Source Control

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Source control with git and Github

Eric Marcon

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git

git is a source manager:

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

GitHub

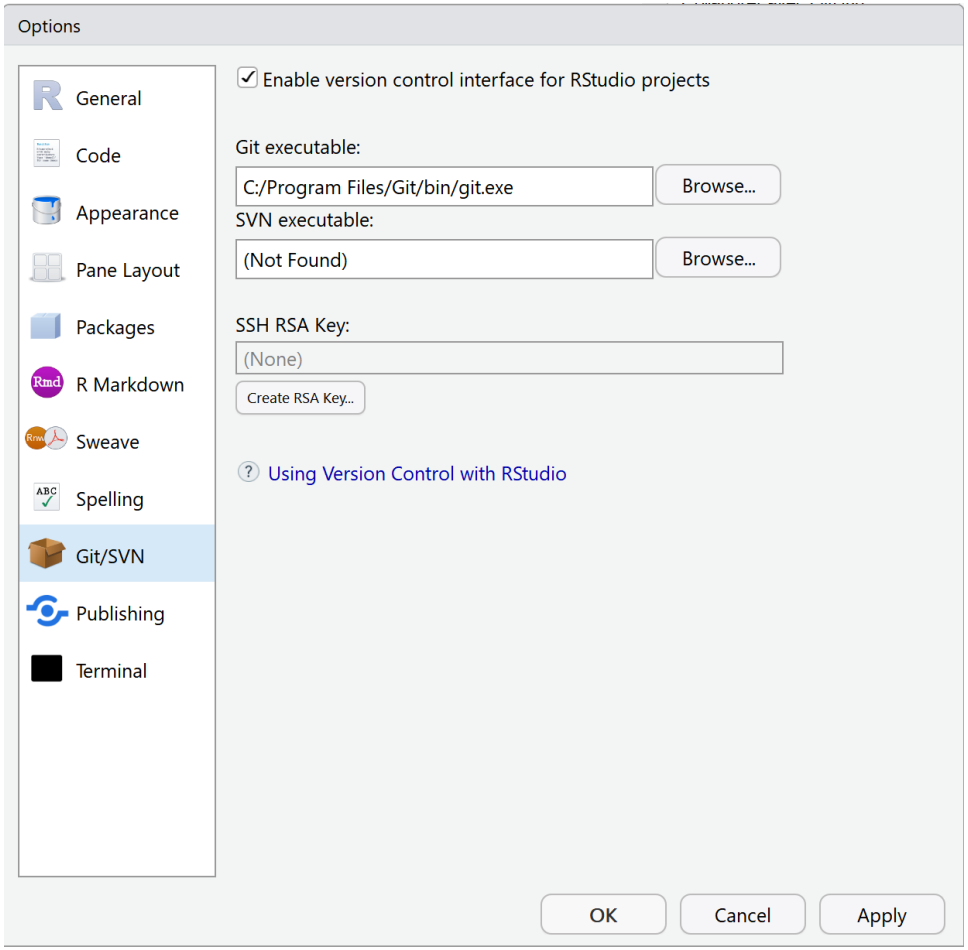
GitHub is a collaboration platform based on Git.

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

Installation

git: install

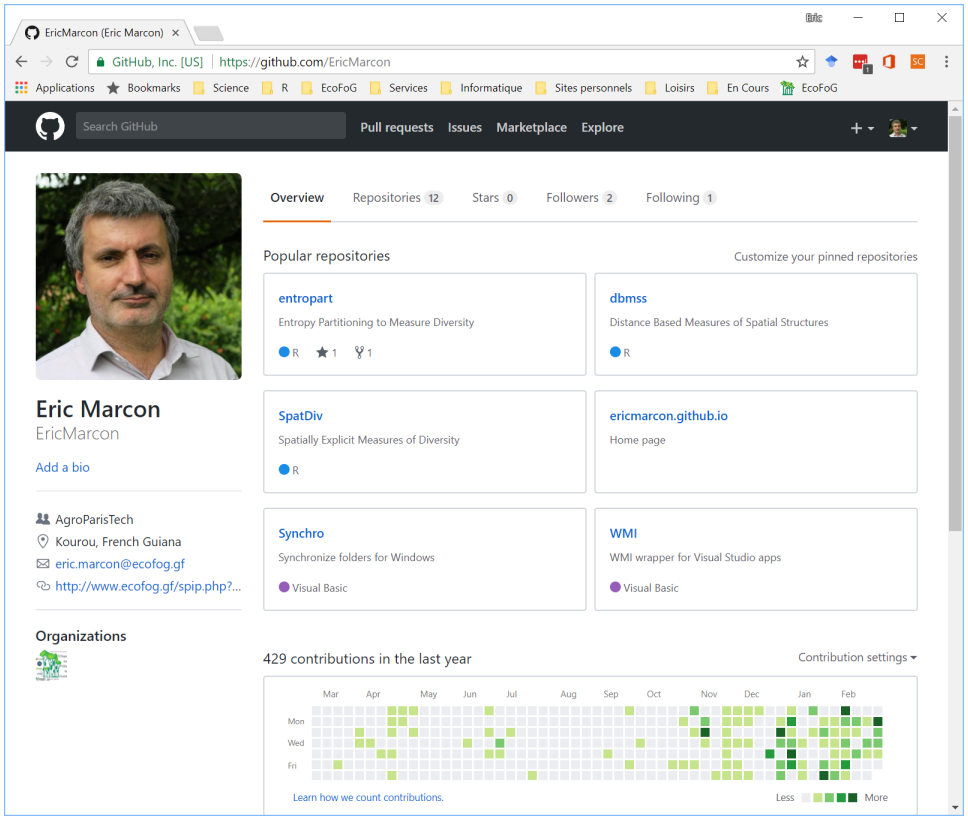
RStudio must detect Git



Otherwise, install it.

GitHub

Open an account on GitHub



GitHub security: SSH

Your computer must be able to write to git. We choose **SSH authentication** for simplicity.

- In RStudio, Tools / Global Options/ Git-SVN, create a new SSH key (no passphrase).
- Click on *View public key*. Copy the key.
- On GitHub, your accounts, Settings, SSH and GPG keys, Add New SSH Key, paste the key. Name it after your computer.

GitHub security: PAT

Create a GitHub token for Continuous Integration:

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

Save the token!

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Create a project

From scratch:

- In GitHub:
  - *New Repository*
  - Choose name (no special characters)
  - Do not add anything else
- Copy the URL from *Clone or Download*.
- In RStudio: New project / Version Control / Git, paste the URL.

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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: git@github.com:MyAccount/MyRepo.git
- In RStudio Terminal, run :

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

Basic operations: filter

Modified files are displayed in the RStudio *git* window.

Use .gitignore to hide non-tracked files.

Basic operations: commit

- 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

Push modifications to GitHub to make them public.

Pull to retrieve changes from GitHub.

Basic operations: collaborate

Declare a collaborator.

Work with two or more people on the same file.

Content of a work session:

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

Conflicts

The elementary data is the line.

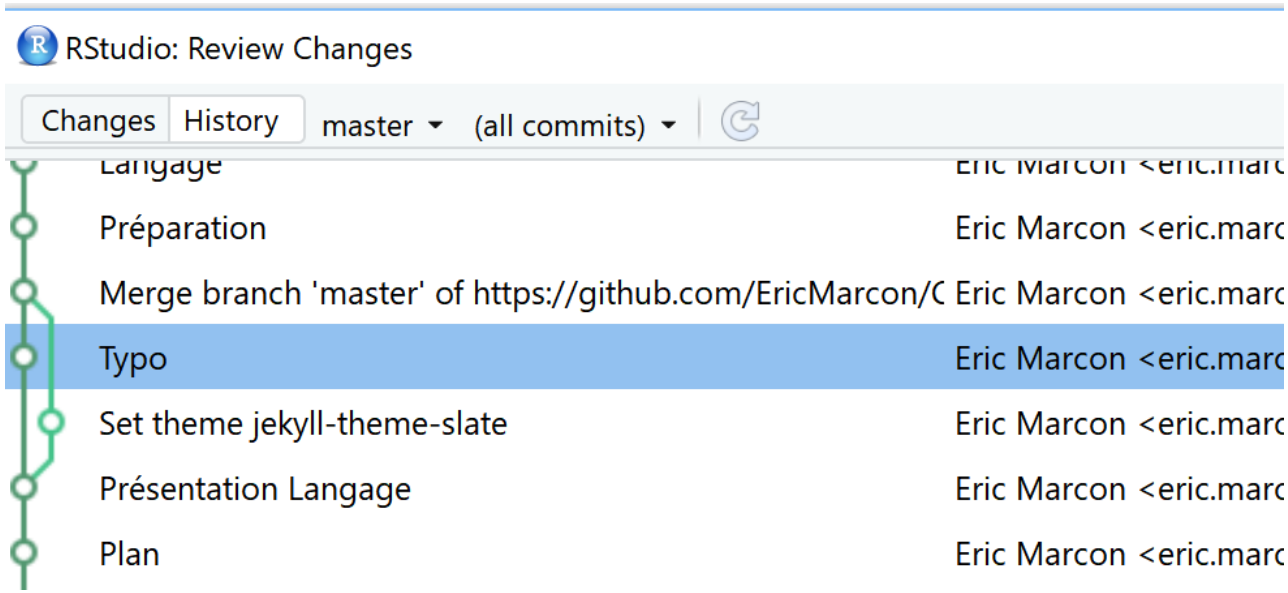
Conflicting changes imply a conflict.

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

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

Project tracking

Clock icon in Git window



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Generate a conflict

Edit the same line of README.md :

- online on GitHub,
- locally.

Commit, Pull, observe the conflict, solve it.

Collaborate with your neighbor

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.

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Purpose

Modify the project without disturbing its stable state.

Application :

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

Create a branch

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Click on the New Branch button.

Type its name.

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

Merge

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Move to master branch.

Run:

```
git merge branch_to_merge
```

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Fork

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Goal: modify someone else's repository

Fork: create a copy of the repository

Start a new branch, modify it.

Pull Request

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Branch integration request: *Pull Request*.

On GitHub.

Dialogue possible.

If accepted, merge branch and delete.

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Write Documents

Use memoiR

Install the **memoiR** package.

Create a new document with memoiR: Stylish Document.

Knit it to check everything is OK.

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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

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Create your repo on GitHub.

Copy the commands to upload an existing git repo:

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

Declare repo in header

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

Commit.

Add a README:

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

Commit.

Continuous integration

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.