Collaborating Using GitHub

GW Libraries Workshop
March 27, 2018

go.gwu.edu/ghw

GitHub Agenda

- Why GitHub?
- A tour of a repository
- Hands-on:
  - Create your own new repository
  - Collaborate on a repository
  - Make a release of your code
  - Fork an existing repository

Why GitHub?

- Version Control - uses `git`
- Collaboration
- Open (or not)
- Pricing - free for open, cheap for private, and free for students education.github.com (and /pack)
- Code with context

Tour of a Repository: About your code

- **README.md** ← showcase your work, this is your home page
- **LICENSE** file ← Important! choosealicense.com
- (Optional) Wiki pages

These use Markdown - lightweight formatting

Tour of a Repository - The Code

- Code
  - history of commits on a branch
  - history of commits on a file
- Branches
  - Master branch vs. others
  - Visually represented with the Insights → Network graph

Tour of a Repository - Code as a Project

- Issues - tags, assignment, releases, comments
- Milestones and Releases
- Pull requests
- Comment threads - on issues, commits, etc.
- Insights (graphs)

Tour of a Repository - Connections

Between Github users/repositories

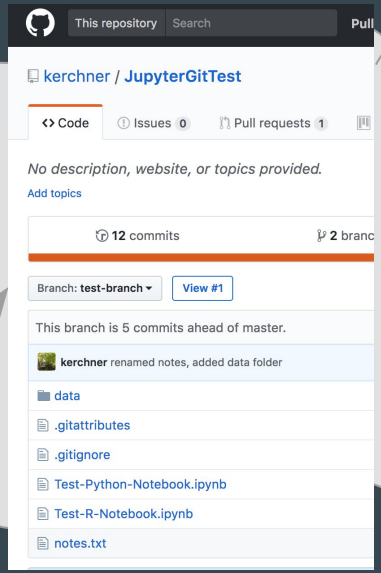
- Watch/Star/Follow
- Mentions

With other software development tools

- Integrations & Webhooks (under repository Settings)

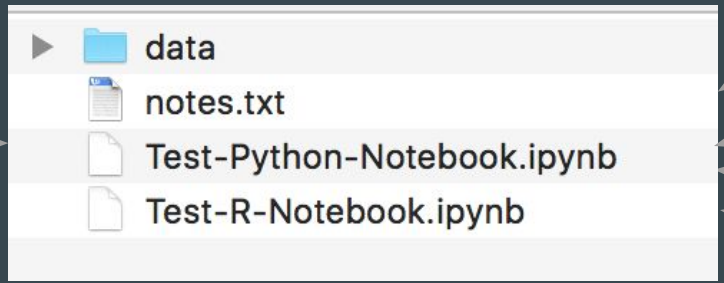
Your Code, Git, and GitHub

Your repository on GitHub



Apps you use that modify your files

Files on your computer - your *local* git repository



GitHub Desktop

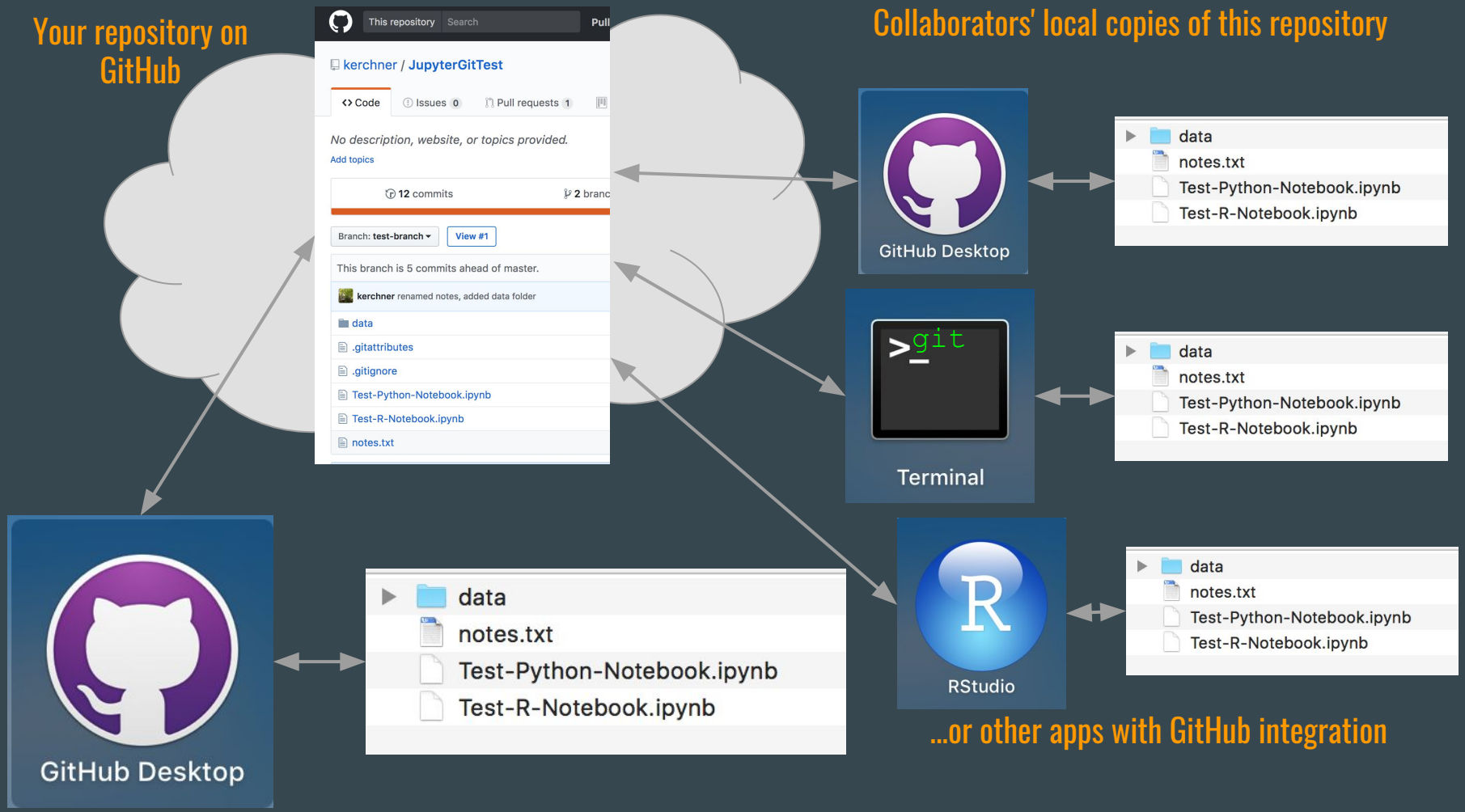
jupyter

Atom

Microsoft Excel

RStudio

** or command-line git, RStudio, Atom, other Git app, etc.*


Your repository on GitHub
This repository
Search
Pull
kerchner / JupyterGitTest
Code
Issues 0
Pull requests 1
No description, website, or topics provided.
Add topics
12 commits
2 branc
Branch: test-branch
View #1
This branch is 5 commits ahead of master.
kerchner renamed notes, added data folder
data
.gitattributes
.gitignore
Test-Python-Notebook.ipynb
Test-R-Notebook.ipynb
notes.txt
Collaborators' local copies of this repository
GitHub Desktop
data
notes.txt
Test-Python-Notebook.ipynb
Test-R-Notebook.ipynb
>_git
Terminal
data
notes.txt
Test-Python-Notebook.ipynb
Test-R-Notebook.ipynb
GitHub Desktop
data
notes.txt
Test-Python-Notebook.ipynb
Test-R-Notebook.ipynb
R
RStudio
data
notes.txt
Test-Python-Notebook.ipynb
Test-R-Notebook.ipynb
...or other apps with GitHub integration

Basic Terminology

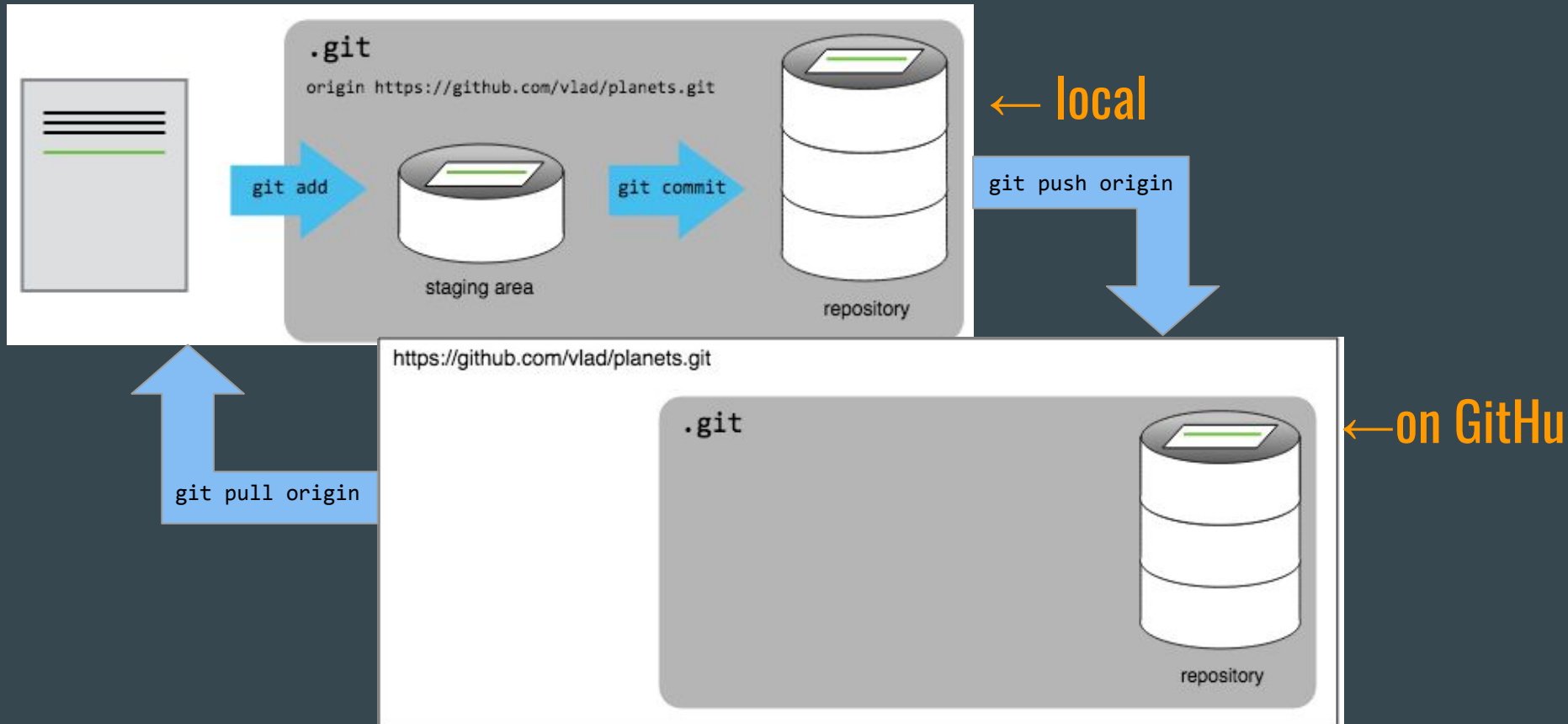
Add/remove - puts changes in a staging area

Commit - commits staged changes to the (local) repository

Push - pushes local repository changes to the remote repository

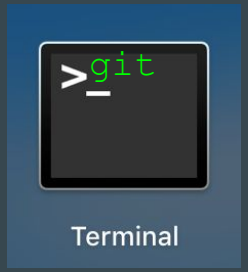
Pull - pulls remote repository changes to the local repository

add ~ commit ~ push ~ pull



Ways to use Git

*or other GUI



...and many IDEs

Ways To Use Git (cont.)

- Git command line
- GitHub Desktop App (or: git-scm.com/downloads/guis)
- GitHub Mobile App
- Integrations w/Editors, IDEs, and other apps
  - R Studio
  - Atom
  - ...many others

Git repository anatomy

- Open the folder containing your local git repository. It contains a `.git` directory which contains all the metadata about the repository (that is, the local copy)

Let's Try It!

Prerequisites / Setup

Your Github account, plus **EITHER**:

- Install **GitHub Desktop app** via desktop.github.com
- Under *Preferences...* sign in to your GitHub account

OR:

- Install **Git command line** via git-scm.com/downloads
- ```
  git config --global user.email "you@youremail.com"
  git config --global user.name "Your Name"
  ```
  ```

1. Create a repository, make some changes

2. Collaborate on a repository

Form groups of 2+

3. Make a release of your code

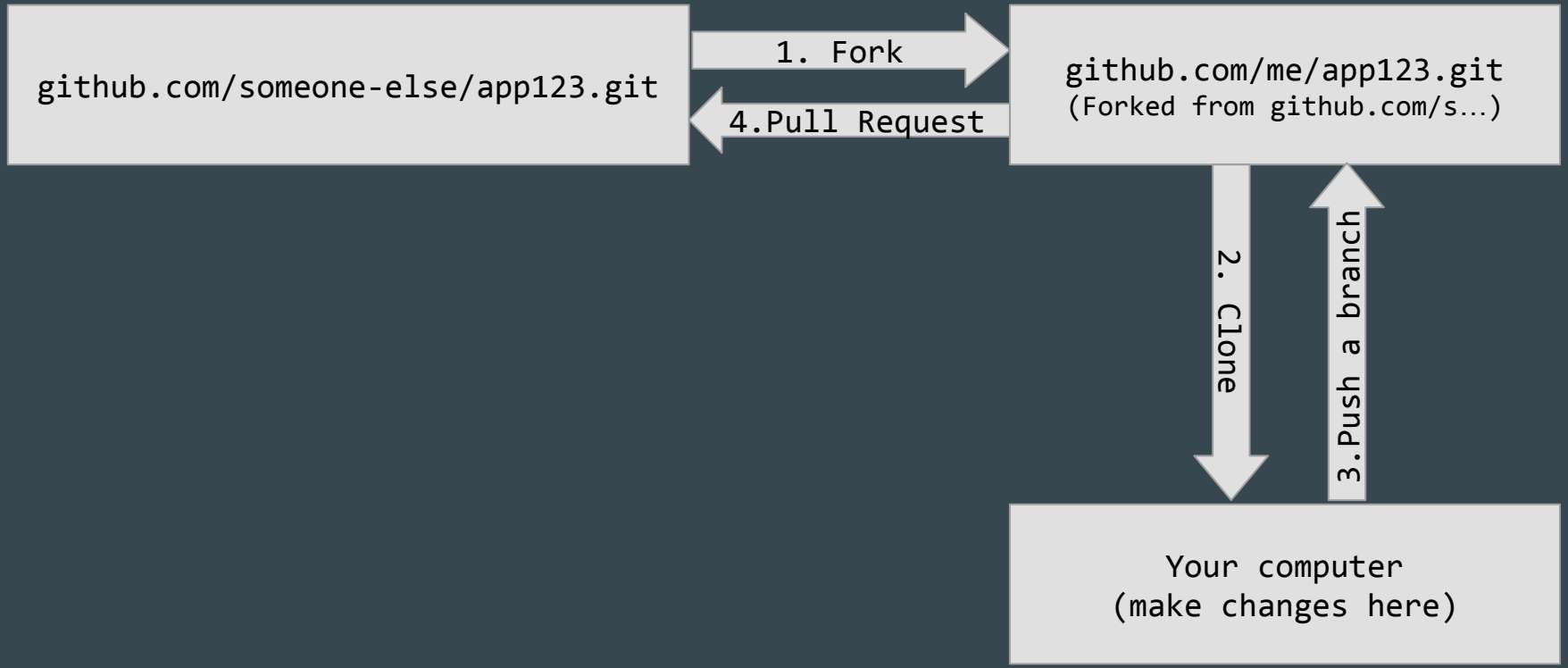
4. Fork a Repository

About forking...

Scenario: There is a Github repository on which you are *not* a collaborator, but you would like to:

- contribute a feature or fix to it, or
- use it, but with your own modifications

Forking a repository



Advanced Git Topics

- `.gitignore`
- Merges that require manual merging
- Resetting
- Re-basing
- Squashing
- Reverting

Git - Command Line - some common commands

```
git config --global user.email
git config --global user.password
git init <name>  # creates new repository in this folder
git clone <URL for repo>
git status       # -s gives a short version
git branch <branch-name>    # creates a branch
git checkout <branch-name>  # switches to a branch
git diff    /  git diff --staged
git add <file(s)>  /  git rm <file(s)>  /  git mv <file>
git commit -m 'Comment goes here'
git push origin <branch> # When working with forks, you might
git pull origin <branch> # use remotes other than "origin"
```

Git - Command Line - continued

```
git log
git merge <branch to merge from>
git rebase <branch to rebase off of>
git reset --hard  # Warning! You'll lose your changes!
git stash
git fetch   # like git pull, but without merging
```

Other Uses for Github Repositories (besides code)

- Sharing data
- "Document" collaboration (e.g. legislation)
- Course sites (e.g. DSCN 6279; ISTM 6212)
- Github Sites (e.g. gwu-libraries.github.io/sfm-ui/)
- Publishing and Citing your code (you can use Zenodo.org to mint a DOI for a Github repository) - See these slides!
- and more

Key takeaways

- Make your code presentable in GitHub:

  * README.md
  * LICENSE
  * Commit messages
  * Releases - release notes should describe new features/ changes, upgrade instructions, known issues
  * Use issues - helps explain WHY you changed code. Open issues communicate desired fixes/enhancements.

More takeaways

- The GitHub Desktop app seems useful, but mainly for "basic" things. Ultimately, it's probably good to learn and use git shell commands. (Especially good on your resume!)

- For team projects, one person can create the repository on their git account and add others as collaborators.
  Or, you can create an "organization" account - go to your profile's Settings -> Organizations -> New Organization

Even more takeaways

- When working together - or even alone - use branches. Merge a branch using a pull request.
- *Insights* → *Network* is a ~~good~~ great way to visualize what's going on with the branches.
- When you're working on a branch for an extended period, consider periodically merging (or rebasing) from the master branch, so your branch doesn't diverge too far from the code on master. This will minimize merge conflicts

To learn more about Git/GitHub...

- *Pro Git* book, free online: **git-scm.com**
- Lynda.com: *Up and Running with Git and GitHub*
- github.com:
  - help.github.com
  - guides.github.com
  - try.github.io (codeschool)
  - services.github.com/on-demand/
  - resources.github.com/webcasts/
- If you want to make your code **citable**: guides.github.com/activities/citable-code/

Thanks!

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Coding Consultations (GitHub, etc.) - **go.gwu.edu/coding**