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Version Control

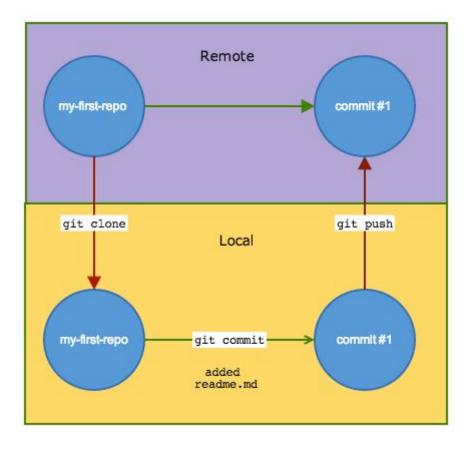
The definition of version control is "a system that records changes to a file or set of files over time so that you can recall specific versions later."

It allows a developer to track what they are doing, recording changes so that

- Changes can be reverted if required •
- Development can be carried out on a branch of the code that doesn't break the stable 'master branch' •
- Software can be tagged as specific release versions
- Developers can collaborate and merge changes •

The most commonly used version control software is <u>ait</u> where all changes can be tracked locally but then 'pushed' to a remote git repository so that others can view code and contribute to code. Three commonly used platforms are github.com, gitlab.com and bitbucket.com. In this way a coder can develop locally making changes and recording those changes in the local git repository and push the changes to github for example so others can see the changes. In addition when major releases are made the specific version of the code corresponding to that release can be tagged and either downloaded or checked out.

An overview of the local <-> remote model is shown in this picture



https://sachsmc.github.io/knit-git-markr-guide/git/git.html



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In this diagram a user can **clone** the remote repository, make changes, **commit** these changes and then **push** them back to the remote server so that others can view and/or download them.

To keep it simple, this tutorial will describe how to get software from a remote repository and checkout specific versions.

On github a repository has a button which gives options to download the repository or a link to clone the project

http://sanger-pathogens.github.io/Roary bioinformatics bioinformatics-pipeline global-health infectious-diseases research ₫ GPL-3.0 81 releases 18 contributors Clone or download Create new file Upload files Find file Use SSH nangelog ... Clone with HTTPS ③ Use Git or checkout with SVN using the web URL. h unique genes per sample https://github.com/sanger-pathogens/F 鼤 ots from .ix to .loc t behaviour to use only CL S features froi **Open in Desktop** Download ZIP somal gene group from of Open Link in New Tab Open Link in New Window s with roary 3 years ago Open Link in Incognito Window 5 months ago Save Link As... Copy Link Address drace

- In this image the link for clone the project is shown in the red box.
 - On the linux machine where you would like to clone the project type git clone and paste the link git clone https://github.com/sanger-pathogens/Roary.git
 - This will create a directory named the same as the project in this case Roary with the code cloned within it.
- To download the project in a static non-version controlled version right click on the Download ZIP button and copy the link address (shown in the pink box)
 - On the linux machine where you would like to clone the project to type wget and paste the link wget https://github.com/sanger-pathogens/Roary/archive/master.zip
 - To access the code unzip the file
 - unzip master.zip

This will create a new directory named after the project Roary-master. The code for the project will be found within this directory but is static but can not be updated with future changes







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A similar interface exists on gitlab. Here for the assembly workflow project the project can be cloned from the link shown by clicking on the clone button

A assembly O Project ID: 9028369	✿ Star 0 Clone ✓
ጫ MIT License -ංං 9 Commits 💡 2 Branches 🖉 3 Tags 🗈 696 KB Files	Clone with SSH
	Clone with HTTPS
master v assembly	https://gitlab.com/cgps/ghru 🖸

or downloaded as static files from the download icon

A assembly @ Project ID: 9028369	☆ Star 0 Clone ✓
MIT License - 9 Commits 2 Branches Ø 3 Tags 3 696 KB Files	History Q Find file Q ~
Merge branch 'develop' into 'master' Anthony Underwood authored 2 days ago	Source code Download zin
B DEADLIE	Downloac Open Link in New Tab Open Link in New Window Open Link in Incognito Window
README	Downloac Save Link As Copy Link Address

Releases (specific tags of the code) can be seen by clicking on 'Releases' in the left hand navigation bar

A assembly	≪ cgps > → pipelines > assembly > Releases
Project Details Activity Releases	1.3 → 570cb238
Cycle Analytics	Version 1.3
Repository	New features
D Issues 0 IN Merge Requests 0 & CI / CD	 Addition of HTML reports aggregated across all samples processed MultiQC summary reports combining QC results for all samples from FastQC: fastqc_multiqc_report.html Quast: quast_multiqc_report.html Quast: quast_multiqc_report.html - If a qc_conditions.yml file was supplied this will contain a summary of the overall pass/fail status of each sample.
Registry	
Packages	1.2 ∞ 98c98457 Ø 1.2 • released 2 months ago
🗅 Wiki	Assets 4
Ж Snippets	Source code 🗸
S Members	Version 1.2
	New features

This enables checking out of specific versions of the code as follows







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1. Check out the project and change directories to the project

git clone https://gitlab.com/cgps/ghru/pipelines/assembly.git
cd assembly
tit

2. List available tags

```
git tag -l
```

1.1

1.2 1.3

3. Checkout a specific tag

```
git checkout tags/1.3
```

The console will report that You are in 'detached HEAD' state. Although this sounds painful, don't worry this is what happened when a particular 'commit' (point in time within the project) is checked out

4. In the future when a new release is made, it is easy to update the code as follows by pulling new changes from the remote repository and checking out the new version

```
git pull
git checkout tags/1.4
```