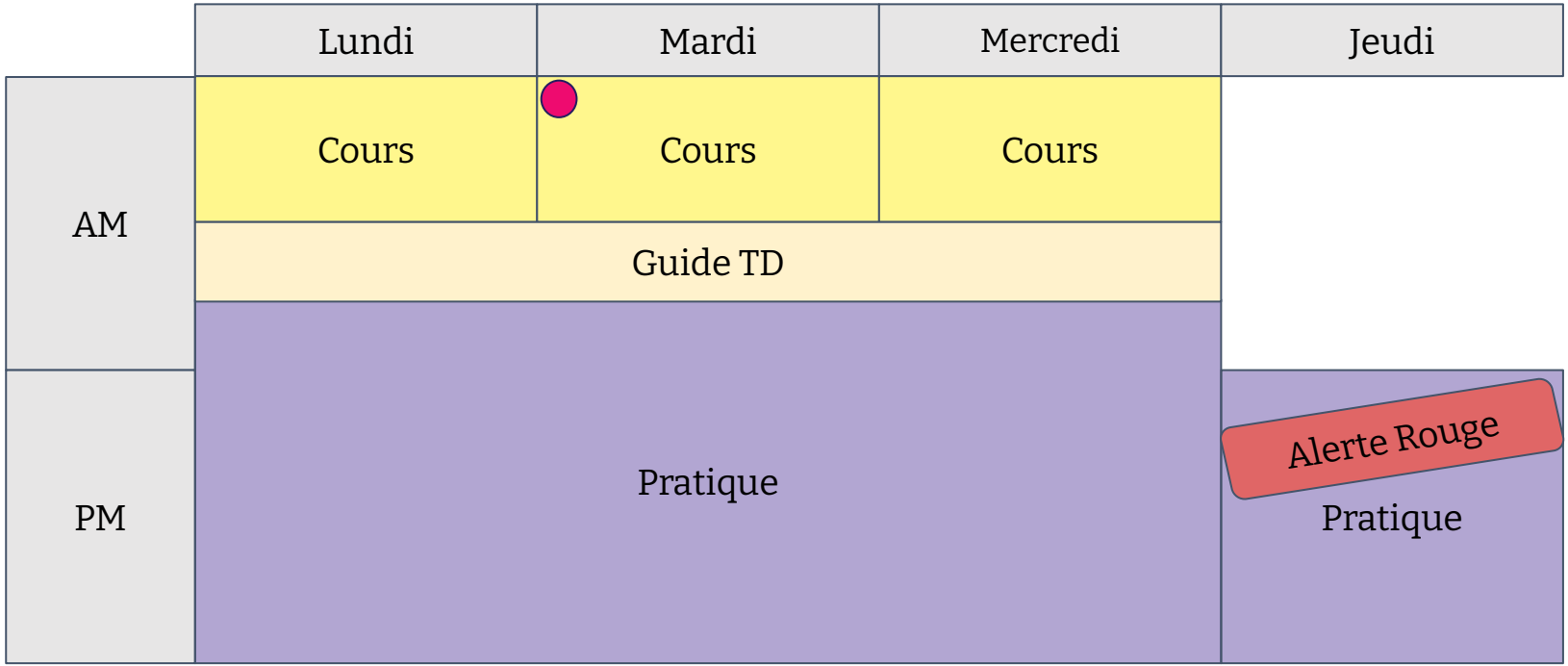
takima
mastering technology

Git & CI/CD

CPE -2023

Planning



Lundi 20/02 15h45-17h45
Examen écrit

Git

GIT is a VCS but what is a VCS?

1. Veritas Cluster Server, a commercial high-availability computer clustering system
2. Version Control System, a system for managing multiple revisions
3. Venture CapitalS, specials investment funds
4. Vietnamese Council of State, the highest standing body of the National Assembly of Vietnam

When is GIT born?

1. 1998, Hugo Chávez is elected President of Venezuela
2. 2002, Salt Lake city winter olympic games
3. 2005, Pope John Paul II dies
4. 2008, Satoshi Nakamoto publish "Bitcoin: A Peer-to-Peer Electronic Cash System"

Who invented GIT?

1. Linus Torvalds, historical inventor of the linux kernel
2. Rod Johnson, programmer and Spring Framework creator
3. Larry Page, Google co-founder
4. Marie Curie, pioneer researcher in radioactivity, first woman to own a Noble Price and only person to win a Nobel Prize in two different sciences (Physics & chemistry)

What is git internal checksum algorithm?

1. None, no one needs to check file/system integrity
2. MD5, producing vulnerable 128-bit hash value, published in 1992
3. SHA-1, producing vulnerable 160-bit hash value, published in 1995
4. SHA-256, NSA secured 256-bit hash value, published in 2001

Pourquoi Git ?

Pourquoi git?

Avant les gestionnaires de version …

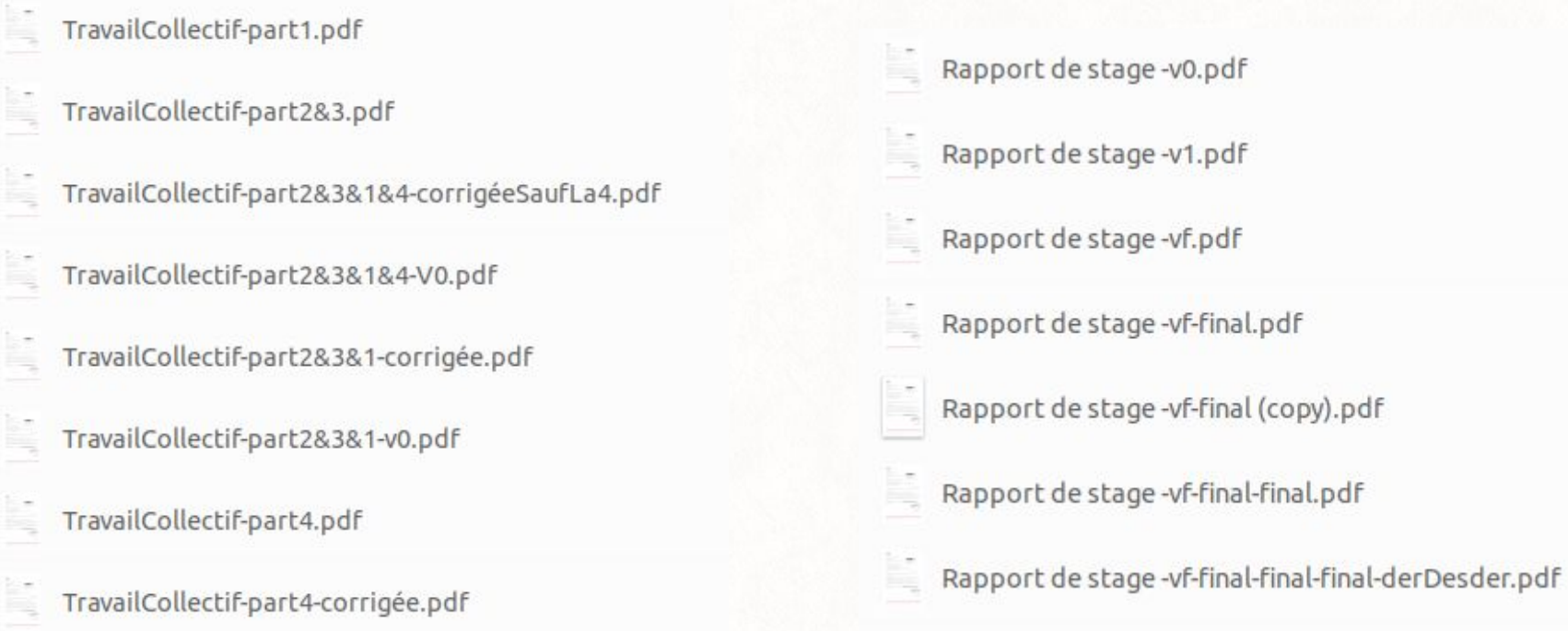
(ノ ಠ_ಠ)ノ 彡┻━━┻

Avec Git

- Collaborative
- Versionnage de projet avec des commits immutables. (historique de commits avec la date et l'utilisateur qui a fait les changements)
- Résolution de conflits

Sans git

Gestions des versions



Basic notions

Pourquoi git?

A working directory avec la version actuelle

Commit = unit of change

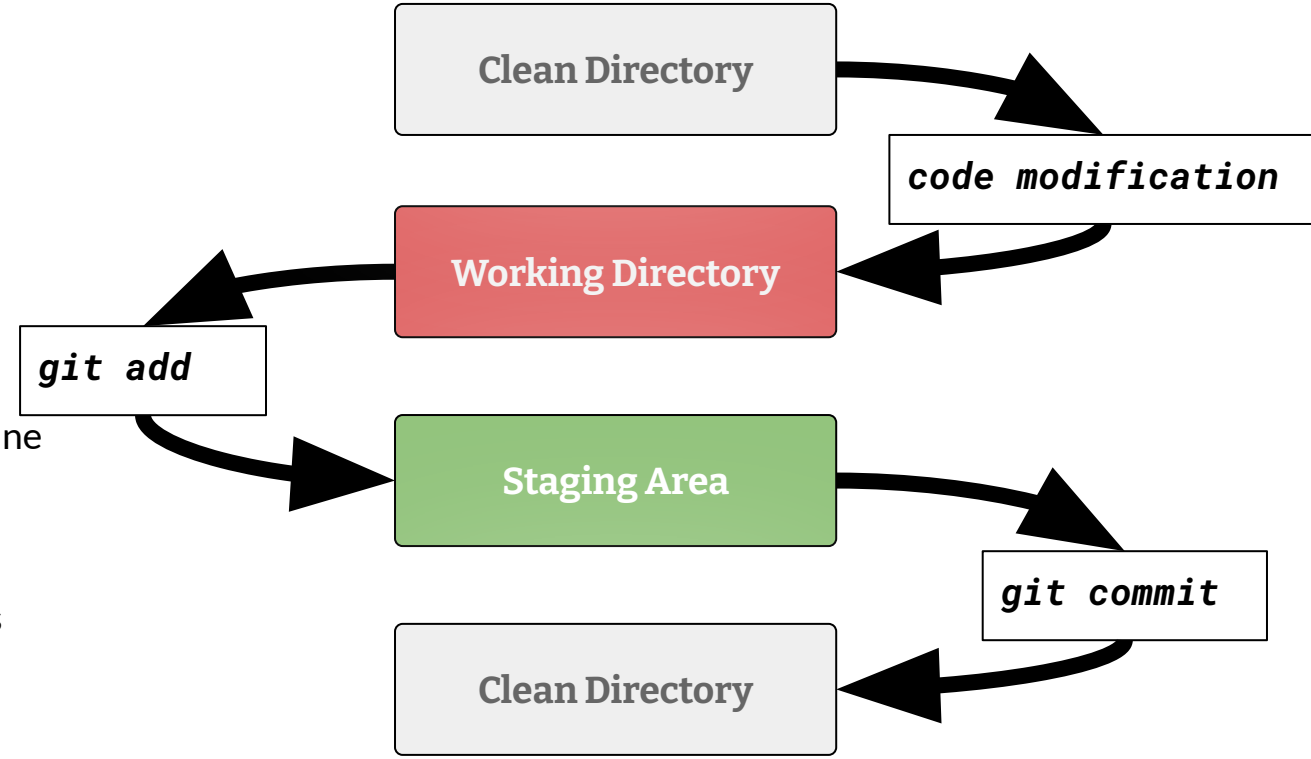
Snapshots pas des diffs !

.git folder contient toutes les git métadonnées:

- Snapshots (blob, tree...)
- Commits
- ...

Pourquoi git?

- Aucun changement depuis le dernier commit
- Commit = unité de changement
- Quelques changements mais git ne s'en préoccupe pas
- Toujours quelques changements mais git s'en préoccupe
- Changements sauvegardés



Inspect git

Keep an eye open. And the good one!

Inspection command

Working directory changes details

- git diff

Staging area informations:

- git status

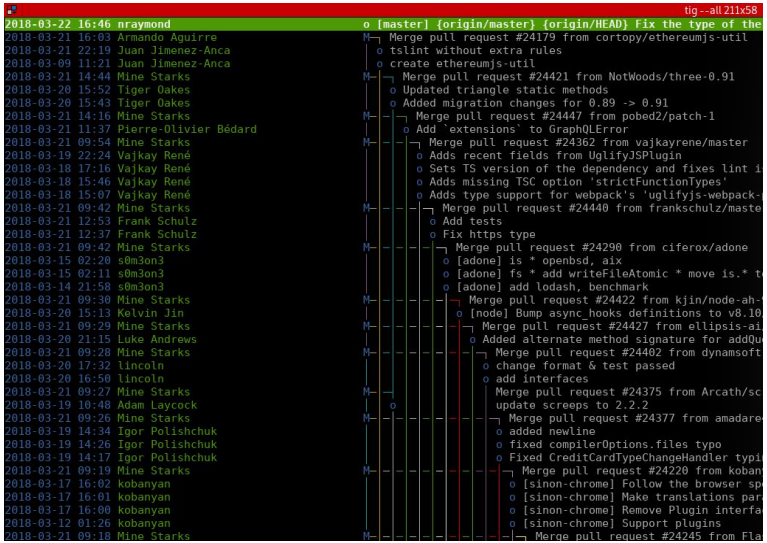
Commit history:

- git log
- git log --graph --decorate --pretty=oneline --abbrev-commit --all

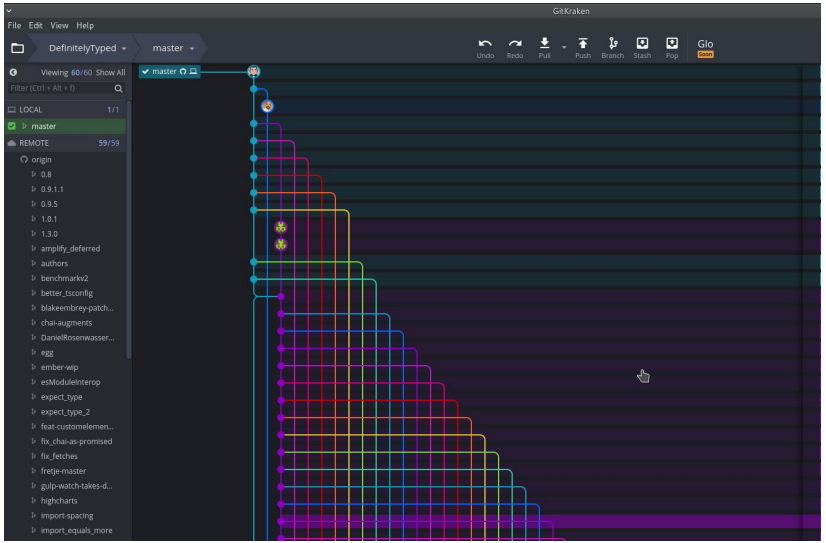
Git

Useful tools

Textual interface for git: TIG



Graphical Interface for GIT:
GitKraken, gitk, gitg...



Premières étapes

S’authentifier

Dans votre working directory :

```
> git config --global user.name jdalton
> git config --global user.email jdalton@takima.fr
```

Pourquoi ?

Pas (encore) un projet Git

Dans ton projet :

```
> git init
```

Qu'observes-tu ?

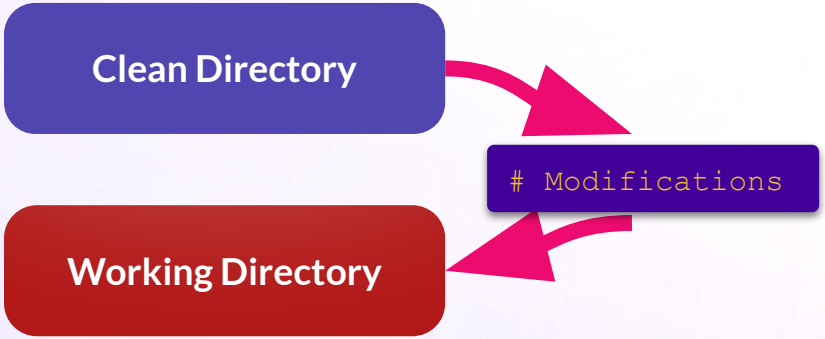
Display hidden files ...

Initialement

Clean Directory

Pas de modification depuis le dernier commit

Faire des modifications



Quelques modifications ont été faites, mais git n'en prends pas compte

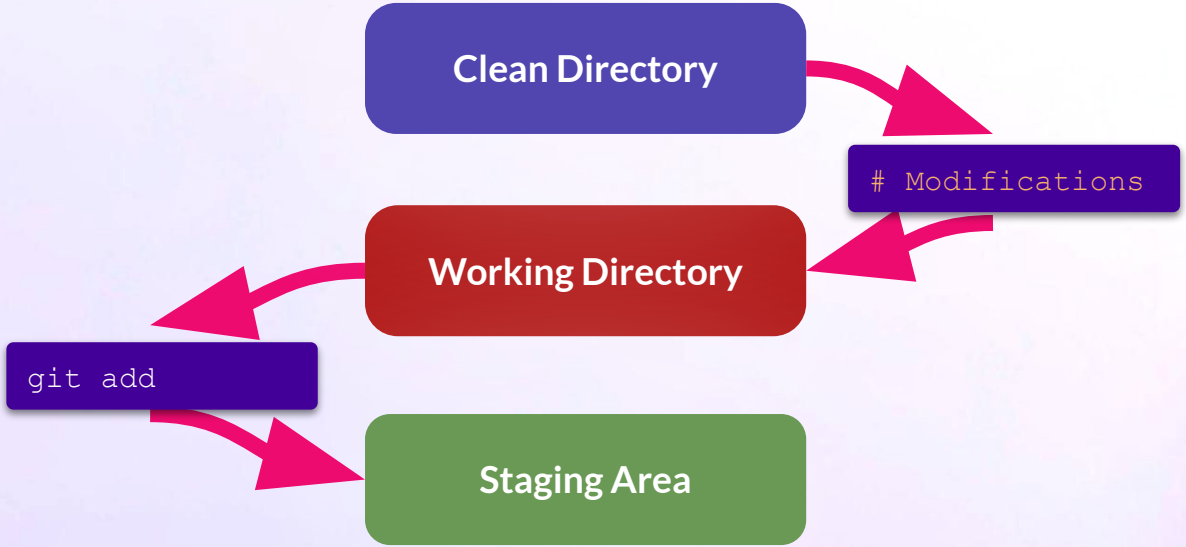
git add

```
> git add myFile.java
```

```
> git add .
```

```
> git add -A
```

Staging area



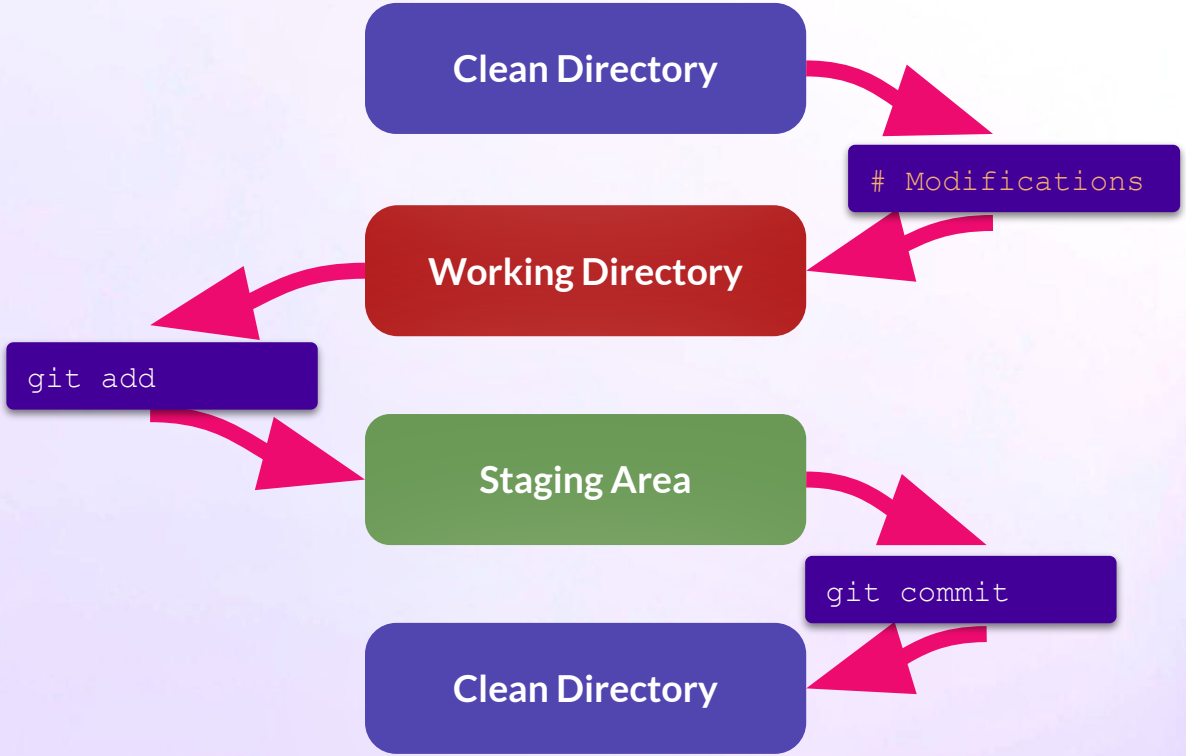
Les modifications ne sont toujours enregistrées
mais Git en prend compte

git commit

```
> git commit -m “feature: Add function that do something”
```

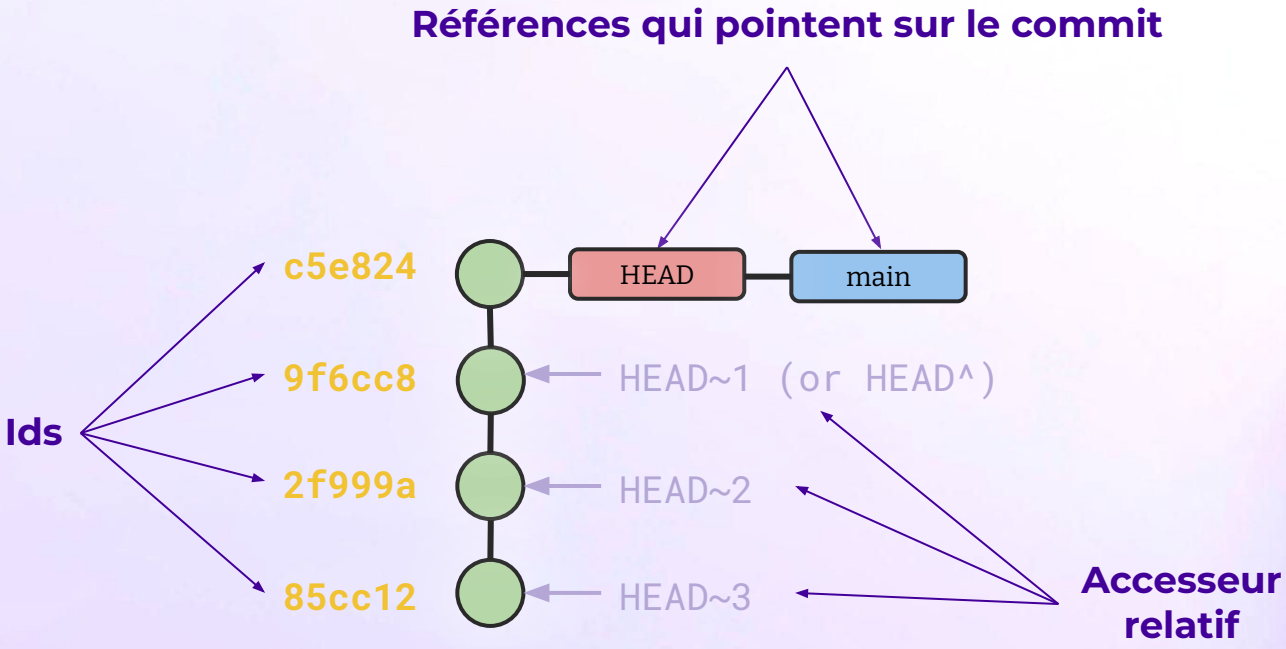
```
> git commit
# ouverture de l’éditeur pour rédiger le message du commit
```

Modifications enregistrées



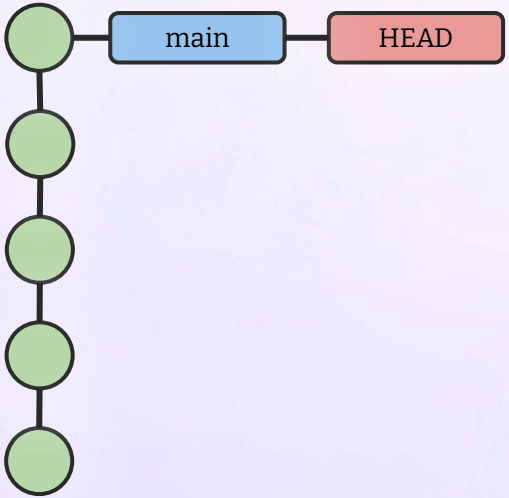
Branches

Désigner un commit



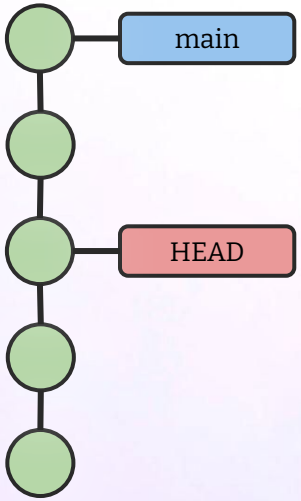
HEAD

Attachée :




```
> git checkout main
```

Détachée :




```
> git checkout main~2
```

Forking

Git

Forking

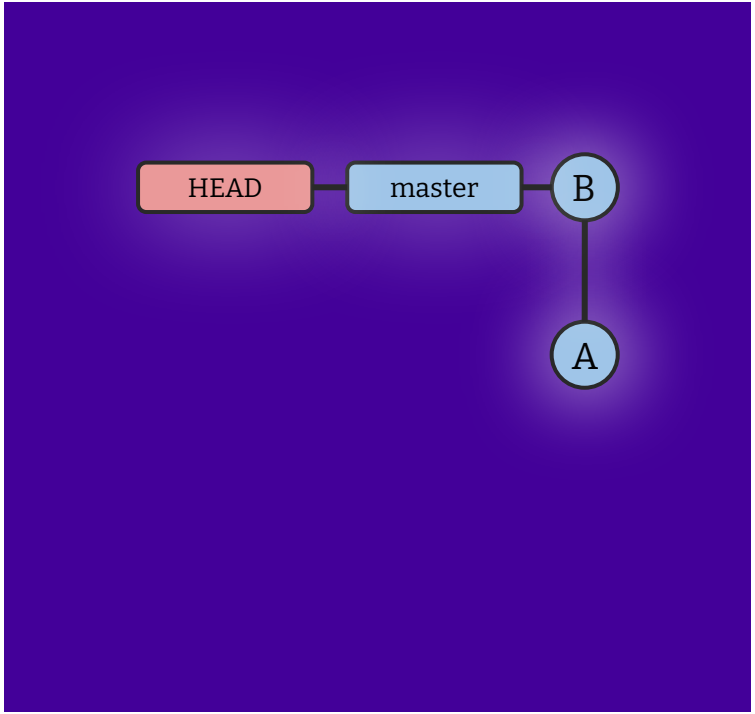
Command Line

```
# We will reuse the last git log
# as an example...
```

Working directory

```
my-project
├── README.md
└── src
    └── hello.java
```

Git log



Forking: Créer une branche

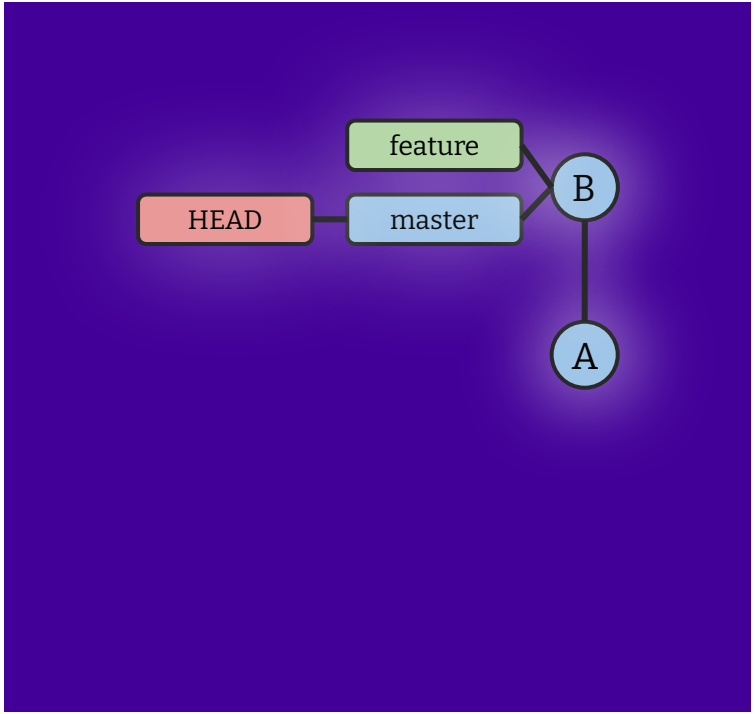
Command Line

```
git branch feature
```

Working directory

```
my-project
├── README.md
└── src
    └── hello.java
```

Git log



Forking: Checkout une autre branche

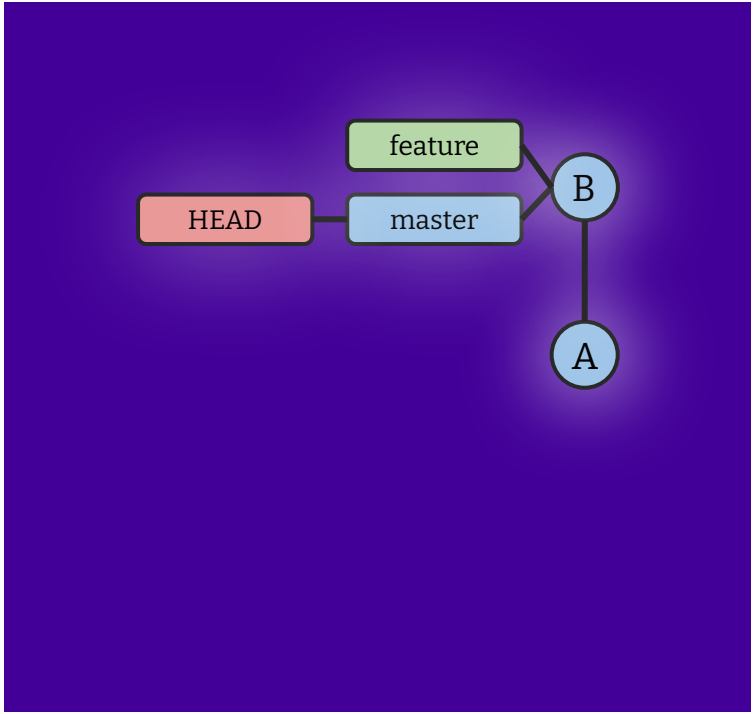
Command Line

```
git checkout feature
# or “git checkout -b feature” to also create the branch
```

Working directory

```
my-project
├── README.md
└── src
    └── hello.java
```

Git log



Forking: Creer un commit sur une branche

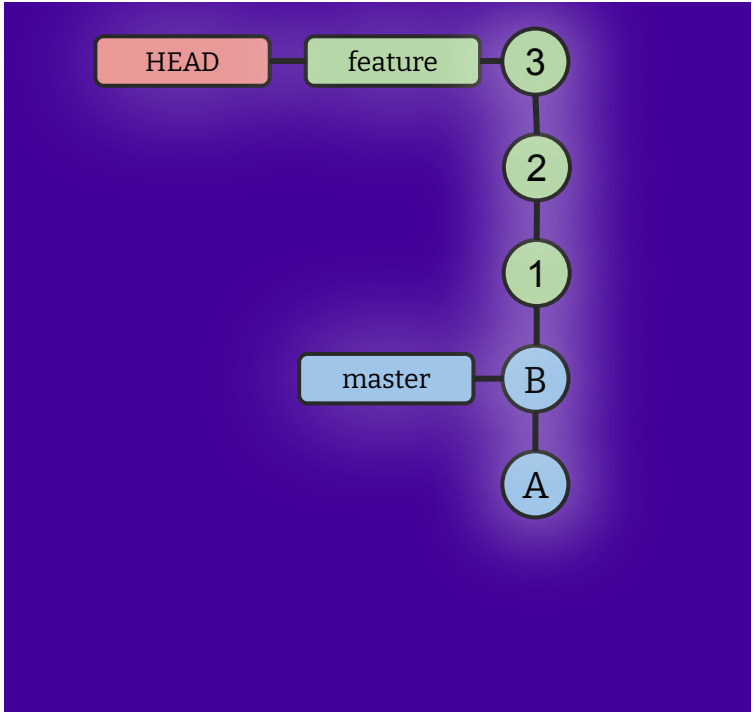
Command Line

```
# Create feature.java file
git add src/feature.java
git commit -m ”1”
# Create 2 more commits...
```

Working directory

```
my-project
├── README.md
└── src
    ├── hello.java
    └── feature.java
```

Git log



Forking: Checkout master

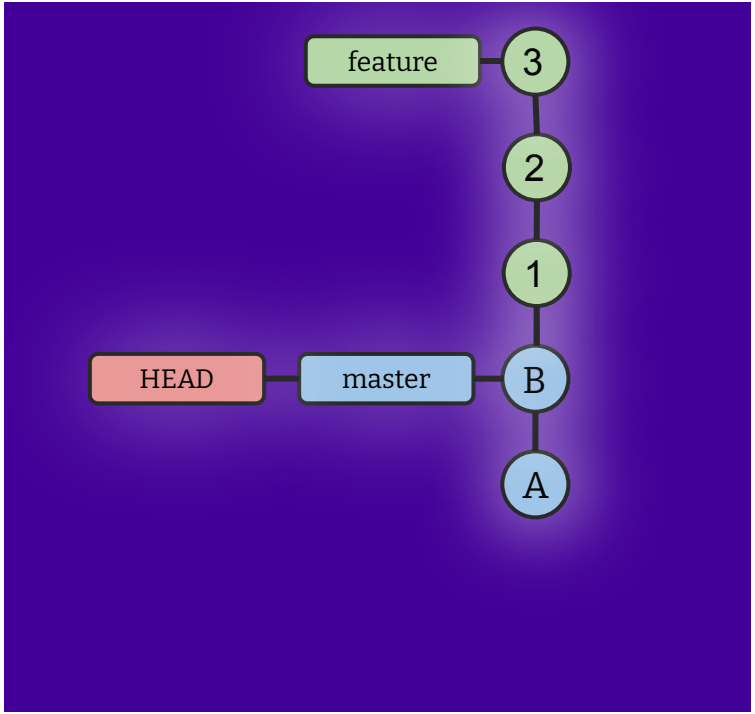
Command Line

```
git checkout master
```

Working directory

```
my-project
├── README.md
└── src
    └── hello.java
```

Git log



CI/CD

DevOps workflows made easy

CI/CD?

Avant CI/CD

Lent cycle de releases

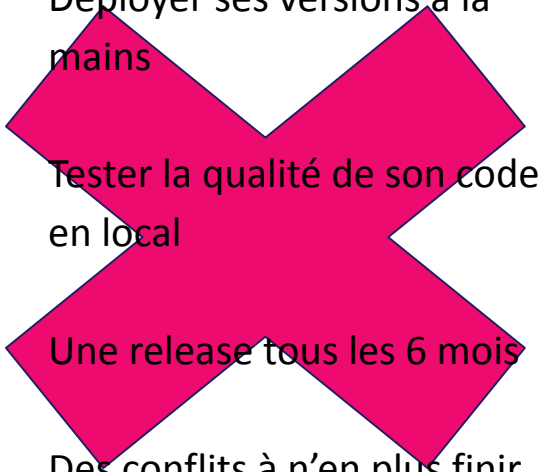
- Des semaines voir des mois …
- Perte de temps

Conflits le jour du “merge day”

- Des bugs à résoudre
- Tester/deployer manuellement

Pourquoi?

- Déployer ses versions à la mains
- Tester la qualité de son code en local
- Une release tous les 6 mois
- Des conflits à n'en plus finir

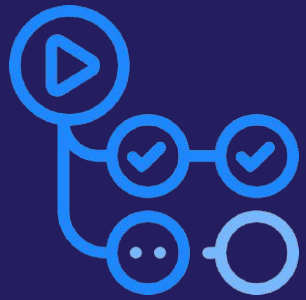


DEVOPS ⇒ Une personne qui **déteste** faire 2 fois la même chose à la main.

Continuous Integration and Continuous Delivery

Automate your problems away

With Github



Github Actions

SonarCloud

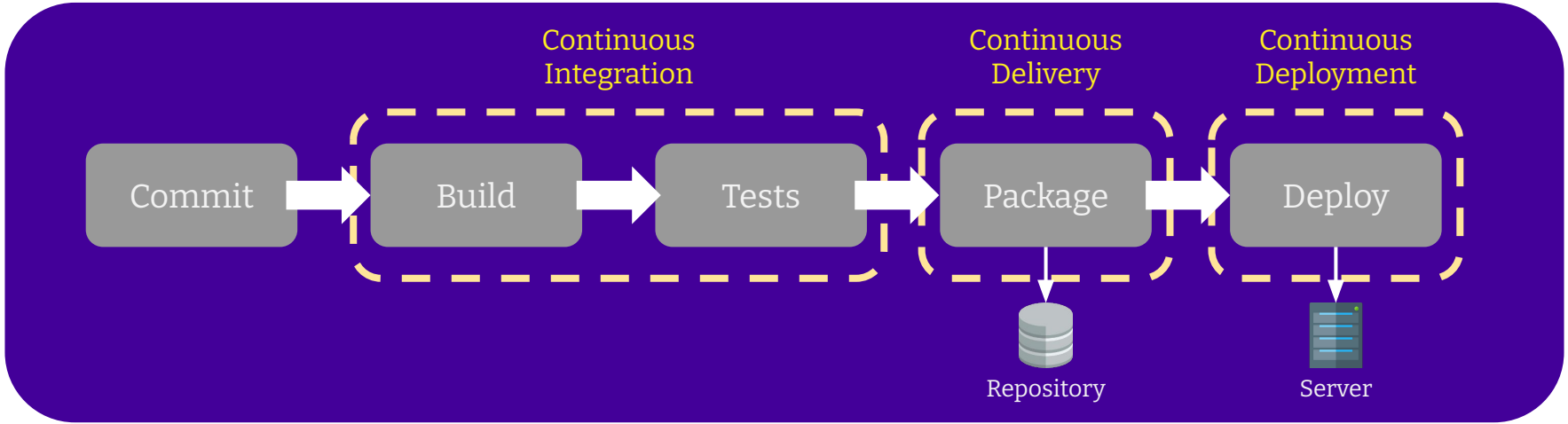
Maintenant CI/CD

Continuous Integration (CI)

- Regular integration => PR et merge
- Build/tests automatisés

Continuous Delivery/Deployment (CD)

- Mettre les artefacts sur un repo
- Automatique déploiement en production



Pour et Contre

Pour et Contre

✓ Releases fréquentes et plus facile
✓ Constant feedback
✓ Rapide découverte de bugs
✓ Plus de temps pour se consacrer aux bugs

✘ Besoin d'une mentalité DevOps
✘ Un temps initial de setup

Outils

- Github Actions
- Travis CI
- Jenkins
- Gitlab CI
- Circle CI
- ...

Intro to Github & Github Actions

Introduction

- Github
  - Fondé en 2008 - @Microsoft 2018
  - Git repository manager
  - Github Enterprise

- Github Actions
  - La réponse de github à gitlab-ci
  - (!) Seulement Github
  - Linux, macOS & Windows

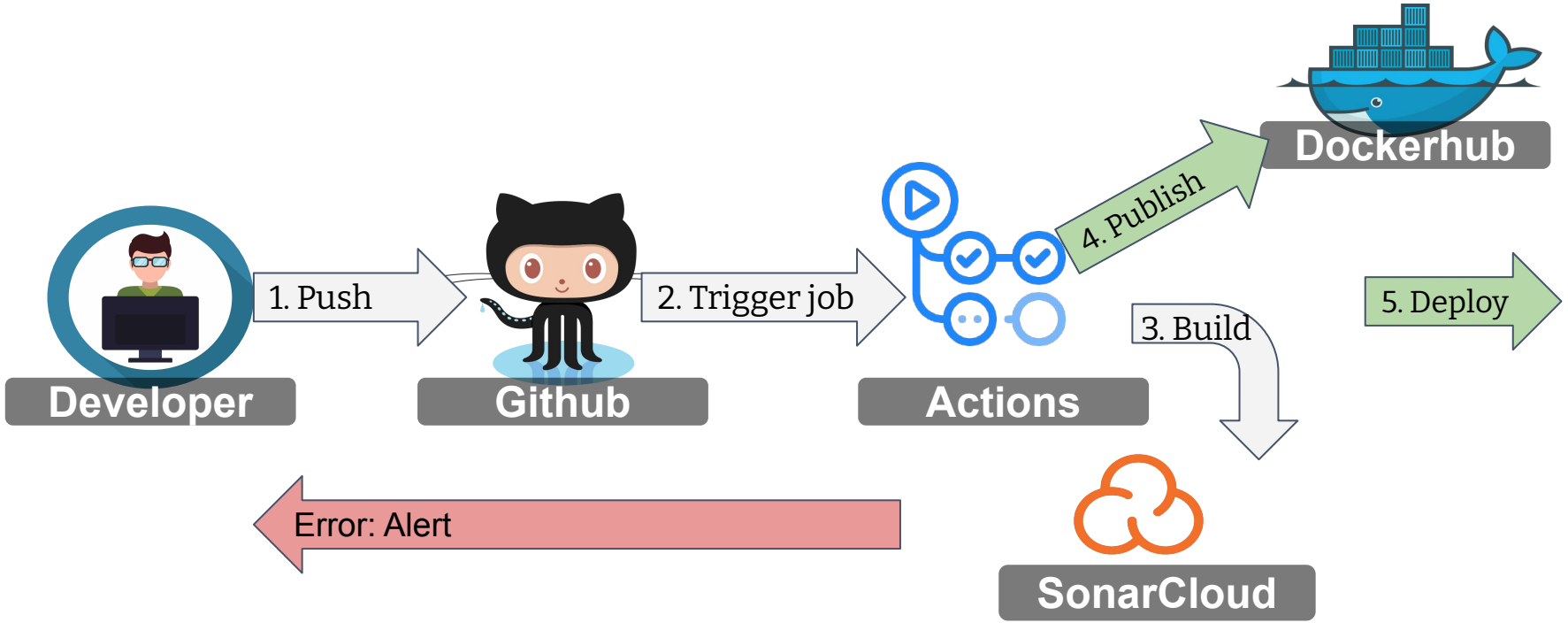
Pourquoi Github Actions ?

- ✓ Full Github integration
- ✓ Simple installation
- ✓ Declarative configuration
- ✓ Open source

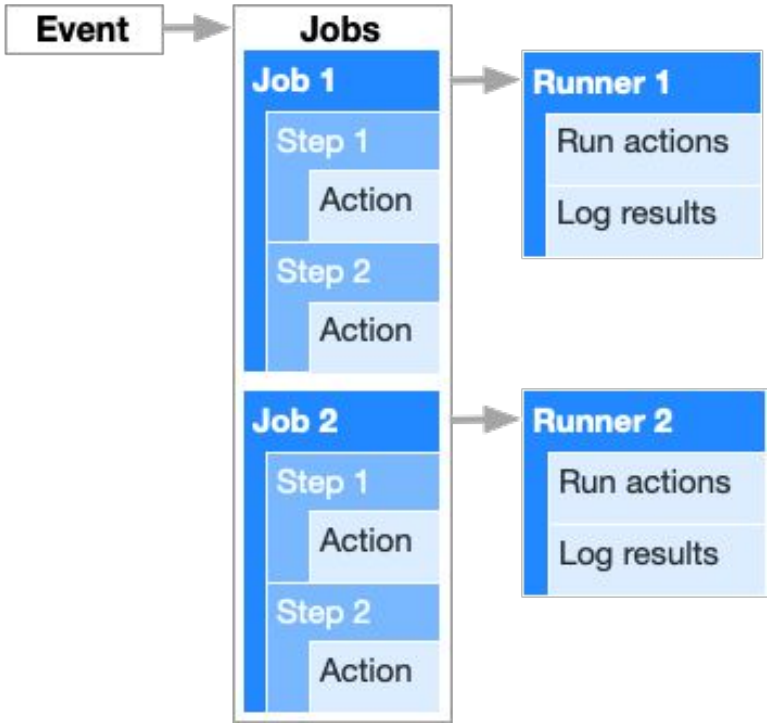
- ✘ Full Github integration
- ✘ Des features payants

Github Actions

Comment ça marche?



Comment ça marche?

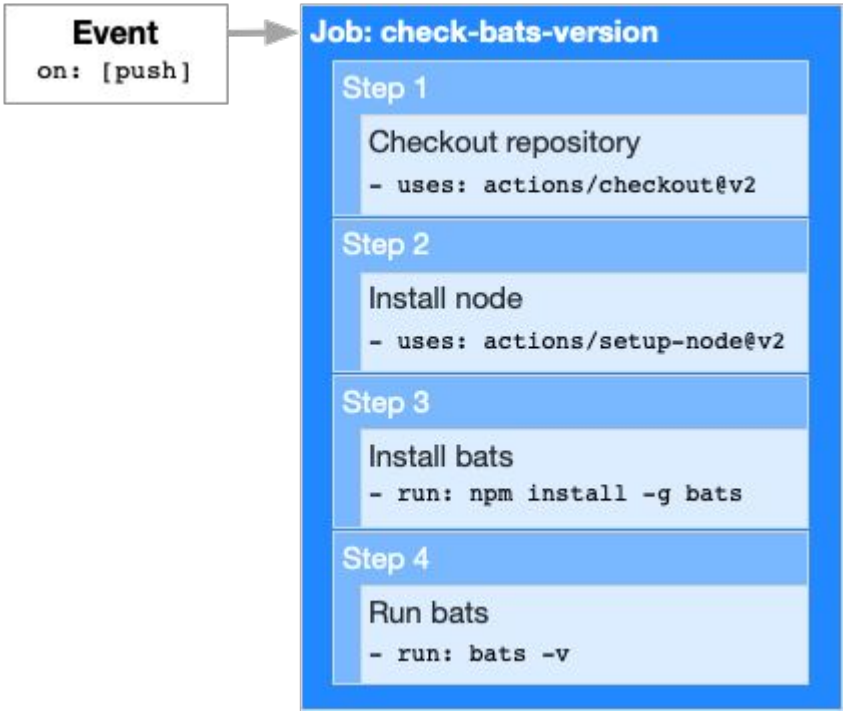


- Workflow
- Event
- Jobs
- Step
- Action
- Template

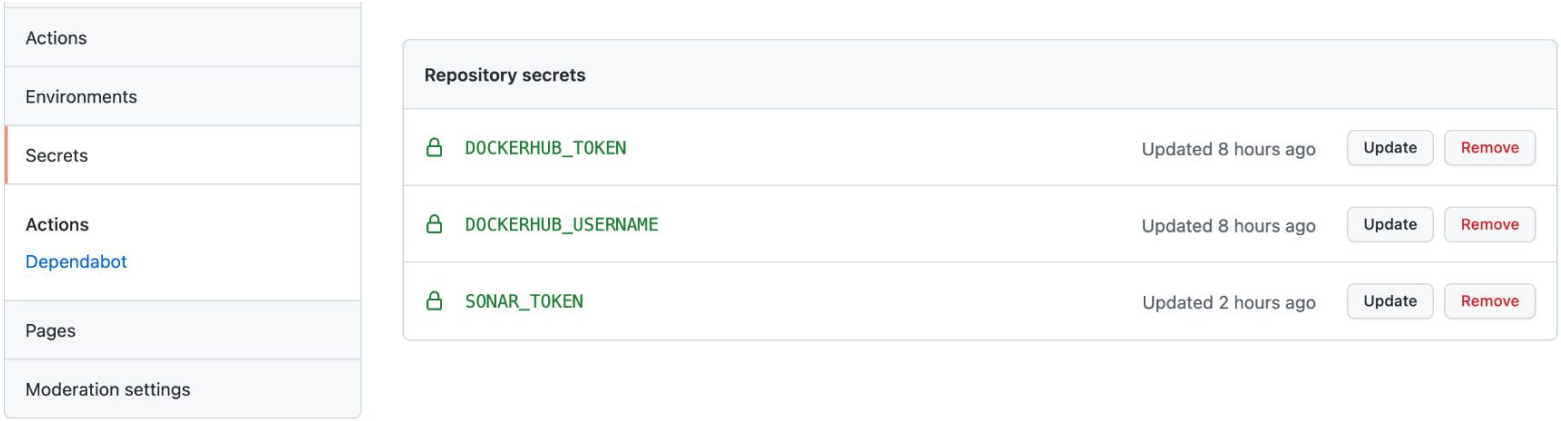
.main.yml

```yaml
name: learn-github-actions
on: [push]
jobs:
  check-bats-version:
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v2
      - uses: actions/setup-node@v2
        with:
          node-version: '14'
      - run: npm install -g bats

       - run: bats -v
```

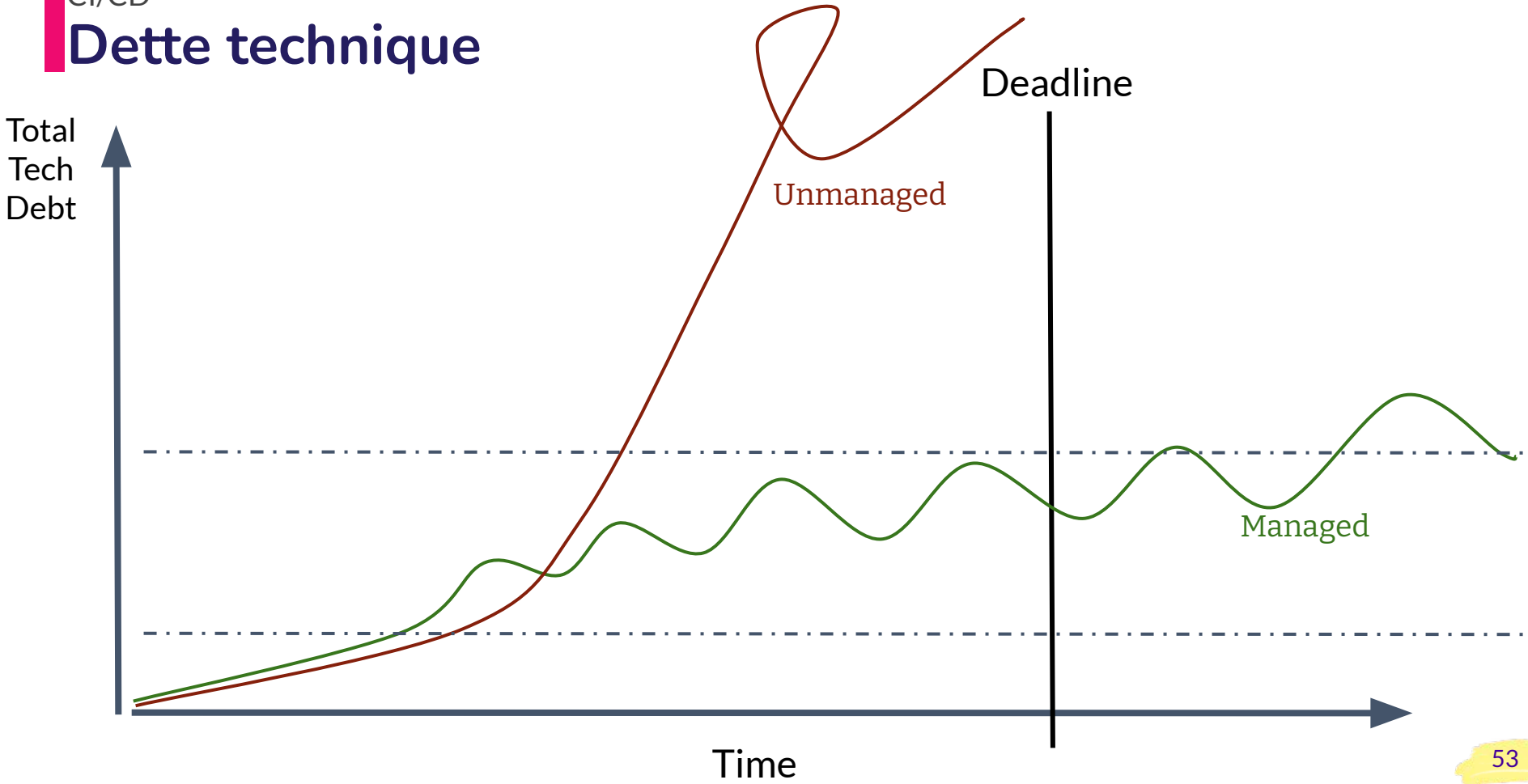


Secrets et variables



Sonar Cloud

Dette technique



SonarCloud: qualité

- Analyse de qualité
- 20+ different languages
- Test coverage & execution
- Vérification des bugs & code smells
- Et plus encore

Take Away

- CI/CD automatise tout du commit à la mise en prod
- Github Actions est une bonne option mais n'est pas la seule
- Ne pas mettre de donnée sensible dans ton `main.yml`
- Utiliser un outil de qualité de code

Enough speaking.
Take me to the code !

http://school.pages.takima.io/devops-resources/

TD02 - git & Github