VERSION CONTROL

WITH GIT

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WHAT WE WANT WHEN WRITING CODE

Backups

Ability to revert to a previous version of code

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Ability to revert to a previous version of code

my_script_v1.py

my_script_v2.py

my_script_v3.py

...

not sustainable!

WHAT WE WANT WHEN WRITING CODE

Backups

Ability to revert to a previous version of code

Access your code from anywhere

Share your code

Synchronize changes to code across computers

Mark / release code that works / is stable

VERSION CONTROL TOOLS

Version control systems (software):

Git (git) - widely used, common in astronomy

Mercurial (hg) - still used occasionally

Subversion (svn) - older, probably won't encounter?

VERSION CONTROL TOOLS

Web interfaces / remote storage:

Git - GitHub - https://github.com

Mercurial - BitBucket - https://bitbucket.com

Subversion - Trac - no global repository

GIT CONCEPTS

Create a ***repository*** to store files, directories

Git will *help* keep track of changes to these files, but you have to:

a) tell Git what files to track by **add**ing them to the repo

b) **commit** your changes as you make them

Can then ***revert*** changes if necessary, view history of code

GIT CONCEPTS

The full repository can be ***pushed*** to remote sources (e.g., GitHub, external Git server)

> This acts like syncing – your changes (and only your changes) are sent to an external source

If changes are made elsewhere, changes can be ***pulled*** down from the remote source

GIT CONCEPTS

Let's say we start with a folder “project” that contains a few files, and we would like to create and add them to a Git repository

```
project/
    my_project/
        file1.py
        tests/
            test1.py
    README.md
```

GIT CONCEPTS

Local repo

We first change to the **project** directory and initialize an empty repository

```
> cd project
> git init
```

the empty repository

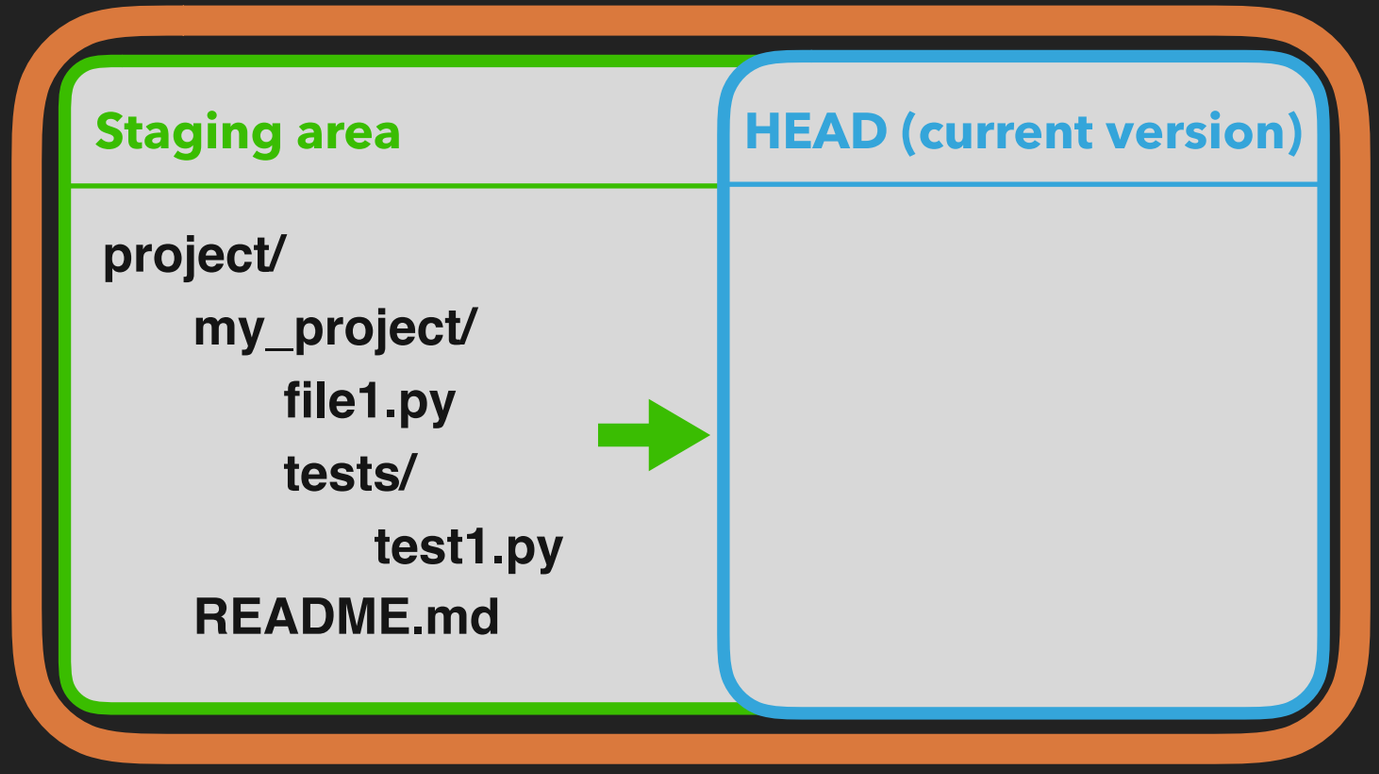

```
project/
    my_project/
        file1.py
        tests/
            test1.py
    README.md
```

GIT CONCEPTS

Local repo

We then have to explicitly add and commit these files to the repository

```
> git add *
```

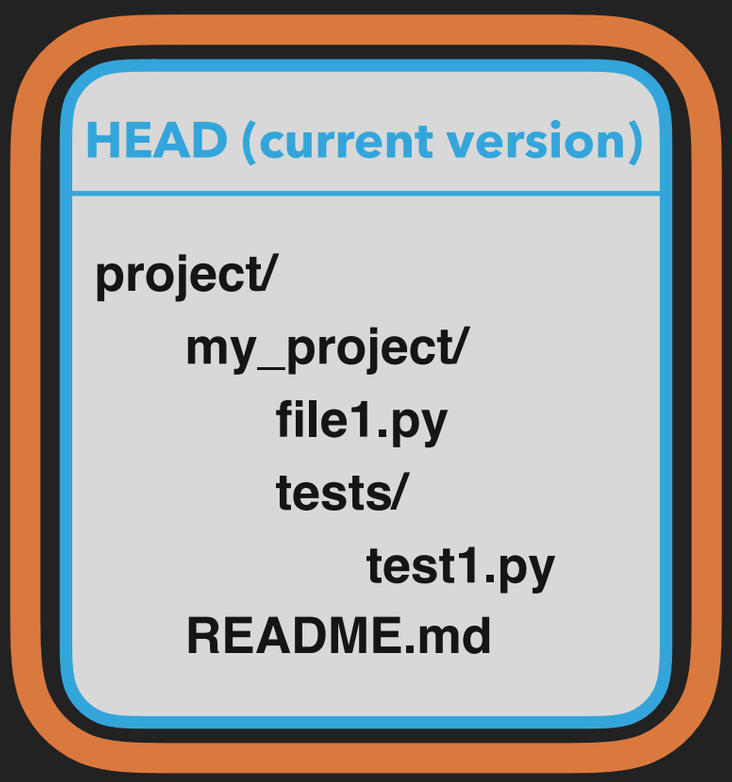


GIT CONCEPTS

Local repo

We then have to explicitly add and commit these files to the repository

```
> git add *
> git commit -m “initial commit message”
```

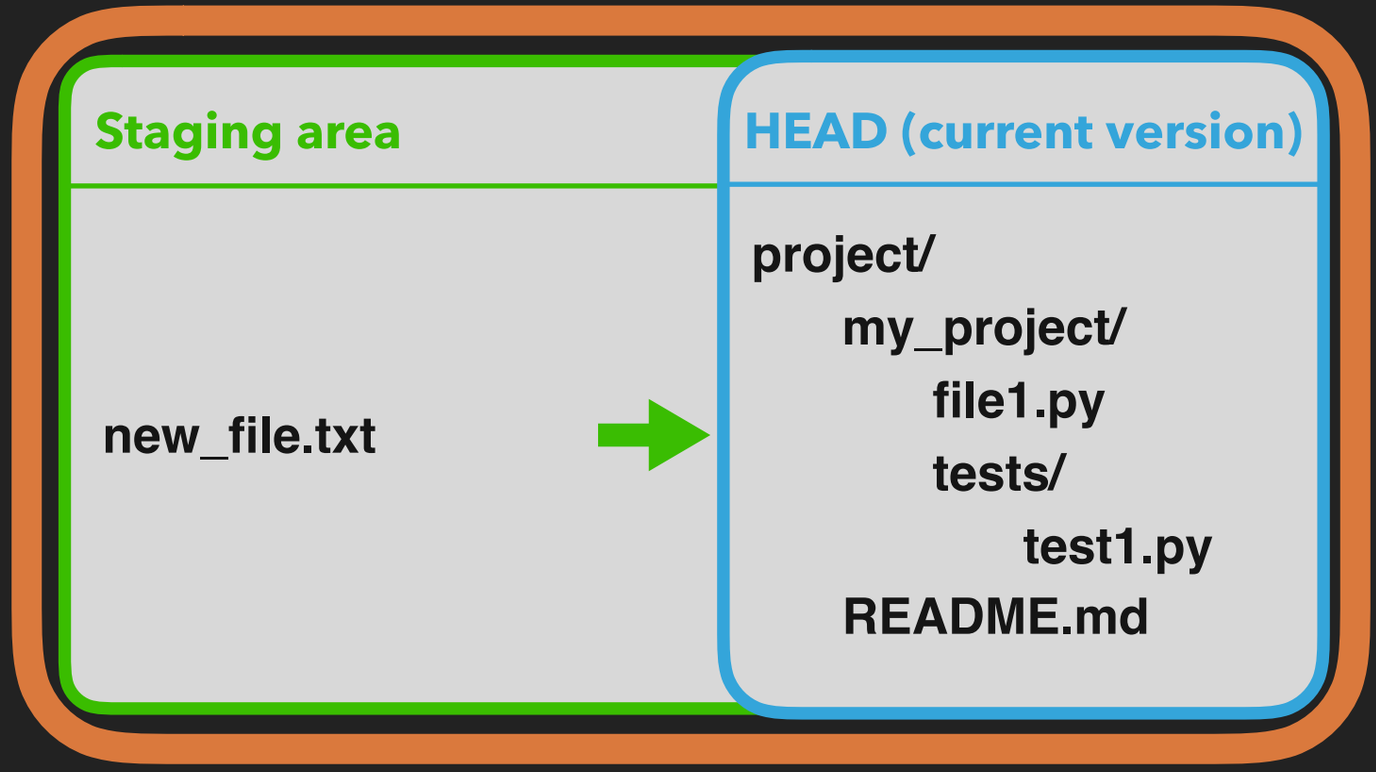


GIT CONCEPTS

Local repo

Now let's create a new file and stage it

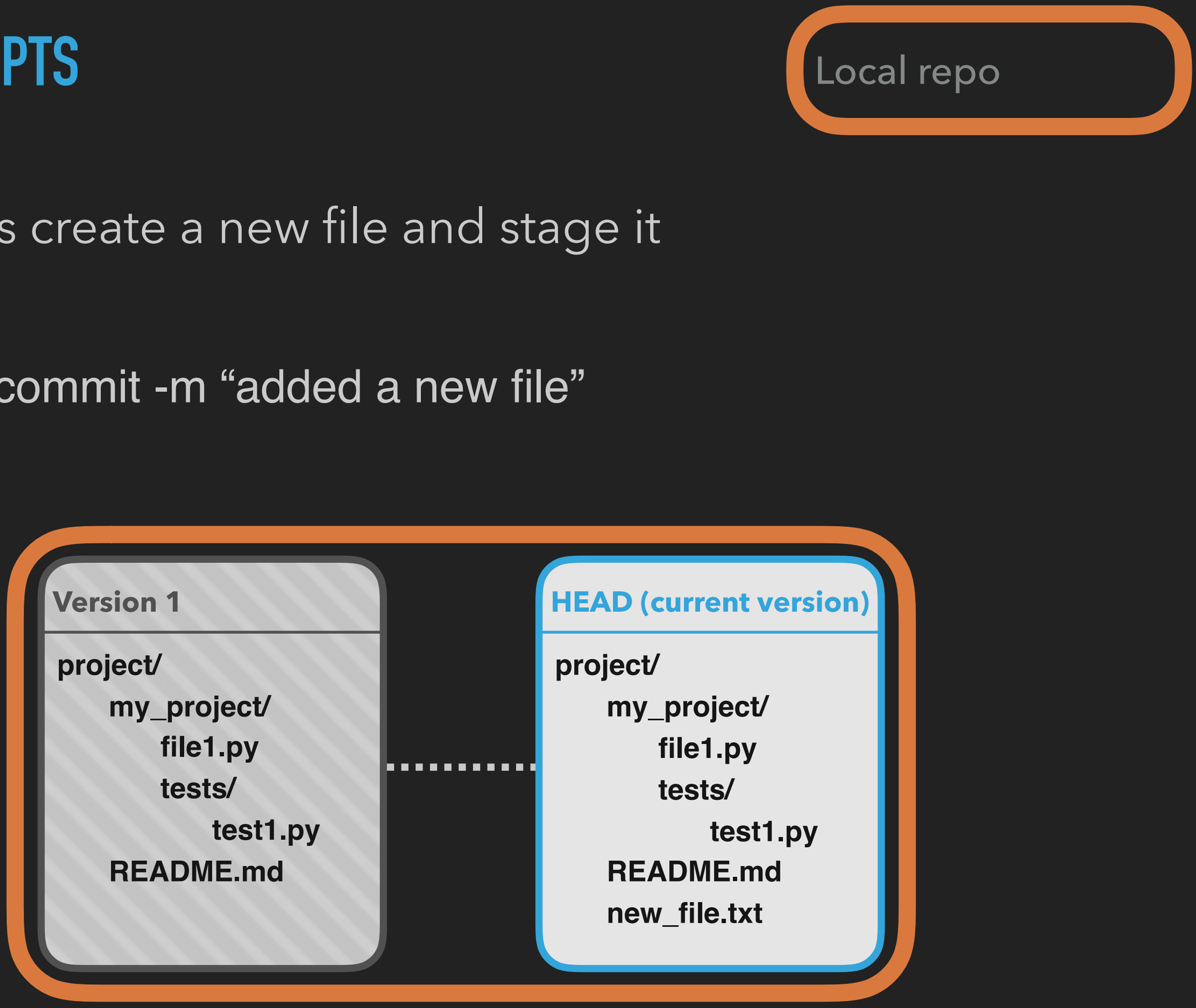
```
> touch new_file.txt
> git add new_file.txt
```



GIT CONCEPTS

Now let's create a new file and stage it

> git commit -m "added a new file"

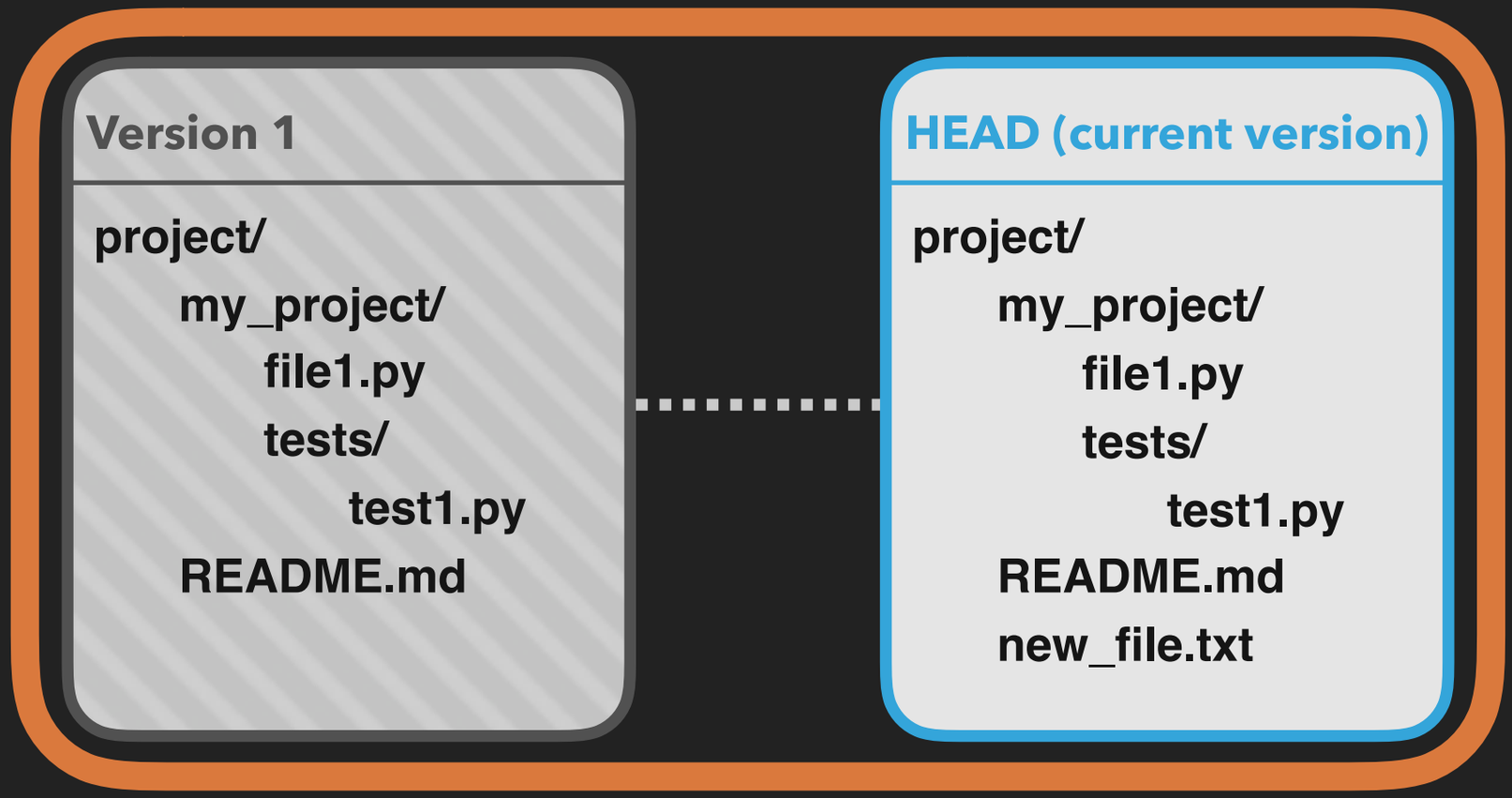


GIT CONCEPTS

Local repo

If we edit the file “new_file.txt”, git would notice:

```
> git status
        modified:   new_file.txt
```

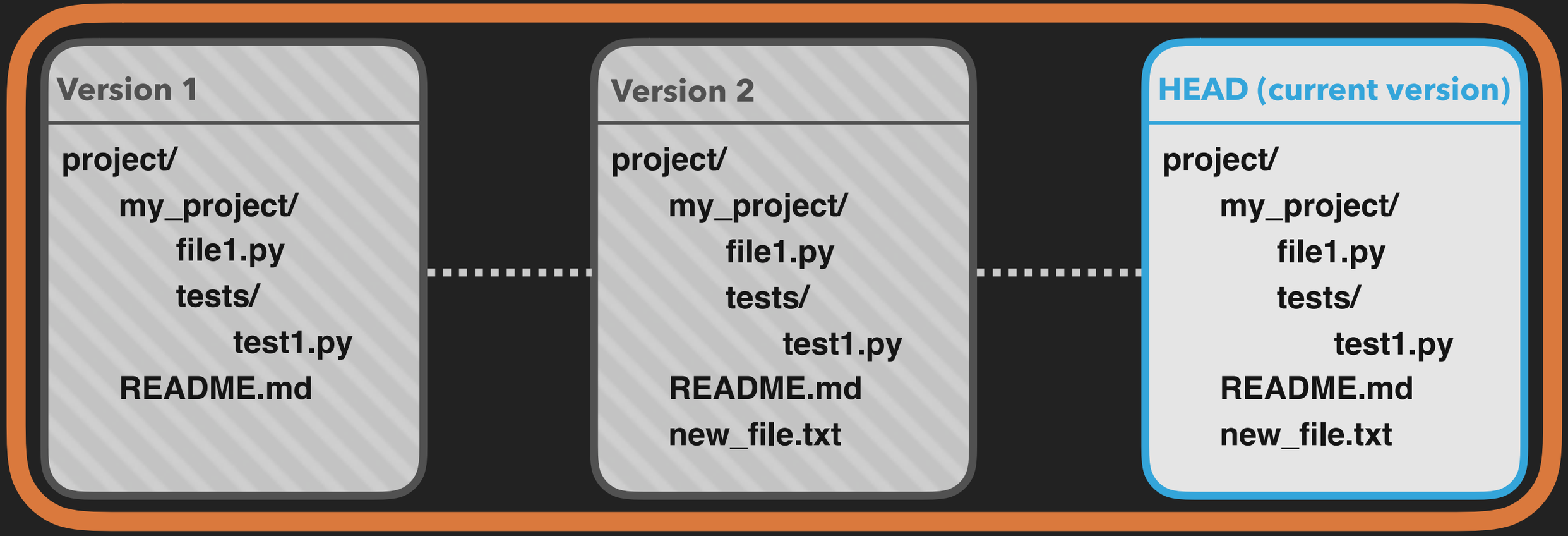


GIT CONCEPTS

Local repo

We can then add the changes, and commit them:

```
> git add new_file.txt
> git commit -m “made some changes”
```



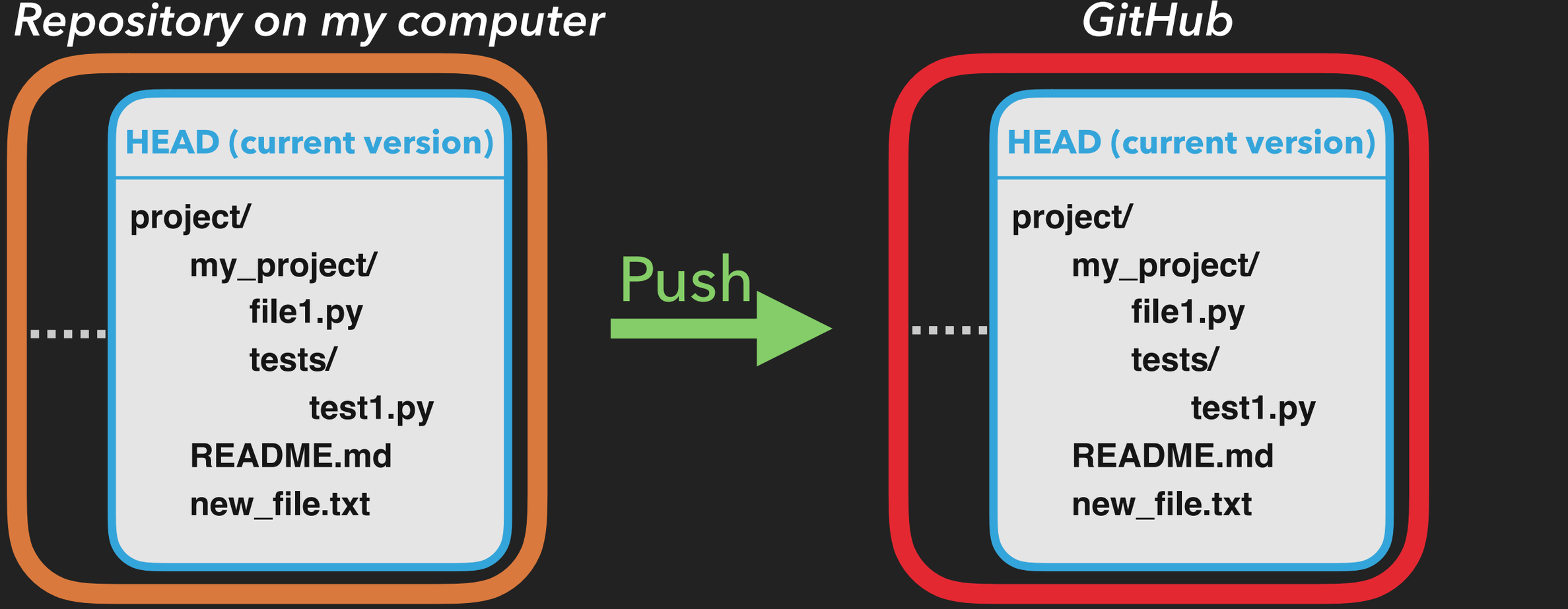
GIT CONCEPTS

Remote repo

Local repo

All of these changes and the repository location are sitting on my computed. What if I want to push this repository to a remote?

> git push



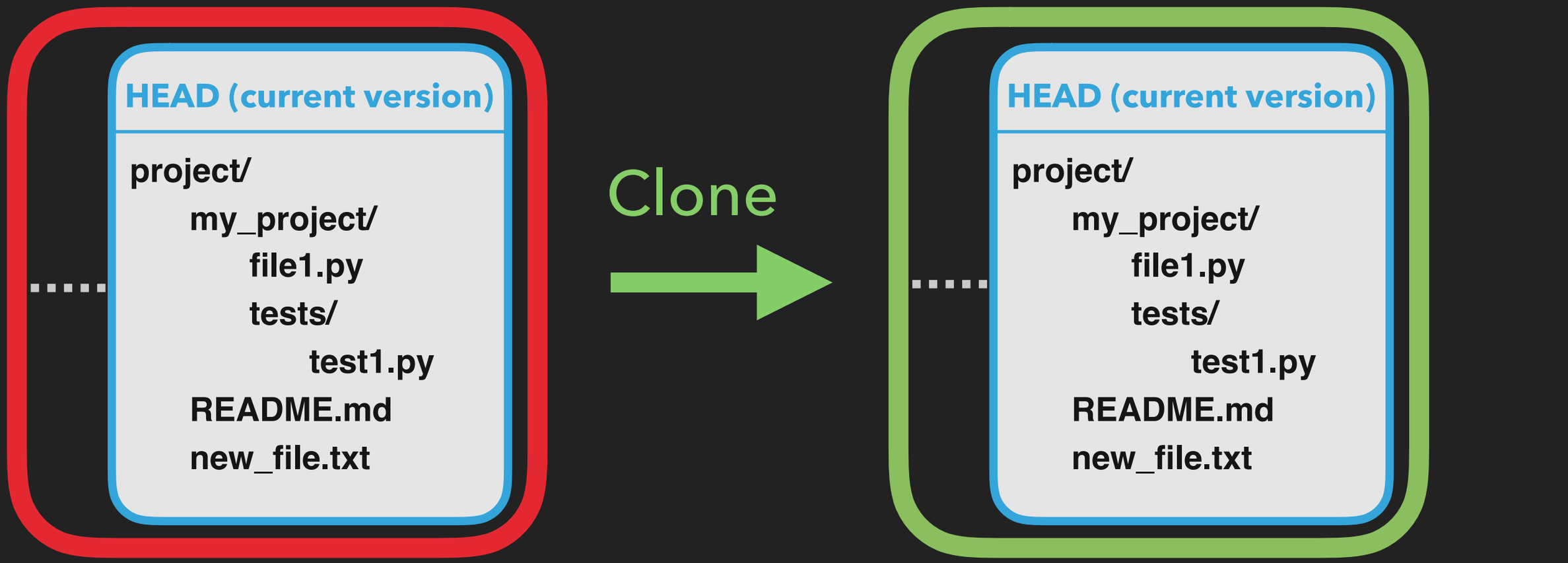
GIT CONCEPTS

Remote repo

Local repo 2

Now let's say I go to another computer, and I want to ***clone*** the repository over to the new machine

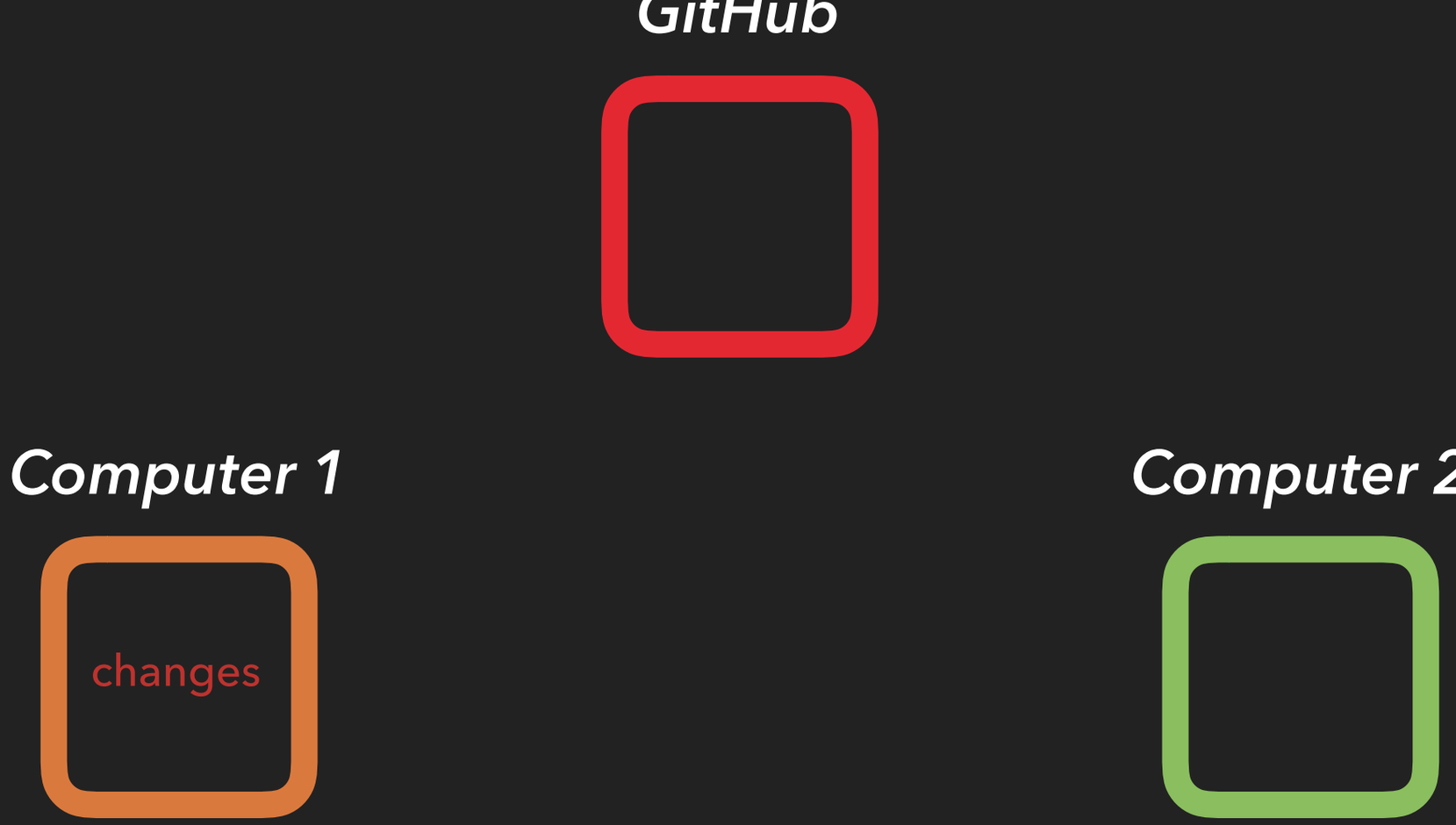
```
> git clone https://github.com/adrn/project
```



GIT CONCEPTS

What if I make a change on computer 1, and want to have those changes over on computer 2?

on Computer 1:
> git add …
> git commit -m ‘did the thing’



GIT CONCEPTS

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on Computer 1:
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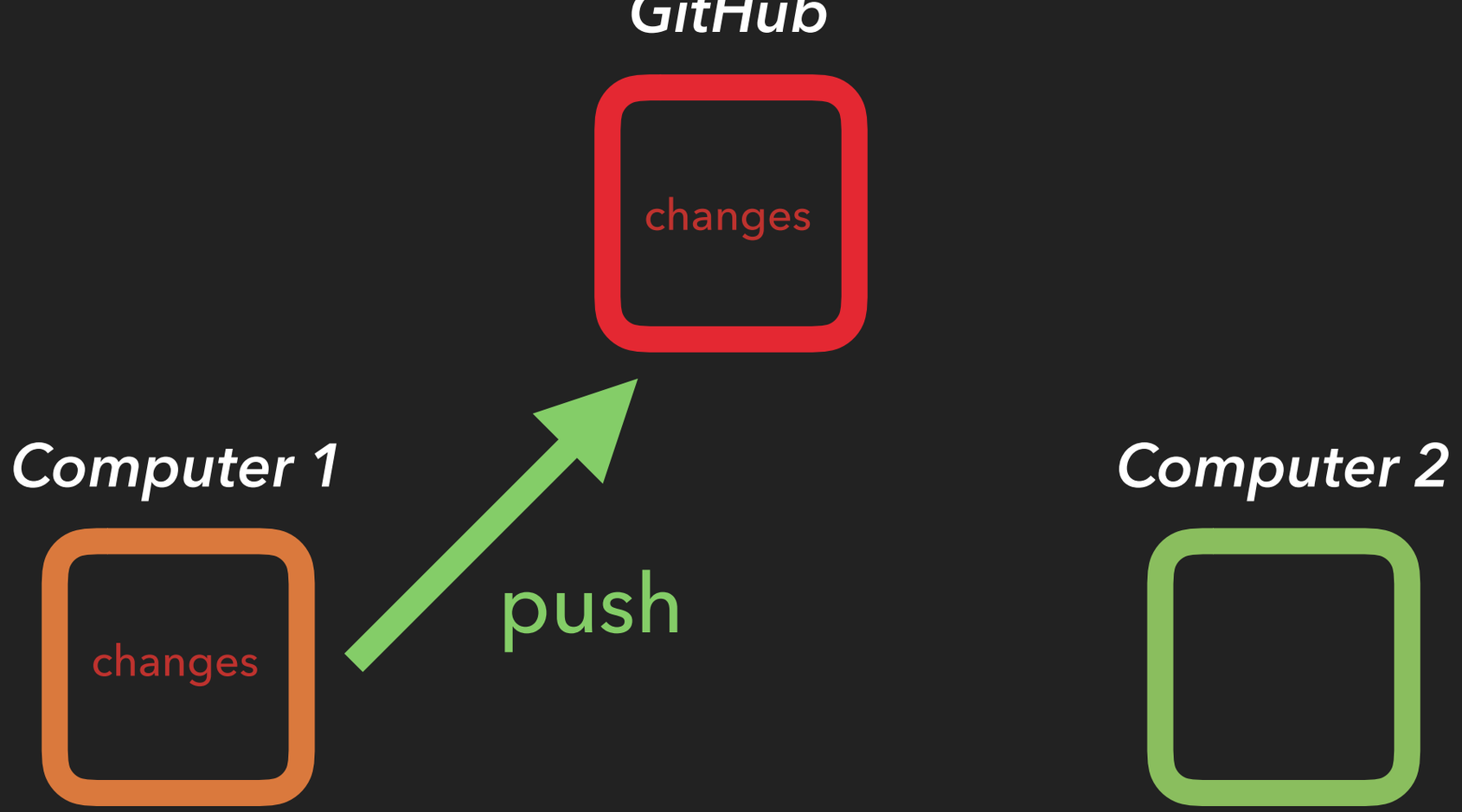
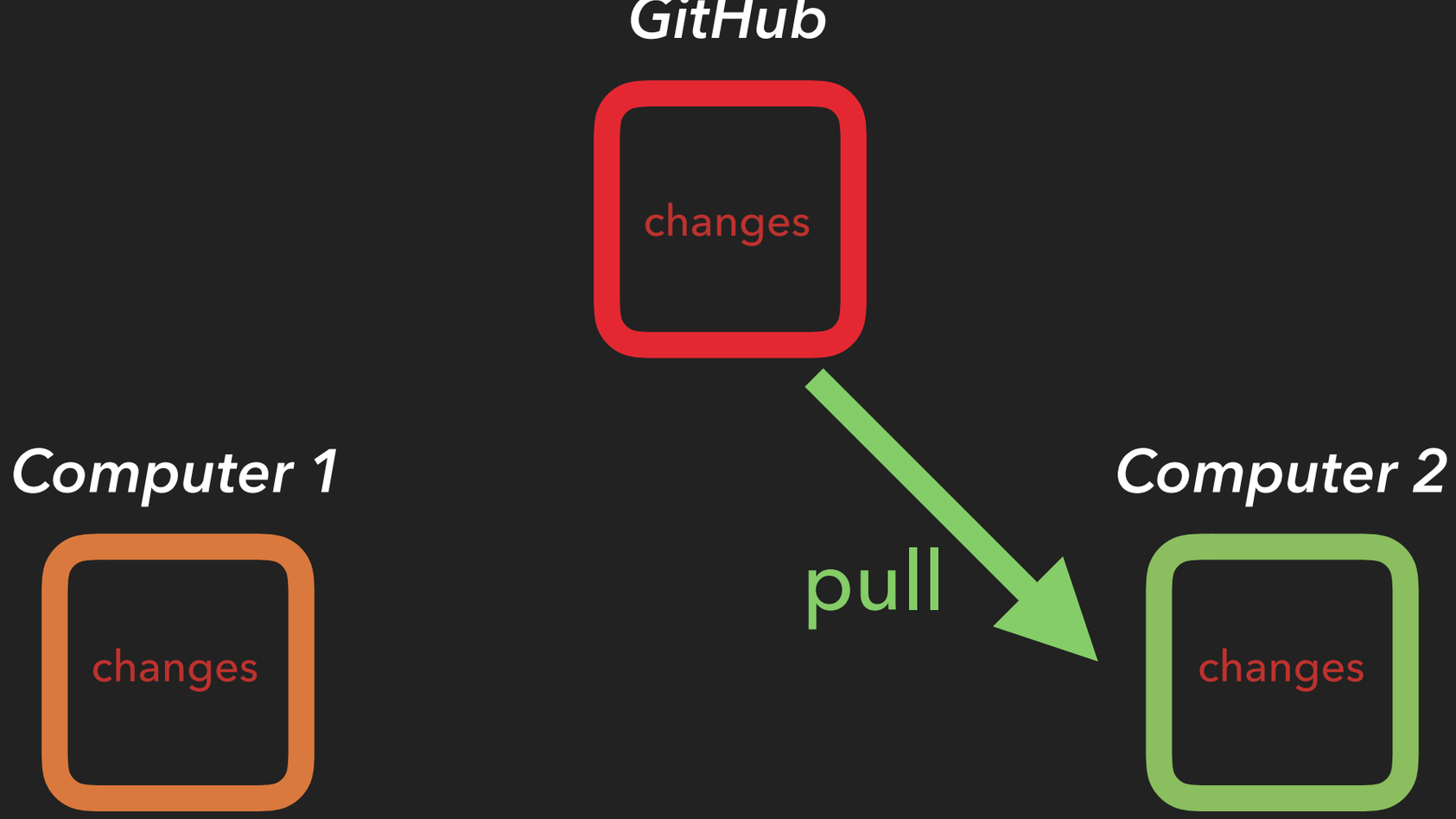


GIT CONCEPTS

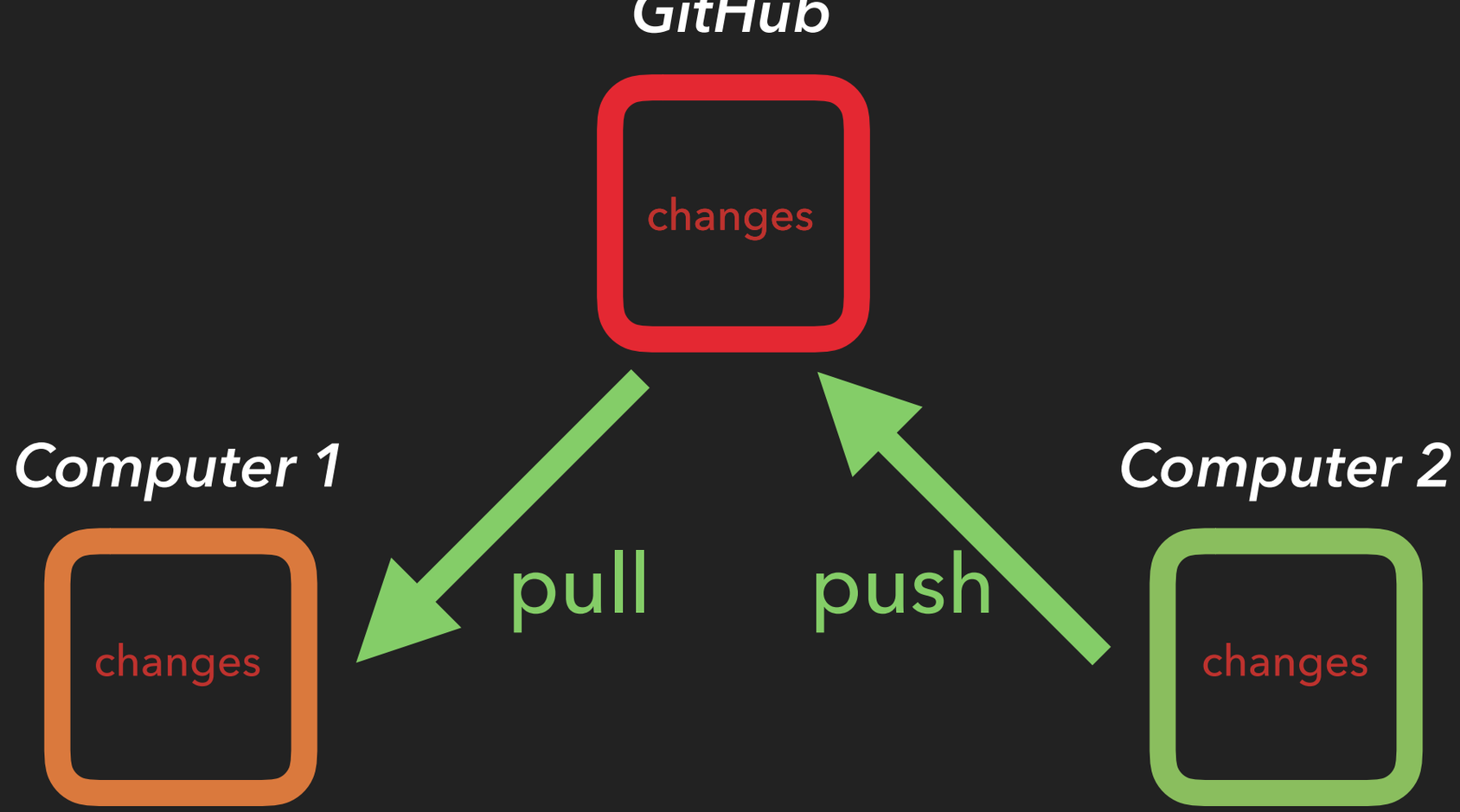
What if I make a change on computer 1, and want to have those changes over on computer 2?

on Computer 2:
> git pull



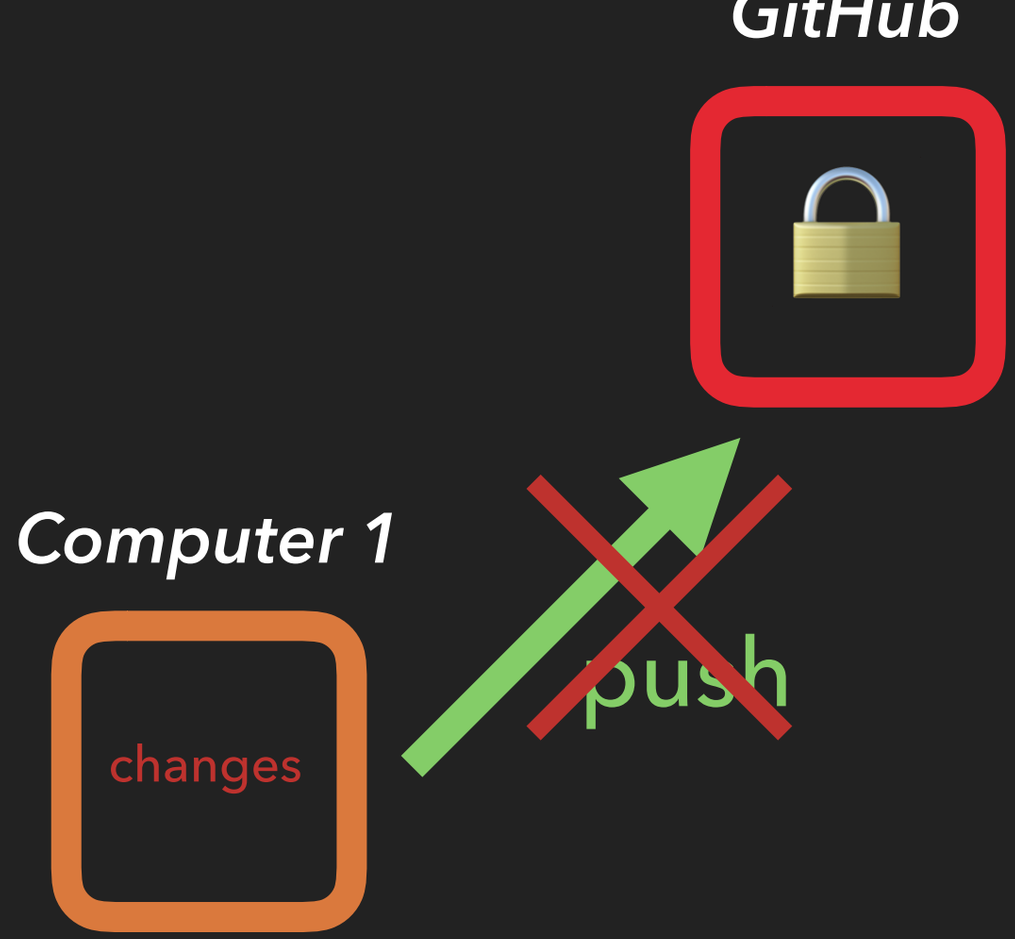
GIT CONCEPTS

It works the same in the other direction from Computer 2 to Computer 1



GIT CONCEPTS

This all assumes that you have ***commit access*** to the repository on GitHub - what if you don't?



GIT CONCEPTS

Instead, you have to submit a ***pull request*** to the repository on GitHub

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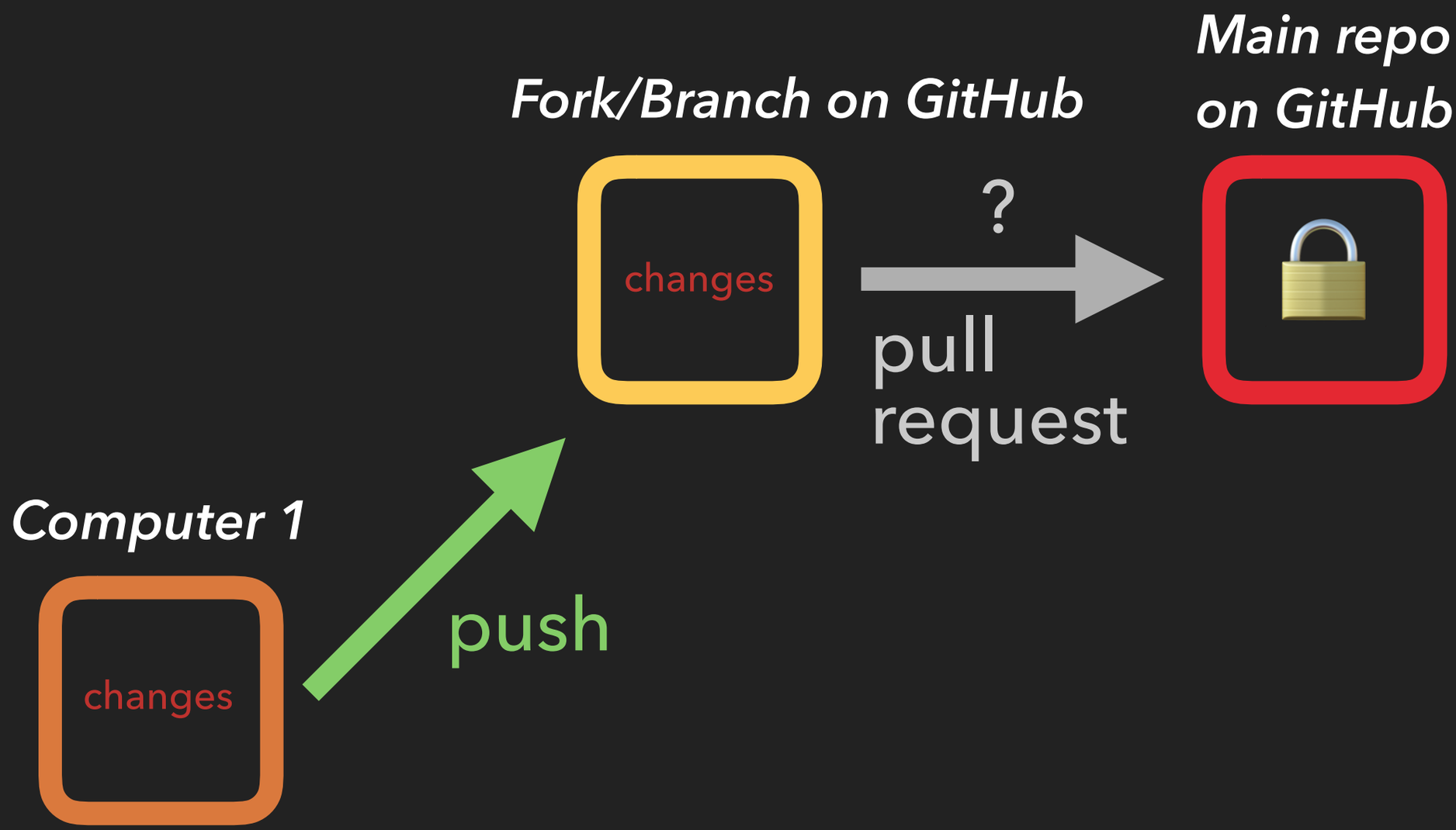
changes

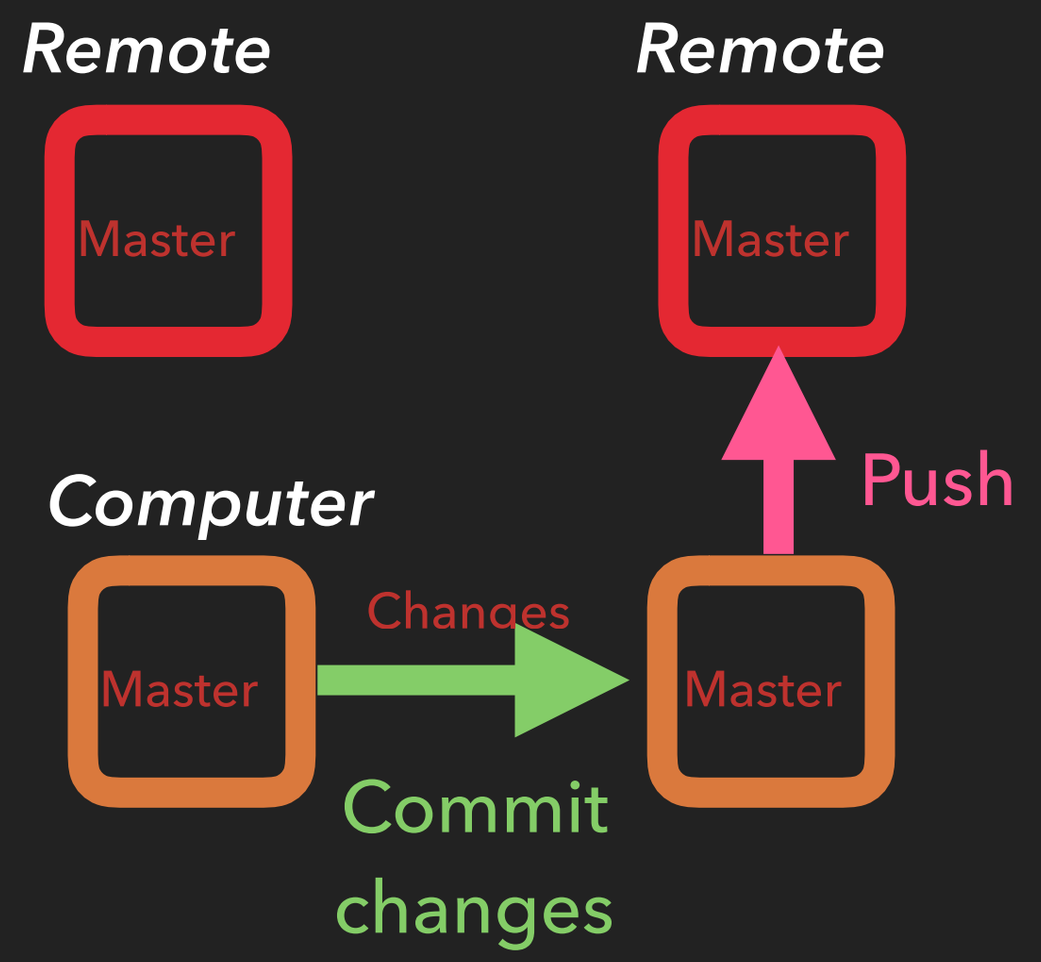
GIT CONCEPTS

Instead, you have to submit a ***pull request*** to the repository on GitHub



GIT CONCEPTS: BRANCHES

Sometimes we try some changes, not knowing whether they will be successful or accepted by a repo's owner. The best way to track and propose such changes is to use **branches.**



What we know so far

GIT CONCEPTS: BRANCHES

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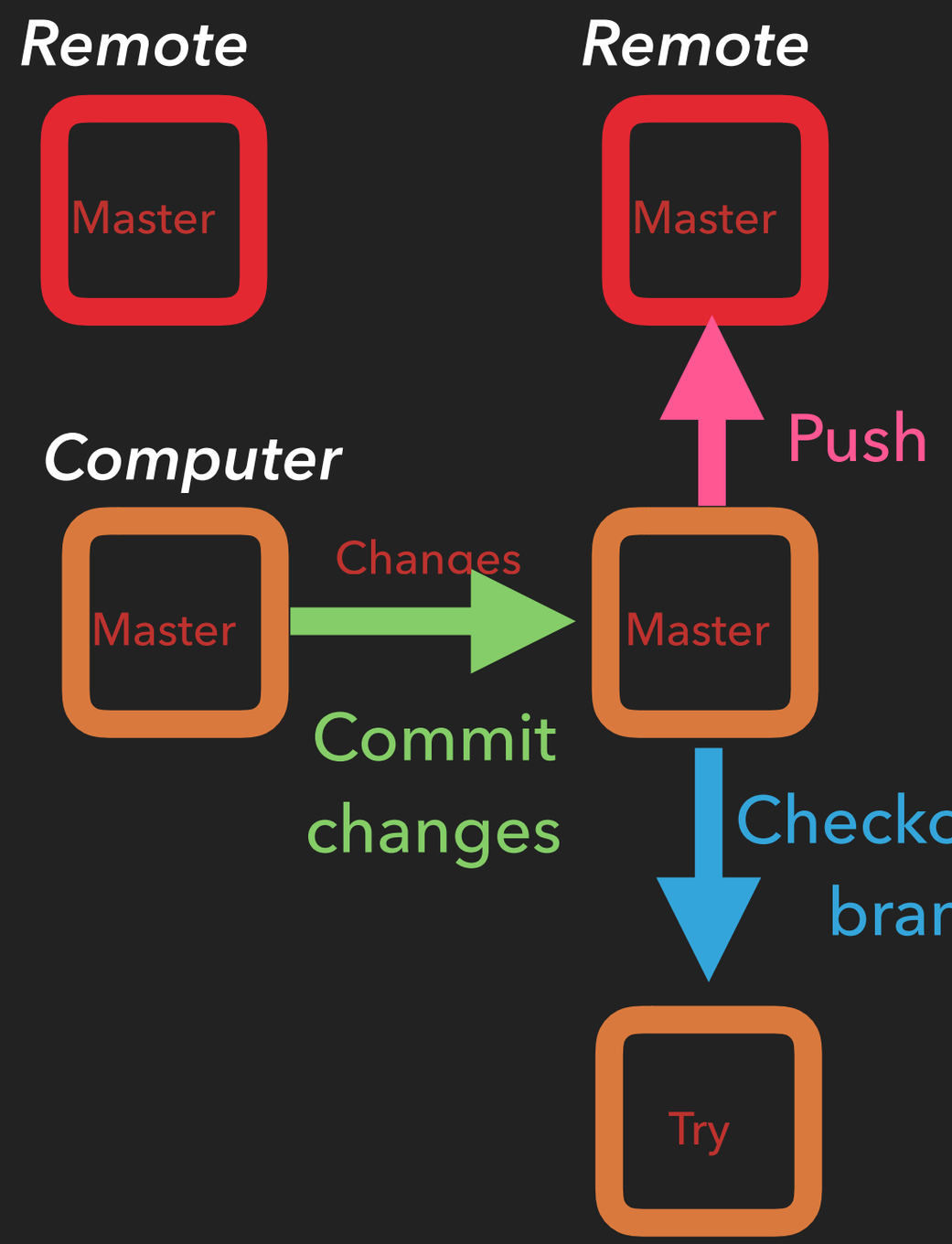

git checkout -b Try

Creates a new branch "Try". Check what branch you are in with:

git branch

GIT CONCEPTS: BRANCHES

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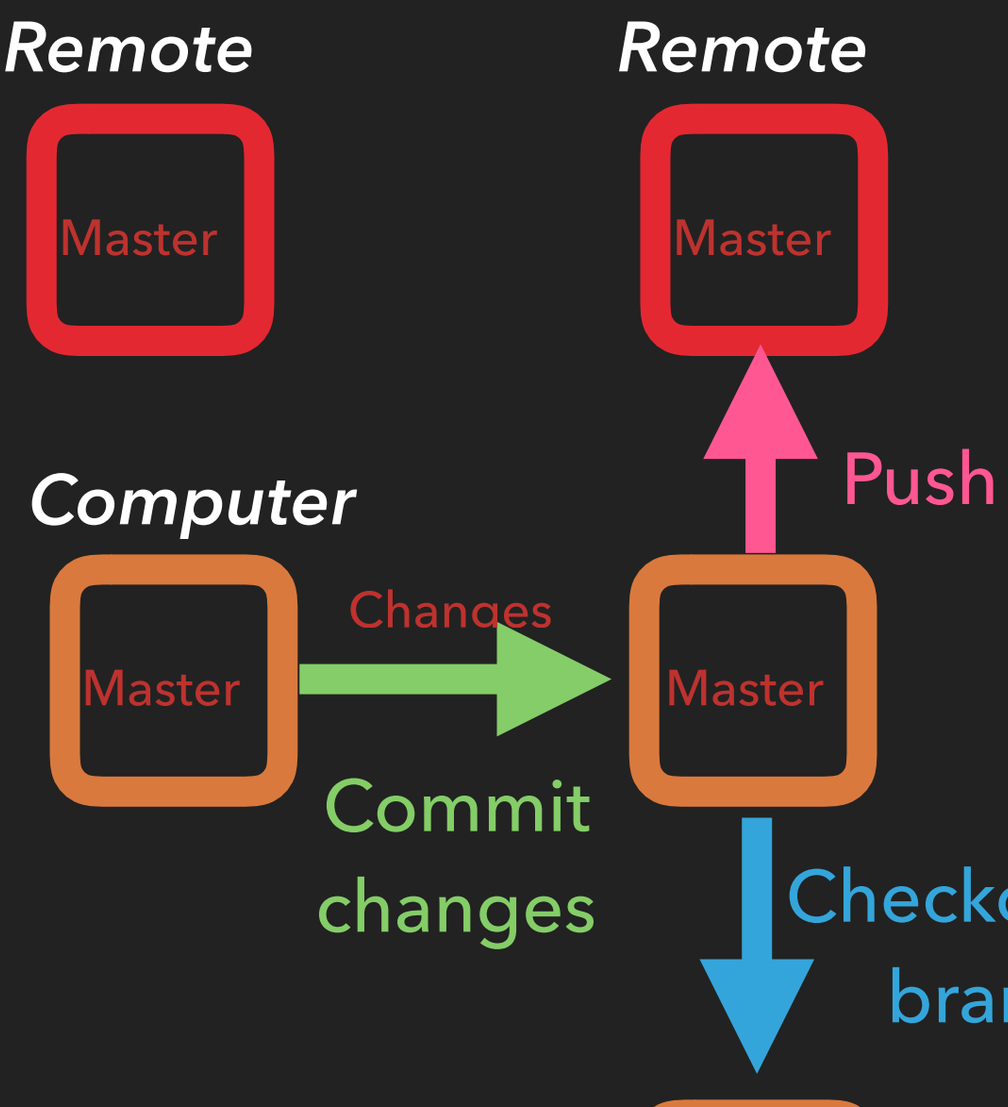
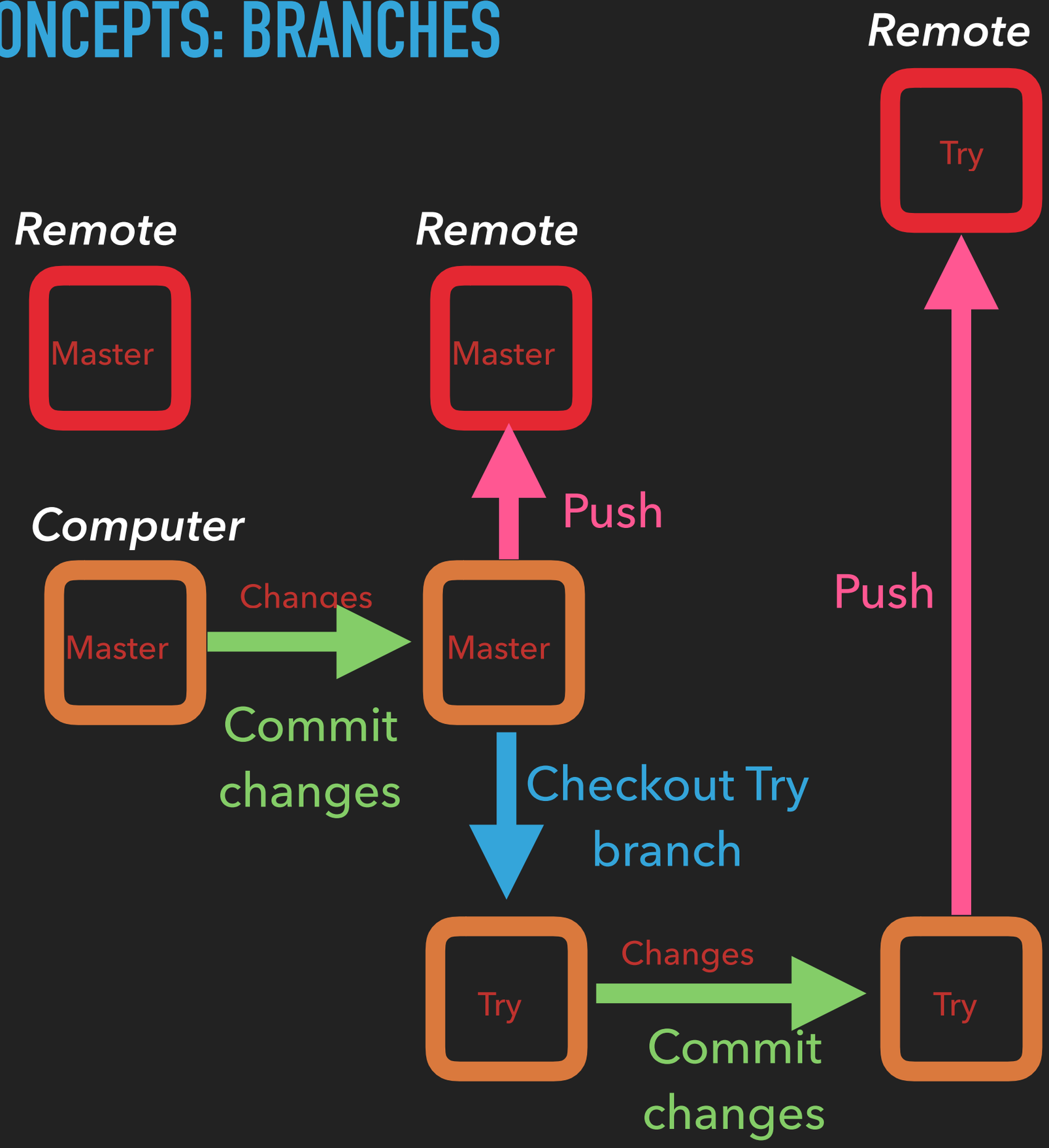


Changes committed to "Try" don't affect "master".

GIT CONCEPTS: BRANCHES

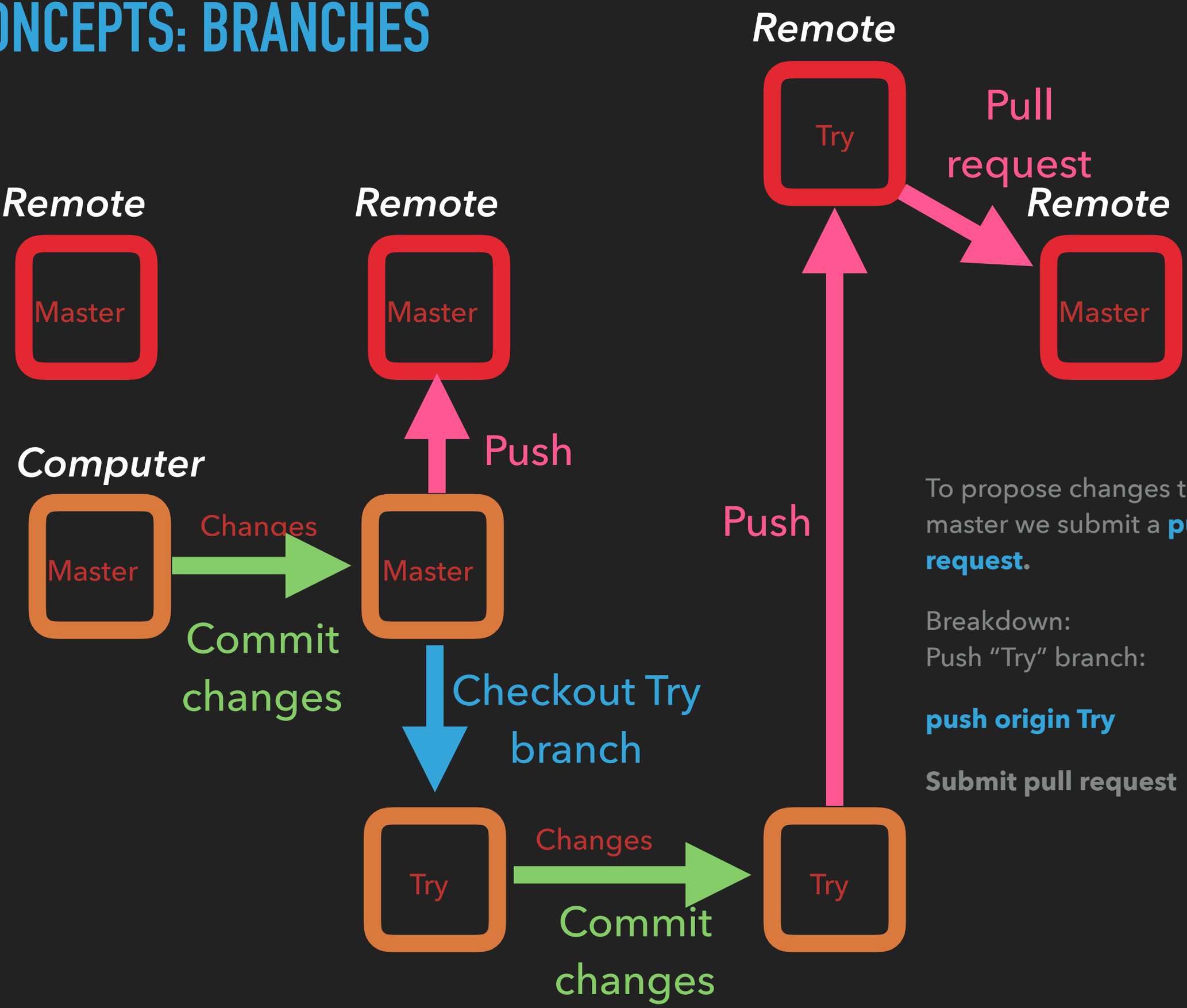


To propose changes to master we submit a **pull request.**

Breakdown:
Push "Try" branch:

push origin Try

GIT CONCEPTS: BRANCHES



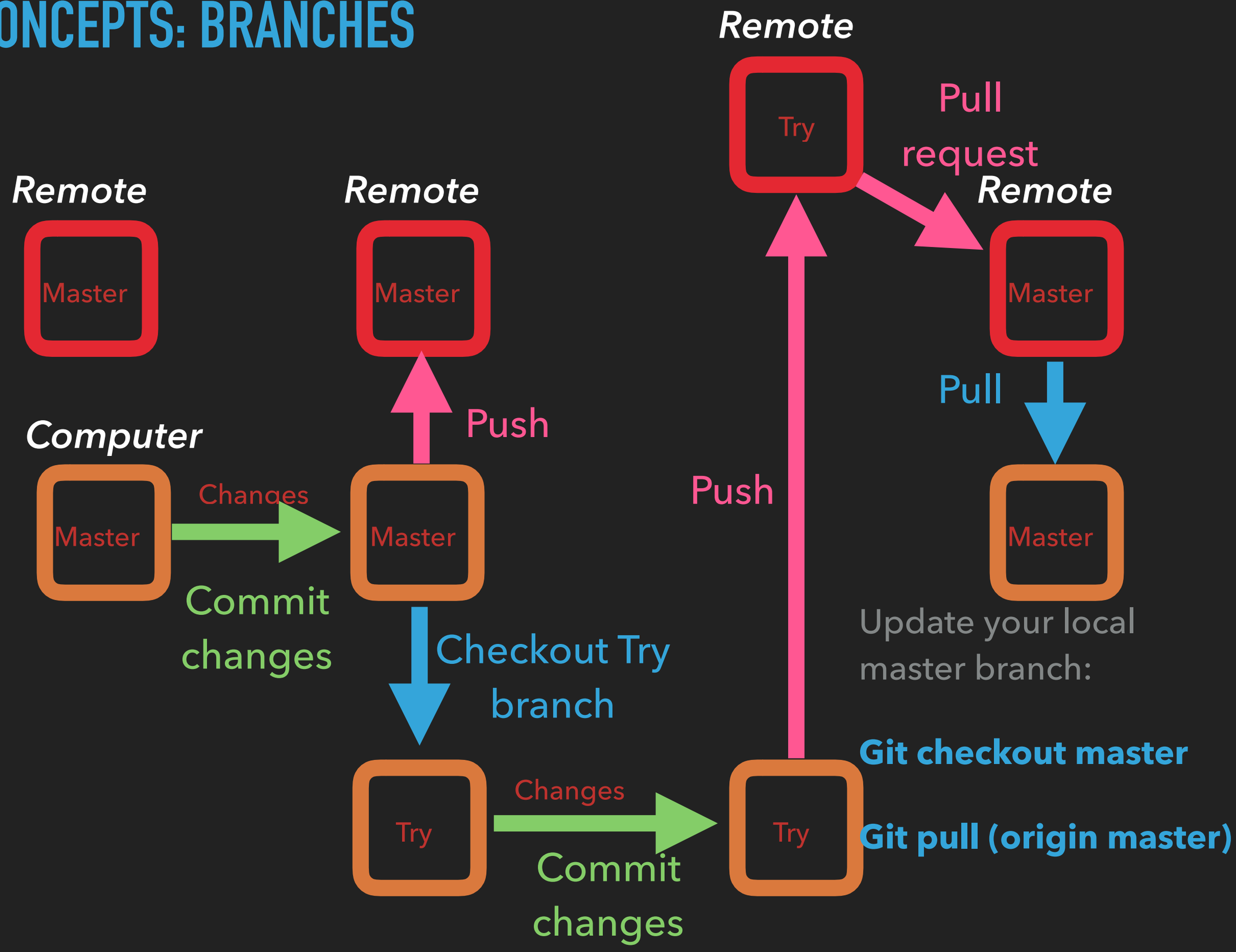
To propose changes to master we submit a **pull request.**

Breakdown:
Push “Try” branch:

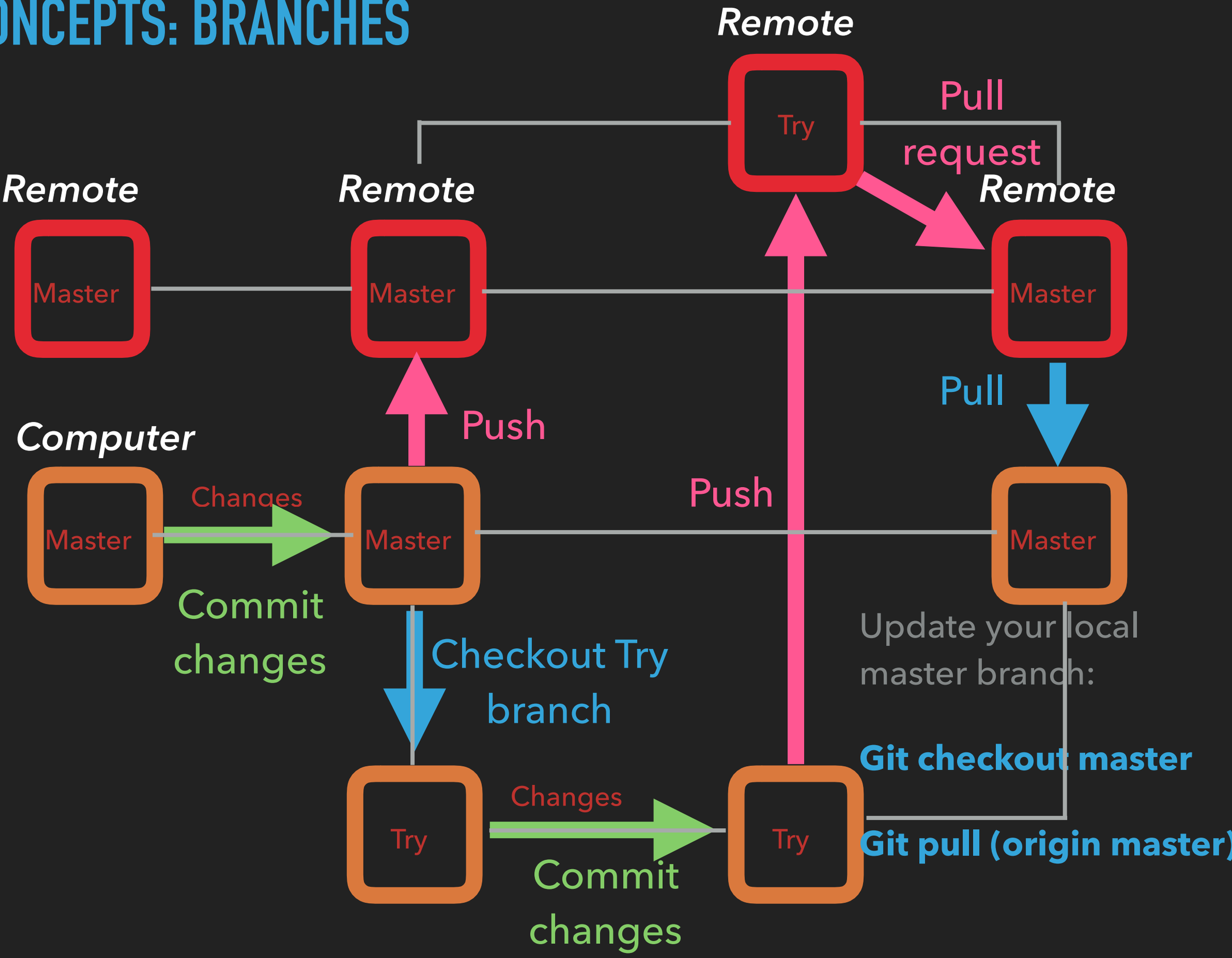
push origin Try

Submit pull request

GIT CONCEPTS: BRANCHES



GIT CONCEPTS: BRANCHES



GIT CONCEPTS: BRANCHES

Useful tips to visualize the status of your repo and your branches:

- Check the status of your brand (added and committed files)
  git status

- Check your current branch:
  git branch

- Visualise your work tree (all branches and their commits):
  git log ––graph ––oneline
  Or got to your GitHub repo's webpage, click **"Insights" -> "Network"** and you will see the full work tree push to this online repo (no information on local changes though!)