Git

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About Git

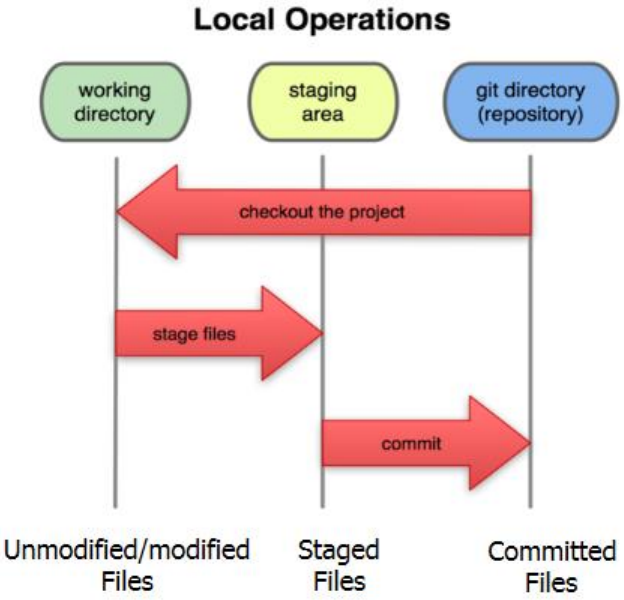
- Created by Linus Torvalds
  - Creator od Linux, in 2005
  - Came out of Linux development community
  - Designed to do version control on Linux kernel
- Goals of Git
  - Speed
  - Support for non-linear development(parallel branches)
  - Fully distributed
  - Able to handle large projects efficiently

How to install

- If you are using Linux:
  - RPM-based distributions(RHEL, CentOS)
    - $ sudo dnf install git-all
  - Debian-based distributions(Ubuntu)
    - $ sudo apt install git-all
- If you are using MacOS:
  - There are several ways to install Git on a Mac. The easiest is probably to install the Xcode Command Line Tools. On Mavericks (10.9) or above you can do this simply by trying to run git from the Terminal the very first time.
  - Or download installer from https://git-scm.com/download/mac
- On windows
  - Download installer from https://git-scm.com/download/win

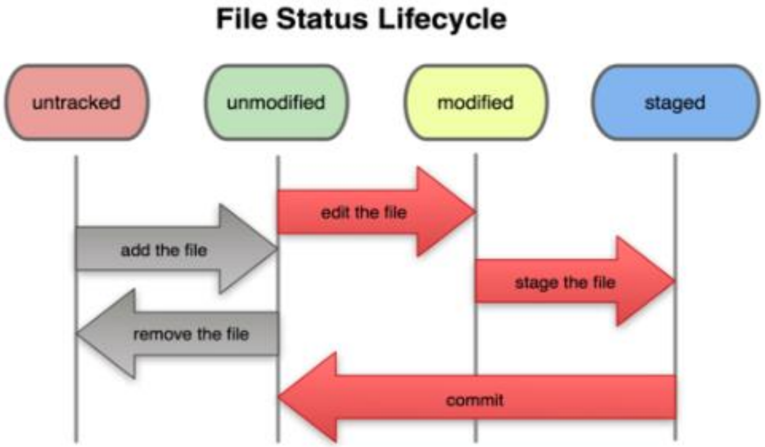
Local git areas

- In your copy on git, files can be:
  - In your local repo
    - (commited)
  - Checked put and modified, but not yet committed
    - (working copy)
  - Or, in-between, in a `staging` area
    - Stagedfiles are ready to be committed
    - A commit saves snapshot of all staged state



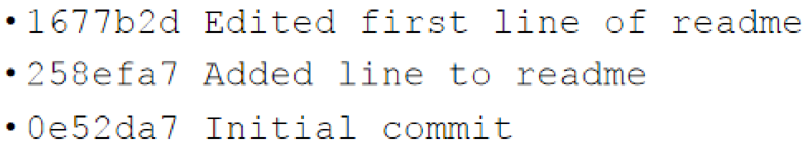
Basic Got workflow

- 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 commit checksums

- In Subversion each modification to the central repo increments the version # of the overall repo
  - In Git, each user has their own copy of the repo, and commits changes to their local copy of the repo befire pushing to the central server
  - So Git generates a unique SHA-1 hash (40 character string of hex digits) for every commit
  - Referes to commit by this ID rather than a version number
  - Often we only see the first seven chars



```
•1677b2d Edited first line of readme
•258efa7 Added line to readme
•0e52da7 Initial commit
```

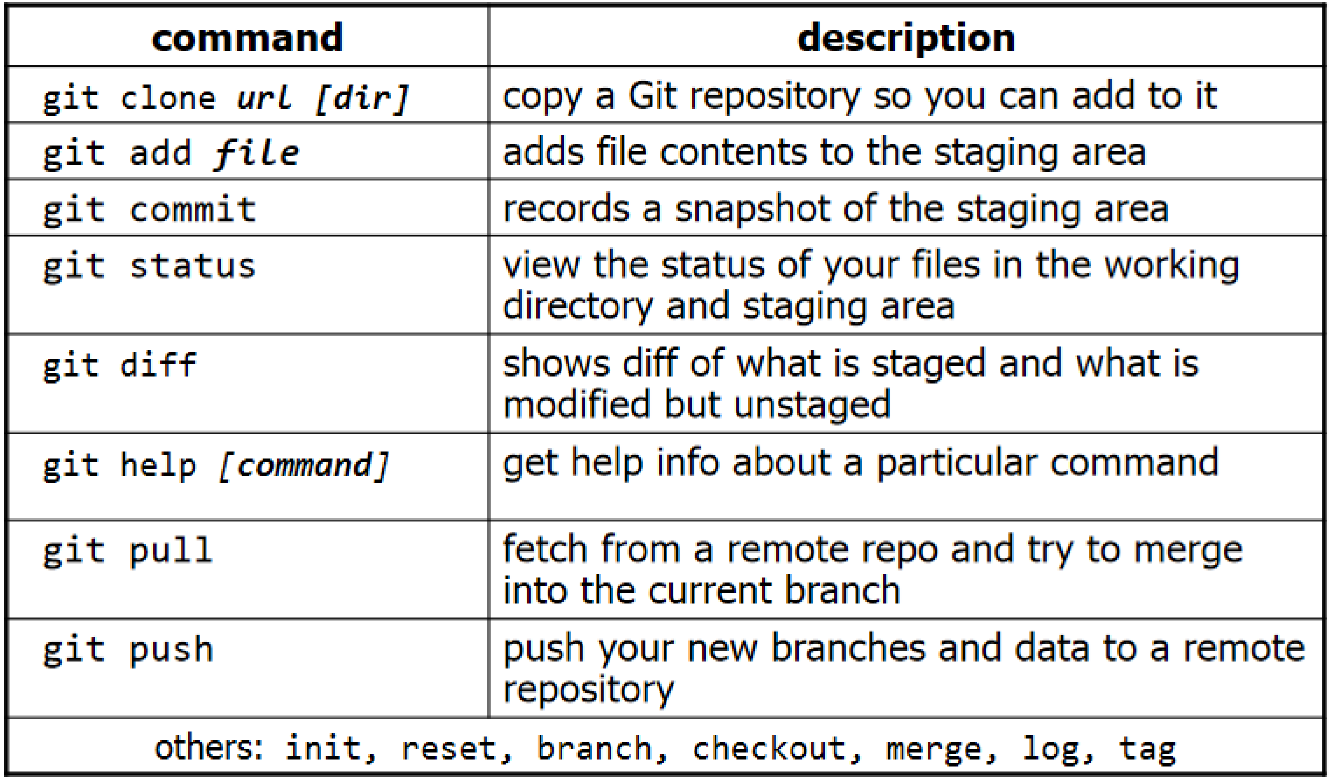
Initial Git configuration

- Set name and email for Git to use when you commit :
  - $ git config --global user.name “My Name”
  - $git config --global user.email myemail
  - You can call **$ git config -list** to verify these are set
- Set the editor that is used for writing commit messages:
  - $ git config --global core.editor nano
  - It is VIM by default

Creating and cloning repo

- To create a new local Git repo:
  - $ 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 filesnames
  - $ git commit -m “commit message”
- To clone a remote repo to your directory
  - $ git clone url [localDirectoryName]

Git commands

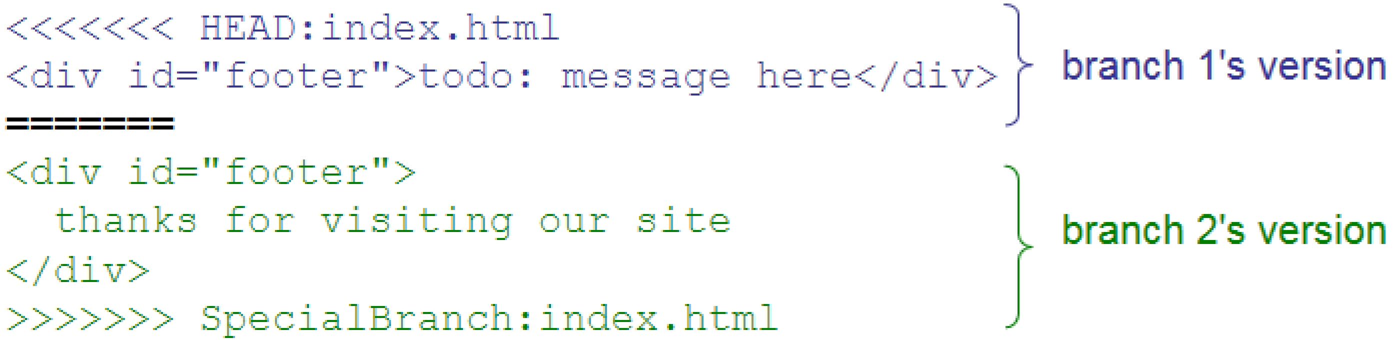


command	description
git clone *url [dir]*	copy a Git repository so you can add to it
git add *file*	adds file contents to the staging area
git commit	records a snapshot of the staging area
git status	view the status of your files in the working directory and staging area
git diff	shows diff of what is 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	

Branching and merging

- Git uses branching heavily to switch between multiple tasks
- To create a new local branch
  - $ git branch name
- To list all local branches
  - $ git branch
- To switch to a given local branch:
  - Git checkout branch name
- To merge changes from a branch into the local master
  - $ git checkout master
  - $ git merge branchname

Conflicts



```
<<<<<<< HEAD:index.html
<div id="footer">todo: message here</div>
=======
<div id="footer">
  thanks for visiting our site
</div>
>>>>>>> SpecialBranch:index.html
```

branch 1's version

branch 2's version

Interaction with remote repo

- Push your local changes to the remote repo
- Pull from remote repo to get most recent changes
- To fetch the most recent updates from remote repo into your local repo, and put them into your working directory
    - $ git pull origin master
- To put your changes from your local repo in the remote repo:
    - $ git push origin master