GitHub Actions

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GitHub Actions

- A continuous integration (CI) platform for GitHub-hosted projects, launched on 16 October 2018.

- Providing GitHub-hosted runners for Linux, MacOS and Windows.

- File-based workflow specification: `.github/workflows/*.yml`.
  A command-line tool, `act` is available for running workflows locally (or from other continuous integration platforms): https://github.com/nektos/act

- Very easy to extend (new reusable actions can be defined in git repositories), Linux runners can run docker containers, user-provided runners can be used.

Continuous integration

Continuous integration (CI): practice of short-lived development cycles, automatically tested and shared regularly between developers involved in a project.

Continuous integration platforms: Github Actions, ci.inria.fr, gitlab.inria.fr.

Automating testing (and CI in general) relies on version control and automated builds.

- speed up development process,
- ease collaboration
- allow programmers to be more confident for not introducing regression and bugs.

This is a step towards broader goals such as reproducible builds and reproducible research.

GitHub-hosted runners

- Hardware specification for Windows and Linux virtual machines:
  - 2-core CPU (x86_64)
  - 7 GB of RAM
  - 14 GB of SSD space
- Hardware specification for macOS virtual machines:
  - 3-core CPU (x86_64)
  - 14 GB of RAM
  - 14 GB of SSD space

Usage limits, billing: available for free for public repositories,

- up to 20 concurrent jobs (Linux/Windows),
- 5 concurrent jobs for macOS.

Self-hosted runners

Example of workflow

In `.github/workflows/example.yml`:

```yaml
on: [push]
jobs:
  build-example:
    runs-on: ubuntu-latest
    steps:
      - name: Checkout
        uses: actions/checkout@v3
      - name: Compile
        run: |
          gcc -o hello_word hello_world.c
      - name: Test
        run: |
          ./hello_word > output.txt
          diff output.txt excepted.txt
```

Action status visible on repository index

Access to logs in action details

Automatic actions in repositories

- Test pull-requests automatically
- Check code formatting, linting
- Publish releases and documentation (Continuous Delivery/Continuous Deployment)
- Generate automatic posts in pull-requests for coverage analysis, performance reports
- Automatic triage of pull-requests, use chatGPT for automatically answering pull requests, etc, etc

Training course on Thursday morning, 10am-12pm

Alexandre Abadie (SED) and myself will give a training course about GitHub Actions on

Thursday morning, 10am-12pm, at Inria Paris, room Gilles Kahn 1&2

Thank you for your attention!