Github Actions vs Gitlab CI

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1 Introduction

Continuous Integration systems are widely used but the features the support are diverse. This paper compares two continuous integration systems: Github Actions[1] and Gitlab CI.[2] To achieve real world comparisions a single project is used and the same solution is implemented using both systems.

2 Building a LaTeX Document

Each of the systems has a different syntax for configuring the steps to perform. Both use YAML but the structure is different. In this example a LaTeX document will be built and the artifact stored so it is available online.

A first (naive) attempt at building a LaTeX document with Github Actions involved several steps (Figure 2)[3].[4] Using the Ubuntu 18.04 image, first the Git repo had to be checked out. Since this is a generic image, the necessary LaTeX packages had to be installed. Make is run which runs pdflatex to build the docs. And finally, the upload-artifact action is run to save the doc.

Building a LaTeX document with Gitlab CI is much simpler (Figure 2)[5].[6] The main reason for this simplification was the use of a Docker image which is setup for building LaTeX documents. The image was found in Gitlab by simply looking through their CI templates. Gitlab provides a wide assortment of templates with Docker images ready to build practically anything.

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[1] *GitHub Actions Documentation.* [Online; accessed 30-April-2020]. URL: https://help.github.com/en/actions.

[2] *GitLab CI/CD Documentation.* [Online; accessed 30-April-2020]. URL: https://docs.gitlab.com/ee/ci/.

[3] *gitlab.com/jmmahler/resume build.yml.* [Online; accessed 30-April-2020]. URL: https://github.com/jmahler/resume/blob/master/.github/workflows/build.yml.

[4] *GitHub resume build job 91697435.* [Online; accessed 30-April-2020]. URL: https://github.com/jmahler/resume/actions/runs/91697435.

[5] *gitlab.com/jmmahler/resume gitlab-ci.yml.* [Online; accessed 30-April-2020]. URL: https://gitlab.com/jmmahler/resume/-/blob/master/.gitlab-ci.yml.

[6] *GitLab resume build job 533777462.* [Online; accessed 30-April-2020]. URL: https://gitlab.com/jmmahler/resume/-/jobs/533777462.

```
 1  # .github/workflows/build.yml
 2
 3  name: Build
 4  on: [push, pull_request]
 5
 6  jobs:
 7     build:
 8        name: Build
 9        runs-on: ubuntu-18.04
10        steps:
11        - name: Checkout
12          uses: actions/checkout@v2
13        - name: Install LaTeX
14          run: |
15             sudo apt install texlive-latex-base
16        - name: Make Doc
17          run: |
18             make
19        - name: Upload PDFs
20          uses: actions/upload-artifact@v2
21          with:
22             name: linux-packaging
23             path: linux-packaging.pdf
```

Figure 1: Build of a LaTeX doc using Github Actions.

```
 1  # gitlab-ci.yml
 2
 3  image: blang/latex
 4
 5  build:
 6     script:
 7        - make
 8     artifacts:
 9        paths:
10           - "*.pdf"
```

Figure 2: Build of a LaTeX doc using GitLab CI.

Could the Github Actions implementation be simplified by using the Docker image that Gitlab CI is using? Not really. The design of GitHub Actions is such that the Docker image must be defined inside it's own `-action` repo.[7] Then this action can be used from the workflow file (Figure 2). Conceptually, the worflow file controls the virtual machine that is being run, the action controls the Docker image.

For building a LaTeX document, GitLab is the simpler solution. GitHub requires more setup and more boiler plate code to get an equivalent solution working.

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[7] *Creating a Docker container action - GitHub Help.* [Online; accessed 01-May-2020]. URL: https://help.github.com/en/actions/building-actions/creating-a-docker-container-action.

```
 1  diff --git a/.github/workflows/build.yml b/.github/workflows/build.yml
 2  index ed84053..36f8f3c 100644
 3  --- a/.github/workflows/build.yml
 4  +++ b/.github/workflows/build.yml
 5  @@ -8,12 +8,10 @@ jobs:
 6        steps:
 7        - name: Checkout
 8          uses: actions/checkout@v2
 9  -      - name: Install LaTeX
10  -        run: |
11  -          sudo apt install texlive-latex-base
12        - name: Make Doc
13  -        run: |
14  -          make
15  +        uses: xu-cheng/latex-action@master
16  +        with:
17  +          root_file: linux-packaging.tex
18        - name: Upload PDFs
19          uses: actions/upload-artifact@v2
20          with:
```

Figure 3: Changes needed to use Docker with a GitHub action.

References

Creating a Docker container action - GitHub Help. [Online; accessed 01-May-2020]. URL: `https://help.github.com/en/actions/building-actions/creating-a-docker-container-action`.

GitHub Actions Documentation. [Online; accessed 30-April-2020]. URL: `https://help.github.com/en/actions`.

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gitlab.com/jmmahler/resume build.yml. [Online; accessed 30-April-2020]. URL: `https://github.com/jmahler/resume/blob/master/.github/workflows/build.yml`.

gitlab.com/jmmahler/resume gitlab-ci.yml. [Online; accessed 30-April-2020]. URL: `https://gitlab.com/jmmahler/resume/-/blob/master/.gitlab-ci.yml`.