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A Fast AND Steady Approach

AWS

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Ground Rules

- Turn off cell phone. If you cannot please keep it on silent mode. You can go out and attend your call.
- If you have any questions or issues please let me know immediately.
- Let us be punctual.

Agenda

Git

Git

- As **Git** is a distributed version control system, it can be used as a server out of the box. Dedicated **Git** server software helps, amongst other features, to add access control, display the contents of a **Git** repository via the web, and help managing multiple repositories.

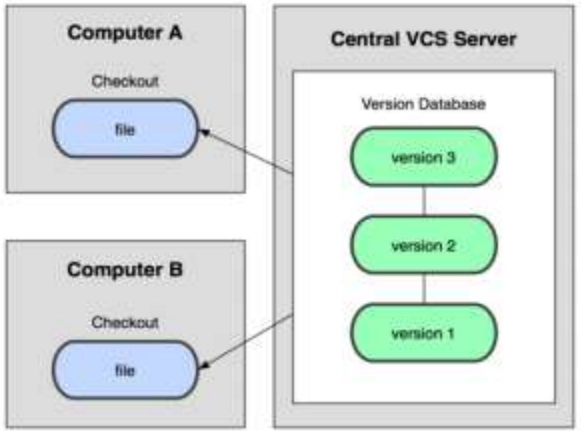
Version Control Systems

- Version Control (or Revision Control, or Source Control) is all about managing multiple versions of documents, programs, web sites, etc.
  - Almost all "real" projects use some kind of version control
  - Essential for team projects, but also very useful for individual projects
- Some well-known version control systems are CVS, Subversion, Mercurial, and Git
  - CVS and Subversion use a "central" repository; users "check out" files, work on them, and "check them in"
  - Mercurial and Git treat all repositories as equal
- Distributed systems like Mercurial and Git are newer and are gradually replacing centralized systems like CVS and Subversion

Why Version Control?

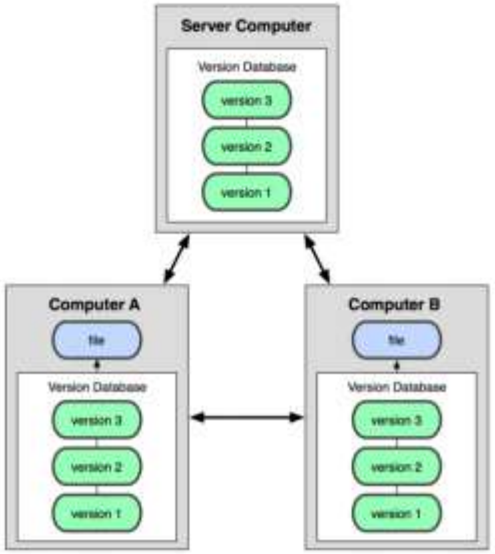
- For working by yourself:
  - Gives you a “time machine” for going back to earlier versions
  - Gives you great support for different versions (standalone, web app, etc.) of the same basic project
- For working with others:
  - Greatly simplifies concurrent work, merging changes

Centralized VCS



- In Subversion, CVS, Perforce, etc.
  – A central server repository (repo) holds the "official copy" of the code
  – The server maintains the sole version history of the repo
- You make "checkouts" of it to your local copy
  – You make local modifications
  – Your changes are not versioned
- When you're done, you "check in" back to the server
  – your checkin increments the repo's version

Distributed VCS (Git)



- In git, mercurial, etc., you don’t “checkout” from a central repo
  - You "clone" it and "pull" changes from it
- Your local repo is a complete copy of everything on the remote server
  - Yours is "just as good" as theirs
- Many operations are local:
  - Check in/out from local repo
  - Commit changes to local repo
  - Local repo keeps version history
- When you're ready, you can "push" changes back to server

Why Git?

- Git has many advantages over earlier systems
  - More efficient, better workflow, etc.
  - See the literature for an extensive list of reasons
  - Of course, there are always those who disagree
  - Very Popular

Version Control Terminology

- Version Control System (VCS) or (SCM)
- Repository
- Commit
- SHA
- Working Directory
- Checkout
- Staging Area/Index
- Branch

Version Control Terminology

- Version Control System :
  - A VCS allows you to: revert files back to a previous state, revert the entire project back to a previous state, review changes made over time, see who last modified something that might be causing a problem, who introduced an issue and when, and more.
- Repository:
  - A directory that contains your project work which are used to communicate with Git. Repositories can exist either locally on your computer or as a remote copy on another computer.

Version Control Terminology

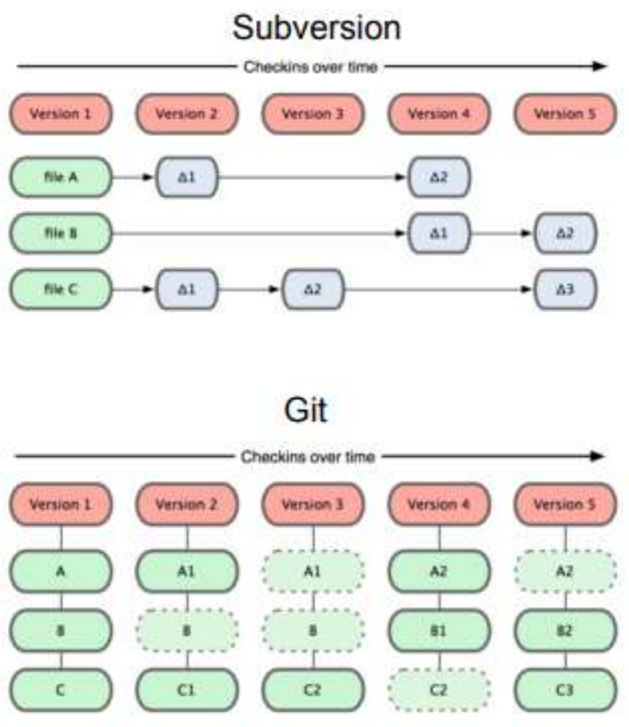
- Commit
  - Git thinks of its data like a set of snapshots of a mini file system.
  - Think of it as a save point during a video game.
- SHA
  - A SHA is basically an ID number for each commit.
  - Ex. E2adf8ae3e2e4ed40add75cc44cf9d0a869afeb6
- Branch
  - A branch is when a new line of development is created that diverges from the main line of development. This alternative line of development can continue without altering the main line.

Version Control Terminology

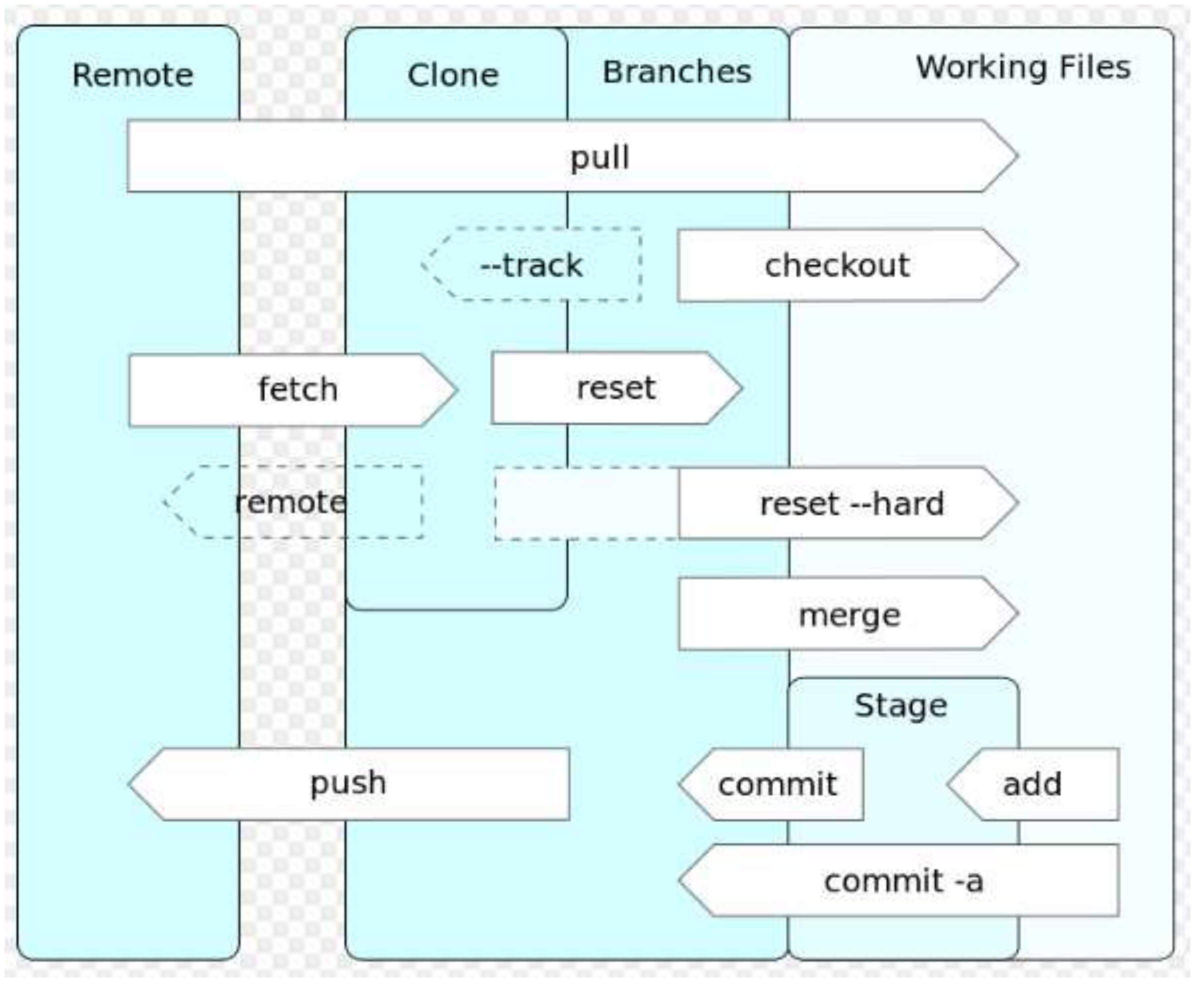
- Working Directory
  - files that you see in your computer's file system. When you open project files up on a code editor, you're working with files in the Working Directory.
- Checkout
  - Content in the repository has been copied to the Working Directory. Possible to checkout many things from a repository; a file, a commit, a branch, etc.
- Staging Area
  - You can think of the staging area as a prep table where Git will take the next commit. Files on the Staging Index are poised to be added to the repo

Git

- Centralized VCS like Subversion track version data on each individual file.
- Git keeps "snapshots" of the entire state of the project.
  - Each checkin version of the overall code has a copy of each file in it.
  - Some files change on a given checkin, some do not.
  - More redundancy, but faster.

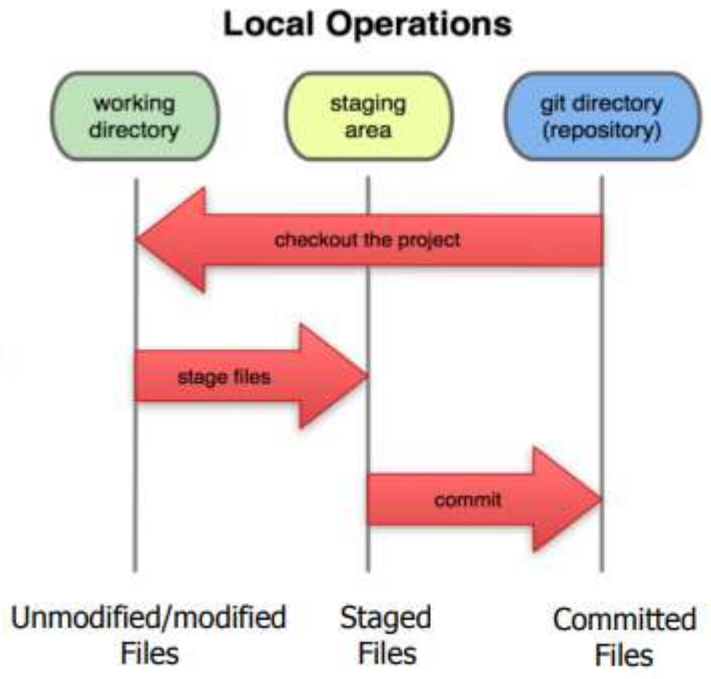


Git

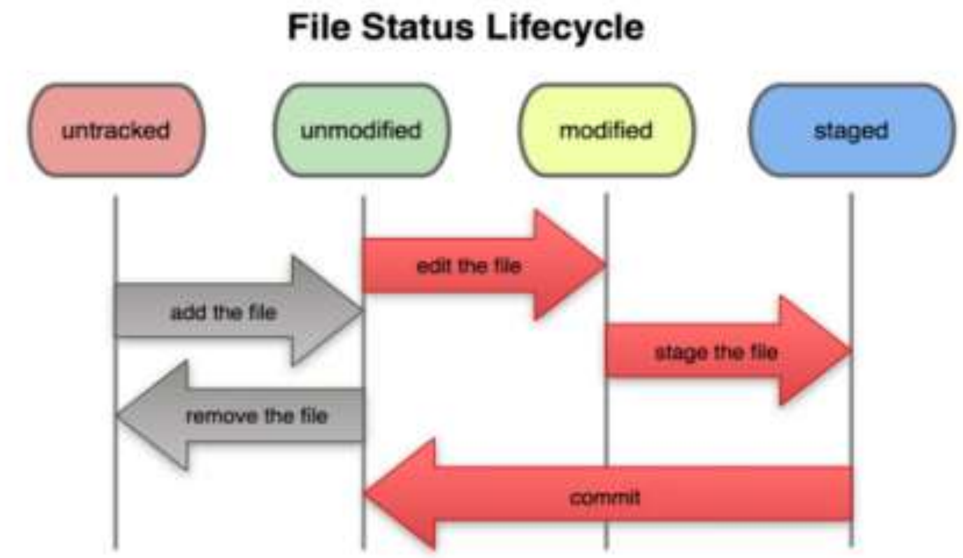

Remote
Clone
Branches
Working Files
pull
--track
checkout
fetch
reset
remote
reset --hard
merge
Stage
push
commit
add
commit -a

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.



Basic 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.

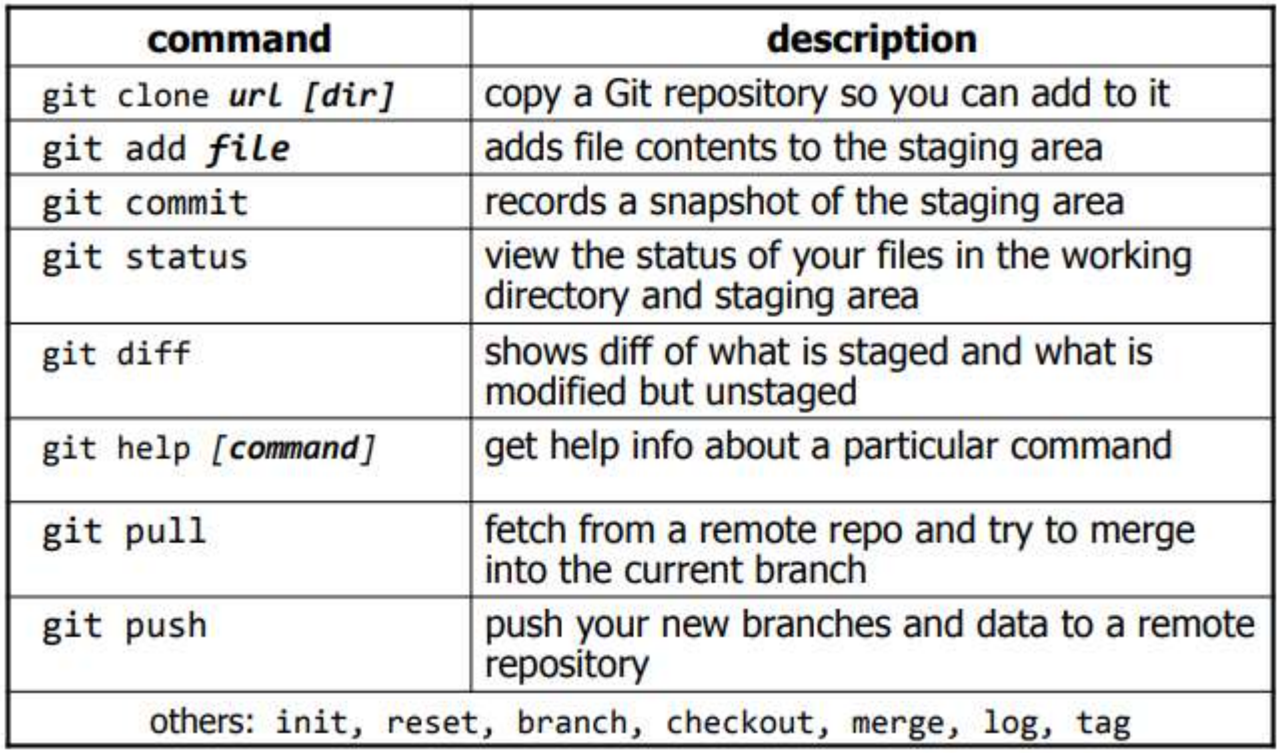
Initial Git configuration

- Set the name and email for Git to use when you commit:
  - git config --global user.name “.."
  - git config --global user.email e@gmail.com
  - 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 a Git Repo

- 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 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	

Add and commit a file

- The first time we ask a file to be tracked, and every time before we commit a file, we must add it to the staging area:
  - git add Hello.java Goodbye.java
    - Takes a snapshot of these files, adds them to the staging area.
- To move staged changes into the repo, we commit:
  - git commit –m "Fixing bug #22"
- To undo changes on a file before you have committed it:
  - git reset HEAD -- filename (unstages the file)
  - git checkout -- filename (undoes your changes)
  - All these commands are acting on your local version of repo.

Viewing/undoing changes

- To view status of files in working directory and staging area:
  - git status or git status –s (short version)
- To see what is modified but unstaged:
  - git diff
- To see a list of staged changes:
  - git diff --cached
- To see a log of all changes in your local repo:
  - git log or git log --oneline (shorter version)
  - git log -5 (to show only the 5 most recent updates) etc

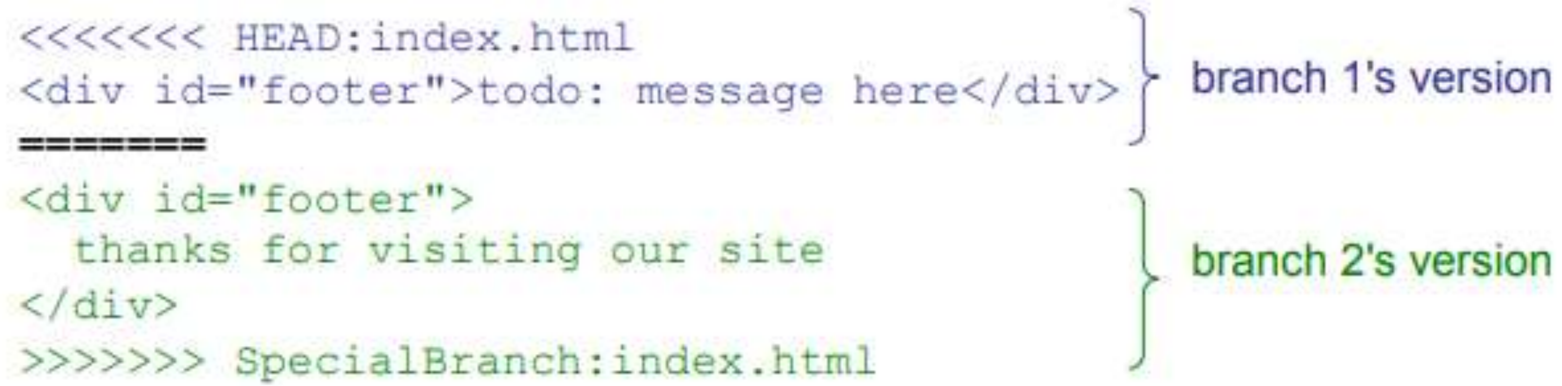
Branching and Merging

Git uses branching heavily to switch between multiple tasks.

- To create a new local branch:
  - git branch name
- To list all local branches: (* = current branch)
  - git branch
- To switch to a given local branch:
  - git checkout branchname
- To merge changes from a branch into the local master:
  - git checkout master
  - git merge branchname

Merge Conflicts

The conflicting file will contain <<< and >>> sections to indicate where Git was unable to resolve a conflict:



```
<<<<<<< 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

Find all such sections, and edit them to the proper state (whichever of the two versions is newer / better / more correct).

Interaction with Remote Repo

- Push your local changes to the remote repo.
- Pull from remote repo to get most recent changes.
  - (fix conflicts if necessary, add/commit them to your local repo)
- To fetch the most recent updates from the 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

GitHub

- GitHub.com is a site for online storage of Git repositories.
  - You can create a remote repo there and push code to it.
  - Many open source projects use it, such as the Linux kernel.
  - You can get free space for open source projects, or you can pay for private projects.

QUESTION / ANSWERS

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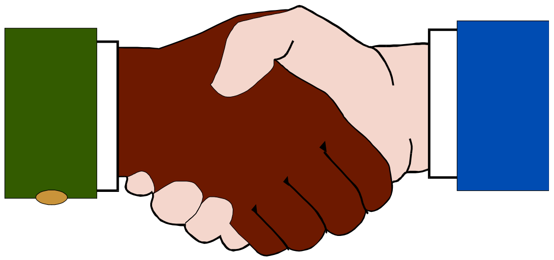
THANKING YOU !



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