



Source control
with git and
Github

Eric Marcon

Principles

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Practical

Practical

Branches

Fork and Pull
Request

Write
Documents

Source control with git and Github

Eric Marcon

11 October 2024



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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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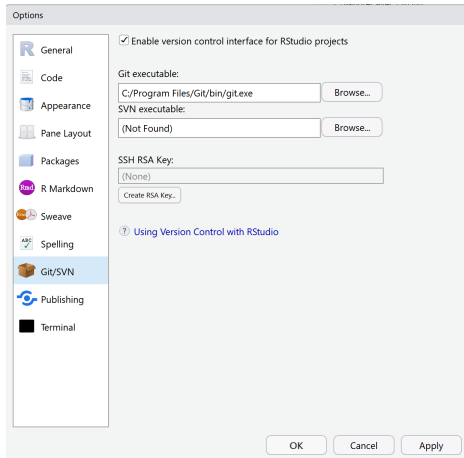
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RStudio must detect Git



Otherwise, install it.



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Open an account on GitHub

The screenshot shows the GitHub profile of Eric Marcon. The browser address bar displays 'https://github.com/EricMarcon'. The profile header includes a profile picture of a man with grey hair and a beard, 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 current employer, 'Kourou, French Guiana' as the location, and an email address 'eric.marcon@ecofog.gf' with a link to a website 'http://www.ecofog.gf/isip.php?...'.

The 'Popular repositories' section displays four repositories:

- endropart**: Entropy Partitioning to Measure Diversity (1 star, 1 fork)
- dismas**: Distance Based Measures of Spatial Structures (1 star)
- SpatDiv**: Spatially Explicit Measures of Diversity (1 star)
- ericmarcon.github.io**: Home page

The 'Synchro' repository is also listed with the description 'Synchronize folders for Windows' and 'Visual Basic' as the language.

The 'WMI' repository is listed with the description 'WMI wrapper for Visual Studio apps' and 'Visual Basic' as the language.

The 'Organizations' section shows a list of organizations with a 'Contribution settings' dropdown.

The '429 contributions in the last year' section displays a heatmap of contributions from March to February. The heatmap shows a high density of contributions in the latter half of the year, with a peak in December and January.



GitHub security 1

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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

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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!



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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:
<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

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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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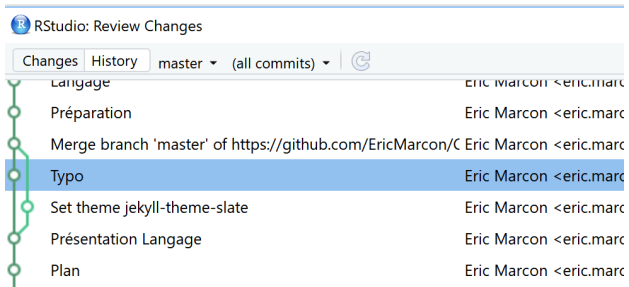
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Clock icon in Git window





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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 New Branch

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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Write
Documents

Install the **memoiR** package.

Create a new document with memoirR: Stylish Document.

Knit it to check everything is OK.



Source Control

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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

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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

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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.