

Git & CI/CD

CPE-2022





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 Springer3

Mettre une application dans un container

avec Docker

Compiler, Tester, et Déployer automatiquement une appli

Continuous Integration & Continuous Delivery

Git



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



Git

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"



Git

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)



Git

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 ?

Git

Pourquoi git?

Avant les gestionnaires de version ...



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

Basic notions



Git

Pourquoi git?

A working directory avec la version actuelle

Commit = unit of change

Snapshots pas des diffs !

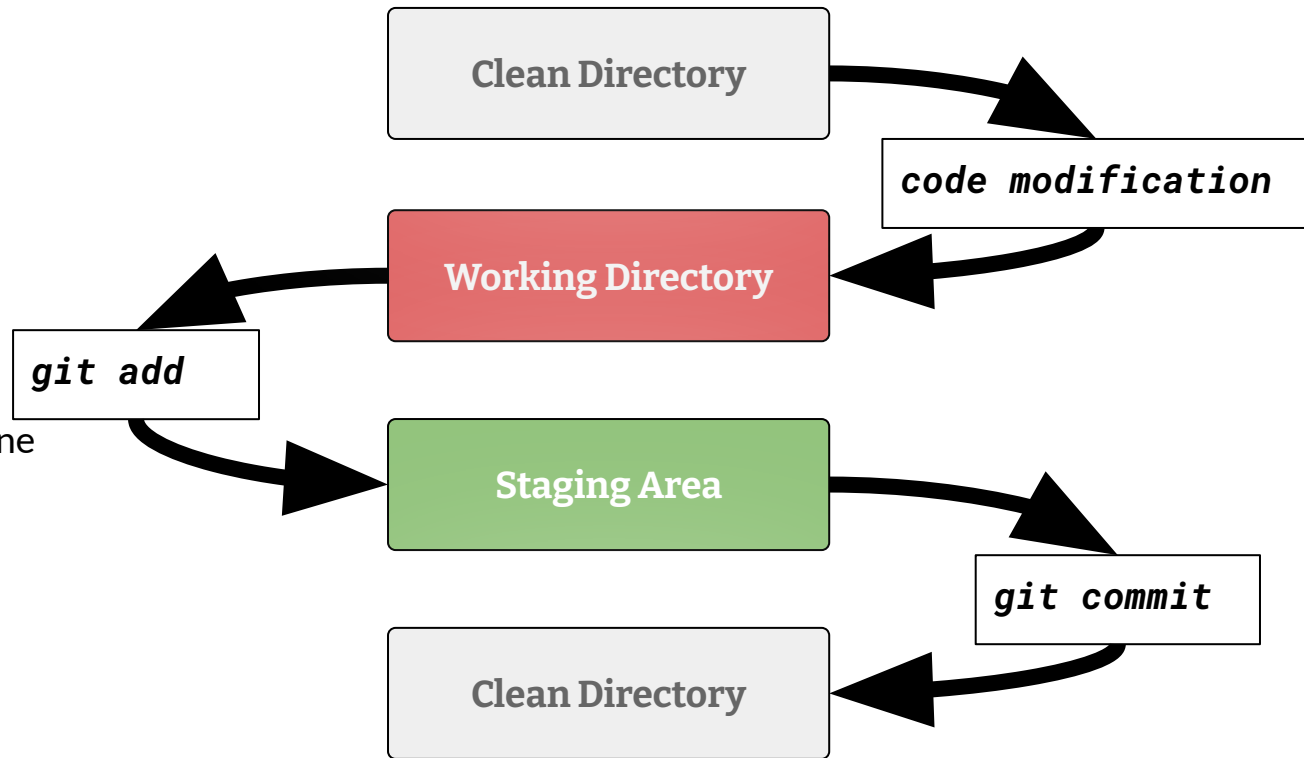
.git folder contient toutes les git métadonnées:

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

Git

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!



Git

Inspection command

Working directory changes details

- `git diff`

Staging area informations:

- `git status`

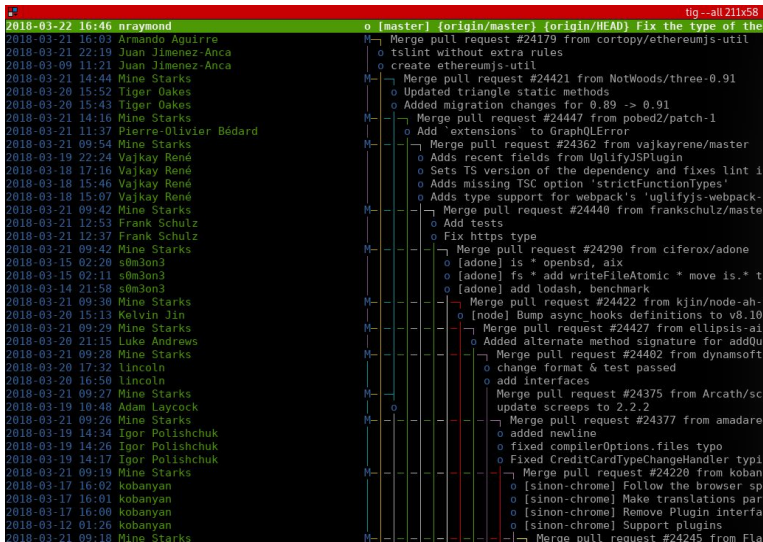
Commit history:

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

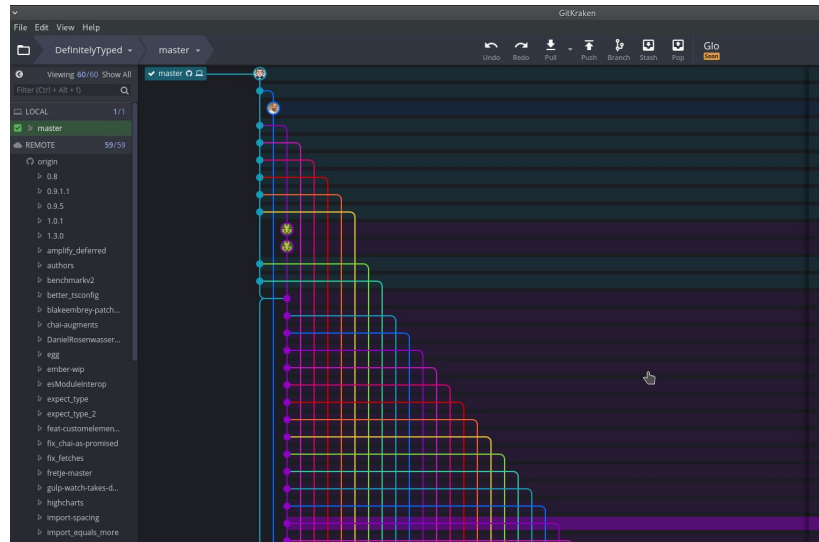
Git Useful tools

Textual interface for git: TIG

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



```
2018-03-22 16:46 nraymond o [master] (origin/master) (origin/HEAD) Fix the type of the
2018-03-21 16:03 Armando Aguirre o Merge pull request #24179 from cortopy/ethereumjs-util
2018-03-21 22:19 Juan Jimenez-Anca o tslint without extra rules
2018-03-09 11:21 Juan Jimenez-Anca o create ethereumjs-util
2018-03-21 14:44 Mine Starks M Merge pull request #24421 from NotWoods/three-0.91
2018-03-20 15:52 Tiger Oakes o Updated triangle static methods
2018-03-20 15:43 Tiger Oakes o Added migration changes for 0.89 -> 0.91
2018-03-21 14:16 Mine Starks M Merge pull request #24447 from pobed2/patch-1
2018-03-21 11:37 Pierre-Olivier Bédard o Add 'extensions' to GraphQLError
2018-03-21 09:54 Mine Starks M Merge pull request #24362 from vajkayrene/master
2018-03-19 22:24 Vajkay René o Adds recent fields from UglifyJSPlugin
2018-03-18 17:16 Vajkay René o Sets TS version of the dependency and fixes lint l
2018-03-18 15:46 Vajkay René o Adds missing TSC option 'strictFunctionTypes'
2018-03-18 15:07 Vajkay René o Adds type support for webpack's 'uglifyjs-webpack-
2018-03-21 09:42 Mine Starks M Merge pull request #24440 from frankschulz/maste
2018-03-21 12:53 Frank Schulz o Add tests
2018-03-21 12:37 Frank Schulz o Fix https type
2018-03-21 09:42 Mine Starks M Merge pull request #24290 from ciferox/adone
2018-03-15 02:20 s8m3on3 o [adone] is * openbsd, aix
2018-03-15 02:11 s8m3on3 o [adone] fs * add writeFileAtomic * move is.* t
2018-03-14 21:58 s8m3on3 o [adone] add lodash, benchmark
2018-03-21 09:38 Mine Starks M Merge pull request #24422 from kjin/node-ah
2018-03-20 15:13 Kelvin Jin o [node] Bump async_hooks definitions to v8.10
2018-03-21 09:29 Mine Starks M Merge pull request #24427 from ellipsis-ai
2018-03-20 21:15 Luke Andrews o Added alternate method signature for addQu
2018-03-21 09:28 Mine Starks M Merge pull request #24402 from dynamsoft
2018-03-20 17:32 Lincoln o change format & test passed
2018-03-20 16:58 Lincoln o add interfaces
2018-03-21 09:27 Mine Starks M Merge pull request #24375 from Arcath/sc
2018-03-19 10:48 Adam Laycock o update screeps to 2.2.2
2018-03-21 09:26 Mine Starks M Merge pull request #24377 from amadare
2018-03-19 14:34 Igor Polishchuk o added newline
2018-03-19 14:26 Igor Polishchuk o fixed compilerOptions.files typo
2018-03-19 14:17 Igor Polishchuk o Fixed CreditCardTypeChangeHandler typi
2018-03-21 09:19 Mine Starks M Merge pull request #24220 from kobanyan
2018-03-17 16:02 kobanyan o [sinon-chrome] Follow the browser sp
2018-03-17 16:01 kobanyan o [sinon-chrome] Make translations par
2018-03-17 16:00 kobanyan o [sinon-chrome] Remove Plugin interfa
2018-03-12 01:26 kobanyan o [sinon-chrome] Support plugins
2018-03-21 09:18 Mine Starks M Merge pull request #24245 from Fla
```



Premières étapes



Git

Premières étapes : S'authentifier

Command Line

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

Working directory

```
my-project
```



Git

Premières étapes : Initialiser le repo

Command Line

```
cd my-project  
git init  
touch README.md
```

Working directory

```
my-project  
├── .git/  
└── README.md
```



Git

Premières étapes : Ajouter le README

Command Line

```
# Edit README.md  
git add README.md
```

Working directory

```
my-project  
├── .git/  
└── README.md ++
```



Git

Premières étapes: Commit README

Command Line

```
git commit -m "Initial commit"
```

Working directory

```
my-project
├── .git/
└── README.md
```

Git log

```
commit
170bbfdbf6215fd31dd0e9df1059e79393e7
438d (HEAD -> master)
Author: John Doe <jdoe@takima.fr>
Date: Thu Jan 30 12:29:15 2020
+0100
```

Initial commit

Git tree

```
* 170bbfd (HEAD -> master) Initial
commit
```



Git

Premières étapes: Ignore des fichiers

Command Line

```
# Add and edit a .gitignore file and hello class:  
src/Hello.java
```

Working directory

```
my-project  
├── .git/  
├── README.md  
├── .gitignore  
└── src/
```

.gitignore

```
.idea/  
*.svn  
.DS_Store  
.project  
.settings  
.classpath  
Thumbs.db  
bin  
target  
*~
```

<https://www.gitignore.io/>



Git

Premières étapes: Trouver de la documentation

Command Line

```
git add --help  
□ git add -A
```

Working directory

```
my-project  
├── .git/  
├── README.md  
├── .gitignore ++  
└── src/Hello.java ++
```

.gitignore

- **Description**
"This command updates the index using the current content found in the working tree ..."
- **Options**
*"-f, --force
Allow adding otherwise ignored files.
-i, --interactive
Add modified contents in the working tree interactively to the index..."*
- **Configuration**
"The optional configuration variable core.excludesFile indicates a path to a file containing patterns"
- **Example**
"\$ git add Documentation/.txt "*



Git

Premières étapes: Commit .gitignore

Command Line

```
git commit -m "Add gitignore and Hello class"
```

Working directory

```
my-project
├── .git/
├── README.md
├── .gitignore ++
└── src/Hello.java ++
```

Git log

Git tree

```
* 2d1d505 (HEAD -> master) Add
gitignore...
* 170bbfd Initial commit
```



Git

Premières étapes: Git difference

Command Line

```
# Implement hello world class: src/Hello.java  
git diff
```

Working directory

```
my-project  
├── .git/  
├── README.md  
├── .gitignore  
└── src  
    └── Hello.java
```

Git diff

```
diff --git a/src/Hello.java  
b/src/Hello.java  
index 9b4320d..30f1f79 100644  
--- a/src/Hello.java  
+++ b/src/Hello.java  
@@ -1,3 +1,5 @@  
    public class Main {  
-  
+    public static void main(String...  
args) {  
+        System.out.println("Hello  
World !");  
+    }  
}
```



Git

Premières étapes: Add

Command Line

```
git commit -am "Add hello world"
```

Working directory

```
my-project
├── .git/
├── README.md
├── .gitignore
├── src
│   └── Hello.java
```

Git tree

```
* 603117b (HEAD -> master) Add hello
world
* 2d1d505 Add gitignore...
* 170bbfd Initial commit
```

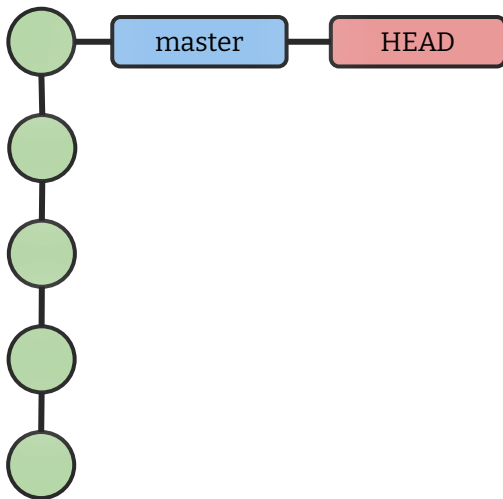
Branches



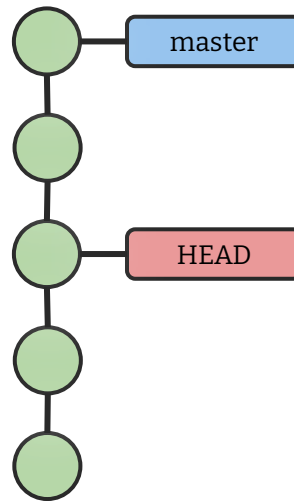
Git

Branching notions:

Head Attached...



Head Detached..



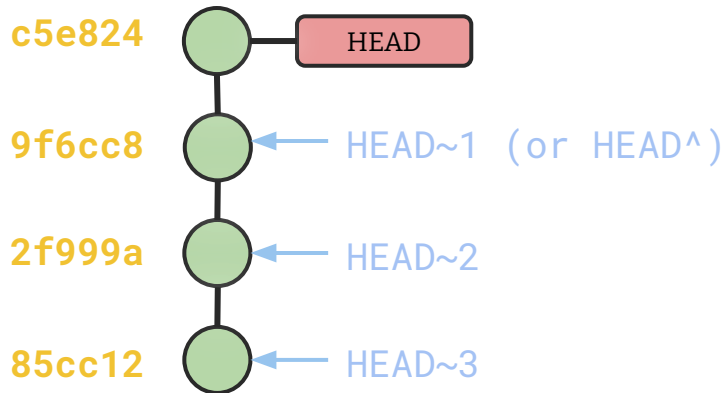


Git

Branching notions

- Utilise une référence qui pointe vers le
commit(branch, tag, HEAD...)
- Utilise le commit id
- Utilise un relative acceso avec `ref~number`

(`HEAD~2` ça veut dire “2 commits avant
HEAD”)



Forking

Git Forking

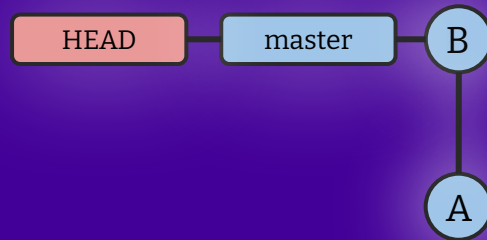
Command Line

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

Working directory

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

Git log



Git Forking: Créer une branche

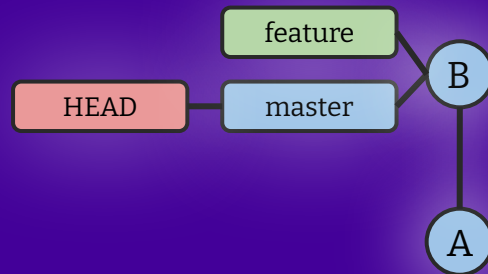
Command Line

```
git branch feature
```

Working directory

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

Git log





Git

Forking: Checkout une autre branche

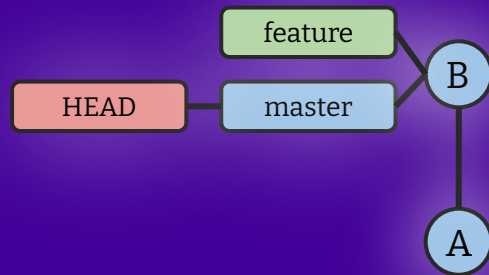
Command Line

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

Working directory

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

Git log





Git

Forking: Creer un commit sur une branche

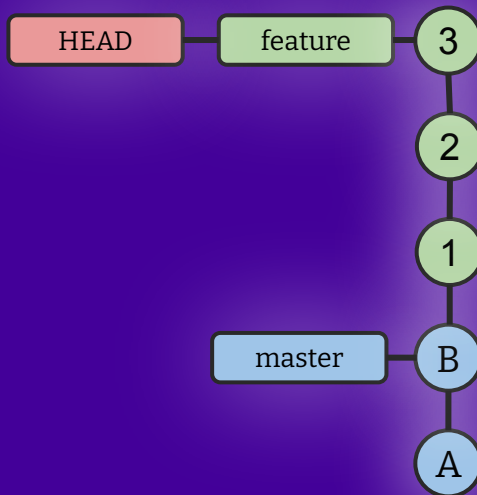
Command Line

```
# 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





Git

Forking: Checkout master

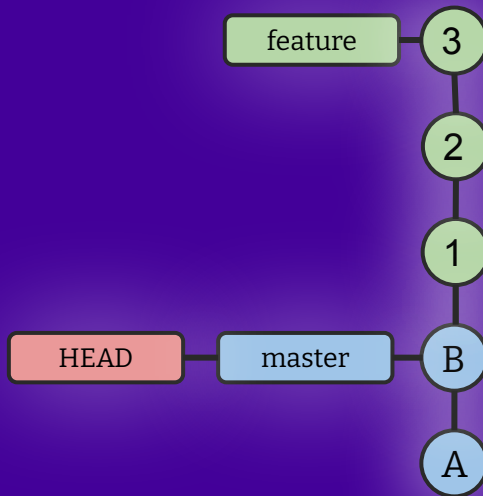
Command Line

```
git checkout master
```

Working directory

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

Git log



CI/CD

DevOps workflows made easy



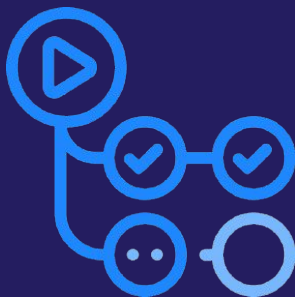


Continuous Integration and Continuous Delivery

Automate your problems away



With Github



Github
Actions



SonarCloud



CI/CD

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 \Rightarrow Une personne qui **déteste** faire 2 fois la même chose à la main.

CI/CD

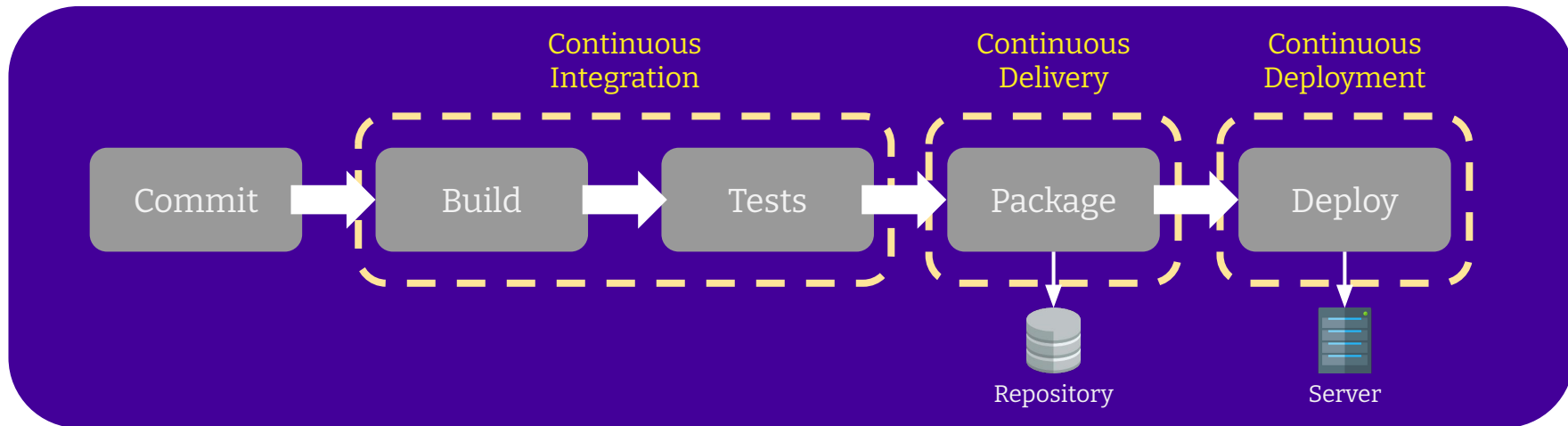
Avant CI/CD

Continuous Integration (CI)

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

Continuous Delivery/Deployment (CD)

- Mettre les artefacts sur un repo
- Automatiser le déploiement





CI/CD

Pour et Contre





CI/CD

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

CI/CD Outils

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

Intro to Github & Github Actions



CI/CD

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
- ✓ Installation simple
- ✓ Configuration déclaration dans un seul fichier
- ✓ Open source

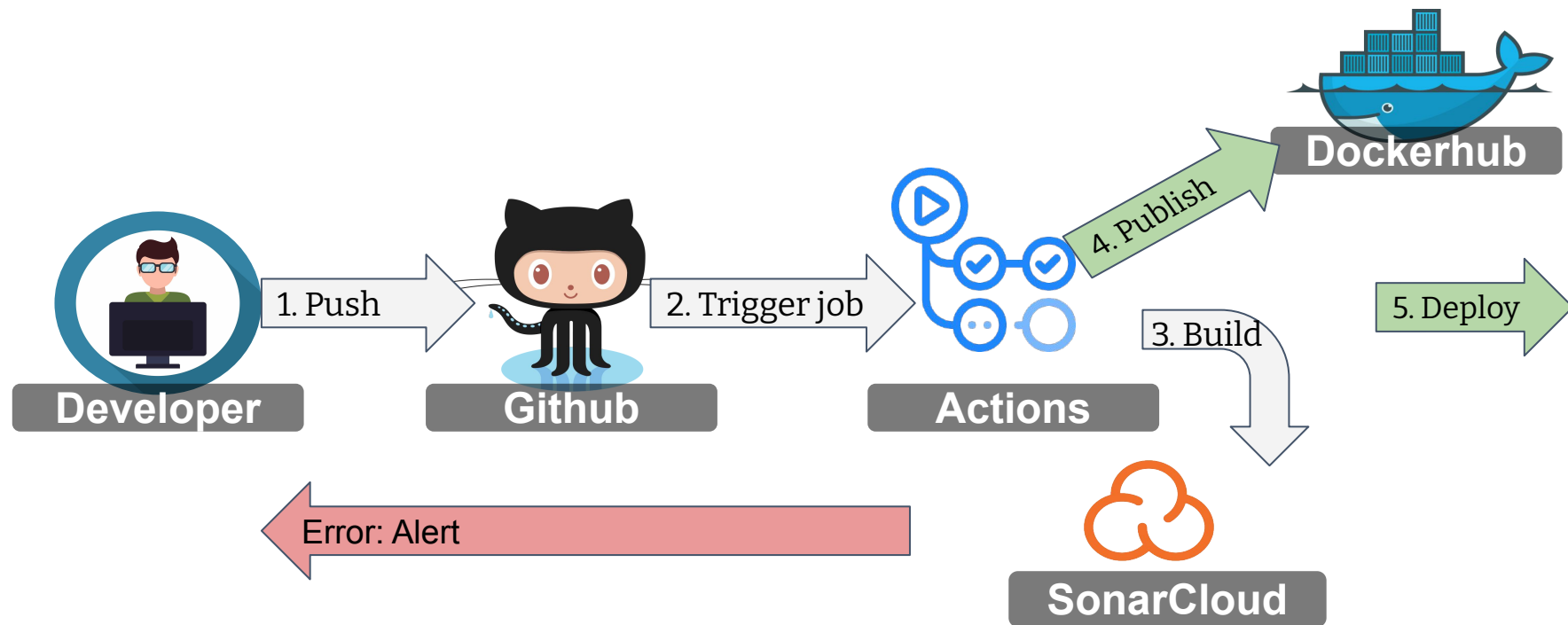
- ✗ Full Github integration
- ✗ Des fonctionnalités payantes

Github Actions



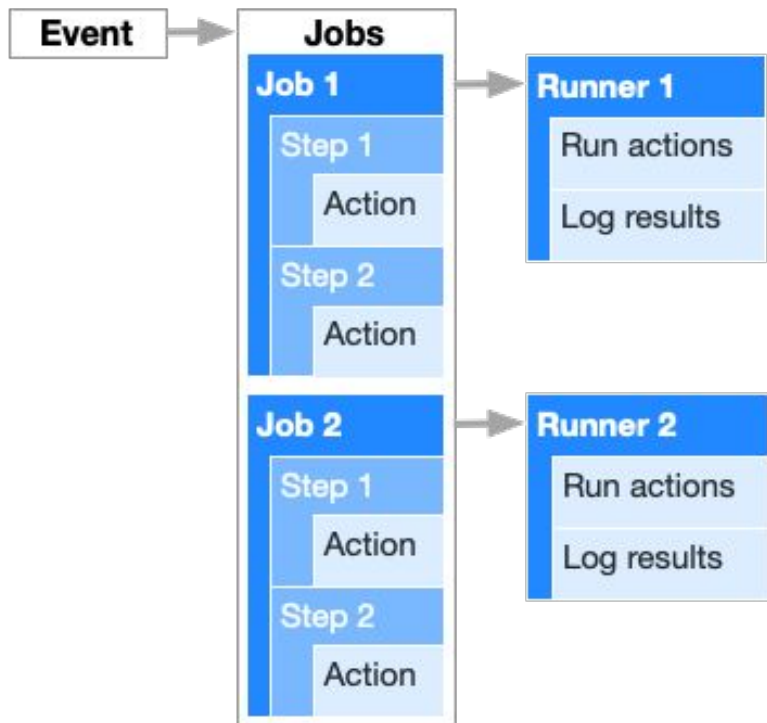
CI/CD

Comment ça marche?





Comment ça marche?



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

CI/CD .main.yml

```
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
```

Event
on: [push]

Job: check-bats-version

Step 1

Checkout repository

- uses: actions/checkout@v2

Step 2

Install node

- uses: actions/setup-node@v2

Step 3

Install bats

- run: npm install -g bats

Step 4

Run bats




- run: bats -v



CI/CD

Secrets et variables

Actions
Environments
Secrets
Actions Dependabot
Pages
Moderation settings

Repository secrets			
	DOCKERHUB_TOKEN	Updated 8 hours ago	<button>Update</button> <button>Remove</button>
	DOCKERHUB_USERNAME	Updated 8 hours ago	<button>Update</button> <button>Remove</button>
	SONAR_TOKEN	Updated 2 hours ago	<button>Update</button> <button>Remove</button>

Sonar Cloud



CI/CD

Dette technique

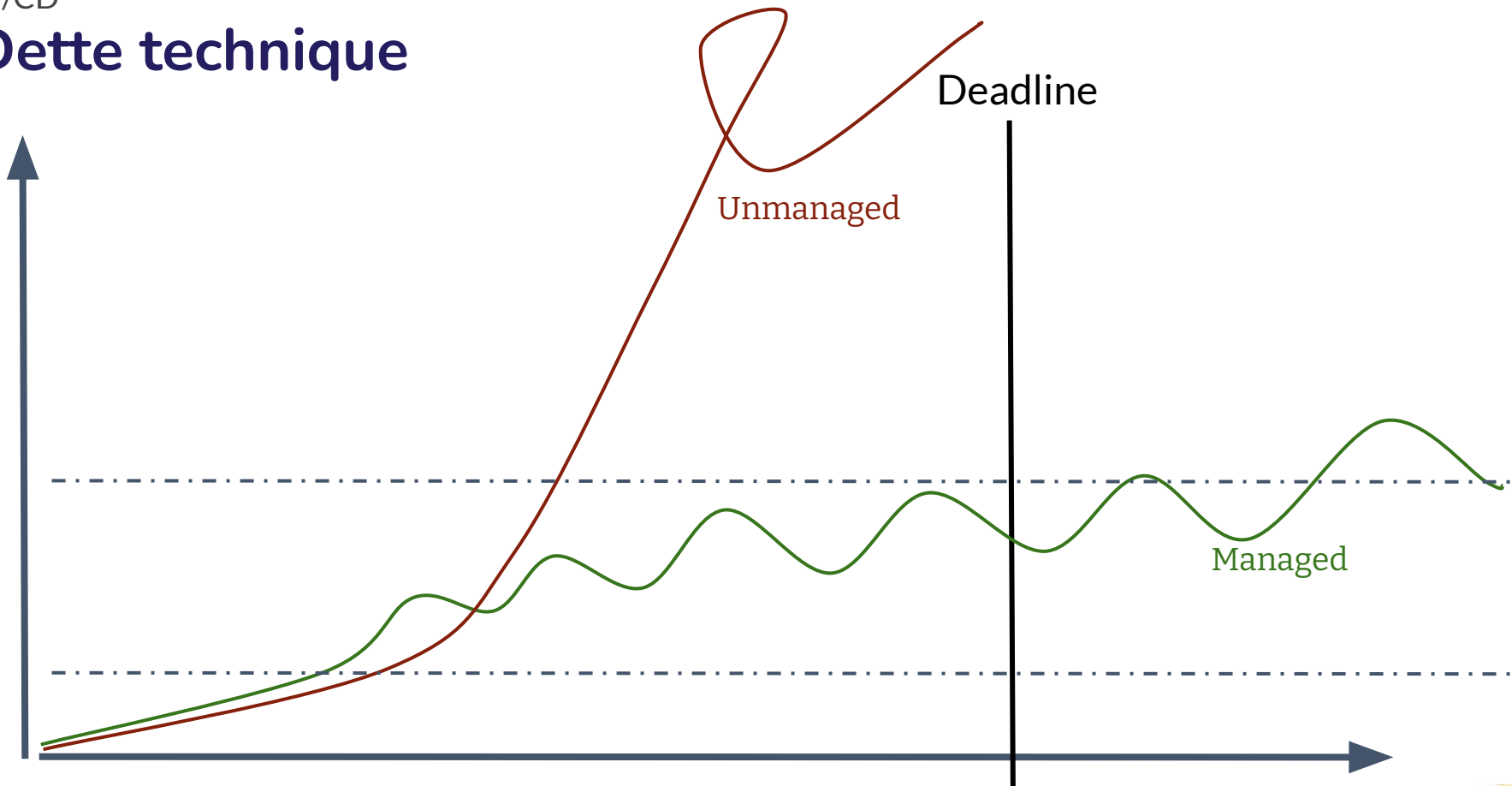
Total
Tech
Debt

Deadline

Unmanaged

Managed

Time





CI/CD

SonarCloud: qualité

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



Docker

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 !

<https://bit.ly/DEVOPS2022>

TD02 - git & Github