

Suivez cette présentation sur votre ordinateur :

<http://bit.ly/2mlKcv8>

Préparez-vous à utiliser git :

- Sur les ordinateur Windows UCL ouvrez git bash
- Ou installez git sur votre ordinateur :
 - **Ubuntu** : `sudo apt-get install git`
 - **OS X** : `https://sourceforge.net/projects/git-osx-installer/`
 - **Windows** : `https://git-for-windows.github.io/`



Présentation Git

Un outil de collaboration puissant

Denis Pettens Pablo Gonzalez Alvarez Gaëtan Cassiers

28 février 2017

Louvain-li-Nux

Cette présentation

- Cette présentation est sous license libre CC-BY 4.0.
- Vous pouvez télécharger les slides à l'adresse
`https://github.com/louvainlinux/atelier-git`
- Les instructions pour les exercices sont à
`https://github.com/louvainlinux/atelier-git/blob/master/instructions.md`.

1. Introduction
2. Installation et configuration
3. Premier pas avec la ligne de commande
4. Premier pas avec Git
5. Les branches
6. Le travail en groupe

Introduction

Comment gérez-vous actuellement un projet ?

- L'envoyer à travers un message sur Facebook, ... (**Très mauvaise idée**)
- L'envoyer par mail (**Un peu moins**)
- Utiliser une Dropbox, Google Drive, ... (**Déjà mieux mais toujours risqué ou manque de fonctionnalités**)

Solution : Utiliser un **système de gestion de version décentralisé** (Distributed Version Control System (DVCS) pour les anglophiles).

- **Version** Enregistre des « instantanés » du projet.
- **Gestion** Revenir en arrière, voir des différences, fusionner des modifications.
- **Décentralisé** Chacun travaille sur sa copie, et on fusionne les modifications.
- **Projet** n'importe quel répertoire (« dossier »). Donc n'importe quoi !

Et Git dans tout ça ?

- Git a été créé en 2005 par **Linus Torvalds** (auteur de Linux) ;

Ses avantages :

- Le plus connu et utilisé (90 % du marché, communauté très présente) ;
- Vitesse ;
- Facile d'utilisation mais aussi très puissant ;
- Distribué (pas besoin de connexion internet tout le temps) ;

Ses inconvénients :

- De nouveaux concepts
- Interface principale en ligne de commande
- Mais il existe aussi des interfaces graphiques

Instalation et configuration

Ubuntu : `sudo apt-get install git`

OS X :

<https://sourceforge.net/projects/git-osx-installer/>

Windows : <https://git-for-windows.github.io/>

Configuration de base

Git a besoin de deux informations de base sur vous pour pouvoir travailler efficacement :

- **Nom et Prénom**

```
git config --global user.name "Jules Dupont"
```

- **Email**

```
git config --global user.email "jules.  
dupont@email.fr"
```

L'option `--global` permet de configurer git pour tous vos autres projets sur votre PC.

Configuration de base – Éditeur de textes

Linux

```
git config --global core.editor "gedit"
```

Windows

```
git config --global core.editor "notepad"
```

Mac

```
git config --global core.editor "TextEdit"
```

Premier pas avec la ligne de commande

Ligne de commande (aka shell), késako ?

Où suis-je :

```
$ pwd
```

Contenu du dossier actuel :

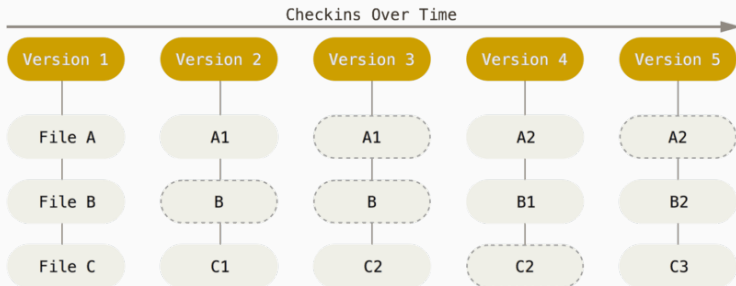
```
$ ls
```

Se déplacer :

```
$ cd <path> # aller a path  
$ cd .. # remonter d'un dossier
```

Premier pas avec Git

Concept : le commit



Les illustrations non-sourcées viennent de <https://git-scm.com/book>.

Commande : git init

- Initialise un dossier en un nouveau dépôt git.
- Exemple

```
$ mkdir newProject  
$ cd newProject  
$ git init
```

- Cela crée un sous-dossier .git où tout la magie de git se fait
- Vous mettez tous les fichiers du projet dans newProject

Commande : git status

- git vous dit où vous en êtes.
- Exemple

```
$ git status
On branch master
Initial commit
nothing to commit (create/copy files and use
    "git add" to track)
```

- À utiliser sans modération !

Commande : git add

- Ajoute un fichier dans le projet git.
- Exemple

```
$ vi notes.txt # copier un fichier
$ git status
#[...]
Untracked files:
  (use "git add <file>..." to include in what
    will be committed)
    notes.txt
nothing added to commit but untracked files
  present (use "git add" to track)
$ git add notes.txt
#[...]
Changes to be committed:
  (use "git rm --cached <file>.." to unstage)
    new file:   notes.txt
```

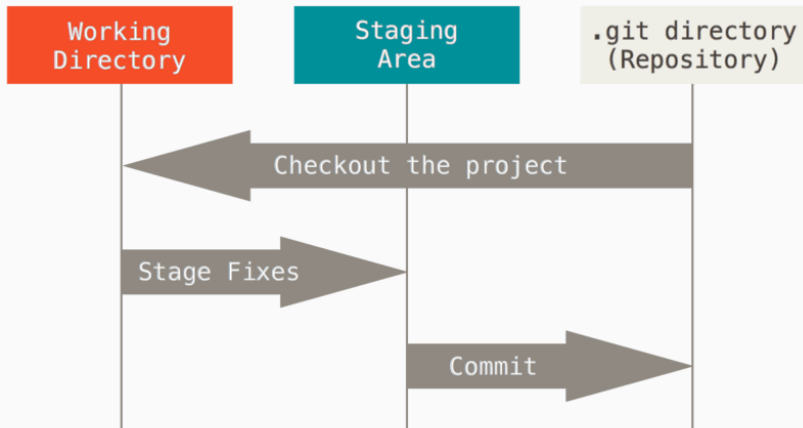
Commande : git commit

- Crée un commit sur base des fichiers ajoutés.
- Exemple

```
# toujours verifier ce qu'on commit
$ git status
#[...]
Changes to be committed:
  (use "git rm --cached <file>.." to unstage)
    new file:   notes.txt
$ git commit
# Ouvre un editeur de texte
# Editer, sauvegarder et fermer
[master (root-commit) 12f87b9] ajout de la
    premiere note
    1 file changed, 1 insertion(+)
```

- Message de commit : décrit les changements effectués.

En résumé : le cycle de vie d'un fichier



Commande : git log

- Visualiser l'historique du projet
- Exemple

```
$ git log
commit 12f87b95caff8cbeb5ce0717528d77e27
Author: Louvain Linux<info@louvainlinux.org>
Date:    Sun Feb 26 17:51:16 2017 +0100

    ajout de le premiere note
```

- Ouvre parfois un pager. Se déplacer avec les flèches haut/bas, quitter avec q.

Astuce : de l'aide !

On peut trouver de l'aide :

- rapide : `git [command] -h`

```
$ git log -h
usage: git log [<options>] [<revision-range>]
      [[--] <path>...]
      or: git show [<options>] <object>...

      -q, --quiet                suppress diff
                                output
      --source                   show source
      [...]

```

- plus détaillée : `git [command] --help`

Exercice 1

```
$ mkdir newProject
$ cd newProject
$ git status
$ # Creer un fichier
$ git add monfichier.txt monfichier2.png
$ git commit
$ # Editer le message de commit
$ git log
```

Utile :

```
$ git --help # liste des commandes git
$ git [commande] --help
```

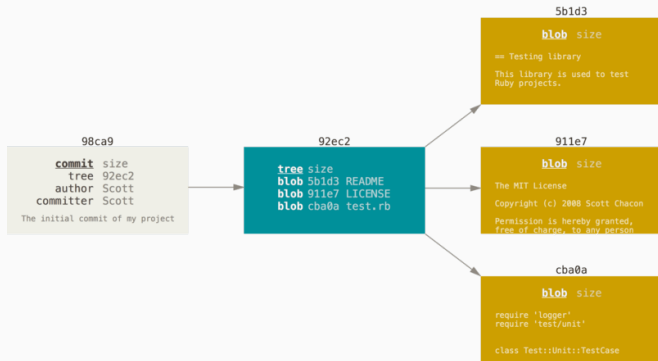
Bonus : regardez l'aide de `git mv` et de `git rm`.

Les branches

De derrière : les objets git

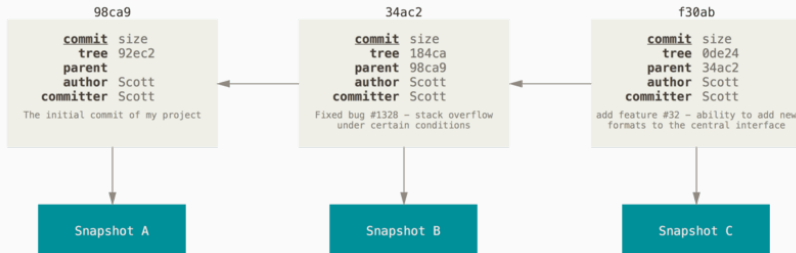
- Chaque commit a un identifiant :

12f87b95caff8cbeb5ce0717528d77e27db5669c.



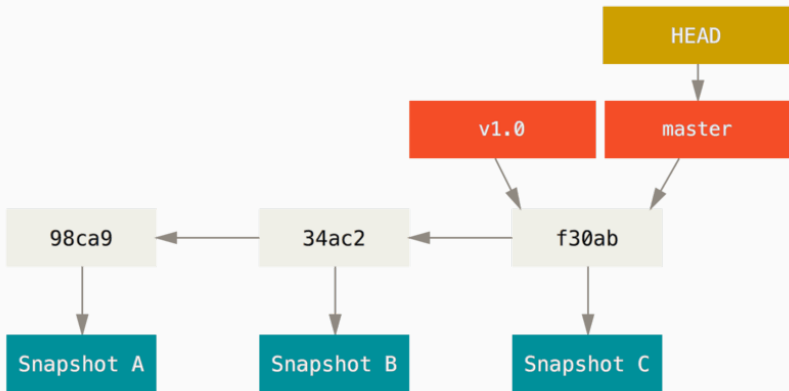
De derrière : les parents

- Chaque commit a un parent.



De derrière : les étiquettes

- On peut mettre des étiquettes sur des commits.
- HEAD est la position actuelle.

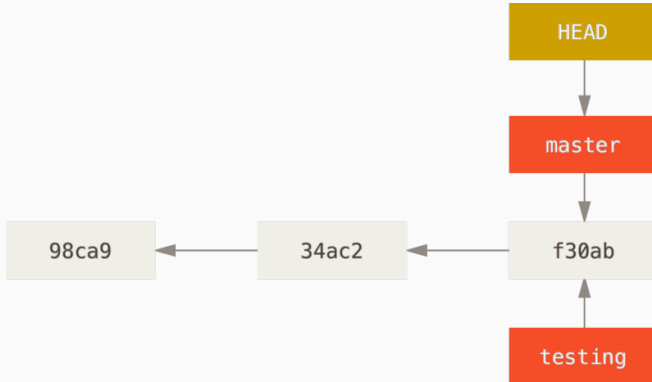


Commande : git branch

- Une branche est une nouvelle étiquette.

```
$ git branch testing
```

- La branche par défaut est master.



Commande : git checkout

- Permet de changer de branche.

```
$ git checkout testing
```

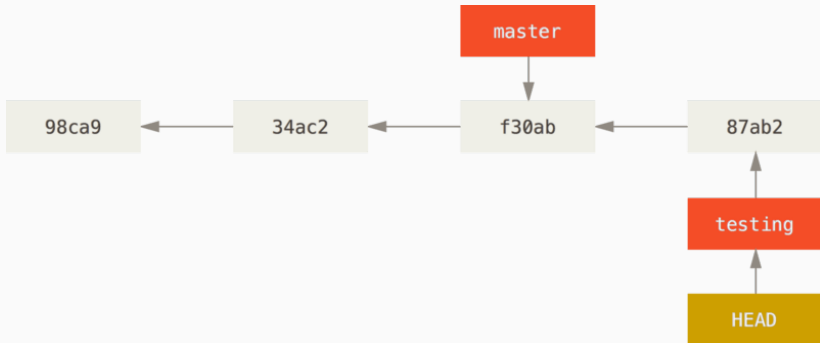
- La branche courante est celle qui suit les nouveaux commits.



Commande : git checkout (2)

- La branche courante est celle qui suit les nouveaux commits.

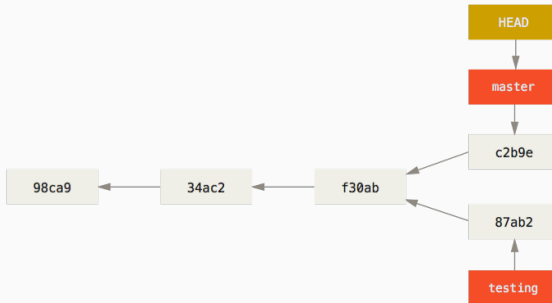
```
$ [Quelques changements]  
$ git commit
```



Branches divergentes

- Utilité : travailler sur des modifications indépendantes.

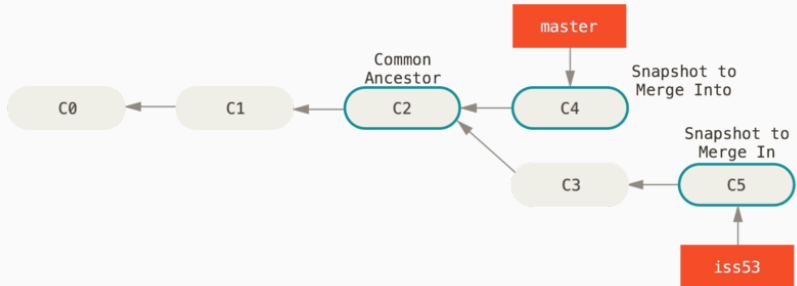
```
$ git checkout master  
$ [Quelques changements]  
$ git commit
```




```
$ git log --oneline --decorate --graph --all
* c2b9e (HEAD, master) made other changes
| * 87ab2 (testing) made a change
|/
* f30ab add feature #32 - ability to add new
  formats to the
* 34ac2 fixed bug #1328 - stack overflow under
  certain conditions
* 98ca9 initial commit of my project
```

Commande : git merge : fusionner des modifications

```
$ git checkout master
Switched to branch 'master'
$ git merge iss53
Merge made by the 'recursive' strategy.
index.html |      1 +
1 file changed, 1 insertion(+)
```



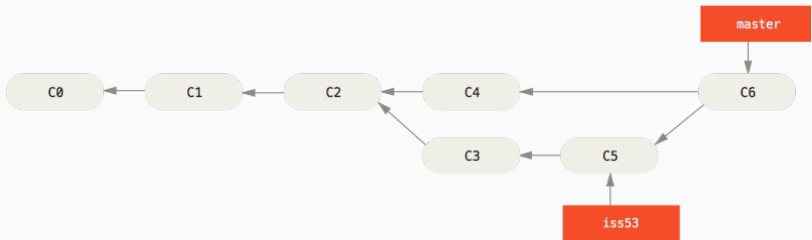
Commande : git merge iss53

```
$ git merge iss53
```

Merge made by the 'recursive' strategy.

```
index.html |      1 +
```

```
1 file changed, 1 insertion(+)
```



Conflicts

```
$ git merge iss53
Auto-merging index.html
CONFLICT (content): Merge conflict in index.html
Automatic merge failed; fix conflicts and then
    commit the result.

$ git status
On branch master
You have unmerged paths.
    (fix conflicts and run "git commit")
Unmerged paths:
    (use "git add <file>..." to mark resolution)
    both modified:      index.html
no changes added to commit (use "git add" and/or
    "git commit -a")
```

Conflits : résolution

```
<<<<<< HEAD:index.html
<div id="footer">contact : email.support@github.
    com</div>
=====
<div id="footer">
    please contact us at support@github.com
>>>>>> iss53:index.html
```

Editer le fichier, ou (**Attention** : supprime les modifications de la branche mergée!) `$ git checkout -- [fichier en conflit]`.

Puis

```
$ git add [fichier en conflit]
$ git commit
```

Exercice : les branches

- Les instructions pour les exercices sont à `https://github.com/louvainlinux/atelier-git/blob/master/instructions.md`.
- Essayez de le faire sans la solution.
- N'hésitez pas à poser des questions !

Le travail en groupe

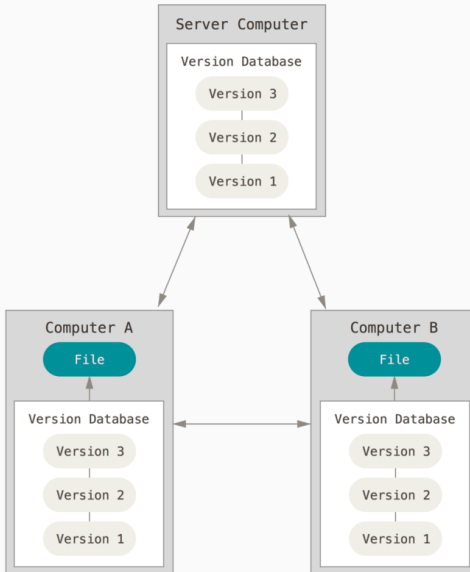


Bitbucket

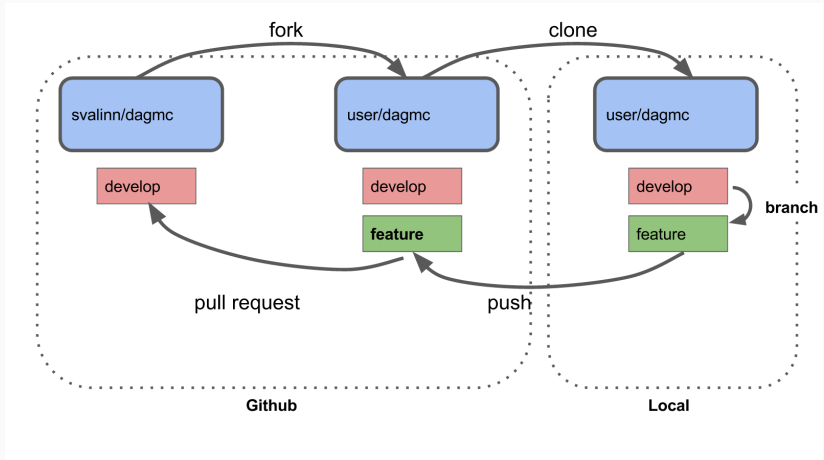


GitLab

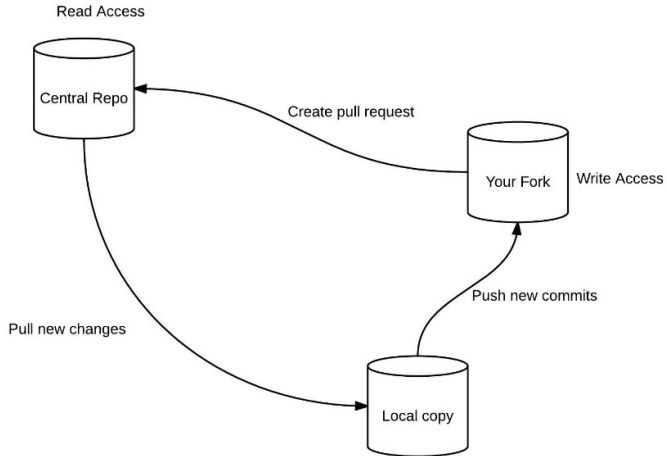
Distribué... comment se synchroniser ?



Mise en place



Méthode de travail



- Cloner un répertoire git depuis un serveur principal
- Exemple

```
git clone <url>
```

- Ajouter un serveur distant à votre répertoire git
- Exemple

```
git remote add origin <url>
```


- Récupérer les dernières modifications depuis le serveur principal
- Exemple

```
git pull origin
```

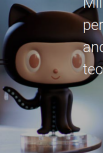
- Envoyer les dernières modifications locales sur le serveur principal
- Exemple

```
git push origin master
```

Exemple de collaboration avec GitHub

[Personal](#) [Open source](#) [Business](#) [Explore](#) [Pricing](#)

[Sign in](#) or [Sign up](#)




How people build software

Millions of developers use GitHub to build personal projects, support their businesses, and work together on open source technologies.

Use at least one letter, one numeral, and seven characters.

[Sign up for GitHub](#)

By clicking "Sign up for GitHub", you agree to our [terms of service](#) and [privacy policy](#). We'll occasionally send you account related emails.



Inform and Act

Read our official statements regarding recent executive orders and find resources to help you take action.

Exemple avec GitHub

The screenshot shows a GitHub profile page for the user **pgonzalezalv**. The page is divided into two main sections: a list of recent repository activities on the left and a sidebar on the right.


Recent Repository Activity:

- 2 hours ago:** **qpeten** edited the **louvainlinux/guide-installation** wiki. Edited Mac OS. View the diff »
- 3 hours ago:** **cassiersg** pushed to **master** at **louvainlinux/atelier-git**. **Sea7F61** Fix github URLs
- 3 hours ago:** **cassiersg** pushed to **master** at **louvainlinux/atelier-git**. **8b3738f** Ajout exercice 2
- 4 hours ago:** **cassiersg** created branch **master** at **louvainlinux/atelier-git-ex2**
- 4 hours ago:** **cassiersg** created repository **louvainlinux/atelier-git-ex2**
- 13 hours ago:** **cassiersg** pushed to **master** at **louvainlinux/atelier-git**. **a8ba664** Fix download link in README
- 13 hours ago:** **cassiersg** pushed to **master** at **louvainlinux/atelier-git**. **676353c** Add license & github references
- 8 days ago:** **cassiersg** pushed to **master** at **louvainlinux/atelier-git**. **5dcd16** Start update presentation for 2016-17/Q2




Right Sidebar:

- Repositories you contribute to (3):**
 - OpenWeek/Inginious-uct-java-b...** 2 ★
 - Gp2mv3/Syntheses** 43 ★
 - louvainlinux/atelier-git** 0 ★
- Your repositories (15):** [New repository](#)
 - Find a repository...
 - Filter: All (selected), Public, Private, Sources, Forks
 - lingi1122**
 - OpenWeek/Inginious-uct-java-bac1**
 - ingi1341-projet**
 - git_repo**
 - cnp3**
 - Syntheses**
 - KingOf13/LINMA1702Project**
 - obronchain/LINGI-1131**
 - os_project2**
 - os_project1**
 - SINF1252**
 - reflections**
 - recipes**
 - fauch1404/mailland**

Exemple avec GitHub

 Search GitHub

[Pull requests](#) [Issues](#) [Gist](#)


  

Create a new repository

A repository contains all the files for your project, including the revision history.


Owner

Repository name


 pgonzalezalv /

Great repository names are short and memorable. Need inspiration? How about [solid-guide](#).

Description (optional)

☒  **Public**

Anyone can see this repository. You choose who can commit.

☐  **Private**


You choose who can see and commit to this repository.

☐ **Initialize this repository with a README**
This will let you immediately clone the repository to your computer. Skip this step if you're importing an existing repository.

Add .gitignore: **None**

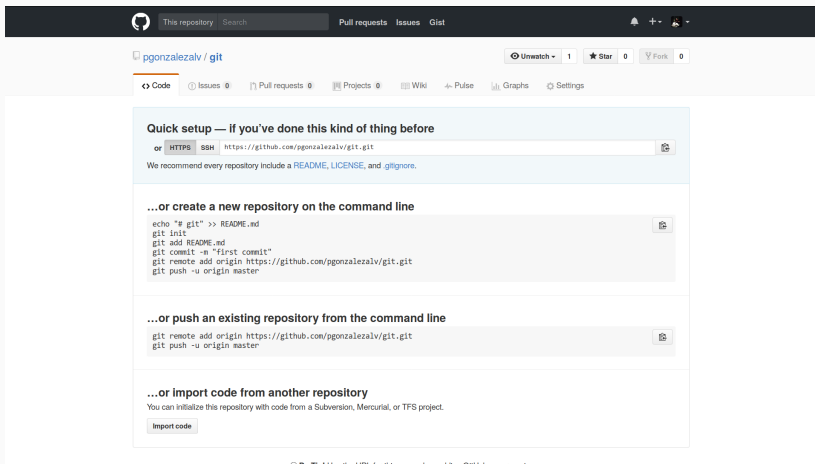
Add a license: **None** ⓘ

© 2017 GitHub, Inc. [Terms](#) [Privacy](#) [Security](#) [Status](#) [Help](#)



[Contact GitHub](#) [API](#) [Training](#) [Shop](#) [Blog](#) [About](#)

Exemple avec GitHub



The screenshot shows the GitHub interface for the repository `pgonzalezalv / git`. The top navigation bar includes links for 'This repository', 'Search', 'Pull requests', 'Issues', and 'Gist'. The repository name is displayed with a clone button, and statistics for 'Unwatch' (1), 'Star' (0), and 'Fork' (0) are shown. Below the repository name, there are tabs for 'Code', 'Issues', 'Pull requests', 'Projects', 'Wiki', 'Pulse', 'Graphs', and 'Settings'. The main content area is titled 'Quick setup — if you've done this kind of thing before' and provides instructions for cloning the repository using HTTPS or SSH. It also includes a section for creating a new repository on the command line and a section for pushing an existing repository from the command line. At the bottom, there is a section for importing code from another repository.

Quick setup — if you've done this kind of thing before

or ☐ HTTPS ☐ SSH `https://github.com/pgonzalezalv/git.git`

We recommend every repository include a [README](#), [LICENSE](#), and [.gitignore](#).

...or create a new repository on the command line

```
echo "# git" >> README.md
git init
git add README.md
git commit -m "first commit"
git remote add origin https://github.com/pgonzalezalv/git.git
git push -u origin master
```

...or push an existing repository from the command line

```
git remote add origin https://github.com/pgonzalezalv/git.git
git push -u origin master
```

...or import code from another repository

You can initialize this repository with code from a Subversion, Mercurial, or TFS project.

[Import code](#)

Exemple avec GitHub

The screenshot shows the GitHub interface for the repository `pgonzalezalv / git`. The top navigation bar includes links for 'This repository', 'Search', 'Pull requests', 'Issues', and 'Gist'. The repository name is displayed with statistics: 1 Unwatch, 0 Stars, and 0 Forks. Below the repository name, there are tabs for 'Code', 'Issues', 'Pull requests', 'Projects', 'Wiki', 'Pulse', 'Graphs', and 'Settings'. The 'Code' tab is active, showing the 'Quick setup' section. This section provides instructions for cloning the repository using HTTPS or SSH, creating a new repository from the command line, pushing an existing repository, and importing code from another repository. The instructions are presented in a clean, light blue and white layout with code blocks and buttons for each option.

Quick setup — if you've done this kind of thing before

or ☐ HTTPS ☐ SSH `https://github.com/pgonzalezalv/git.git`

We recommend every repository include a [README](#), [LICENSE](#), and [.gitignore](#).

...or create a new repository on the command line

```
echo "# git" >> README.md
git init
git add README.md
git commit -m "first commit"
git remote add origin https://github.com/pgonzalezalv/git.git
git push -u origin master
```

...or push an existing repository from the command line

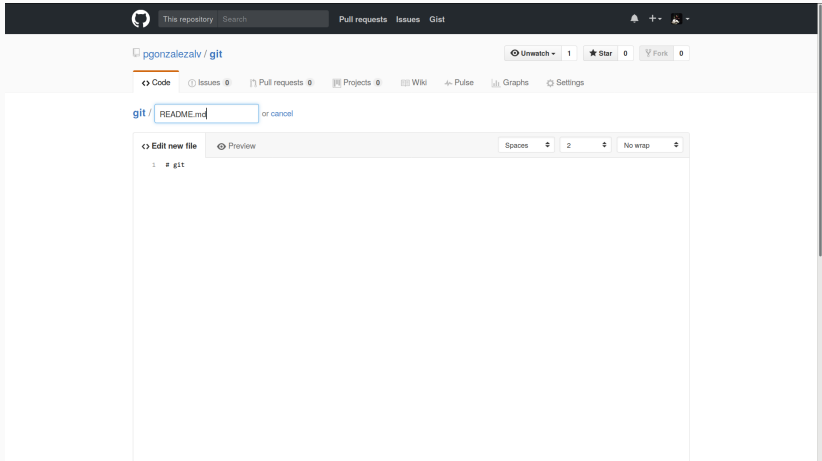
```
git remote add origin https://github.com/pgonzalezalv/git.git
git push -u origin master
```

...or import code from another repository

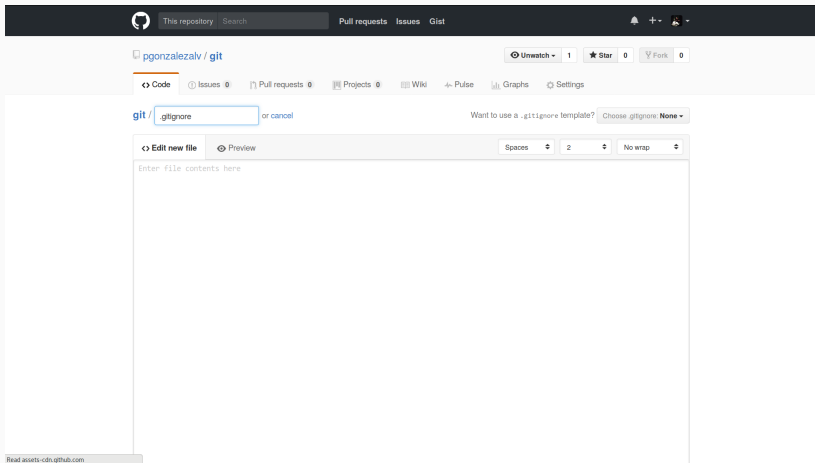
You can initialize this repository with code from a Subversion, Mercurial, or TFS project.

[Import code](#)

Exemple avec GitHub



Exemple avec GitHub



Exemple avec GitHub

The screenshot shows the GitHub interface for the repository 'louvainlinux / atelier-git'. At the top, there are navigation links: Personal, Open source, Business, Explore, and Pricing. A search bar and a 'Sign in or Sign up' link are also present. Below the repository name, there are statistics: 6 Watchers, 0 Stars, and 1 Fork. The repository is categorized under 'Code', with links to Issues (4), Pull requests (0), Projects (0), Pulse, and Graphs. The main content area displays the repository's description: 'Slides et exercices de la présentation de l'outil git du Louvain-li-Nux', along with a link to the 'git' tutorial. Below this, a summary bar shows 32 commits, 1 branch, 0 releases, 3 contributors, and the CC-BY-4.0 license. A 'Branch: master' dropdown and a 'New pull request' button are visible. A 'Find file' button and a 'Clone or download' button are also present. The file list shows the following files and their commit history:

File	Commit Message	Time Ago
ex2	Ajout exercice 2	4 hours ago
src	Merge branch 'master' of github.com:louvainlinux/atelier-git	10 minutes ago
.gitignore	Re-organize the file structure	18 days ago
LICENSE	Add license file	18 days ago
README.md	Ajout exercice 2	4 hours ago
instructions.md	Fix github URLs	4 hours ago
main.pdf	Fix github URLs	4 hours ago
notes_TODO.txt	Ajout exercice 2	4 hours ago

Below the file list, there is a section for the 'README.md' file, which is currently empty. The URL at the bottom of the page is 'https://github.com/login?return_to=https://github.com/louvainlinux/atelier-git'.

Exemple avec GitHub

The screenshot shows the GitHub interface for the repository 'pgonzalezalv / cnp3'. The repository is forked from 'obonaventure/cnp3'. It has 1 Unwatch, 0 Stars, and 69 Forks. The repository is titled 'Computer Networking : Principles, Protocols and Practice' and has a 'New' tag with 'Add topics'. It shows 652 commits, 2 branches, 0 releases, and 18 contributors. The current branch is 'master', and there is a 'New pull request' button. Below this, it states 'This branch is 13 commits behind obonaventure/master.' and provides a 'Pull request' link. A table lists recent commits by 'obonaventure' merged from 'jadinm/master' on GitHub, with the latest commit on 5 Oct 2016. The table includes files like 'Missions', 'blog', 'book-2nd', 'book-es', 'book-fr', 'book', 'slides', 'svg', 'svg1', 'website', and 'README.rst'.

File	Commit Message	Time Ago
Missions	transport exercises	6 years ago
blog	Start of new website	3 years ago
book-2nd	Clearer sentence	5 months ago
book-es	Some typos	3 years ago
book-fr	continuing translation	5 years ago
book	Changed multimode vs monomode	6 months ago
slides	update of the slides in keynote format. The pdf versions are not up t...	6 years ago
svg	exercises first week	4 years ago
svg1	Spanish translation started	5 years ago
website	update for 2016	5 months ago
README.rst	new top-level README for github	5 years ago

Exemple avec GitHub

The screenshot shows the GitHub interface for a pull request comparison. At the top, the repository is identified as `pgonzalezalv / cnp3`, forked from `obonaventure/cnp3`. The page is titled "Comparing changes" and includes a sub-header: "Choose two branches to see what's changed or to start a new pull request. If you need to, you can also [compare across forks](#)." Below this, a comparison bar shows the selected branches: `base fork: pgonzalezalv/cnp3`, `base: master`, `head fork: obonaventure/cnp3`, and `compare: master`. A green checkmark indicates the comparison is "Able to merge" and that the branches can be automatically merged. A prominent green button labeled "Create pull request" is visible, with a note to "Discuss and review the changes in this comparison with others." Below the comparison bar, summary statistics are shown: 13 commits, 7 files changed, 0 commit comments, and 2 contributors. The commit history is listed below, showing commits from November 8, 9, and 15, 2016, with details on the changes made, such as reorganization of exercises, merging pull requests, and adding new exercises and policies.

pgonzalezalv / cnp3
forked from obonaventure/cnp3

Unwatch 1 Star 0 Fork 69

Code Pull requests 0 Projects 0 Wiki Pulse Graphs Settings

Comparing changes

Choose two branches to see what's changed or to start a new pull request. If you need to, you can also [compare across forks](#).

base fork: pgonzalezalv/cnp3 base: master ... head fork: obonaventure/cnp3 compare: master

✓ Able to merge. These branches can be automatically merged.

Create pull request Discuss and review the changes in this comparison with others.

13 commits 7 files changed 0 commit comments 2 contributors

Commits on Nov 08, 2016

- jadinn Reorganization of exercises for TCP congestion bc9bd89

Commits on Nov 09, 2016

- obonaventure Merge pull request #218 from jadinn/master 34b2554
- obonaventure · obonaventure added new exercises in web version d382829
- obonaventure · obonaventure fixed typo 62cf18e

Commits on Nov 15, 2016

- jadinn Add bgp policies 0eb489c
- obonaventure · obonaventure typos 61fab3c

Exemple avec GitHub – Les commandes utiles

```
$ git clone https://github.com/username/  
  repo_name.git # pour cloner un repo git  
  depuis GitHub  
  
$ git add remote origin https://github.com/  
  username/repo_name.git # pour ajouter un repo  
  GitHub a un repo git existant  
  
$ git pull origin master # pour recuperer les  
  modifications sur le repo GitHub  
  
$ git push origin master # pour envoyer des  
  modifications sur le repo GitHub
```

Pour aller plus loin ...

Références

- **La référence : Git book** : <https://git-scm.com/book>
- Github help : <https://help.github.com/>

GUI

- <https://git-scm.com/docs/gitk> (Installé par défaut sous Windows)
- <https://www.gitkraken.com/>
- <https://desktop.github.com/>
- D'autres : <https://git-scm.com/downloads/guis>

Github Student Pack

- <https://education.github.com/pack>

Questions ?