

# Introduction to Git & GitHub

Terminal, RStudio

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AG Landscape Ecology

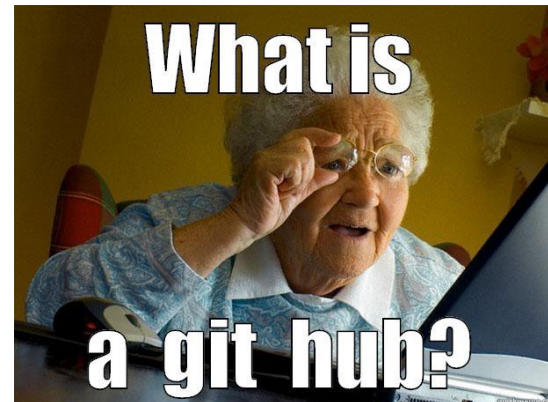
2021-10-25 (updated: 2021-10-24)

# Why Git?

- Version control software
- Modern software development
  - most R-packages
- Git is the **software**
- GitHub is the **platform**

## Other Platforms

- GitLab: <https://about.gitlab.com>
- BitBucket: <https://bitbucket.org>



# Install Git

<https://github.com/git-guides/install-git>

## On Linux Ubuntu

```
sudo apt update  
sudo apt install git-all
```

## On windows

Download manually

# Setup Local Git Repository

```
cd my_root_directory  
git init
```

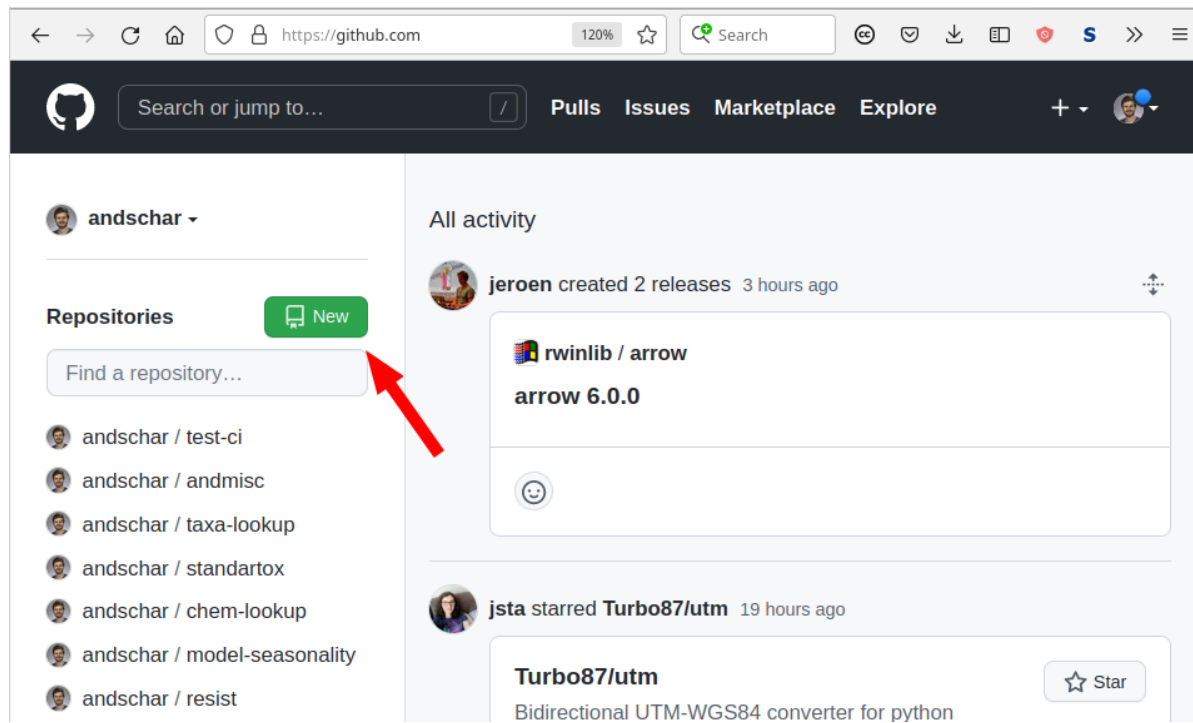
# Create a GitHub account

# Create (initialize) repository

## Locally

```
git init
```

## Remote



# Create (initialize) repository

# Fork a repository

- Fork someone's repo to your GitHub account

The screenshot shows the GitHub repository page for `tidyverse/ggplot2`. The browser address bar displays `https://github.com/tidyverse/ggplot2`. The repository is public and has 318 watchers, 5.1k stars, and 1.8k forks. The `Fork` button is highlighted with a red arrow. Another red arrow points to the search bar in the top navigation bar. The repository's main branch is `master`. The `About` section describes it as an implementation of the Grammar of Graphics in R, with a link to `ggplot2.tidyverse.org`. The `Files` section shows a list of files, including `.github`, `R`, and `data`.

Search or jump to...

Pulls Issues Marketplace Explore

tidyverse / ggplot2 Public

Watch 318 Star 5.1k Fork 1.8k

Code Issues 282 Pull requests 32 Actions Wiki

master

Go to file Add file Code

About

An implementation of the Grammar of Graphics in R

ggplot2.tidyverse.org

r visualisation

teunbrand Manual scale limits default to p... on Sep 20 4,794

.github Use the dev version of pkgdown (#4... 2 months ago

R Manual scale limits default to presen... last month

data row Update economic data (#2062) 2 years ago

# Clone a repository

- Clone **your** fork (i.e. version) to your local machine

The screenshot shows the GitHub interface for the repository 'andschar/ggplot2'. The browser address bar displays 'https://github.com/andschar/ggplot2'. The repository is public and forked from 'tidyverse/ggplot2'. The 'Code' button is highlighted in green. A red arrow points from the search bar to the repository name 'andschar/ggplot2', and another red arrow points from the repository name to the 'Code' button. A third red arrow points from the 'Code' button to the 'Clone' dropdown menu, which is open and shows the 'SSH' option selected. The 'Clone' menu displays the URL 'git@github.com:andschar/ggplot2.git' and a 'Download ZIP' option.

Search or jump to...

andschar / ggplot2 Public

forked from tidyverse/ggplot2

Code Pull requests Actions Projects Wiki Security

master

This branch is up to date with tidyverse:master.

teunbrand Manual

.github

Clone

HTTPS SSH GitHub CLI

git@github.com:andschar/ggplot2.git

Use a password-protected SSH key.

Download ZIP

About

An implementation of the Grammar of Graphics in R

ggplot2.tidyverse.org

Readme

View license



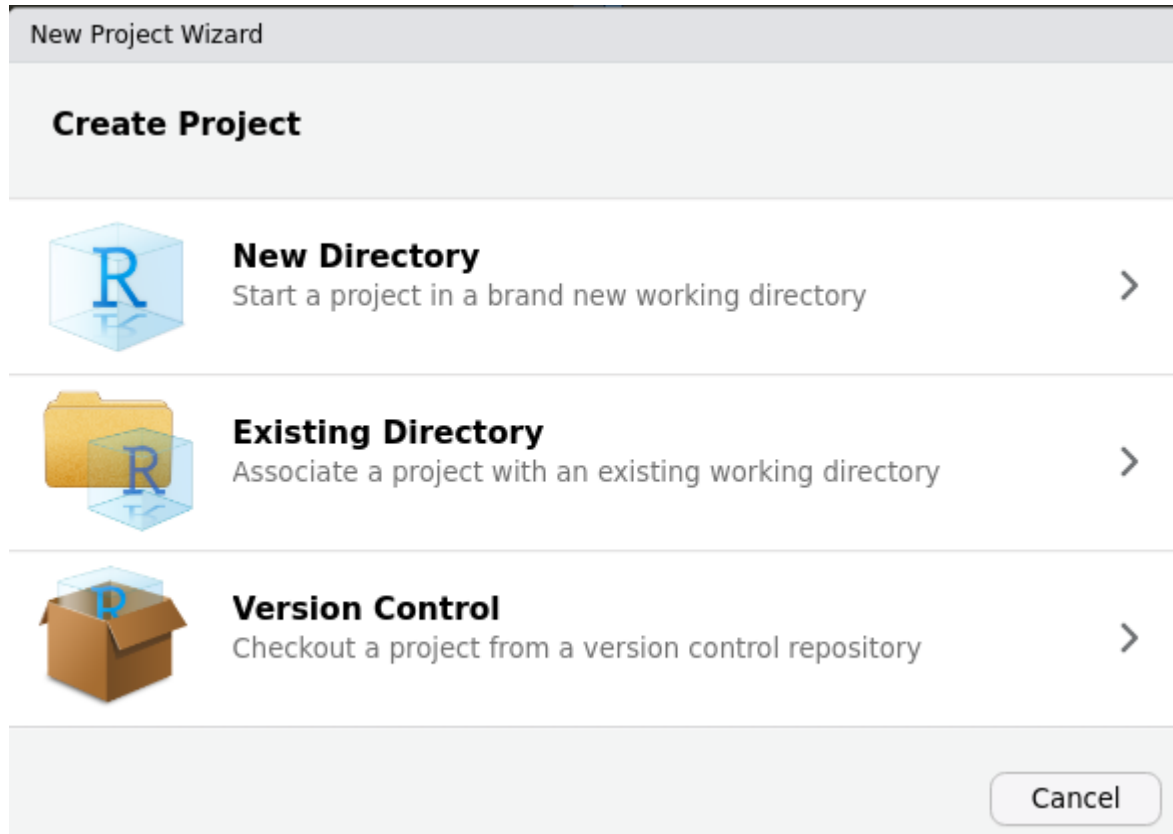
# Clone a repository

## Command line

```
cd Projects  
git clone git@github.com:andschar/MOD3.git # SSH  
git clone https://github.com/andschar/MOD3.git # HTTPS
```

## RStudio


# RStudio



# RStudio

New Project Wizard

**Back** **Clone Git Repository**



Repository URL:

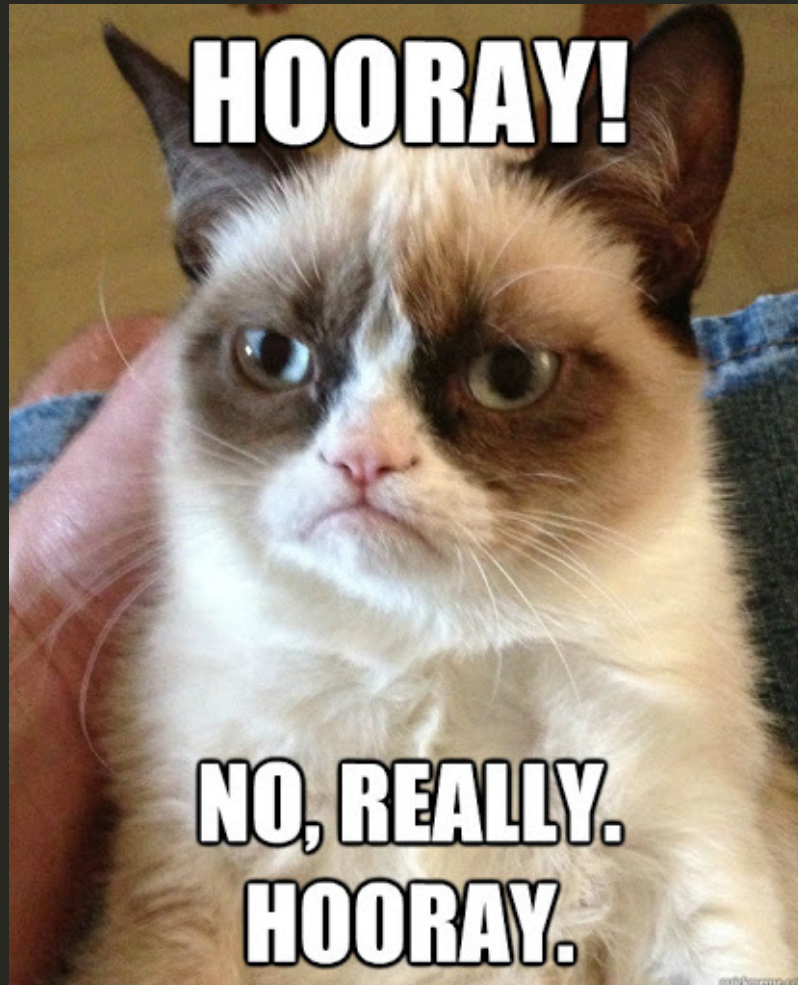
Project directory name:

Create project as subdirectory of:  
 **Browse...**

☐ Open in new session

**Create Project** **Cancel**

First repository (i.e. fork) !!



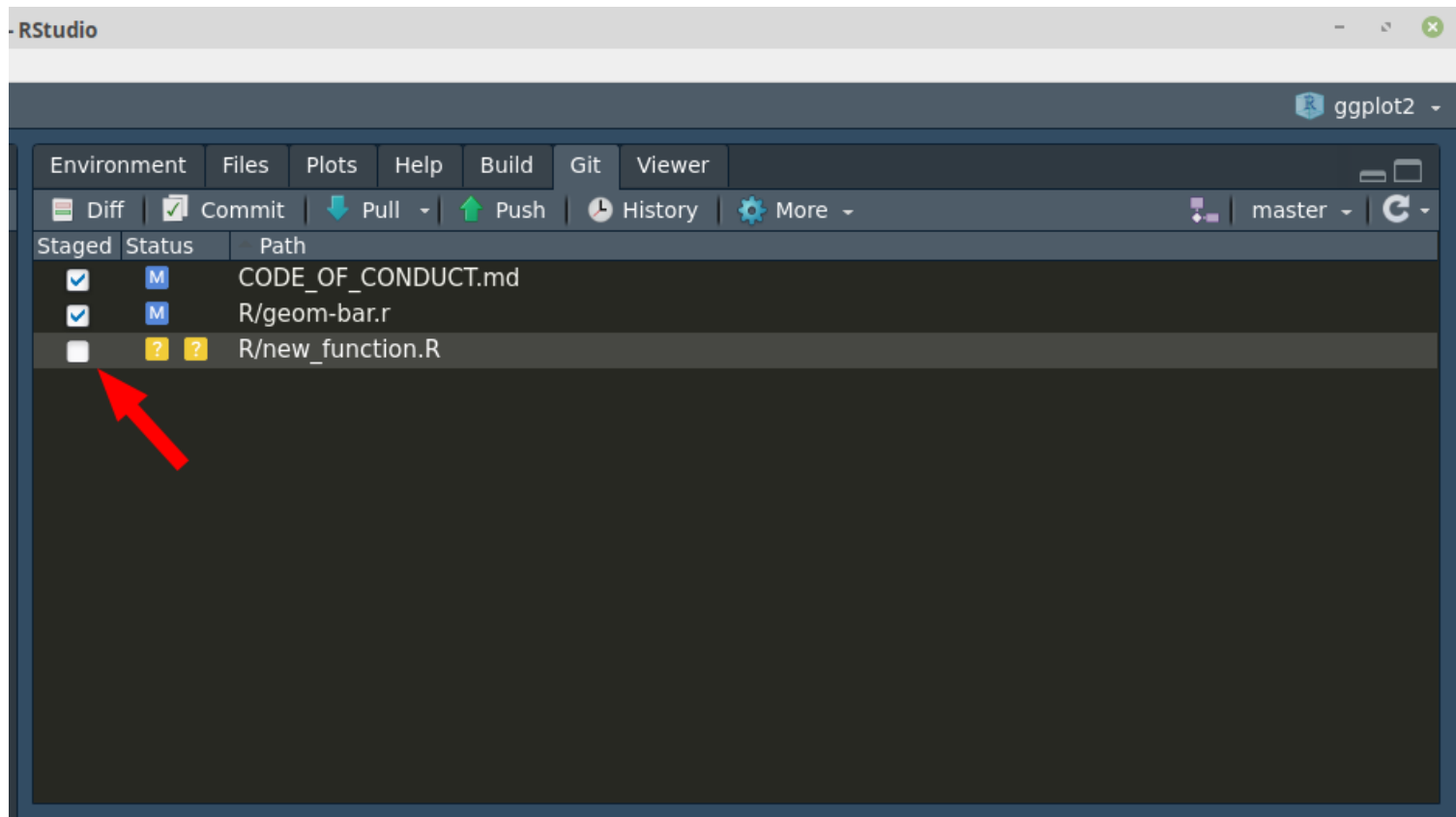
# Local changes

Make changes to the .txt, .R, .python or to whatever file...



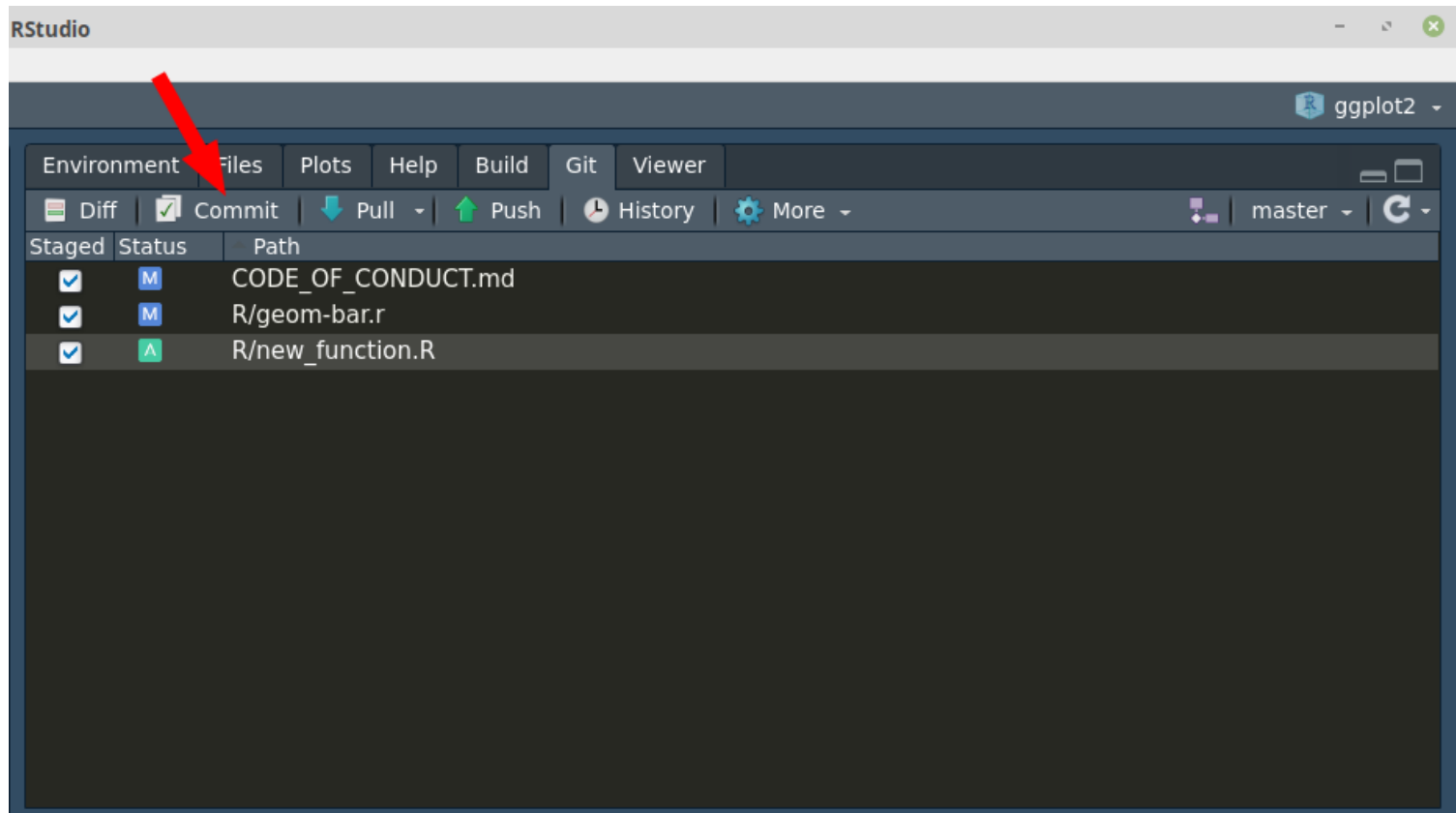
# Stage your changes

```
git add file.txt  
git add *.txt  
git add -A
```



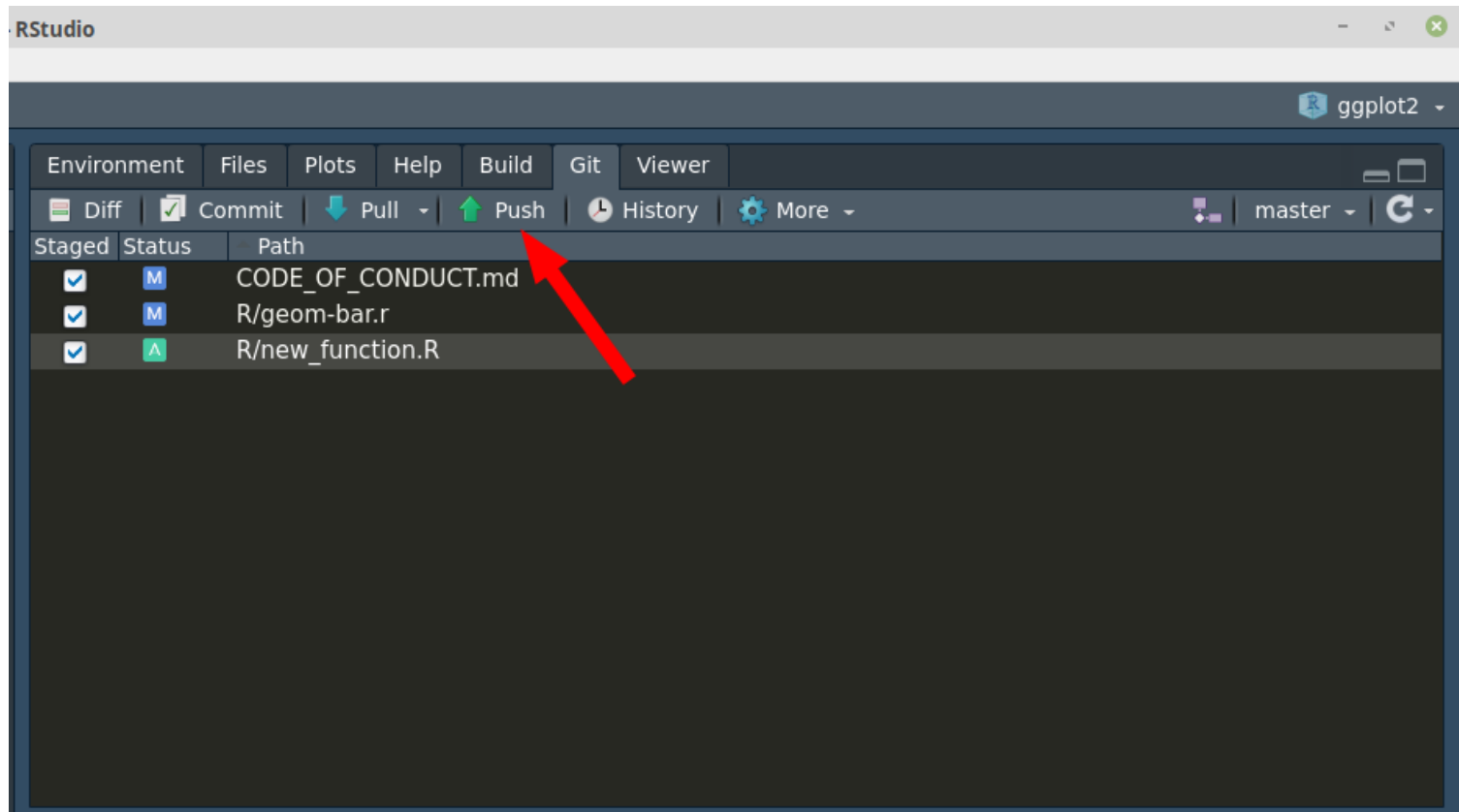
# Commit changes

```
git commit -m 'Patch-1'
```



# Push to your repo (origin)

```
git push origin master  
git push origin main
```





# Pull Request

## From your main branch to the remote main branch

The screenshot shows the GitHub interface for the repository `andschar / ggplot2`, which is a public fork of `tidyverse/ggplot2`. The repository is currently on the `master` branch, which is 1 commit ahead of the upstream `tidyverse:master`. A red arrow points to the text "This branch is 1 commit ahead of tidyverse:master." in the branch status bar. Another red arrow points to the "Open pull request" button in a tooltip that appears when hovering over the branch status. The tooltip also contains the text "This branch is 1 commit ahead of tidyverse:master. Open a pull request to contribute your changes upstream." and a green "Open pull request" button. The repository's file list shows folders for `.github`, `R`, and `data-raw`. The commit history on the right shows 4,795 commits, with the most recent commit made 2 minutes ago.

GitHub repository page for `andschar / ggplot2` (Public fork of `tidyverse/ggplot2`).

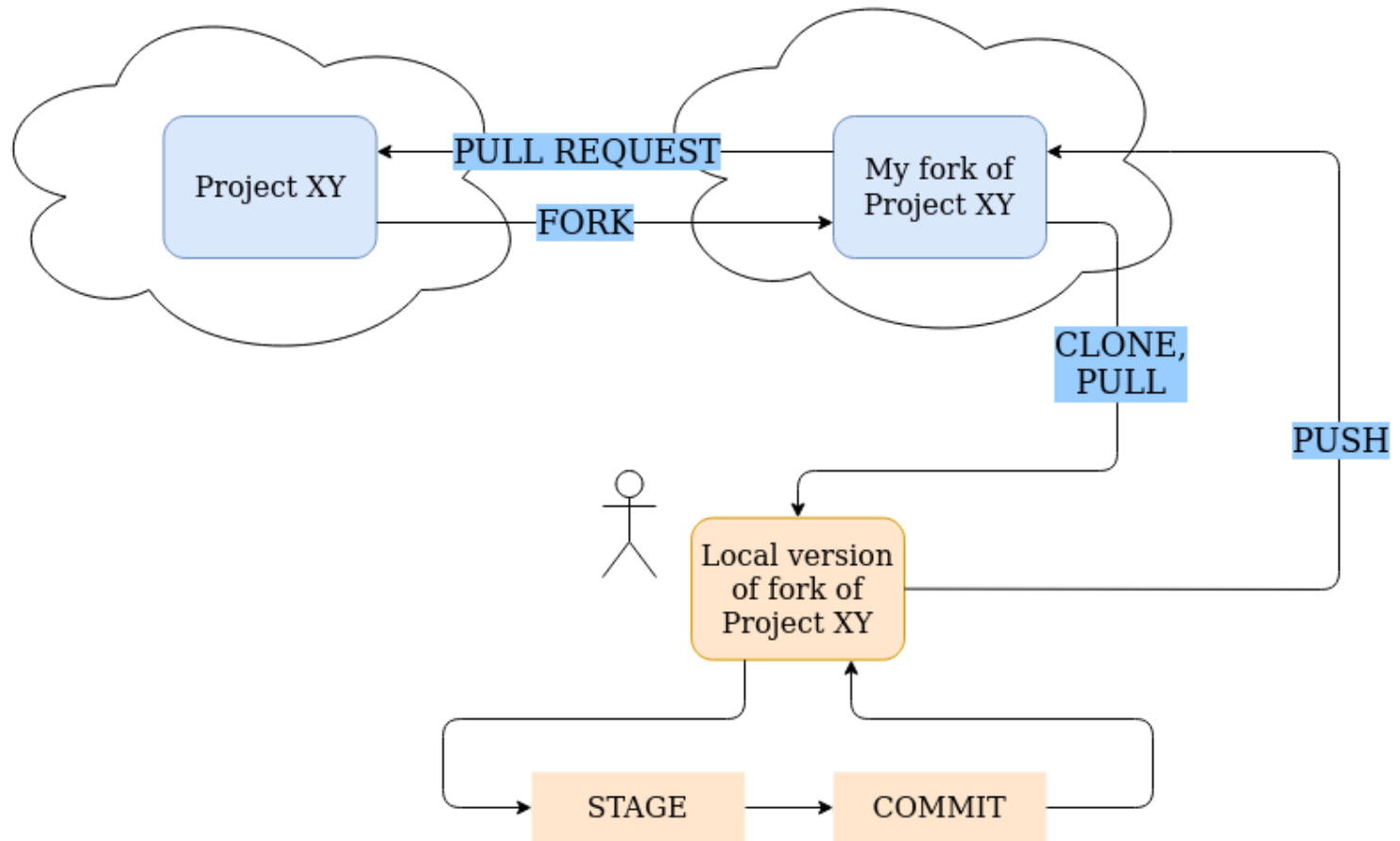
Branch status: `master` (51 branches, 34 tags). This branch is 1 commit ahead of `tidyverse:master`.

Files: `.github`, `R`, `data-raw`.

Commits: 4,795 commits (2 months ago, 2 minutes ago, 3 years ago).

Buttons: Go to file, Add file, Code, Open pull request.

# Git/Github Workflow



# Git/Github Workflow

1. Create or Fork a repo
2. Clone the repo to local machine
3. Local changes
4. Stage (i.e. add) & Commit changes to Git tree
5. Push to origin
6. Create a Pull-Request against the remote repository

Branches

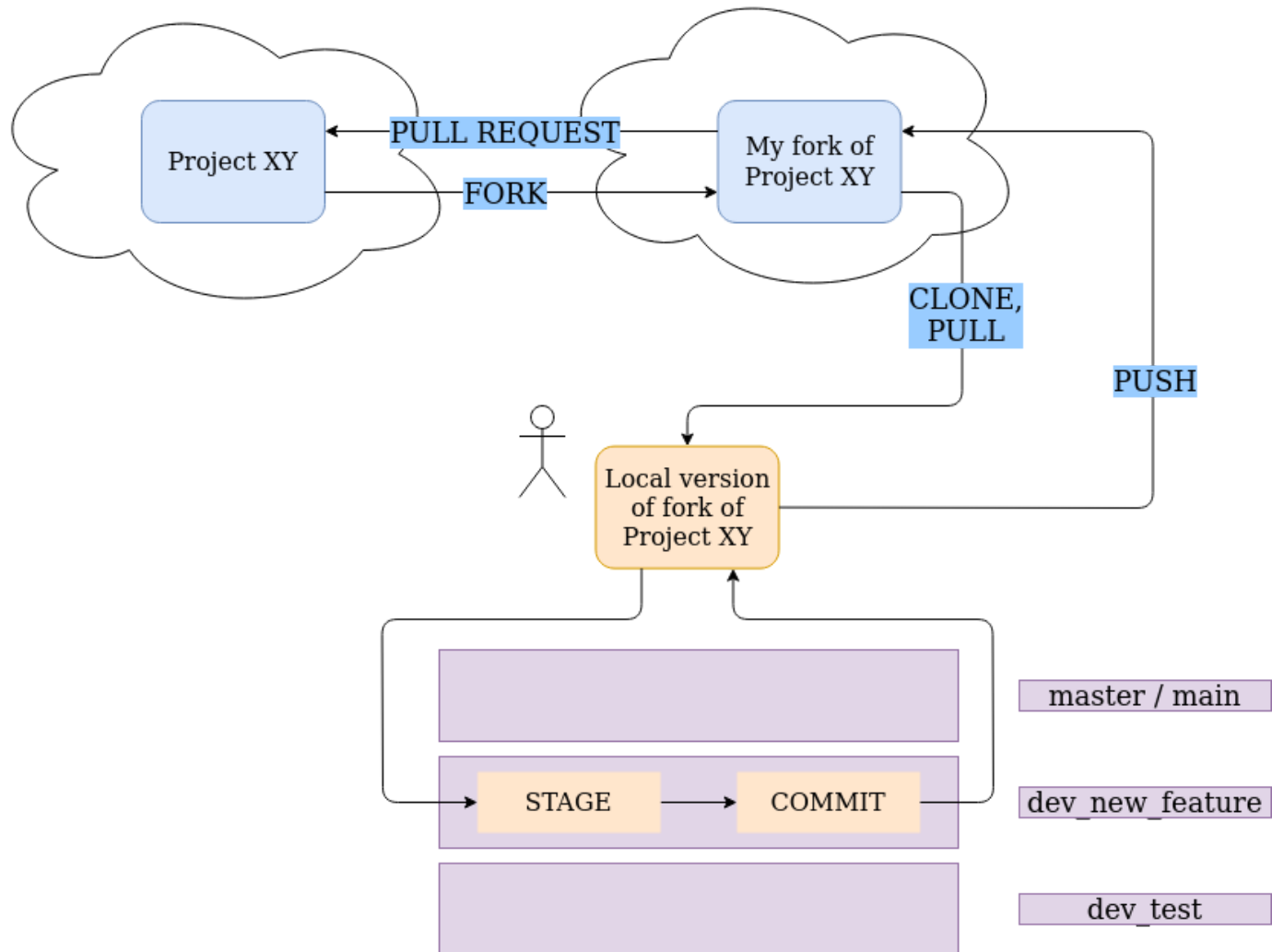


# Branch

## Create/Switch Branch

```
git checkout -b dev_new_feature  
git checkout master  
git status  
git branch
```

# Branch



# Branch

## Merge Branch

```
git checkout master  
git merge dev_new_feature
```

# Branch

## Merge example

First 8 commits of my R-package repo: **andschar/dbreport**

```
git log --all --decorate --oneline --graph
```

```
* 190eed7 changed ggplot2 dependancy
* 1d4d97f Merge branch 'master' of github.com:andschar/dbreport
| \
| * 86dfc87 test
| * | 39fd318 exists check
| /
* 1ccf212 handling integer64 + minor changes
* 571795b documentation
* 86052cf DESCRIPTION
* 7dd5646 1st commit
```



# Branch

## Pull / Merge Request

From your dev\_XXX branch to a new remote dev\_XXX branch

The screenshot shows the GitHub interface for the repository 'andschar/ggplot2'. The browser address bar shows the URL 'https://github.com/andschar/ggplot2'. The repository is public and forked from 'tidyverse/ggplot2'. The main navigation bar includes links for Code, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. A yellow banner at the top indicates that the 'dev\_new\_feature' branch has recent pushes less than a minute ago, with a green 'Compare & pull request' button. Below this, the current branch is 'master', which is 1 commit ahead of 'tidyverse:master'. The commit history shows three commits: 'Patch-1' (32a6a15, 8 minutes ago, 4,795 commits), 'Use the dev version of pkgdown (tidyverse#4543)' (2 months ago), and 'Update economics data (tidyverse#2962)' (3 years ago). Two red arrows point to the 'dev\_new\_feature' branch name and the 'Compare & pull request' button.

dev\_new\_feature had recent pushes less than a minute ago [Compare & pull request](#)

master 51 branches 34 tags [Go to file](#) [Add file](#) [Code](#)

This branch is 1 commit ahead of tidyverse:master. [Contribute](#) [Fetch upstream](#)

**andschar** Patch-1 32a6a15 8 minutes ago 4,795 commits

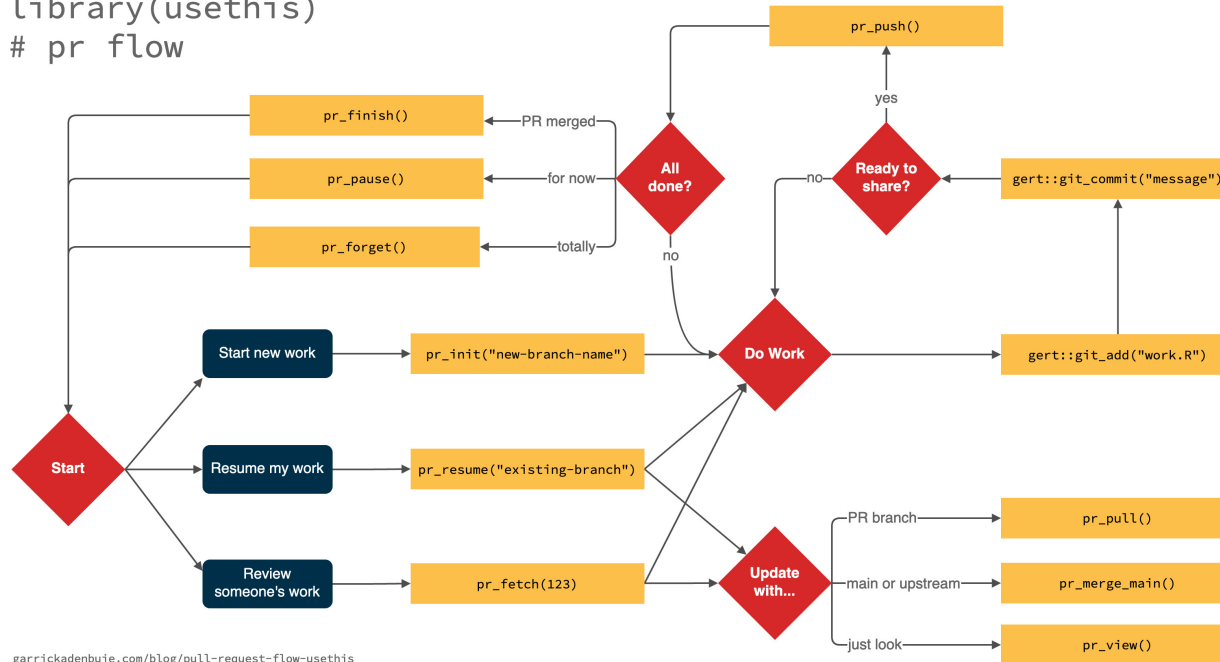
.github	Use the dev version of pkgdown (tidyverse#4543)	2 months ago
R	Patch-1	8 minutes ago
data-raw	Update economics data (tidyverse#2962)	3 years ago

# R solutions

# {usethis} & {gert} package

```
gert::git_commit()  
usethis::pr_pull()  
usethis::pr_push()
```

```
library(usethis)  
# pr flow
```

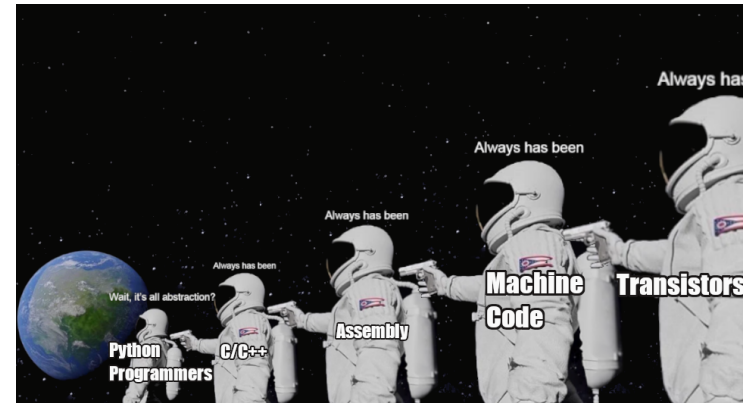


[garrickadenbuie.com/blog/pull-request-flow-usethis](https://www.garrickadenbuie.com/blog/pull-request-flow-usethis)

# {usethis} & {gert} package

```
gert::git_commit()  
usethis::pr_pull()  
usethis::pr_push()
```

- Convenience **wrapper** around git
- Advantage:
  - Easier to use
- Disadvantage:
  - More software to maintain
  - Might break something in the future
  - You might not always use R in your career





# Material

- OpenOlat
- StackOverflow
- YouTube
- <https://guides.github.com/activities/hello-world>
- <https://support.rstudio.com/hc/en-us/articles/200532077-Version-Control-with-Git-and-SVN>
- <https://ohshitgit.com>
- <https://www.garrickadenbuie.com/blog/pull-request-flow-use-this>

## Made with

- <https://github.com/rstudio/rmarkdown>
- <https://github.com/yihui/knitr>
- <https://github.com/yihui/xaringan>

# Task: RMarkdown & Git

- **Fork** the MOD3 test repo: <https://github.com/andschar/MOD3>
- **Clone** the repo to your local machine
- Create a new branch named dev\_YOURSURNAME
- Change the file *task.Rmd* according to the steps described in the file
- Create (i.e. knit) a .html out of the .Rmd file
- **Stage & Commit** both files in the new branch
- **Push** your local changes to your repo (HINT: this might cause some trouble ;))
- Create a **Pull Request** against my original repo

# Introduction to Git & GitHub

Thank you for your attention!

Slides: <https://andschar.github.io/teaching/GIT>

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