

# Version Control with Git

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15-441 Computer Networks

Recitation 3



# What is version control?

- Revisit previous code versions
- Backup projects
- Work with others
- Find where things broke



# Version Control Workflow

- **Check** for any remote updates
- **Do** your work
- **Test** your work
- **Check** differences, try to isolate changes
- **Check** for any remote updates
- **Commit** your work



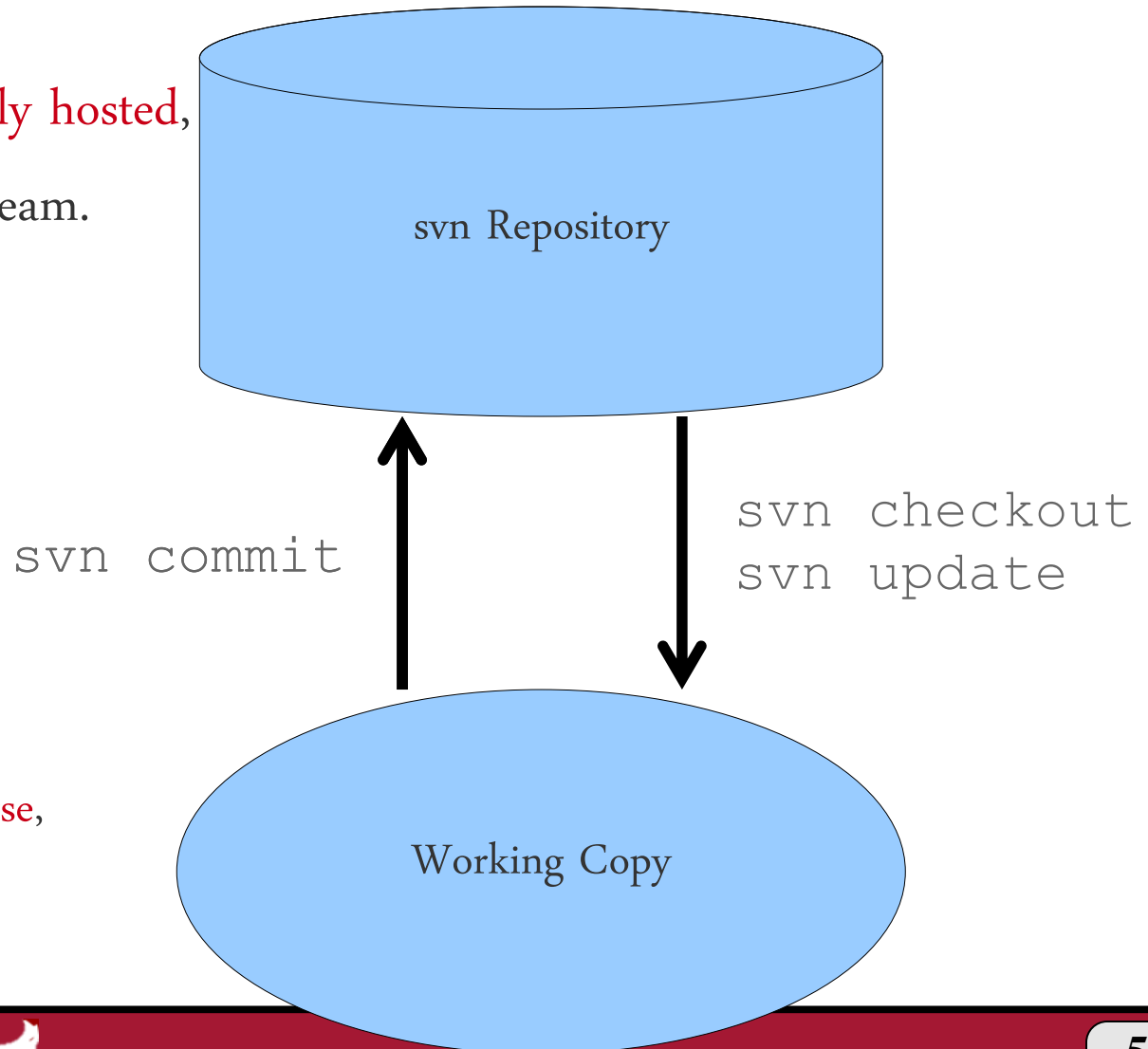
# Options

- Git
- Subversion (svn)
- Mercurial (hg)
- Bazaar (bzd)
- CVS
- ~~Dropbox~~
- Others...



# svn

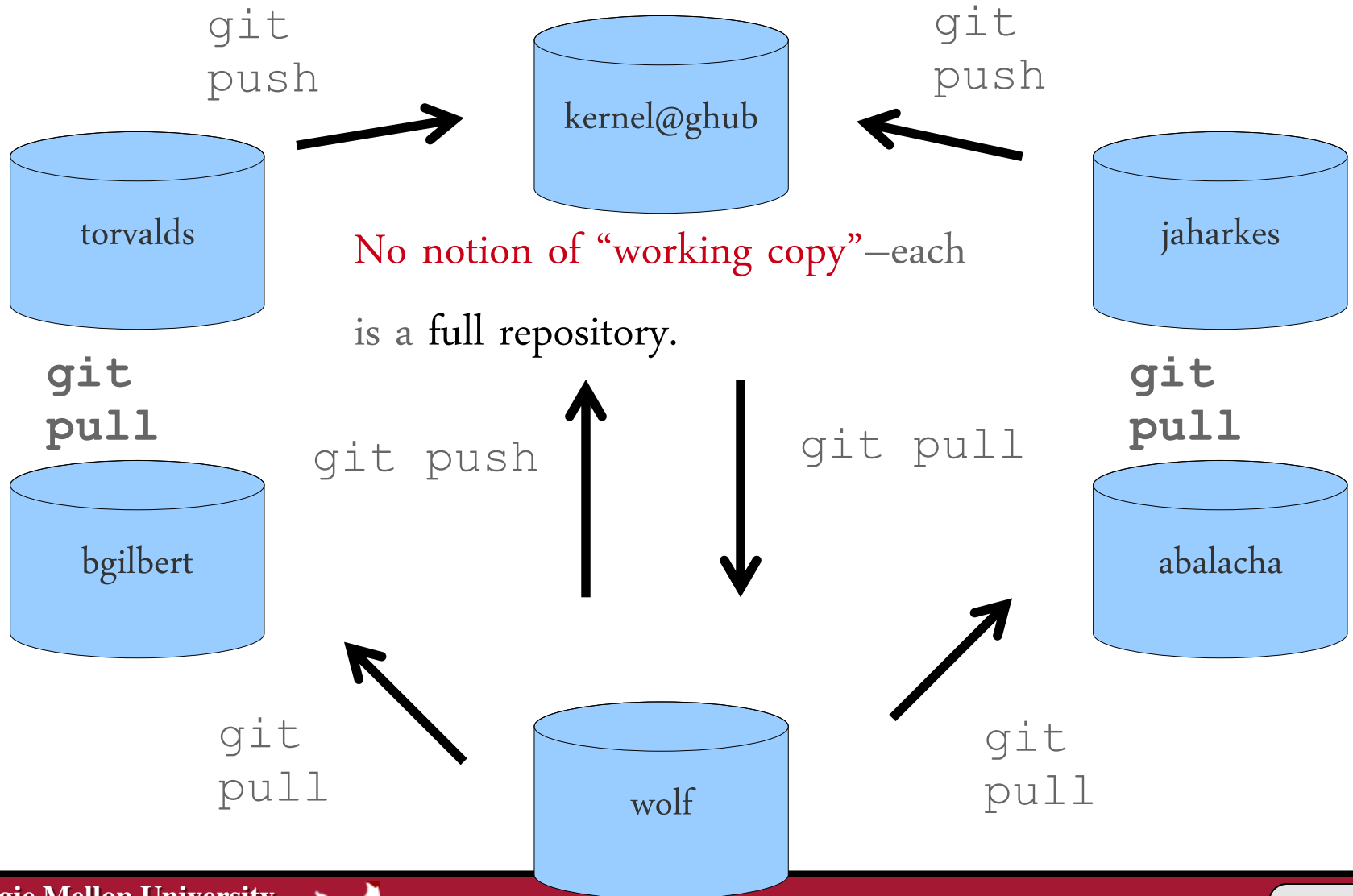
Usually **remotely hosted**,  
shared with a team.

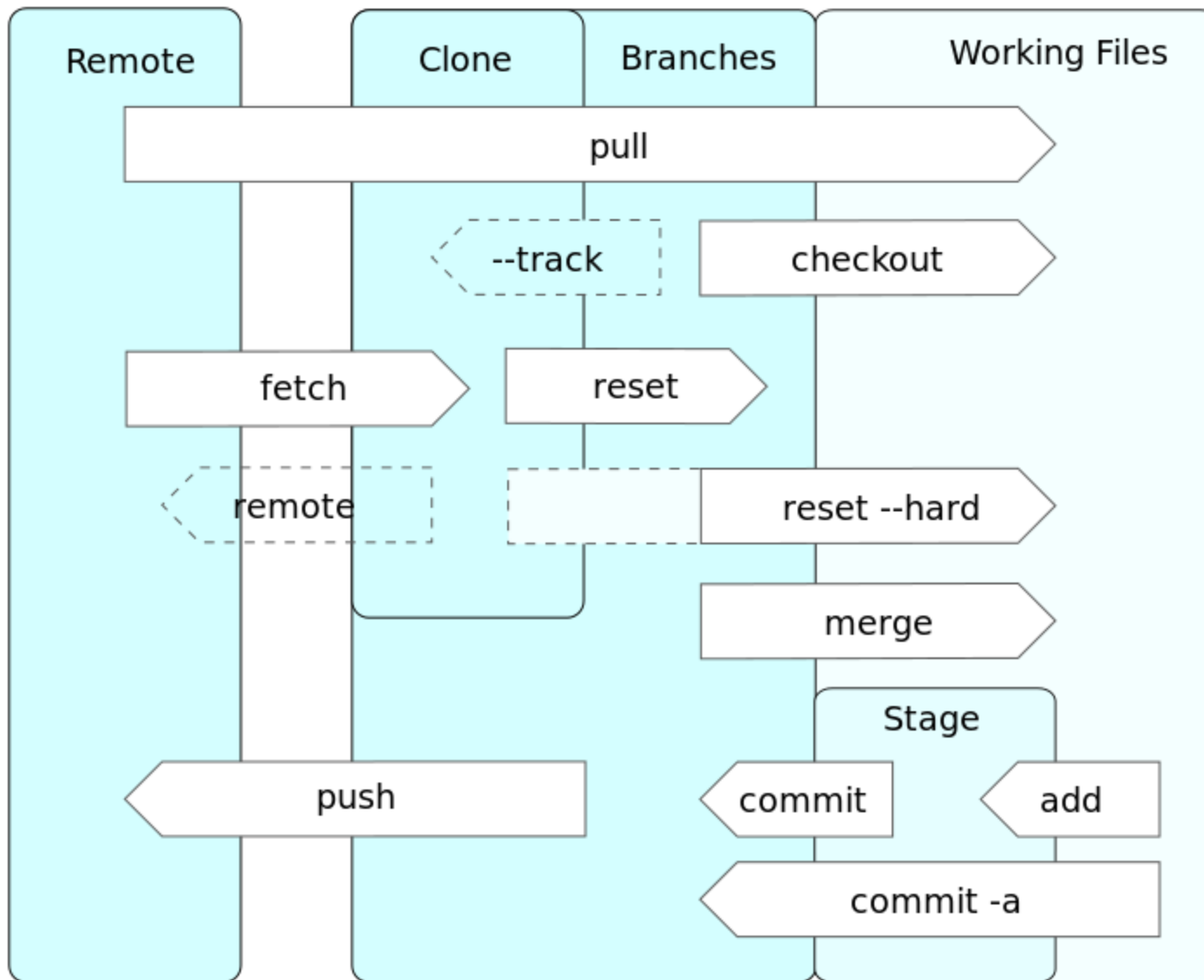


Your **private universe**,  
before commit.



# git





# Creating a Repository (repo)

Create locally

```
git init .
```

Create remote

```
git init --bare
```

Clone local copy

```
git clone git://path/to/repo
```





# --bare or not?

- No-bare
  - Creates a repository in your working directory
  - Don't need to create multiple copies of your repo
  - Won't help if you nuke the directory/disk
  - This is probably what you need if you'll work in AFS
- --bare
  - Creates a “server copy” for hosting the project
  - Workflow more similar to svn (but still better)
  - Everyone pushes to shared bare repo (like svn)
  - You don't work in this copy; must clone elsewhere
  - You want this to develop on your PC



# Aside: network protocols

- Use different protocols to pull/push to repositories.
- If on the same computer:
  - git://path/to/repo
- If hosted on AFS
  - ssh+git://path/to/repo
- No ssh keys for AFS, sorry



# Aside: Configure git

- `git config --global user.name "Ben Wasserman"`
- `git config --global user.email "benjamin@cmu.edu"`



# Clone

Pull a copy of the repo to develop on

```
git clone git://path/to/repo
```

```
git clone  
ssh+git://unix.andrew.cmu.edu/afs/and  
rew/course/15/441-  
641/ANDREWID/ANDREWID-15-441-project-  
1.git
```



# status

- Which files changed?
- Which files aren't being watched?
- Which files are stashed for commit?

`git status`



# Pull

- Get latest updates from remote copy

```
git pull
```

- If this fails, you probably need to commit any unsaved changes



# Commit

- Merge your changes into the repository

```
git add foo.c ...  
git commit
```



# Push

- Don't push broken code!!

`git push`

- If this fails, you probably need to pull first





# Branch & Merge

- Work on something different, without disturbing master/trunk

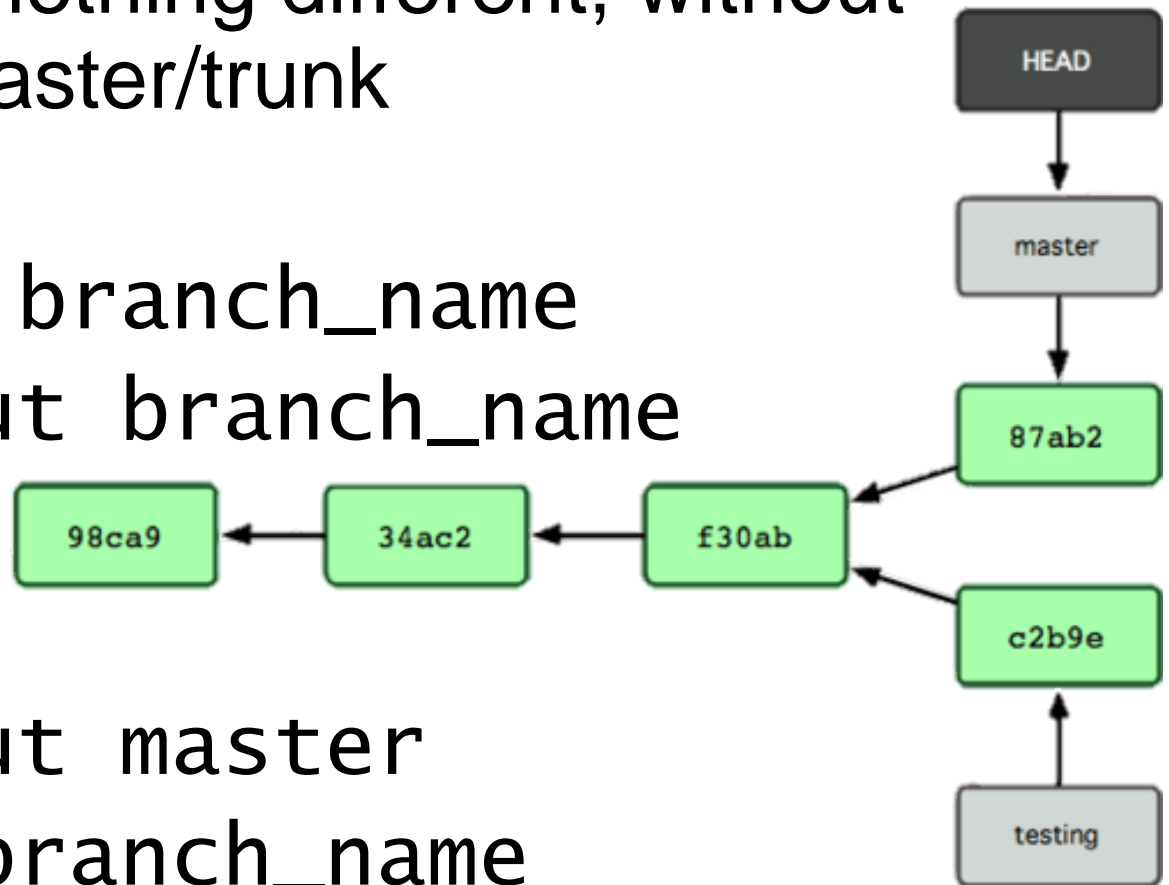
`git branch branch_name`

`git checkout branch_name`

do stuff...

`git checkout master`

`git merge branch_name`



# Tag

- Mark a revision as “final” or “ready”

```
git tag tag_name  
git push --tags
```



# Remote Hosting

- [github.com](https://github.com)
- [bitbucket.org](https://bitbucket.org)
- [svnhub.com](https://svnhub.com)
- AFS
- Google code
- Sourceforge



# Aside: AFS Permissions

- To make a bare repo in AFS that someone else can pull/push from:
  1. Make a new directory in your home dir
  2. `fs sa . ANDREWID rlidwk`
  3. `git init --bare`



# Good practices

- Small commits
- Useful messages
- Commit frequently
- Develop in branches
- Tag releasable versions



# Small commits

- Only change one thing per commit
- When something breaks, easier to trace



# Helpful commit messages

- Say what you changed
- Keep the first line short
- Make commits easy to find
- [www.commitlogsfromlastnight.com](http://www.commitlogsfromlastnight.com)



# Commit Frequently

- Make changes, commit them
- When something breaks, go to the commit that broke it
- Only push when ready for others to get the changes
  - Don't make your teammates hate you





# Git questions?



# Checkpoint 2

- Add basic HTTP server
  - Read RFC 2616
- Start by parsing and building HTTP headers
- Serve error messages
- Then HEAD requests
- Then GET
- Then POST



# Wireshark

- Packet monitoring software
- Install it. Use it.
- You will want this to examine the HTTP headers you're sending/receiving
- Do the Wireshark question on HW1



# All questions?

