

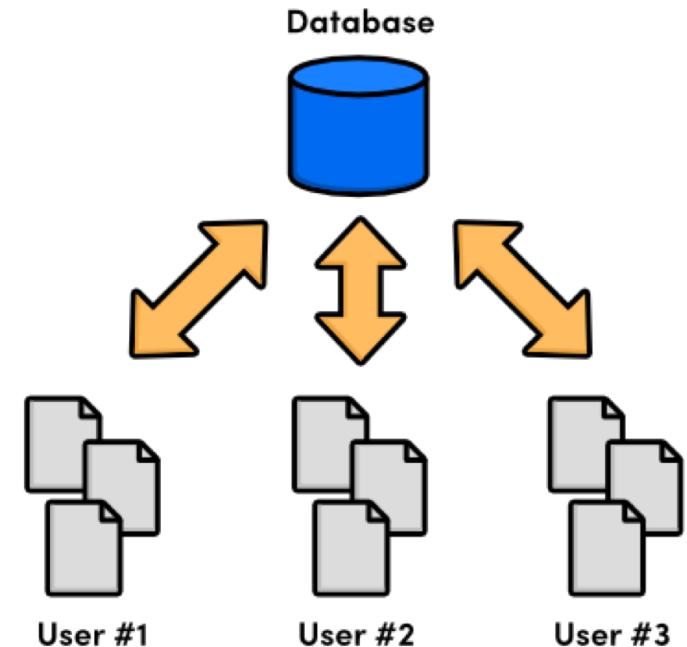


Git 101

CFM Hack 2018 (Fall)

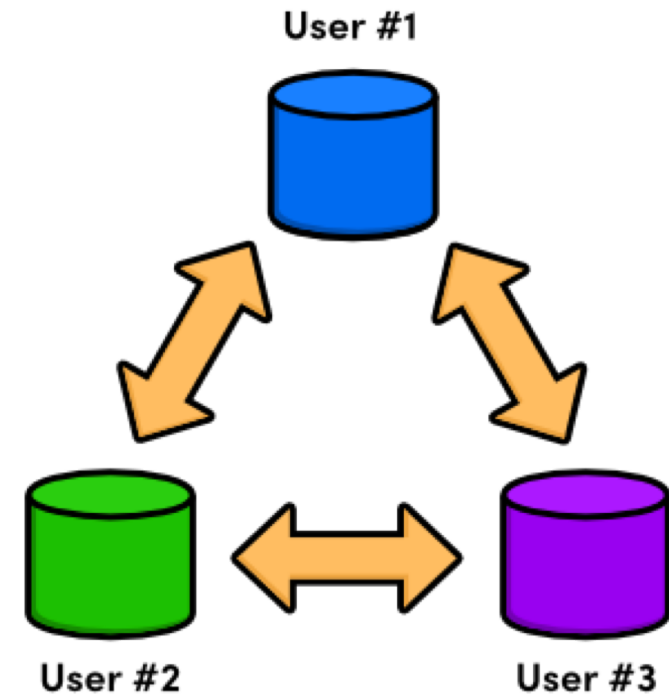
Version Control Systems

- **Software** that manages **changes** that you make to your files (source code)
- Track **versions of sets of changes** to your files
- Handles **concurrent changes** from **multiple sources** (e.g. different developers working on the same code base)
- Typically central repository stores every version of every file



Distributed Version Control (DVCS)

- Every user has a copy of every file
- So we will use Git, a very popular DVCS
 - Design goals => Large scale distributed development
 - Git doesn't require a server, but it's common to use one for coordination (i.e. Github)



Concepts

- Working directory
 - Your local copy of the files that you're working with
- Staging area
 - A “place” where you tell Git to hold a set of changes, temporarily
- Repository
 - A place where Git stores copies of your files and their history

What is the difference between
Local Repository and **Remote Repository**?

Answer:

Local Repository is the copy of repo on your **working machine**

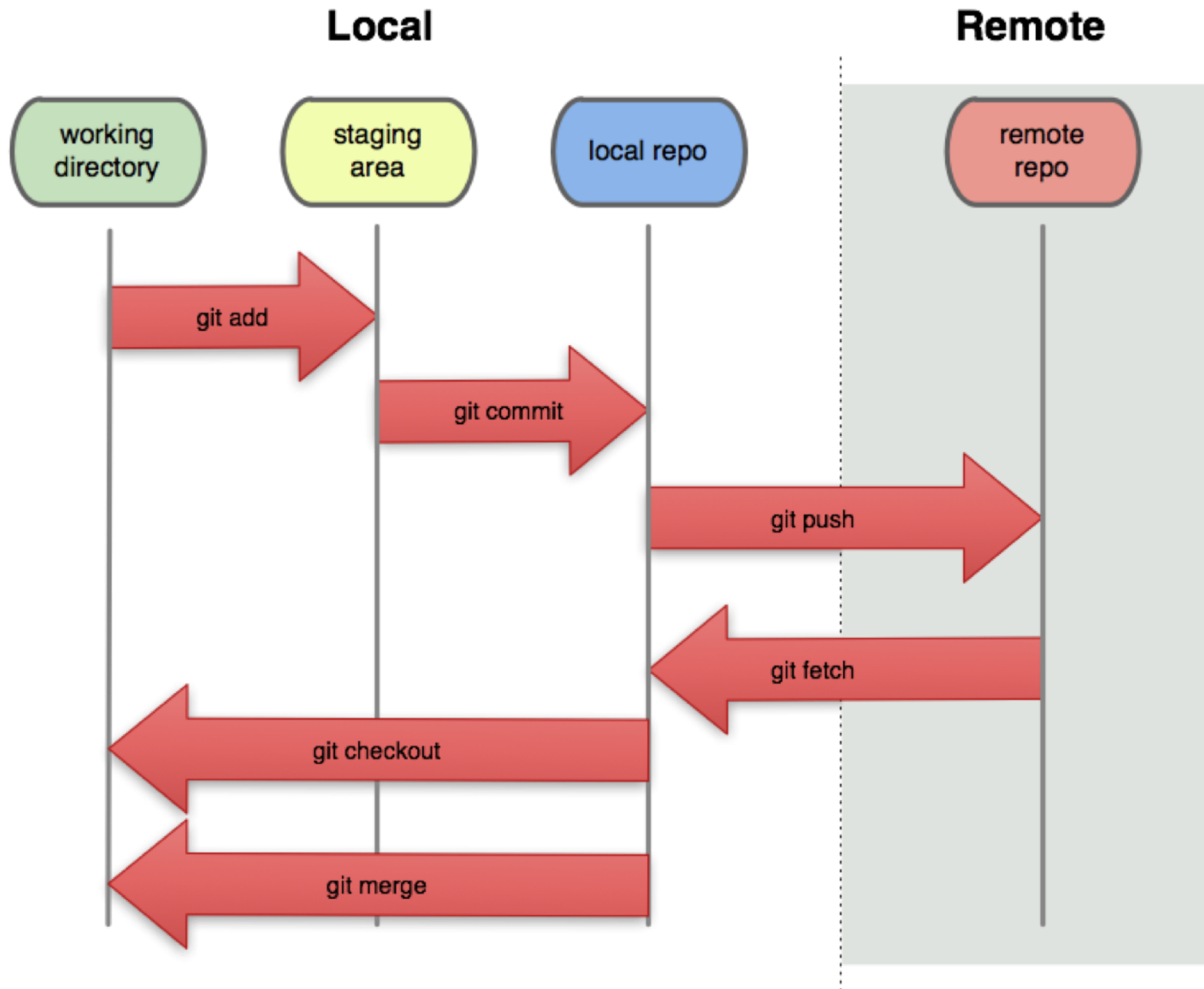
Remote Repository is the repo on a **server** (e.g. **Github**)

Commands

- Perform these operations using a Git client (command-line or GUI)
- Commands typically move files between working directory, staging area and local or remote repository

Local Commands	Description
git add	Add a file from working directory to staging area
git commit	Commit changes from staging area to repo
git checkout	Get files from repo to working directory

Remote Commands	Description
git clone	Make a copy from remote repo to working directory
git pull	Pull (merge) changes from repo to working directory
git push	Push (merge) changes from staging area to repository



Installing Git

- Before anything else, you need to install and configure Git
- Install a Git client (command-line or GUI)
 - <https://git-scm.com/downloads>
- Sign up a github account (tell me your username later)
- Setup your email address for Git:
`git config --global user.email your_email@example.com`

Setup

- Get a copy the repository from the server

git clone https://github.com/uwcfm/CFM-HACK-2018.git

- Branch off from xxx to create a new copy of repo

git checkout -b your_team_branch_name

- One team can share one branch and push commits to the same branch
 - This can cause merge conflicts sometimes
 - **Solution:** one branch per person off from the team branch, then git rebase with the team branch and merge at times (out of scope of this tutorial)

Always **PULL** before push

Resources

Git rebase (Advance)

- One person per branch from the team branch

```
Git checkout team_branch           // switch to team_branch
Git checkout -b team_branch_alex   // create your own branch
Git add *                          // add all changes to staging area
Git commit -m "message about the changes" // commit changes to local repo
Git push origin team_branch_alex   // push changes to remote repo
Git checkout team_branch           // switch to team_branch
Git pull origin team_branch        // make sure you have the latest changes from team_branch
Git checkout team_branch_alex      // switch back to team_branch_alex
Git rebase team_branch             // rebase team_branch_alex onto team_branch
Git checkout team_branch           // switch to team_branch
Git merge team_branch_alex         // fast-forward merge team_branch with team_branch_alex
```

Useful Aliases

- Git config --global alias.glog=log --graph --abbrev-commit --decorate --format=format:'%C(bold blue)%h%C(reset) - %C(bold green)(%ar)%C(reset) %C(white)%s%C(reset) %C(dim white)-%an%C(reset)%C(bold yellow)%d%C(reset)' --all
- Git glog //shows tree representation for branches

```
alexchen@Alexs-MacBook-Pro:~/achen/Projects/CFM-HACK-2018 (master)$ git glog
* 93c76d4 - (31 hours ago) added homepage url to deployment onto github page - Alex Chen (origin/martin, testing, martin)
* 9a1fac9 - (31 hours ago) move react app to root - Alex Chen
* 1bef3c9 - (31 hours ago) Merge branch 'martin' of https://github.com/uwcfm/CFM-HACK-2018 into martin - Alex Chen
| \
| * 9937c53 - (32 hours ago) ADD: react-strap - martinchu
| * b2c4cab - (31 hours ago) added gh-page config - Alex Chen
| | * 8a8219e - (31 hours ago) Updates - Alex Chen (HEAD -> master, origin/master, origin/HEAD)
| | * 66ffb4f - (31 hours ago) Updates - Alex Chen
| | /
| / \
| * 051a782 - (32 hours ago) Merge pull request #1 from uwcfm/martin - Martin Chu
| \
| \
| * ae7a839 - (32 hours ago) ADD: react project directory - martinchu
| /
* 017b671 - (6 days ago) EDIT: readme (test) - Martin Chu
* eb6e79b - (11 days ago) add event page template - Alex Chen
* 41ecc98 - (11 days ago) fix url with git configuration - Alex Chen
* 888cc32 - (11 days ago) added gitignore and move data files - Alex Chen
* 7fe3649 - (11 days ago) completed demo example - Alex Chen
* a6a2b9d - (11 days ago) Finished team module. Adding chartjs example. - Alex Chen
* a59a53b - (11 days ago) Set up application boilerplate. Add nba example module for demo. - Alex Chen
* 5de1962 - (12 days ago) Initial commit - Computing and Financial Management
```


Online Tutorials

- <https://git-scm.com/book/en/v2/Getting-Started-First-Time-Git-Setup>
- <https://www.atlassian.com/git/tutorials>
- <https://git-scm.com/book/en/v2/Git-Basics-Git-Aliases>
- <https://git-scm.com/book/en/v2/Git-Branching-Rebasing>