



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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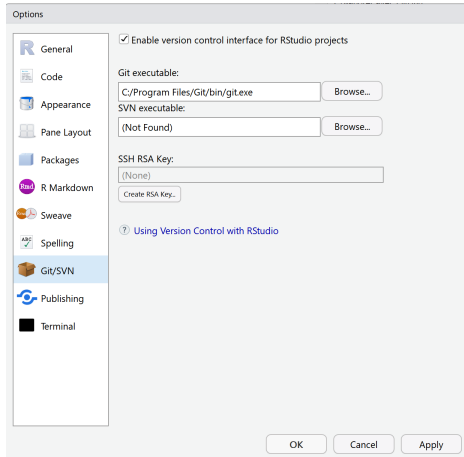
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RStudio must detect Git



Otherwise, install it.



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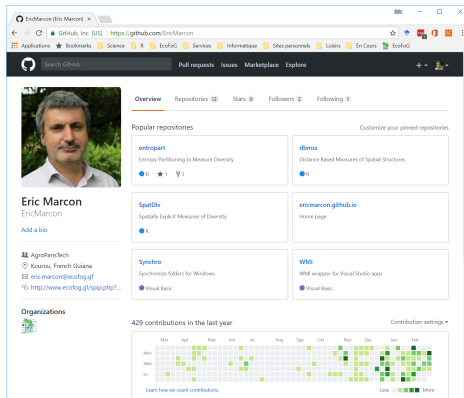
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Open an account on GitHub



The screenshot shows the GitHub profile page for Eric Marcon. The browser address bar displays the URL <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 profile information section lists the organization **AgroParisTech**, the location **Kourou, French Guiana**, the email `eric.marcon@ecofog.gf`, and a link to <http://www.ecofog.gf/gsp.php?..>. The **Organizations** section shows a logo for **AgroParisTech**. The **Popular repositories** section displays 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 **Syncho** repository is also listed with the description "Synchronize folders for Windows" and the tag "Visual Basic". The **WMI** repository is listed with the description "WMI wrapper for Visual Studio apps" and the tag "Visual Basic". The **Contributions** section shows **429 contributions in the last year** with a calendar grid visualization. The grid shows contributions from March to February, with a legend indicating the number of contributions per day (Less, More). The **Contribution settings** dropdown is visible.



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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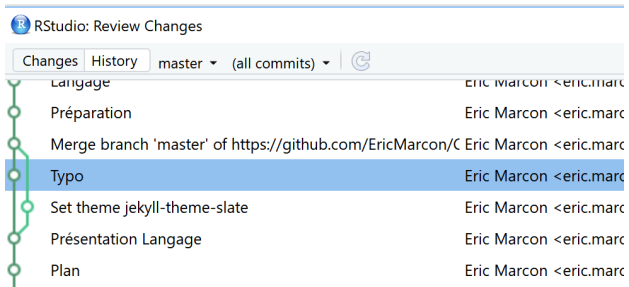
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Clock icon in Git window





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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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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

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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.