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Open-source tools development for geospatial analysis

Introduction to GIT

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What is GIT?

Created by Linus Torvalds, creator of Linux, in 2005

- Came out of Linux development community
- Designed to do version control on Linux kernel

Goals of Git:

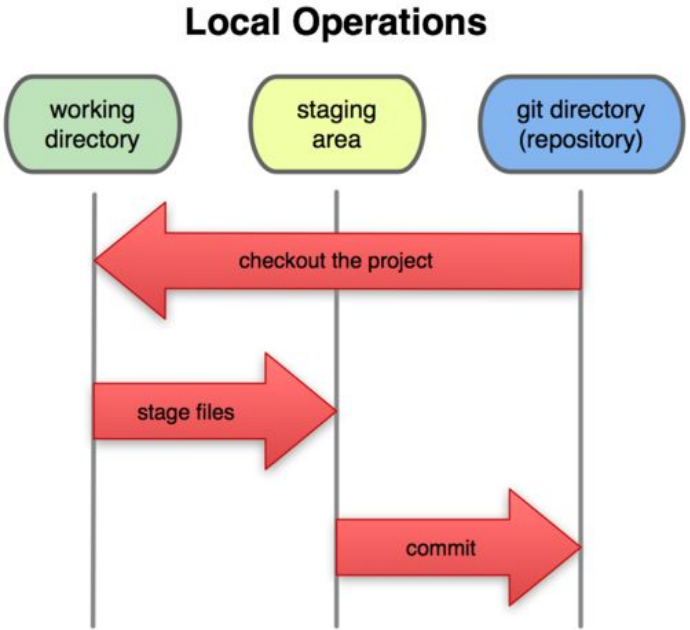
- Speed
- Support for non-linear development (thousands of parallel branches)
- Fully distributed
- Able to handle large projects efficiently

GIT install: https://git-scm.com/book/en/v2/Getting-Started-Installing-Git

Local GIT structure

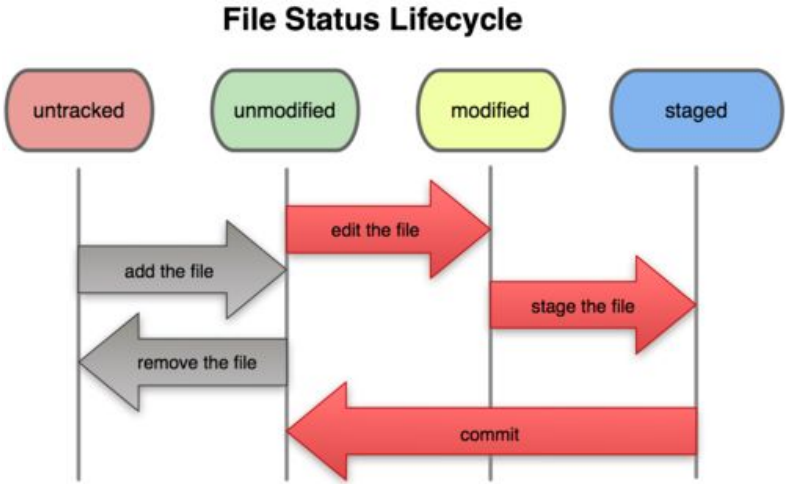
In your local copy on git, files can be:

- In your local repo (committed)
- Checked out and modified, but not yet committed (working copy)
- Or, in-between, in a "staging" area (Staged files are ready to be committed.
  A commit saves a snapshot of all staged state).



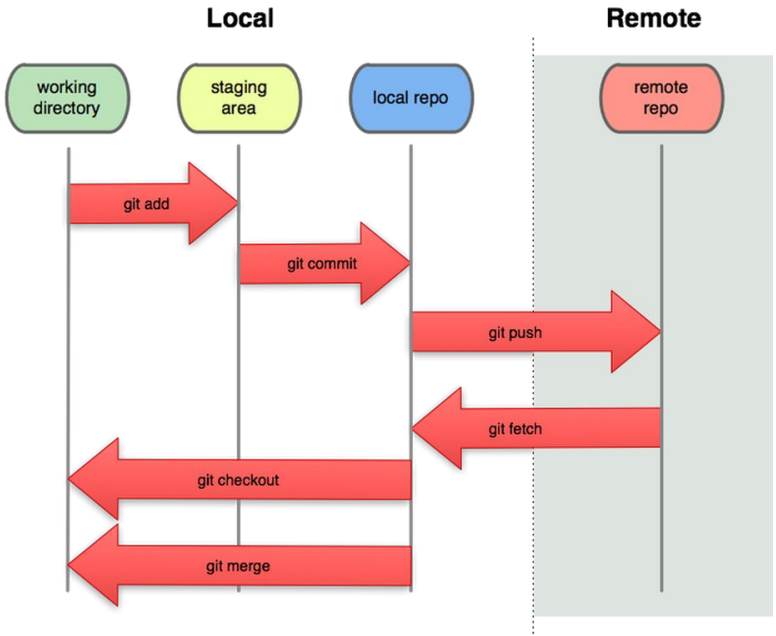
GIT workflow

- **Modify** files in your working directory.
- **Stage files**, adding snapshots of them to your staging area.
- **Commit**, which takes the files in the staging area and stores that snapshot permanently to your Git directory



GIT fetch, pull and push

- *git fetch* - git fetch really only downloads new data from a remote repository, but it doesn't integrate any of this new data into your working files
- *git pull* - pull not only downloads new data, it also directly integrates it into your current working copy files
- *git push* - to put your changes from your local repo in the remote repo



GIT first config

Set the name and email for Git to use when you commit:

- *git config --global user.name "Bugs Bunny"*
- *git config --global user.email bugs@gmail.com*
- You can call *git config –list* to verify these are set

Creating a GIT repo

Two common scenarios (only do one of these):

- To create a new local Git repo in your current directory:
  - *git init*

  This will create a .git directory in your current directory.
  Then you can commit files in that directory into the repo.
  - *git add filename*
  - *git commit –m "commit message"*

- To clone a remote repo to your current directory:
  - *git clone url localDirectoryName*

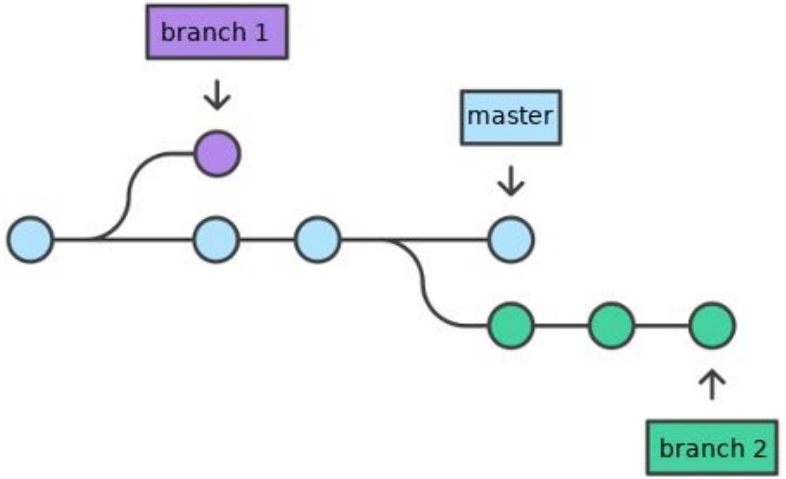
  This will create the given local directory, containing a working copy of the files from the repo, and a .git directory (used to hold the staging area and your actual local repo)

GIT commands

command	description
`git clone` ***`url [dir]`***	copy a Git repository so you can add to it
`git add` ***`file`***	adds file contents to the staging area
`git commit`	records a snapshot of the staging area
`git status`	view the status of your files in the working directory and staging area
`git diff`	shows diff of what is staged and what is modified but unstaged
`git help` ***`[command]`***	get help info about a particular command
`git pull`	fetch from a remote repo and try to merge into the current branch
`git push`	push your new branches and data to a remote repository
others: `init, reset, branch, checkout, merge, log, tag`	

GIT tree

- *master*
- *development*
- *branch*



GIT common workflow

To change branch

- *git status* - info to user
- *git fetch* - update local repo
- *git checkout branchname* - change branch

To update remote repo

- *git status* - info to user
- *git add filename.txt* - modify working directory and add to staging area
- *git commit -m 'message'* - commit with a message to local repo
- *git push* - push to remote repo

Documentation

GitLab docs: https://docs.gitlab.com/ee/tutorials/make_first_git_commit/index.html

GitLab start git: https://docs.gitlab.com/ee/gitlab-basics/start-using-git.html

BitBucket docs: https://bitbucket.org/product/guides/basics/bitbucket-interface#repositories

Github docs: https://docs.github.com/en/get-started/quickstart/hello-world