Introduction to Scientific Computing I

Lab 3

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git

- git is a Version Control System (VCS)
    - Useful for code development or writing a large document
    - Keeps track of the evolution of files
    - Facilitates collaboration between multiple coders or authors
    - Allows concurrent development of multiple versions
    - Can be completely local or on a server
    - Enables establishing releases
- GitLab is a implementation of a git server.
    - Many companies or projects host their own GitLab service enabling their employees or participants to collaborate.
    - Can automate the process of incorporating new code or changes to code, testing, and building releases.
    - Also provides a browser, markdown documentation, wiki, and other convenient features.
- GitHub is a service that runs a public instance of a git server
    - Has become the de-facto mechanism for sharing open-source code

Git Concepts

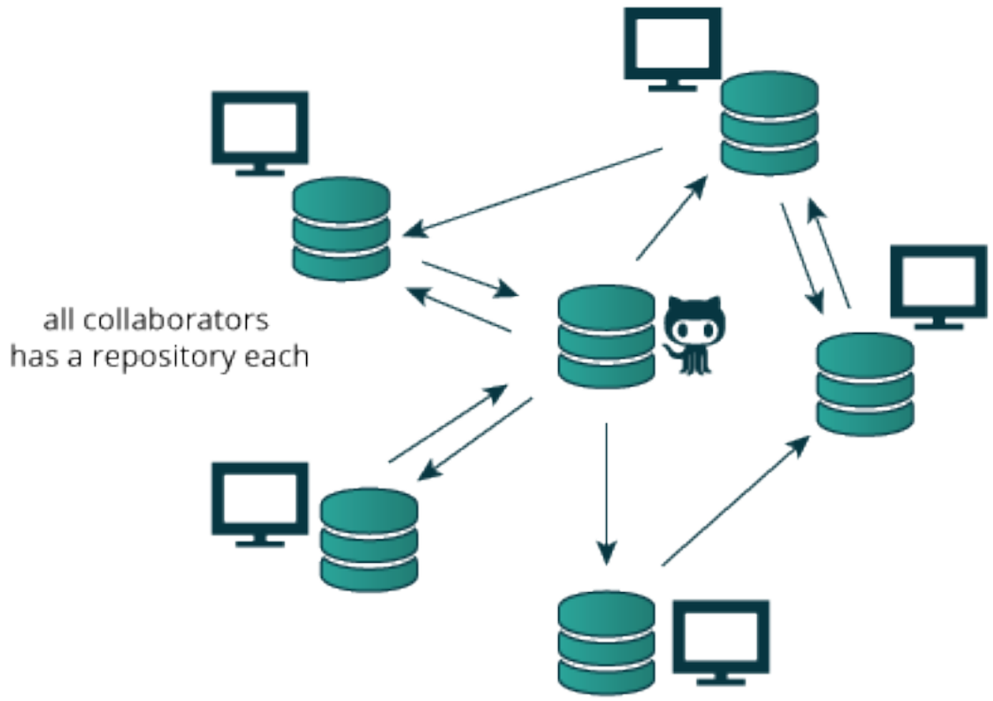
- ***Repository***: a container for all of the source code/docs for a specific project. Typically consists of:

  - ***Index:*** keeps all of the information about the files, including previous versions, comments, ….

  - ***Working directory:*** a copy of the files that you can use or modify.

- ***Add***: add a new file in the working directory to the index

- ***Commit***: puts the current state of file(s) into the index



diagrams from: http://thepilcrow.net/explaining-basic-concepts-git-and-github/

- ***Clone***: a copy of a repository, usually local, and typically what the user interacts with.

- ***Remote:*** an instance of the repository in on a server.

    - ***origin:*** where your local commits are ***pushed***

    - ***upstream:*** where changes/updates are ***pulled*** into your ***local*** repository

    - for your own packages origin and upstream will likely be the same.

- ***Fork:*** a clone of a repository that can evolve independently from other clones.

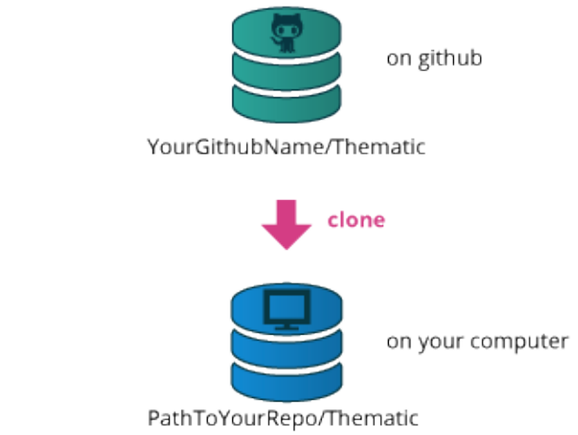
- ***Branch:*** a parallel version of the repository that doesn't conflict with others.

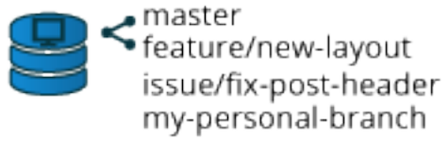
    - ***Master:*** name of the main branch.

    - Branches can be later merged.

    - Typically, someone will develop something new in their own branch, and then merge it with master when tested.

- ***Tag:*** Name associated with a specific version of all of the files





- ***Fetch***: getting updates from a remote into your index

- ***Merge:*** incorporation changes in index into your working directory

    - ***Merge conflict***: when incorporating changes isn't trivial and requires a manual ***merge resolution***.

        - For example if two different people work on same file simultaneously

            - The first person to push to the remote would have no issues

            - The second person would have to pull from the repository and resolve any conflicts

- ***Pull*** **=** fetch (from upstream) + merge

    - ***Pull request***: asking for pulling of your fork into another.

- ***Push:*** puts your index into your origin remote