Github Actions

An event-driven tool to automatically respond to particular GitHub events.

Introduction

We'll explore GitHub Actions and its role in enhancing software development. From automating tasks to facilitating continuous integration and deployment, GitHub Actions provides a comprehensive solution to streamline your workflow.

What are GitHub Actions?

In essence, GitHub Actions are customizable workflows enabling task automation within your repository. This empowers you to automate specific steps whenever events occur in your repository, enhancing efficiency and productivity.

Solution for continuous integration/deployment:

GitHub Actions serves as an ideal solution for continuous integration and deployment (CI/CD). It allows you to configure workflows that automatically execute tasks like unit tests, integration tests, and artifact building every time new code is pushed, ensuring smooth integration and deployment processes.

What is continuous integration?

CI is fundamental in modern software development, ensuring efficient and reliable practices. Without it, changes made by team members can lead to fragmented code and conflicts during merging. With CI enabled through GitHub Actions, automated workflows trigger predefined tasks upon every event, including running tests and deploying the application, thereby fostering collaboration and trust within the team and reducing the time needed for bug fixes.

What is continuous deployment?

CD consists of the last but most important part of using GitHub Actions, the automatization of the actions themselves. Whenever an event is triggered, a workflow composed of many jobs, each of them composed of different steps (each one being an action) will be executed. These events may range from creating a pull request from making a commit. The jobs are independent between themselves, but each step is not, which allows, for instance, to create something in one step and to test its presence in another.

Ok, but why should I care?

Let’s think of a practical example of why you should use Github actions:

Take for example Dario's webpage and let's focus on all the steps needed to upload any change. The following is required:

- Compile my API maven project by hand
- Connect by ssh to the server and upload the jar
- Stop the current running API
- Run the newly uploaded jar file
- If nothing is broken, there is no way to check it since there are no tests!

We used this example to express one thing: You should use Github actions (or any continuous deployment solution) because all of these steps can be simplified into one (or none) steps!

Of course there are catches to all of this, since there is a limit for the amount of time our github actions can take and after that limit you start being charged. It is about 50 hours a month which is quite enough for a normal user's needs.

Github also allows you to use those 50 hours to run your apps into their own containers, although these are 20 times as expensive as azure's cheapest tier and they don't allow you to choose the location.

Actions also allow you to set up and run your own docker containers, which can help you save some precious runtime minutes.

How are the actions defined?

GitHub provides the users with a syntax that allows for specifying actions. This syntax must be written in .yml files included in the directory ".github/workflows", which can be found in the root folder of every GitHub project.

The language provided by GitHub allows for a very deep control of the actions, as you can define when, how and where they must run as well as what they should do. For example, you can have an action that every time you open a PR, all tests are run.

In addition, you are able to specify the inputs and outputs of the actions, which can be linked this way.

Actions can be difficult to implement as you need to learn this new syntax, which can be tiresome even if you just want to write the simplest of workflows.

But, worry not! As many other times in programming, someone has probably done that before, and you can take advantage of that. GitHub hosts an Action Marketplace where you can use the actions that other people have previously defined.

Bibliography

https://se-radio.net/2023/06/se-radio-567-dave-cross-on-github-actions/
https://docs.github.com/en/actions/using-workflows/workflow-syntax-for-github-actions#jobs
https://docs.github.com/en/actions/quickstart
https://docs.github.com/en/actions/learn-github-actions/understanding-github-actions
https://github.com/marketplace?type=actions