Quick review of Git

Réunion de rentrée 2015

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About Dropbox

- Dropbox versioning is not free.
- Only keep your edits over a period of 30 days.
- Privacy and Security ?
- No differences display.
- The service have the right to delete information from free and inactive accounts.
- Users are not allowed to perform encryption.

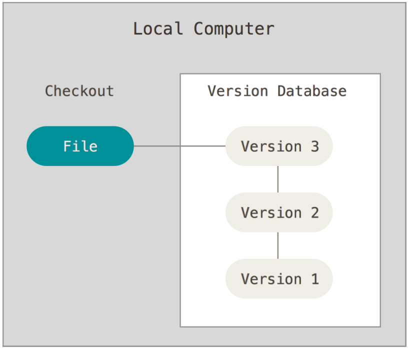
New products based on a git server for collaborating writing.

- ShareLaTeX `https://fr.sharelatex.com`
- Authorea `https://www.authorea.com`
- Overleaf `https://www.overleaf.com`

About Version Control

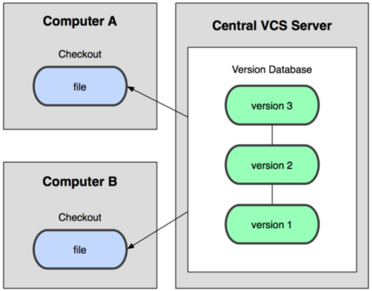
- Records changes to a file or set of files over time.
- You can recall specific versions later.
- You can use it with nearly any type of file on a computer.
- This is the better way to collaborate on the same document.
- Every change is committed with an author and a date.
- Figures are downloaded from Pro Git book : `http://git-scm.com/book`.
- "Become a git guru" tutorial `https://www.atlassian.com/git/tutorials/`.

Local Version Control Systems



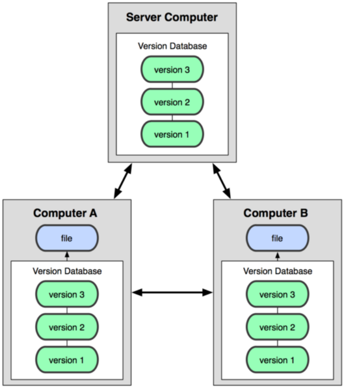
- One of the most saving popular was a system called RCS
- ✓ Available with the Developer Tools with Mac OS X
- ✗ Collaboration is not really possible.

Centralized Version Control Systems



- ✓ Clients check out files from a central place.
- ✓ You know what everyone else on the project is doing
- ✓ A single server contains all the versioned files.
- ✓ For many years, this has been the standard (CVS, SVN).
- ✗ You always need network connection.
- ✗ If the server is corrupted, with no backup, you lose everything !

Distributed Version Control Systems



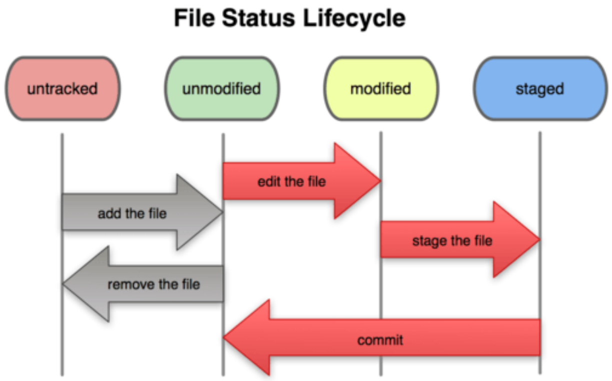
- ✓ Clients fully mirror the repository.
- ✓ You can collaborate with different groups of people in different ways simultaneously within the same project.
- ✓ No need of network connection.
- ✓ Multiple backups.

Configure Git

```
$ git config --global user.name "Pierre Navaro"

$ git config --global user.email "pierre.navaro@univ-rennes1.fr"

$ git config --global core.editor mvim

$ git config --global merge.tool opendiff

$ git config --list
user.name=Pierre Navaro
user.email=pierre.navaro@univ-rennes1.fr
core.editor=mvim
merge.tool=opendiff
```

Settings are saved on the computer for all your git repositories.

Four File status in the repository



Initializing a Repository in an Existing Directory

```
$ cd article
$ ls
document.tex    figure.png

$ git init
Initialized empty Git repository in /Users/navaro/article/.git/

$ git status
On branch master
Initial commit
Untracked files:
  (use "git add <file>..." to include in what will be committed)

        document.tex
        figure.png

nothing added to commit but untracked files present
(use "git add" to track)
```

Adding files in your repository

```
$ git add document.tex
$ git add figure.png

$ git status
On branch master
Initial commit
Changes to be committed:
  (use "git rm --cached <file>..." to unstage)

        new file:   document.tex
        new file:   figure.png

$ git commit -m ’Initial project version’
[master (root-commit) 9d23b49] Initial project version
 2 files changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 document.tex
 create mode 100644 figure.png
```

Cloning a New Directory

```
$ git clone git@git.math.cnrs.fr:plm/navaro/projet
Cloning into 'projet'...
Initialized empty Git repository in /git/repositories/plm/navaro/proj
warning: You appear to have cloned an empty repository.
Checking connectivity... done.
```

Now you can add and commit your files.

```
$ cd projet/
$ cp ../article/*
$ git add document.tex
$ git add figure.png
$ git commit -m 'Initial version of the project'
```

Your files are NOT present on the server!

```
$ git status
On branch master
Your branch is based on 'origin/master', but the upstream is gone.
  (use "git branch --unset-upstream" to fixup)
nothing to commit, working directory clean
```

Synchronizing your files on the server

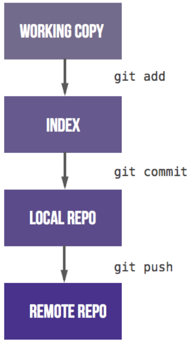
By default you are on the "master" branch.

```
$ git branch
* master
```

Upload your files to the server:

```
$ git push origin master
Counting objects: 3, done.
Delta compression using up to 8 threads.
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 246 bytes | 0 bytes/s, done.
Total 3 (delta 0), reused 0 (delta 0)
To git@git.math.cnrs.fr:plm/navaro/projet
 * [new branch]      master -> master
```

Git Workflow



Cloning an Existing Directory

Now i change my computer.

```
$ git clone git@git.math.cnrs.fr:plm/navaro/projet
Cloning into 'projet'...
remote: Counting objects: 3, done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 0 (delta 0)
Receiving objects: 100% (3/3), 246 bytes | 0 bytes/s, done.
Checking connectivity... done.

$ cd projet/
$ ls
document.tex    figure.png

$ git log
commit 7cef21ac9119ef2fb97065c9e5549550e2f603fd
Author: Pierre Navaro <pierre.navaro@univ-rennes1.fr>
Date:   Fri Oct 2 13:51:43 2015 +0200

    Initial version of the project
```

Display and Create a Branch

Display all branches :

```
$ git branch -a
* master
  remotes/origin/HEAD -> origin/master
  remotes/origin/master
```

Create your own branch and switch:

```
$ git branch pierre-branch
$ git checkout pierre-branch

Switched to branch 'pierre-branch'
```

Check

```
$ git branch
  master
* pierre-branch
```

Files could be different or non existant between branches but are at the same place on the file system

Contributing

Modify the file document.tex

```
$ git status
On branch pierre-branch
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working dire
        modified:   document.tex
no changes added to commit (use "git add" and/or "git commit -a")

$ git diff
diff --git a/document.tex b/document.tex
index a608114..e69de29 100644
--- a/document.tex
+++ b/document.tex
@@ -1,3 +0,0 @@
-Exemple Git pour la journée de rentrée
```

Locally saving your modifications

```
$ git add document.tex
```

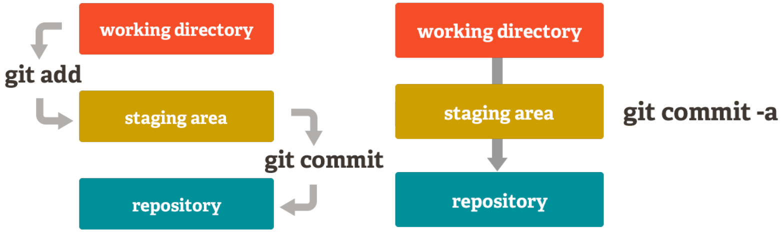
Checking which files are ready to be committed.

```
$ git status
On branch pierre-branch
Changes to be committed:
  (use "git reset HEAD <file>..." to unstage)
        modified:   document.tex
```

Now save your work on the local branch.

```
$ git commit -m 'Some modification is available'
[pierre-branch 8c6bf81] Some modification is available
 1 file changed, 3 insertions(+)
```

Fast commit



Use it carefully!

How to share your work and make it available on the server?

Option 1 : Merge to the main branch and push

```
$ git checkout master
Switched to branch 'master'
Your branch is up-to-date with 'origin/master'.

$ git merge pierre-branch
Updating 7cef21a..8c6bf81
Fast-forward
 document.tex | 3 +++
 1 file changed, 3 insertions(+)

$ git push origin master
Counting objects: 3, done.
Delta compression using up to 8 threads.
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 351 bytes | 0 bytes/s, done.
Total 3 (delta 0), reused 0 (delta 0)
To git@git.math.cnrs.fr:plm/navaro/projet
   7cef21a..8c6bf81  master -> master
```

Option 2 : Push your branch to the server

```
$ git checkout pierre-branch
Switched to branch 'pierre-branch'

$ git push origin pierre-branch
Total 0 (delta 0), reused 0 (delta 0)
To git@git.math.cnrs.fr:plm/navaro/projet
 * [new branch]      pierre-branch -> pierre-branch

$ git branch -a
  master
* pierre-branch
  remotes/origin/HEAD -> origin/master
  remotes/origin/master
  remotes/origin/pierre-branch
```

Updating from the Repository

The master branch has changed. To get all new updates :

```
$ git checkout master          (change to master)
Switched to branch 'master'

$ git fetch origin            (download changes from repository)

$ git merge origin/master      (update local branch master)

$ git checkout pierre-branch (back to your branch)
Switched to branch 'pierre-branch'

$ git merge master             (update your branch)
```

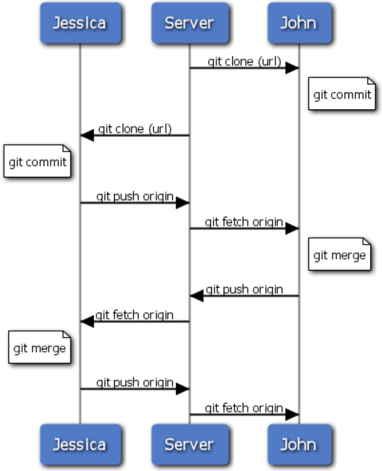
If you have conflict, no problem just do :

```
$ git mergetool
```

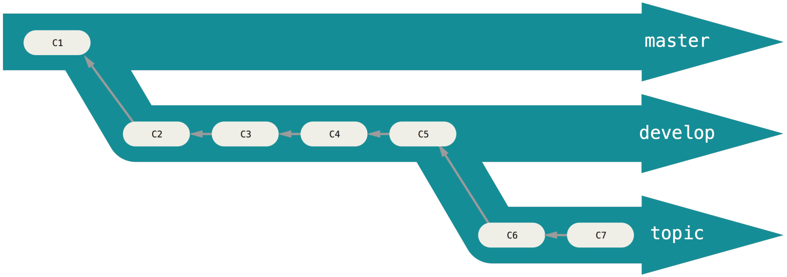
A nice editor helps you to choose the right version. Close and :

```
$ git commit -m ’Update and fixed conflicts’
```

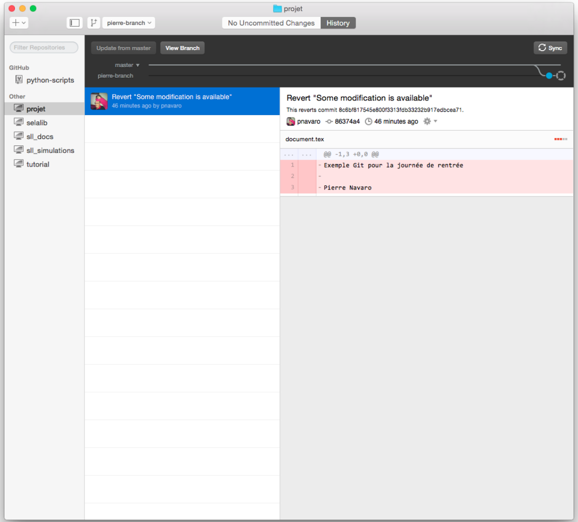
Git cycle on a single branch



Progressive-stability branching



GitHub Desktop - Modifications view



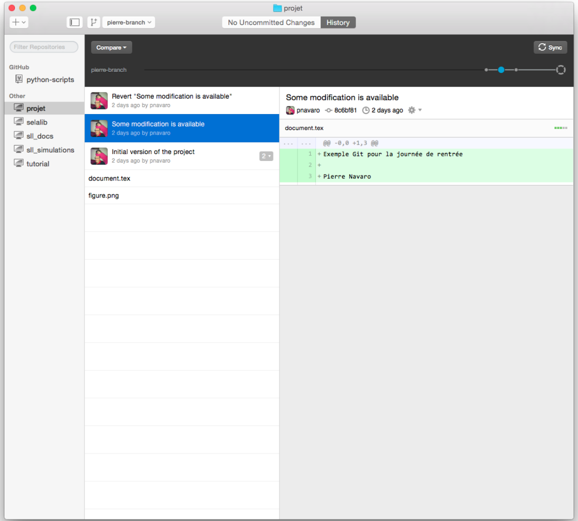
Revert "Some modification is available"
46 minutes ago by pnavaro

Revert "Some modification is available"
This reverts commit 8c6bf817545e800f3313fdb33232b917edbcea71.
pnavaro 86374a4 46 minutes ago

document.tex

```
@@ -1,3 +0,0 @@
- Exemple Git pour la journée de rentrée
-
- Pierre Navaro
```

GitHub Desktop - History view



Revert "Some modification is available"
2 days ago by pnavaro

Some modification is available
2 days ago by pnavaro

Initial version of the project
2 days ago by pnavaro

document.tex

figure.png

Some modification is available
pnavaro 8c6bf81 2 days ago

document.tex

```
@@ -0,0 +1,3 @@
+ Exemple Git pour la journée de rentrée
+
+ Pierre Navaro
```

Why Git?

Tracking and controlling changes in the software.

- ✓ Branches : Frictionless Context Switching, Role-Based Codelines.
- ✓ Everything is local : Git is fast.
- ✓ Multiple Backups.
- ✓ It’s impossible to get anything out of Git other than the exact bits you put in.
- ✓ Staging Area : intermediate index between working directory and repository.
- ✗ Sometimes confusing for new users.

Some tips.

- Install bash-completion and source git-prompt.sh.
- use GitHub Desktop `https://desktop.github.com/`