Intro to Version Control with Git

- https://betterexplained.com/articles/a-visual-guide-to-version-control/
- https://hackernoon.com/understanding-git-fcffd87c15a3

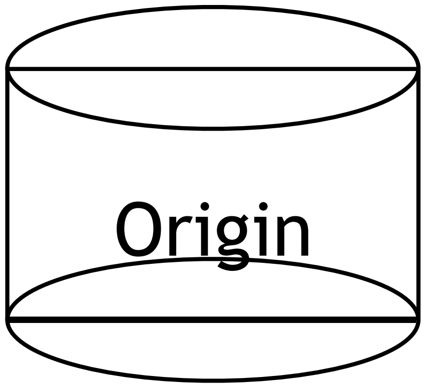
What’s Version Control?

- A master repository of files exists on a server.
- People “clone” the repo to get their own local copy.
- As significant progress is made, people “push” their changes to the master repo, and “pull” other people’s changes from the master repo.
- The repo keeps track of every change, and people can revert to older versions.

Git

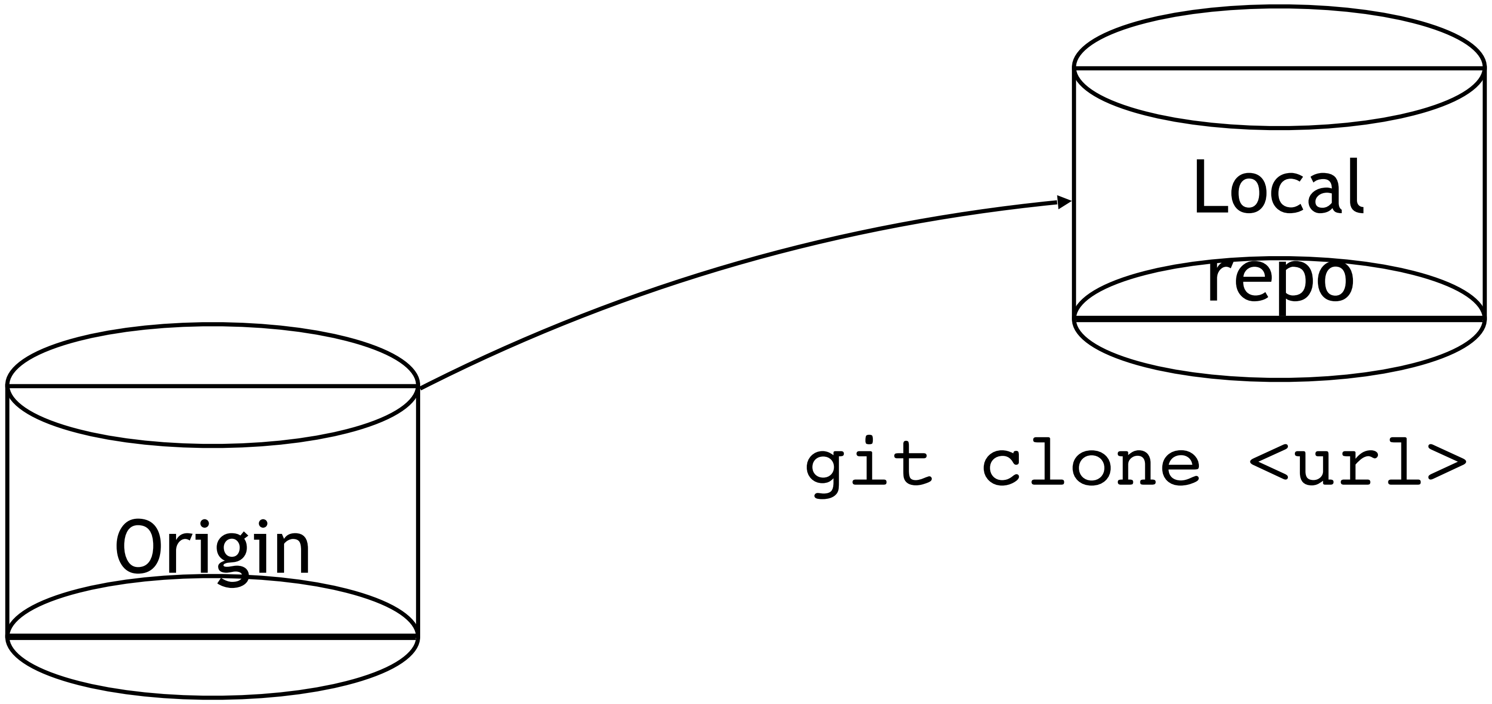
- For CSC207, we have created repositories for you
- These repositories live on a department server (on MarkUs!)
- You will *clone* your remote repository, edit files locally, *add* and *commit* changes to your local repository, and *push* changes to the remote repository

Remote repository



- This is the repo that lives on another server.
- By convention we call it the *origin*
- (In Github terminology, you may have an “upstream” repo and a forked copy of the repo called the “origin”, but we are working with a simpler model)

Clone to get local repo

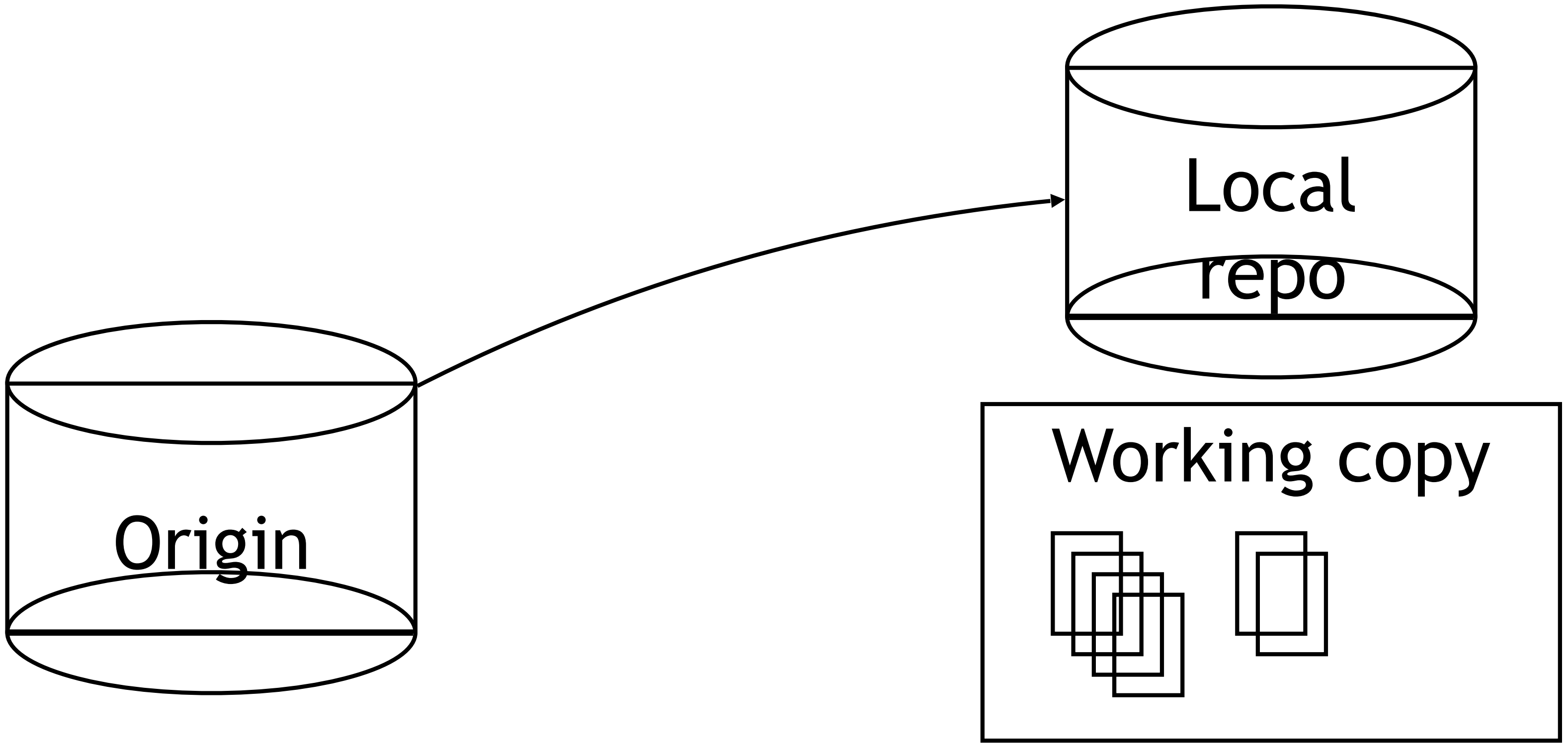


```
git clone <url>
```

- The *clone* command makes a copy of the remote repository on your local machine.

- Now there are two repositories. (Git is a *distributed* version control system)

Clone to get local repo

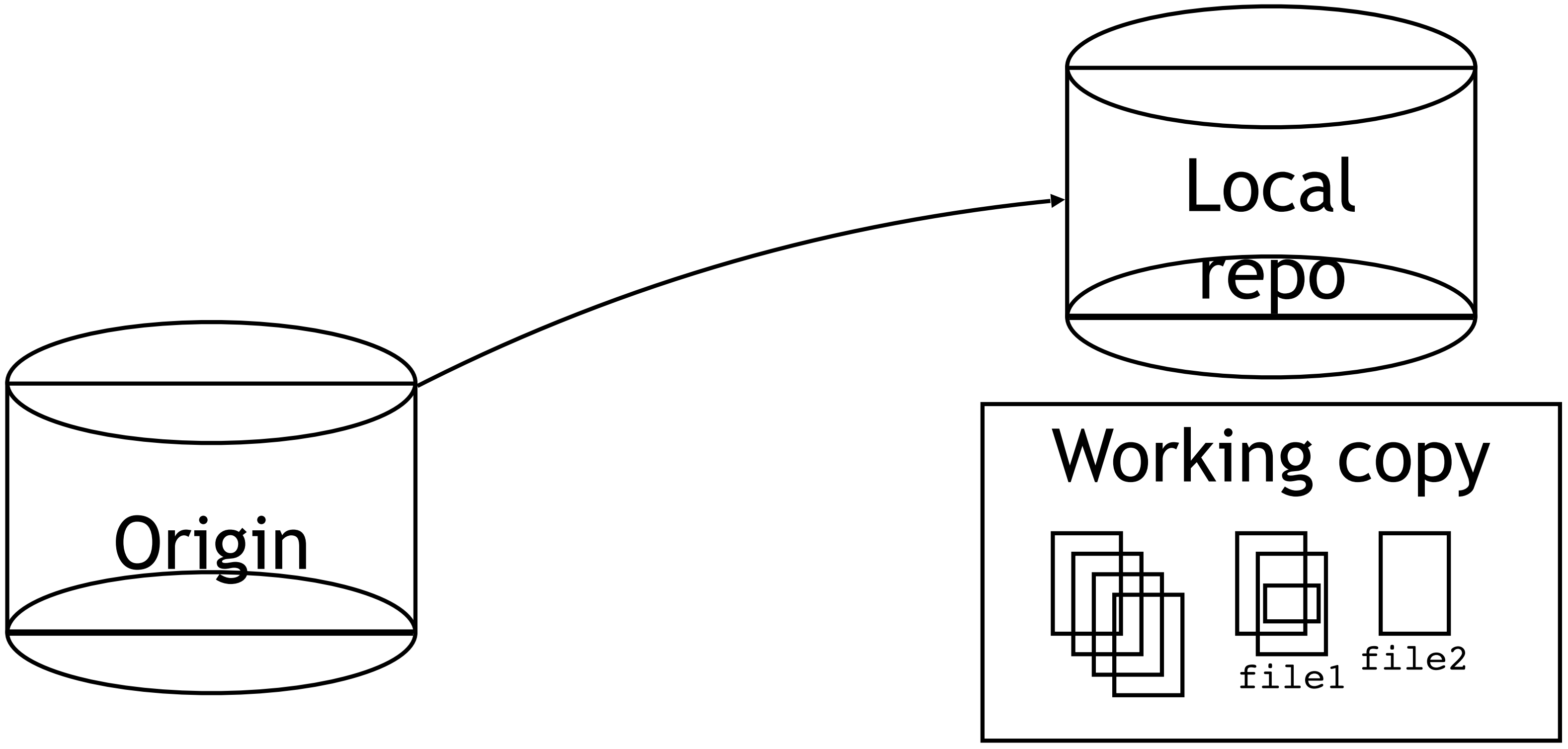


- The *clone* command makes a copy of the remote repository on your local machine.
- Now there are two repositories. (Git is a *distributed* version control system)

Local repository

- The actual repository is hidden. What you see is the working copy of the files from the repository.
- Now you can create new files, make changes to files, and delete files.
- When you want to commit a change to the local repository, you need to first *stage* the changes

How to get work done



- Make changes to files, add new files. When you are ready to commit your work to your local repo you need to tell git which files have changes that you want to add this time.

```
git add file1 file2
git commit -m “adding feature x”
```

Staging changes

- `git add` doesn’t add files to your repo. Instead, it marks a file as being part of the current change.
- This means that when you make some changes to a file and then add and commit them, the next time you make some changes to a file you will still have to run `git add` to add the changes to the next commit.

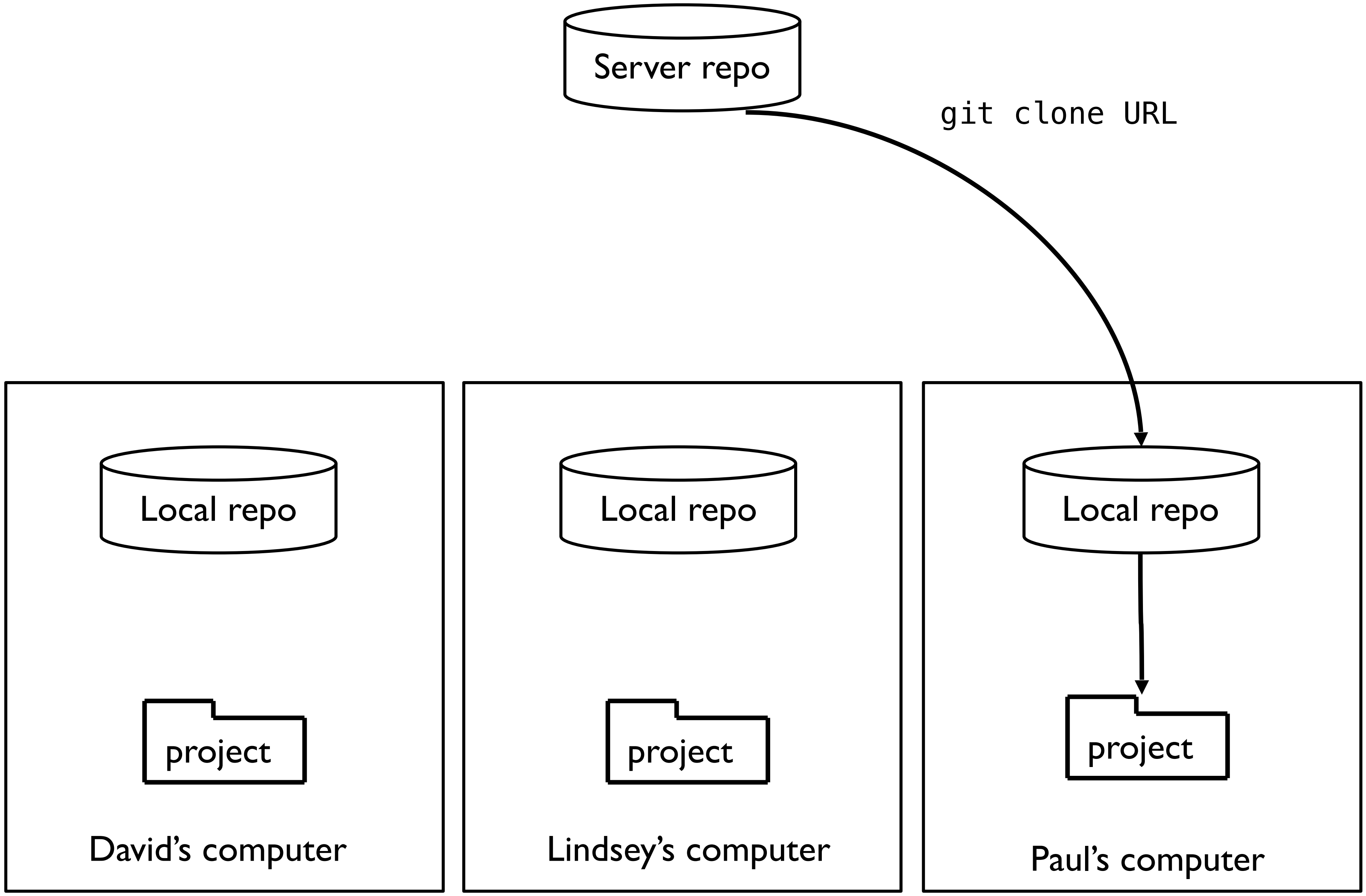
git status

- A file in your working copy can be in one of 4 states:
  - **untracked** – you have never run a git command on the file
  - **tracked** – committed
  - **staged** – `git add` has been used to add changes in this file to the next commit
  - **dirty/modified** – the file has changes that haven't been staged
- TIP: Use `git status` *regularly*. It helps you make sure the changes you have made really make it into the repo.

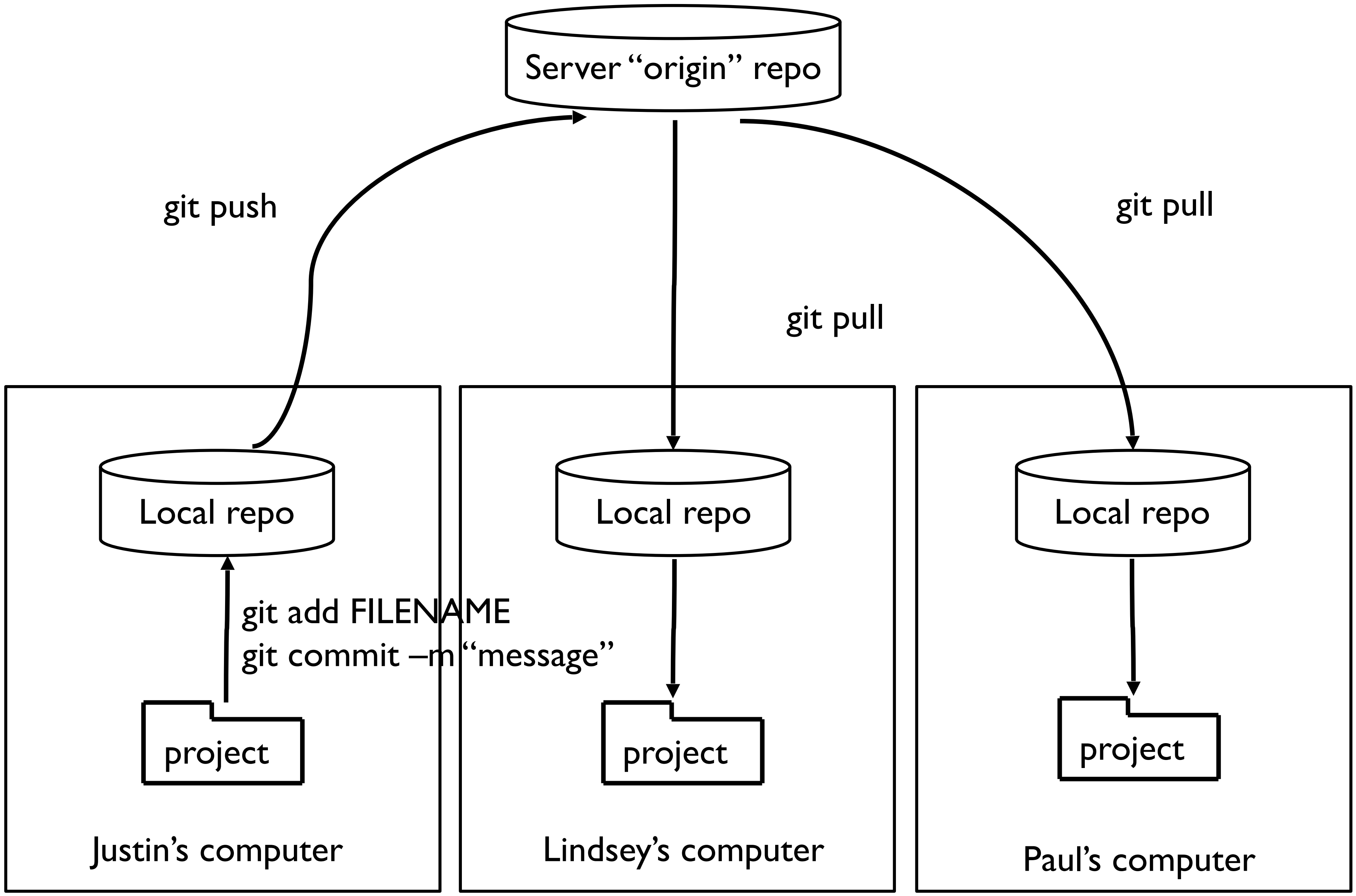
Typical work flow

- Starting a project:
  - `git clone <url>`
- Normal work:
  - After you have made some changes
  - `git status` (see what has really changed)
  - `git add file1 file2 file3`
  - `git commit –m “meaningful commit message”`
  - `git push`

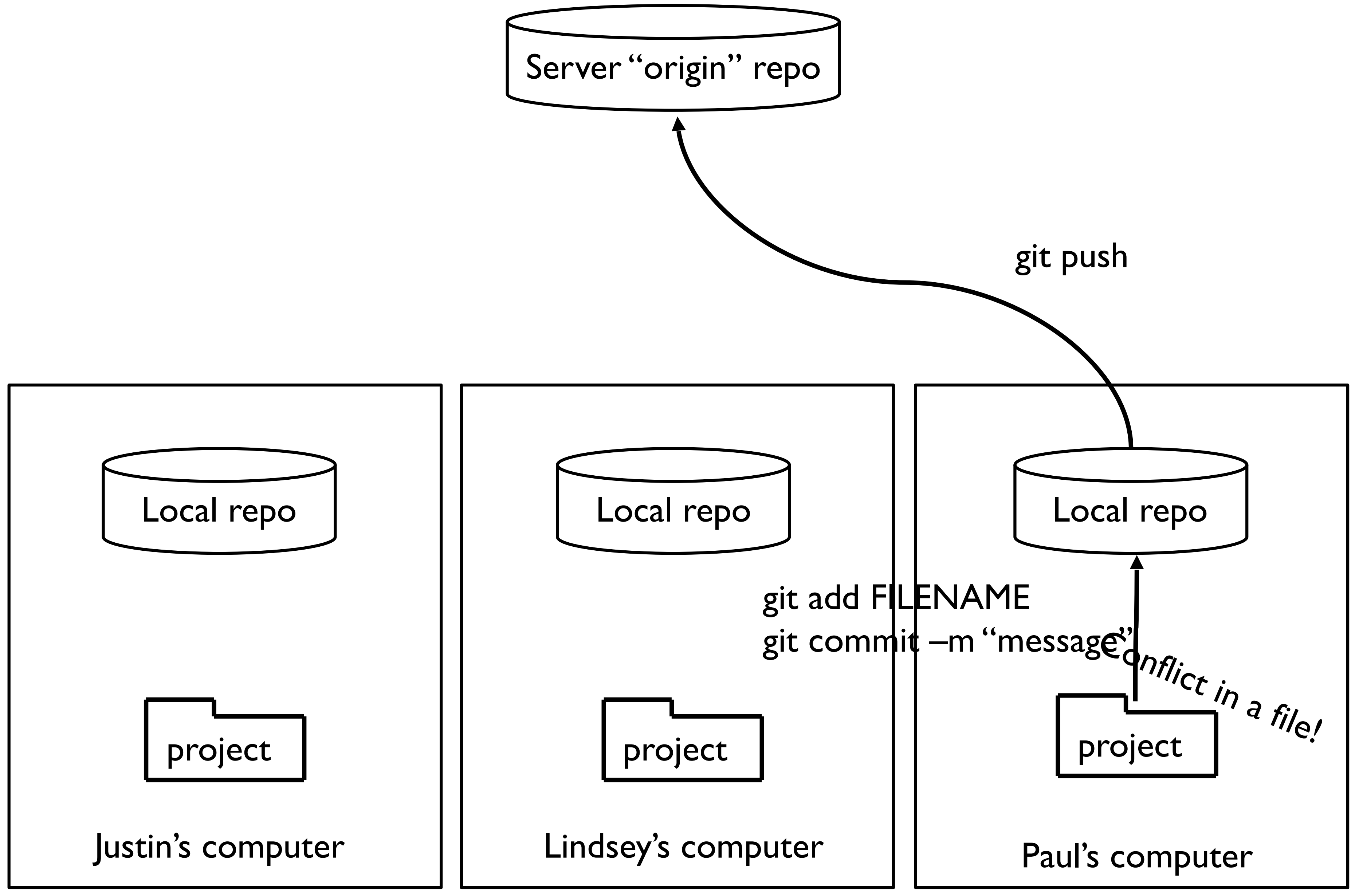
Distributed Version Control Systems: Paul joins the team



Distributed Version Control Systems: Justin works on his current feature



Distributed Version Control Systems: Paul has a conflict



Server "origin" repo
git push
Local repo
Local repo
Local repo
git add FILENAME
git commit –m "message"
Conflict in a file!
project
project
project
Justin's computer
Lindsey's computer
Paul's computer