GitHub Actions

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Corso OLSS 2021

Shamelessly inspired by Alexey Golub Github Actions in action slides

GitHub Actions

https://docs.github.com/en/actions

Available since Nov. 13, 2019

Implemented on Microsoft Azure Pipelines

Tightly integrated with the GitHub API

YAML-based configuration

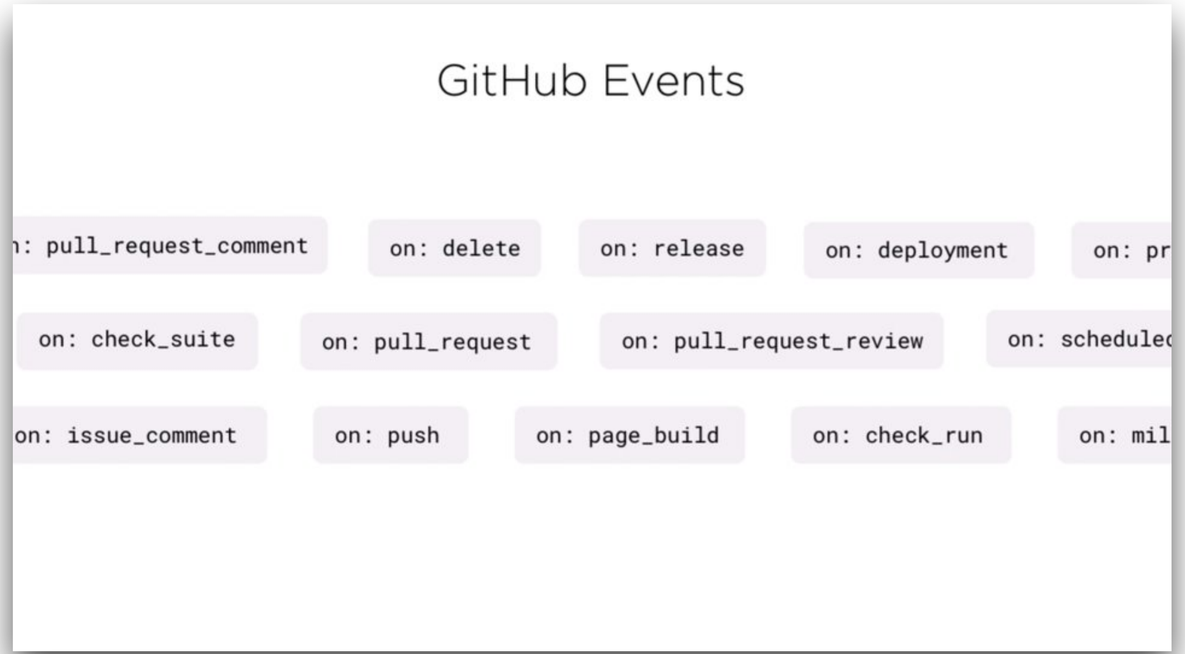
Modular architecture, community-driven

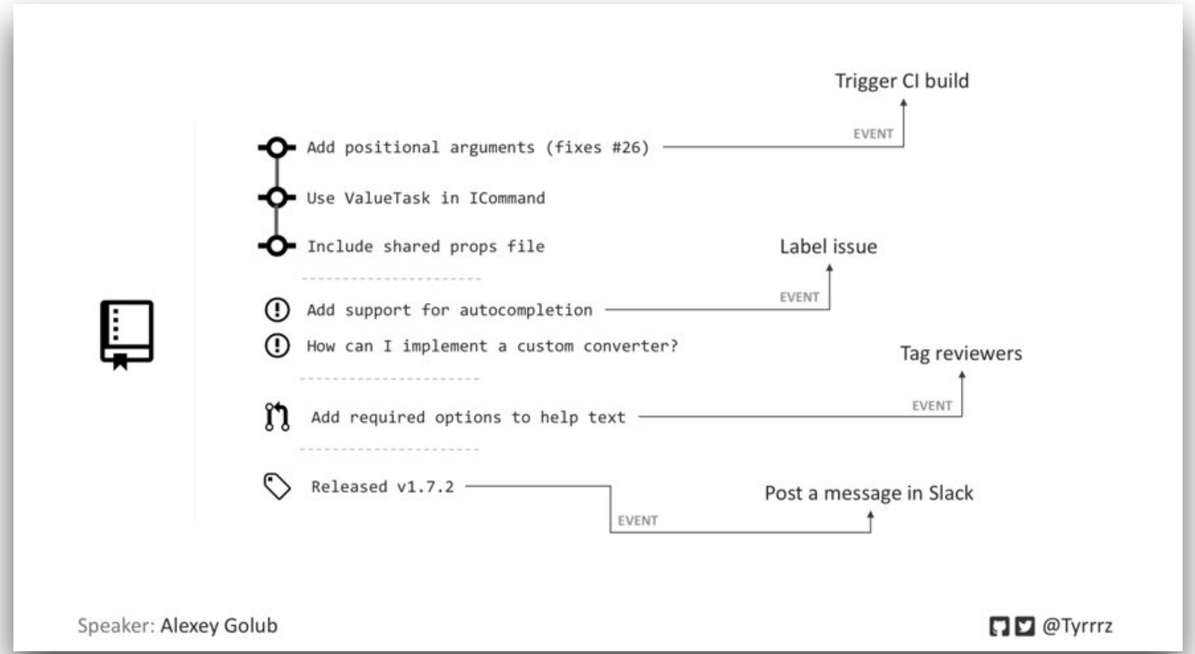
Windows, Linux, MacOS, self hosted runners

Free for public repositories

More than CI/CD?

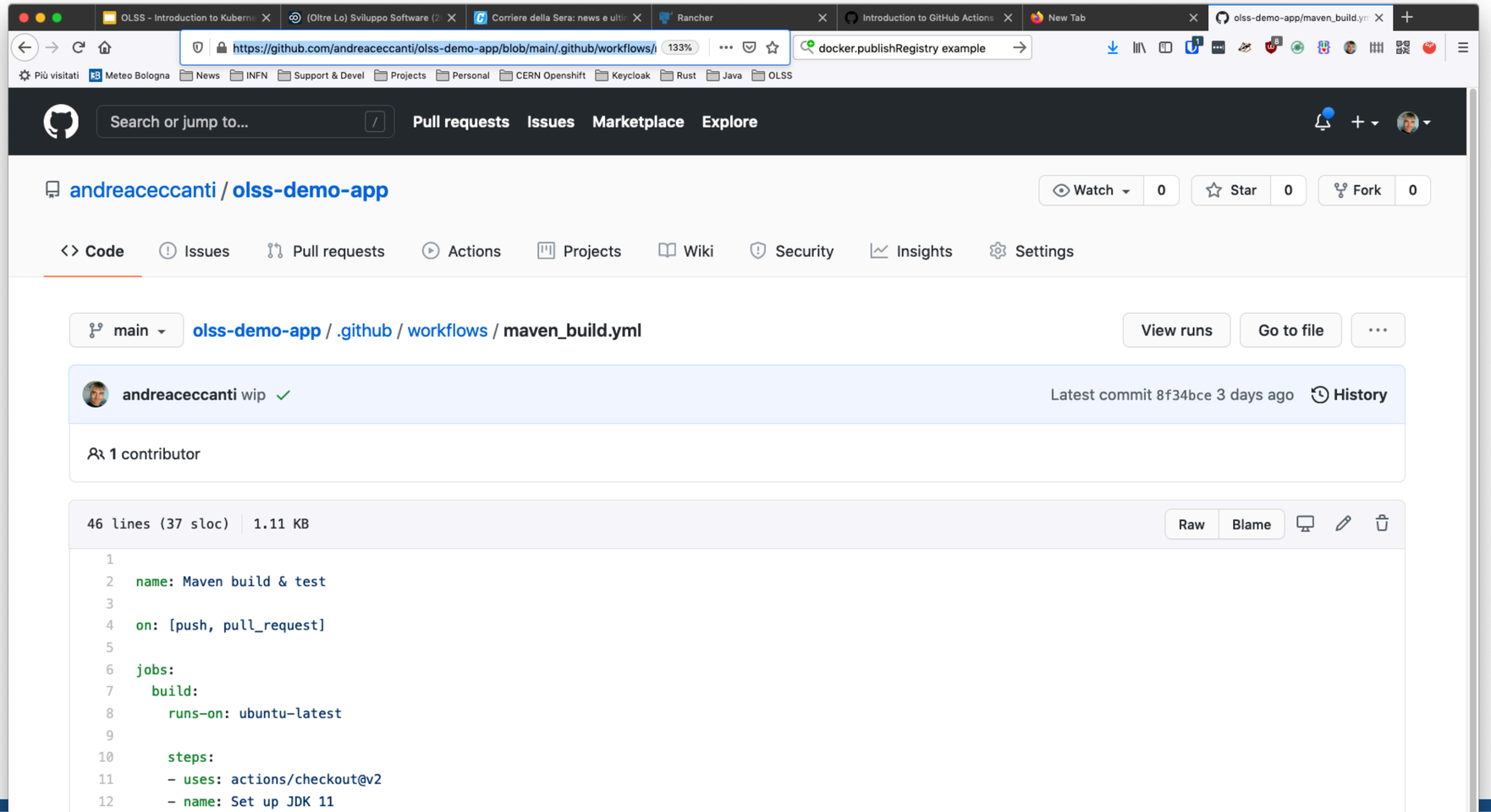
GH Actions provides tools to automate any task on your Github-hosted repository





An example

https://github.com/andreaceccanti/olss-demo-app/blob/main/.github/workflows/maven_build.yml



.github/workflows/maven_build.yml

46 lines (37 sloc) | 1.11 KB

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Workflow name

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Events that trigger this workflow

see https://docs.github.com/en/actions/reference/events-that-trigger-workflows

This workflow will run on every push and pull_request

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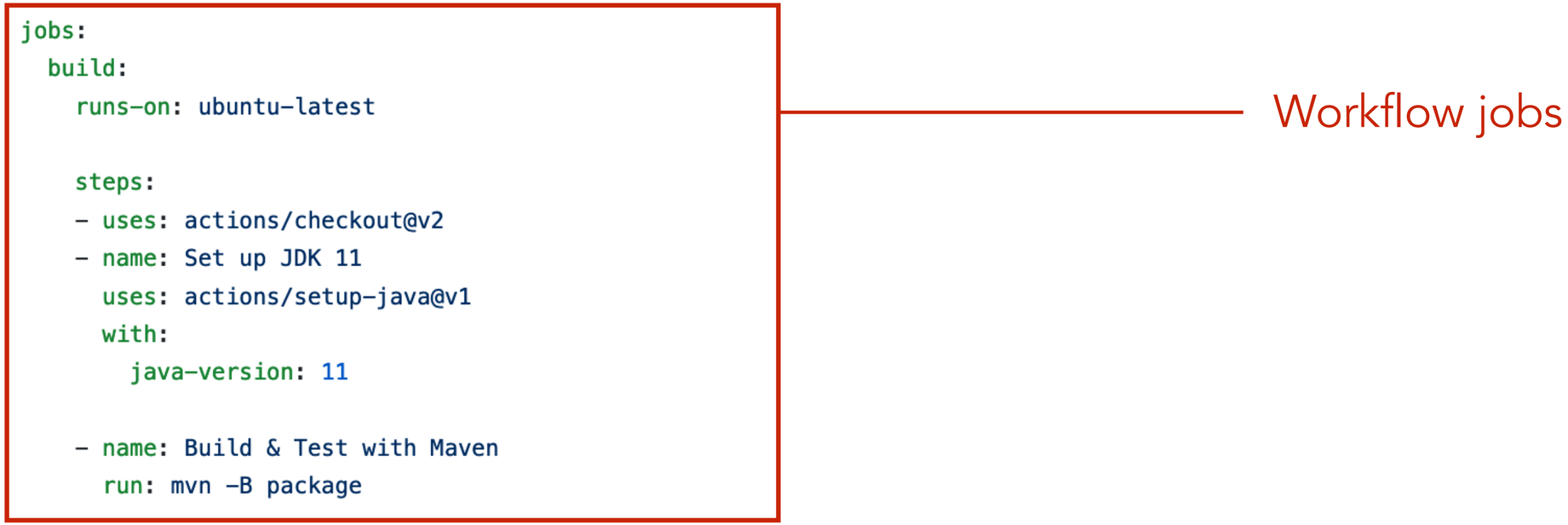

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Jobs

A job is a set of steps that execute on the same runner. By default, a workflow with multiple jobs will run those jobs in parallel. You can also configure a workflow to run jobs sequentially. For example, a workflow can have two sequential jobs that build and test code, where the test job is dependent on the status of the build job. If the build job fails, the test job will not run.

from https://docs.github.com/en/actions/learn-github-actions/introduction-to-github-actions

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The job runs on an ubuntu runner

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The job runs on an ubuntu runner

to know more about runners see:
https://docs.github.com/en/actions/using-github-hosted-runners/about-github-hosted-runners

Supported runners and hardware resources

Hardware specification for Windows and Linux virtual machines:

- 2-core CPU
- 7 GB of RAM memory
- 14 GB of SSD disk space

Hardware specification for macOS virtual machines:

- 3-core CPU
- 14 GB of RAM memory
- 14 GB of SSD disk space

Virtual environment	YAML workflow label
Windows Server 2019	`windows-latest` or `windows-2019`
Windows Server 2016	`windows-2016`
Ubuntu 20.04	`ubuntu-latest` or `ubuntu-20.04`
Ubuntu 18.04	`ubuntu-18.04`
Ubuntu 16.04	`ubuntu-16.04`

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Steps

A step is an individual task that can run commands in a job. A step can be either an *action* or a shell command. Each step in a job executes on the same runner, allowing the actions in that job to share data with each other.

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The first step is the execution of the checkout action, which checks out the code for this repository

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Actions

Actions are standalone commands that are combined into *steps* to create a *job*. Actions are the smallest portable building block of a workflow. You can create your own actions, or use actions created by the GitHub community. To use an action in a workflow, you must include it as a step.

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Then we setup the Java Development Kit version 11 using an already available action

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We provide input parameters to the action using the **with** keyword.
Each action defines its set of allowed input parameter

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The **run** keyword tells the job to execute a command on the runner.
Here we use it to build the codebase using the **mvn** tool, which is installed in the previous step by the setup-java action

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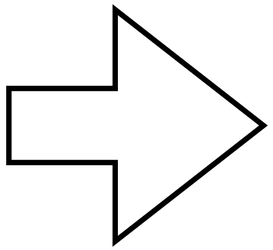

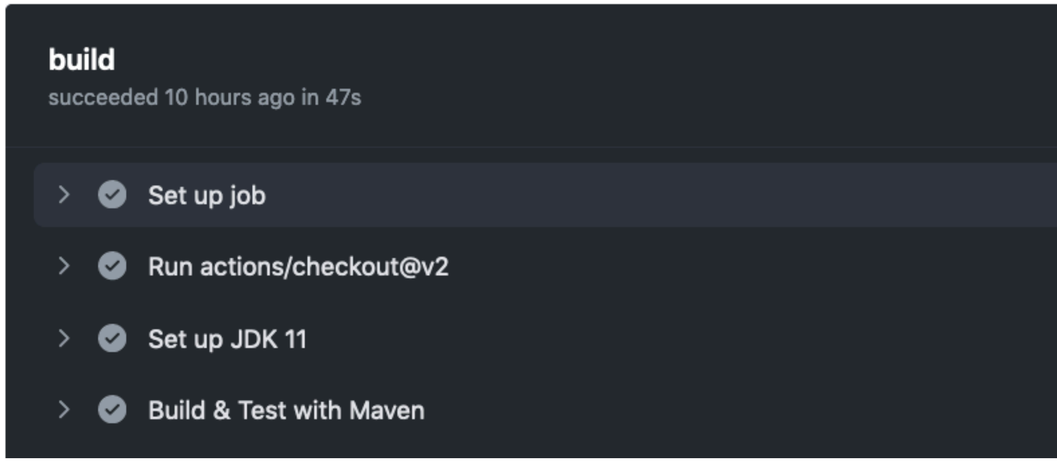

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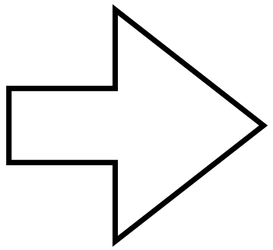

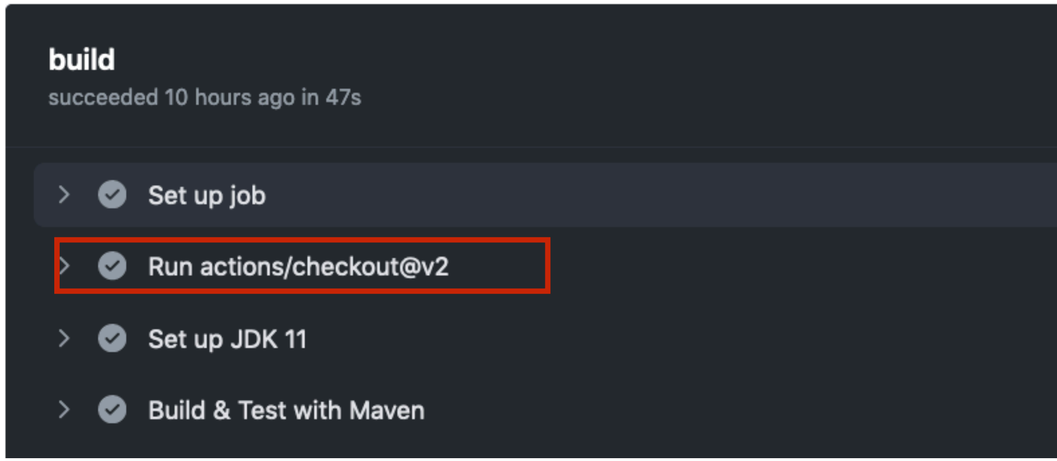

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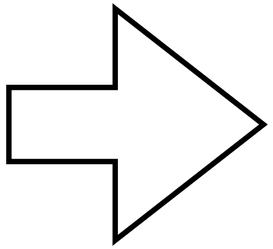

build

succeeded 10 hours ago in 47s

- Set up job
- Run actions/checkout@v2

```
1   ▸ Run actions/checkout@v2
11  Syncing repository: ***/olss-demo-app
12  ▸ Getting Git version info
16  Deleting the contents of '/home/runner/work/olss-demo-app/olss-demo-a
17  ▸ Initializing the repository
31  ▸ Disabling automatic garbage collection
33  ▸ Setting up auth
39  ▸ Fetching the repository
144 ▸ Determining the checkout info
145 ▸ Checking out the ref
149 /usr/bin/git log -1 --format='%H'
150 'b0a6d1bd515b3d62eb91afb991cd4325481853ae'
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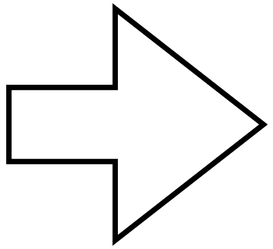

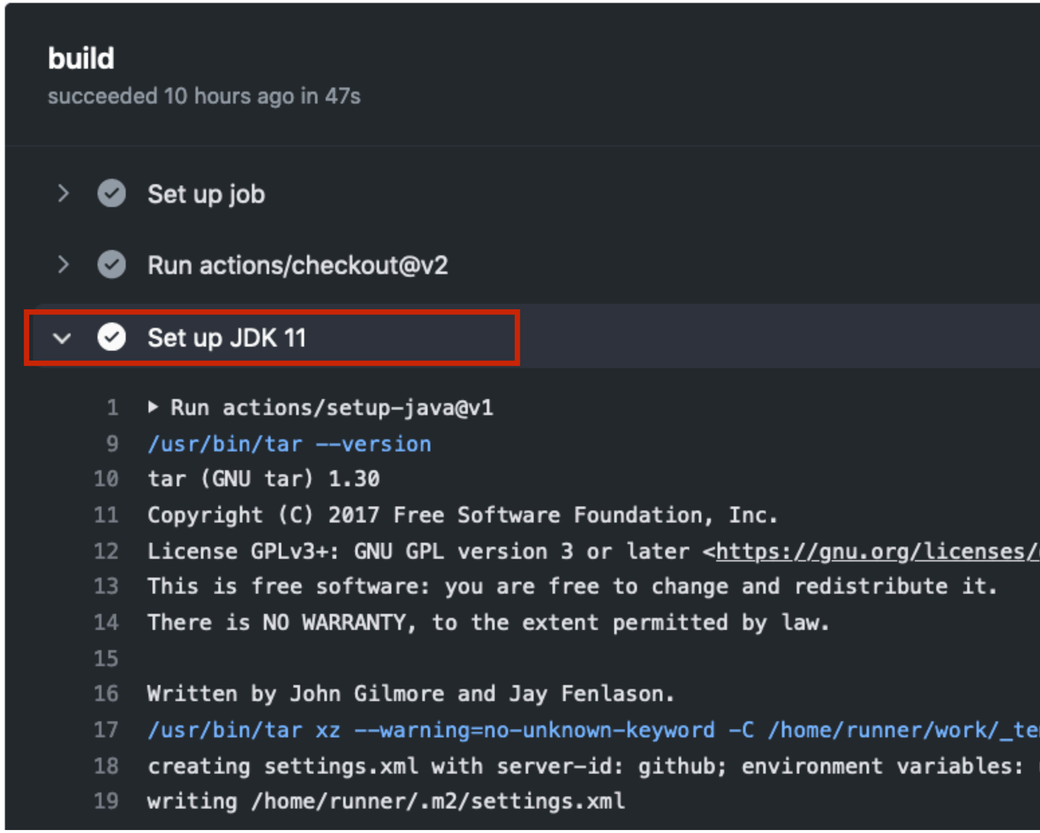

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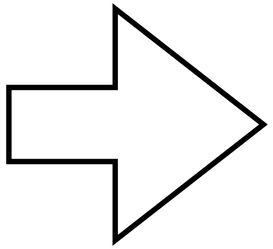

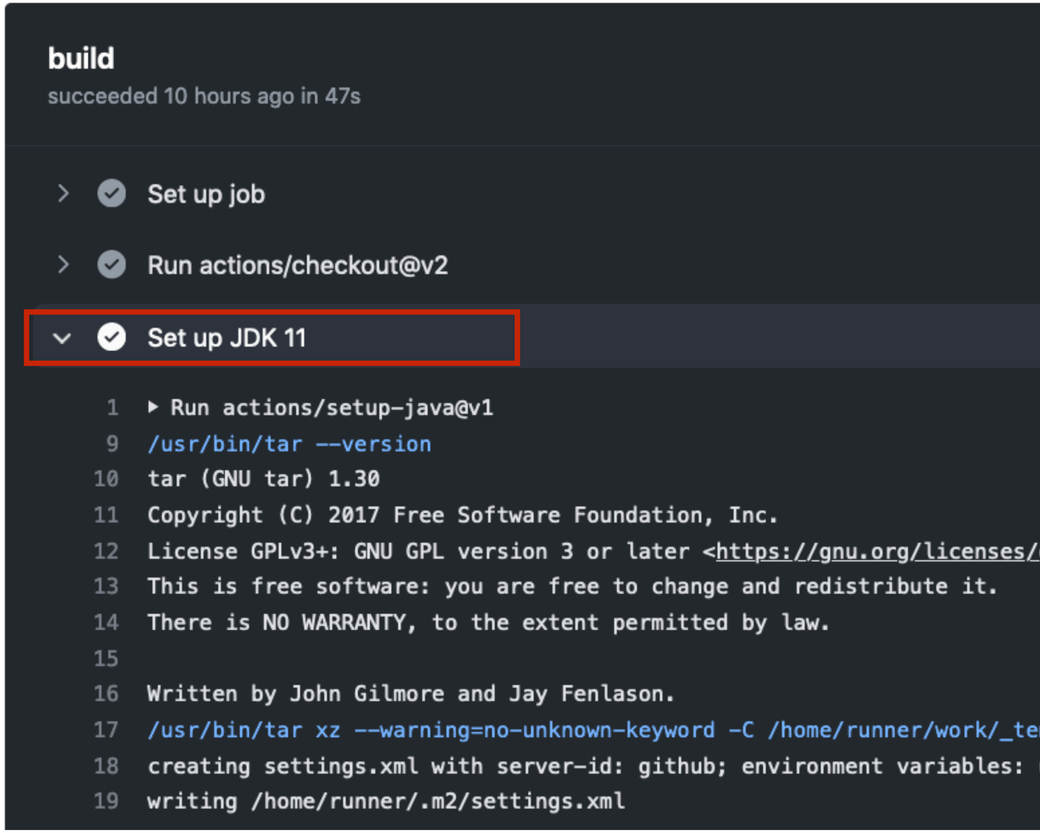

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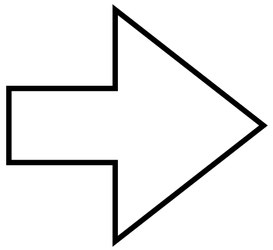

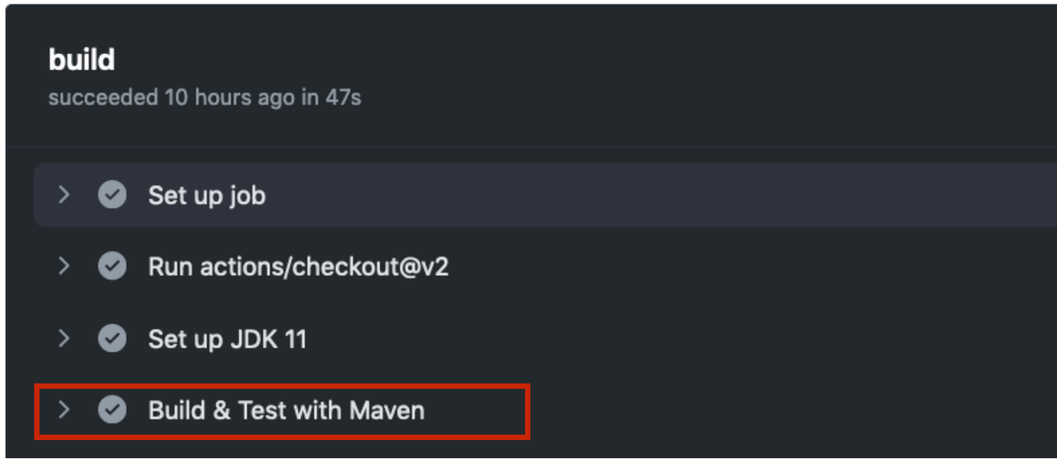

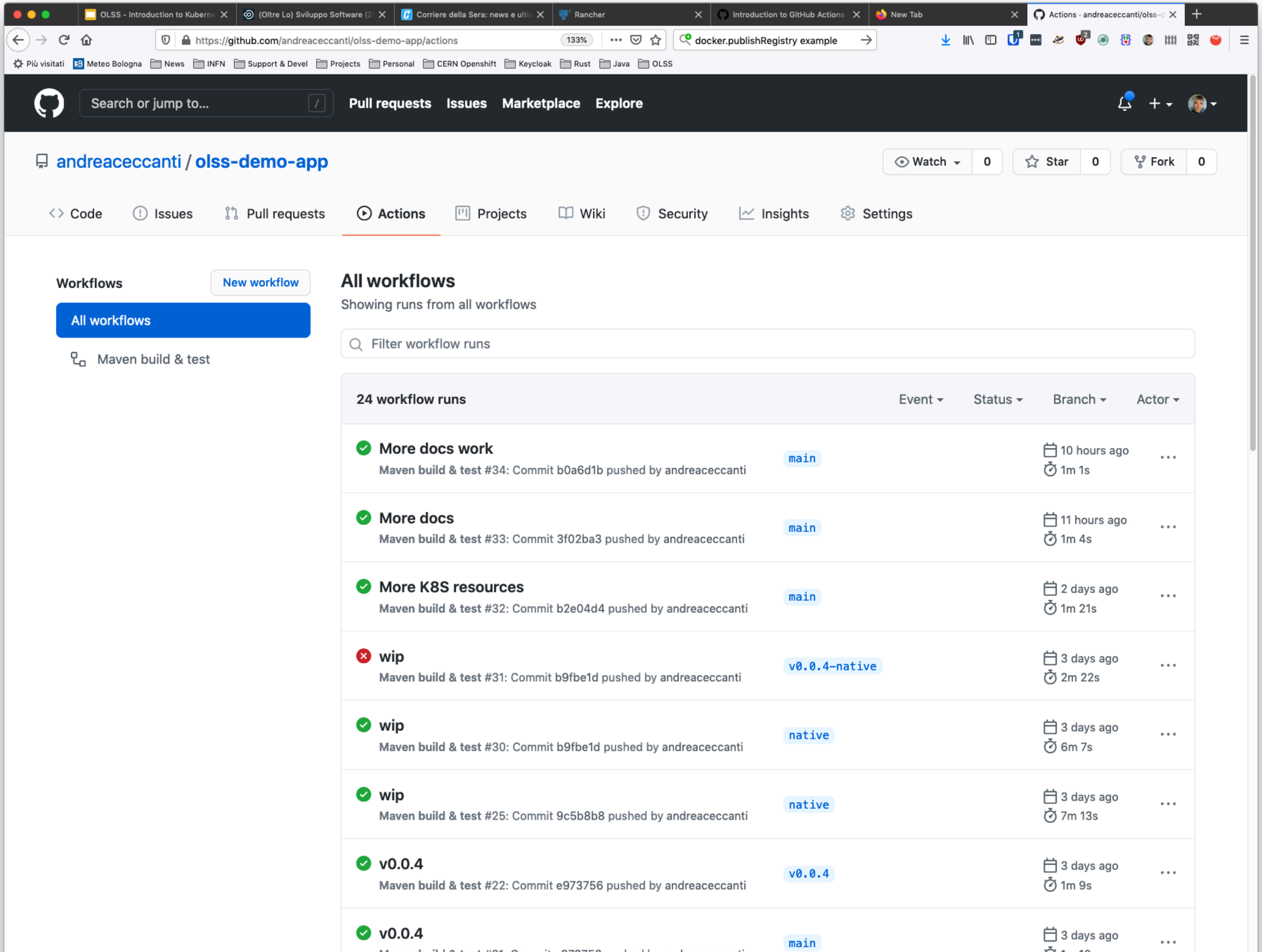
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Actions
Projects
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Actor
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v0.0.4-native
3 days ago
2m 22s
wip
Maven build & test #30: Commit b9fbe1d pushed by andreaceccanti
native
3 days ago
6m 7s
wip
Maven build & test #25: Commit 9c5b8b8 pushed by andreaceccanti
native
3 days ago
7m 13s
v0.0.4
Maven build & test #22: Commit e973756 pushed by andreaceccanti
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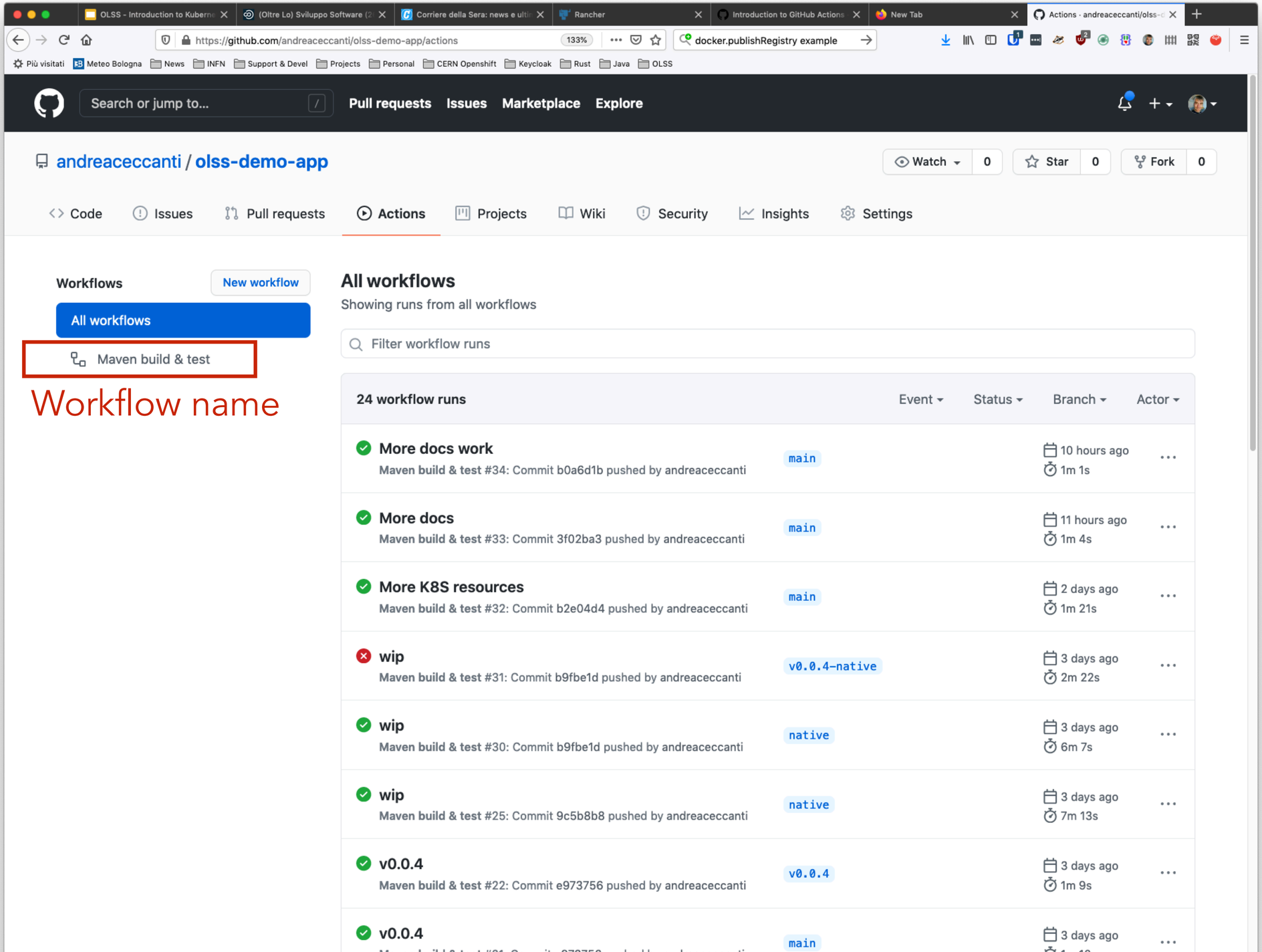
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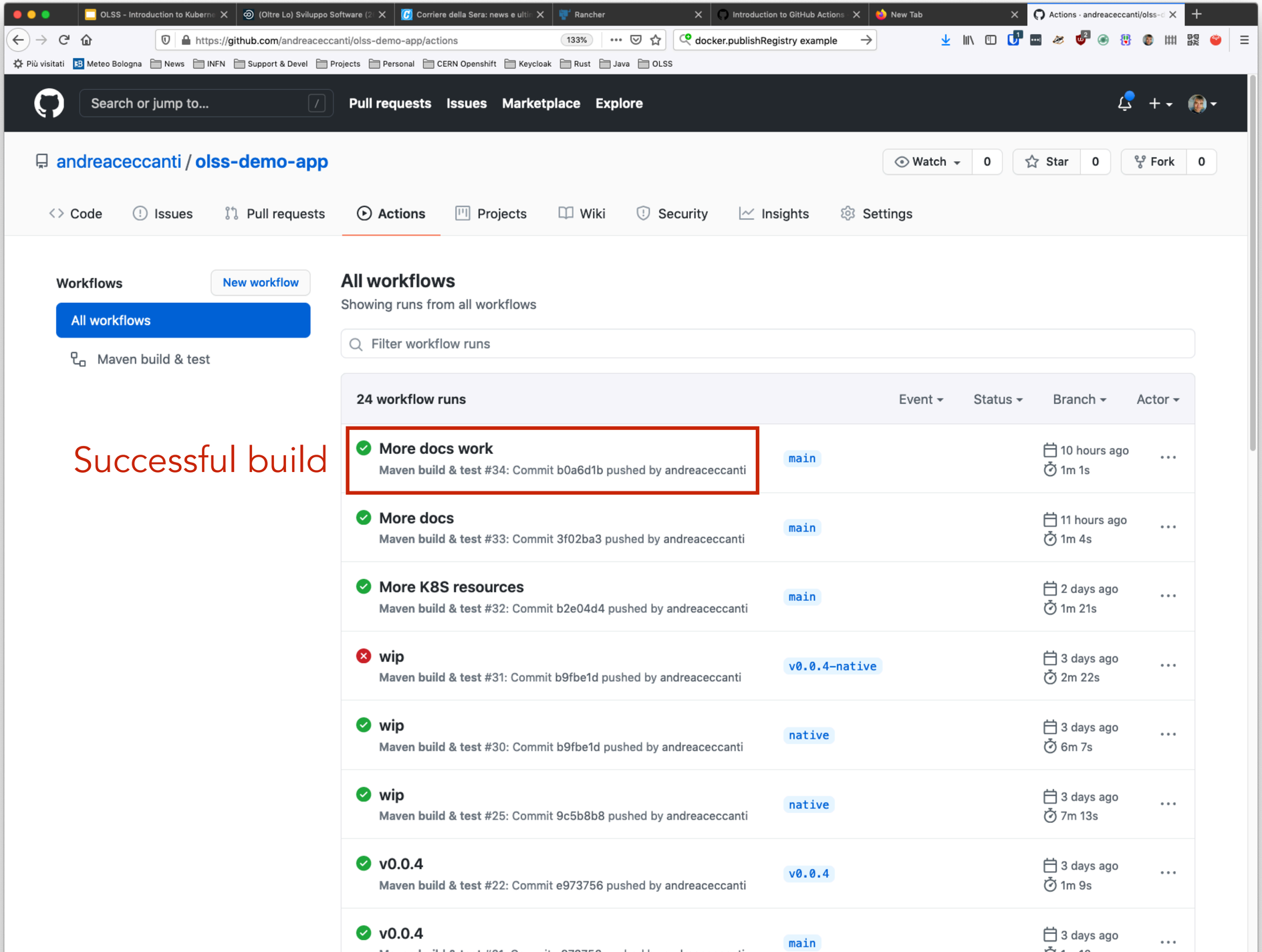
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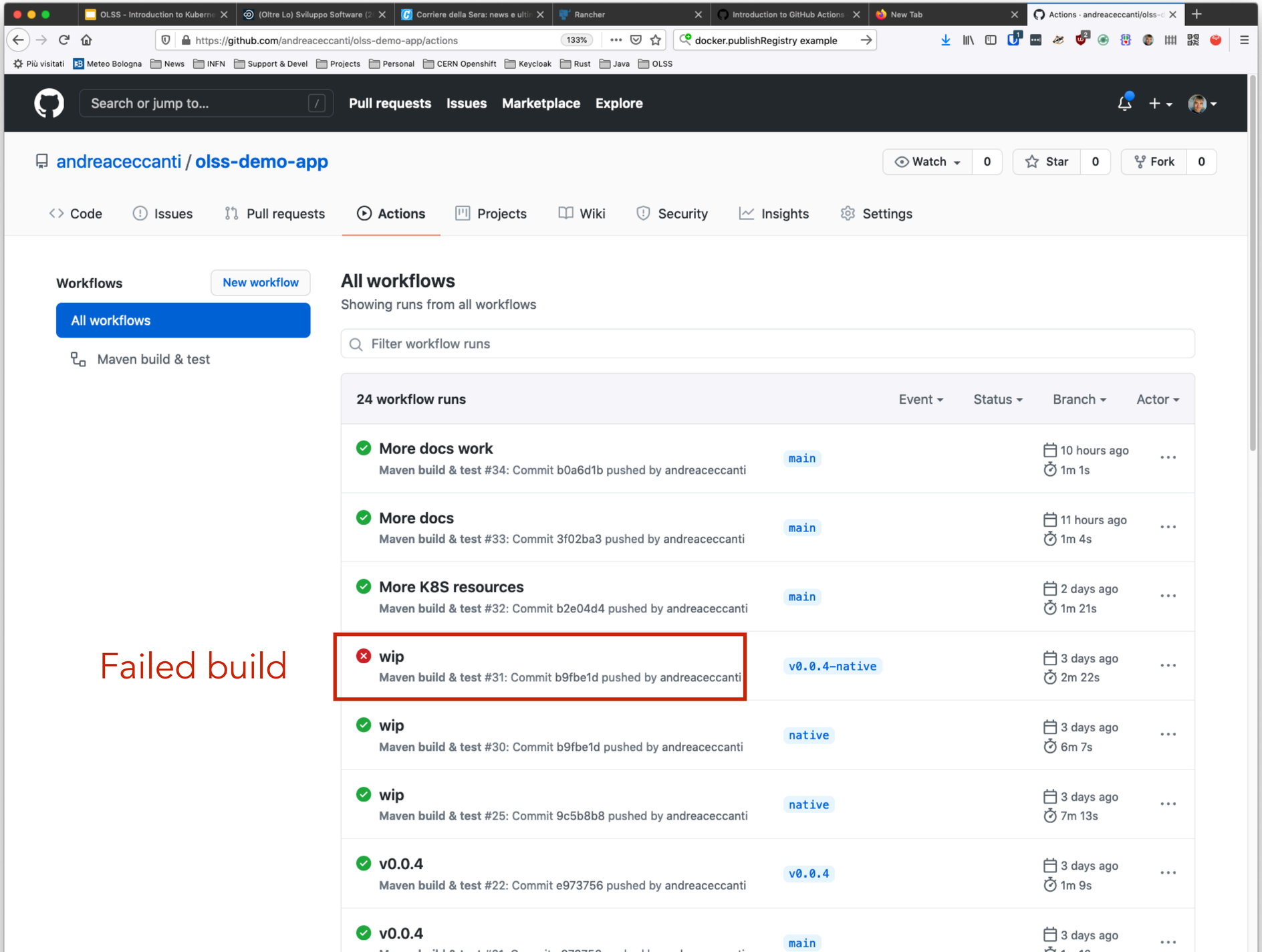
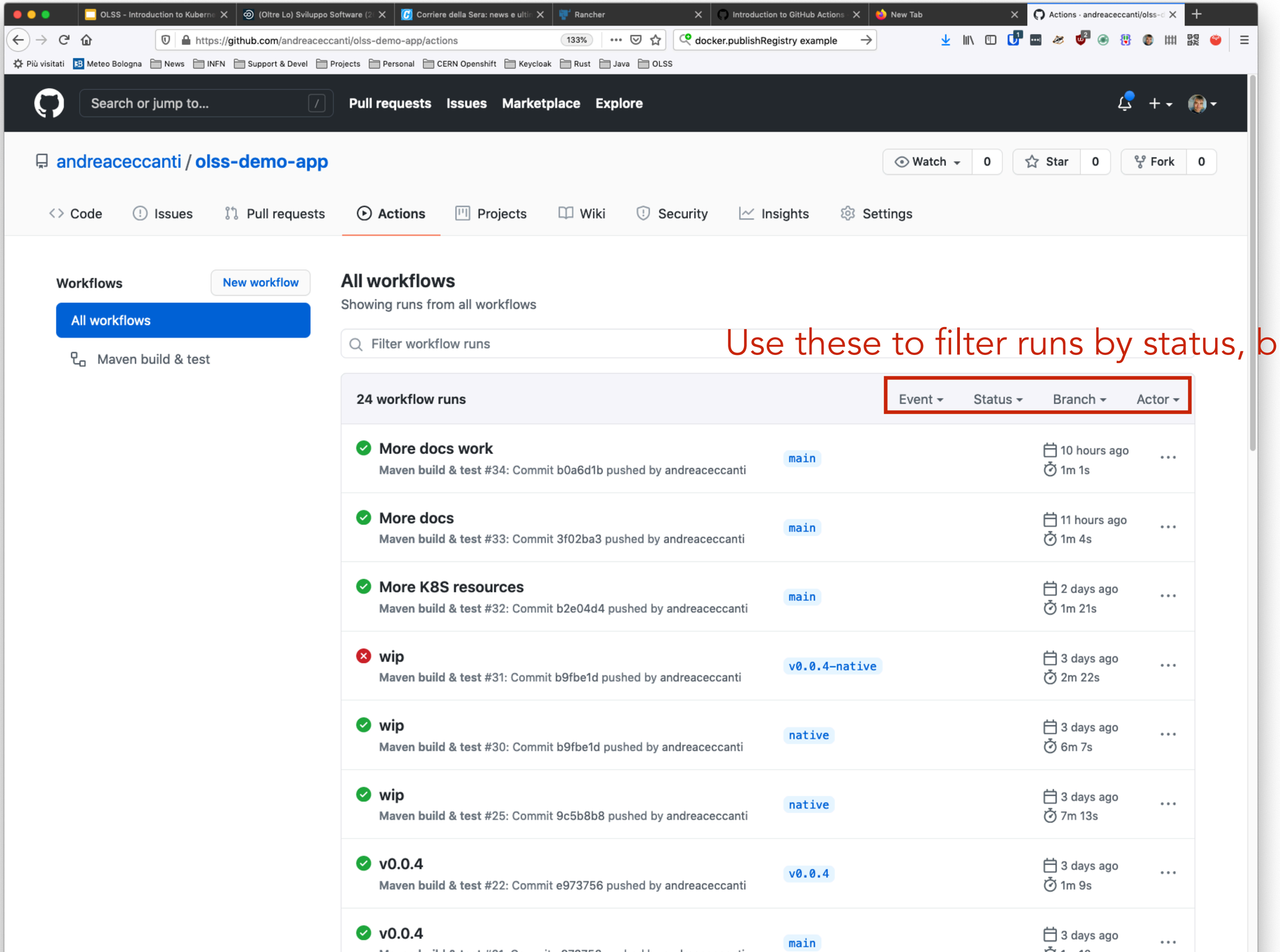

https://github.com/andreaceccanti/olss-demo-app/actions
Search or jump to...
Pull requests
Issues
Marketplace
Explore
andreaceccanti / olss-demo-app
Watch 0
Star 0
Fork 0
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
Workflows
New workflow
All workflows
Maven build & test
All workflows
Showing runs from all workflows
Filter workflow runs
24 workflow runs
Event
Status
Branch
Actor
More docs work
Maven build & test #34: Commit b0a6d1b pushed by andreaceccanti
main
10 hours ago
1m 1s
More docs
Maven build & test #33: Commit 3f02ba3 pushed by andreaceccanti
main
11 hours ago
1m 4s
More K8S resources
Maven build & test #32: Commit b2e04d4 pushed by andreaceccanti
main
2 days ago
1m 21s
wip
Maven build & test #31: Commit b9fbe1d pushed by andreaceccanti
v0.0.4-native
3 days ago
2m 22s
wip
Maven build & test #30: Commit b9fbe1d pushed by andreaceccanti
native
3 days ago
6m 7s
wip
Maven build & test #25: Commit 9c5b8b8 pushed by andreaceccanti
native
3 days ago
7m 13s
v0.0.4
Maven build & test #22: Commit e973756 pushed by andreaceccanti
v0.0.4
3 days ago
1m 9s
v0.0.4
main
3 days ago
Failed build


https://github.com/andreaceccanti/olss-demo-app/actions
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andreaceccanti / olss-demo-app
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New workflow
All workflows
Maven build & test
All workflows
Showing runs from all workflows
Filter workflow runs
Use these to filter runs by status, branch etc..
24 workflow runs
Event
Status
Branch
Actor
More docs work
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main
10 hours ago
1m 1s
More docs
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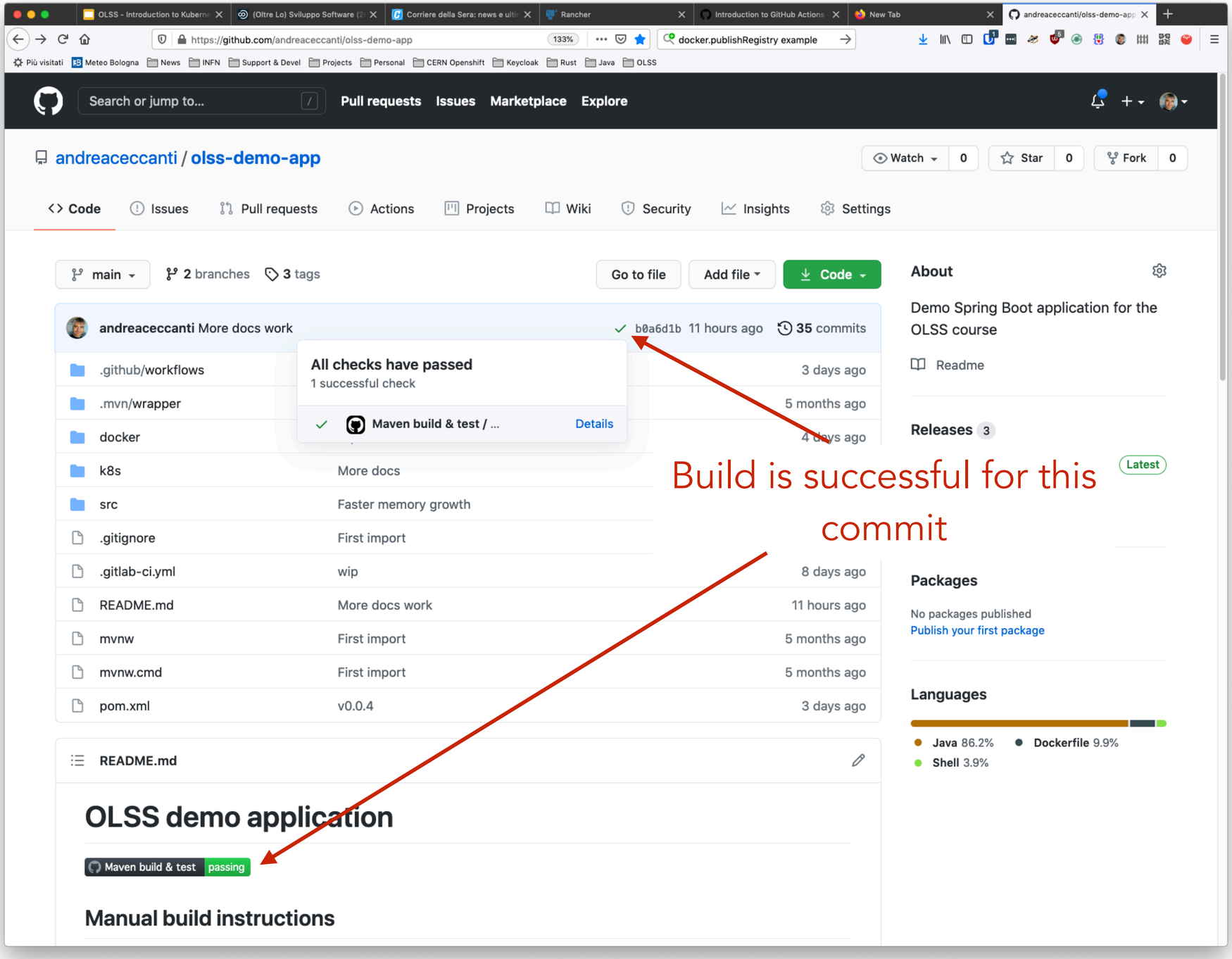
3 days ago
1m 9s
v0.0.4
main
3 days ago


Search or jump to...
Pull requests
Issues
Marketplace
Explore
andreaceccanti / olss-demo-app
Watch 0
Star 0
Fork 0
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
main
2 branches
3 tags
Go to file
Add file
Code
andreaceccanti More docs work
b0a6d1b 11 hours ago
35 commits
All checks have passed
1 successful check
Maven build & test / ...
Details
.github/workflows 3 days ago
.mvn/wrapper 5 months ago
docker
k8s More docs
src Faster memory growth
.gitignore First import
.gitlab-ci.yml wip 8 days ago
README.md More docs work 11 hours ago
mvnw First import 5 months ago
mvnw.cmd First import 5 months ago
pom.xml v0.0.4 3 days ago
README.md
OLSS demo application
Maven build & test passing
Manual build instructions
About
Demo Spring Boot application for the OLSS course
Readme
Releases 3
Latest
Packages
No packages published
Publish your first package
Languages
Java 86.2%
Dockerfile 9.9%
Shell 3.9%
Build is successful for this commit

Triggers

- **GitHub API events** ⚡
  `push`, `pull_request`, `issues`, `release`, and 20 others
- **Schedule** 🕒
  Cron syntax, e.g.: `*/15 * * * *`
- **Manual** 🌐
  POST to /repos/:owner/:repo/dispatches

Triggers

```yaml
# Trigger on push events on s
pecific branches
on:
  push:
    branches:
      - 'master'
      - 'release/*'
```

```yaml
# Trigger on manual dispatch
on: repository_dispatch
```

```yaml
# Trigger every midnight UTC
on:
  schedule:
    - cron: '0 0 * * *'
```

```yaml
# Trigger when an issue is opened o
r labeled
on:
  issues:
    types: [opened, labeled]
```

Referencing actions

- By GitHub repository
  `{owner}/{repo}@{ref}` — `jessfraz/branch-cleanup-action@master`
  `{owner}/{repo}/{path}@{ref}` — `johndoe/my-actions/push-image@v1`
- By file path
  `./path/to/dir` — `./.github/actions/my-action`
- By Docker image
  `docker://{image}:{tag}` — `docker://hello-world:latest`

Advanced configurations

Matrices

Ubuntu-16.04	Ubuntu-18.04
Node v6	Node v6
Node v8	Node v8
Node v10	Node v10

```yaml
name: Matrix Reloaded

on: [push]

jobs:
  build:
    runs-on: ${{ matrix.os }}

    strategy:
      max-parallel: 4
      matrix:
        os: [ubuntu-16.04, ubuntu-18.04]
        node-ver: [6, 8, 10]

    steps:
      - uses: actions/setup-node@v1
        with:
          node-version: ${{ matrix.node-ver }}
```

Reference variables from the matrix

Docker containers

```yaml
jobs:
  build:
    runs-on: ubuntu-latest

    services:
      redis:
        image: redis
        ports:
        - 6379/tcp
        options: --entrypoint redis-server

    steps:
      - uses: actions/checkout@v1

      - run: node client.js
        env:
          REDIS_HOST: localhost
          REDIS_PORT: ${{ job.services.redis.ports[6379] }}
```

Image from the Docker registry

Bind port 6379 in container to a random port on host

Custom arguments passed to `docker create`

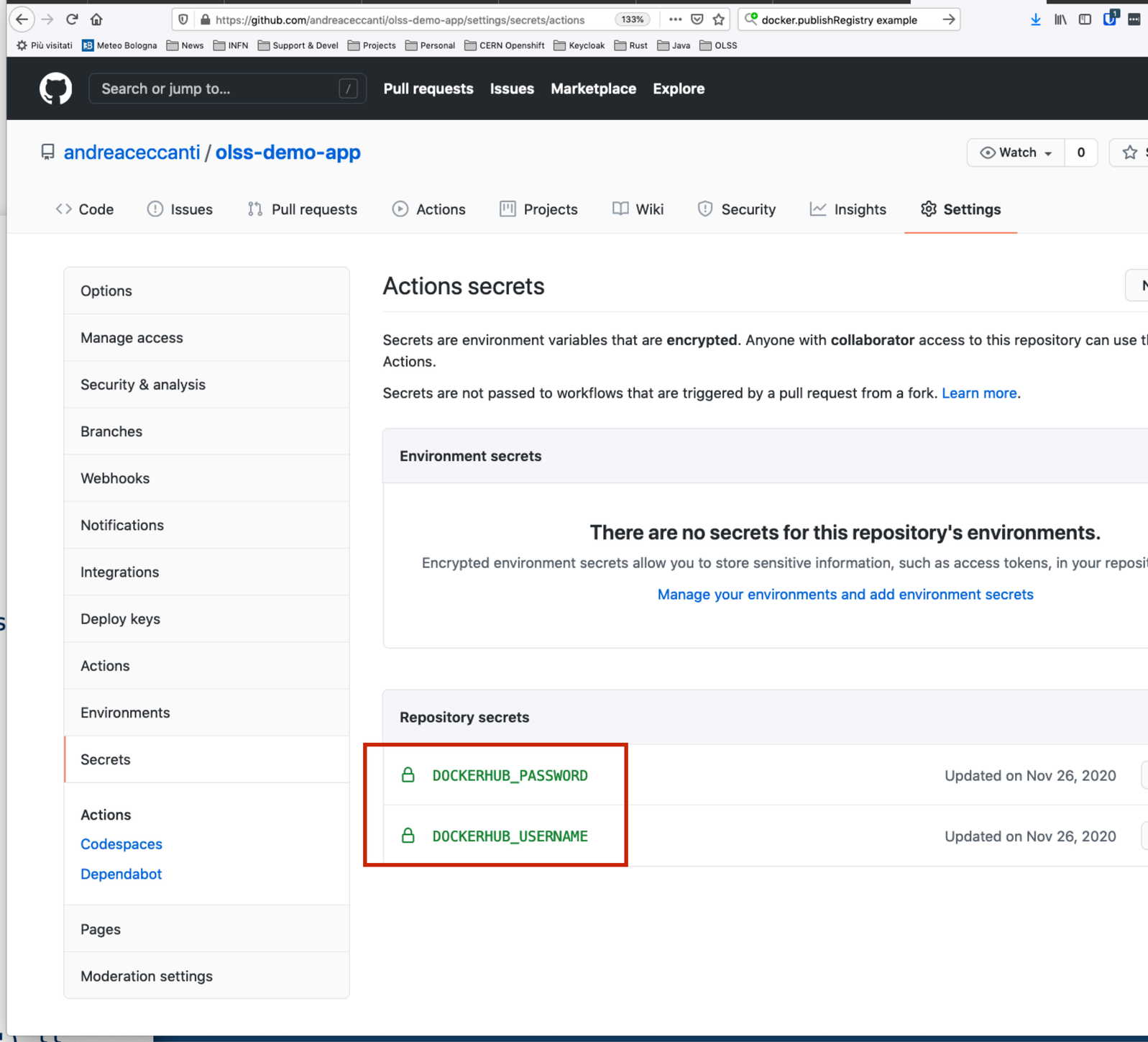
Exposed port is resolved dynamically

Secrets

```yaml
- name: Login to Dockerhub
  uses: docker/login-action@v1
  with:
    username: ${{ secrets.DOCKERHUB_USERNAME }}
    password: ${{ secrets.DOCKERHUB_PASSWORD }}

- name: Docker meta
  id: docker_meta
  uses: crazy-max/ghaction-docker-meta@v2
  with:
    images: ${{ secrets.DOCKERHUB_USERNAME }}/ols
    tags: |
      type=sha
      type=semver,pattern={{raw}}
      type=ref,event=branch

- name: Build & Push image
  uses: docker/build-push-action@v2
  with:
    context: .
    file: docker/Dockerfile
    push: ${{ startsWith(github.ref, 'refs/tags/') }}
```



Action to action I/O

```yaml
- name: Create release
  id: create_release
  uses: actions/create-release@v1
  env:
    GITHUB_TOKEN: ${{ secrets.GITHUB_TOKEN }}
  with:
    tag_name: ${{ github.ref }}
    release_name: ${{ github.ref }}

- name: Upload release asset
  uses: actions/upload-release-asset@v1.0.1
  env:
    GITHUB_TOKEN: ${{ secrets.GITHUB_TOKEN }}
  with:
    upload_url: ${{ steps.create_release.outputs.upload_url }}
    asset_path: DiscordChatExporter/bin/Publish/Archive.zip
    asset_name: DiscordChatExporter.zip
```

Actions can be referenced by their ID

Resolved from the outputs of another action

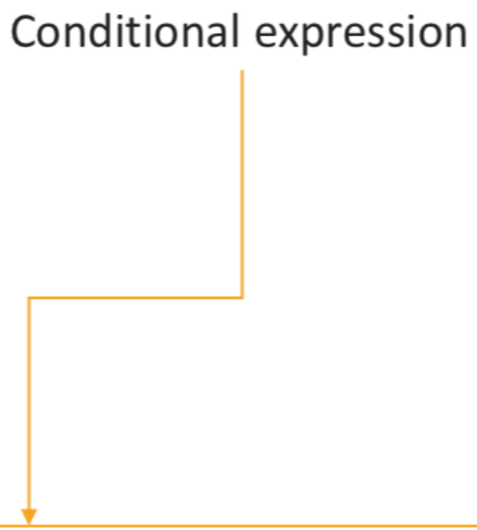
Conditionals

```yaml
jobs:
  build:
    runs-on: ubuntu-18.04

    steps:
    - uses: actions/checkout@v1
    - uses: actions/setup-dotnet@v1
      with:
        dotnet-version: 3.1.100

    - run: dotnet test src
    - run: dotnet pack src

    - if: github.event_name == 'push' && startsWith(github.ref, 'refs/tags/v')
      run: dotnet nuget push src/**.nupkg -k ${{secrets.NUGET_TOKEN}}
```



Things that can be done with GH actions

Run tests on every commit

Publish docker image when a tag is published

Label an issue by content when it’s created

Run nightly E2E tests

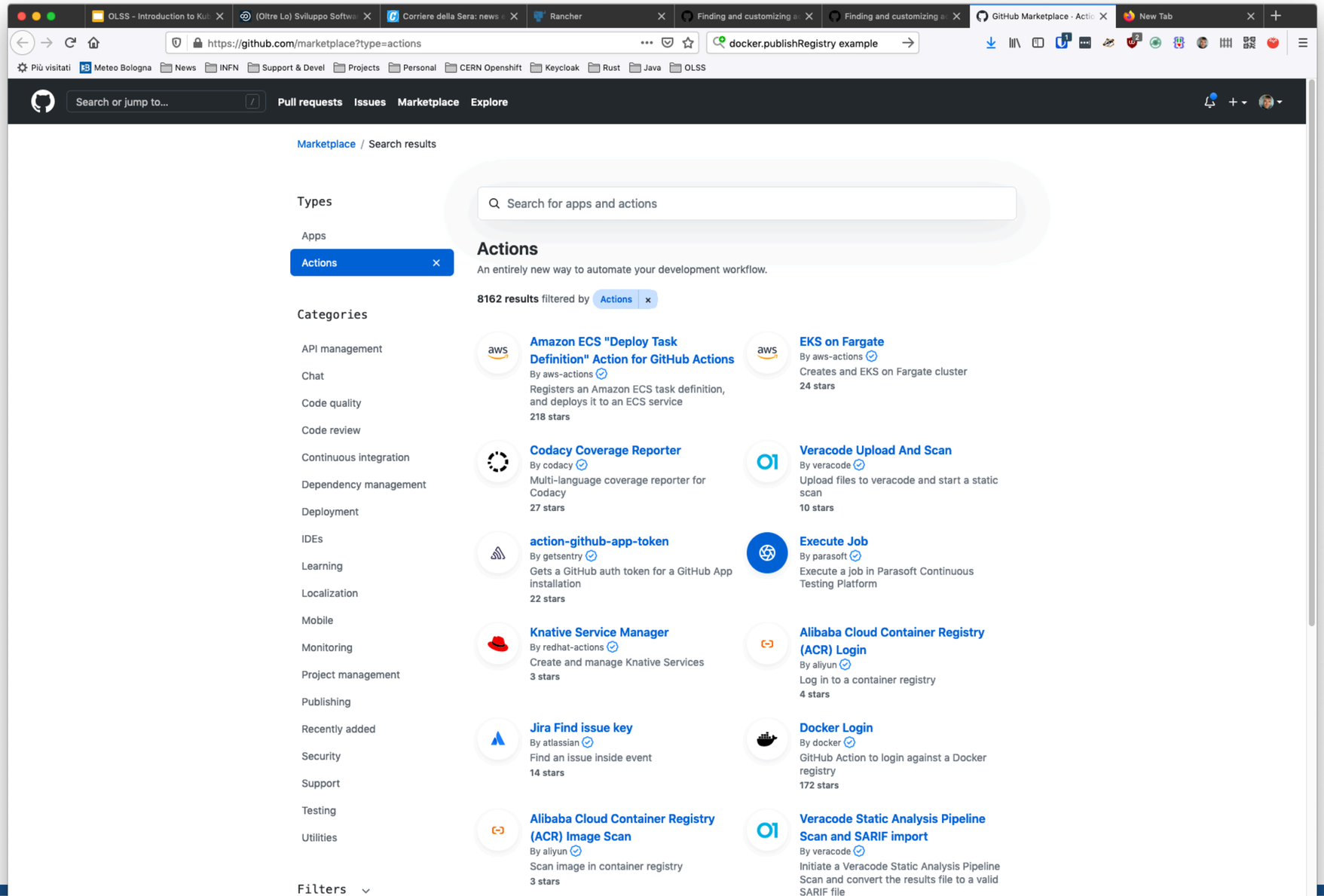
Automatically close stale issues every week

Invite new contributors to sign the CLA when a PR is opened

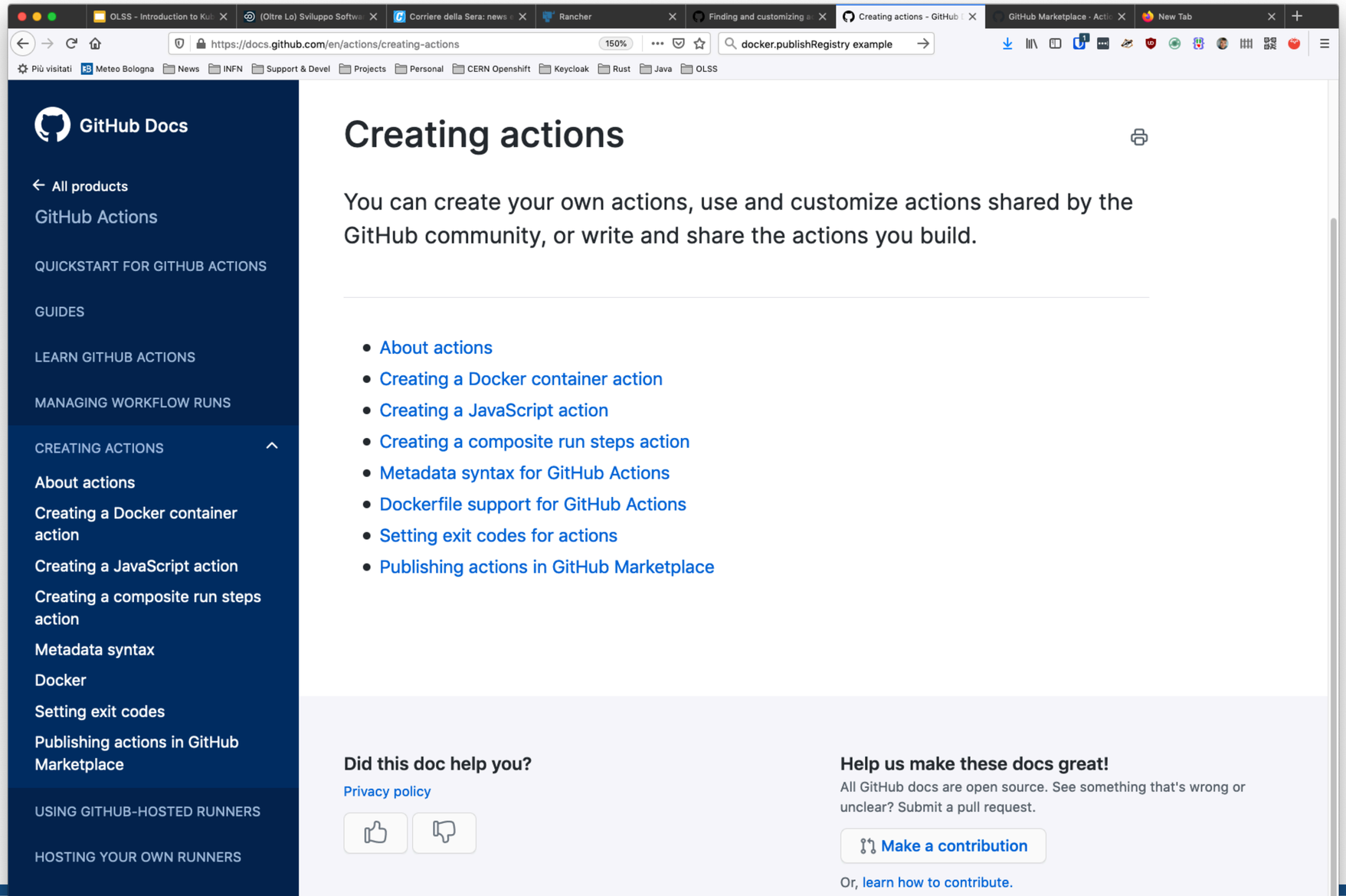
Automatically format the code on push

…

Discovering actions



Making your own actions



Hands on

Fork the olss-demo-app repo:

https://github.com/andreaceccanti/olss-demo-app

Add a workflow that adds the `olss` label to any issue opened against your fork

Hint:

https://github.com/marketplace/actions/auto-label