



# GitHub Actions Continuous Delivery 101

ScaleUp 360° Continuous  
Delivery Europe

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2020 07 10

MOOVEL BECOMES

REACHNOW 

pic: © moovel



MOOVEL BECOMES

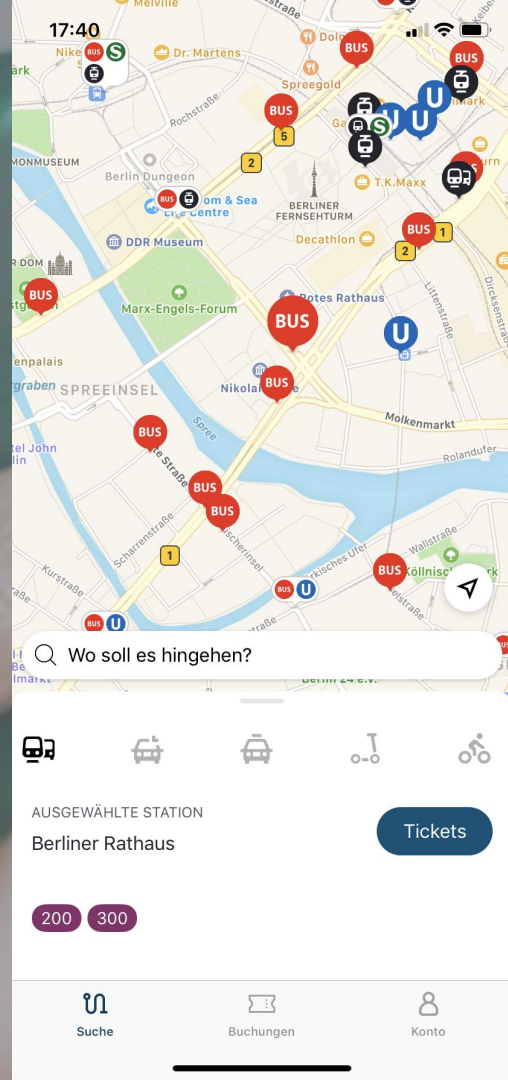
REACHNOW ✓

pic: © moovel



MOOVEL BECOMES

REACHNOW ✓



pic: © moovel

# Me



**Engineering Manager**

[lotharschulz.info](https://lotharschulz.info)

[github.com/lotharschulz](https://github.com/lotharschulz)

[speakerdeck.com/lothar](https://speakerdeck.com/lothar)

[@lothar\\_schulz](https://twitter.com/lothar_schulz)

[lnkd.in/lotharschulz](https://lnkd.in/lotharschulz)

CI/CD Meetup Berlin

[medium.com/reachnow-tech](https://medium.com/reachnow-tech)



GitHub Actions

# Workflow Automation



# GitHub Actions

## Built-in CI/CD




# What are GitHub Actions?

With GitHub Actions, workflows and steps are just code in a repository, so you can create, share, reuse, and fork your software development practices.

### Deploy to Amazon ECS

Deploy a container to an Amazon ECS service powered by AWS Fargate or Amazon EC2.




Set up this workflow

```
# Build a docker container and
# push it to ECR so that it can
# be deployed to ECS.
```

actions/starter-workflows

### Build and Deploy to GKE

Build a docker container, publish it to Google Container Registry, and deploy to GKE.




Set up this workflow

```
# Set up docker to authenticate
# via gcloud command-line tool.
gcloud auth configure-docker
```

actions/starter-workflows

### Deploy Node.js to Azure Web App

Build a Node.js project and deploy it to an Azure Web App.



Set up this workflow


```
# Build and test the project, then
# deploy to Azure Web App.
npm install
```

actions/starter-workflows

<https://github.blog/2019-08-08-github-actions-now-supports-ci-cd/>

### Dart

Build and test a Dart project with Pub.




Set up this workflow

```
pub get
pub run test
```

actions/starter-workflows Dart

### Android CI

Build an Android project with Gradle.




Set up this workflow

```
./gradlew build
```

actions/starter-workflows Java

### Haskell

Build and test a Haskell project with Cabal.




Set up this workflow

```
cabal update
cabal install --only-dependencies --enable-tests
cabal configure --enable-tests
```

actions/starter-workflows Haskell

### Go

Build a Go project.




Set up this workflow

```
go get -v -t -d ./...
if [ -f Gopkg.toml ]; then
  curl
  https://raw.githubusercontent.com/golang/dep/master/install.sh | sh
fi
```

actions/starter-workflows Go

### Clojure

Build and test a Clojure project with Leiningen.




Set up this workflow

```
lein deps
lein test
```

actions/starter-workflows Clojure

### Python application

Create and test a Python application.



Set up this workflow

```
python -m pip install --upgrade pip
pip install -r requirements.txt
pip install flake8
```

actions/starter-workflows Python



# Open Source



*pic: © moovel*



## GitHub Actions

Automate your GitHub workflows

<https://github.com/features/actions> Verified

**Repositories** 36

**Packages** 21

**People** 14

**Projects**

### Pinned repositories

#### **starter-workflows**

Accelerating new GitHub Actions workflows

★ 2.2k 🍴 1.4k

#### **toolkit**

The GitHub ToolKit for developing GitHub Actions.

● TypeScript ★ 1.4k 🍴 537

#### **setup-node**

Set up your GitHub Actions workflow with a specific version of node.js

● TypeScript ★ 375 🍴 170

#### **javascript-action**

Template

Create a JavaScript Action with tests, linting, workflow, publishing, and versioning

● JavaScript ★ 239 🍴 70

#### **typescript-action**

Template

Create a TypeScript Action with tests, linting, workflow, publishing, and versioning

● TypeScript ★ 280 🍴 74

#### **labeler**

An action for automatically labelling pull requests

● TypeScript ★ 228 🍴 83

Find a repository...

Type: All ▾

Language: All ▾

#### **virtual-environments**

GitHub Actions virtual environments

● PowerShell 🍴 MIT 🍴 179 ★ 324 ⓘ 117 ⓘ 14 Updated 36 minutes ago



#### **runner**

The Runner for GitHub Actions 🚀

● C# 🍴 MIT 🍴 61 ★ 611 ⓘ 40 ⓘ 4 Updated 4 hours ago



#### Top languages

● TypeScript ● JavaScript  
● Dockerfile ● C# ● HCL

#### Most used topics

Loading...

[github.com/actions](https://github.com/actions)

## Community Resources

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### GitHub Tools and Management

- Declaratively setup GitHub Labels
- Action to sync GitHub labels in the declarative way
- Add releases to GitHub
- Publish a docker image to Dockerhub
- Create an issue using content from a file
- Publish GitHub Releases with Assets
- GitHub Project Automation+ - Automate GitHub Project cards with any webhook event.
- Run GitHub Actions Locally with a web interface
- Run GitHub Actions Locally in Terminal
- Build and Publish Android debug APK
- Generate sequential build numbers for GitHub Actions
- Push Git changes to GitHub repository without authentication difficulties
- Generate release notes based on your events
- Create a GitHub wiki page based on the provided markdown file
- Label your Pull Requests auto-magically (using committed files)
- Add Label to your Pull Requests based on the author team name
- Manually trigger your GitHub Actions from a UI
- Get a list of file changes with PR/Push
- Use private actions in any workflow
- Label Your Issues Using the Issue's Contents
- Rollback a GitHub Release
- Lock Closed Issues and Pull Requests after a Period of Inactivity
- Get Commit Difference Count Between Two Branches

### Collection of Actions

- Use HashiCorp's Terraform
- GitHub Actions for Yarn 1
- GitHub Actions for Yarn 2
- GitHub Actions for Golang
- GitHub Actions for R and accompanying #rstats package
- GitHub Actions for WordPress
- GitHub Actions for Composer
- GitHub Actions for Flutter
- GitHub Actions for PHP

[github.com/sdras/  
awesome-actions  
#community-resources](https://github.com/sdras/awesome-actions#community-resources)



jessfraz / shaking-finger-action

<> Code ⓘ Issues 0 📄 Pull requests 0 ▶ Actions 🛡 Security 📊 Insights

A GitHub action that displays a gif of Conan O'Brien shaking his finger to a pull request on fail.

🔗 20 commits 🌿 1 branch 📦 0 packages 📄 0 releases 👤 4 contributors

Branch: master ▾ New pull request Create new file Upload files Find file Clone or download ▾

📄 toc-me Update ToC for README.md ✓ Latest commit 907e137 on 29 Dec 2018

📄 .travis.yml	update scripts	16 months ago
📄 Dockerfile	Dockerfile: Fixing another mention of Colbert :) (#3)	16 months ago
📄 Makefile	add makefile and tests	16 months ago
📄 README.md	Update ToC for README.md	15 months ago
📄 add-comment.sh	Update add-comment.sh	16 months ago
📄 demo.png	Add files via upload	16 months ago
📄 finger.gif	first commit	16 months ago
📄 test.sh	add makefile and tests	16 months ago

📖 README.md

## Shaking Finger Action

BUILD **PASSING**

A GitHub action that displays a Gif of Conan O'Brien shaking his finger to a pull request on fail.

[github.com/  
jessfraz/  
shaking-finger-action](https://github.com/jessfraz/shaking-finger-action)

## Open Source Projects using GitHub actions (incomplete list)

- <https://github.com/gatsbyjs/gatsby/tree/master/.github/workflows>
- <https://github.com/hakimel/reveal.js/blob/master/.github/workflows/js.yml>
- <https://github.com/twbs/bootstrap/blob/master/.github/workflows/test.yml>
- <https://github.com/microsoft/vscode/tree/master/.github/workflows>
- <https://github.com/facebook/create-react-app/tree/master/.github/workflows>
- <https://github.com/hakimel/reveal.js/blob/master/.github/workflows/js.yml>
- <https://github.com/babel/babel/tree/master/.github/workflows>
- <https://github.com/nodejs/node/tree/master/.github/workflows>
- <https://github.com/microsoft/TypeScript/tree/master/.github/workflows>
- <https://github.com/kubernetes/utls/tree/master/.github/workflows>
- <https://github.com/jonico/programmatic-runner-test/blob/master/.github/workflows/blank.yml>



# How To's

## Matrix - Builds on Linux, macOS, Windows

```
strategy:
  fail-fast: false
  matrix:
    os: [macOS-10.14, ubuntu-18.04]
    goos: [linux, darwin]
    exclude:
      - os: macOS-10.14
        goos: linux
      - os: ubuntu-18.04
        goos: darwin
  runs-on: ${ matrix.os }
```

## Matrix - Excludes

```
strategy:
  fail-fast: false
matrix:
  os: [macOS-10.14, ubuntu-18.04]
  goos: [linux, darwin]
  exclude:
    - os: macOS-10.14
      goos: linux
    - os: ubuntu-18.04
      goos: darwin
runs-on: ${ matrix.os }
```

```
exclude:
  - os: macOS-10.14
    goos: linux
  - os: ubuntu-18.04
    goos: darwin
```

## Matrix - Includes & Excludes

```
strategy:
  fail-fast: false
  matrix:
    os: [macOS-10.14, ubuntu-18.04]
    goos: [linux, darwin]
    exclude:
      - os: macOS-10.14
        goos: linux
      - os: ubuntu-18.04
        goos: darwin
  runs-on: ${matrix.os}
```

```
exclude:
  - os: macOS-10.14
    goos: linux
  - os: ubuntu-18.04
    goos: darwin
```

```
include:
  - os: macOS-10.14
    goos: darwin
  - os: ubuntu-18.04
    goos: linux
```

## Matrix - Includes & Excludes

```
strategy:
  fail-fast: false
matrix:
  os: [macOS-10.14, ubuntu-18.04]
  goos: [linux, darwin]
  exclude:
    - os: macOS-10.14
      goos: linux
    - os: ubuntu-18.04
      goos: darwin
runs-on: ${ matrix.os }
```

```
exclude:
  - os: macOS-10.14
    goos: linux
  - os: ubuntu-18.04
    goos: darwin
```

```
include:
  - os: macOS-10.14
    goos: darwin
  - os: ubuntu-18.04
    goos: linux
```

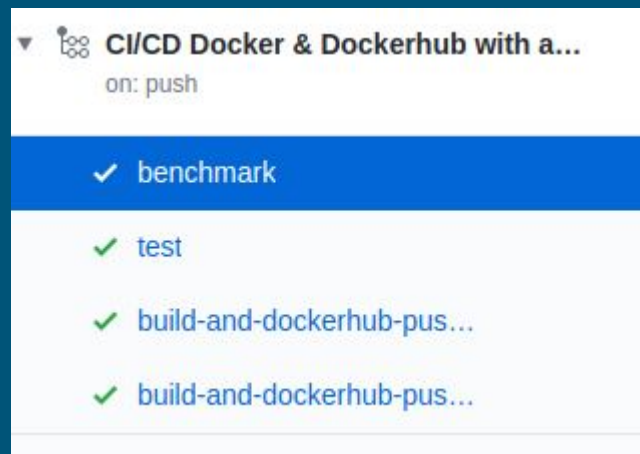




# Jobs

Jobs can run at the same time in parallel or be dependent on the status of a previous job and run sequentially.

```
build-and-dockerhub-push-if-linux:  
  needs: [benchmark, test]
```





## Conditionals

```
if: matrix.os == 'ubuntu-18.04'
```

```
env:
```

```
  DOCKER_USERNAME: ${ secrets.DOCKER_USERNAME }
```

```
  DOCKER_PASSWORD: ${ secrets.DOCKER_PASSWORD }
```

```
run: |
```

```
  d=$(date +%Y-%m-%d)
```


```
  tag=$d-${ matrix.os }-${ github.sha }
```

```
  docker build -t lotharschulz/hello-github-actions:$tag .
```

```
  docker login -u ${DOCKER_USERNAME} -p ${DOCKER_PASSWORD}
```

```
  docker push lotharschulz/hello-github-actions:$tag
```

# Matrix

▼  CI/CD Docker & Dockerhub with a...  
on: push

✓ benchmark

✓ test

✓ build-and-dockerhub-pus...

✓ build-and-dockerhub-pus...

CI/CD Docker & Dockerhub with actions v2 / build-and-dockerhub-push-if-linux (macOS-10.14, darwin)  
succeeded 3 days ago in 6s

Search logs

< > ...

▶ ✓ Set up job1s

▶ ✓ Dump GitHub context0s

▶ ✓ Dump strategy context0s

▶ ✓ Dump matrix context0s

▶ ✓ Dump job context0s

▶ ✓ Dump runner context0s

▶ ✓ Dump steps context0s

▶ ✓ Run actions/checkout@v11s

▶ ✓ builds the binary3s

▶ ✓ Run actions/checkout@master1s

▶ ■ if linux -> docker build image and docker hub login & push0s

▶ ✓ Post actions/checkout@master0s

▶ ✓ Complete job0s

# Matrix

The screenshot displays a GitHub Actions workflow run for a repository named 'CI/CD Docker & Dockerhub with a...'. The workflow is triggered on a 'push' event. The job is titled 'CI/CD Docker & Dockerhub with actions v2 / build-and-dockerhub-push-if-linux (macOS-10.14, darwin)' and has a status of 'succeeded 3 days ago in 6s'. A search bar is visible in the top right corner of the workflow view.

The left sidebar shows a list of workflow steps, with 'build-and-dockerhub-pus...' selected. The main panel shows a detailed view of the workflow steps, which are listed as follows:

- Set up job (1s)
- Dump GitHub context (0s)
- Dump strategy context (0s)
- Dump matrix context (0s)
- Dump job context (0s)
- Dump runner context (0s)
- Dump steps context (0s)
- Run actions/checkout@v1 (1s)
- builds the binary (3s)
- Run actions/checkout@master (1s)
- if linux -> docker build image and docker hub login & push (0s)**
- Run actions/checkout@master (0s)
- Complete job (0s)

The step 'if linux -> docker build image and docker hub login & push' is highlighted with a red box.

# Matrix

The screenshot displays a GitHub Actions workflow run for a project named 'Matrix'. The workflow is titled 'CI/CD Docker & Dockerhub with actions v2 / build-and-dockerhub-push-if-linux (ubuntu-18.04, linux)' and is triggered on a 'push' event. The workflow has succeeded 3 days ago in 1m 16s. The left sidebar shows a list of workflow runs, with the current run 'build-and-dockerhub-pus...' selected. The main panel shows a list of steps in the workflow, each with a green checkmark indicating success. The step 'if linux -> docker build image and docker hub login & push' is highlighted with a red box. The steps are as follows:

Step	Duration
Set up job	3s
Dump GitHub context	0s
Dump strategy context	0s
Dump matrix context	0s
Dump job context	0s
Dump runner context	0s
Dump steps context	0s
Run actions/checkout@v1	2s
builds the binary	7s
Run actions/checkout@v1	1s
if linux -> docker build image and docker hub login & push	1m 3s
Post version/branching@master	0s
Complete job	0s

# Surprises

test:

runs-on: ubuntu-18.04

steps:

- uses: actions/checkout@v1
- uses: actions/setup-java@v1

with:

java-version: 11

- uses: eskatos/gradle-command-action@v1

with:

arguments: test

- name: test the code

GitHub Actions / .github/workflows/main.yml

failed 20 minutes ago in 0s

**.github/workflows/main.yml**

Invalid Workflow File

DETAILS

every step must define a `uses` or `run` key

# Fix

```
test:
  runs-on: ubuntu-18.04
  steps:
    - uses: actions/checkout@v1
    - uses: actions/setup-java@v1
      with:
        java-version: 11
    - uses: eskatos/gradle-command-action@v1
      with:
        arguments: test
# - name: test the code
```

GitHub Actions / .github/workflows/main.yml  
failed 20 minutes ago in 0s

## .github/workflows/main.yml

Invalid Workflow File

### DETAILS

every step must define a `uses` or `run` key





# Demo

# Demo Code

The screenshot shows the GitHub repository page for 'lotharschulz / hello-github-actions'. The repository has 207 commits, 7 branches, 0 packages, 0 releases, and 1 contributor. The 'Code' tab is selected, showing a list of files and folders. The files include .github, action, .gitignore, CONTRIBUTING.md, Dockerfile, Makefile, README.md, build\_test\_benchmark\_docker\_build\_push\_and\_shaking\_finger..., hello\_test.go, hello\_world.go, and screenshot2019-08-23--12.17.35.png. The README.md file is open, showing the title 'GitHub Actions'.

lotharschulz / hello-github-actions

Unwatch 1 Star 0 Fork 4

Code Issues 0 Pull requests 2 Actions Projects 0 Wiki Security Insights Settings

hello github actions Edit

Manage topics

207 commits 7 branches 0 packages 0 releases 1 contributor

Branch: master New pull request Create new file Upload files Find file Clone or download

lotharschulz doc: Latest commit 0ac892f on 30 Dec 2019

.github	go with the exclude block	7 months ago
action	drop own docker cli action	11 months ago
.gitignore	make targets	11 months ago
CONTRIBUTING.md	doc:	3 months ago
Dockerfile	make targets	11 months ago
Makefile	linux and darwin target os	7 months ago
README.md	docs:	4 months ago
build_test_benchmark_docker_build_push_and_shaking_finger...	actions screenshot	11 months ago
hello_test.go	unfail tests	11 months ago
hello_world.go	main comment	11 months ago
screenshot2019-08-23--12.17.35.png	v2 screenshot	7 months ago

README.md

## GitHub Actions

There is even more

- Core concepts
- Encrypted secrets
- Self hosted runners

There is more

- Contexts available on run time
- Triggered by own events
- Package manager and gh docker registry integrated



# THANK YOU

*pic: © moovel*

# SLIDE DECK



pic: © moovel