

# FAIR Bioinfo 2022

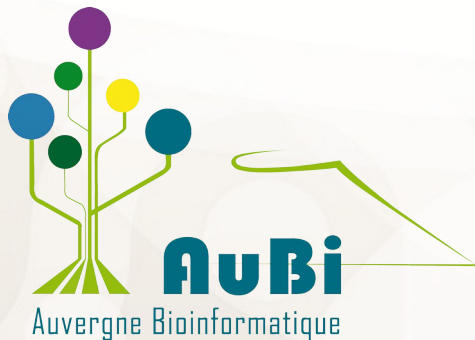
## Introduction to Git, GitHub/Gitlab

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Université Clermont Auvergne, AuBi, Mésocentre

du 28 novembre au 02 décembre 2022



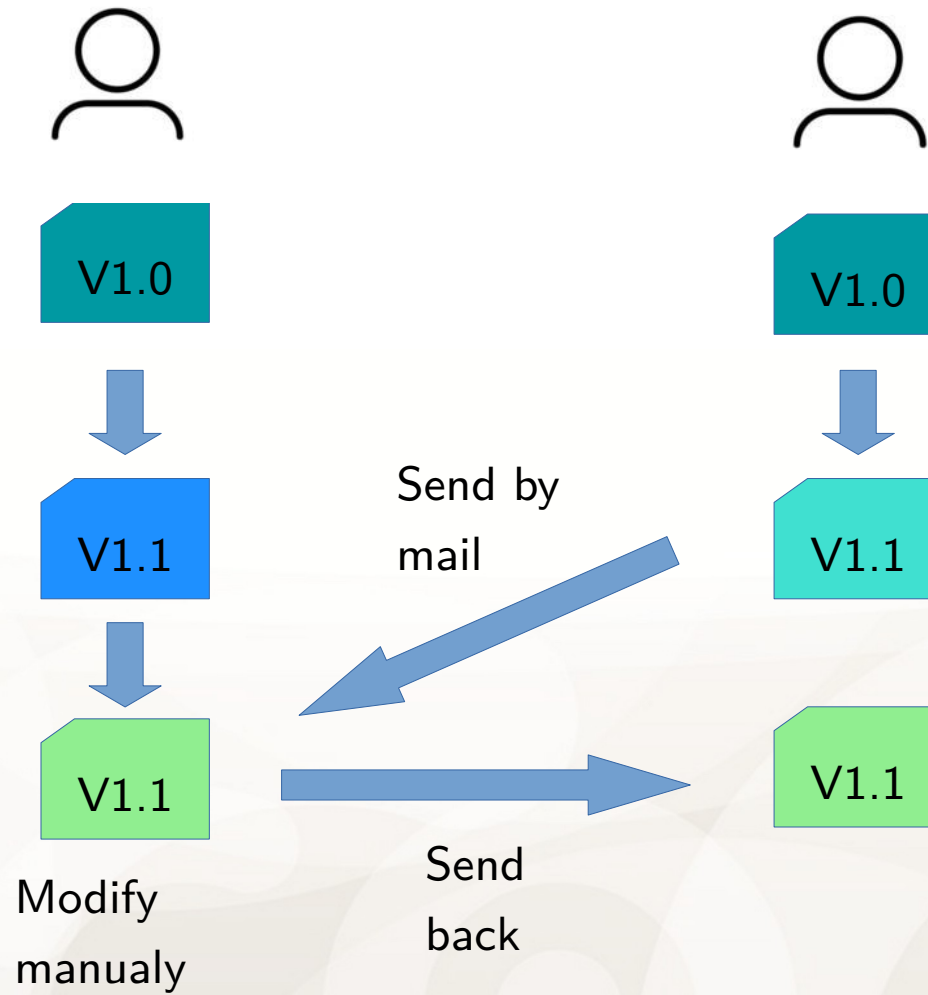
Version control system

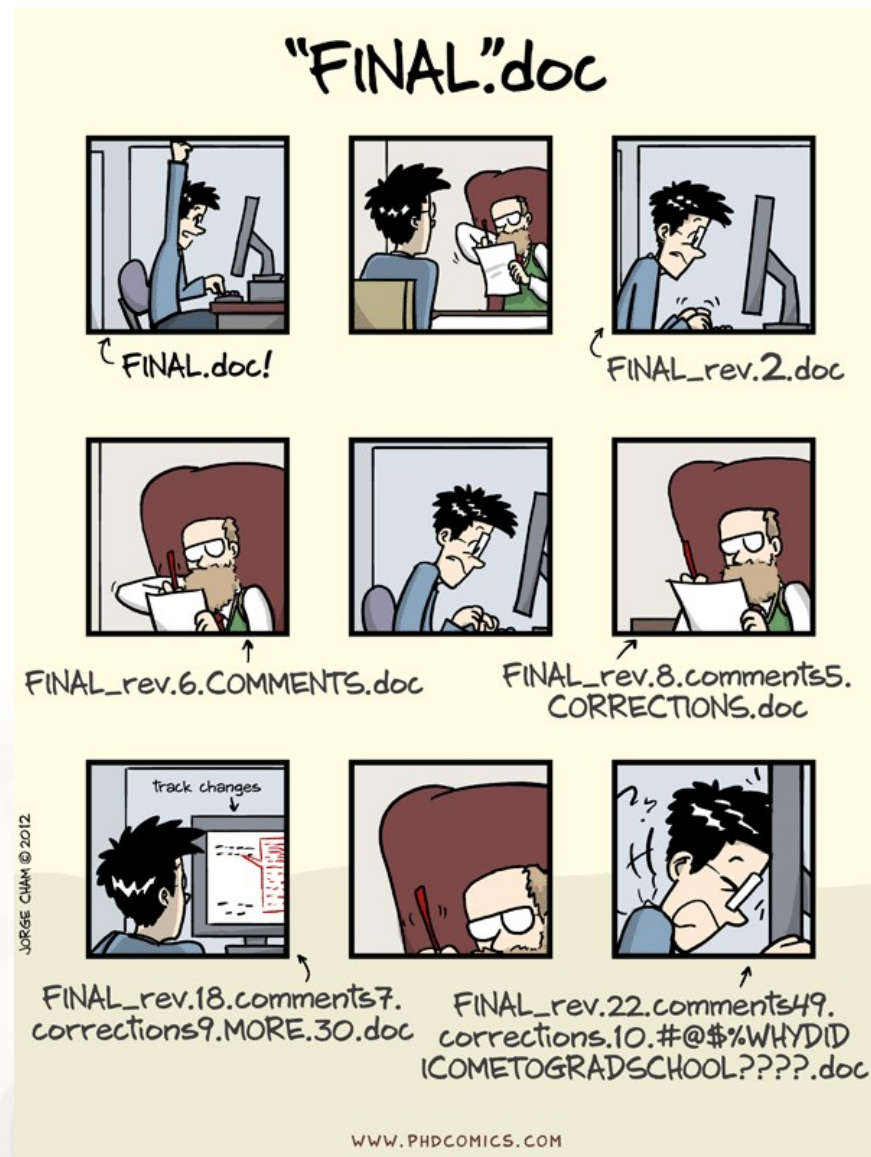


Online hosting service  
for software base on git

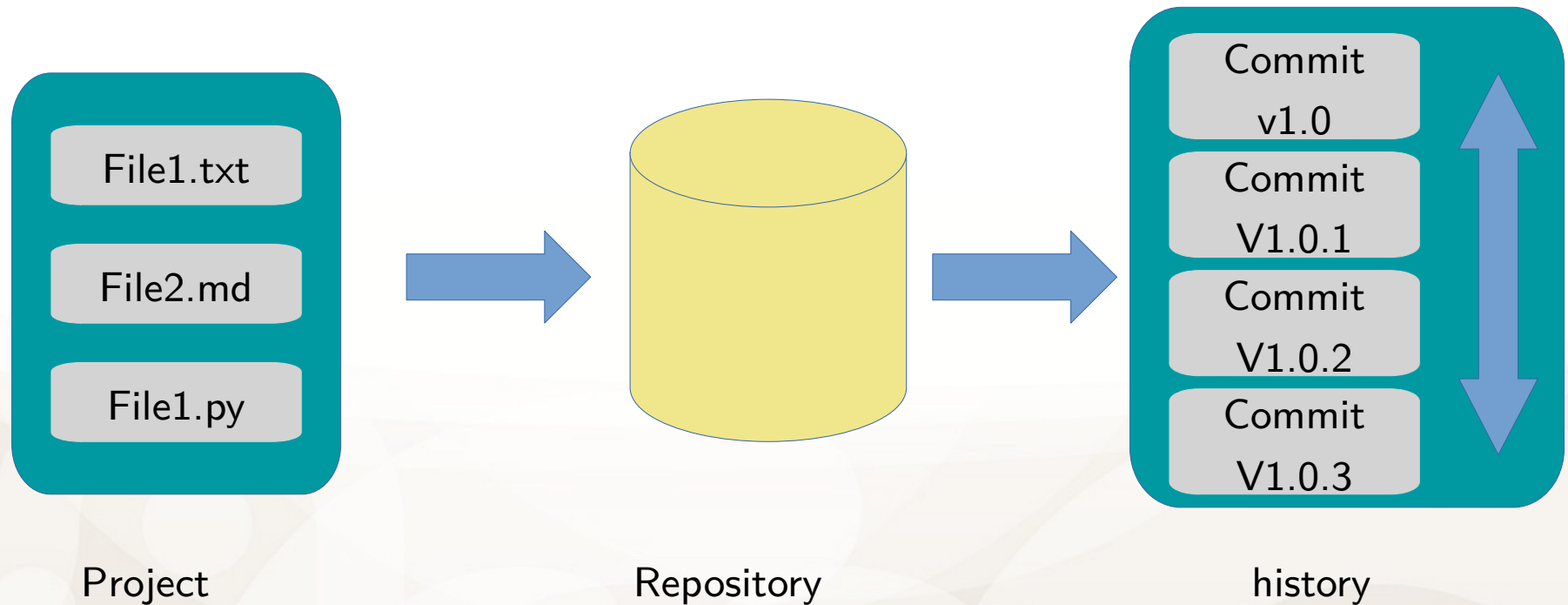


# Sharing code

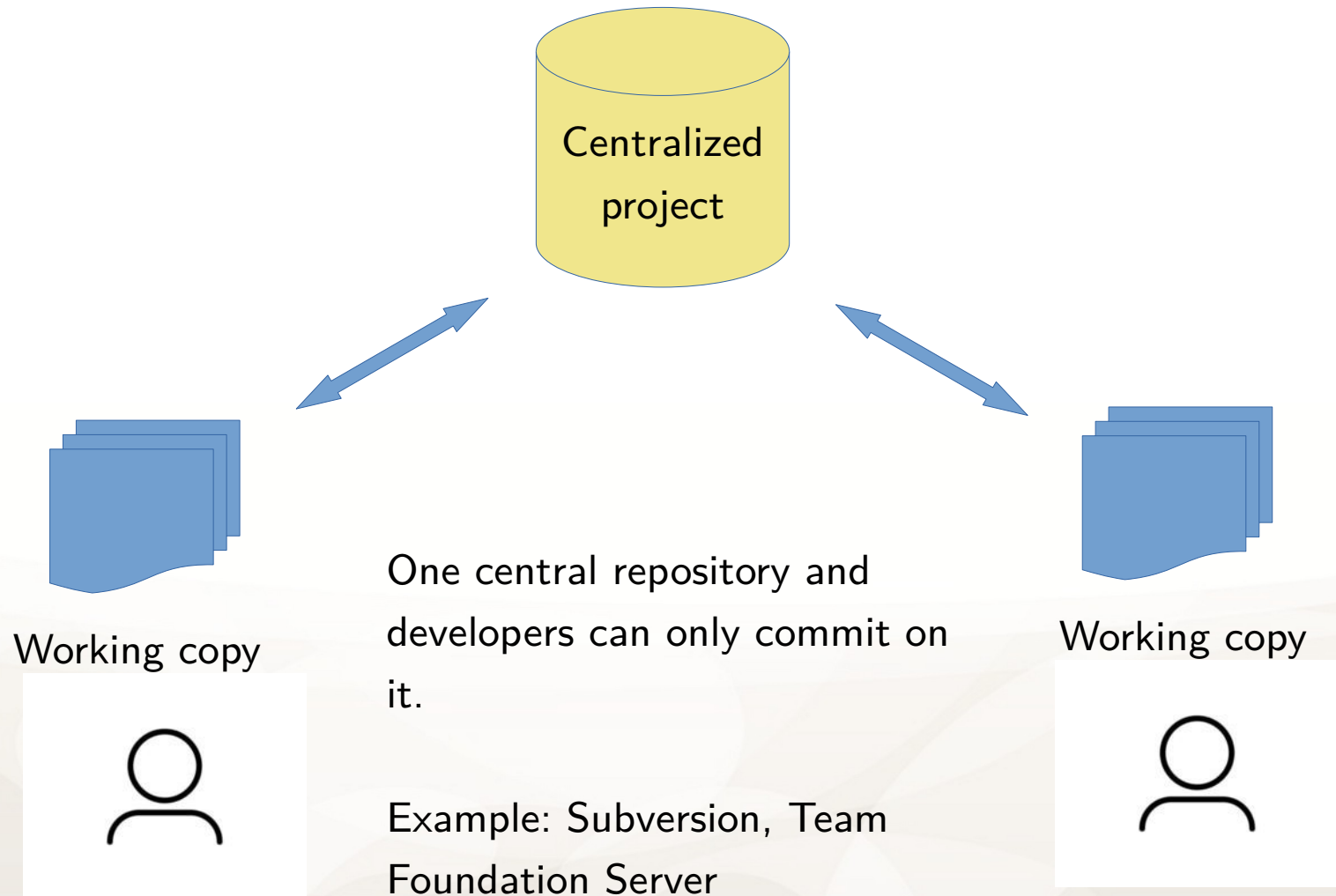




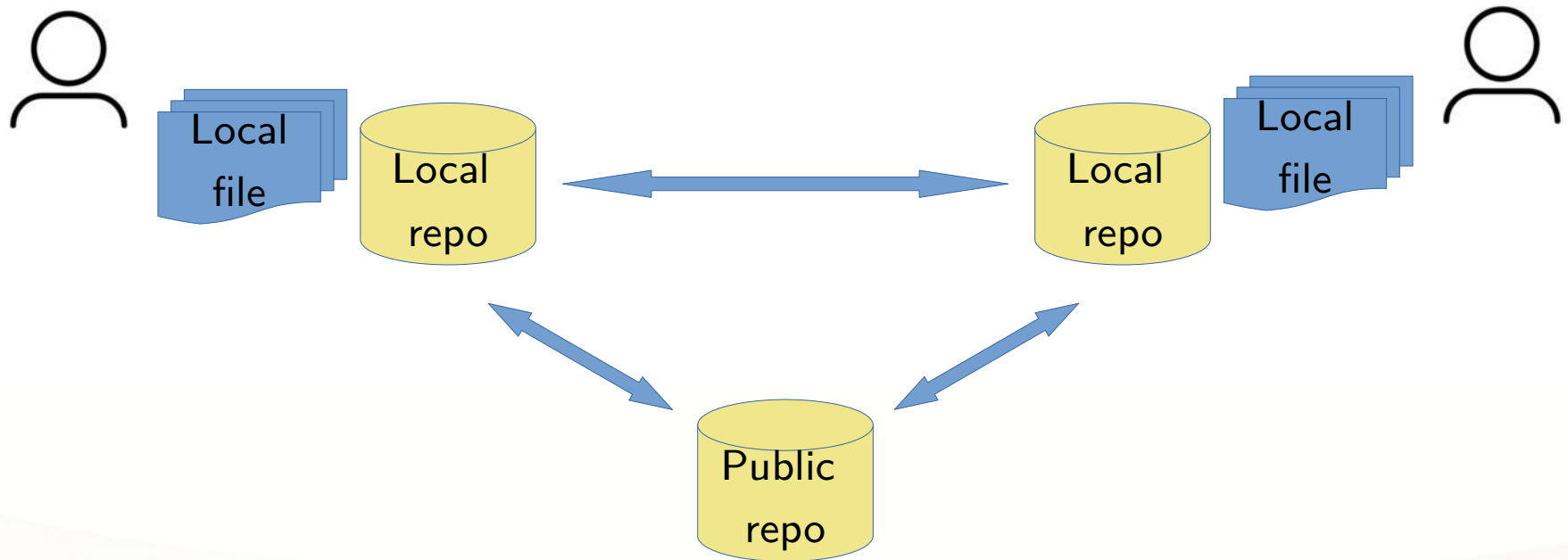
# Git a version control system



# Centralized version control



# Distributed version control



All repositories are interconnected and can be edited at same time.

Example: Git, Mercurial

Git is a free and open source distributed version control system.

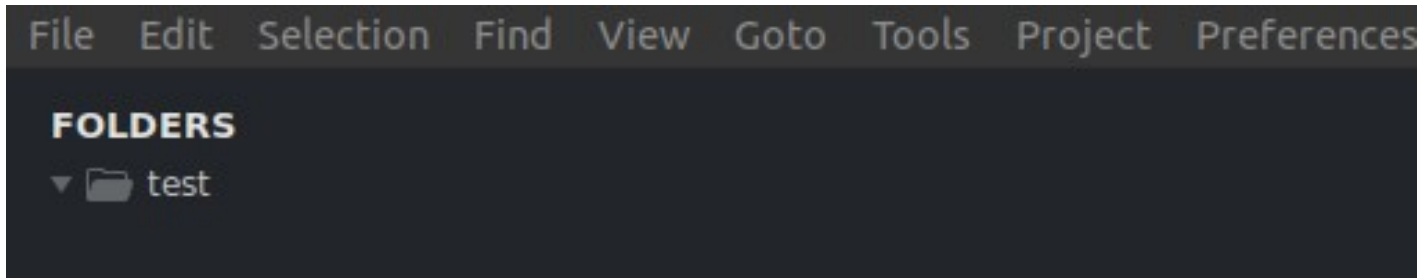
Handle any type of project, fast and efficiency.

Created in 2005 by Linus Torvalds

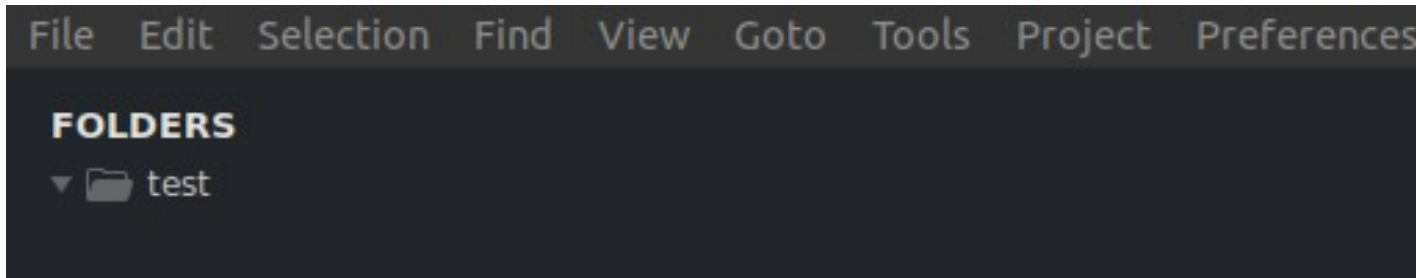




# Git: Initialisation



# Git: Initialization

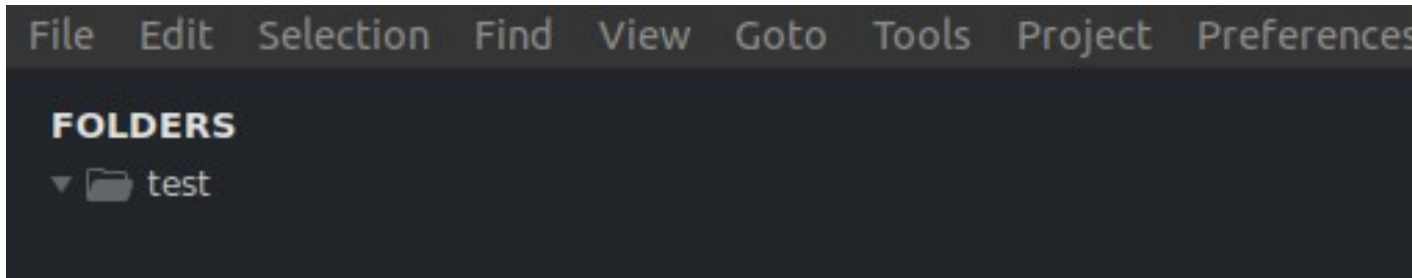


```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git init
Dépôt Git vide initialisé dans /home/mateo_h/formation_fair/test/.git/
```

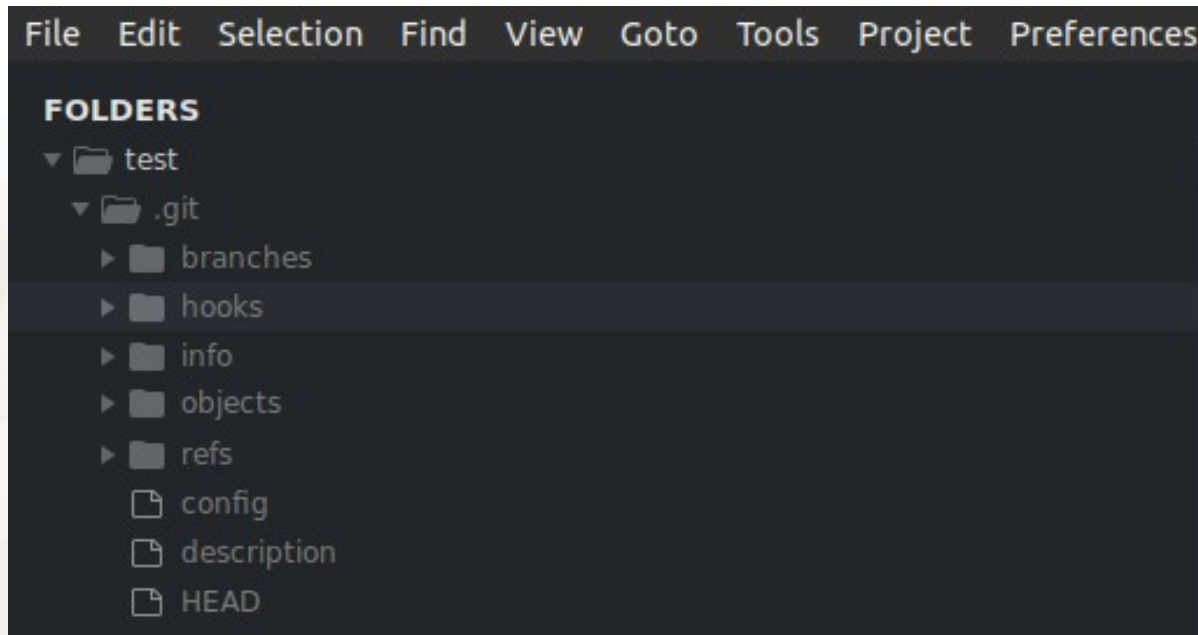
“Git init “ to initialize a git repository in any folder

“Git clone” can also be used to import an existing repository

# Git: Initialization



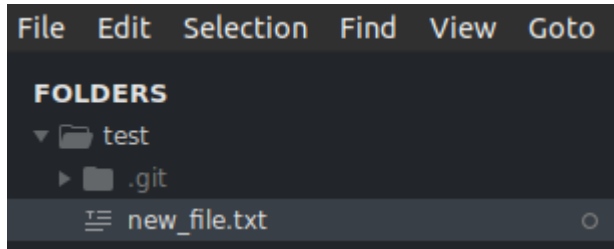
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mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git init
Dépôt Git vide initialisé dans /home/mateo_h/formation_fair/test/.git/
```



“Git init “ to initialize a git repository in any folder

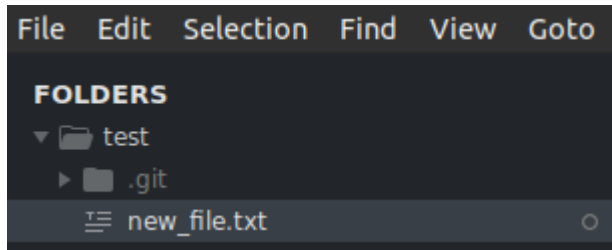
“Git clone” can also be used to import an existing repository

# Git: Commit



Create new file in project

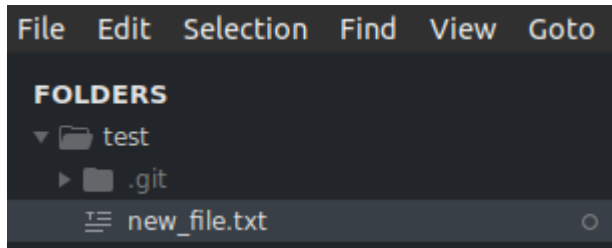
# Git: Commit



Create new file in project

```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git add new_file.txt
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git commit -m "first commit"
[master (commit racine) 59647f6] first commit
1 file changed, 1 insertion(+)
create mode 100644 new_file.txt
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$
```

# Git: Commit



Create new file in project

```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git add new_file.txt
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git commit -m "first commit"
[master (commit racine) 59647f6] first commit
1 file changed, 1 insertion(+)
create mode 100644 new_file.txt
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$
```

```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git log
commit 59647f6ac1250276f91d7312b25e52c7974e616d (HEAD -> master)
Author: HIRIART <mateo.HIRIART@uca.fr>
Date:   Wed Nov 23 15:25:26 2022 +0100

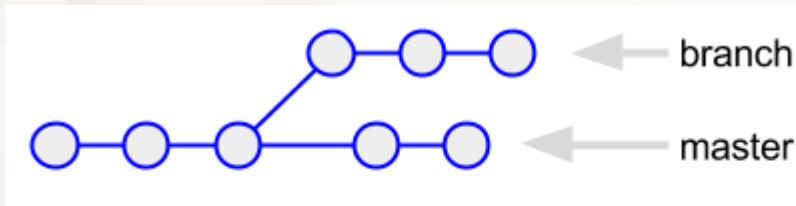
    first commit
```

Commits are snapshot of your files (code)

They all have a unique id

And are linked to their parent

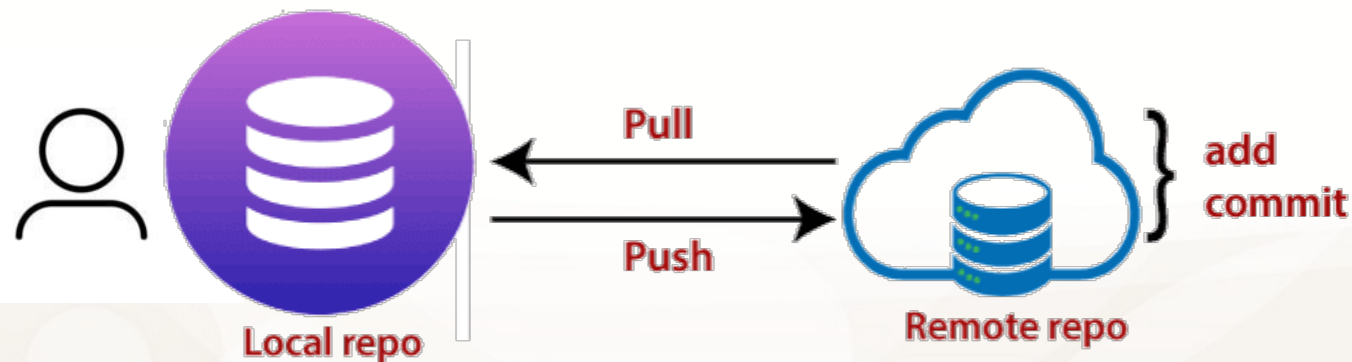
Can always go back to previous commit



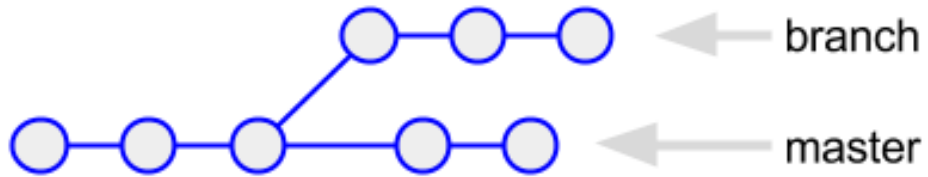
# Git: Push and Pull

Git **pull** imports modification from another repository if it has the same origin.

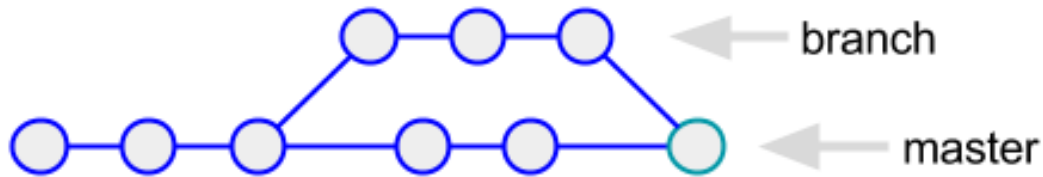
Git **push** exports modification to another repository if it has same origin.



# Git: branches



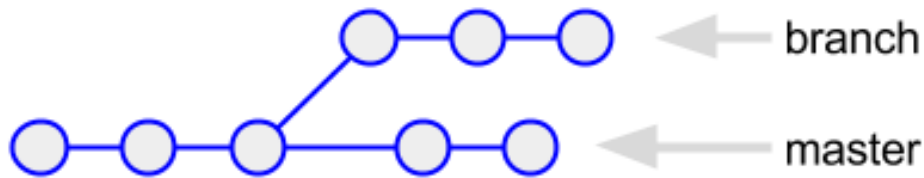
Git **branch** allows parallel development



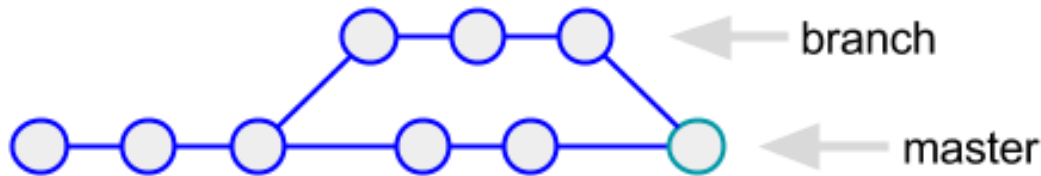
And still applies it latter with code control



# Git: branches



Git **branch** allows parallel development



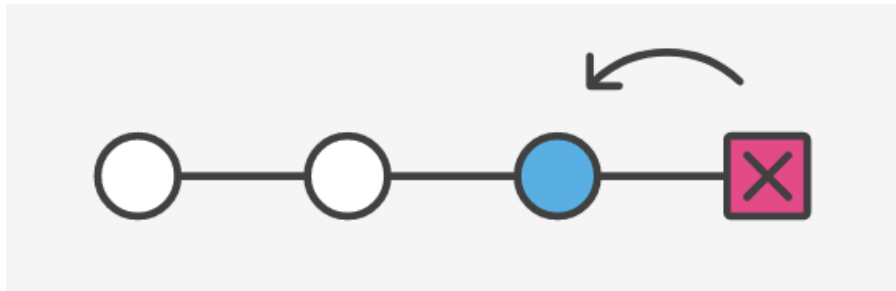
And still applies it latter with code control

```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git branch new_branch
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git branch
* master
  new_branch
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git switch new_branch
Basculement sur la branche 'new_branch'
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git branch
  master
* new_branch
```

# Git: Revert

Git **reset**: reset repository back to the specified HEAD

Git **restore**: reset current modification



```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git status
Sur la branche new_branch
Modifications qui ne seront pas validées :
  (utilisez "git add <fichier>..." pour mettre à jour ce qui sera validé)
  (utilisez "git restore <fichier>..." pour annuler les modifications dans le
répertoire de travail)
      modifié :      new_file.txt

aucune modification n'a été ajoutée à la validation (utilisez "git add" ou "git
commit -a")
```

# Git: Revert

Git reset: reset repository back to the specified commit

Git restore: reset current modification

```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git add .
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git commit -m "update my new_file"
[new_branch 8ad9fa7] update my new_file
1 file changed, 3 insertions(+), 1 deletion(-)
```

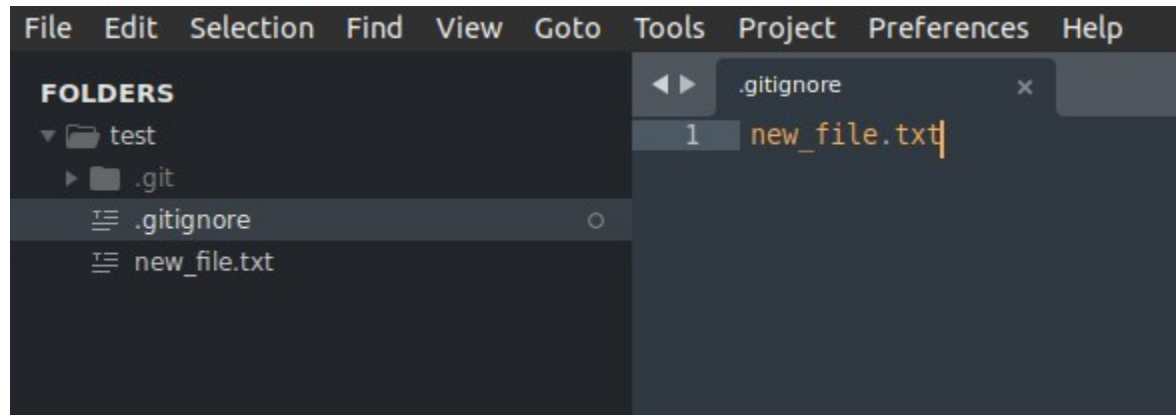
```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git log
commit 8ad9fa7e0c1c91a5d4469d2aa883a0d2052fc18d (HEAD -> new_branch)
Author: HIRIART <mateo.HIRIART@uca.fr>
Date:   Fri Nov 25 11:34:28 2022 +0100

    update my new_file

commit 59647f6ac1250276f91d7312b25e52c7974e616d (master)
Author: HIRIART <mateo.HIRIART@uca.fr>
Date:   Wed Nov 23 15:25:26 2022 +0100

    first commit
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git reset --hard 59647f6ac1250276f9
1d7312b25e52c7974e616d
HEAD est maintenant à 59647f6 first commit
```

# Git: .gitignore



Specific file that tells git to untrack any files listed inside.

Very useful especially with project that required other packages or if you have any file that stores sensitive data.

**Git help:** display multiple git command with a description

**Git log:** display commit history of the current branch

**Git status:** display current state off your local repository

**Git diff:** display code difference between current local repository and HEAD

Documentation link for git command:

<https://git-scm.com/doc>

<https://docs.github.com/fr>

Public repository hosting server.

Both free version with pricing for enhance features.



Released in 2008

Owned by  
microsoft

Fast, more popular



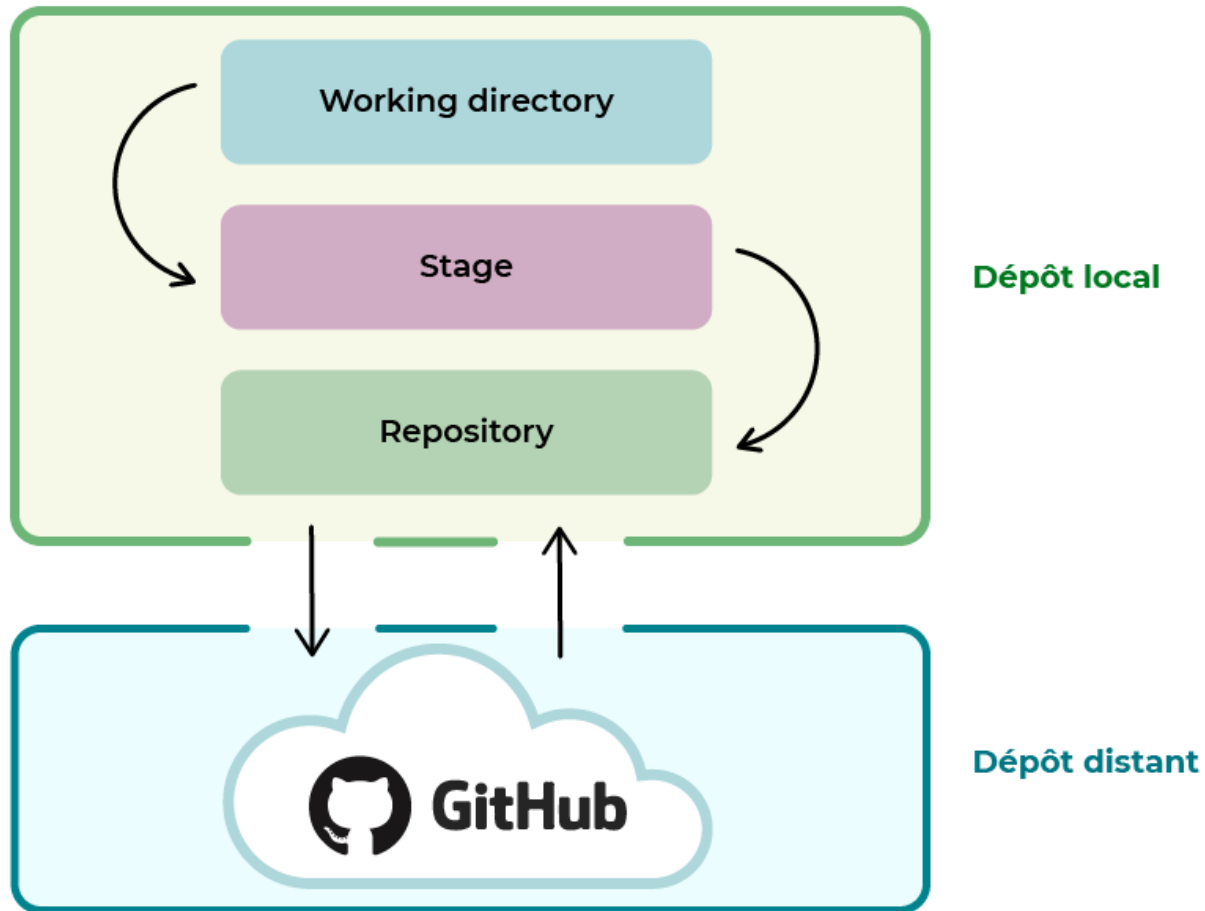
Released in 2014

Open source

Built-in CI/CD,  
Less restriction in  
free version



UNIVERSITÉ  
Clermont Auvergne





## Create your own repository


### Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

---

Owner \*

Repository name \*


 mahiriart ▾

 /


Great repository names are short and memorable. Need inspiration? How about **improved-broccoli?**

Description (optional)

---

☒  **Public**

Anyone on the internet can see this repository. You choose who can commit.

☐  **Private**

You choose who can see and commit to this repository.



Create your own repository, with base features

## Initialize this repository with:

Skip this step if you're importing an existing repository.

### ☐ Add a README file

This is where you can write a long description for your project. [Learn more.](#)

### Add .gitignore


Choose which files not to track from a list of templates. [Learn more.](#)

.gitignore template: None ▾

### Choose a license

A license tells others what they can and can't do with your code. [Learn more.](#)

License: None ▾

 You are creating a public repository in your personal account.

Create repository

## Main page of a repository

The screenshot shows the main page of the **mahiriart / Auract** repository on GitHub. The repository is public and has 1 star, 0 forks, and 1 watch. The navigation bar includes links for Code, Issues, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. The repository is currently on the **master** branch, with 1 branch and 0 tags. The commit history shows a new change with the microreact access token, dated Nov 18, 2021, with 27 commits. The file list includes **auract**, **data\_test**, **.gitignore**, **LICENCE.txt**, **README.md**, **requirements.txt**, and **setup.py**. The **About** section describes the tool as a visualization tool for phylogenomic data, with a README, AGPL-3.0 license, 1 star, 1 watching, and 0 forks. The **Releases** section indicates no releases published and provides a link to create a new release.

**mahiriart / Auract** Public

Pin Unwatch 1 Fork 0 Star 1

<> Code Issues Pull requests Actions Projects Wiki Security Insights Settings

master 1 branch 0 tags

Go to file Add file <> Code

**mahiriart** new change with microreact access token 9f34558 on Nov 18, 2021 27 commits

auract	new change with microreact access token	12 months ago
data_test	add output path argument, update readme	17 months ago
.gitignore	fix	17 months ago
LICENCE.txt	Create LICENCE.txt	17 months ago
README.md	new change with microreact access token	12 months ago
requirements.txt	setuptools implementation, better path managementand and small issu...	17 months ago
setup.py	setuptools implementation, better path managementand and small issu...	17 months ago

**About**

Tool for vizualizing phylogenomic data

Readme

AGPL-3.0 license

1 star

1 watching

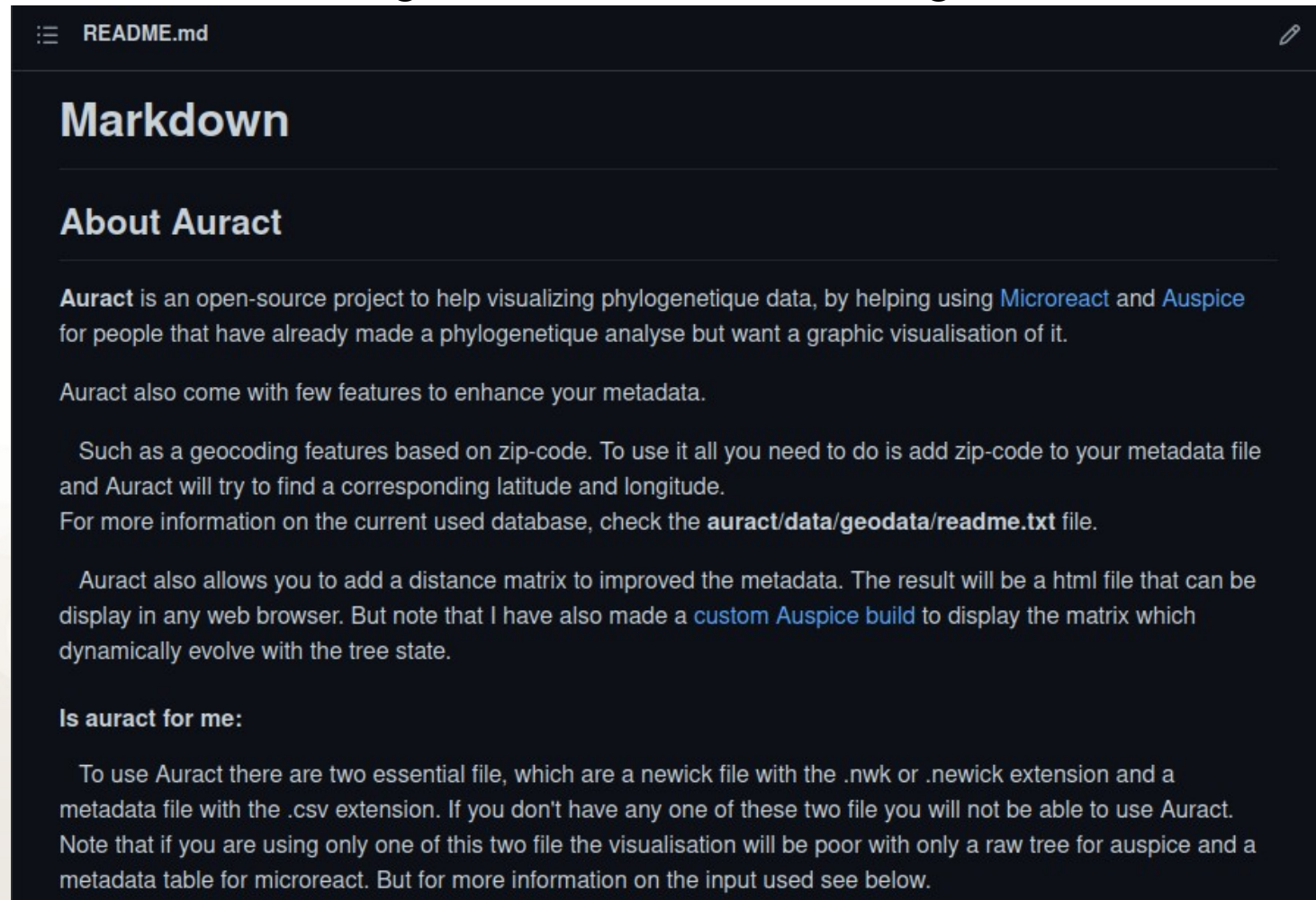
0 forks

**Releases**

No releases published

Create a new release

Readme usually presents the repository and also has documentation or guide on installation and usage.




# Github/Gitlab: Open source project

Find open source project and publish yours


Worldwide interactive development

**8 repository results**


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 [vadumont/heimdall](#)  
Projet Heimdall - **Université Clermont Auvergne**  
● Shell   GPL-3.0 license   Updated on Feb 1, 2019


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 [bibnumbcu/barometre-uca](#)  
Baromètre pour la science ouverte pour l'**Université Clermont Auvergne**  
● Jupyter Notebook   GPL-3.0 license   Updated on Feb 11

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 [mariuslp/iut\\_crypto](#)  
Slides du cours d'introduction à la cryptographie, IUT de l'**Université Clermont-Auvergne**  
Updated on Oct 3, 2019


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 [ksubileau/ENTDownloader](#) Public archive  
[ARCHIVE] Gestionnaire de fichiers pour l'ENT de l'**Université d'Auvergne**.  
☆ 1   ● Java   GPL-3.0 license   Updated on Jul 12, 2014

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Key element for public repository, allow then to truly be open source.

Allow others to freely use, change and distribute your code.

 mahiriart/Auract is licensed under the **GNU Affero General Public License v3.0**

Permissions of this strongest copyleft license are conditioned on making available complete source code of licensed works and modifications, which include larger works using a licensed work, under the same license. Copyright and license notices must be preserved. Contributors provide an express grant of patent rights. When a modified version is used to provide a service over a network, the complete source code of the modified version must be made available.

Permissions	Limitations	Conditions
✓ Commercial use	✗ Liability	ⓘ License and copyright notice
✓ Modification	✗ Warranty	ⓘ State changes
✓ Distribution		ⓘ Disclose source
✓ Patent use		ⓘ Network use is distribution
✓ Private use		ⓘ Same license



Many licences available

## Searching GitHub by license type

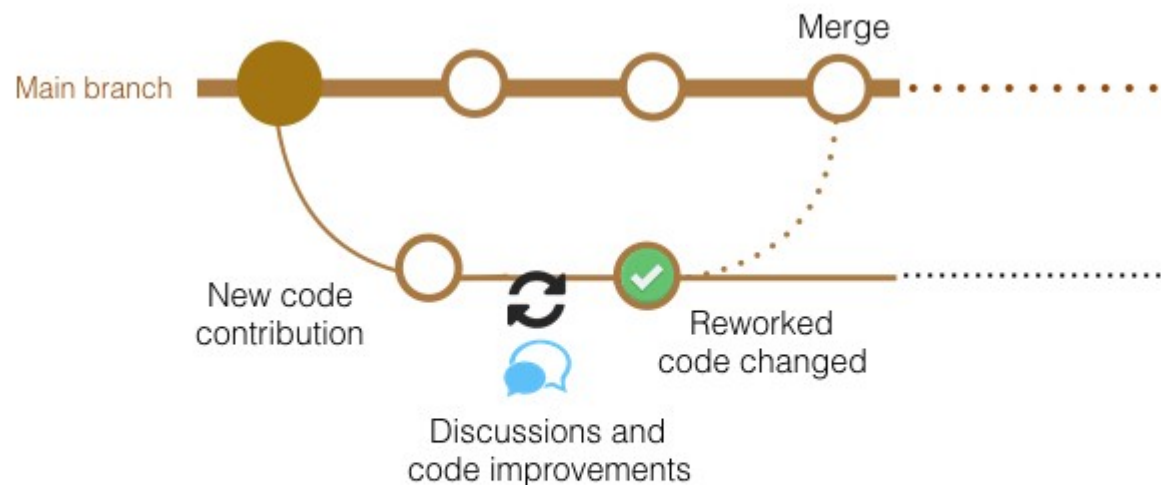
You can filter repositories based on their license or license family using the `license` qualifier and the exact license keyword:

License	License keyword
Academic Free License v3.0	<code>af1-3.0</code>
Apache license 2.0	<code>apache-2.0</code>
Artistic license 2.0	<code>artistic-2.0</code>
Boost Software License 1.0	<code>bsl-1.0</code>
BSD 2-clause "Simplified" license	<code>bsd-2-clause</code>
BSD 3-clause "New" or "Revised" license	<code>bsd-3-clause</code>
BSD 3-clause Clear license	<code>bsd-3-clause-clear</code>
Creative Commons license family	<code>cc</code>

# Github/Gitlab: Issues and pull request

Issues are features to point out problem in code or possible enhancement. Usually solved in a pull request.

Pull requests are code contributions in a review state.



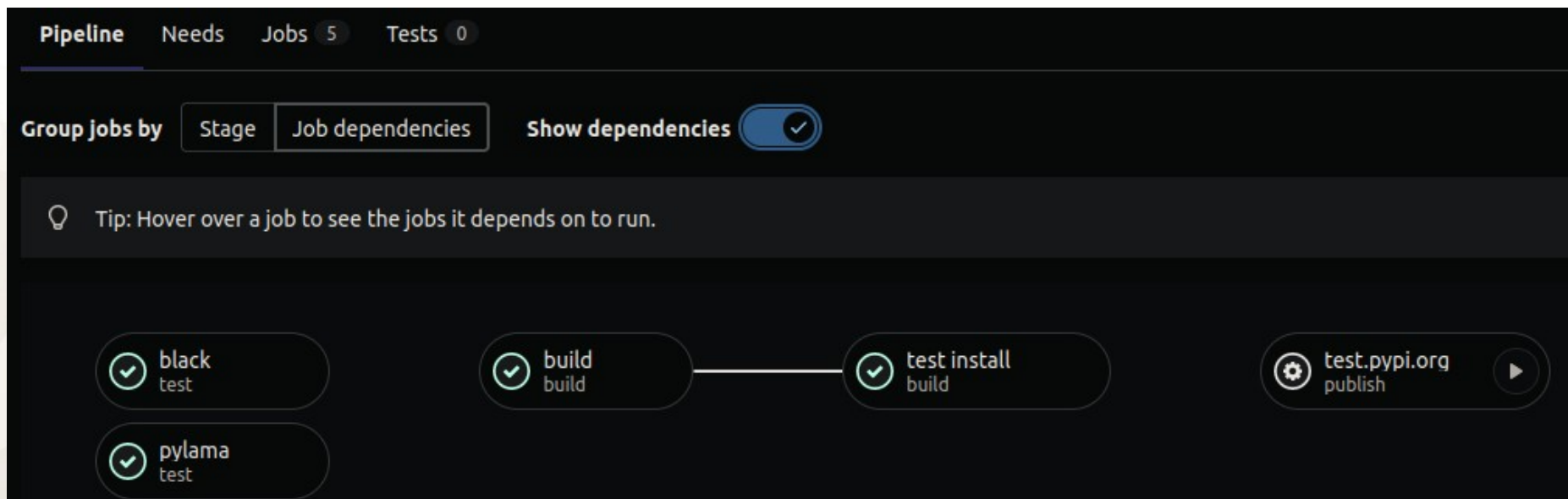
Simplified Pull Request process

Continuous Integration (CI)

Continuous Delivery (CD)

Can automatically build, test, deploy, and monitor your applications

Example of CI pipeline





Easily build own web site for your project. To highlight your work.

Hosted by Github or Gitlab.

Multiple templates can be found.

<https://pages.gitlab.io/hugo/>

[https://github.com/mesocentre-clermont-auvergne/formation\\_fair\\_2022/tree/main/fair\\_git](https://github.com/mesocentre-clermont-auvergne/formation_fair_2022/tree/main/fair_git)

