



Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Source control with git and Github

Eric Marcon

11 October 2024



Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Principles



git

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

git is a source manager:

- Track changes: much more than a backup!
- Ability to go back in time;
- Several competing versions: branches.



GitHub

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

GitHub is a collaboration platform based on Git.

- Multiple developers: the end of attached files!
- Presentation of results: GitHub pages;
- Continuous integration: GitHub Actions.



Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Installation



git: install

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

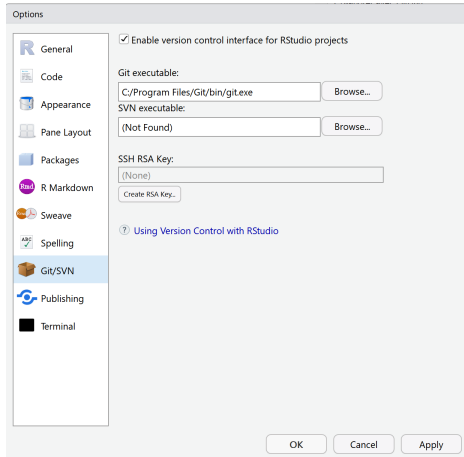
Practical

Branches

Fork and Pull
Request

Write
Documents

RStudio must detect Git



Otherwise, install it.



GitHub

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Open an account on GitHub

The screenshot shows the GitHub profile page for Eric Marcon. The browser address bar displays 'https://github.com/EricMarcon'. The page layout includes a profile picture of a man with grey hair, the name 'Eric Marcon', and the username 'EricMarcon'. Below the name is a link to 'Add a bio'. The 'About' section lists 'AgroParisTech' as the organization, 'Kourou, French Guiana' as the location, and the email 'eric.marcon@ecofog.gf'. A link to a website is also provided. The 'Popular repositories' section features four cards: 'endropart' (Entropy Partitioning to Measure Diversity), 'dismo' (Distance Based Measures of Spatial Structures), 'SpatDiv' (Spatially Explicit Measures of Diversity), and 'ericmarcon.github.io' (Home page). The 'Synchro' repository is also listed with the description 'Synchronize folders for Windows' and the tag 'Visual Basic'. A 'Contributions' section shows '429 contributions in the last year' with a calendar grid from March to February. The grid uses green squares to indicate contributions, with a legend at the bottom right showing 'Less' and 'More' options.



GitHub security 1

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Your computer must be able to write to git.

In RStudio, Tools / Global Options/ Git-SVN, create a new SSH key.

Copy the private key to GitHub, your accounts, Settings, SSH and GPG keys.



GitHub security 2

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Create a GitHub token for CI:

- User account settings;
- Developer Settings > Personal Access Tokens;
- Generate a token, describe it as “git-RStudio” and give it “repo” authorization.

Save the token!



Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Practical



Create a project

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

From scratch:

- In GitHub:
 - *New Repository*
 - Choose name (no special characters)
 - Add an appropriate *.gitignore*.
- Copy the URL from *Clone or Download*.
- In RStudio: New project / Version Control / Git, paste the URL.



Create a project

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

From an existing RStudio project:

- Put the project under version control:
 - *Tools /Version Control /Project Setup...*
 - Select *Git*.
- Create a repository on GitHub and retrieve its URL:
<https://github.com/MyAccount/MyRepo.git>
- In RStudio Terminal, run :

```
git remote add origin https://github.com/MyAccount/MyRepo.git
git branch -M master
git push -u origin master
```



Basic operations: filter

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Modified files are displayed in the RStudio Git window.

Use `.gitignore` to hide non-tracked files.



Basic operations: commit

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

- Create an R file with one line of code and save it.

After each work session, *Commit* the result.

Select files to commit.

Enter a clear message: summary on the first line.



Basic operations: synchronize

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Push modifications to GitHub to make them public.

Pull to retrieve changes from GitHub.



Basic operations: collaborate

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Declare a collaborator.

Work with two or more people on the same file.

Content of a work session:

- Pull,
- Modify,
- Commit,
- Push.



Conflicts

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

The elementary data is the line.

Conflicting changes imply a conflict.

Minimize conflicts: in a text, one sentence = one line.

In case of conflict, decide which code or text to keep.



Project tracking

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

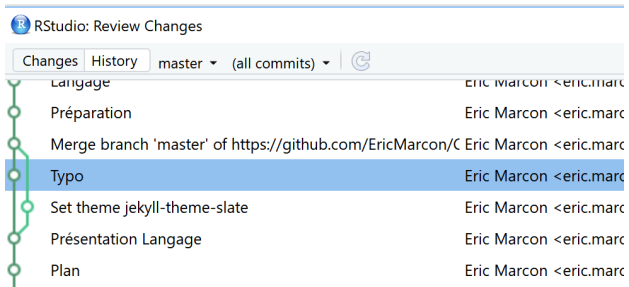
Practical

Branches

Fork and Pull
Request

Write
Documents

Clock icon in Git window





Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Practical



Generate a conflict

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Edit the same line of README.md :

- online on GitHub,
- locally.

Commit, Pull, observe the conflict, solve it.



Collaborate with your neighbor

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

The neighbor on the left invites the neighbor on the right to GitHub.

Both modify the project.

- Remember to pull before modifying.
- Push quickly to limit conflicts.



Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Branches



Purpose

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Modify the project without disturbing its stable state.

Application :

- develop new functionality,
- test it, correct bugs,
- make it visible when finished.



Create a branch

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Click on New Branch

Work in the new branch (pull, commit, push).



Merge

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Move to master branch.

Run:

```
git merge branch_to_merge
```



Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Fork and Pull Request



Fork

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Goal: modify someone else's repository

Fork: create a copy of the repository

Start a new branch, modify it.



Pull Request

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Branch integration request: *Pull Request*.

On GitHub.

Dialogue possible.

If accepted, merge branch and delete.



Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Write Documents



Use memoirR

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Install the **memoiR** package.

Create a new document with memoirR: Stylish Document.

Knit it to check everything is OK.



Source Control

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Use git with your document.

Create an appropriate gitignore:

```
memoiR::build_gitignore()
```

Store the knitted files into /docs

```
memoiR::build_githubpages()
```

Make your first commit.



Upload to GitHub

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Create your repo on GitHub.

Copy the commands to upload an existing git repo:

```
git remote add origin https://github.com/MyAccount/MyRepo.git
git branch -M master
git push -u origin master
```




Declare repo in header

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

In the header of your Rmd file, update the repository name and the URL.

Commit.

Add a README:

```
memoiR::build_readme()
```

Commit.



Continuous integration

Source control
with git and
Github

Eric Marcon

Principles

Installation

Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

On GitHub, your repo, Settings / Secrets and variables /
Action :

- Add two secrets:
 - EMAIL: your email address
 - GH_PAT: your personal access token

In RStudio, run

```
memoiR::build_ghworkflow()
```

Commit, Push and look at Actions.