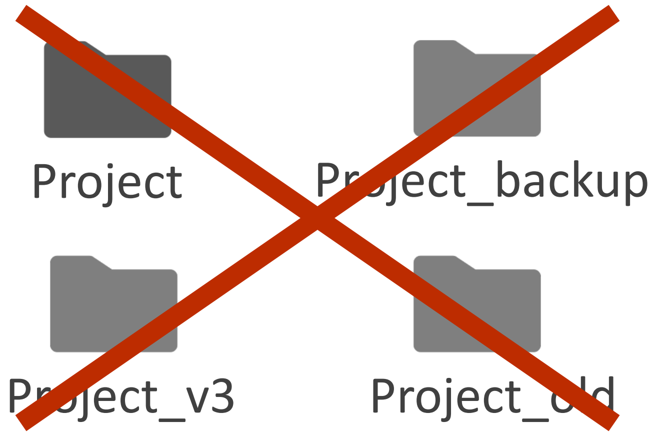
git

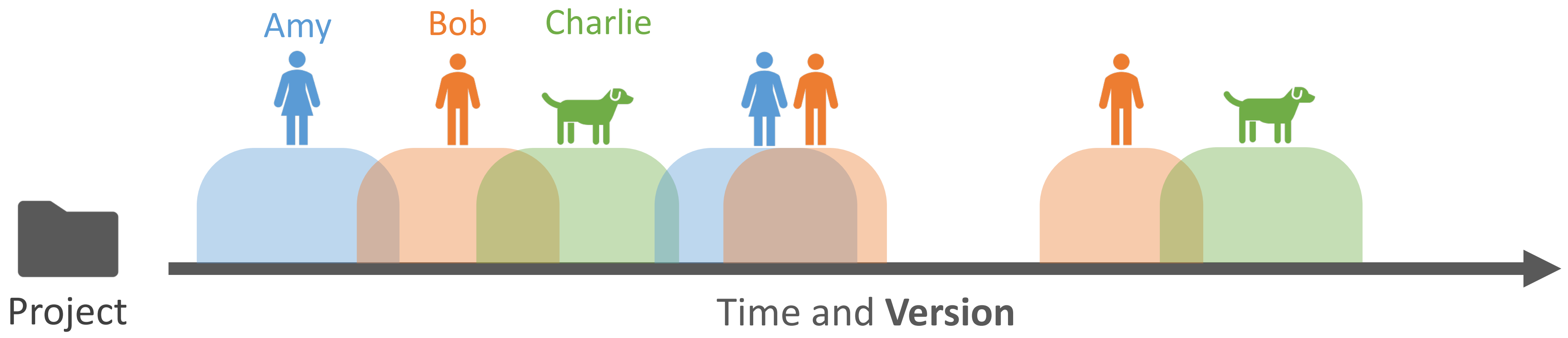
20 April 2022

Erasmus MC
University Medical Center Rotterdam

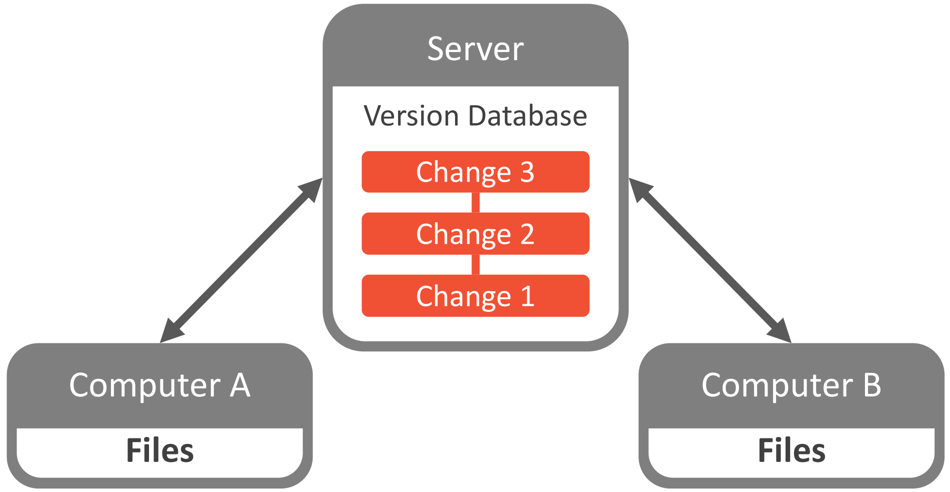
Version Control

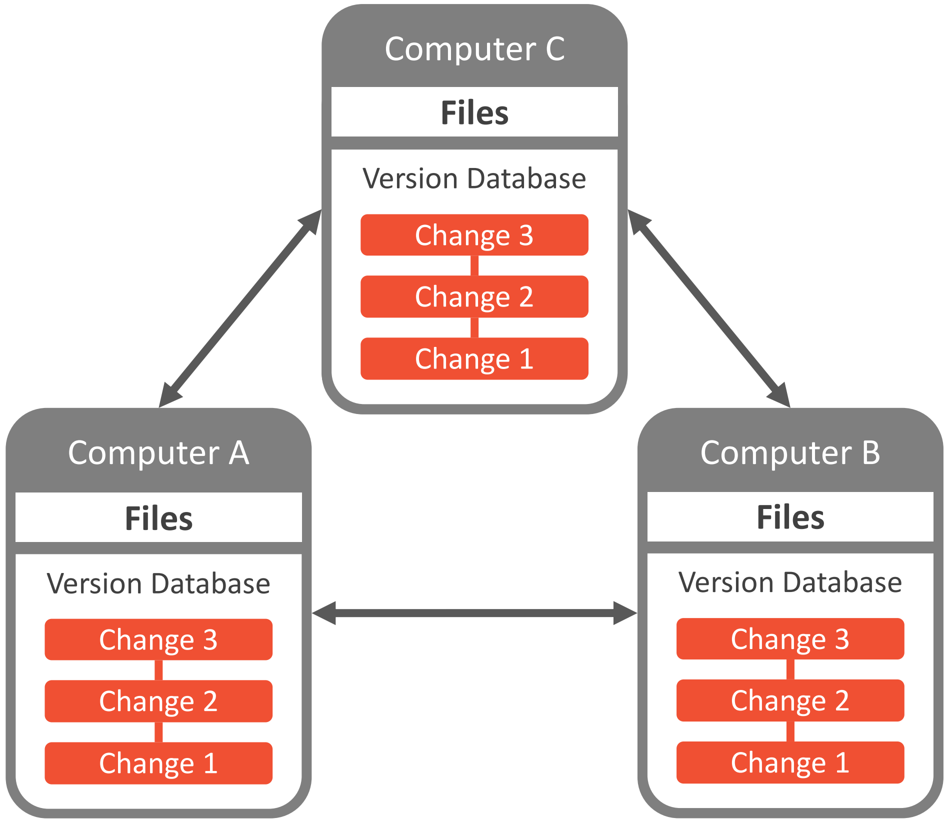
- Tracks **changes** in computer files
- Efficient **collaboration** with colleagues





Version Control Systems





Centralized SVN, CVS, Perforce

+ manage access rights

Distributed Git, Mercurial

+ local version database

+ backup on collaborator machines

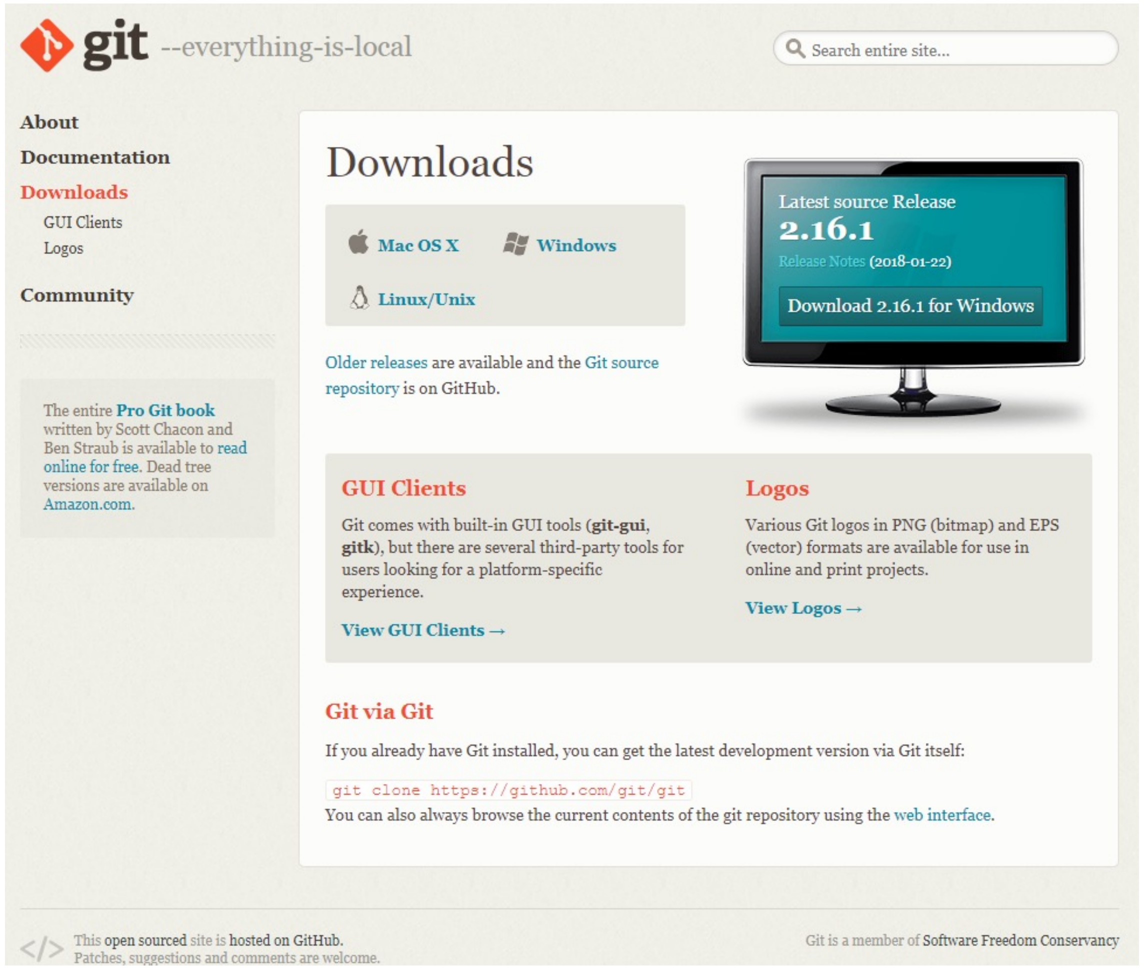
About Git

- Git is a **distributed** version control system for local and remote repositories

- Git is advertised with the following features
  - Offers **review** functionality
  - Work **offline** anywhere
  - **Fast** and lightweight
  - **Journal** of changes rather than a backup
  - Serves the needs of **beginners** and **advanced** users equally well

Installation

- **Download** at https://git-scm.com/downloads
- Accept **default** settings during installation



Downloads

Older releases are available and the Git source repository is on GitHub.

The entire Pro Git book written by Scott Chacon and Ben Straub is available to read online for free. Dead tree versions are available on Amazon.com.

GUI Clients

Git comes with built-in GUI tools (**git-gui**, **gitk**), but there are several third-party tools for users looking for a platform-specific experience.

Logos

Various Git logos in PNG (bitmap) and EPS (vector) formats are available for use in online and print projects.

Git via Git

If you already have Git installed, you can get the latest development version via Git itself:

```
git clone https://github.com/git/git
```

You can also always browse the current contents of the git repository using the web interface.

This open sourced site is hosted on GitHub.
Patches, suggestions and comments are welcome.

Git is a member of Software Freedom Conservancy

Interfaces

Command Line Interface (CLI)

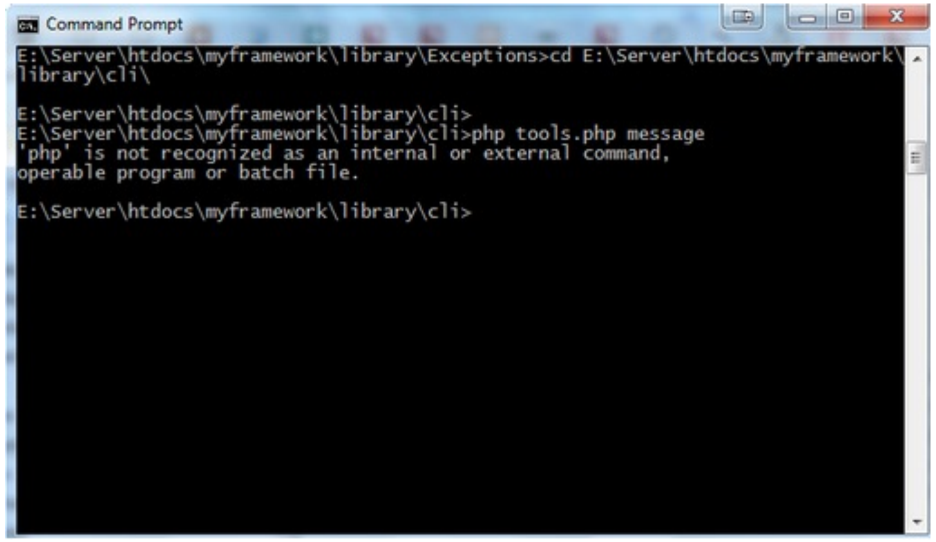
- Syntax: `git [verb] [options]`
- Allows for **customized** commands
- Commands are **platform-independent**
- **Fast**

Graphical User Interface (GUI)

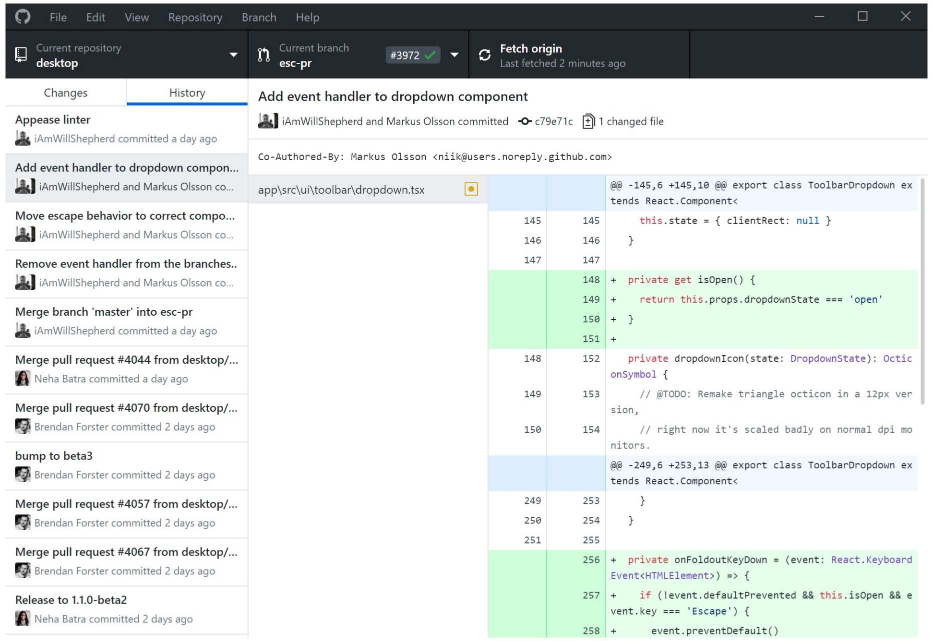
- Saves **typing**
- Lower **barrier-of-entry**
- (we recommend GitHub Desktop or Sourcetree)

Integrated Development Environment (IDE)

- Integrates version control with programming **projects** e.g., generates .gitignore.



```
E:\Server\htdocs\myframework\library\Exceptions>cd E:\Server\htdocs\myframework\
library\cli\

E:\Server\htdocs\myframework\library\cli>
E:\Server\htdocs\myframework\library\cli>php tools.php message
'php' is not recognized as an internal or external command,
operable program or batch file.

E:\Server\htdocs\myframework\library\cli>
```



Appease linter
iAmWillShepherd committed a day ago

Add event handler to dropdown compon...
iAmWillShepherd and Markus Olsson co...

Move escape behavior to correct compo...
iAmWillShepherd and Markus Olsson co...

Remove event handler from the branches..
iAmWillShepherd and Markus Olsson co...

Merge branch 'master' into esc-pr
iAmWillShepherd committed a day ago

Merge pull request #4044 from desktop/...
Neha Batra committed a day ago

Merge pull request #4070 from desktop/...
Brendan Forster committed 2 days ago

bump to beta3
Brendan Forster committed 2 days ago

Merge pull request #4057 from desktop/...
Brendan Forster committed 2 days ago

Merge pull request #4067 from desktop/...
Brendan Forster committed 2 days ago

Release to 1.1.0-beta2
Neha Batra committed 2 days ago

Add event handler to dropdown component
iAmWillShepherd and Markus Olsson committed c79e71c 1 changed file

```
Co-Authored-By: Markus Olsson <niik@users.noreply.github.com>
```

app\src\ui\toolbar\dropdown.tsx

```
@@ -145,6 +145,10 @@ export class ToolbarDropdown extends React.Component<
     this.state = { clientRect: null }
   }

+  private get isOpen() {
+    return this.props.dropdownState === 'open'
+  }
+
   private dropdownIcon(state: DropdownState): OcticonSymbol {
     // @TODO: Remake triangle octicon in a 12px version,
     // right now it's scaled badly on normal dpi monitors.
@@ -249,6 +253,13 @@ export class ToolbarDropdown extends React.Component<
     }
   }

+  private onFoldoutKeyDown = (event: React.KeyboardEvent<HTMLElement>) => {
+    if (!event.defaultPrevented && this.isOpen && event.key === 'Escape') {
+      event.preventDefault()
```

Configure Git – CLI

Verify installed git **version**

```
git --version
```

Configure git on a `--system`, `--global` or `--local` level

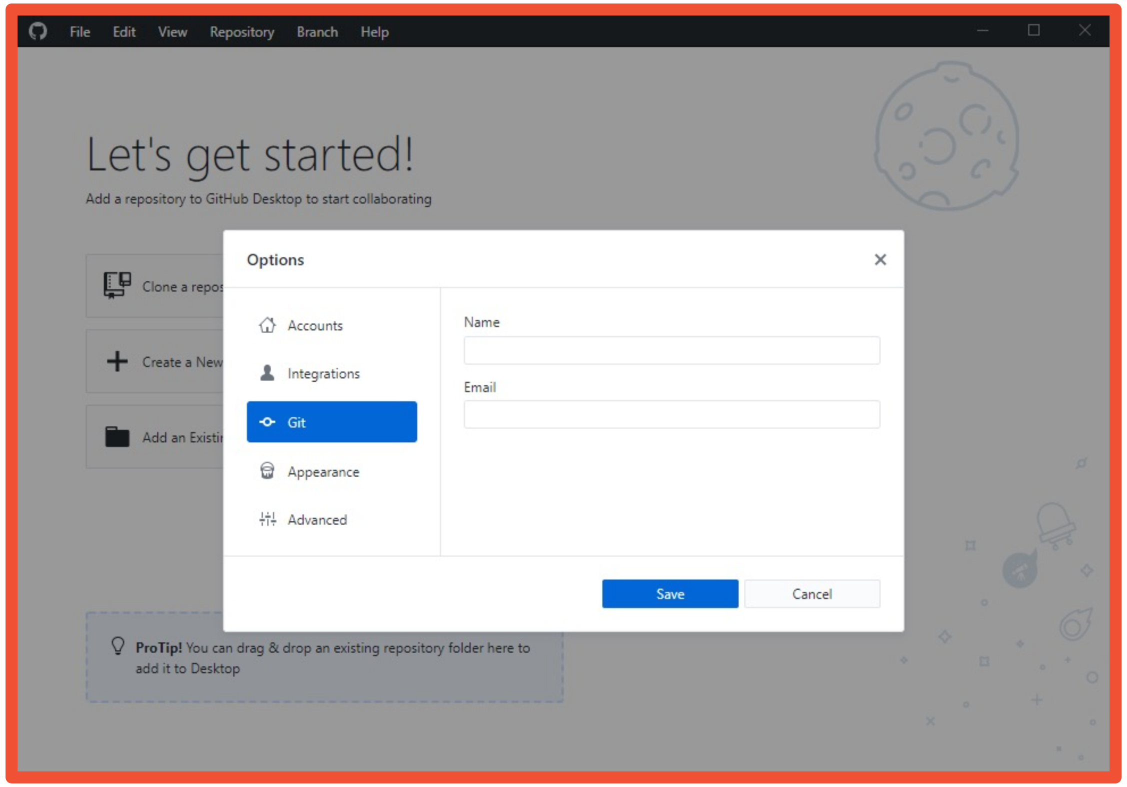
```
git config --global user.name “your name”
git config --global user.email “my@mail.nl”
git config --global --list
```

Open **documentation** of verb (e.g. `config`)

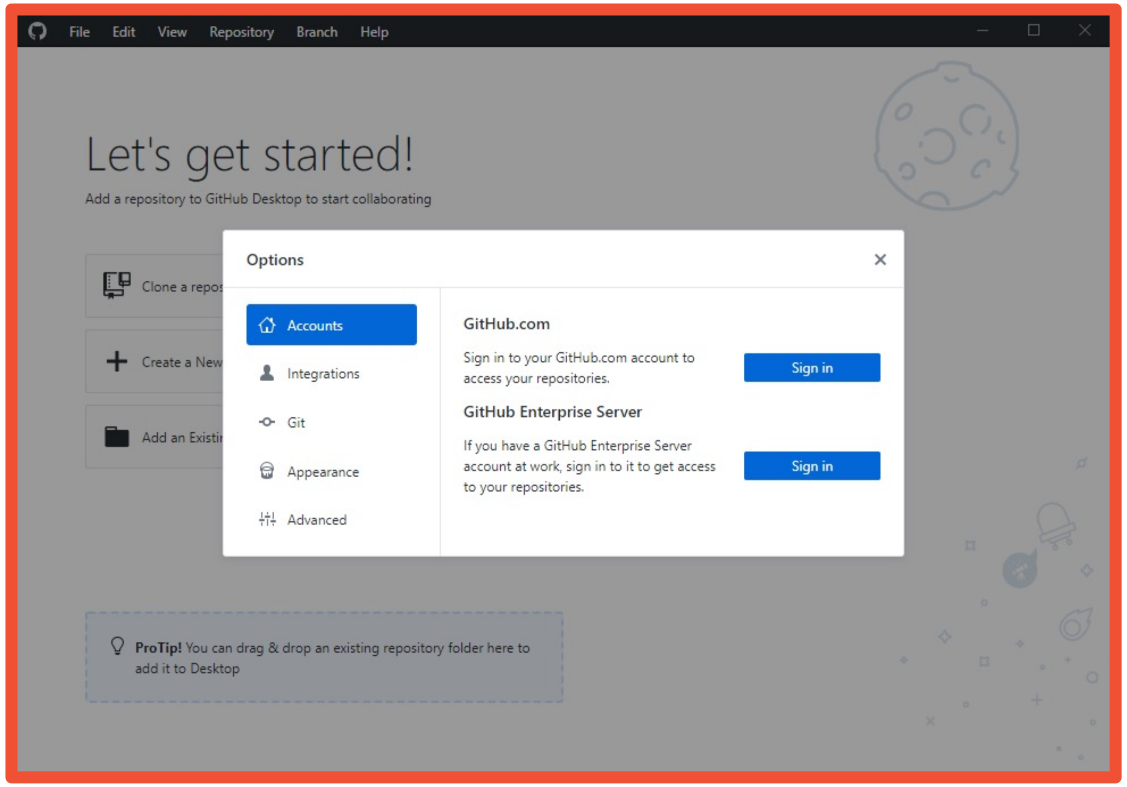
```
git help [verb]
git [verb] –help
git config --global --unset user.name
```

Configure Git – GUI (GitHub Desktop)

File → Options → Git



File → Options → Accounts



File
Edit
View
Repository
Branch
Help
Let's get started!
Add a repository to GitHub Desktop to start collaborating
Clone a repos
Create a New
Add an Existi
Options
Accounts
Integrations
Git
Appearance
Advanced
GitHub.com
Sign in to your GitHub.com account to access your repositories.
Sign in
GitHub Enterprise Server
If you have a GitHub Enterprise Server account at work, sign in to it to get access to your repositories.
Sign in
ProTip! You can drag & drop an existing repository folder here to add it to Desktop

Local Repositories – CLI

The local repository is the project folder under version control. It contains the .git subfolder (hidden by default) and all project related files and subfolders.

Initialize local **repository**

```
git init [project-name]
```

Check **status** of local repository

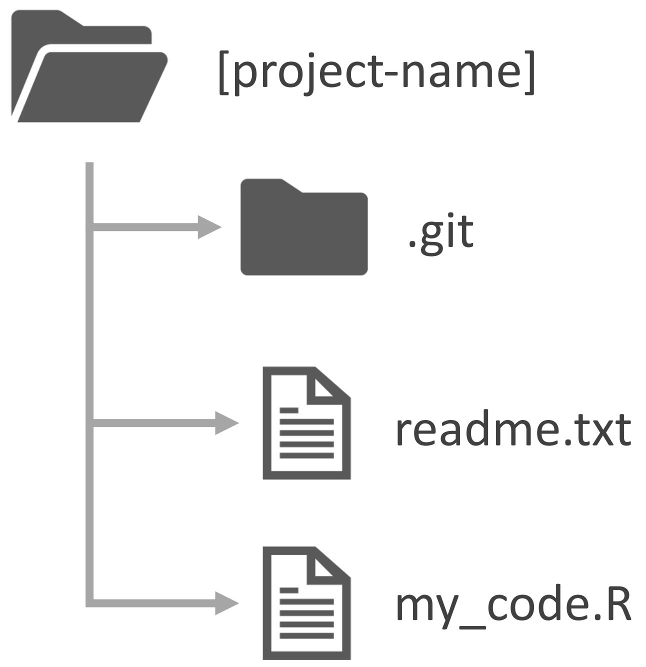
```
git status
```

Create empty file on Windows

```
copy NUL [file-name]
```

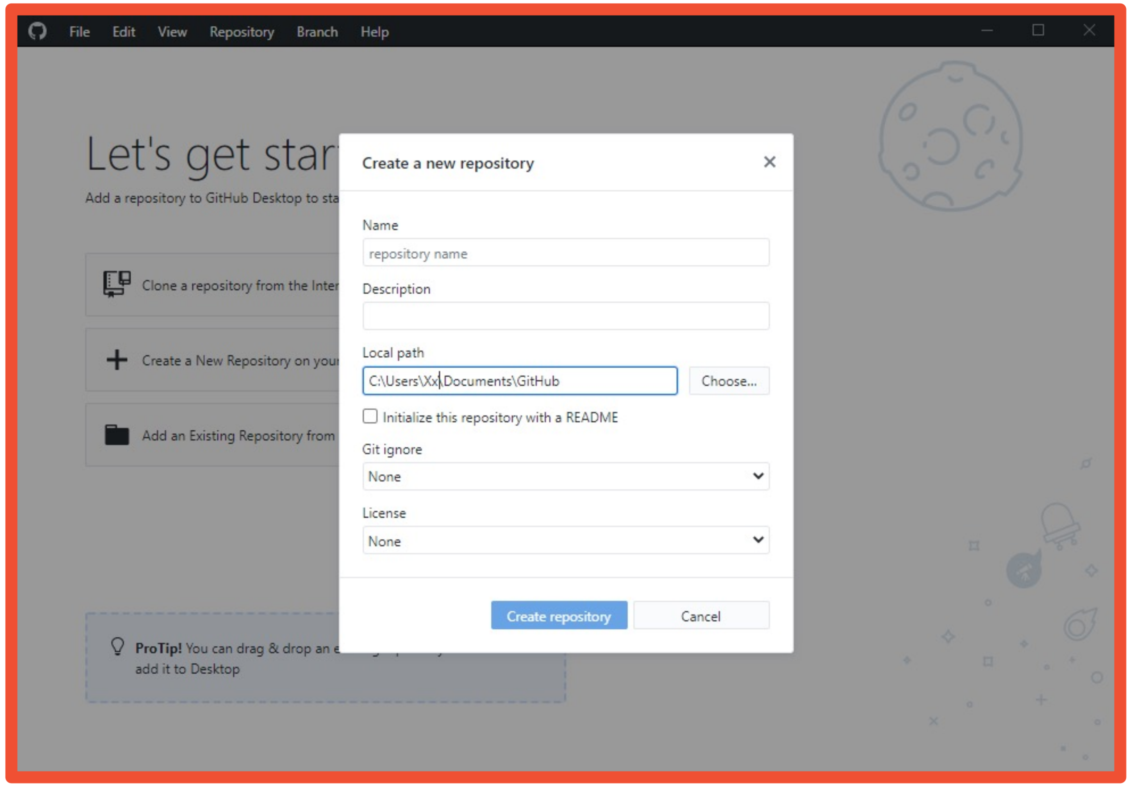
Create empty file on macOS, Linux

```
touch [file-name]
```



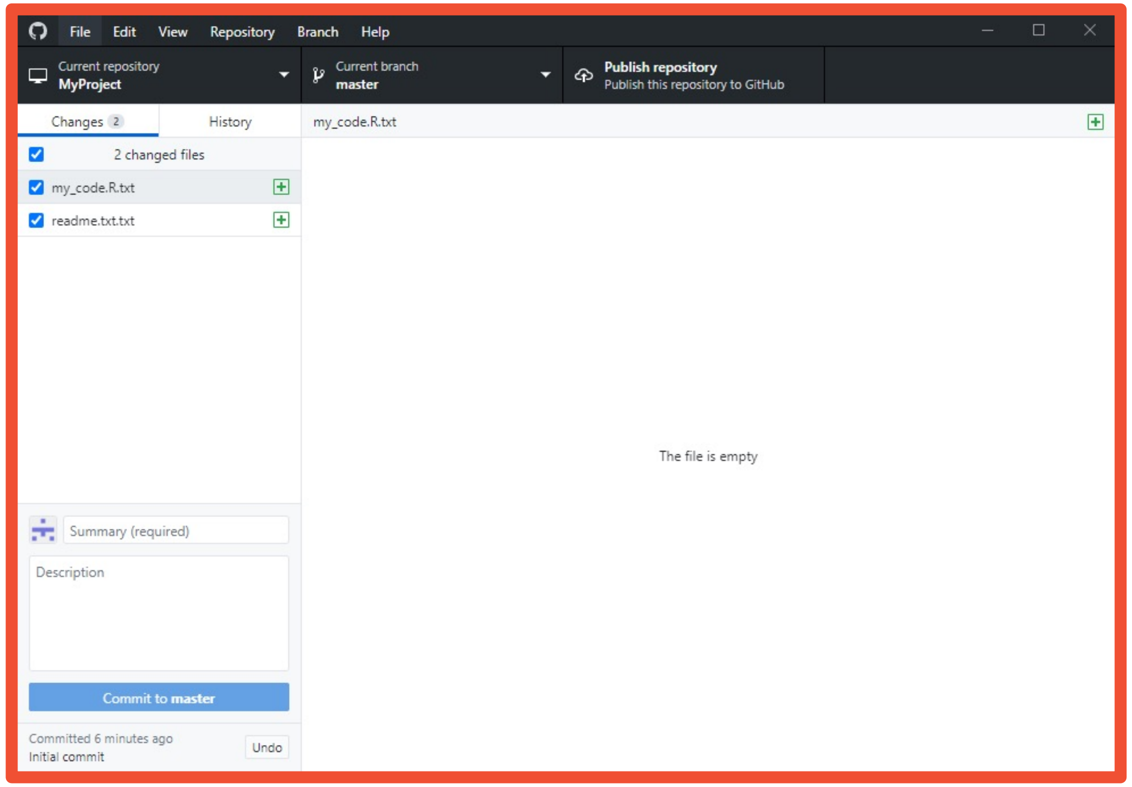
Local Repositories – GUI (GitHub Desktop)

File → New repository


File Edit View Repository Branch Help
Let's get star
Add a repository to GitHub Desktop to sta
Clone a repository from the Inter
Create a New Repository on your
Add an Existing Repository from
ProTip! You can drag & drop an e
add it to Desktop
Create a new repository
Create repository
Cancel
Choose...

Name
repository name
Description
Local path
C:\Users\Xx\Documents\GitHub
Initialize this repository with a README
Git ignore
None
License
None

Changes are detected with a background call to `git status`



2 changed files
my_code.R.txt
readme.txt.txt
my_code.R.txt
The file is empty
Committed 6 minutes ago
Initial commit

File Status Lifecycle

Stage untracked/modified file

```
git add [file-name]
```

Commit staged files

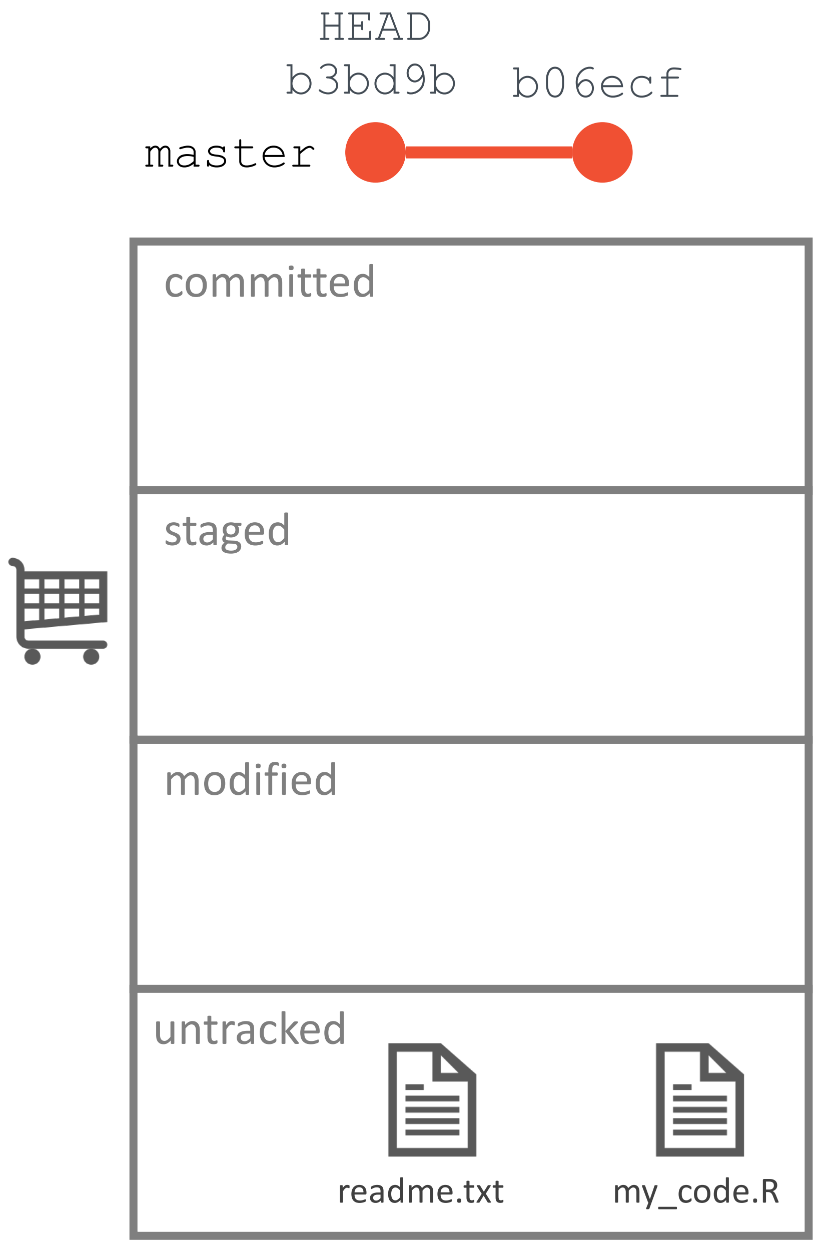
```
git commit -m "[message]"
```

Show **modification**

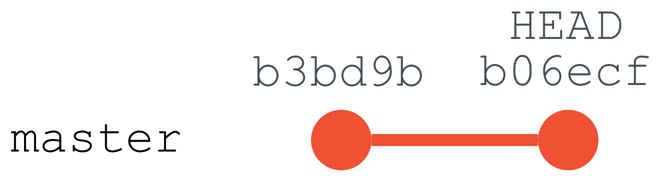
```
git diff HEAD

git diff [commit] [commit]
```

Stage all files

```
git add -A
```



Log – CLI



Show **logged** commits

```
git log
```

Show command **options**

```
git help log
```

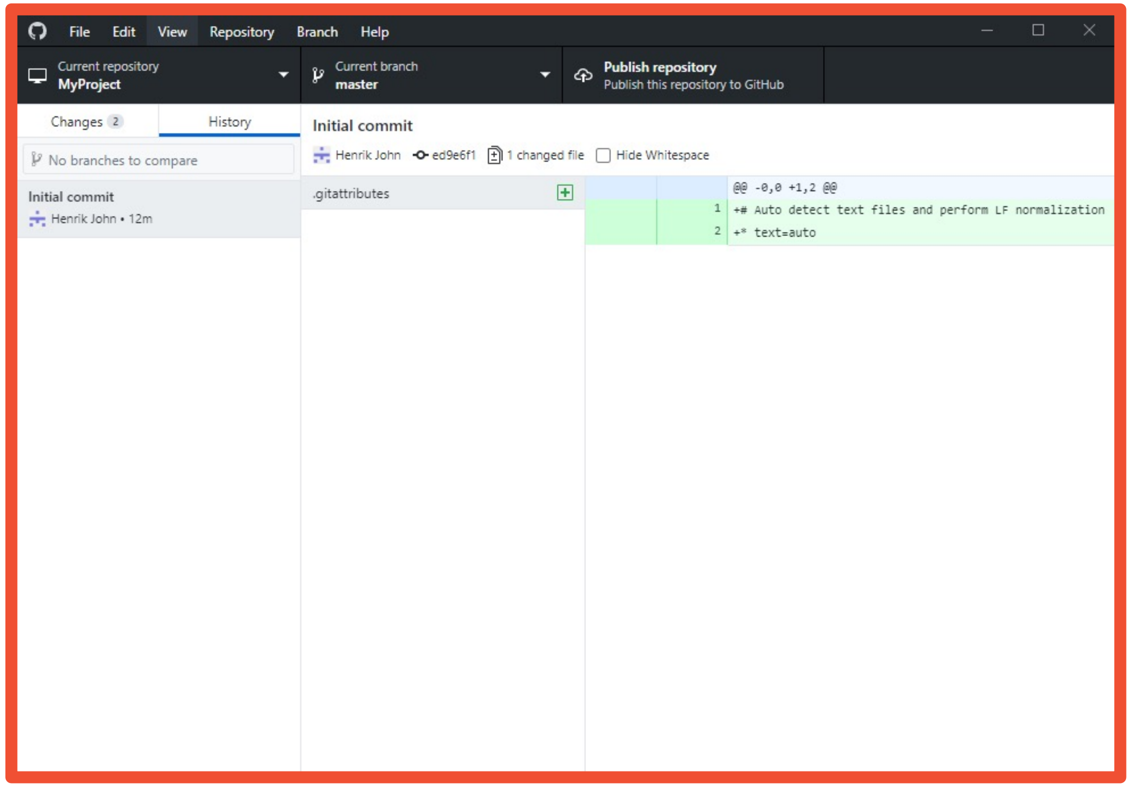
Show **formatted** log message and **graph.** Also, check out https://tinyurl.com/pretty-log.

```
git log --graph --oneline
```

Log – GUI (GitHub Desktop)

View → History

History of the OHDSI Atlas repository

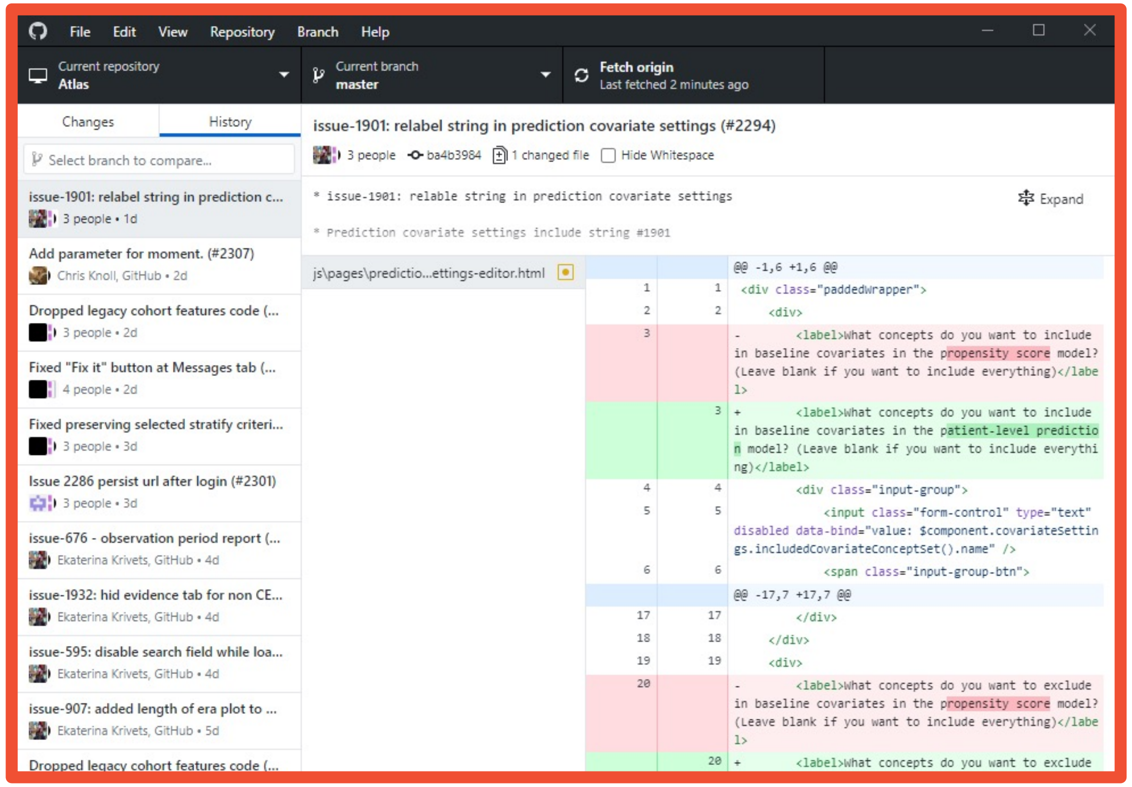


Initial commit
Henrik John • 12m

Initial commit
Henrik John ed9e6f1 1 changed file

.gitattributes

```
@@ -0,0 +1,2 @@
+# Auto detect text files and perform LF normalization
+* text=auto
```



issue-1901: relabel string in prediction c...
3 people • 1d

Add parameter for moment. (#2307)
Chris Knoll, GitHub • 2d

Dropped legacy cohort features code (...
3 people • 2d

Fixed "Fix it" button at Messages tab (...
4 people • 2d

Fixed preserving selected stratify criteri...
3 people • 3d

Issue 2286 persist url after login (#2301)
3 people • 3d

issue-676 - observation period report (...
Ekaterina Krivets, GitHub • 4d

issue-1932: hid evidence tab for non CE...
Ekaterina Krivets, GitHub • 4d

issue-595: disable search field while loa...
Ekaterina Krivets, GitHub • 4d

issue-907: added length of era plot to ...
Ekaterina Krivets, GitHub • 5d

Dropped legacy cohort features code (...

issue-1901: relabel string in prediction covariate settings (#2294)
3 people ba4b3984 1 changed file

```
* issue-1901: relable string in prediction covariate settings

* Prediction covariate settings include string #1901
```

js\pages\predictio...ettings-editor.html

```
@@ -1,6 +1,6 @@
 <div class="paddedWrapper">
     <div>
-        <label>What concepts do you want to include in baseline covariates in the propensity score model? (Leave blank if you want to include everything)</label>
+        <label>What concepts do you want to include in baseline covariates in the patient-level prediction model? (Leave blank if you want to include everything)</label>
         <div class="input-group">
             <input class="form-control" type="text" disabled data-bind="value: $component.covariateSettings.includedCovariateConceptSet().name" />
             <span class="input-group-btn">
@@ -17,7 +17,7 @@
         </div>
     </div>
     <div>
-        <label>What concepts do you want to exclude in baseline covariates in the propensity score model? (Leave blank if you want to include everything)</label>
+        <label>What concepts do you want to exclude
```

Commit message

- Use imperative mode for summary line. Start with "Fix", "Add", instead of "Fixed", "Added".
- Leave the second line blank
- Line break the commit message (at about 72 characters)
- Don't end the summary line with a period, as it is a title

```
Short (50 chars or less) summary of changes

More detailed explanatory text, if necessary. Wrap it to
about 72 characters or so. In some contexts, the first
line is treated as the subject of an email and the rest
of the text as the body. The blank line separating the
summary from the body is critical (unless you omit the
body entirely); tools like rebase can get confused if you
run the two together.

Further paragraphs come after blank lines.

- Bullet points are okay, too

- Typically a hyphen or asterisk is used for the bullet,
  preceded by a single space, with blank lines in
  between, but conventions vary here
```

Custom editor and tools

Git ships with **editors** and **tools** that are mostly command line based. While these tools are fast, they may not offer functionality or usability that suits all users and can, therefore, be changed.

Default core editor is `vim` , but can be changed, e.g., to *Atom*.

```
git config --global core.editor "atom -w"
```

Default `difftool` can be set, e.g., to *Meld* or *Beyond Compare*.

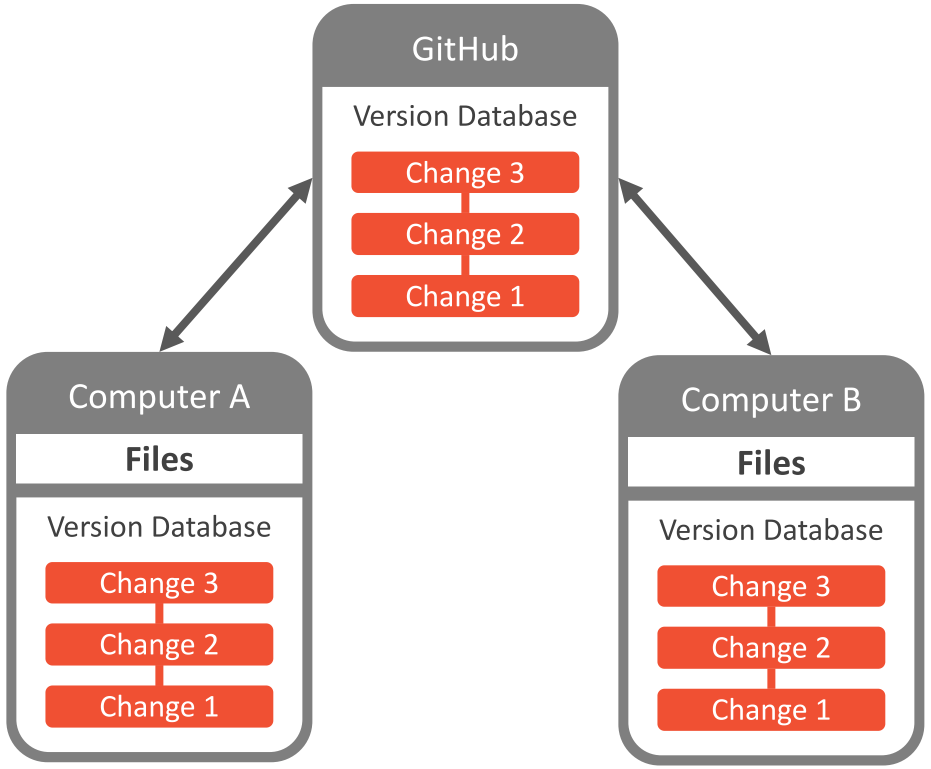
```
git config --global diff.tool "meld”
git difftool
```

Default `mergetool` can be set, e.g., to *Meld* or *Beyond Compare*.

```
git config --global merge.tool "meld”
```

Remote Repositories

- **Bare repository** only contains version database (e.g., GitHub)
- **Working repository** generates working directory from version database



Distributed Version Control System

Remote Repositories – CLI

A project copy, which is hosted on a remote server, e.g., **https://github.com/mi-erasmusmc/GitTutorial**

Clone a remote repository

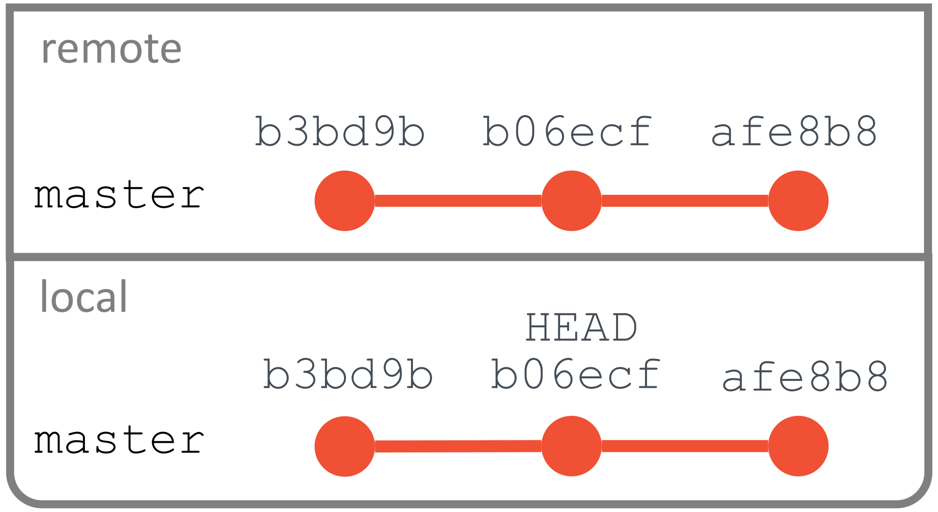
```
git clone [url]
```

Lists remote repository **Information**

```
git remote -v
git branch -a
```

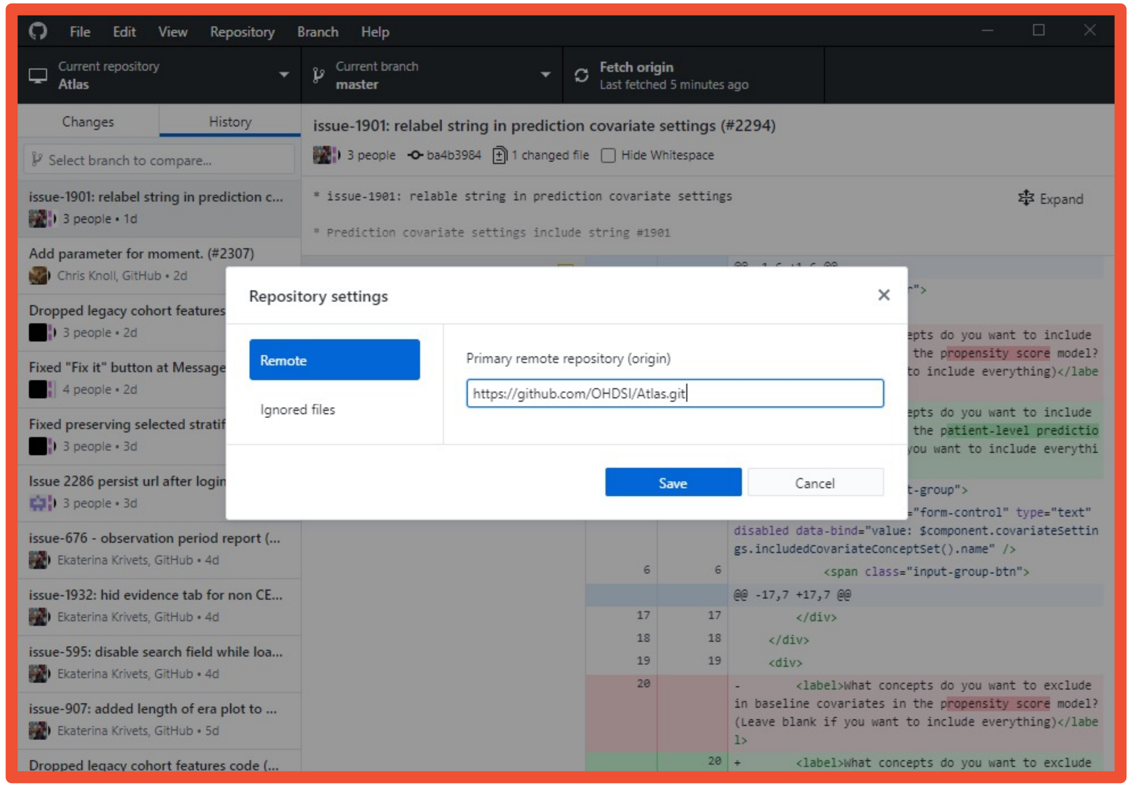
Push changes to remote repository

```
git pull
git push
```



Remote Repositories – GUI (GitHub Desktop)

Repository → Repository settings → Remote



issue-1901: relabel string in prediction covariate settings (#2294)
3 people · ba4b3984 · 1 changed file · Hide Whitespace

```
* issue-1901: relable string in prediction covariate settings

* Prediction covariate settings include string #1901
```

- issue-1901: relabel string in prediction c... — 3 people • 1d
- Add parameter for moment. (#2307) — Chris Knoll, GitHub • 2d
- Dropped legacy cohort features — 3 people • 2d
- Fixed "Fix it" button at Message — 4 people • 2d
- Fixed preserving selected stratif — 3 people • 3d
- Issue 2286 persist url after login — 3 people • 3d
- issue-676 - observation period report (... — Ekaterina Krivets, GitHub • 4d
- issue-1932: hid evidence tab for non CE... — Ekaterina Krivets, GitHub • 4d
- issue-595: disable search field while loa... — Ekaterina Krivets, GitHub • 4d
- issue-907: added length of era plot to ... — Ekaterina Krivets, GitHub • 5d
- Dropped legacy cohort features code (...

Repository settings

Remote | Ignored files

Primary remote repository (origin)

https://github.com/OHDSI/Atlas.git

Save | Cancel

```
epts do you want to include
 the propensity score model?
to include everything)</labe

epts do you want to include
 the patient-level predictio
you want to include everythi

t-group">
="form-control" type="text"
disabled data-bind="value: $component.covariateSettin
gs.includedCovariateConceptSet().name" />
        <span class="input-group-btn">
@@ -17,7 +17,7 @@
            </div>
        </div>
        <div>
-           <label>What concepts do you want to exclude
in baseline covariates in the propensity score model?
(Leave blank if you want to include everything)</labe
l>
+           <label>What concepts do you want to exclude
```

Branches – CLI

Diverge from the main line of development to work independently.

List local branches

```
git branch
```

Create a branch

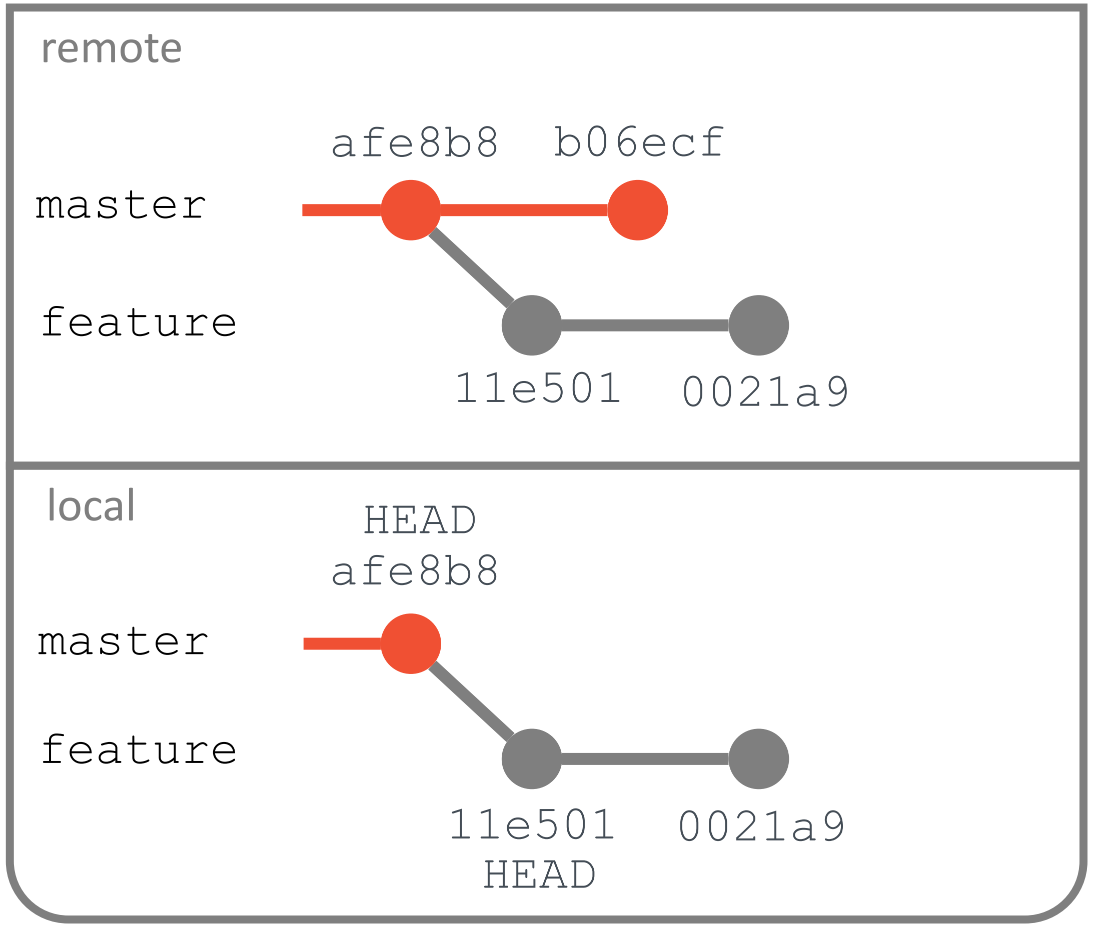
```
git branch [branch-name]
```

Enter a branch

```
git checkout [branch-name]
```

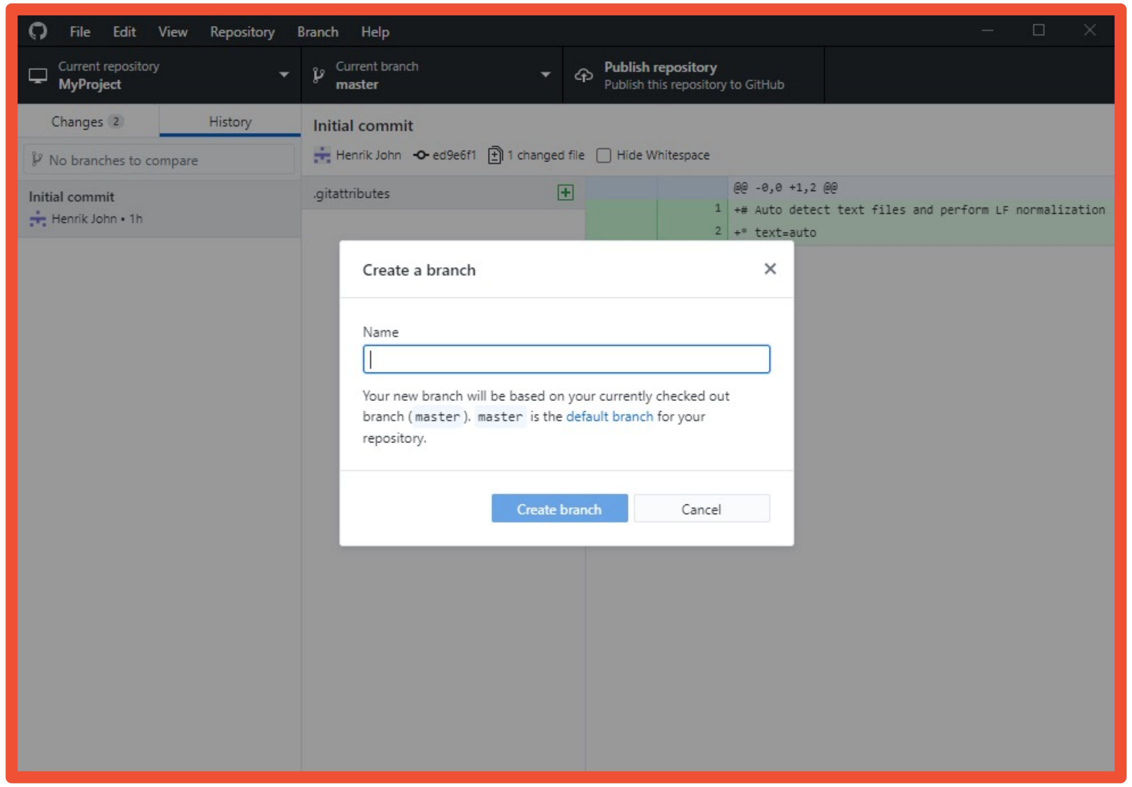
Push branch to remote repository

```
git push -u origin [branch-name]
```



Branches – GUI (GitHub Desktop)

Branch → New branch


File Edit View Repository Branch Help
Current repository MyProject
Current branch master
Publish repository
Publish this repository to GitHub
Changes 2
History
No branches to compare
Initial commit
Henrik John • 1h
Initial commit
Henrik John ed9e6f1 1 changed file Hide Whitespace
.gitattributes

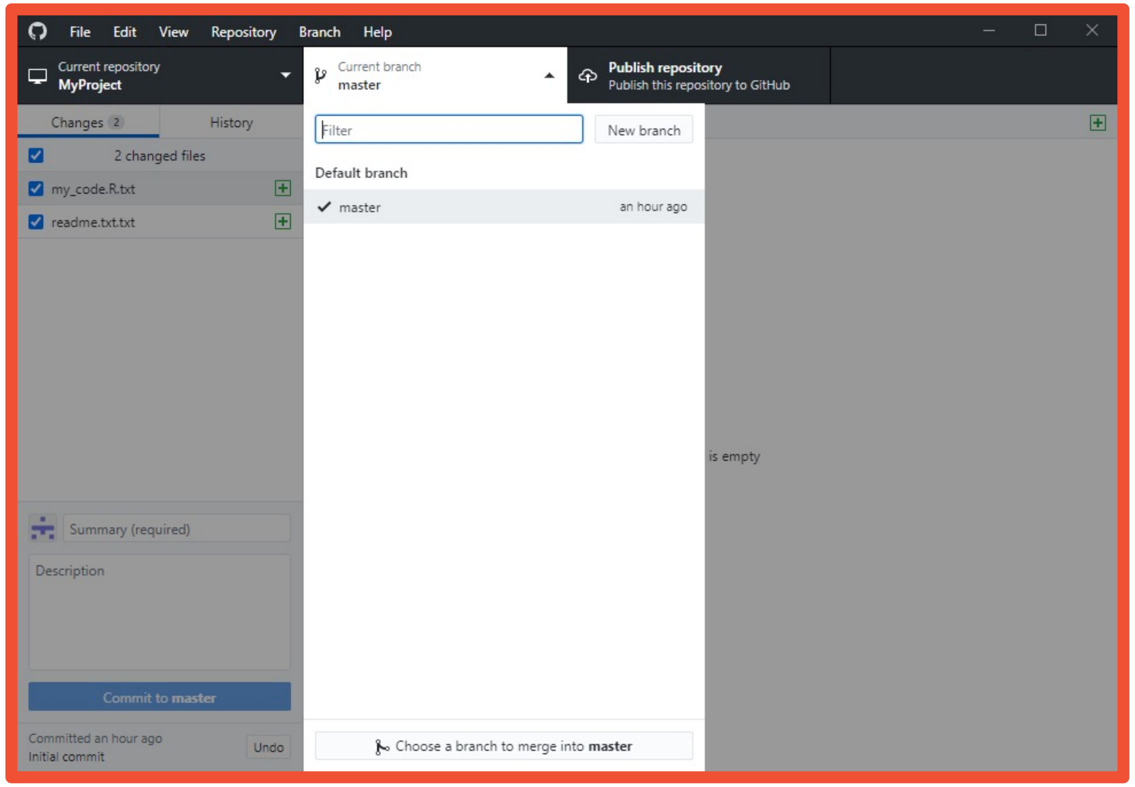
```
@@ -0,0 +1,2 @@
+# Auto detect text files and perform LF normalization
+* text=auto
```

Create a branch

Name

Your new branch will be based on your currently checked out branch (master). master is the default branch for your repository.

Checkout branches from the main window



Merging – CLI

Combine two lines of development after independent work is completed.

Pull **Master** branch changes

```
git checkout master
git pull
```

Show **Merged** branches

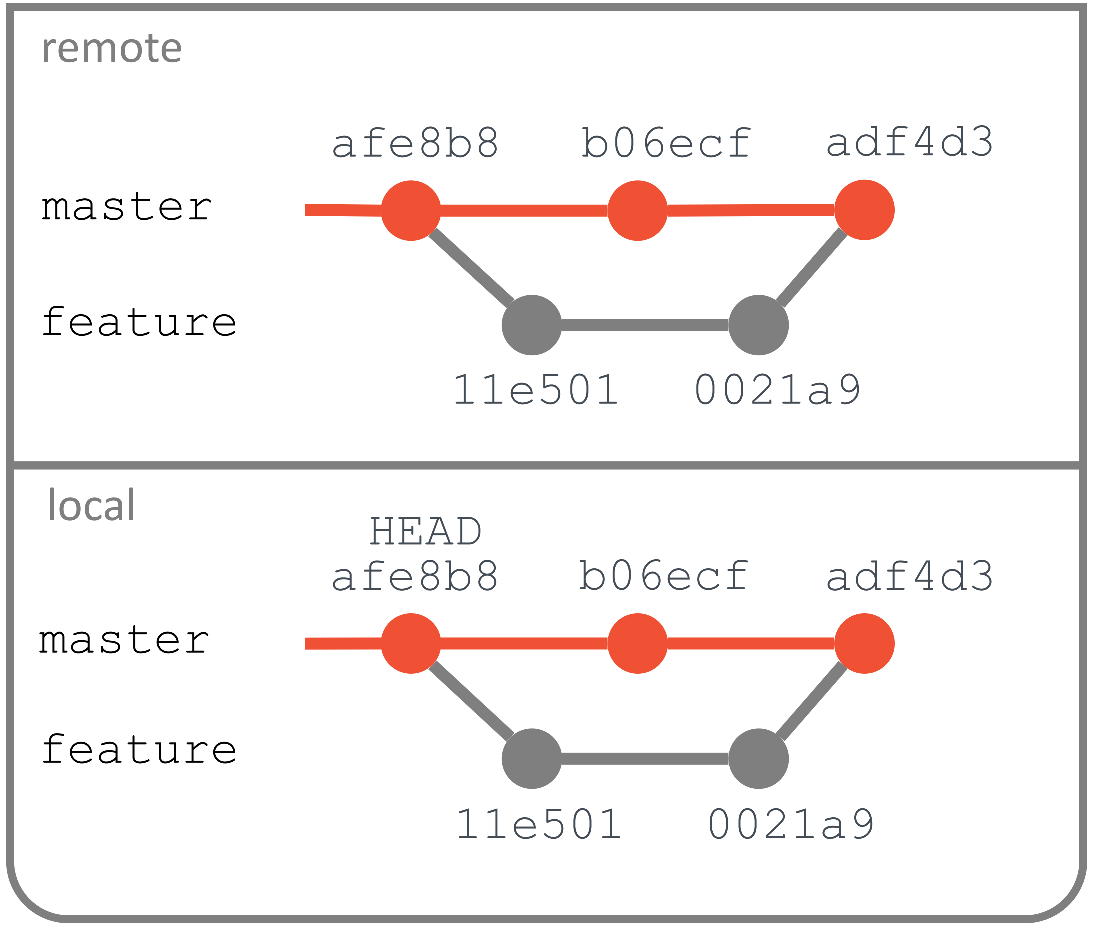
```
git branch --merged
```

Merge feature branch into master

```
git merge [branch-name]
```

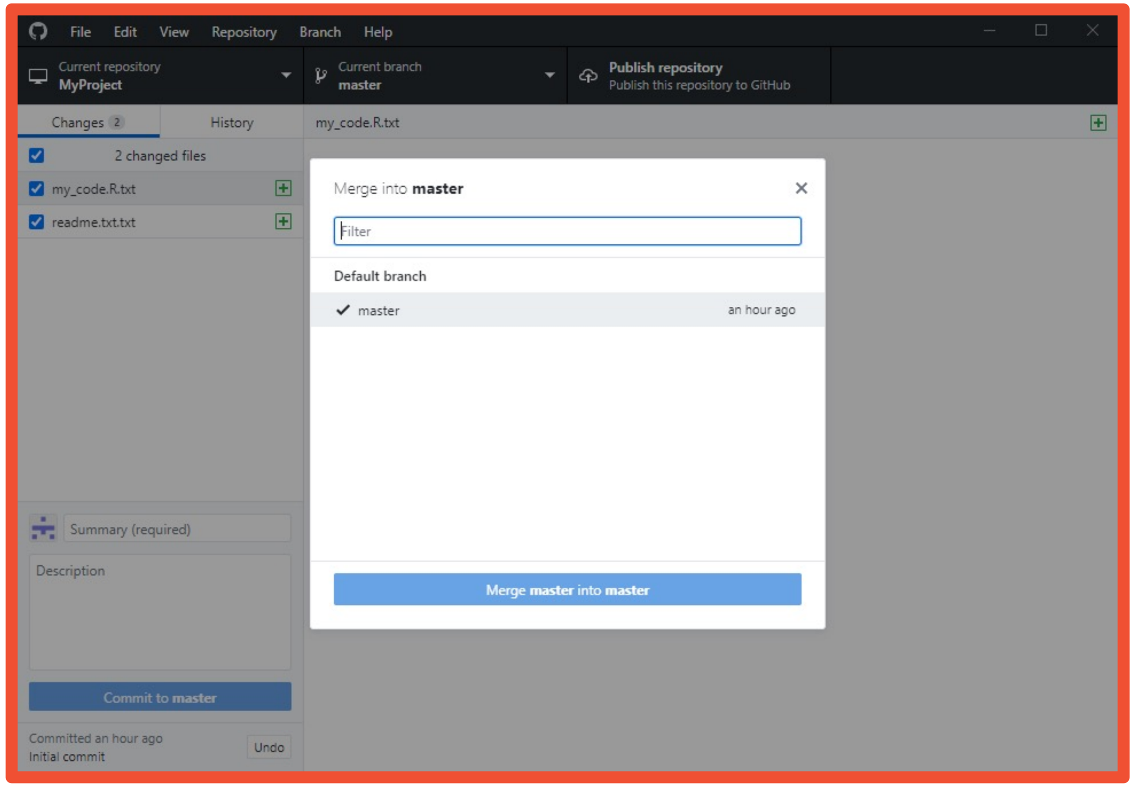
Push merge to remote repository

```
git push
```



Merging – GUI (GitHub Desktop)

Branch → Merge into current branch



Merge Conflicts

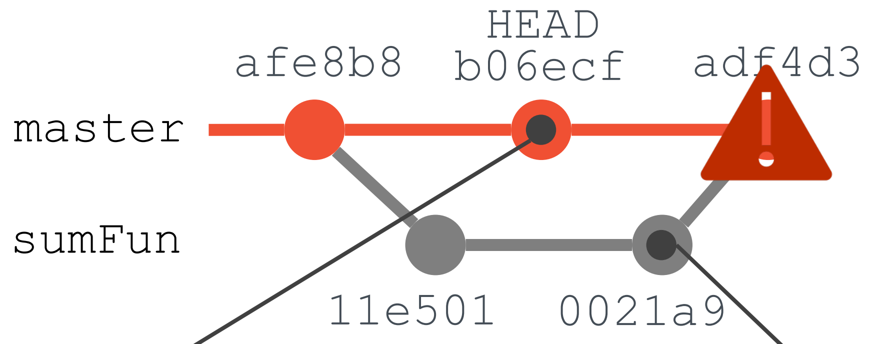
```
# Take sum of vector
sum <- function(x){
  sum <- 0
```

```
  if (any(is.na(x)){
<<<<<<< HEAD
  stop ("x has NA values")
=======
  if (any(is.na(x)) {
>>>>>>> sumFun
  }

  for (val in x) {
    sum <- sum + val
  }
  sum
}
```

```
# Take sum of vector
sum <- function(x){
  sum <- 0
  stop ("x contains NA")
  stop ("x has NA values")
```

Amy

sum.R



```
git merge sumFun
```

```
Auto-merging sum.R
CONFLICT (content): merge conflict in sum.R
Automatic merge failed; fix conflicts and then commit the result.
```

```
git mergetool
```

```
# Take sum of vector
sum <- function(x){
  sum <- 0

  if (any(is.na(x)) {
    stop ("x contains NA")
  }

  for (val in x) {
    sum <- sum + val
  }
  sum
}
```

Bob

sum.R

Removing Branch

Show **Merged** branches

```
git branch --merged
```

Remove branch

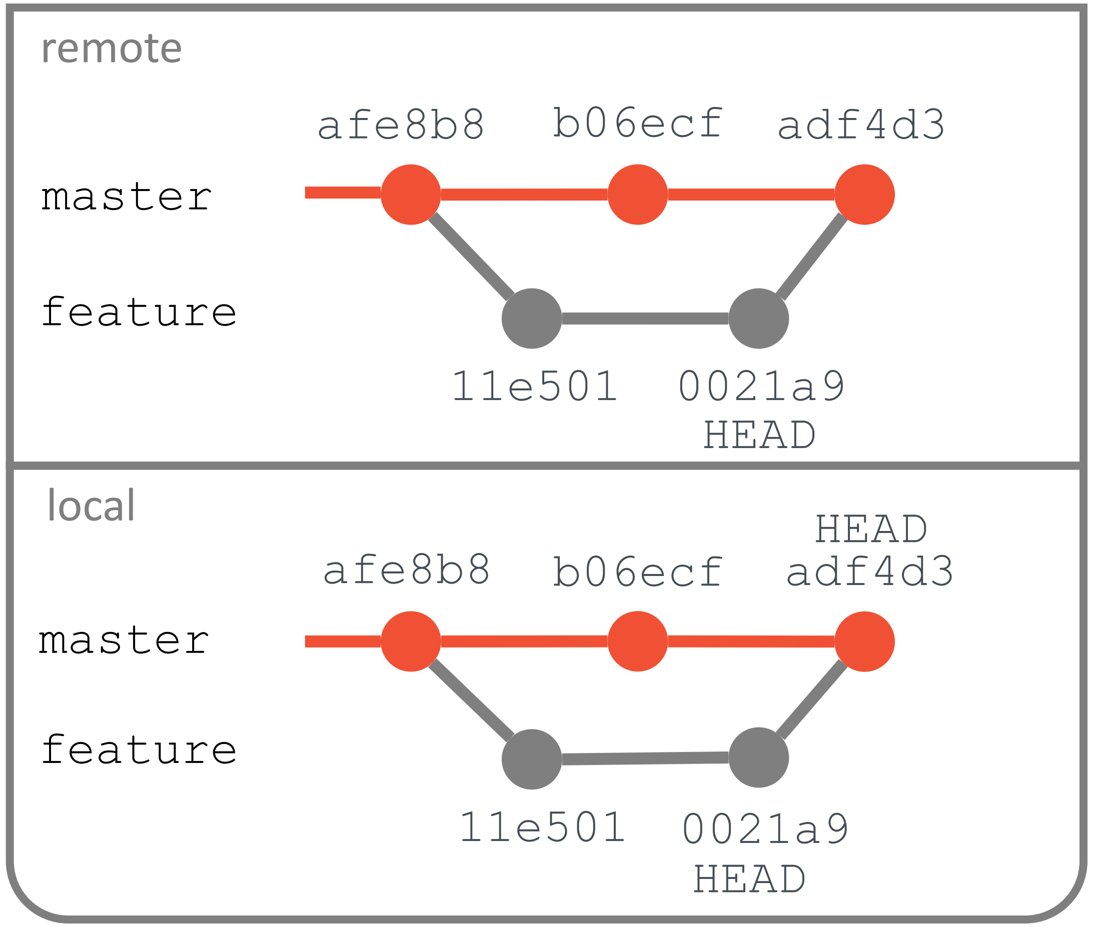
```
git branch -d [branch-name]
```

List **remote** branches

```
git branch -a
```

Remove branch from **remote** repository

```
git push origin -delete [branch-name]
```



Rebase – CLI

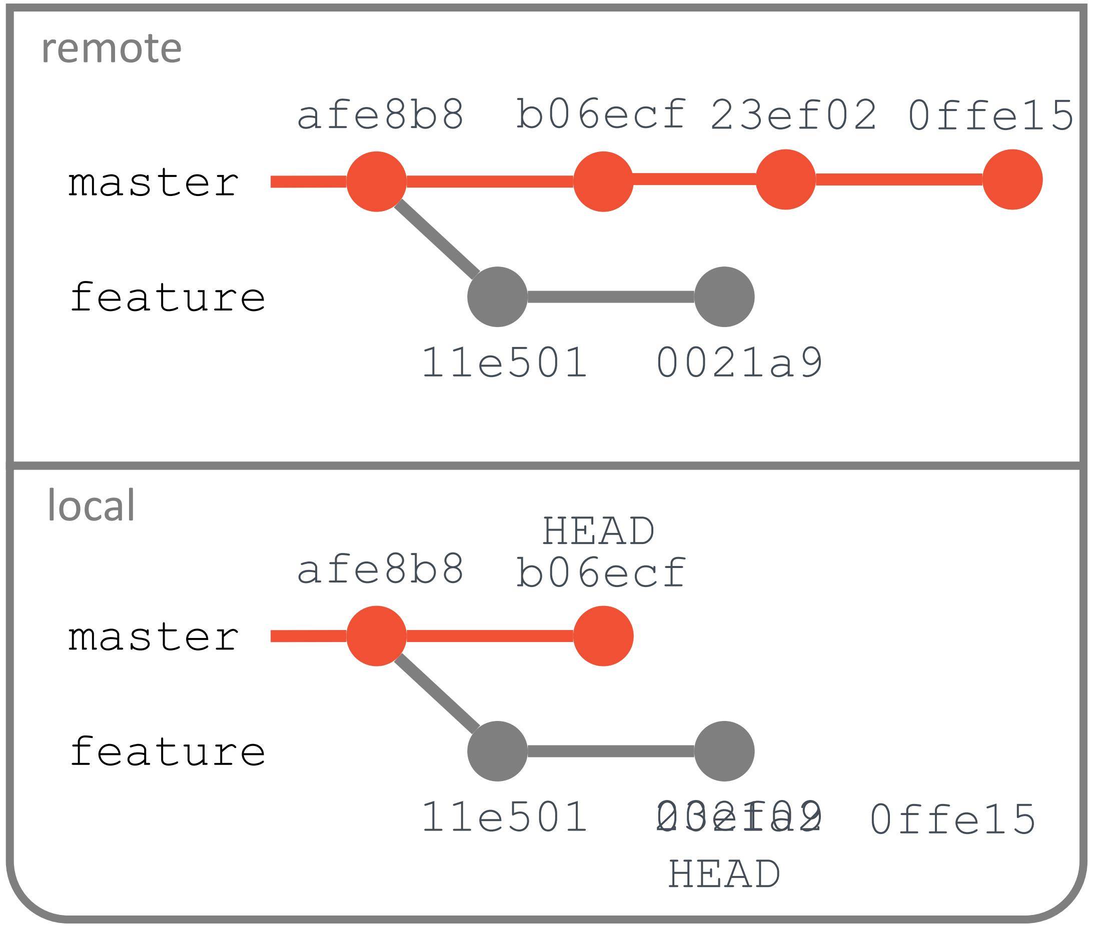
Changes base of a branch from one commit to another. *Moved* branch is composed of entirely new commits.

Rebase branch

```
git checkout [branch-name]
git rebase master
```

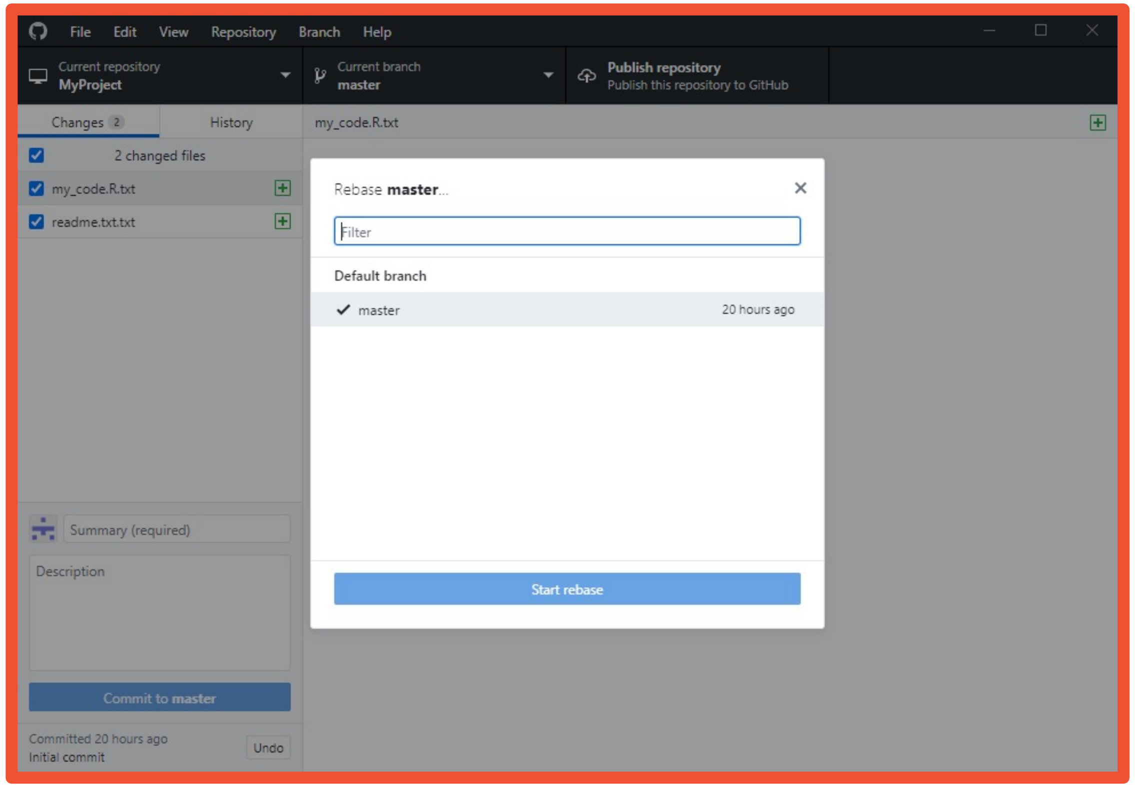
Fast-Forward merge

```
git checkout master
git merge [branch-name]
```



Rebase – GUI

Branch → Rebase current branch

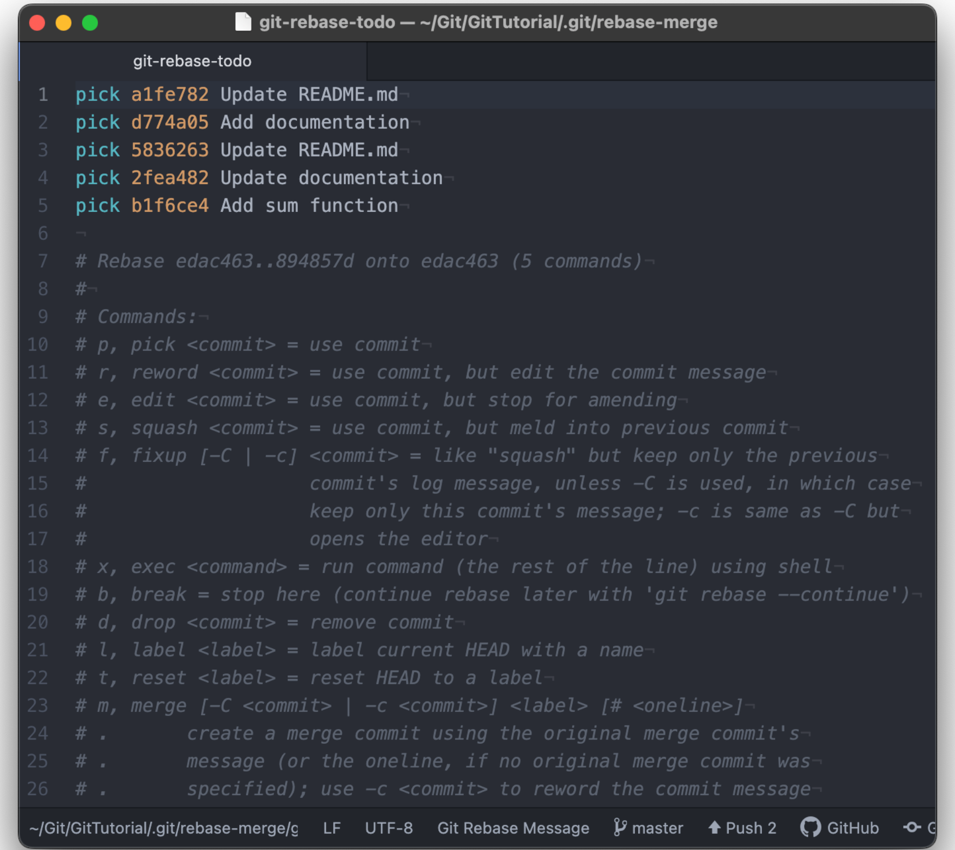


Interactive Rebase – CLI

Rewrite history using the powerful interactive rebase functionality. Combine multiple existing commits into one.

Rewrite last three commits

```
git rebase -i HEAD~3
```


git-rebase-todo — ~/Git/GitTutorial/.git/rebase-merge
git-rebase-todo
~/Git/GitTutorial/.git/rebase-merge/g
LF
UTF-8
Git Rebase Message
master
Push 2
GitHub

```
pick a1fe782 Update README.md
pick d774a05 Add documentation
pick 5836263 Update README.md
pick 2fea482 Update documentation
pick b1f6ce4 Add sum function

# Rebase edac463..894857d onto edac463 (5 commands)
#
# Commands:
# p, pick <commit> = use commit
# r, reword <commit> = use commit, but edit the commit message
# e, edit <commit> = use commit, but stop for amending
# s, squash <commit> = use commit, but meld into previous commit
# f, fixup [-C | -c] <commit> = like "squash" but keep only the previous
#                    commit's log message, unless -C is used, in which case
#                    keep only this commit's message; -c is same as -C but
#                    opens the editor
# x, exec <command> = run command (the rest of the line) using shell
# b, break = stop here (continue rebase later with 'git rebase --continue')
# d, drop <commit> = remove commit
# l, label <label> = label current HEAD with a name
# t, reset <label> = reset HEAD to a label
# m, merge [-C <commit> | -c <commit>] <label> [# <oneline>]
# .       create a merge commit using the original merge commit's
# .       message (or the oneline, if no original merge commit was
# .       specified); use -c <commit> to reword the commit message
```

Useful

Stage and commit all files

```
git commit -am “[message]”
```

Tag a commit

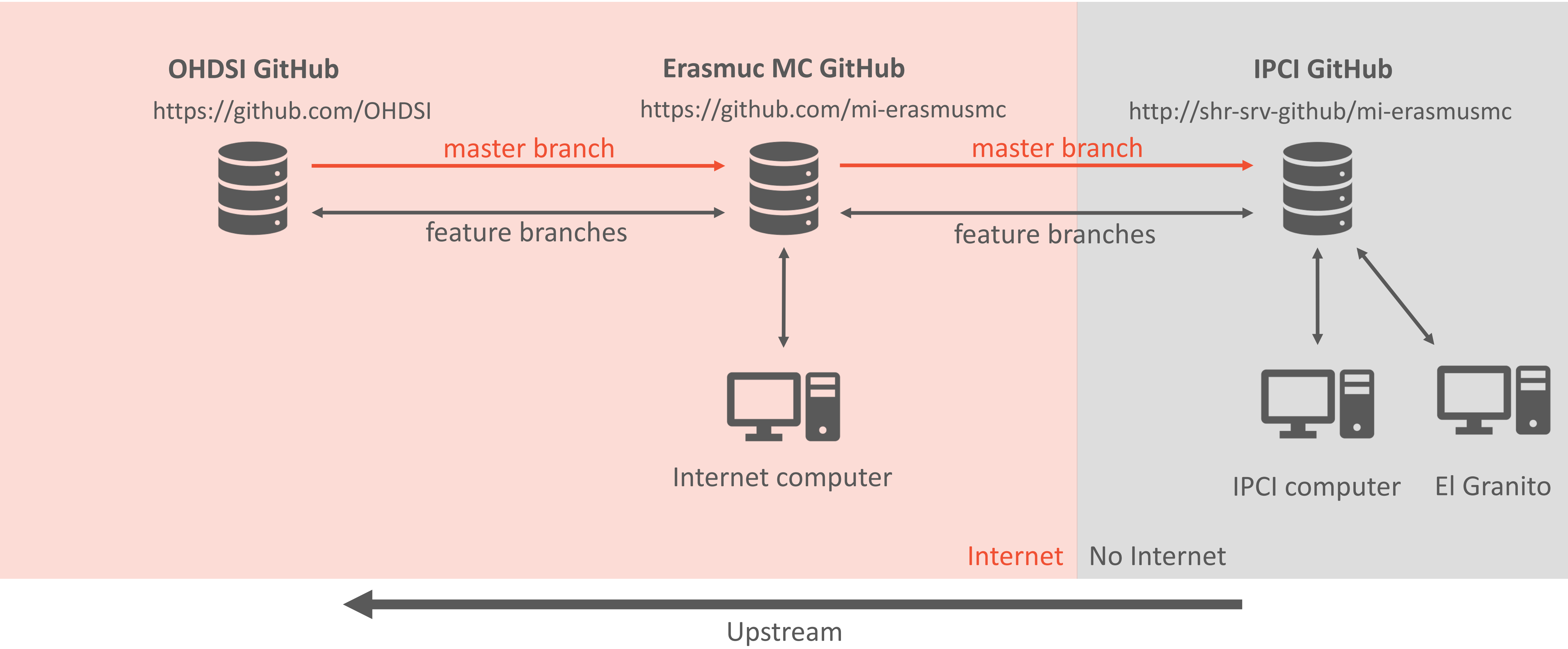
```
git tag
```

Stash changes in branch and apply them elsewhere

```
git stash
git stash apply
```

.gitignore

Health Data Science Workflow


OHDSI GitHub
https://github.com/OHDSI
Erasmuc MC GitHub
https://github.com/mi-erasmusmc
IPCI GitHub
http://shr-srv-github/mi-erasmusmc
master branch
feature branches
master branch
feature branches
Internet computer
IPCI computer
El Granito
Internet
No Internet
Upstream