

Other events

![[Continuous documentation camp]](https://www.ahus1.de/_nuxt/img/logo.f9491e0.svg =256x256)
![[DevOpsCamp]](https://s3-eu-west-1.amazonaws.com/emnify-hackmd-upload/uploads/upload_e31b897ee7b3903b854acf0fe39522f2.png =256x256)

- <https://www.ahus1.de/post/continuous-doc-camp>
2020-04-25
- <https://devops-camp.de/>
2020-05-15/17

Github Actions - automate your workflows

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What is Github Actions?



GitHub Actions enables you to create custom software development life cycle (SDLC) workflows directly in your GitHub repository.



Use-cases of Github Actions?

- CI/CD pipelines
- automating repositories
 - approvals
 - comments
 - labels
- complex scripted workflows using ([GH scripts \(https://github.com/actions/github-script\)](https://github.com/actions/github-script))
- ~~mining Bitcoin~~

Why Github Actions?

:white_check_mark: Free for public repositories
:white_check_mark: (Some) :free: minutes for private repositories
:white_check_mark: Integrated with GitHub
:white_check_mark: Easy setup and good documentation
:white_check_mark: Common actions provided [directly \(https://github.com/actions\)](https://github.com/actions) by GitHub
:white_check_mark: Less common patterns available from the [community \(https://github.com/marketplace?type=actions\)](https://github.com/marketplace?type=actions)
:white_check_mark: Docker builds natively supported

Competitors

	 (https://raw.githubusercontent.com/drone/brand/master/logos/png/dark/drone-ci.com/logo-png-dark-128.png =128x128)	 Travis
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A bit of history

- Introduced in 2019, but...
 - August 8, 2019
Updates to GitHub Actions (limited public beta)
 - November 5, 2019
GitHub Actions: Self-hosted runners
 - December 10, 2019
GitHub Actions: AWS and gcloud actions deprecated :(
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- ...rapidly changing
 - December 19, 2019
GitHub Actions: The Runner is now open sourced
 - January 14, 2020
GitHub Actions: Changes to artifact download experience
 - January 27, 2020
GitHub Actions: API Beta
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Syntax and workflows

- Simpler and cleaner than Jenkins
 - YAML! (and [HCL \(https://github.com/hashicorp/terraform-github-actions/issues/40\)](https://github.com/hashicorp/terraform-github-actions/issues/40) in the past)
 - Stored directly in your repository in `.github/workflows`
 - Automatically started by GH
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Workflows

- Name (name)

- Triggers (on)
 - event -> branch -> path
 - schedule
 - Jobs (jobs)
 - dependencies (needs)
 - run environment (runs_on, containers, services)
 - conditions (if)
 - steps (steps)
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Example 1

```
name: "Run tests on master"
on:
  pull_request:
  push:
    branches:
      - master
jobs:
  test:
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v1
      - run: npm ci
      - run: npm test
```

Triggers I

- Git (push/pull_request) events
 - Pull request/Issues events (label, comment, pull_request_review)
 - Repository events (label, watch)
 - Cron/Schedule (schedule)
 - Project (project, project_card, project_column)
 - External(repository_dispatch)
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Triggers II

- There is [more \(https://help.github.com/en/actions/reference/events-that-trigger-workflows\)](https://help.github.com/en/actions/reference/events-that-trigger-workflows) event types & payloads
 - Never executed on forks
 - Single trigger -> multiple jobs/configurations
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Workflow strategies

- Same job with multiple configurations
- Config instances under strategy -> matrix
- Provided as parameters to the job
- Runs in parallel

GitHub Actions infrastructure

- Github workflows run by default on GitHub infrastructure
- Multiple [environments \(https://github.com/actions/virtual-environments\)](https://github.com/actions/virtual-environments) available (Ubuntu 18.04/Windows Server 2019/Mac 10.15)
- 2-core CPU, 7 GB of RAM memory, 14 GB of SSD disk space
- 5 regions, but all in the **US**!
- Common tools available
- Docker containers on Ubuntu

Local actions

- Same job locally as in your CI environment
- Faster iterations
- Coming from the community
 - [Act \(https://github.com/nektos/act\)](https://github.com/nektos/act)
 - [Wflow \(https://github.com/phishy/wflow\)](https://github.com/phishy/wflow)
- Only subset of environments supported

Github (Self-hosted) Runner

- allows to run actions on self-hosted infrastructure
- runner written in [Mono/C# \(https://github.com/actions/runner\)](https://github.com/actions/runner)
- **!!! limited to a single repository !!!**
- need to setup a token in repository and configure runner
- waiting runner uses roughly only ~2-10 MB of memory
- can be selected based on runs_on label

Secrets

- Stored in the repository (settings)
- provided by the runner
- can be used in workflows
 - `{{secrets.mysecret}}`
- ideal for deployment tokens in public repositories

Caching

- Why?
 - Downloaded dependencies
 - Generated artifacts
 - NPM, SBT, Gradle, Maven
- Possible with uses: `actions/cache@v1`
- Allows to cache any path

- Path can be result of a function (hashFiles(...))
 - Limits - 5GB and clean up after 7 days
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Custom actions

- Anyone can create and publish new actions
 - :exclamation: Releases **NOT** immutable
 - Refrenced in uses: <action_name>
 - Docker and JS supported
 - GitHub provides [Toolkit \(https://github.com/actions/toolkit\)](https://github.com/actions/toolkit) and templates [JS \(https://github.com/actions/javascript-action\)](https://github.com/actions/javascript-action), [Typescript \(https://github.com/actions/typescript-action\)](https://github.com/actions/typescript-action)
 - Metadata in action.yml in root folder
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Metadata of custom action

```
name: Nyan cat action
author: Grumpy cat
description: Adds nyan cat link variable
inputs:
  hours:
    description: Length of nyan cat video
    required: false
outputs:
  link:
    description: Nyan cat video URL
runs:
  using: 'node12'
  main: 'nyan.js'
```

Typical opensource project

- [Welcome new contributors \(https://github.com/xjrk58/github-actions-demo/blob/master/.github/workflows/welcome_issue.yaml\)](https://github.com/xjrk58/github-actions-demo/blob/master/.github/workflows/welcome_issue.yaml)
 - [Run automated checks \(https://github.com/xjrk58/github-actions-demo/blob/master/.github/workflows/run_tests.yaml\)](https://github.com/xjrk58/github-actions-demo/blob/master/.github/workflows/run_tests.yaml)
 - [Create releases and release notes \(https://github.com/xjrk58/github-actions-demo/blob/master/.github/workflows/create_release.yaml\)](https://github.com/xjrk58/github-actions-demo/blob/master/.github/workflows/create_release.yaml)
 - [Cleanup stale issues \(https://github.com/xjrk58/github-actions-demo/blob/master/.github/workflows/stale.yaml\)](https://github.com/xjrk58/github-actions-demo/blob/master/.github/workflows/stale.yaml)
 - Publish artifacts
 - Deploy documentation
 - Automatic security updates
 - Deploy demo
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Known problems

- not possible to re-send event/re-trigger workflow
 - need for self-hosted runner for deployment
 - single runner for multiple repositories is not (yet) supported
 - GH provided runners might keep your build waiting
 - Cost might not be predictable (pay-per-build-minute)
 - no organizational secrets
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Links

- [Starter Workflows \(https://github.com/actions/starter-workflows\)](https://github.com/actions/starter-workflows)
 - [Javascript Action \(https://github.com/actions/javascript-action\)](https://github.com/actions/javascript-action)
 - [Hello word docker action \(https://github.com/actions/hello-world-docker-action\)](https://github.com/actions/hello-world-docker-action)
 - [Awesome actions \(https://github.com/sdras/awesome-actions\)](https://github.com/sdras/awesome-actions)
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Q/A