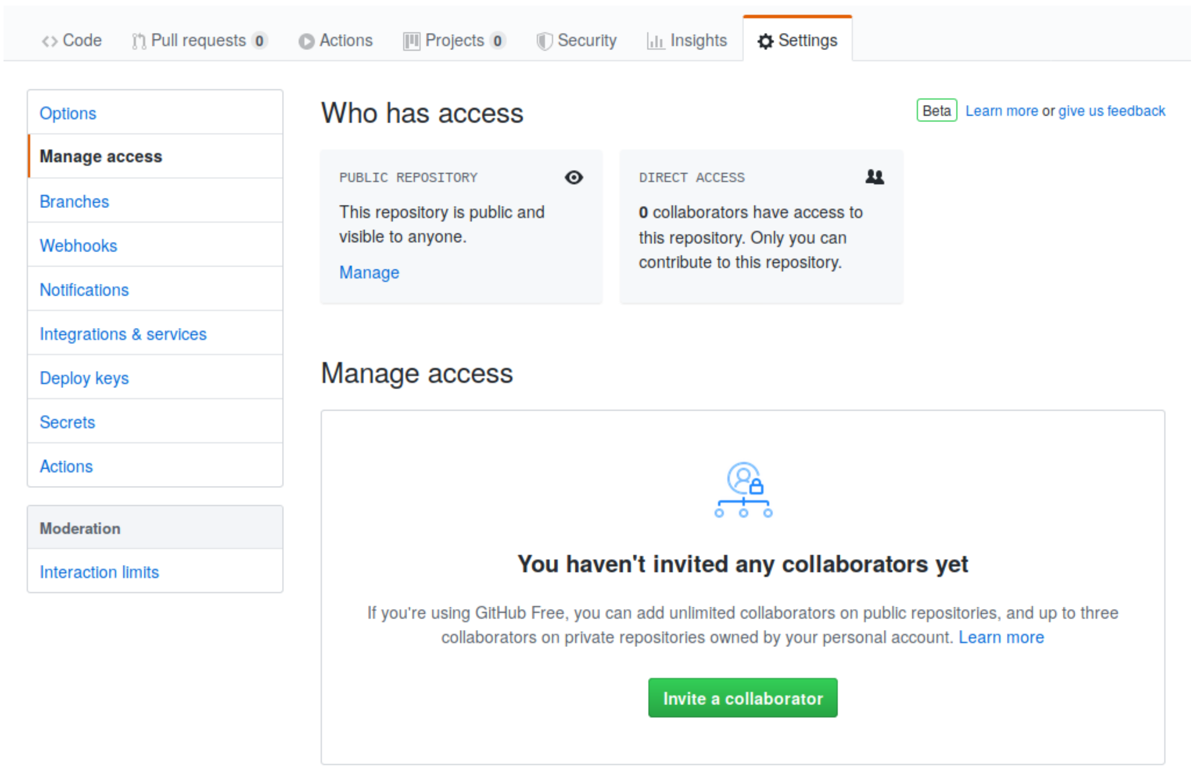
Collaborating

For the next step, get into pairs. One person will be the “Owner” and the other will be the “Collaborator”. The goal is that the Collaborator add changes into the Owner’s repository. We will switch roles at the end, so both persons will play Owner and Collaborator.

> ## Practicing By Yourself
>
> If you’re working through this lesson on your own, you can carry on by opening a second terminal window. This window will represent your partner, working on another computer. You won’t need to give anyone access on GitHub, because both ‘partners’ are you.

The Owner needs to give the Collaborator access. On GitHub, click the settings button on the right, select Manage access, click Invite a collaborator, and then enter your partner’s username.



Who has access

PUBLIC REPOSITORY

This repository is public and visible to anyone.

DIRECT ACCESS

0 collaborators have access to this repository. Only you can contribute to this repository.

Manage access

You haven't invited any collaborators yet

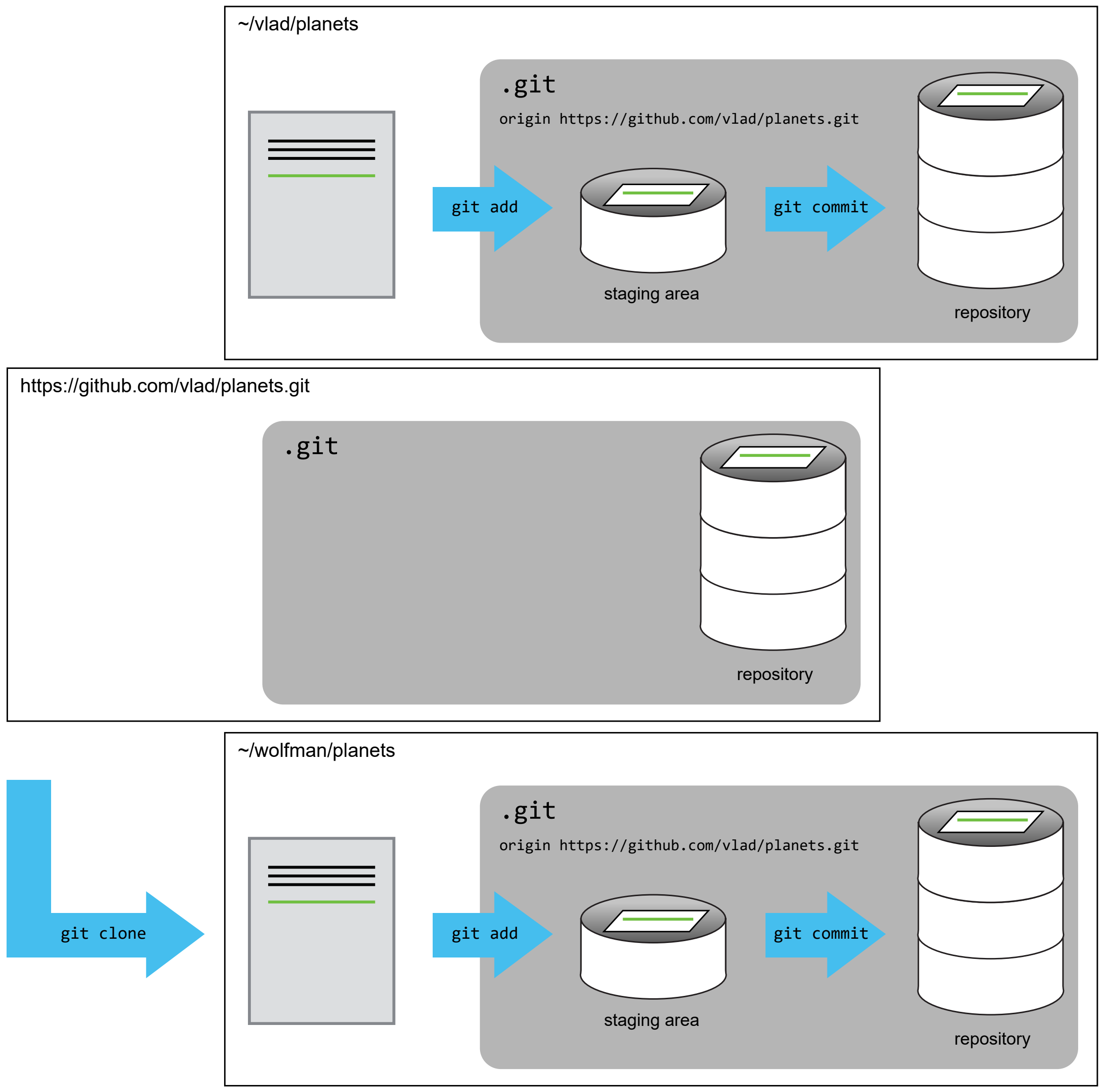
If you're using GitHub Free, you can add unlimited collaborators on public repositories, and up to three collaborators on private repositories owned by your personal account. Learn more

To accept access to the Owner’s repo, the Collaborator needs to go to https://github.com/notifications. Once there she can accept access to the Owner’s repo.

Next, the Collaborator needs to download a copy of the Owner’s repository to her machine. This is called “cloning a repo”. To clone the Owner’s repo into her `Desktop` folder, the Collaborator enters:

```
$ git clone https://github.com/vlad/planets.git ~/Desktop/vlad-planets
```

Replace ‘vlad’ with the Owner’s username.



The Collaborator can now make a change in her clone of the Owner's repository, exactly the same way as we've been doing before:

```
$ cd ~/Desktop/vlad-planets
$ nano pluto.txt
$ cat pluto.txt
```

Output:

```
It is so a planet!
```

Add latest changes to staging area and commit to the repository:

```
$ git add pluto.txt
$ git commit -m "Add notes about Pluto"
```

Output:

```
 1 file changed, 1 insertion(+)
 create mode 100644 pluto.txt
```

Then push the change to the *Owner's repository* on GitHub:

```
$ git push origin master
```

Output:

```
Enumerating objects: 4, done.
Counting objects: 4, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 306 bytes, done.
Total 3 (delta 0), reused 0 (delta 0)
To https://github.com/vlad/planets.git
   9272da5..29aba7c  master -> master
```

Note that we didn't have to create a remote called `origin`: Git uses this name by default when we clone a repository. (This is why `origin` was a sensible choice earlier when we were setting up remotes by hand.)

Some more about remotes

In this episode and the previous one, our local repository has had a single "remote", called `origin`. A remote is a copy of the repository that is hosted somewhere else, that we can push to and pull from, and there's no reason that you have to work with only one. For example, on some large projects you might have your own copy in your own GitHub account (you'd probably call this `origin`) and also the main "upstream" project repository (let's call this `upstream` for the sake of examples). You would pull from `upstream` from time to time to get the latest updates that other people have committed.

Remember that the name you give to a remote only exists locally. It's an alias that you choose - whether `origin`, or `upstream`, or `fred` - and not something intrinstic to the remote repository.

The `git remote` family of commands is used to set up and alter the remotes associated with a repository. Here are some of the most useful ones:

- `git remote -v` lists all the remotes that are configured (we already used this in the last episode)
- `git remote add [name] [url]` is used to add a new remote
- `git remote remove [name]` removes a remote. Note that it doesn't affect the remote repository at all - it just removes the link to it from the local repo.
- `git remote set-url [name] [newurl]` changes the URL that is associated with the remote. This is useful if it has moved, e.g. to a different GitHub account, or from GitHub to a different hosting service. Or, if we made a typo when adding it!
- `git remote rename [oldname] [newname]` changes the local alias by which a remote is known - its name. For example, one could use this to change `upstream` to `fred`.

Take a look to the Owner's repository on its GitHub website now (maybe you need to refresh your browser.) You should be able to see the new commit made by the Collaborator.

To download the Collaborator's changes from GitHub, the Owner now enters:

```
$ git pull origin master
```

Output:

```
remote: Enumerating objects: 4, done.
remote: Counting objects: 100% (4/4), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 3 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), done.
From https://github.com/vlad/planets
 * branch            master     -> FETCH_HEAD
   9272da5..29aba7c  master     -> origin/master
Updating 9272da5..29aba7c
Fast-forward
 pluto.txt | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 pluto.txt
```

Now the three repositories (Owner's local, Collaborator's local, and Owner's on GitHub) are back in sync.

A Basic Collaborative Workflow

In practice, it is good to be sure that you have an updated version of the repository you are collaborating on, so you should `git pull` before making our changes. The basic collaborative workflow would be:

- update your local repo with `git pull origin master`,
- make your changes and stage them with `git add`,
- commit your changes with `git commit -m`, and
- upload the changes to GitHub with `git push origin master`

It is better to make many commits with smaller changes rather than of one commit with massive changes: small commits are easier to read and review.

Switch Roles and Repeat

Switch roles and repeat the whole process.

Review Changes

The Owner pushed commits to the repository without giving any information to the Collaborator. How can the Collaborator find out what has changed with command line? And on GitHub?

Solution

On the command line, the Collaborator can use `git fetch origin master` to get the remote changes into the local repository, but without merging them. Then by running `git diff master origin/master` the Collaborator will see the changes output in the terminal.

> > On GitHub, the Collaborator can go to the repository and click on “commits” to view the most recent commits pushed to the repository.

> ## Comment Changes in GitHub
>
> The Collaborator has some questions about one line change made by the Owner and has some suggestions to propose.
>
> With GitHub, it is possible to comment the diff of a commit. Over the line of code to comment, a blue comment icon appears to open a comment window.
>
> The Collaborator posts its comments and suggestions using GitHub interface.

> ## Version History, Backup, and Version Control
>
> Some backup software can keep a history of the versions of your files. They also allows you to recover specific versions. How is this functionality different from version control? What are some of the benefits of using version control, Git and GitHub?

> ## Key Points
>
> - `git clone` copies a remote repository to create a local repository with a remote called `origin` automatically set up.