upload-artifact@v3
   with:
     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
     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

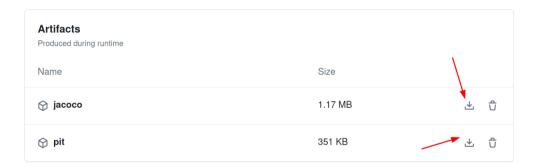
Artifacts



Artifacts



Artifacts



PIT+Integration tests



- Integration tests work with mvn test, but not with PIT
- There is allegedly a feature to exclude tests with 100% coverage and 100% passing
- It's not well-documented, so instead the tests were just commented out for now

Thanks for your attention!