CONTINUOUS INTEGRATION

In Web Application Development
with Vanilla TypeScript

PROGRAMMING INTERACTIVE APPLICATIONS

OUR TEAM

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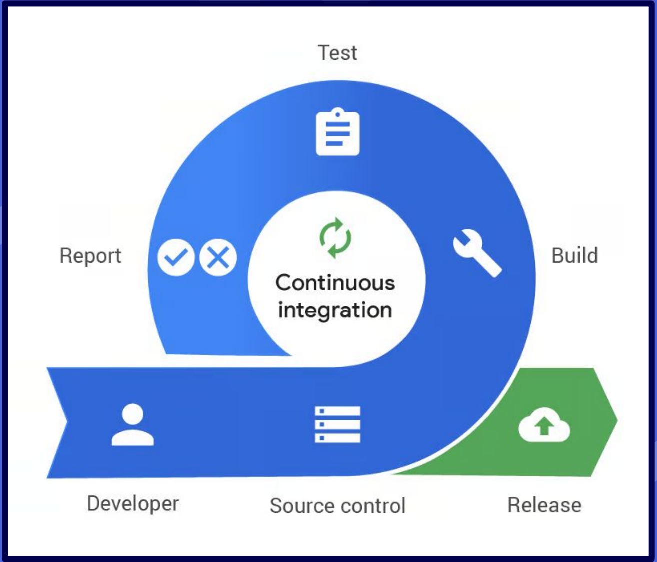
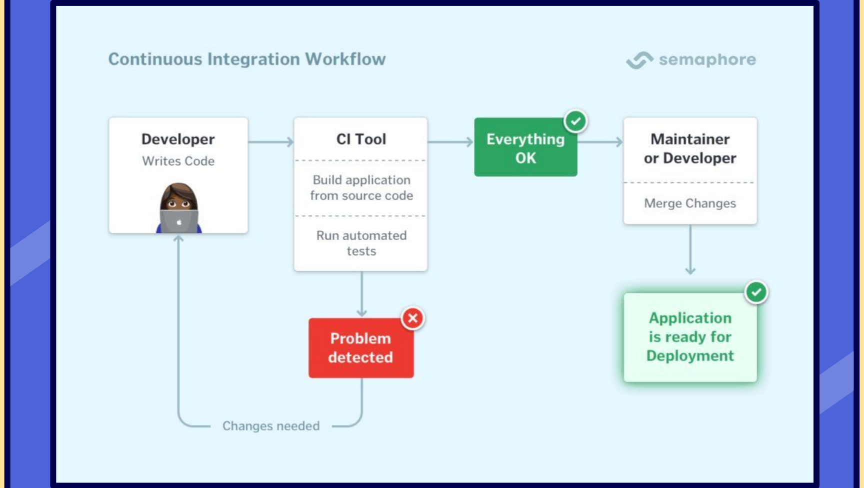
01 INTRODUCTION TO CI

What is Continuous Integration (CI)?



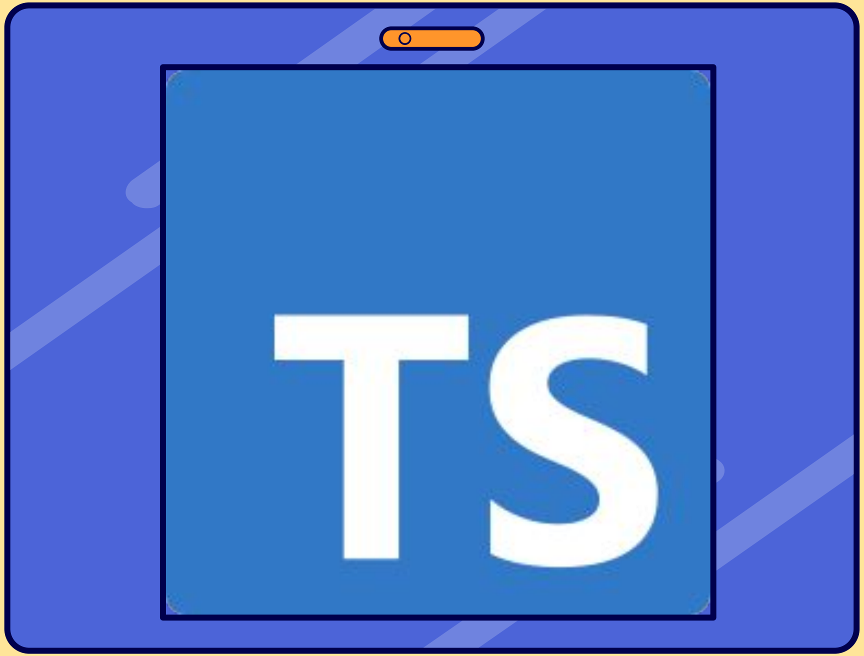
- Improve software quality & accelerate delivery
- Enable simultaneous work in a project
- Automatic processes that validate code stability through:
  - Compilation
  - Testing
  - Etc.

Benefits of using CI?



- Early detection of errors
- Reduction of integration time
- Greater transparency and confidence in the code
- Automation of repetitive tasks

CI with Vanilla TS projects



- Code is transpiled (TypeScript → JavaScript).
- Style rules defined by linters (ESLint or TSLint).
- Unit tests executed using tools (Jest or Vitest)
- Code ready to be deployed to production (GitHub Pages or Vercel).

02

CI TOOLS

WHAT IS GITLAB-CI?

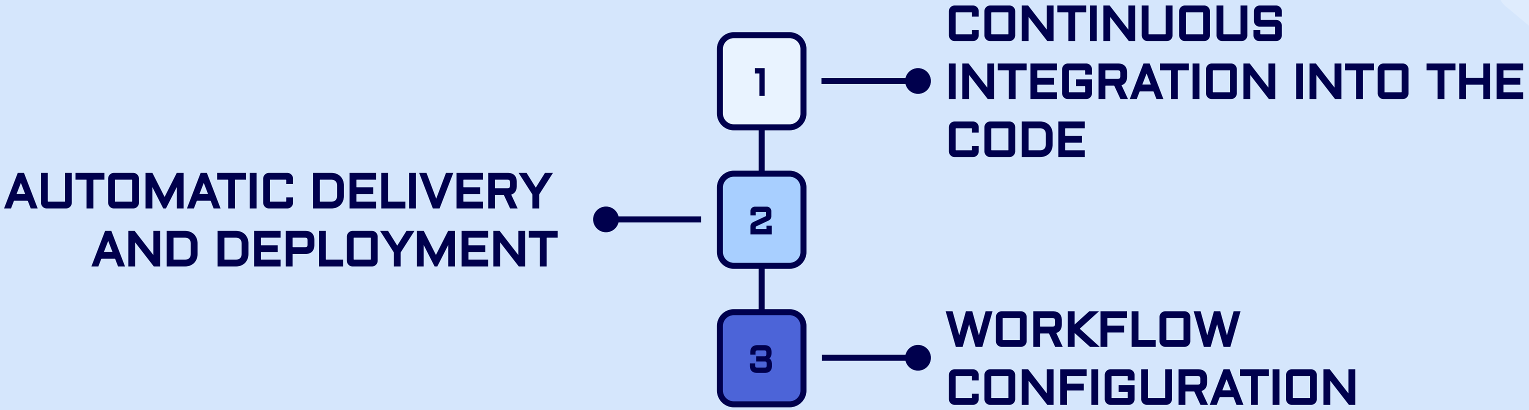
CI TOOL

DEVELOPMENT AUTOMATION

AUTOMATIC TESTING AND DEPLOYMENT

PART OF GITLAB

WHAT IT IS USED FOR



1. CONTINUOUS INTEGRATION INTO THE CODE
2. AUTOMATIC DELIVERY AND DEPLOYMENT
3. WORKFLOW CONFIGURATION

WHAT LANGUAGES CAN USE THIS TOOL?

PYTHON

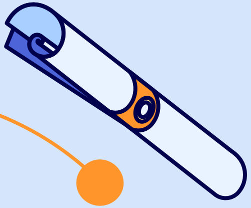
JAVA

JAVASCRIPT/NODE JS

C/C++/C#

RUBY

TYPESCRIPT



GETTING STARTED WITH GITLAB-CI

CREATE THE CONFIGURATION FILE

.gitlab-ci.yml

SELECT THE GITHUB REPOSITORY

→ We import or create the repository in gitlab-ci

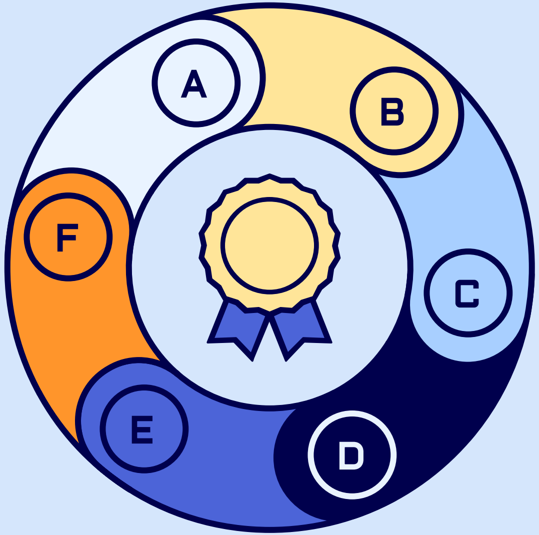
https://gitlab.com/frannelfran

ADVANTAGES AND DISADVANTAGES

NATIVE INTEGRATION WITH GITLAB

CUSTOM PIPELINE CONFIGURATION

TRANSPARENCY AND TRACEABILITY OF THE PROCESS

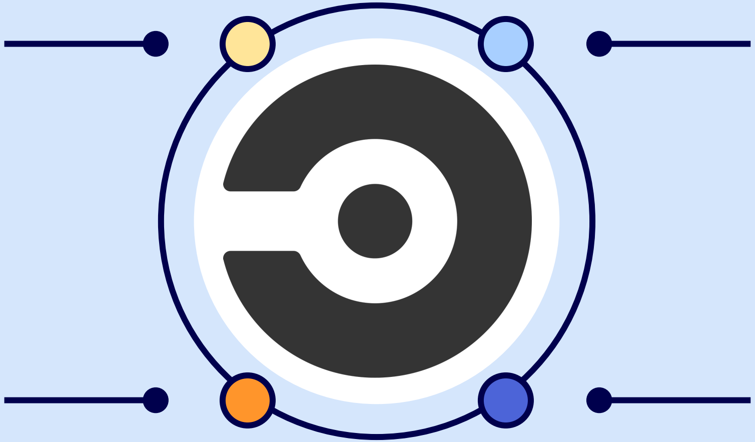


DEPENDENCE ON THE PLATFORM

STEEP LEARNING CURVE

MAJOR MAINTENANC E DEMANDS

WHAT IS CIRCLECI?



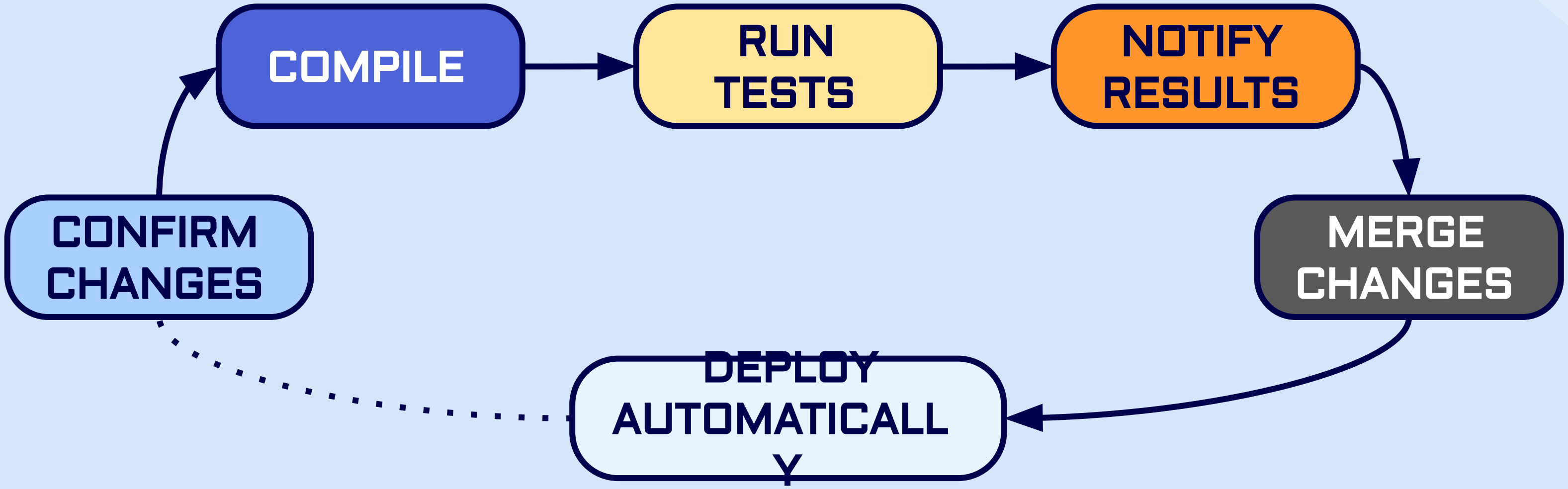
CI/CD PLATFORM

NO INSTALLATION REQUIRED

EASILY INTEGRATES WITH GITHUB

VISUALLY INTUITIVE

FULL SOFTWARE DEVELOPMENT LIFECYCLE



COMPILE

RUN TESTS

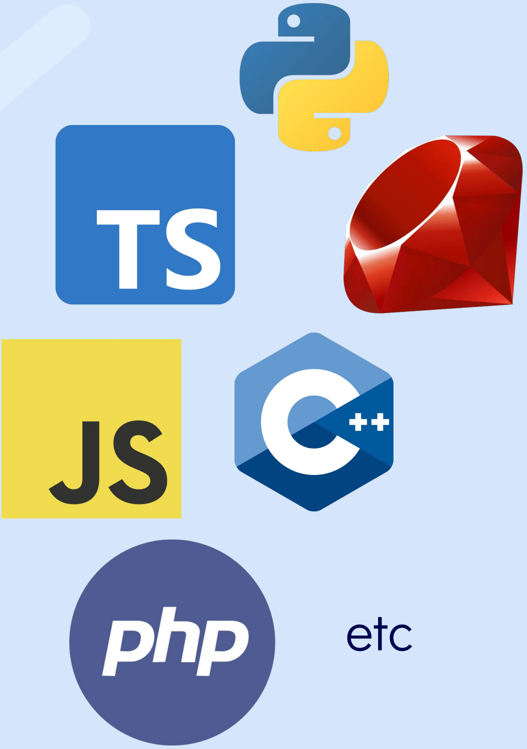
NOTIFY RESULTS

MERGE CHANGES

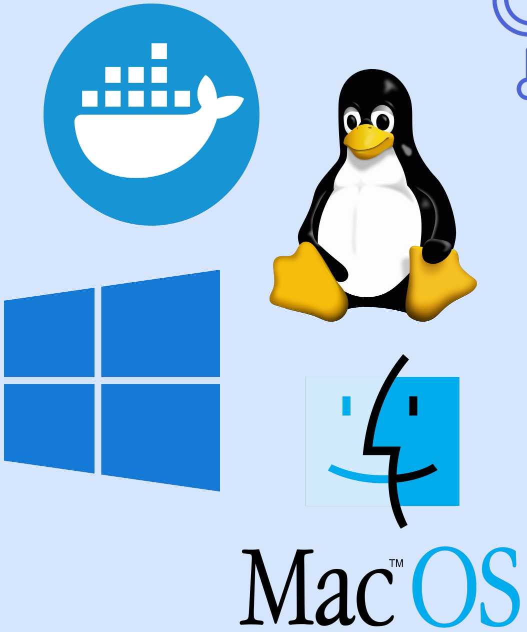
DEPLOY AUTOMATICALLY

CONFIRM CHANGES

LANGUAGES & EXECUTION ENVIRONMENTS



etc



GETTING STARTED WITH CIRCLECI

CREATE THE CONFIGURATION FILE

.circleci/config.yml

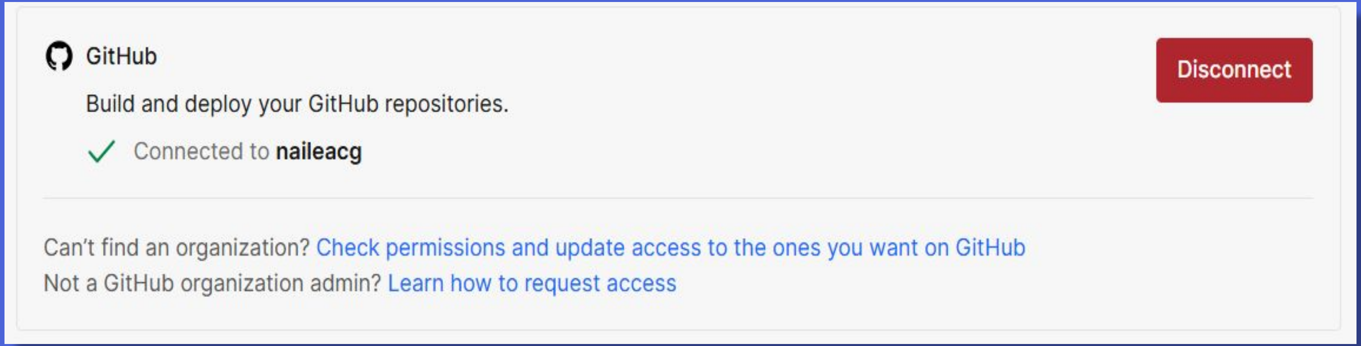
YAML format

SELECT THE GITHUB REPOSITORY

→ Every push starts a workflow now

DON'T FORGET!

Link your GitHub account in Account Integrations



Build and deploy your GitHub repositories.

✓ Connected to **naileacg**

Can't find an organization? Check permissions and update access to the ones you want on GitHub

Not a GitHub organization admin? Learn how to request access but, wait...

THERE'S A PROBLEM

How do we integrate CircleCI into our PAI practices?

SOLUTION

1 **Fork** the repository to your GitHub account

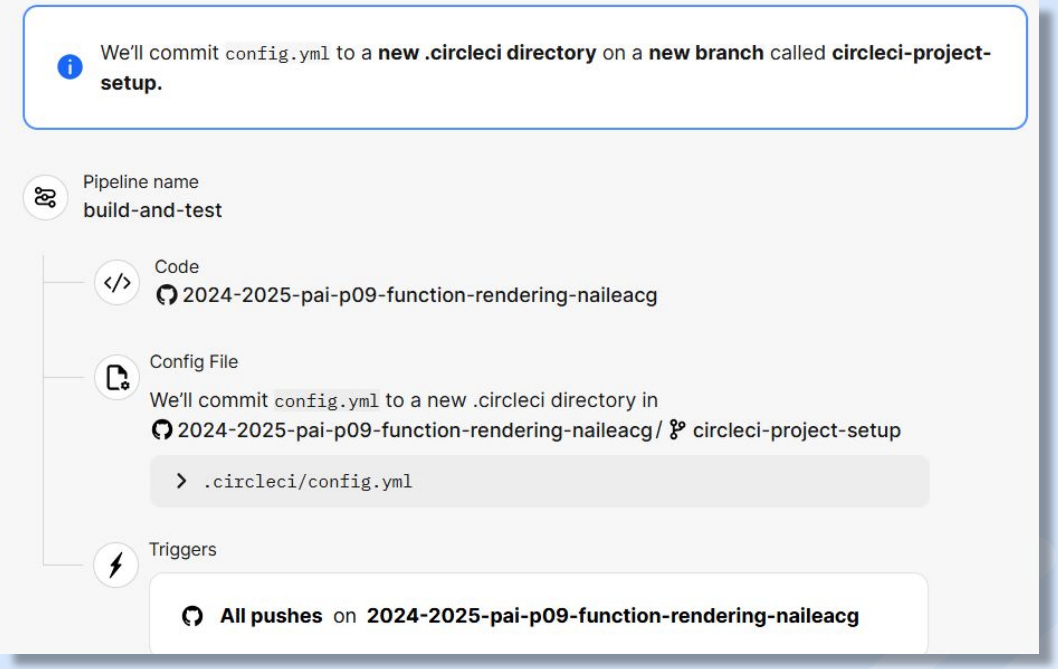
2 Follow **this tutorial** to create a project in CircleCI

RESULTS

→ Auto-generated configuration file

→ New branch created for CircleCI setup

→ Triggers defined



We'll commit `config.yml` to a **new .circleci directory** on a **new branch** called **circleci-project-setup.**

Pipeline name
build-and-test

Code
2024-2025-pai-p09-function-rendering-naileacg

Config File
We'll commit `config.yml` to a new .circleci directory in
2024-2025-pai-p09-function-rendering-naileacg / circleci-project-setup

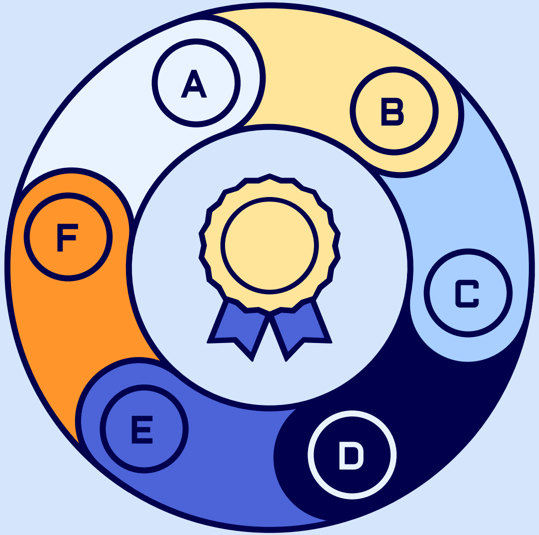
```
> .circleci/config.yml
```

Triggers

All pushes on **2024-2025-pai-p09-function-rendering-naileacg**

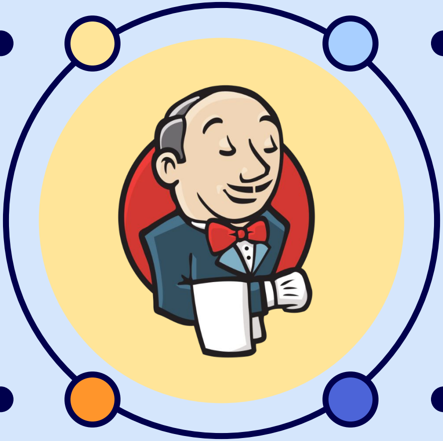
ADVANTAGES AND DISADVANTAGES

- VERY INTUITIVE & CLEAR VISUALIZATION
- GOOD PERFORMANCE
- CUSTOM ENVIRONMENTS
- WELL-DOCUMENTED



- YAML SYNTAX CAN BE TRICKY
- LIMITED FREE USAGE
- PRIVATE REPO LIMITATIONS

What is Jenkins?



CI/CD OPEN CODE TOOL

NOT LINKED TO ANY PLATFORM

WIDELY USED IN SOFTWARE DEVELOPMENT

INTEGRATED WITH PLUGINS

WHAT IT IS USED FOR

1. MANAGE COMPLEX PIPELINES TO ADAPT THE TEAM'S WORKFLOWS

2. INTEGRATED WITH ALMOST ANY DEVELOPMENT TOOL: REPOSITORIES, CLOUD SERVICES, ETC.

3. WORKFLOW CONFIGURATION

WHAT LANGUAGES CAN USE THIS TOOL?

PYTHON

JAVA/KOTLIN

JAVASCRIPT/NODE JS

C/C++/C#

RUBY

RUST

GETTING STARTED WITH JENKINS

TRADITIONAL WAY

Create jobs via graphic interface

MODERN WAY

Using pipelines in Jenkinsfile

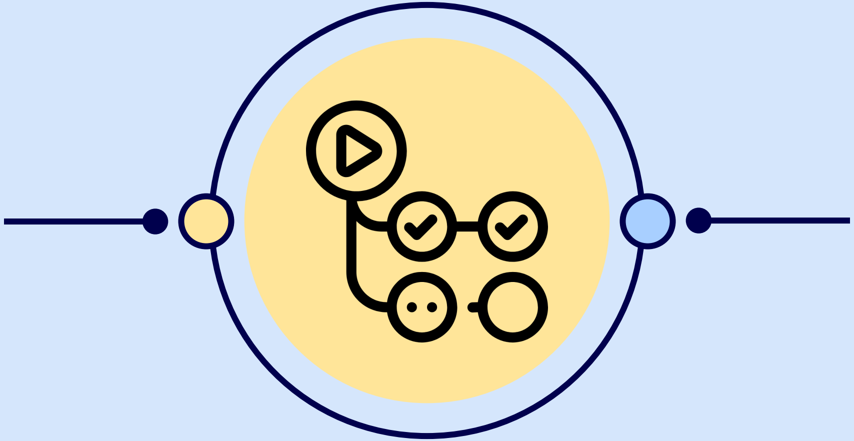
TOOLS OVERVIEW

	Hosting	Repositories	Complexit y
GitLab CI/CD	Cloud & Self-hosted	GitLab	○ ○ ●
CircleCI	Cloud	GitHub / Bitbucket	○ ● ●
Jenkins	Self-Hosted	Not linked to any	● ● ●

03 GITHUB ACTIONS

WHAT ARE GITHUB ACTIONS?

AUTOMATE WORKFLOWS



DESIGNED MAINLY FOR CI/CDC

WHAT DOES THAT MEAN?

For example, you can have a script run automatically every time

01

A BRANCH IS PUSHED

02

A PULL REQUEST IS CREATED

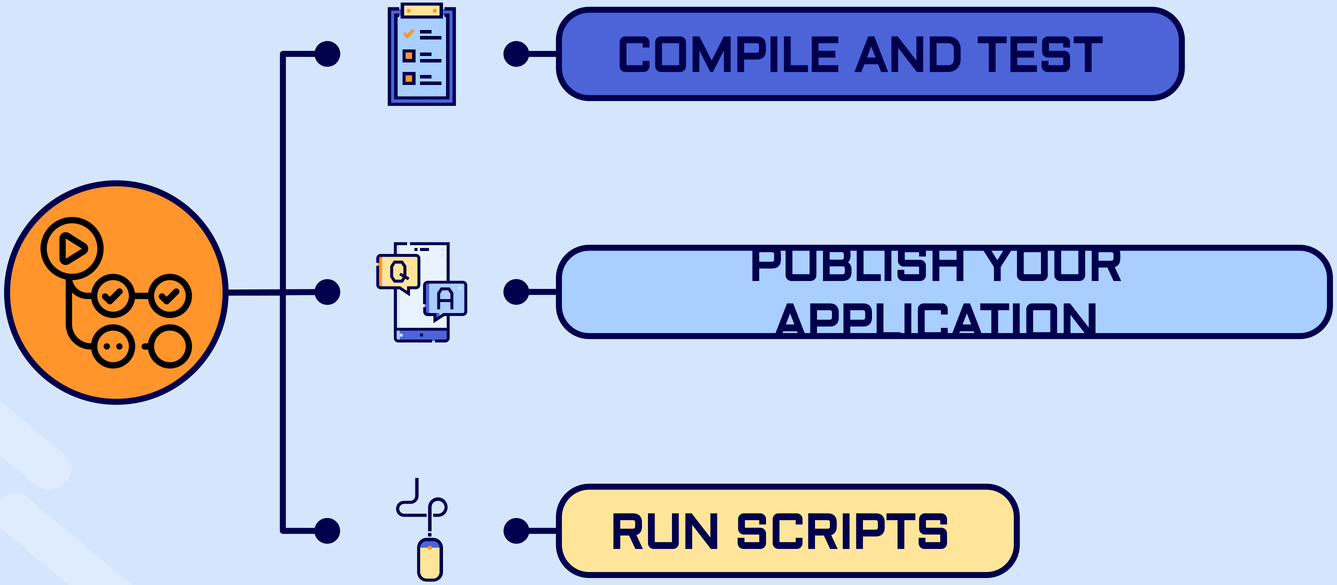
03

A RELEASE IS PUBLISHED

04

OR EVEN AT SPECIFIC TIMES

WHAT YOU CAN DO WITH GITHUB ACTIONS?



COMPILE AND TEST

PUBLISH YOUR APPLICATION

RUN SCRIPTS

GETTING STARTED WITH GITHUB ACTIONS

CREATE THE CONFIGURATION FILE

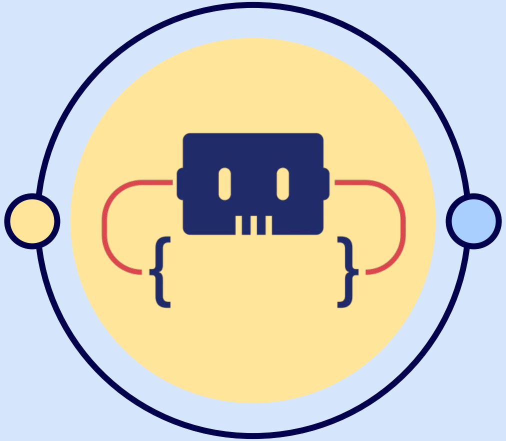
.github/workflows/<name>.yml

SELECT THE GITHUB REPOSITORY

→ Presentation Repository

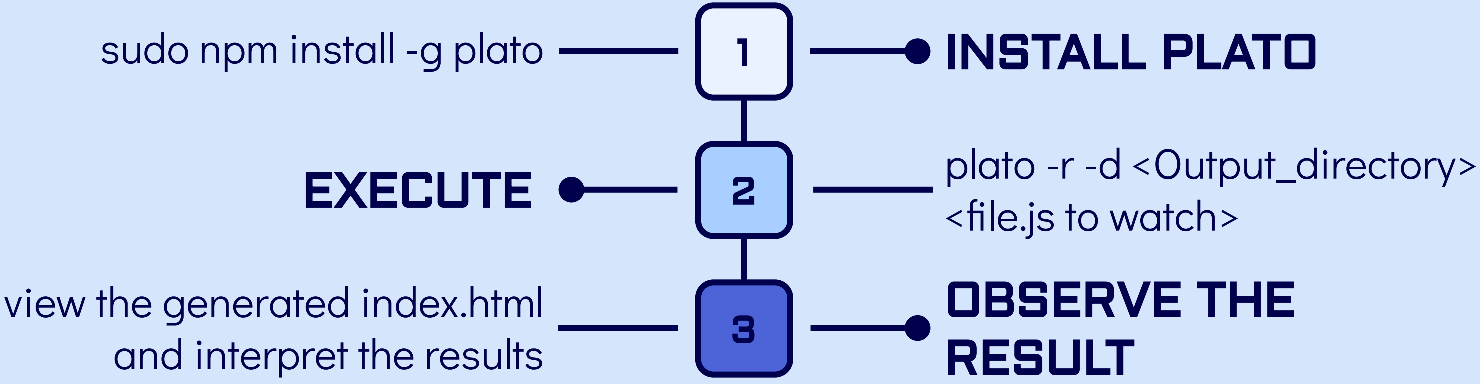
WHAT ARE CODE SMELLS?

INDICATORS OF DESIGN PROBLEMS



THEY ARE NOT MISTAKES

HOW TO USE IT?



1

INSTALL PLATO

sudo npm install -g plato

2

EXECUTE

```
plato -r -d <Output_directory>
<file.js to watch>
```

3

OBSERVE THE RESULT

view the generated index.html
and interpret the results

WHAT IS LINTER?

STATIC ANALYSIS TOOL

DETECT ERROR, INCONSISTENCIES AND MORE...

WHAT PROBLEMS CAN BE POINTED OUT

01

SYNTAX ERRORS

02

INAPPROPRIATE USE OF CONTROL STRUCTURES

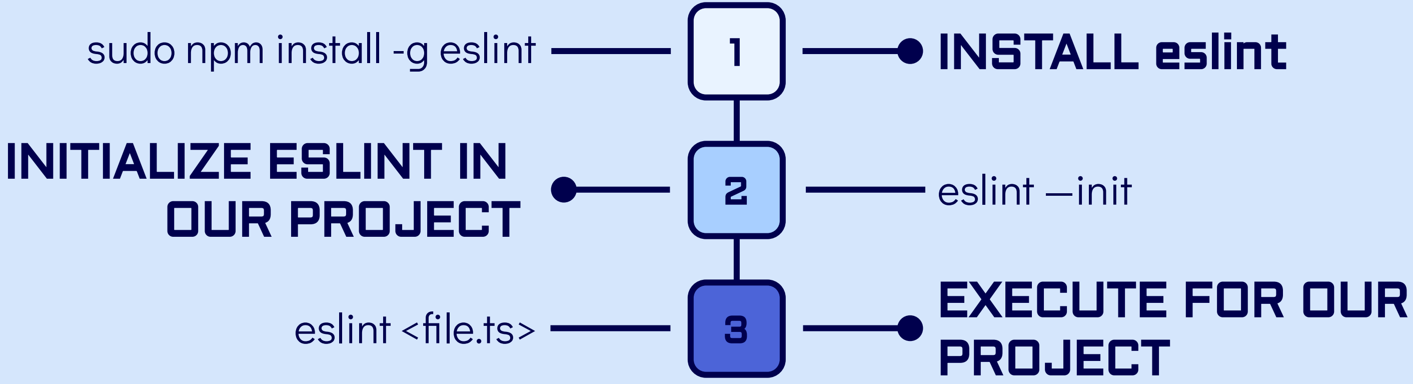
03

INCORRECT NAME VARIABLES

04

FORMATTING AND STYLE ISSUES

HOW TO USE IT?



1. **INSTALL eslint**

   `sudo npm install -g eslint`

2. **INITIALIZE ESLINT IN OUR PROJECT**

   `eslint —init`

3. **EXECUTE FOR OUR PROJECT**

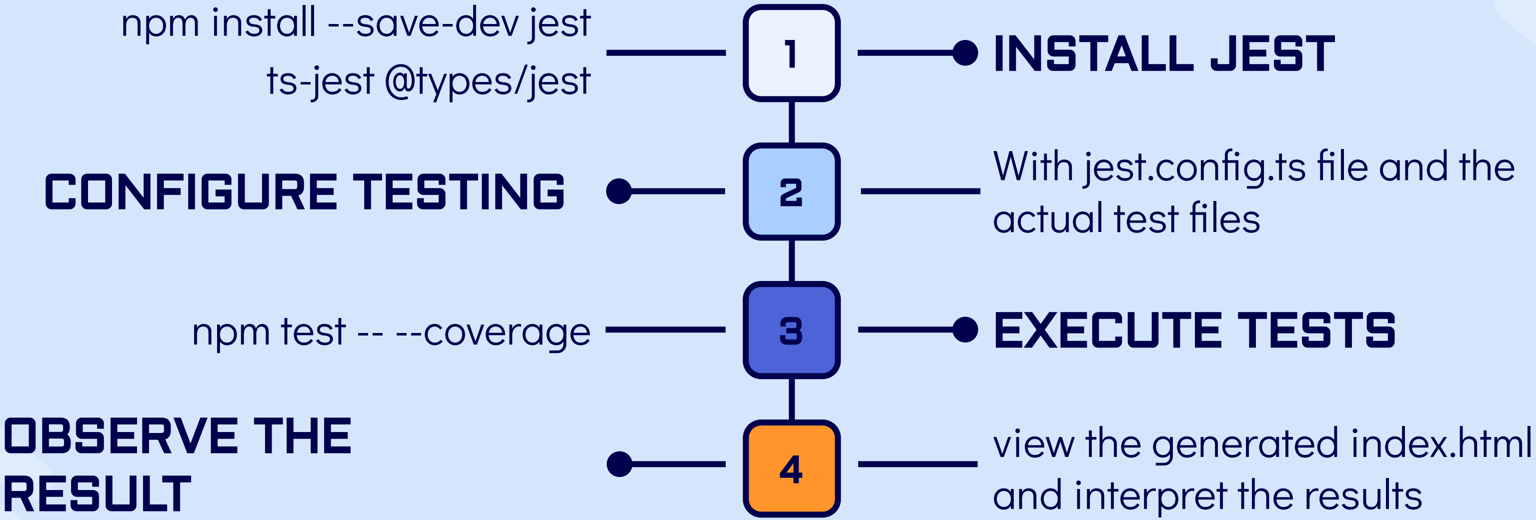
   `eslint <file.ts>`

TESTING AND COVERAGE

AUTOMATED TEST EXECUTION

MEASURE CODE COVERAGE

HOW TO USE IT?



1. **INSTALL JEST**

```
npm install --save-dev jest ts-jest @types/jest
```

2. **CONFIGURE TESTING**

With jest.config.ts file and the actual test files

3. **EXECUTE TESTS**

```
npm test -- --coverage
```

4. **OBSERVE THE RESULT**

view the generated index.html and interpret the results

WHAT ARE GITHUB PAGES?

STATIC SITE HOSTING SERVICE STRAIGHT FROM A REPOSITORY ON GITHUB

RUNS THE FILES THROUGH A BUILD PROCESS, AND PUBLISHES A WEBSITE

04 BIBLIOGRAPHY

- Jenkins. (s. f.). Jenkins. https://www.jenkins.io/

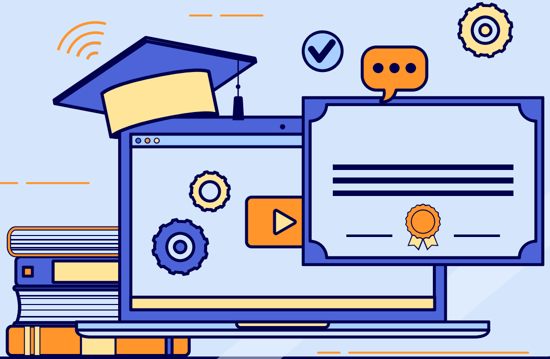
- La plataforma DevSecOps con tecnología de IA más completa. (s. f.). GitLab. https://about.gitlab.com/es/

- CircleCI. (2025, 17 abril). CircleCI. https://circleci.com/

- Daniel. (2025, 21 febrero). ¿Qué es CircleCI? Introducción a la Integración Continua Simplificada. Formación En Ciencia de Datos | DataScientest.com. https://datascientest.com/es/que-es-circleci

- Create a project in CircleCI - CircleCI. (s. f.). https://circleci.com/docs/create-project/

- GitHub Actions. (2025). GitHub. https://github.com/features/actions



THANKS!

Do you have any **questions?**

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