Git

An unpleasant, silly, incompetent, stupid, annoying, senile, elderly or childish person.

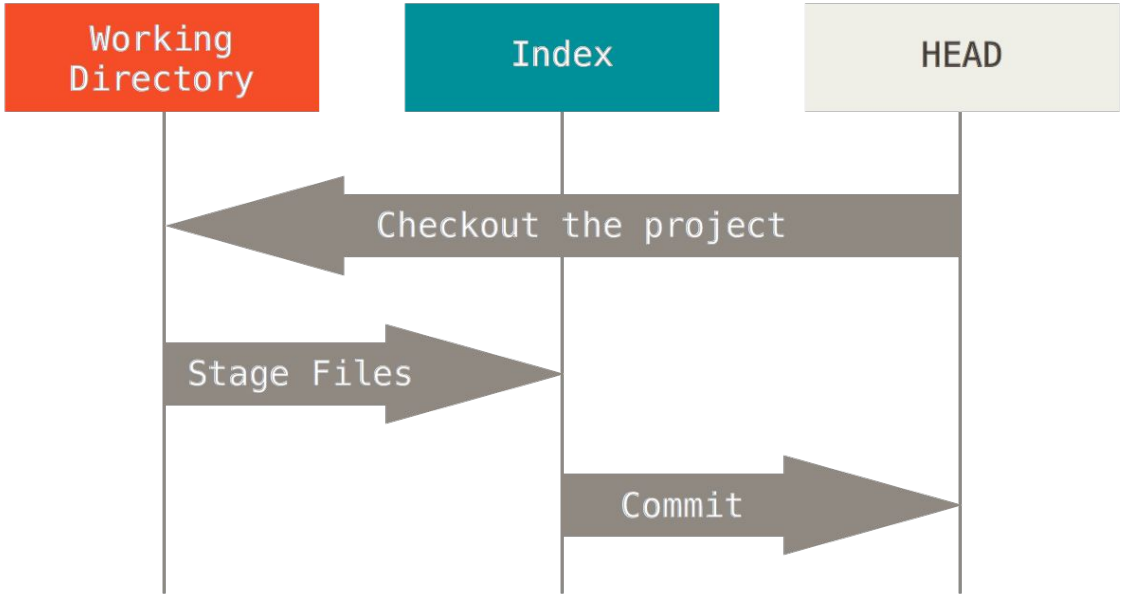
Version Control System

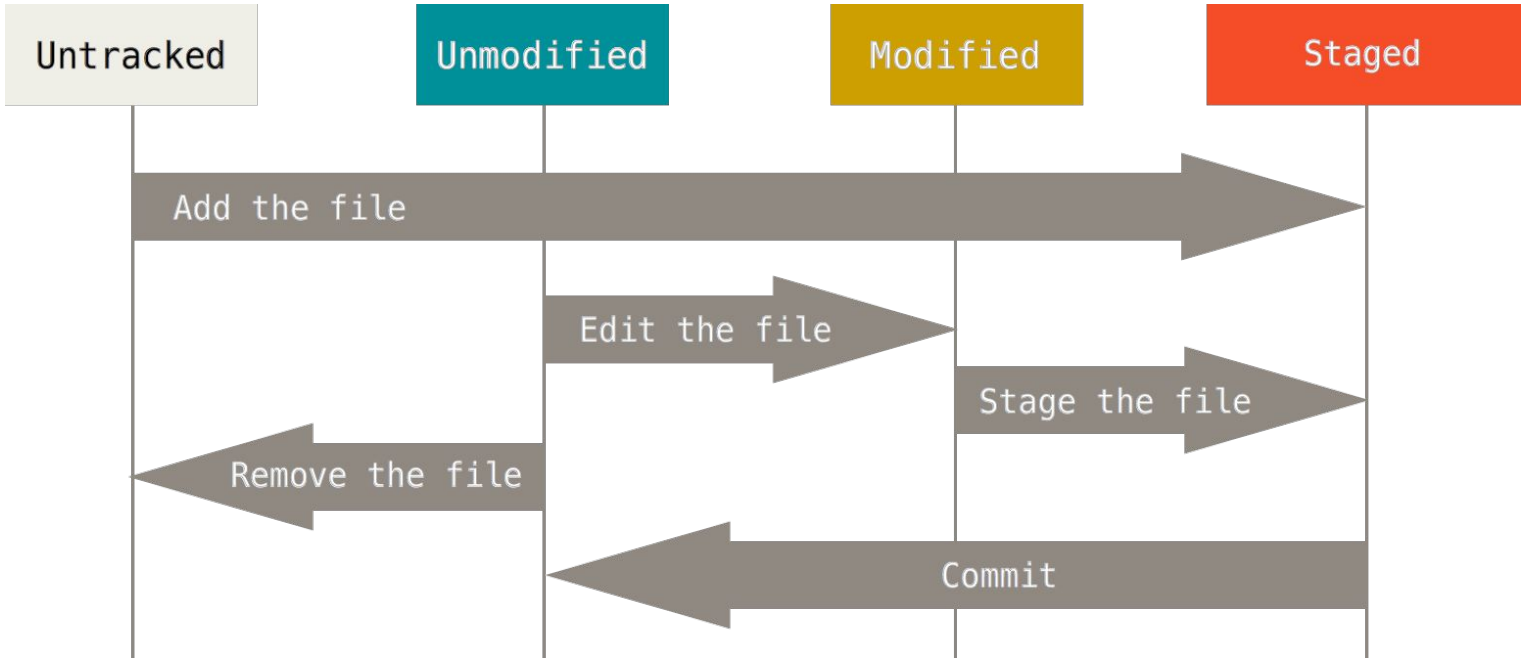
- What is Version Control System?
- Why to use VCS?
- Different VCS tools
- Types of VCS
  - Local
  - Centralized
  - Distributed

Git

- What is Git?
- Difference between Git and other VCS
  - Git keeps snapshots and not the differences
  - It can be used locally, ergo faster than other VCS that need network
  - Uses 40 character SHA-1 checksum to provide integrity
- Why use git?
- Features
  - Speed
  - Simple design
  - Strong support for non-linear development (thousands of parallel branches)
  - Fully distributed
  - Able to handle large projects like the Linux kernel e□iciently (speed and data size)

Workflow


Working Directory
Index
HEAD
Checkout the project
Stage Files
Commit


Untracked
Unmodified
Modified
Staged
Add the file
Edit the file
Stage the file
Remove the file
Commit

Git - Configuration

- First time setup
  - /etc/gitconfig *(for --system)*
  - ~/.gitconfig **or** ~/.config/git/config *(for --global)*
- Your Identity
  - $ ***git config --global user.name “your_name”***
  - $ ***git config --global user.email “your_email”***
- Your Editor
  - $ ***git config --global core.editor emacs***
- Check your settings
  - $ ***git config --list***

Git - Getting Started

- ➔ $ ***git init***
- ➔ $ ***git clone***
- ➔ $ ***git status***
- ➔ $ ***git add***
- ➔ *.gitignore* file
- ➔ $ ***git diff*** (file changed but not staged)
- ➔ $ ***git diff --staged/--cached*** (file staged)
- ➔ $ ***git commit*** (***-a -m --amend*** flags)
- ➔ $ ***git rm -f <file>*** (if the file to be removed is staged)
- ➔ $ ***git log*** (***git help log*** to look for different formats)

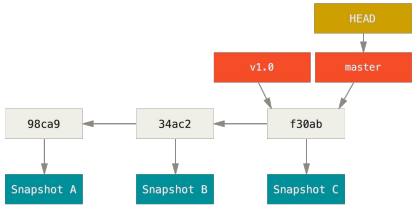
Git - Remote

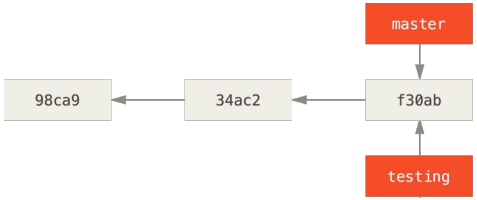
- ➔ $ ***git remote*** (***-v*** to list all remotes)
- ➔ $ ***git remote add <remote_name> <url>***
- ➔ $ ***git remote show <remote_name>***
- ➔ $ ***git remote rename <orig_name> <new_name>***
- ➔ $ ***git remote remove <remote_name>***

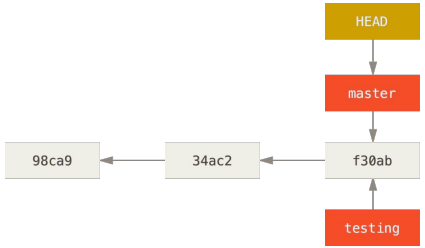
Git - Branch

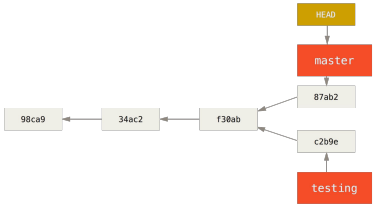
- ➔ $ ***git branch <branch_name>*** (Create a new branch)
- ➔ $ ***git branch -d <branch_name>*** (delete branch)
- ➔ $ ***git branch --merged/--no-merged***
- ➔ $ ***git checkout <branch_name>*** (switch to different branch)
- ➔ $ ***git checkout -b <branch_name>*** (create and switch to *branch_name*)

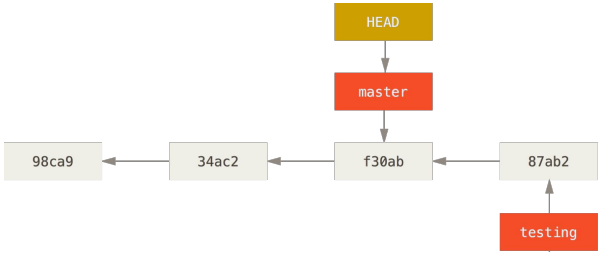
Git - Branch

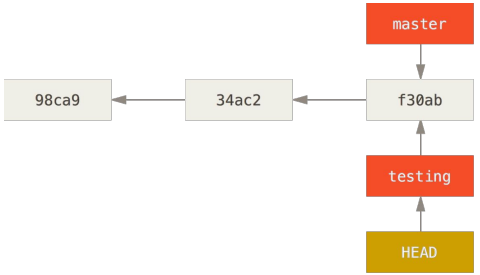

HEAD
v1.0
master
98ca9
34ac2
f30ab
Snapshot A
Snapshot B
Snapshot C


master
98ca9
34ac2
f30ab
testing


HEAD
master
98ca9
34ac2
f30ab
testing


HEAD
master
87ab2
98ca9
34ac2
f30ab
c2b9e
testing

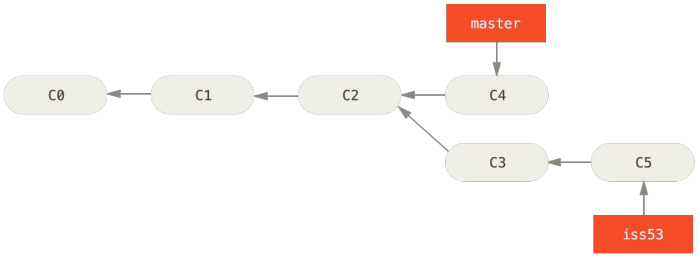

HEAD
master
98ca9
34ac2
f30ab
87ab2
testing

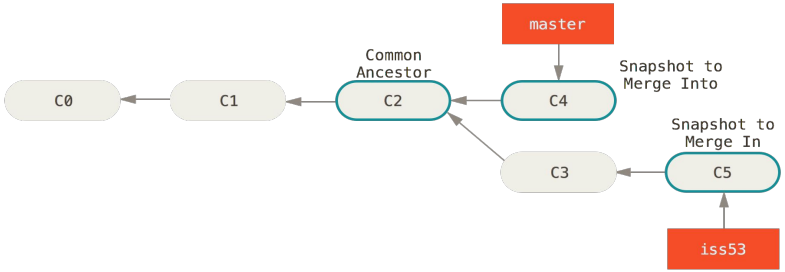

master
98ca9
34ac2
f30ab
testing
HEAD

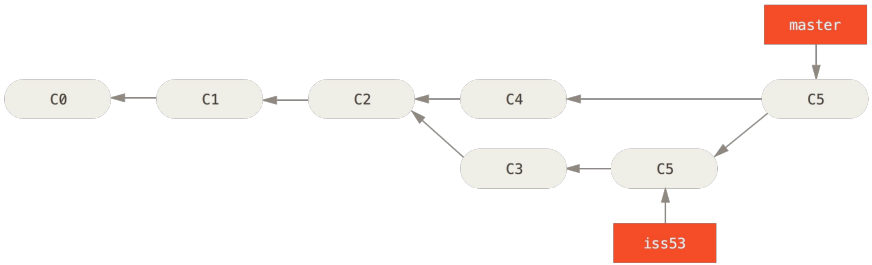
Git - Merge, Fetch, Push, Pull

- ➔ $ *git merge <branch_name>*
- ➔ $ *git mergetool*
- ➔ $ *git fetch <branch_name>*
- ➔ $ *git push <remote_name> <branch_name>*
- ➔ $ *git pull <remote_name> <branch_name>*

Git - Merge


master
C0
C1
C2
C4
C3
C5
iss53


master
Common
Ancestor
Snapshot to
Merge Into
C0
C1
C2
C4
Snapshot to
Merge In
C3
C5
iss53


master
C0
C1
C2
C4
C5
C3
C5
iss53

Git - More Features

- ➔ Tags
- ➔ Aliases (git config --global alias.co checkout)
- ➔ Rebase (git rebase <base_branch> <topic_branch>)
  - ◆ When to rebase and when to merge
- ➔ Stashing
- ➔ $ ***git reset*** (--hard, --soft)

Git - Server

- ➔ Git on Servers
  - ◆ git init --bare (server side)
  - ◆ git remote add user@ip:/path/to/server (client side)
  - ◆ touch .ssh/authorized_keys && chmod 600 .ssh/authorized_keys
  - ◆ Append *.pub* file of required users in *authorized_keys* file
- ➔ Third Party hosting servers
  - ◆ GitHub
  - ◆ GitLab
  - ◆ BitBucket