



Source control
with git and
Github

Eric Marcon

Source
Control

Installation

Practical 1

Practical 2

Branches

Fork and Pull
Request

Write
Documents

Source control with git and Github

Eric Marcon

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Source Control



git

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git is a source manager:

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



GitHub

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GitHub is a collaboration platform based on Git.

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



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git: install

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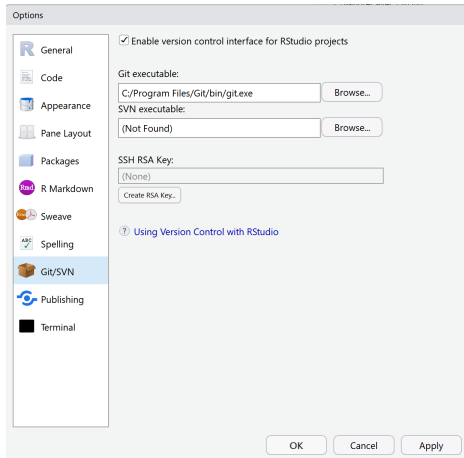
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RStudio must detect Git



Otherwise, install it.



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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 profile information, there are links for 'Add a bio', 'AgroParisTech', 'Kourou, French Guiana', 'eric.marcon@ecofog.gf', and a website link 'http://www.ecofog.gf/sip.php?'. The 'Organizations' section shows 'AgroParisTech'. The 'Popular repositories' section lists four repositories: 'endropart' (Entropy Partitioning to Measure Diversity), 'dismas' (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 'Visual Basic'. The 'WMI' repository is listed with the description 'WMI wrapper for Visual Studio apps' and 'Visual Basic'. The 'Contributions' section shows '429 contributions in the last year' with a calendar grid for the last year. The grid shows contributions for Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec, Jan, and Feb. The grid is color-coded by the number of contributions, with green indicating 1-9 contributions and yellow indicating 10-19 contributions. The 'Contribution settings' dropdown is visible.



GitHub security: SSH

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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

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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

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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.



Create a project

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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](https://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

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

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



Basic operations: commit

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- 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

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Push modifications to GitHub to make them public.

Pull to retrieve changes from GitHub.



Basic operations: collaborate

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Declare a collaborator.

Work with two or more people on the same file.

Content of a work session:

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



Conflicts

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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

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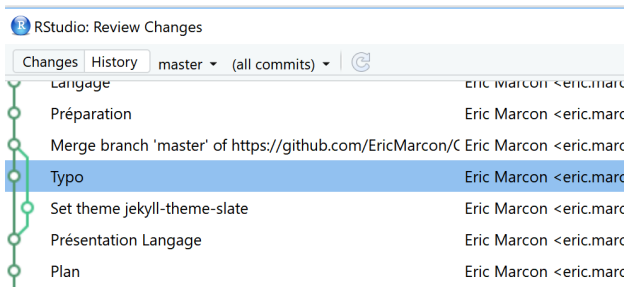
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Clock icon in Git window





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Generate a conflict

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Edit the same line of README.md :

- online on GitHub,
- locally.

Commit, Pull, observe the conflict, solve it.



Collaborate with your neighbor

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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

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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 and Pull Request



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 memoirR

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Install the **memoiR** package.

Create a new document with memoirR: 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

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

Commit.

Add a README:

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

Commit.



Continuous integration

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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.