



Continuous Integration (CI)

Alejandro García Perdomo (alu0101312101)

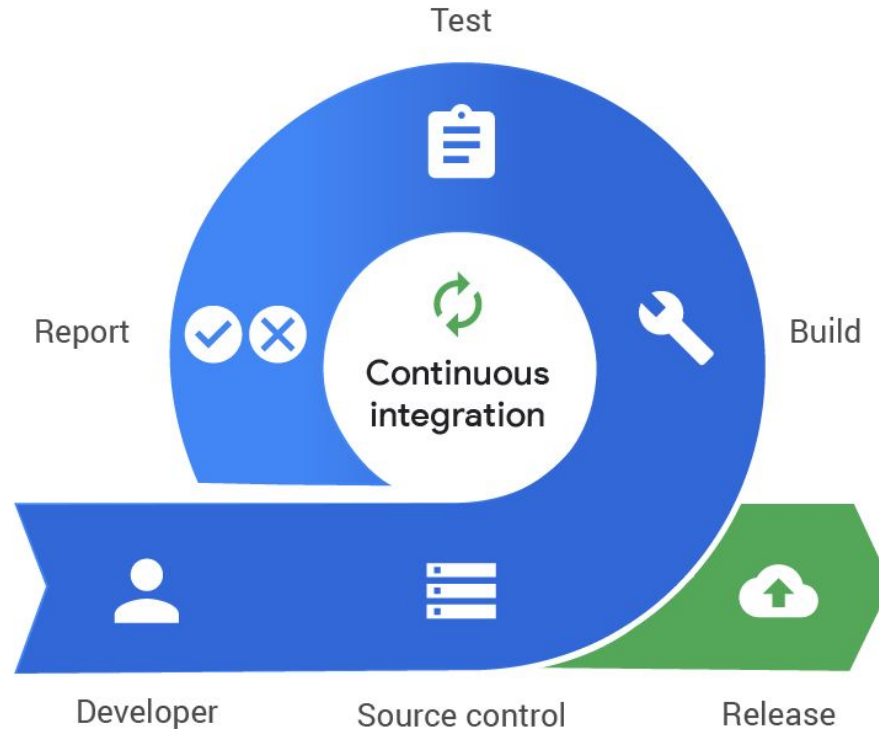
Jorge Cabrera Rodríguez (alu0101351773)



Tips to be covered

1. Introduction
 - a. An example
2. What is CI
3. Advantages and disadvantages
4. CI vs CDep vs CDeI
5. Phases of CI
6. CircleCI
 - a. Creating an account
 - b. Basic concepts
 - c. Workflows
 - d. Jobs
 - e. Step
 - f. Relevant features

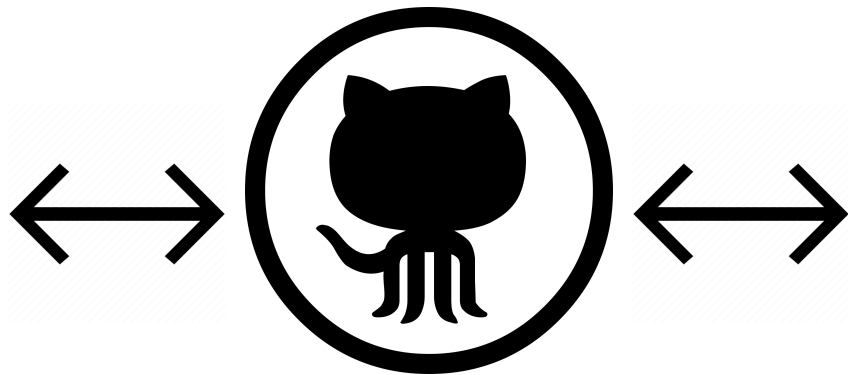
A brief introduction to CI



An introduction example



Alice



Bob

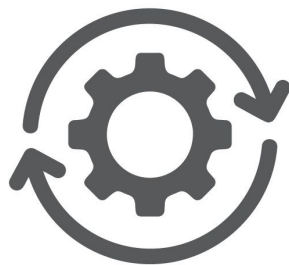



What is CI?

Development practice where developers **integrate code** into a shared repository **frequently**.



Each integration can then be verified by an **automated build** and **automated tests**.





*“Continuous Integration doesn’t get rid of bugs, but it
does make them dramatically easier to find and
remove.”*

-Martin Fowler-

Advantages and Disadvantages



Advantages

- Merging is much easier.
- There is always executable code.
- Bugs are easier to find.
- More communication between team members.

Disadvantages

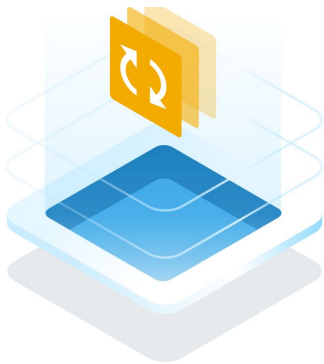
- May be slower.
- Needs a lot of push and pull actions.



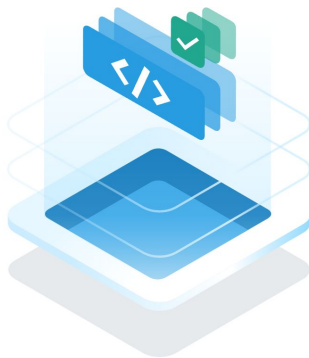
Continuous Integration
VS
Continuous Deployment
VS
Continuous Delivery

Differences between each model

**Continuous
Integration (CI)**



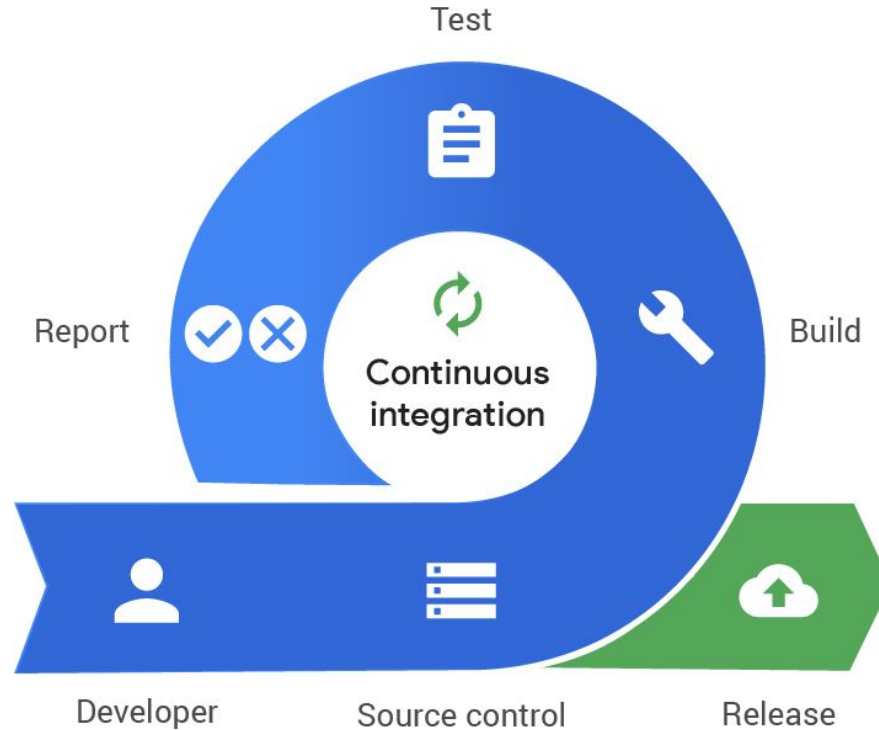
**Continuous
Deployment (CD)**



**Continuous
Delivery (CD)**



Phases of CI





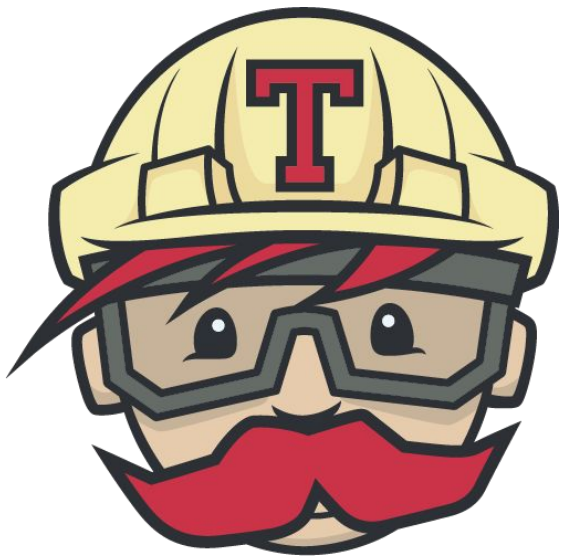
Tools for CI



GitHub Actions



Jenkins

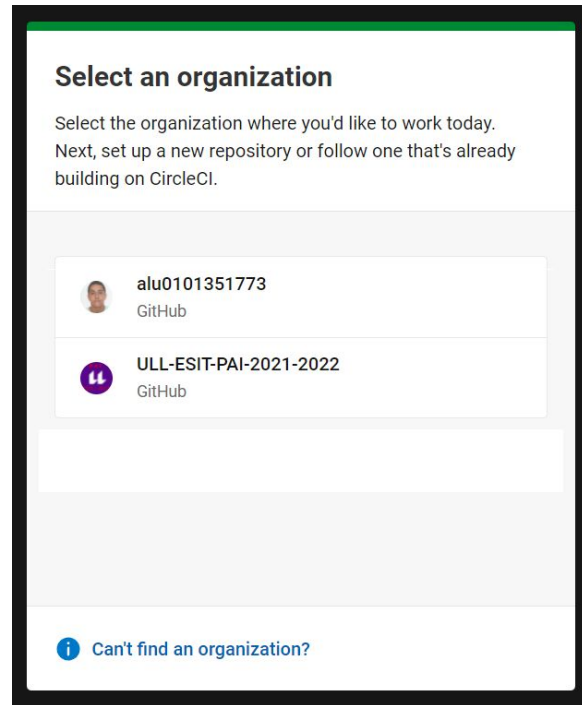
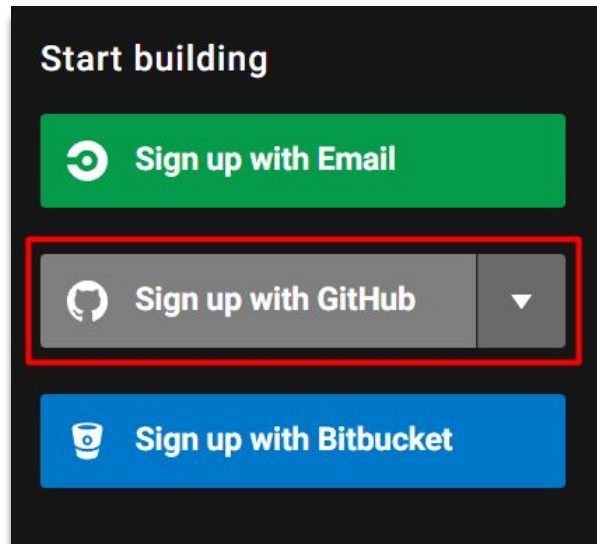
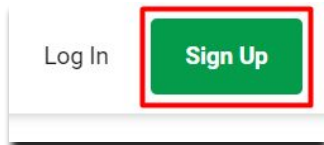


Travis CI

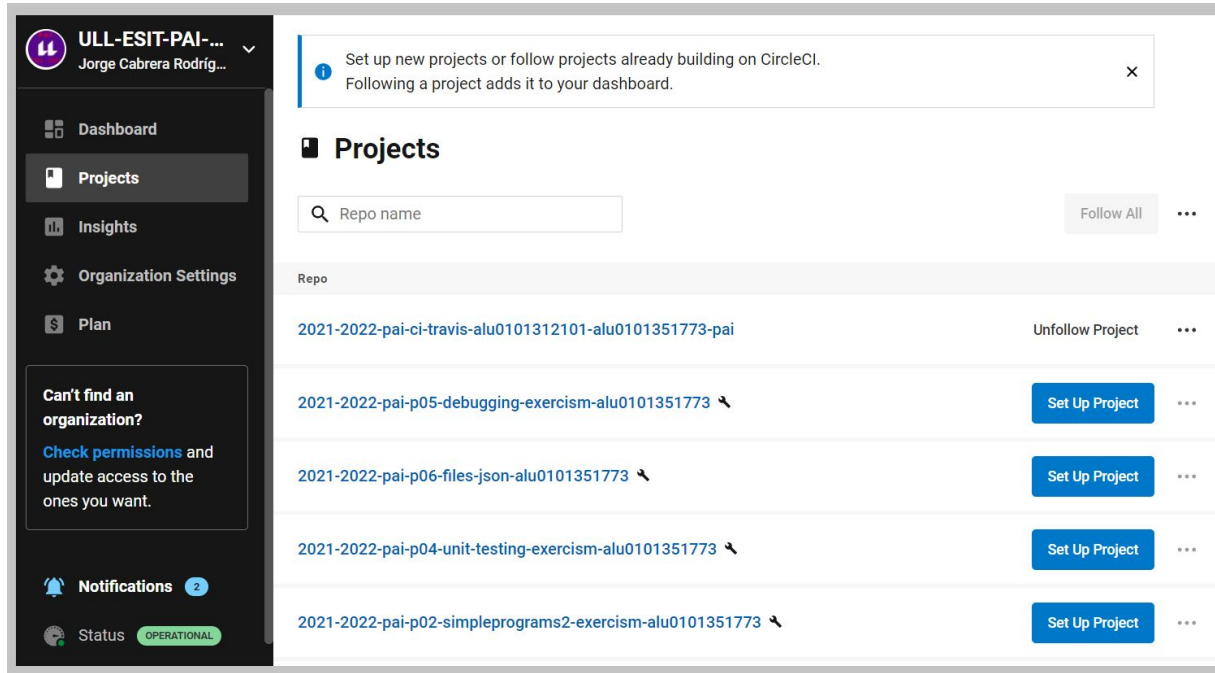


circleci

Creating an account



Setting up a repo



The screenshot displays the CircleCI dashboard for the organization 'ULL-ESIT-PAI-...' managed by Jorge Cabrera Rodríguez. The left sidebar contains navigation links for Dashboard, Projects (selected), Insights, Organization Settings, and Plan. A status bar at the bottom indicates the system is 'OPERATIONAL'. The main content area features a notification about setting up new projects, a 'Projects' section with a search bar, and a list of existing projects. Each project entry includes a 'Set Up Project' button and an 'Unfollow Project' option.

ULL-ESIT-PAI-...
Jorge Cabrera Rodríg...

Dashboard
Projects
Insights
Organization Settings
Plan

Can't find an organization?
[Check permissions](#) and update access to the ones you want.

Notifications 2

Status OPERATIONAL

Set up new projects or follow projects already building on CircleCI.
Following a project adds it to your dashboard.

Projects

Repo name

Follow All ...

Repo	
2021-2022-pai-ci-travis-alu0101312101-alu0101351773-pai	Unfollow Project ...
2021-2022-pai-p05-debugging-exercism-alu0101351773	Set Up Project ...
2021-2022-pai-p06-files-json-alu0101351773	Set Up Project ...
2021-2022-pai-p04-unit-testing-exercism-alu0101351773	Set Up Project ...
2021-2022-pai-p02-simpleprograms2-exercism-alu0101351773	Set Up Project ...

Main page of our CI

[Dashboard](#) [Project](#)

[All Pipelines](#) > [2021-2022-pai-ci-travis-alu0101312101-alu0101351773-pai](#)

[2021-2022-pai-ci-travis-alu0101312101-alu0101351773-pai](#) [Add team members](#)

[Edit Config](#) [Trigger Pipeline](#) [Project Settings](#)

Filters

Everyone's Pipelines

2021-2022-pai-ci-travi...

All Branches

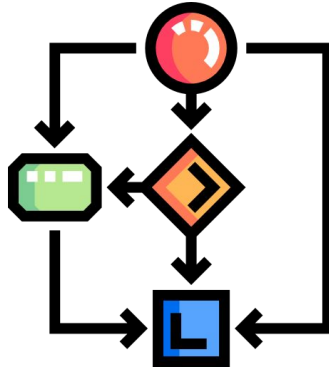
Pipeline	Status	Workflow	Branch / Commit	Start
2021-2022-pai-ci-travis-alu0101312101-alu0101351773-pai 66	Success	upload-to-codecov	codecov-orb 244e9ad act README	5m ago
Jobs	Success codecov 89			
2021-2022-pai-ci-travis-alu0101312101-alu0101351773-pai	Success	test_only	test-and-artifacts 9731e6f 2 workflows	36m ago

CI basic concepts

Pipelines



Workflows




Jobs



Steps



Workflows

Pipeline	Status	Workflow
2021-2022-pai- ci-travis- alu0101312101- alu0101351773- pai 64	▼  Success	build_and_artifacts

Jobs

 **test_only** ✓ Success

Duration / Finished

 21s / 8m ago


Branch

 [test-and-artifacts](#)

Commit

 [9731e6f](#)

Author & Message

 2 workflows

✓ tests

18s

Steps

STEPS

TESTS 16

TIMING BETA

ARTIFACTS

RESOURCES NEW

1 / 16 parallel runs ⓘ

▶ ✓ Spin up environment

3s

↗

↓

▶ ✓ Preparing environment variables

0s

↗

↓

▶ ✓ Checkout code

0s

↗

↓

▶ ✓ npm i

11s

↗

↓

▶ ✓ npm run test

1s

↗

↓

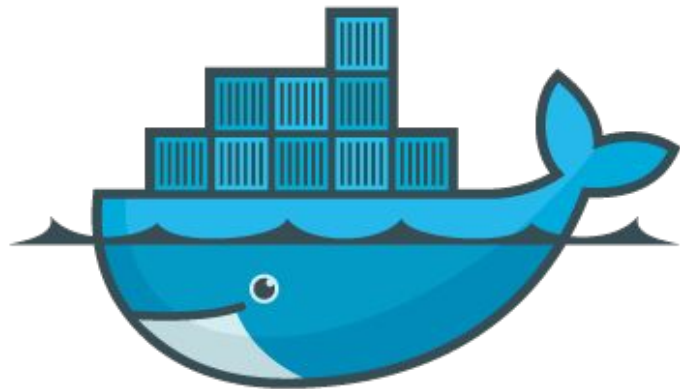
▶ ✓ Uploading test results

0s

↗

↓

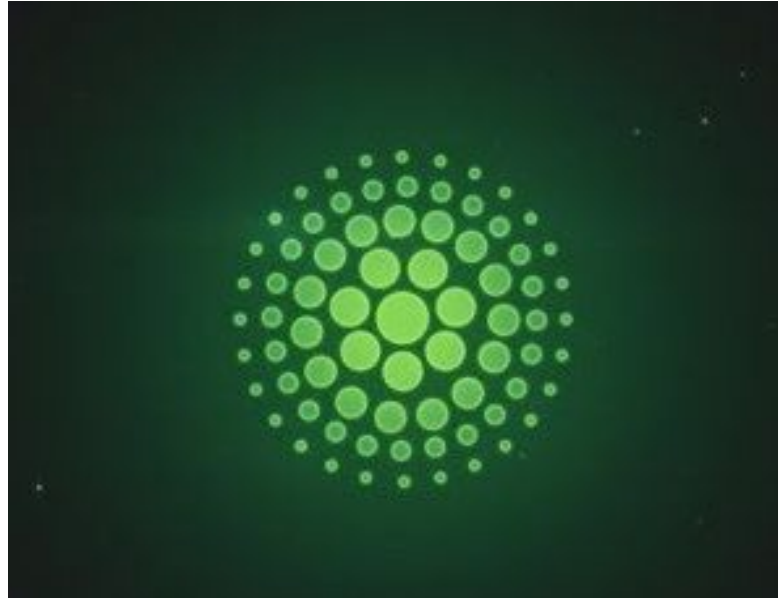
Workflows and jobs



docker

Workflows and jobs

Orbs





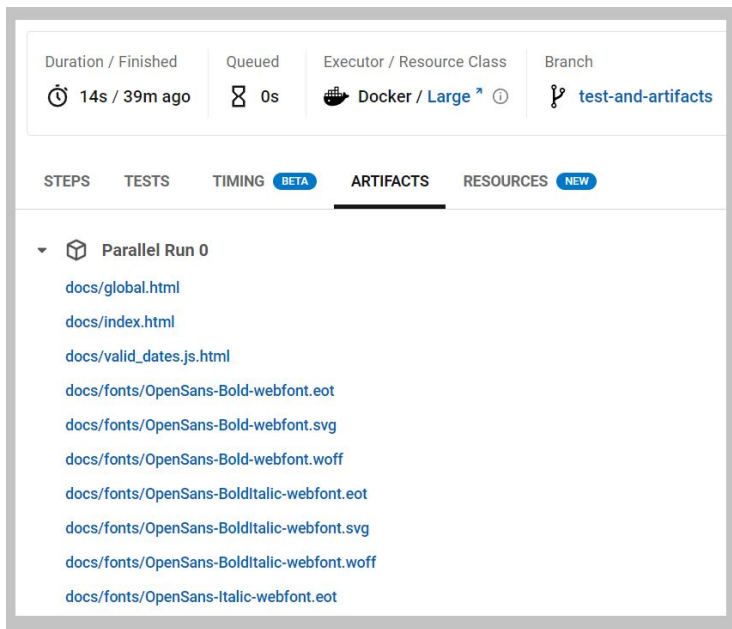
Relevant features

Test and Documentation



Relevant features

Artifacts

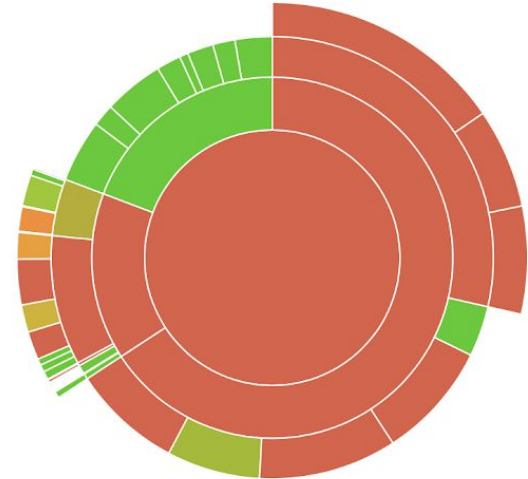


The screenshot displays the Jenkins interface for the 'Artifacts' tab of a build. At the top, a summary bar shows the build's status and details: 'Duration / Finished' (14s / 39m ago), 'Queued' (0s), 'Executor / Resource Class' (Docker / Large), and 'Branch' (test-and-artifacts). Below this, a navigation bar includes tabs for 'STEPS', 'TESTS', 'TIMING' (marked BETA), 'ARTIFACTS' (selected), and 'RESOURCES' (marked NEW). The main content area, titled 'Parallel Run 0', lists the following artifacts:

- docs/global.html
- docs/index.html
- docs/valid_dates.js.html
- docs/fonts/OpenSans-Bold-webfont.eot
- docs/fonts/OpenSans-Bold-webfont.svg
- docs/fonts/OpenSans-Bold-webfont.woff
- docs/fonts/OpenSans-BoldItalic-webfont.eot
- docs/fonts/OpenSans-BoldItalic-webfont.svg
- docs/fonts/OpenSans-BoldItalic-webfont.woff
- docs/fonts/OpenSans-Italic-webfont.eot

Relevant features

Code coverage



Other interesting features

Environment Variables

... declared with the `environment` key for a job

```
jobs:
  build-job:
    docker:
      - image: cimg/base:2020.01
    environment:
      LITTLE_CORVETTE: red
```

Context

Context: `my-context`

```
$MY_ENV_VAR = myvalue
```

```
jobs:
  build:
    docker:
      - image: <image-name>:<version TAG>
    steps: # use env var from Context
      - run: echo $MY_ENV_VAR
```

Other interesting features

Multiple Branches Execution

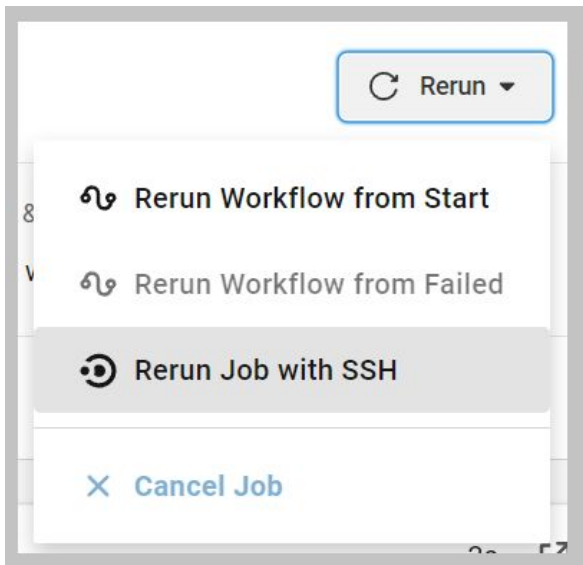
```
filters:  
  branches:  
    only:  
      - dev  
      - /user-.*/
```

Job approval

```
- hold:  
  type: approval  
  requires:  
    - build  
    - test  
- deploy:  
  requires:  
    - hold
```

Other interesting features

SHH



Schedules

```
nightly:
  triggers:
    - schedule:
        cron: "0 0 * * *"
        filters:
```

Bibliografía



- YT Video - [What is Continuous Integration?](#)
- Wikipedia - [Continuous Integration definition](#)
- [Another definition of CI and its uses](#)
- [CircleCI](#)
- [CircleCI getting started](#)
- [14 Examples of CI tools](#)

Bibliografía (CircleCI)



- [Workflows](#)
- [Orbs](#)
- [Docker](#)
- [Store test results](#)
- [Artifacts](#)
- [Code Coverage](#)



Questions ?

alejandro.garcia.perdomo.18@ull.edu.es

cabrera.rodriguez.12@ull.edu.es