

Let's Tame 'Git'saurus!



Hello! I am Damini Satya

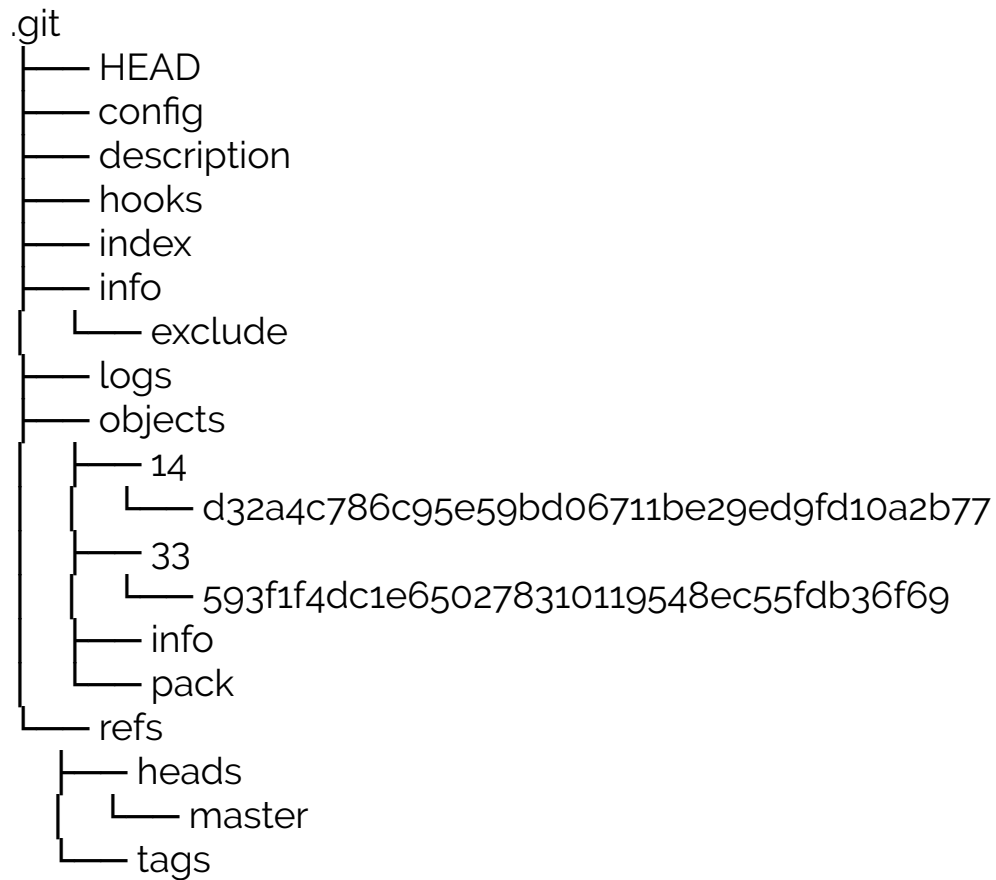
Software Engineer at Salesforce

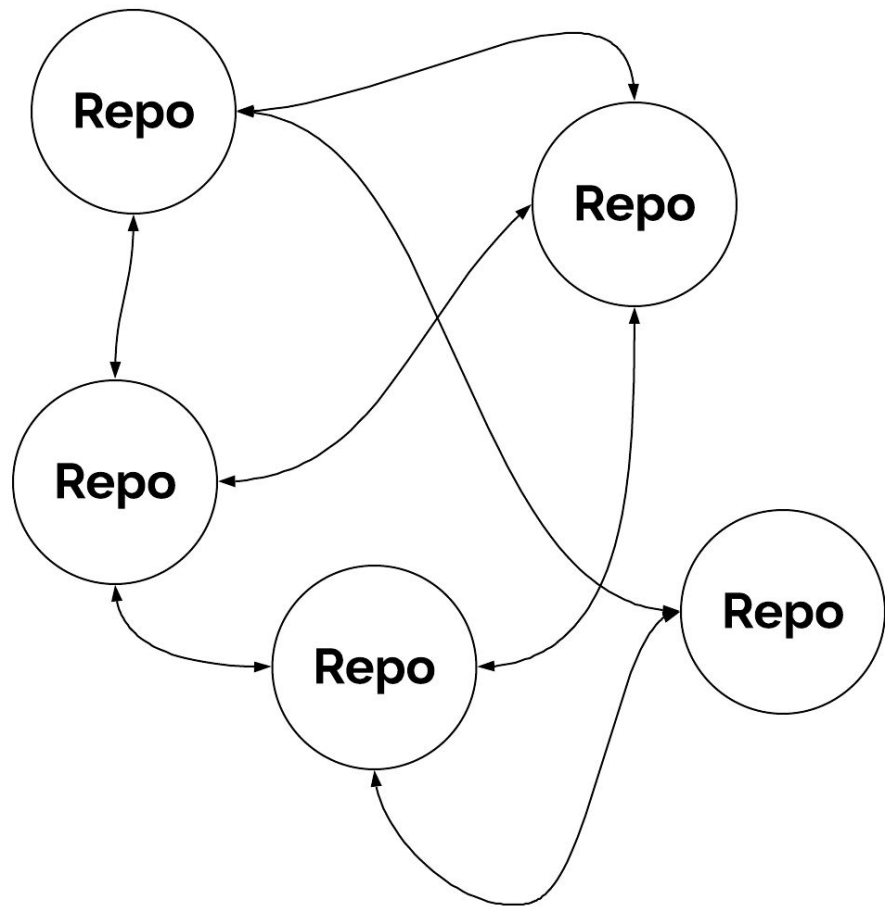
Twitter - @Daminisatya



Some Quick Things to Understand About Git

.git





Terminology

- Remote Repository

Terminology

- Remote Repository
- Local Repository

Terminology

- Remote Repository
- Local Repository
- Index

Terminology

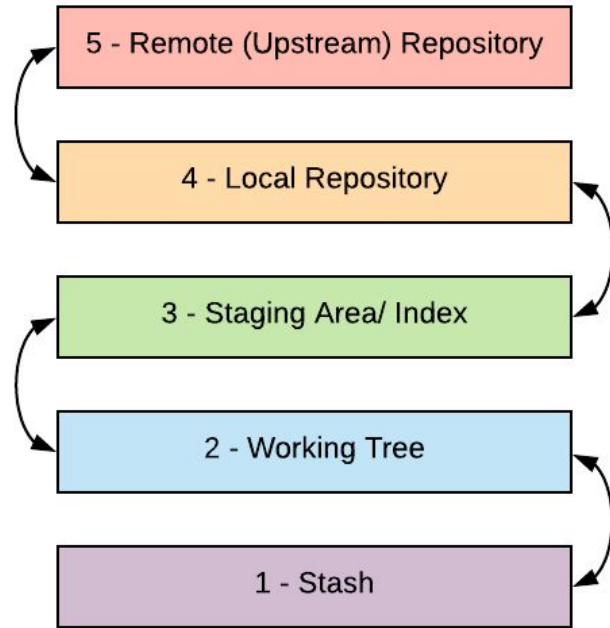
- Remote Repository
- Local Repository
- Index
- Working tree

Terminology

- Remote Repository
- Local Repository
- Index
- Working tree
- Stash

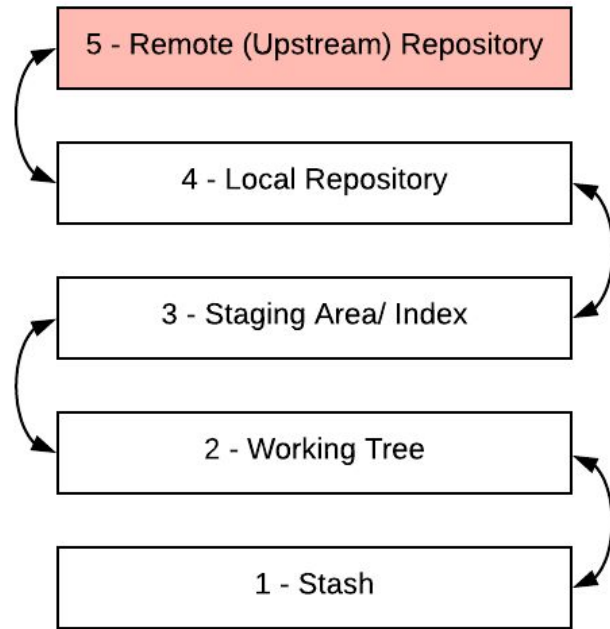
Terminology

- Remote Repository
- Local Repository
- Index
- Working tree
- Stash



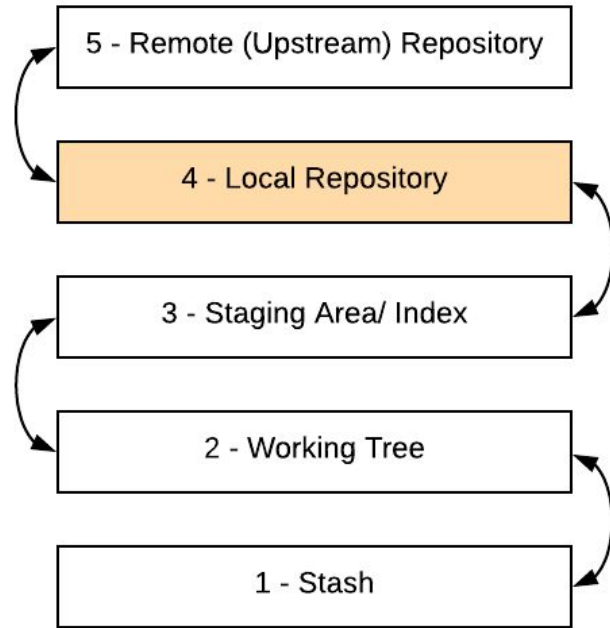
Terminology

- **Remote Repository**
- Local Repository
- Index
- Working tree
- Stash



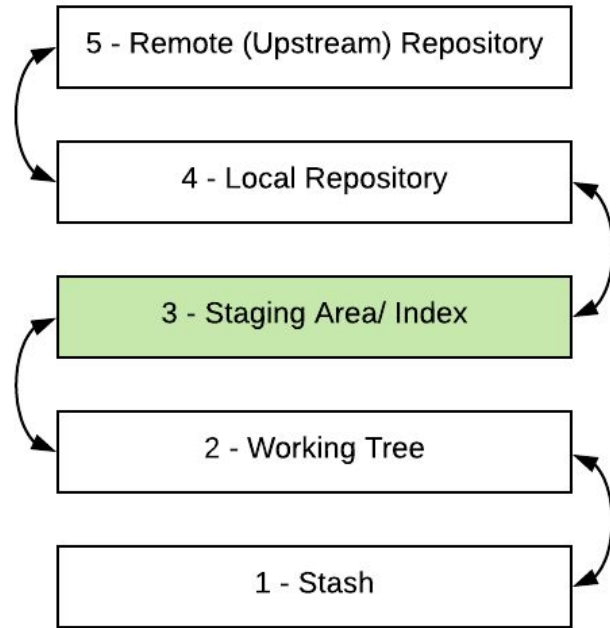
Terminology

- Remote Repository
- **Local Repository**
- Index
- Working tree
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Terminology

- Remote Repository
- Local Repository
- **Index**
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```
$ git status
On branch helloBranch
Changes to be committed:
  (use "git reset HEAD <file>..." to unstage)
```

```
    new file:   helloBP.txt
```

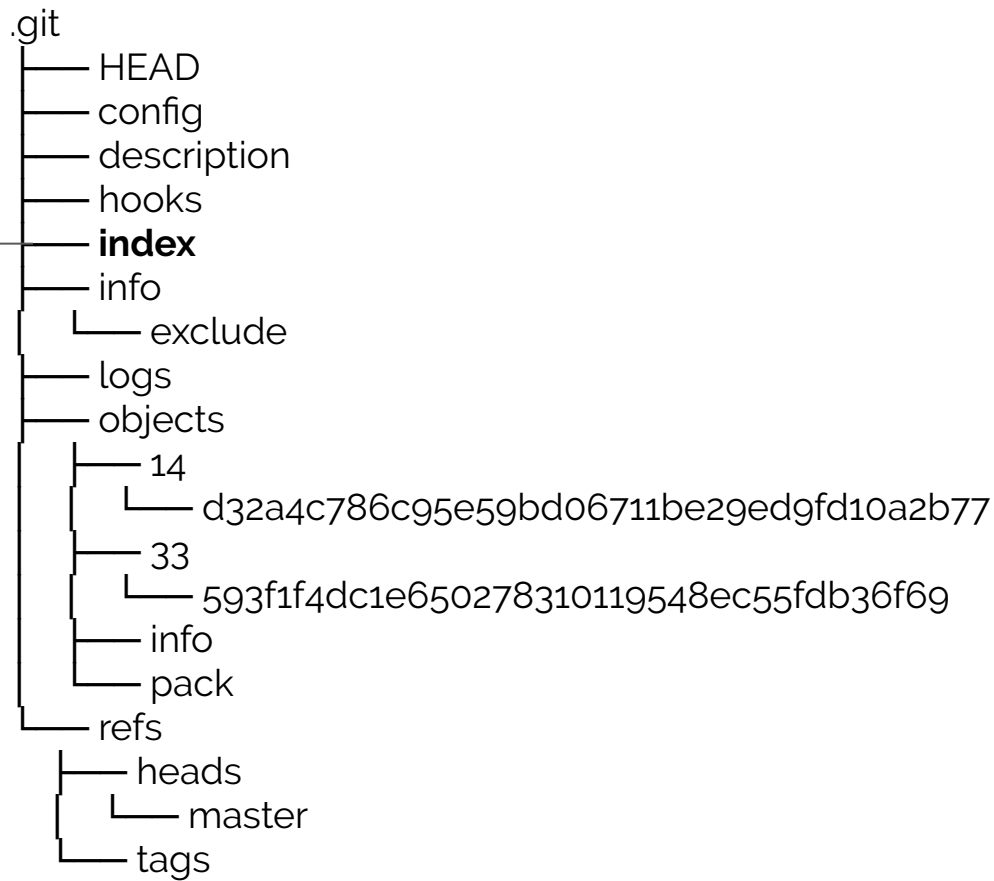
```
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)
```

```
    modified:   README.md
```

```
Untracked files:
  (use "git add <file>..." to include in what will be committed)
```

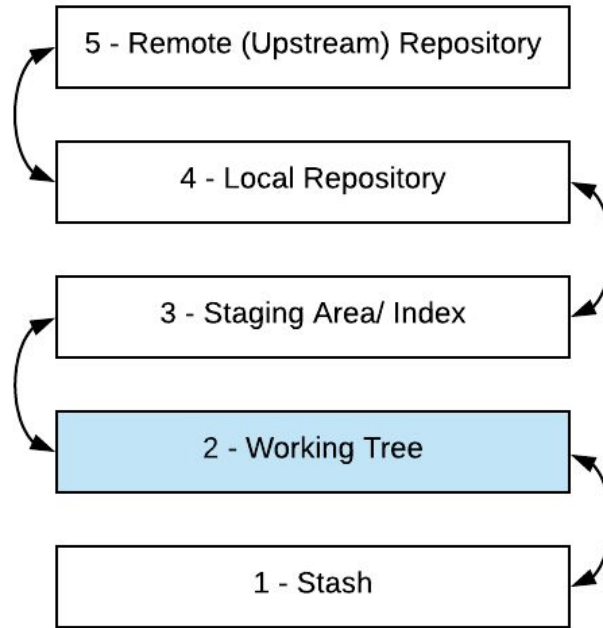
```
    untrackedFile.txt
```


.git/index



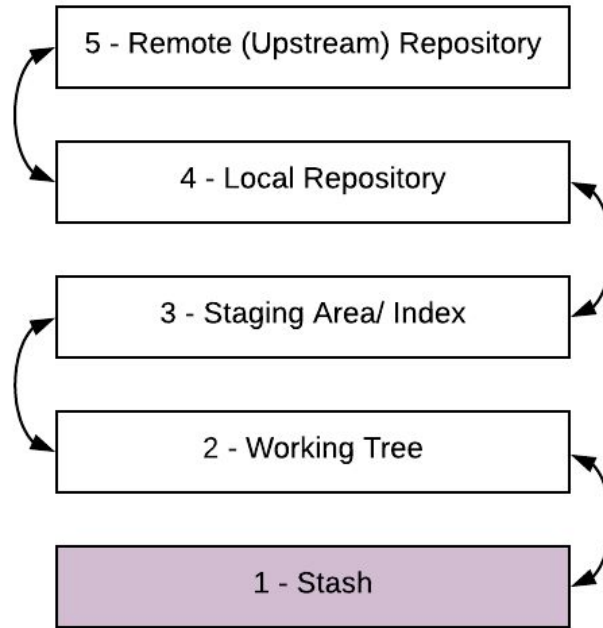
Terminology

- Remote Repository
- Local Repository
- Index
- **Working tree**
- Stash



Terminology

- Remote Repository
- Local Repository
- Index
- Working tree
- **Stash**



Terminology

- Remote Repository
- Local Repository
- Index
- Working tree
- Stash
- **HEAD**

git log

```
commit fe24318a9177dc5f15cb18b50a56310680a9b0 (HEAD -> master, origin/master, origin/HEAD)
```

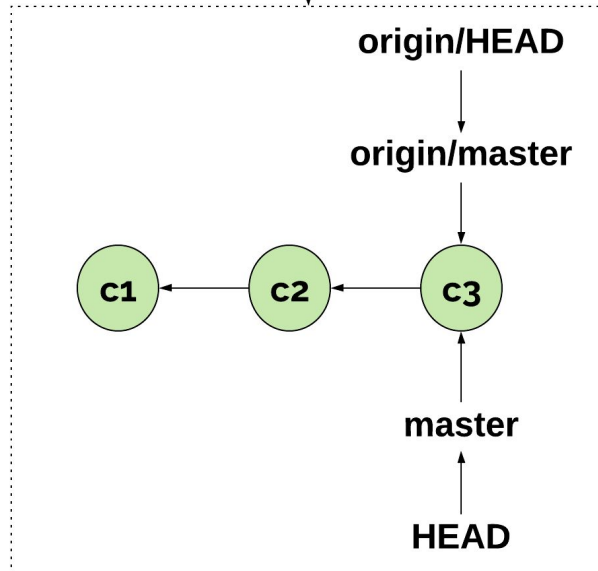
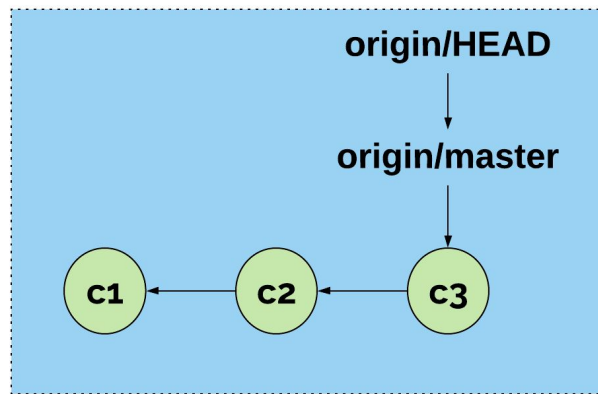
```
Merge: 3d31080e e661d98c
```

```
Author: Kubernetes Prow Robot <k8s-ci-robot@users.noreply.github.com>
```

```
Date: Mon Sep 23 17:37:24 2019 -0700
```

Merge pull request #4101 from aimeeu/aimeeu-addSurveyResults

Add 2019 SIG Docs survey explanation and results to sig-docs directory



.git/HEAD

.git

HEAD

config

description

hooks

index

info

└─ exclude

logs

objects

└─ 14

└─ d32a4c786c95e59bd06711be2ged9fd10a2b77

└─ 33

└─ 593f1f4dc1e650278310119548ec55fdb36f69

└─ info

└─ pack

└─ refs

└─ heads

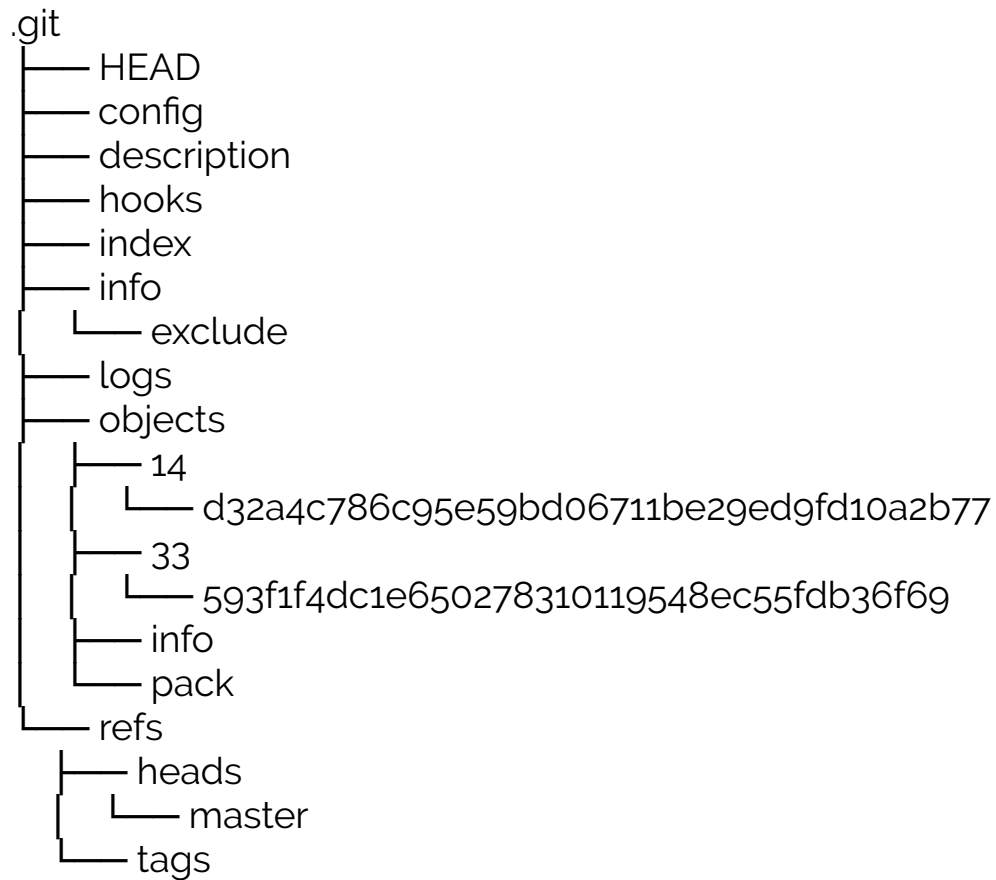
└─ master

└─ tags

The Anatomy of 'Git'saurus!

AKA

Git Internals!



[core]

repositoryformatversion = 0

filemode = true

bare = false

logallrefupdates = true

ignorecase = true

precomposeunicode = true

[remote "origin"]

url = https://github.com/daminisatya/kapitan.git

fetch = +refs/heads/*:refs/remotes/origin/*

[remote "upstream"]

url = https://github.com/deepmind/kapitan.git

fetch = +refs/heads/*:refs/remotes/origin/*

[branch "master"]

remote = origin

merge = refs/heads/master

.git/config

.git

HEAD

config

description

hooks

index

info

exclude

logs

objects

14

d32a4c786c95e59bd06711be29ed9fd10a2b77

33

593f1f4dc1e650278310119548ec55fdb36f69

info

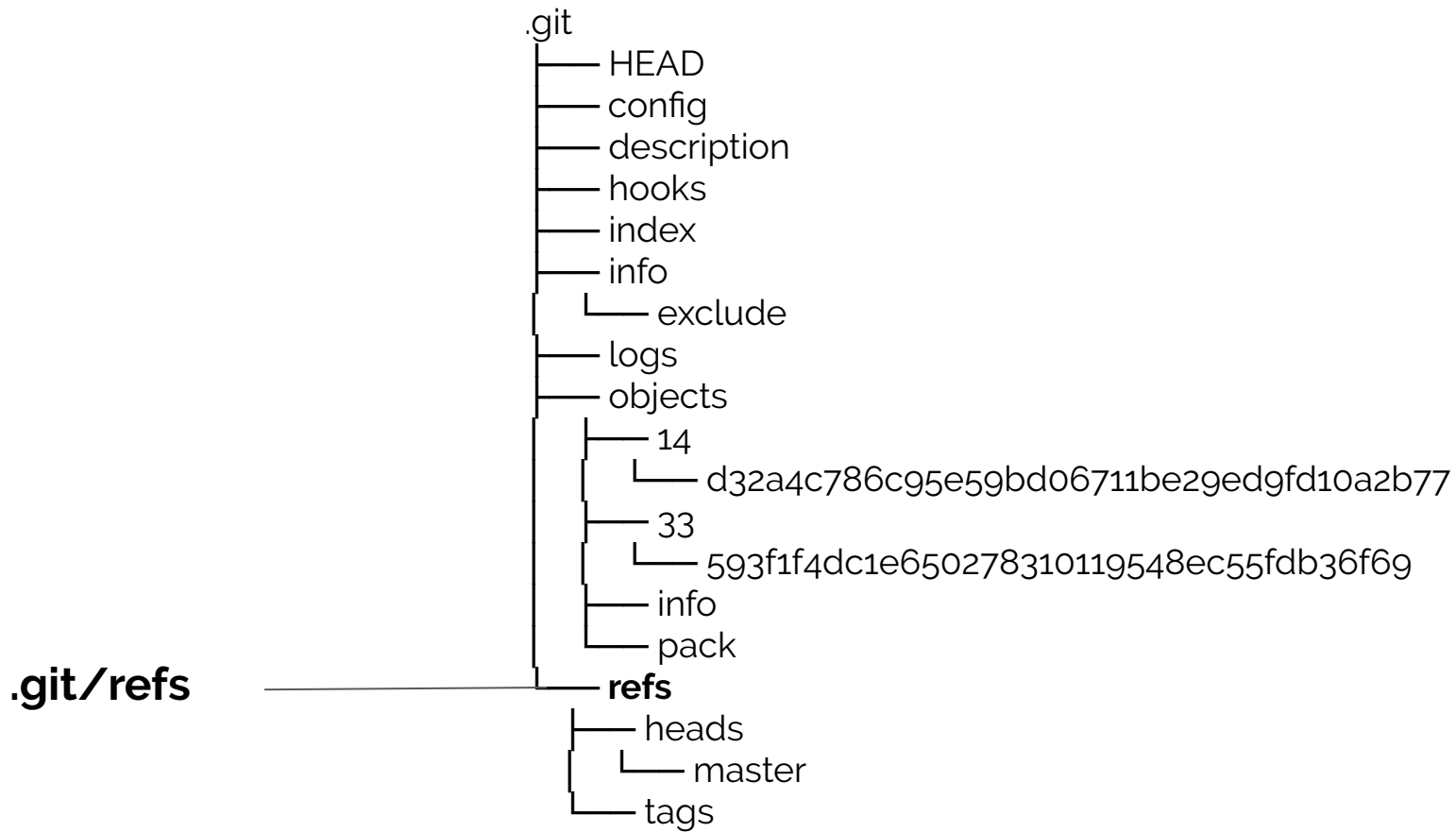
pack

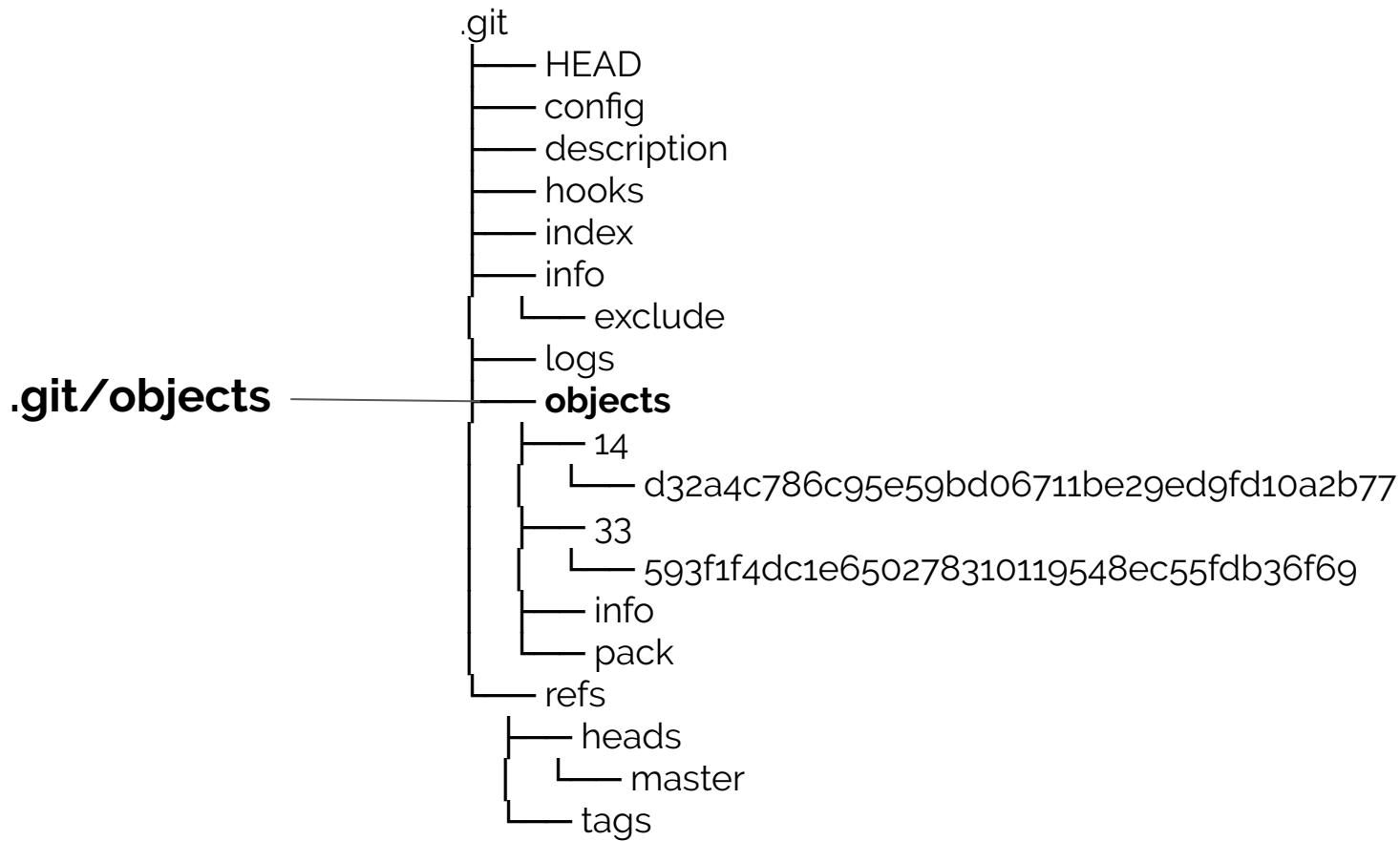
refs

heads

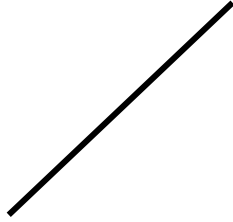
master

tags



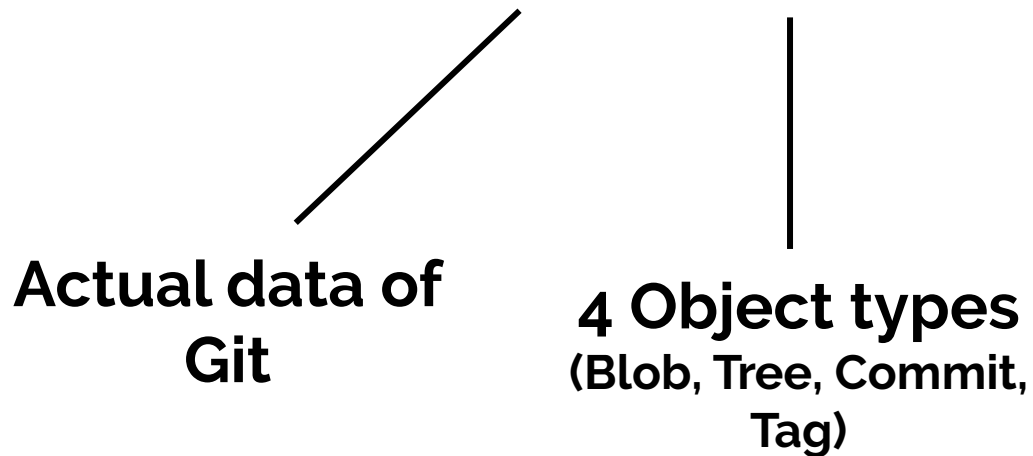


Git Objects

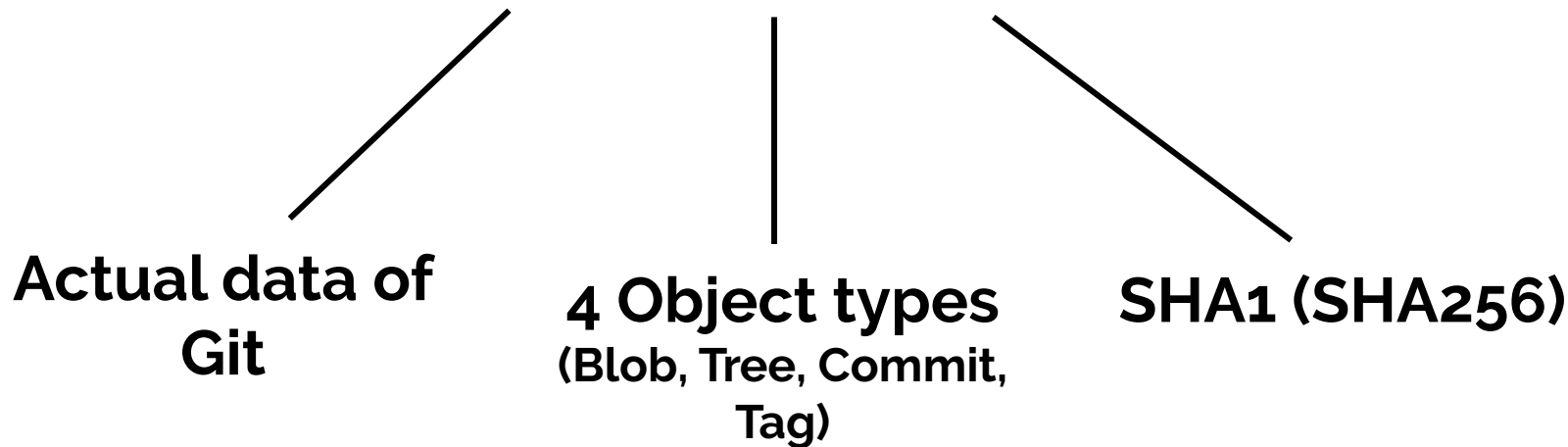


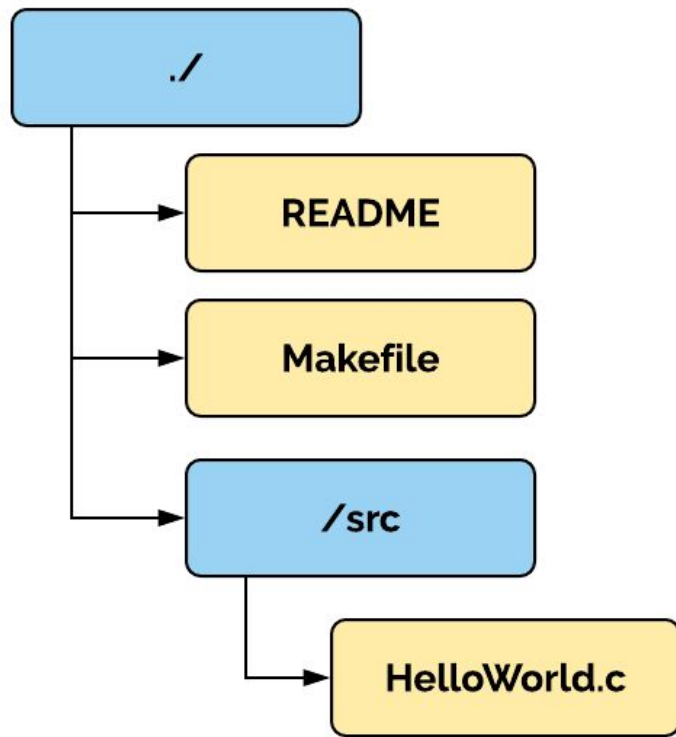
Actual data of
Git

Git Objects



Git Objects





Blob

- The contents of files are stored as blobs.
- Just the contents!
- Git will only store the blob once.

WORKSPACE

./

README

Makefile

/src

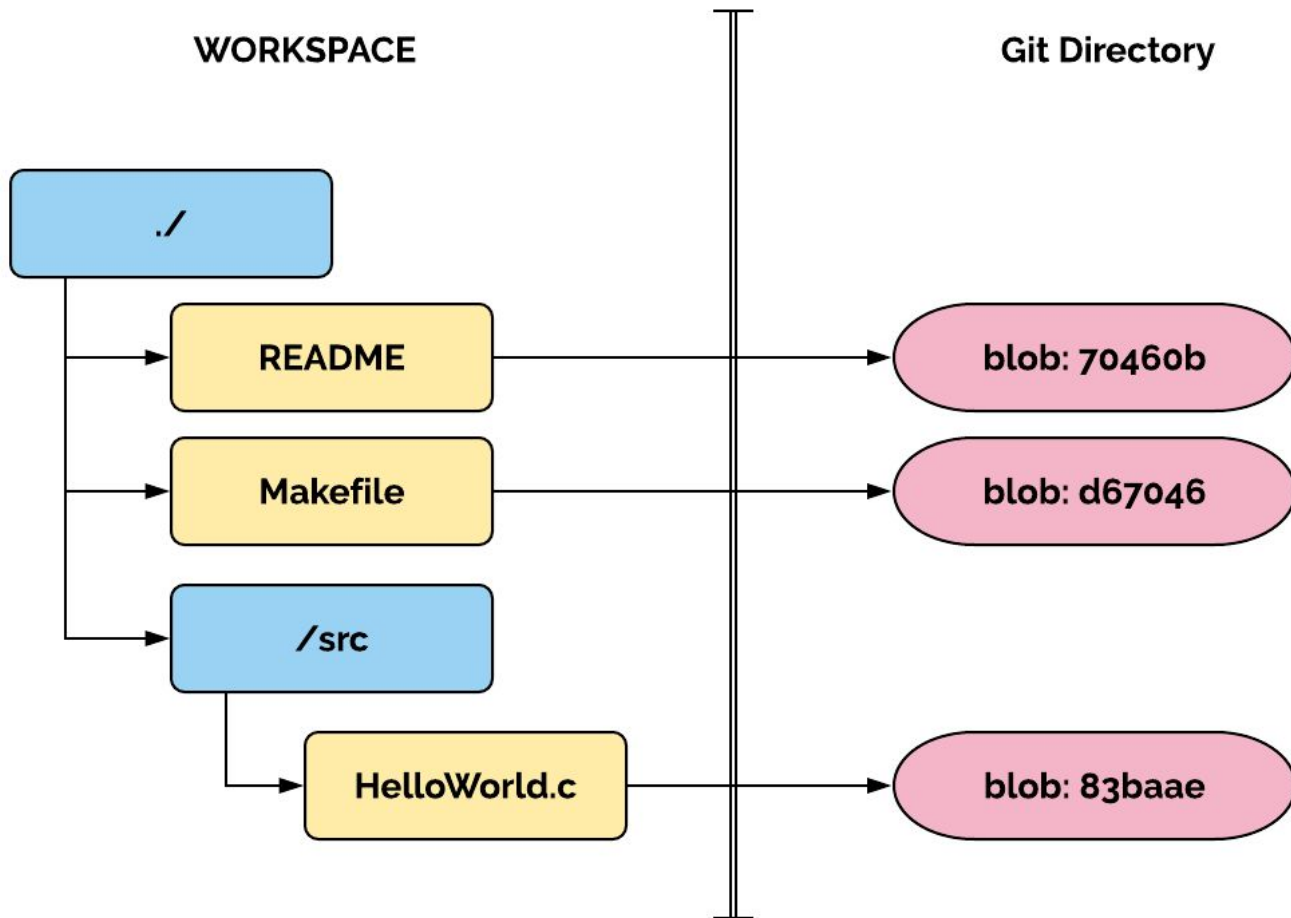
HelloWorld.c

Git Directory

blob: 70460b

blob: d67046

blob: 83baae

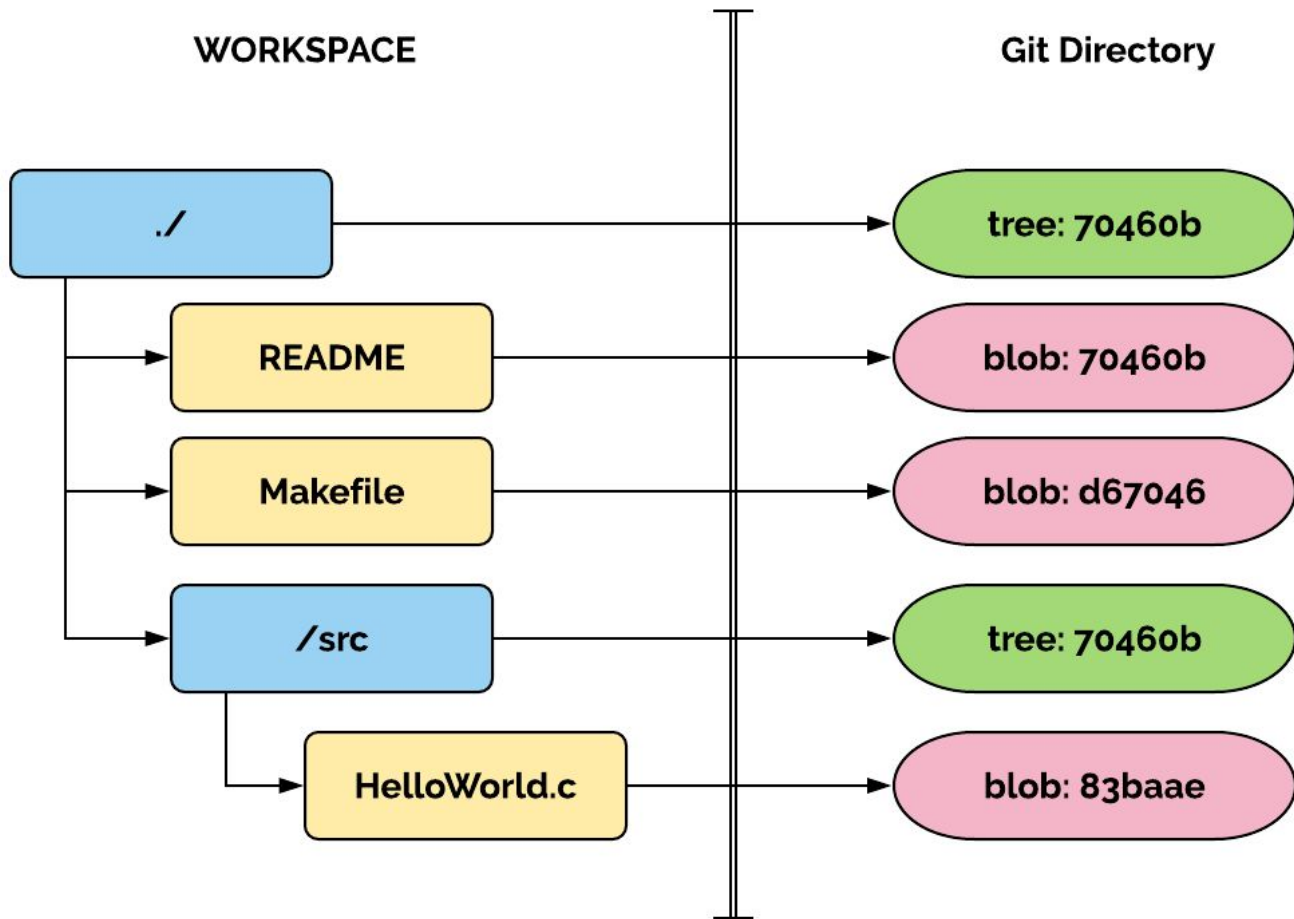


Tree

- **Directories in Git basically correspond to trees.**
- **Trees are pointers to blobs and other trees.**
- **Tree object contains**
 - **Names**
 - **Modes**
 - **List of trees and blobs that the tree contains**

Tree

100644	blob	ag06cb2a4a904a152e80877d4088654daad0c859	README
100644	blob	8f94139338f9404f26296befa88755fc2598c289	Makefile
040000	tree	99f1a6d12cb4b6f19c8655fca46c3ecf317074e0	src



Commit

- A commit references a tree
- It simply points to a tree and keeps an
 - Author
 - Committer
 - Message
 - Parent commits

Commit

tree d8329fc1cc938780ffdd9f94e0d364e0ea74f579

parent 1a410efbd13591db07496601ebc7a059dd55cfe9

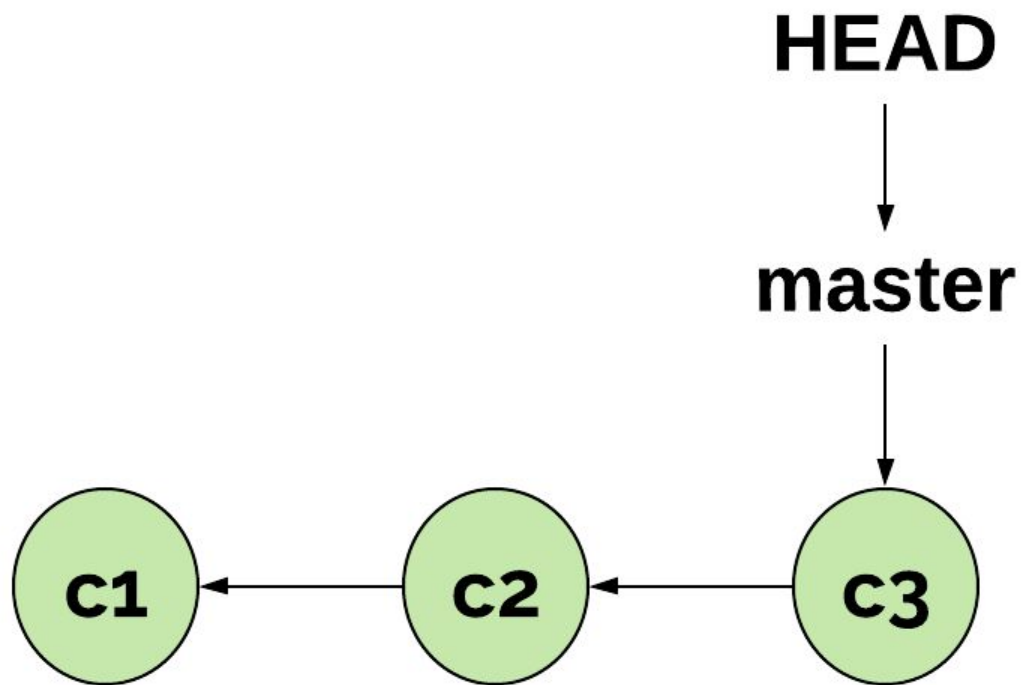
author Damini <email@gmail.com> 1243040974 -0700

committer Damini <email@gmail.com> 1243040974 -0700

first commit

Concepts With Which We Struggle!

Branching



```
commit 805b4be27182c63762125fa602383ceab3c540f5 (HEAD -> master, origin/master, origin/HEAD)
```

```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Thu Aug 22 10:17:00 2019 +0200
```

```
Update vacuumlabs-reasonml.mdx
```

```
commit 0763aa976aac45b0db620522bfa73df33daf2663
```

```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Thu Aug 22 10:15:02 2019 +0200
```

```
sponsor and workshop updates
```

```
commit e0771ab9698fe63259d929df1c45d9ce560893fb
```

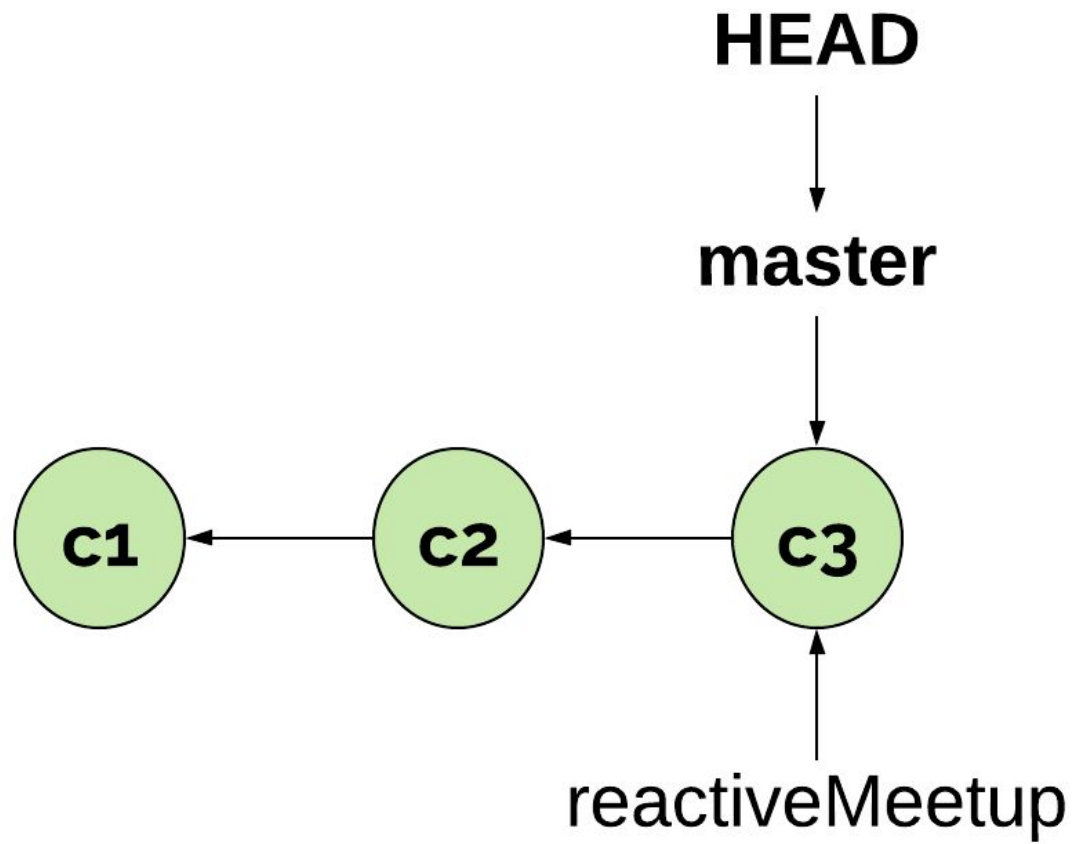
```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Tue Aug 13 08:41:55 2019 +0200
```

```
Update taylor_fairbank.mdx
```

git branch reactiveMeetup

```
$ git branch reactiveMeetup  
$ git branch  
* master  
  reactiveMeetup
```



```
commit 805b4be27182c63762125fa602383ceab3c540f5 (HEAD -> master, origin/master, origin/HEAD, reactiveMeetup)
```

```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Thu Aug 22 10:17:00 2019 +0200
```

```
Update vacuumlabs-reasonml.mdx
```

```
commit 0763aa976aac45b0db620522bfa73df33daf2663
```

```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Thu Aug 22 10:15:02 2019 +0200
```

```
sponsor and workshop updates
```

```
commit e0771ab9698fe63259d929df1c45d9ce560893fb
```

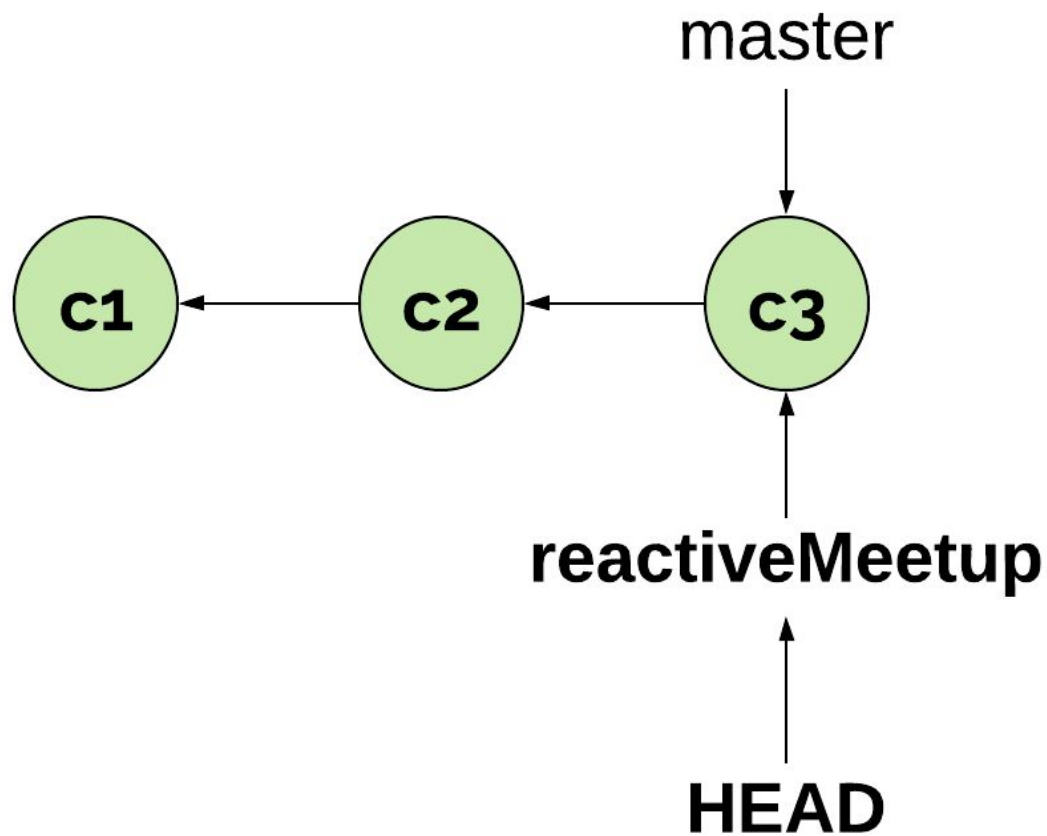
```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Tue Aug 13 08:41:55 2019 +0200
```

```
Update taylor_fairbank.mdx
```

git checkout reactiveMeetup

```
$ git checkout reactiveMeetup
Switched to branch 'reactiveMeetup'
$ git branch
  master
* reactiveMeetup
```




```
commit 805b4be27182c63762125fa602383ceab3c540f5 (HEAD -> reactiveMeetup, origin/master, origin/HEAD, master)
```

```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Thu Aug 22 10:17:00 2019 +0200
```

Update vacuumlabs-reasonml.mdx

```
commit 0763aa976aac45b0db620522bfa73df33daf2663
```

```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Thu Aug 22 10:15:02 2019 +0200
```

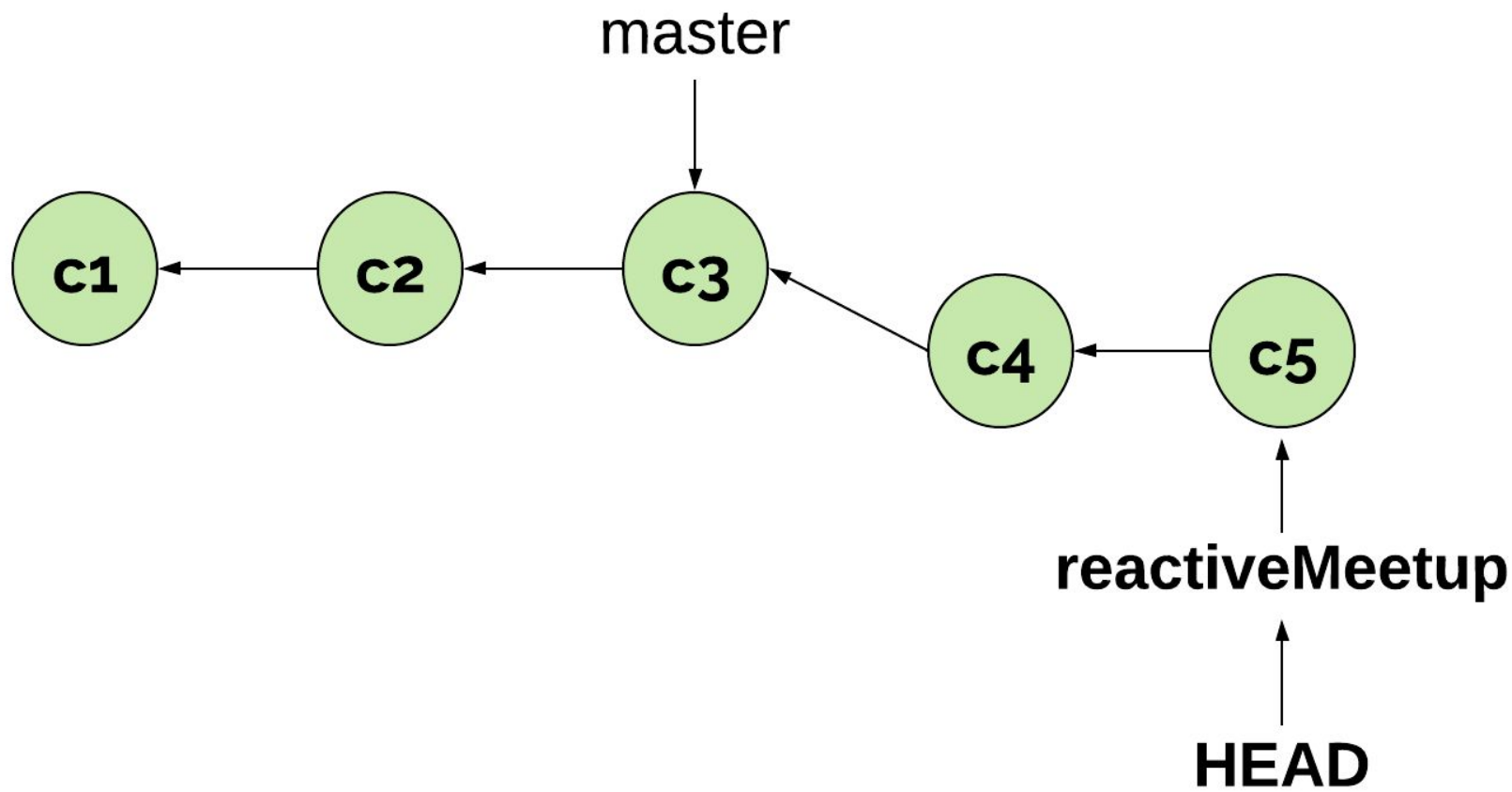
sponsor and workshop updates

```
commit e0771ab9698fe63259d929df1c45d9ce560893fb
```

```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Tue Aug 13 08:41:55 2019 +0200
```

Update taylor_fairbank.mdx



commit 595b2c4bb92ff108c54db6ed90a4e3e42ac28595 (HEAD -> reactiveMeetup)

Author: daminisatya <hello@jsconfbp.com>

Date: Tue Sep 24 10:16:30 2019 +0200

my second commit on reactiveMeetup branch

commit 3ce29231c29737a50efb380a5cd55813ea4c4a49

Author: daminisatya <hello@jsconfbp.com>

Date: Tue Sep 24 10:15:30 2019 +0200

my first commit on reactiveMeetup branch

commit 805b4be27182c63762125fa602383ceab3c540f5 (origin/master, origin/HEAD, master)

Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>

Date: Thu Aug 22 10:17:00 2019 +0200

Update vacuumlabs-reasonml.mdx

commit 0763aa976aac45b0db620522bfa73df33daf2663

Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>

Date: Thu Aug 22 10:15:02 2019 +0200

sponsor and workshop updates

commit e0771ab9698fe63259d929df1c45d9ce560893fb

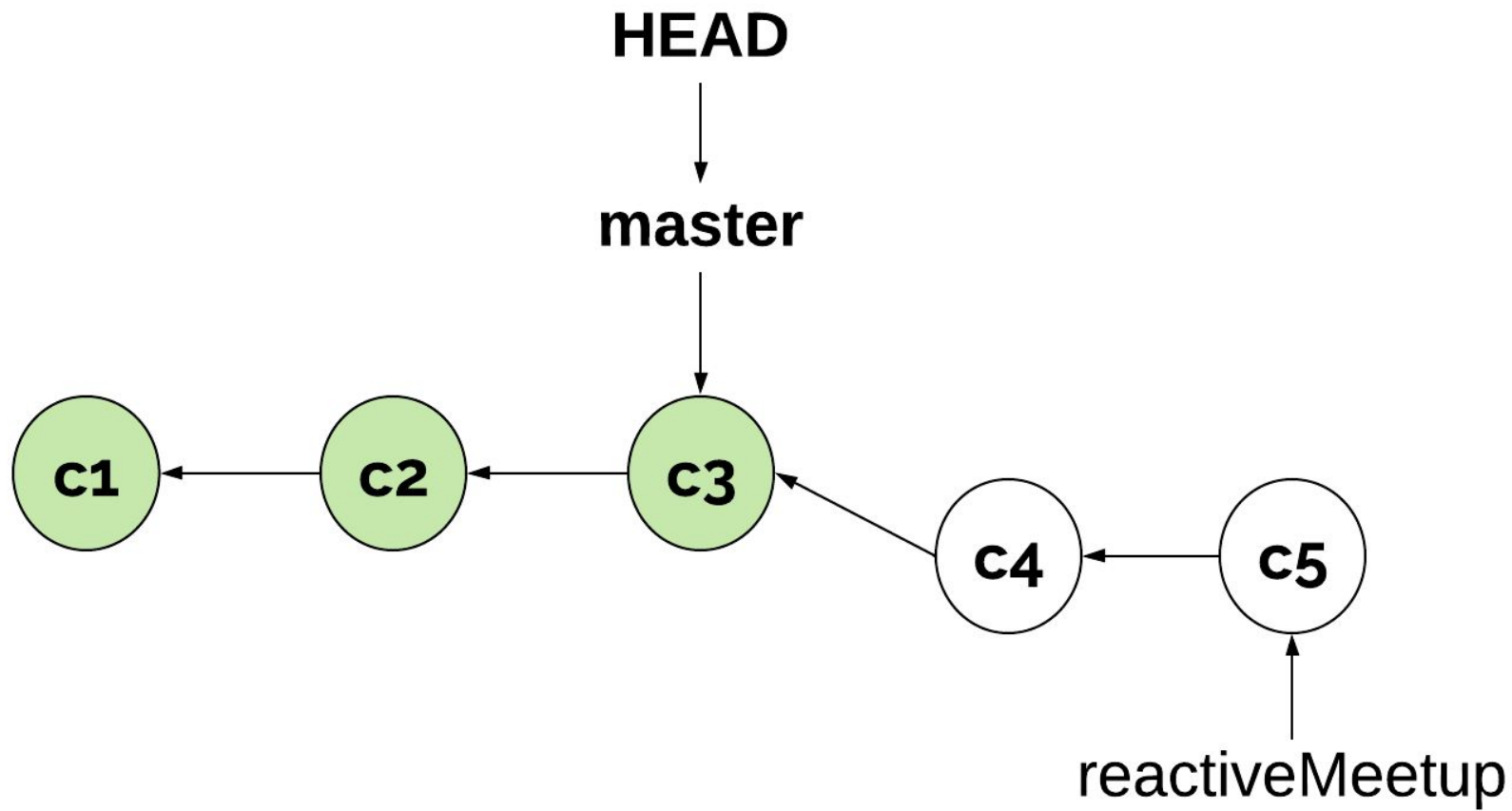
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>

Date: Tue Aug 13 08:41:55 2019 +0200

Update taylor_fairbank.mdx

git checkout master

```
$ git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.
$ git branch
* master
  reactiveMeetup
```



```
commit 805b4be27182c63762125fa602383ceab3c540f5 (HEAD -> master, origin/master, origin/HEAD)
```

```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Thu Aug 22 10:17:00 2019 +0200
```

```
Update vacuumlabs-reasonml.mdx
```

```
commit 0763aa976aac45b0db620522bfa73df33daf2663
```

```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Thu Aug 22 10:15:02 2019 +0200
```

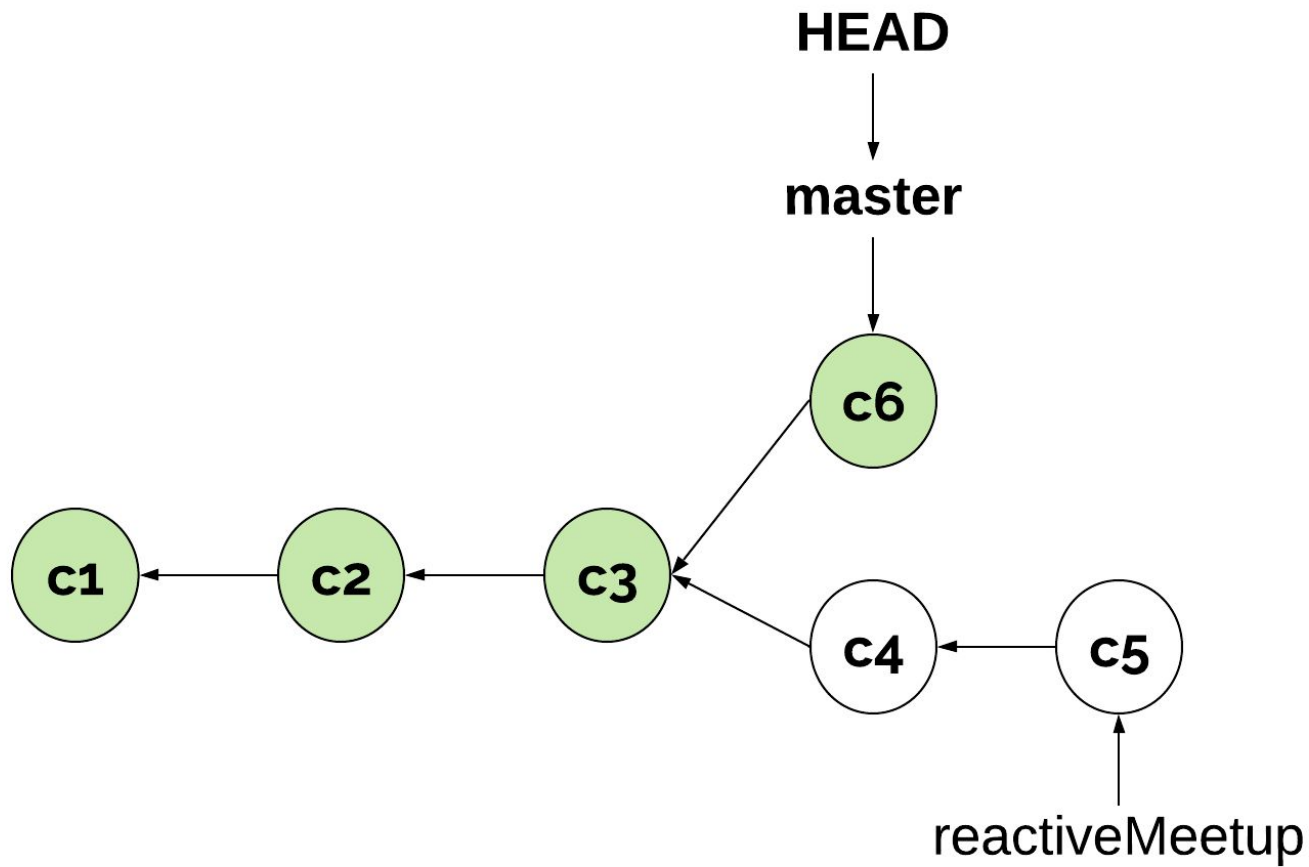
```
sponsor and workshop updates
```

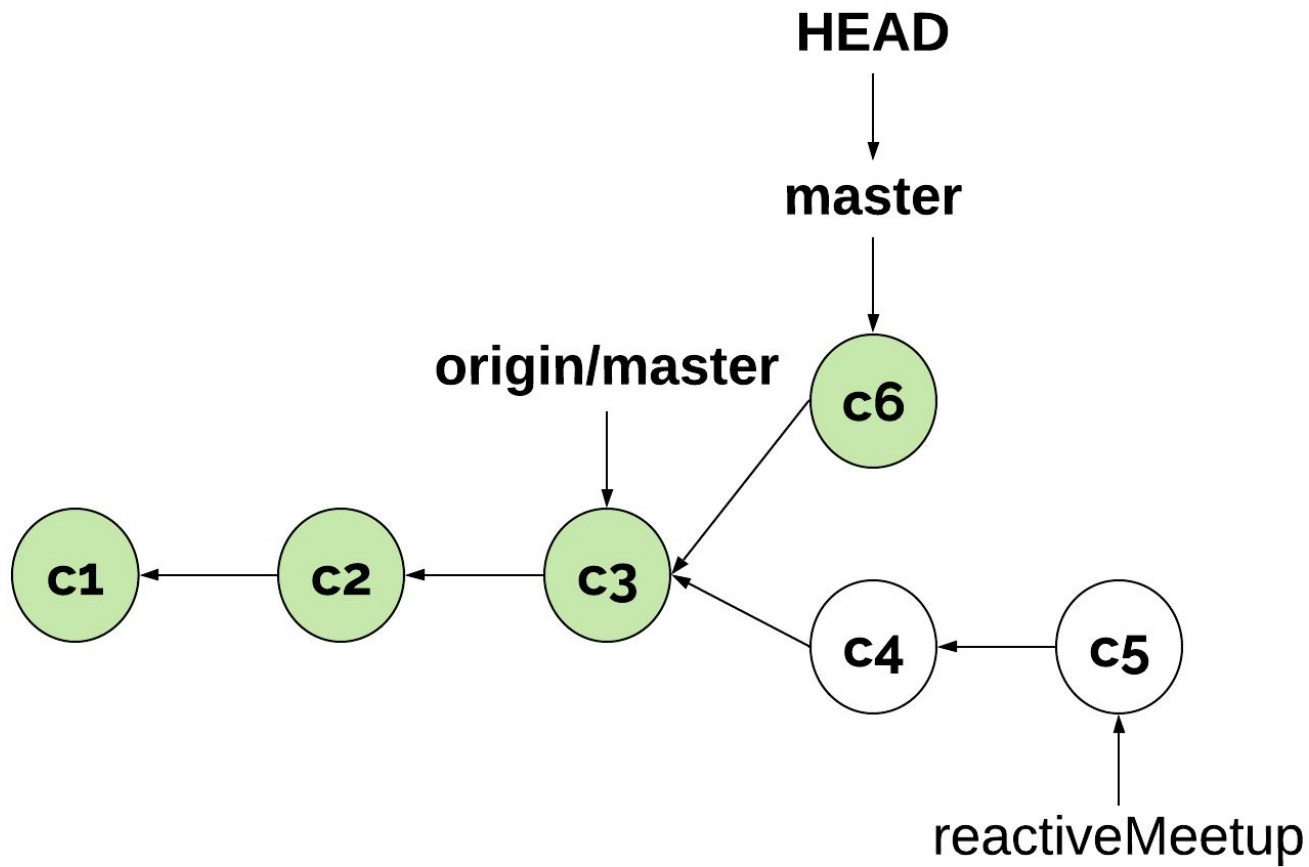
```
commit e0771ab9698fe63259d929df1c45d9ce560893fb
```

```
Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>
```

```
Date: Tue Aug 13 08:41:55 2019 +0200
```

```
Update taylor_fairbank.mdx
```





commit 68510c6983d21d0348400b78b36a2c71f316e991 (HEAD -> master)

Author: daminisatya <hello@jsconfbp.com>

Date: Tue Sep 24 10:24:09 2019 +0200

My commit to master branch

commit 805b4be27182c63762125fa602383ceab3c540f5 (origin/master, origin/HEAD)

Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>

Date: Thu Aug 22 10:17:00 2019 +0200

Update vacuumlabs-reasonml.mdx

commit 0763aa976aac45b0db620522bfa73df33daf2663

Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>

Date: Thu Aug 22 10:15:02 2019 +0200

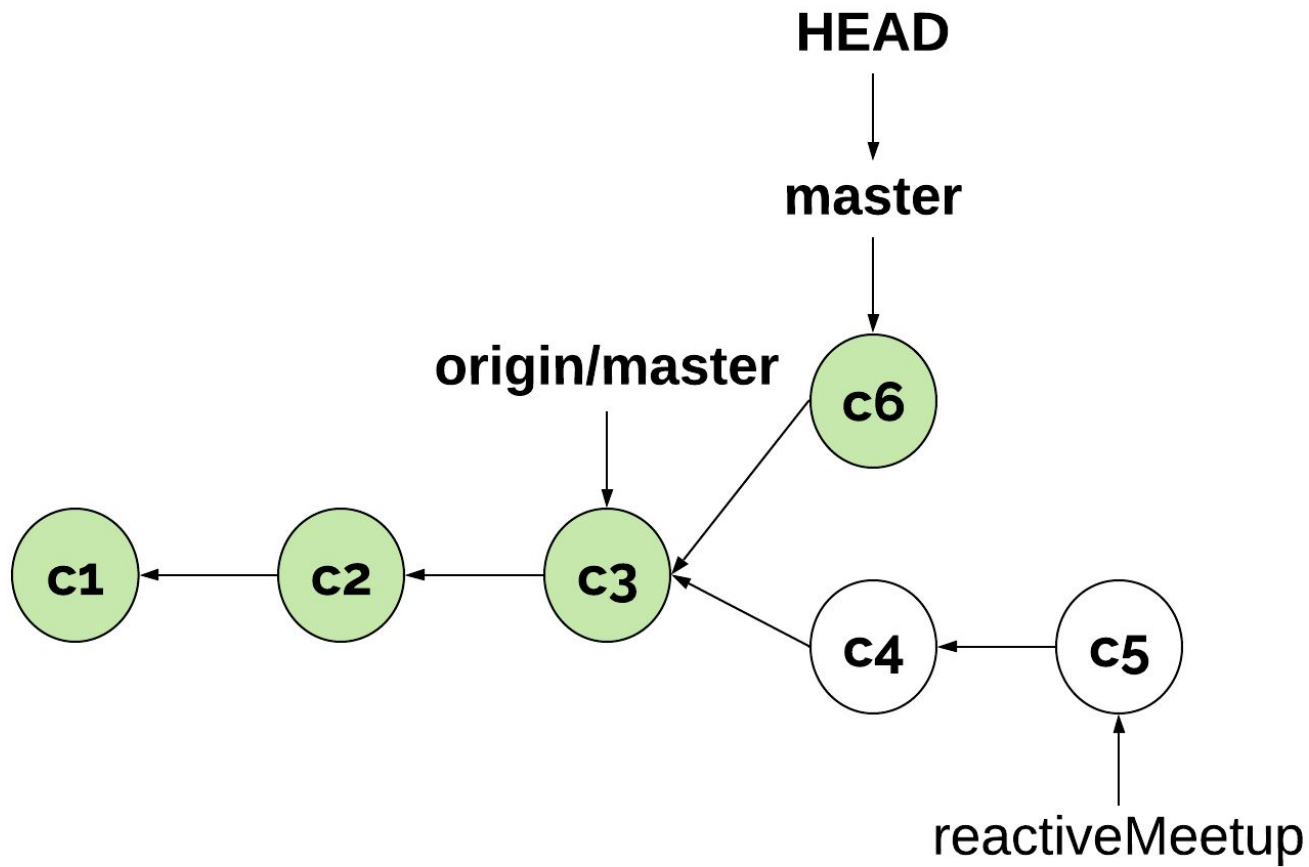
sponsor and workshop updates

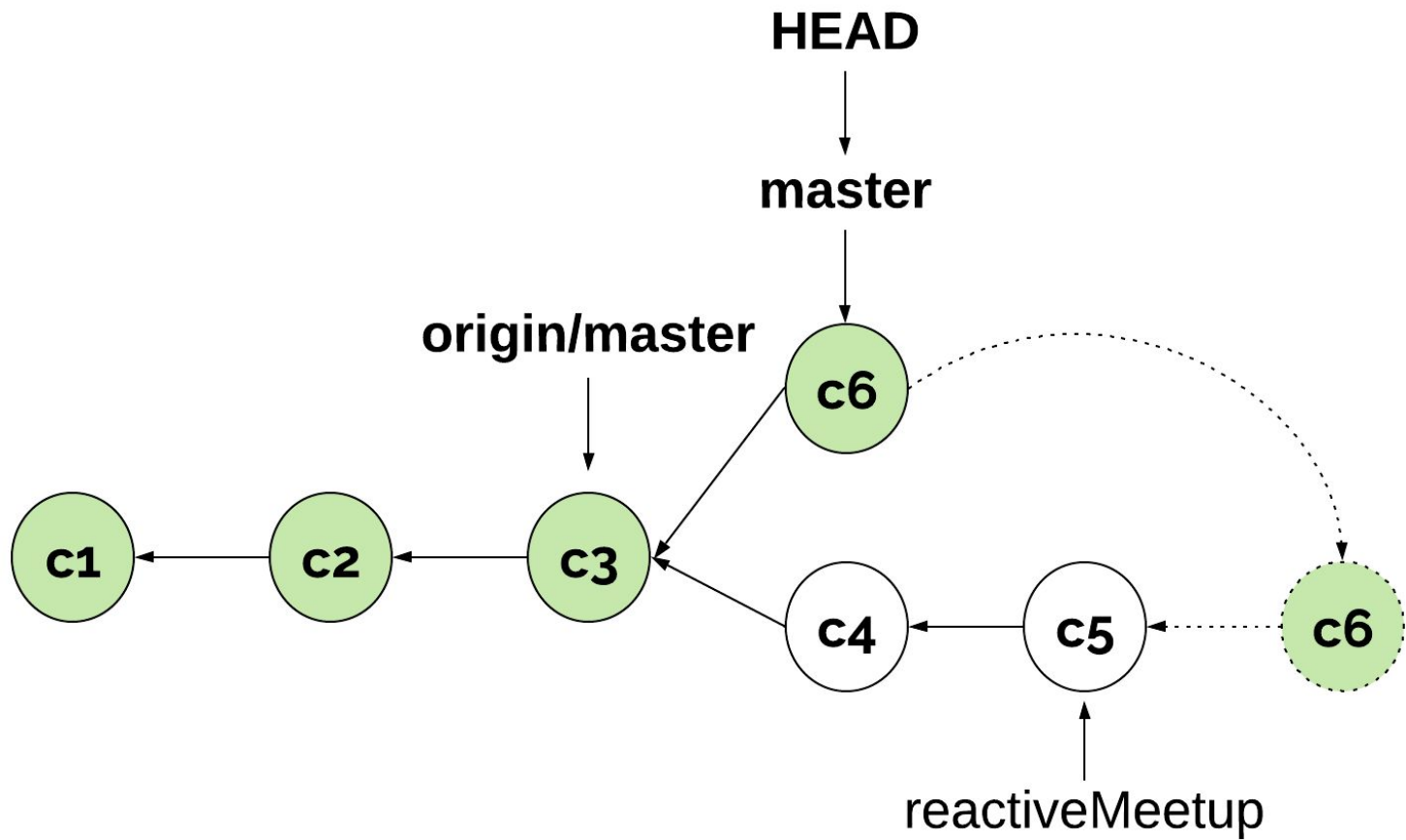
commit e0771ab9698fe63259d929df1c45d9ce560893fb

Author: Szabolcs Szabolcsi-Toth <szabolcsit@hu.ibm.com>

Date: Tue Aug 13 08:41:55 2019 +0200

Update taylor_fairbank.mdx





Cherry picking!

- Copy the *commit ID*
- Switch branch to *reactiveMeetup*
- Cherry-pick

git cherry-pick <commit hash>

```
$ git checkout reactiveMeetup  
Switched to branch 'reactiveMeetup'  
$ git cherry-pick 68510c
```

Oh no! A merge conflict!

```
$ git cherry-pick 68510c  
error: could not apply 68510c69... My commit to master branch  
hint: after resolving the conflicts, mark the corrected paths  
hint: with 'git add <paths>' or 'git rm <paths>'  
hint: and commit the result with 'git commit'
```

- Do NOT panic!

- Do NOT panic!
- Do NOT even try to think of deleting anything!

- Do NOT panic!
- Do NOT even try to think of deleting anything!
- git **status** is your friend

git status

```
$ git status
```

```
On branch reactiveMeetup
```

```
You are currently cherry-picking commit 68510c69.
```

```
(fix conflicts and run "git cherry-pick --continue")
```

```
(use "git cherry-pick --abort" to cancel the cherry-pick operation)
```

```
Unmerged paths:
```

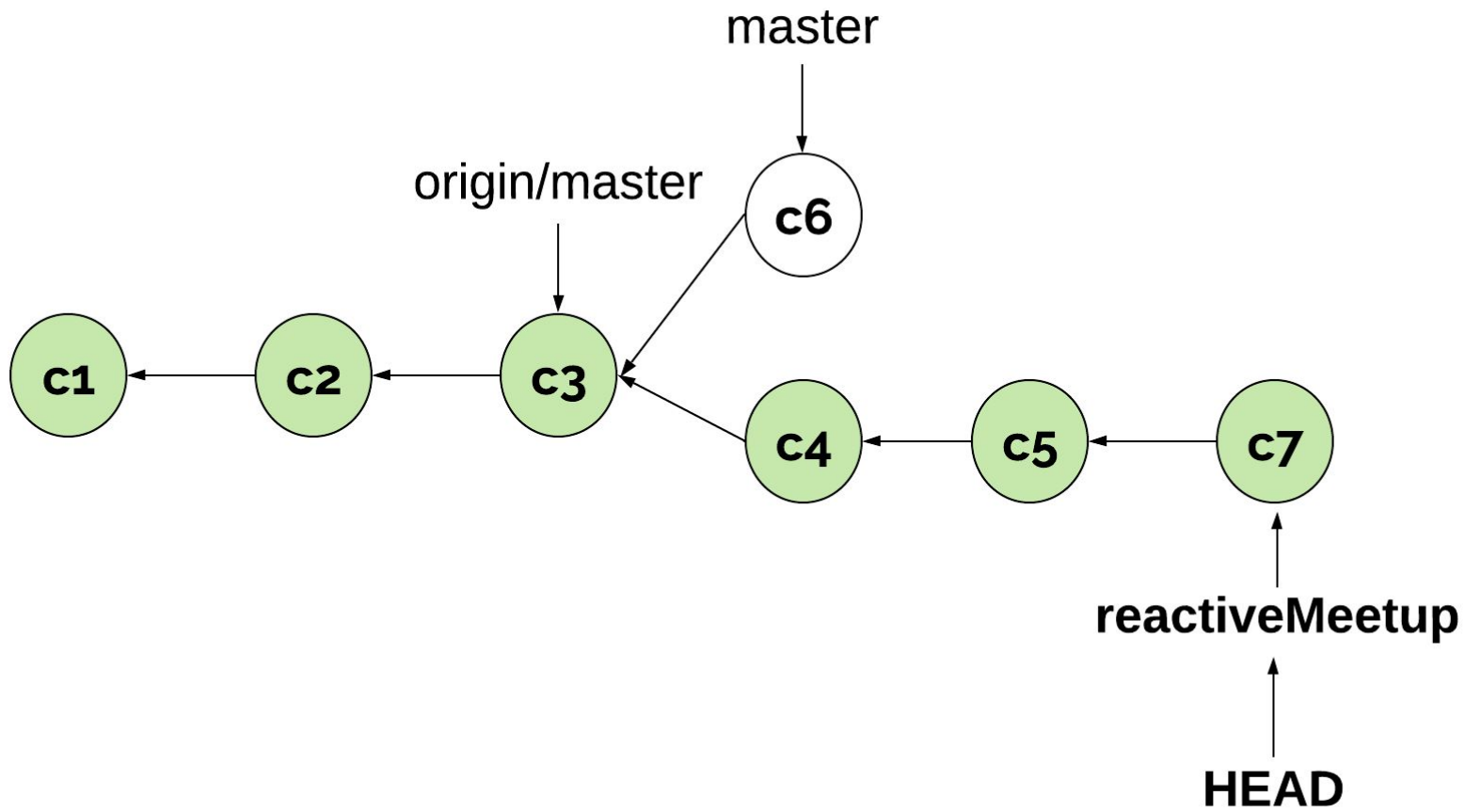
```
(use "git add <file>..." to mark resolution)
```

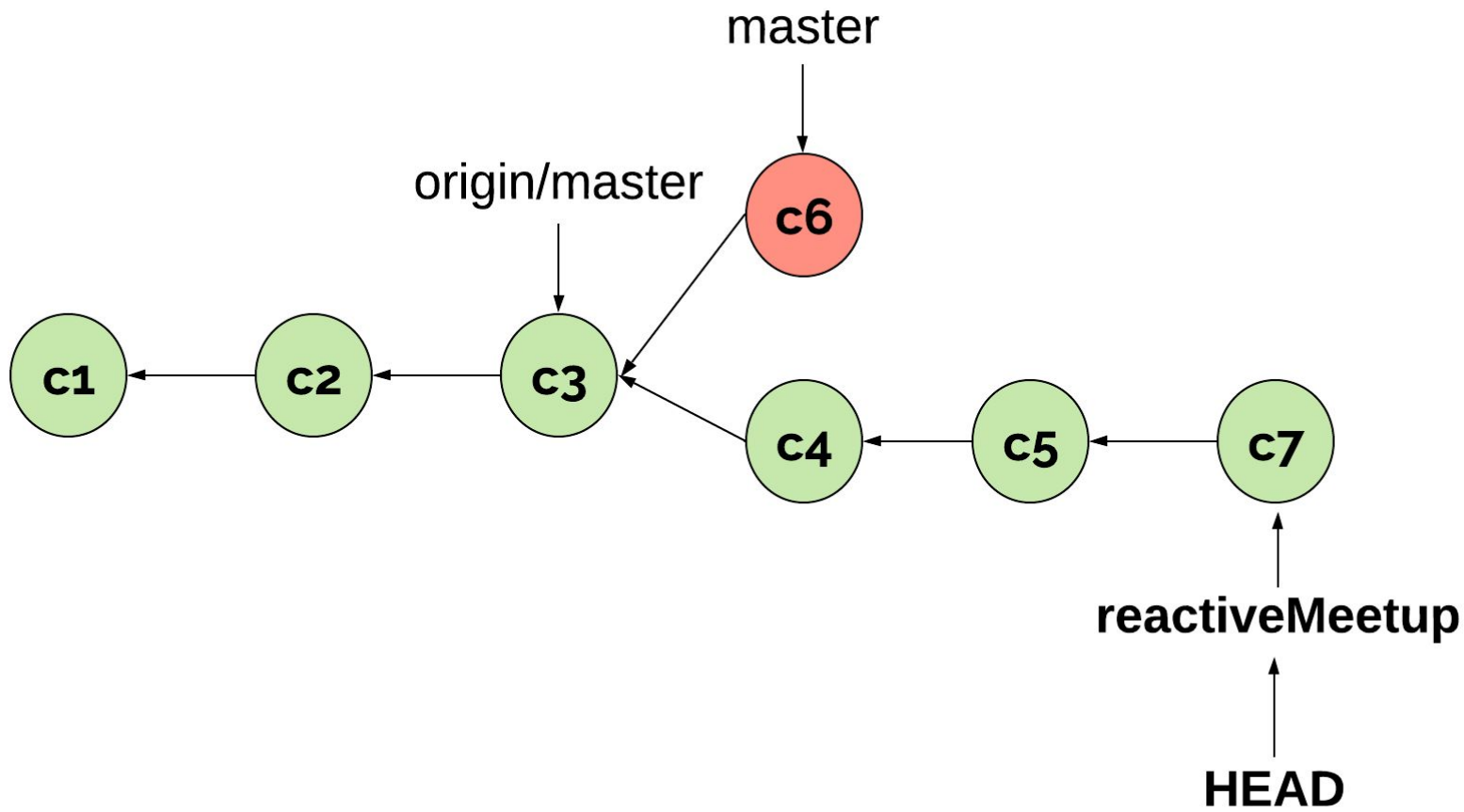
```
both modified:  README.md
```

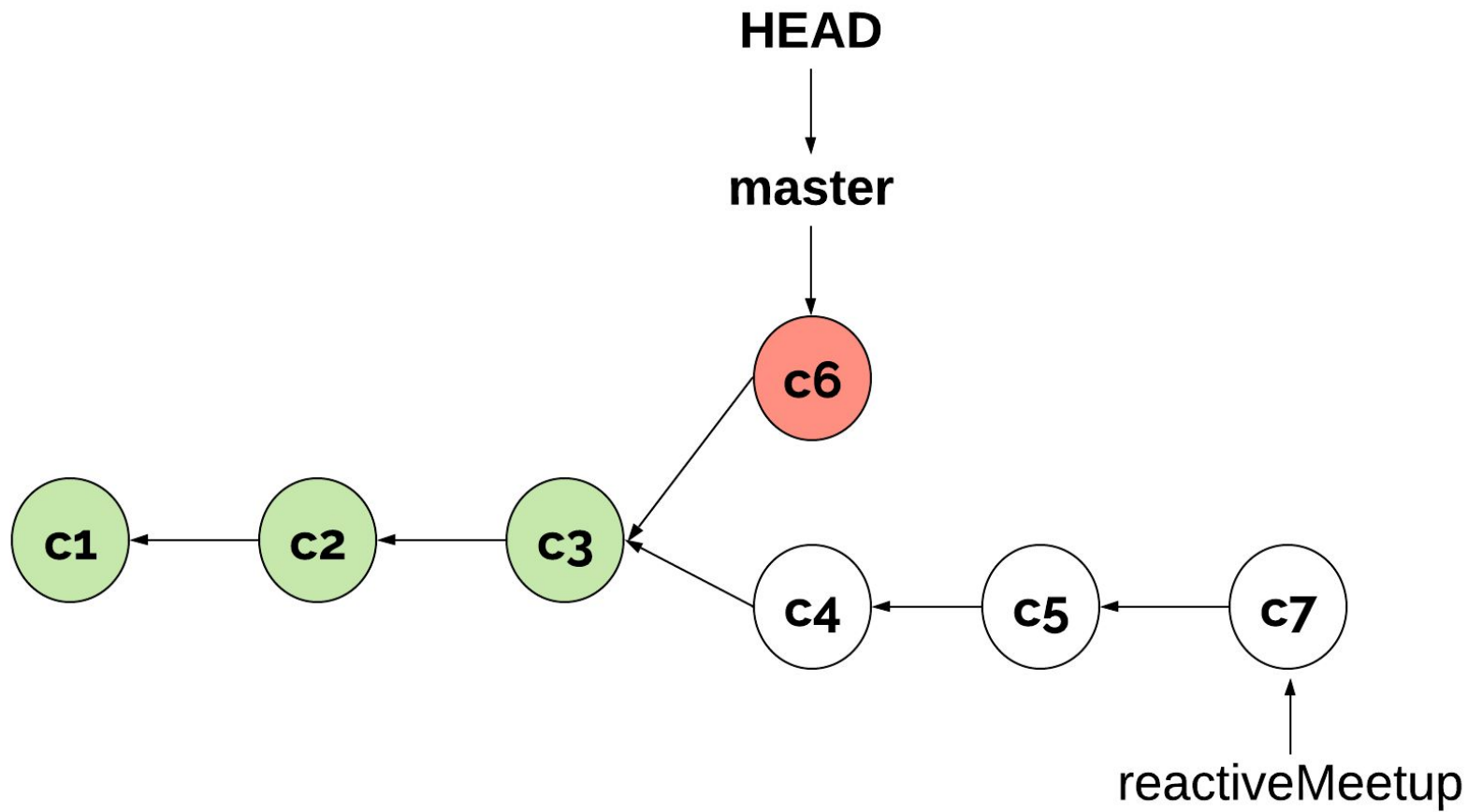
```
no changes added to commit (use "git add" and/or "git commit -a")
```

Open the file having conflicts

```
<<<<<<< HEAD
## Run yes1
=====
## Run No
>>>>>>> 68510c69... My commit to master branch
```

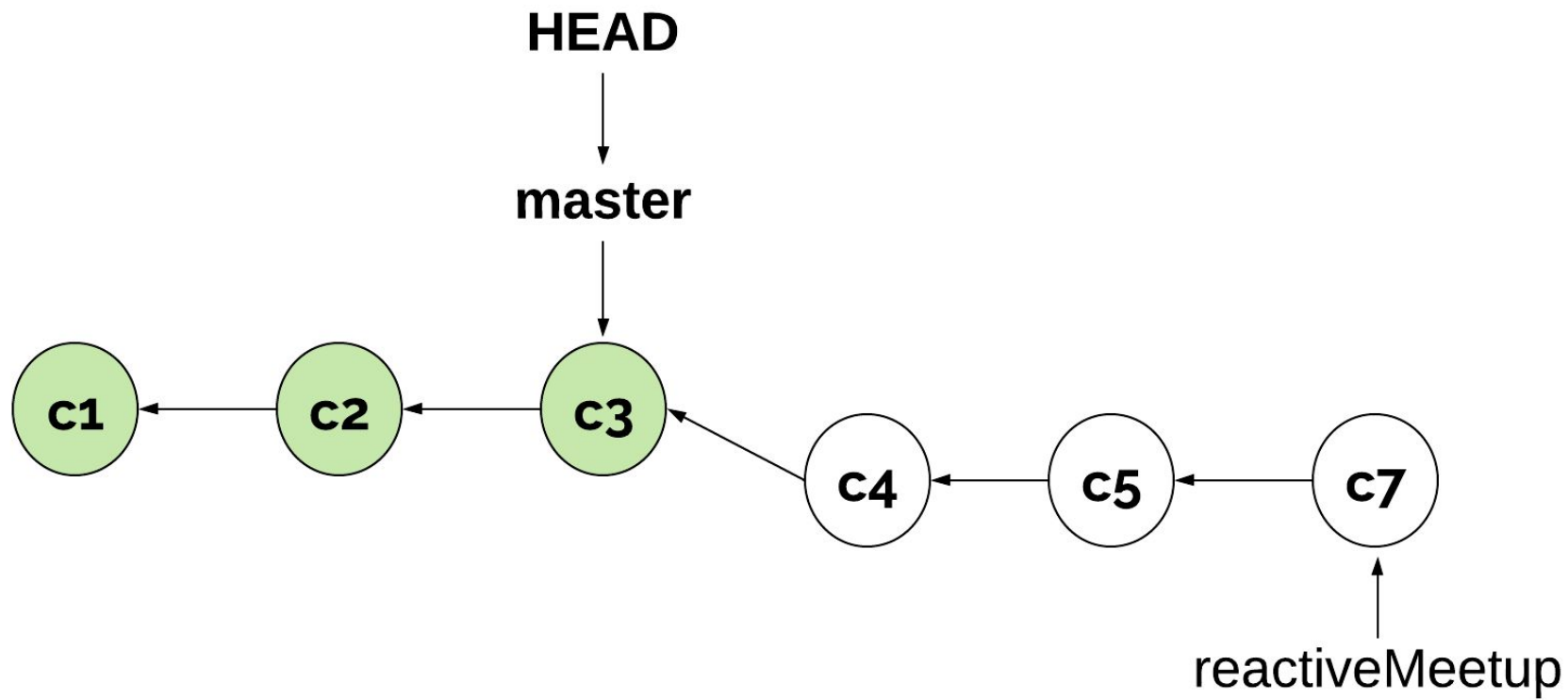




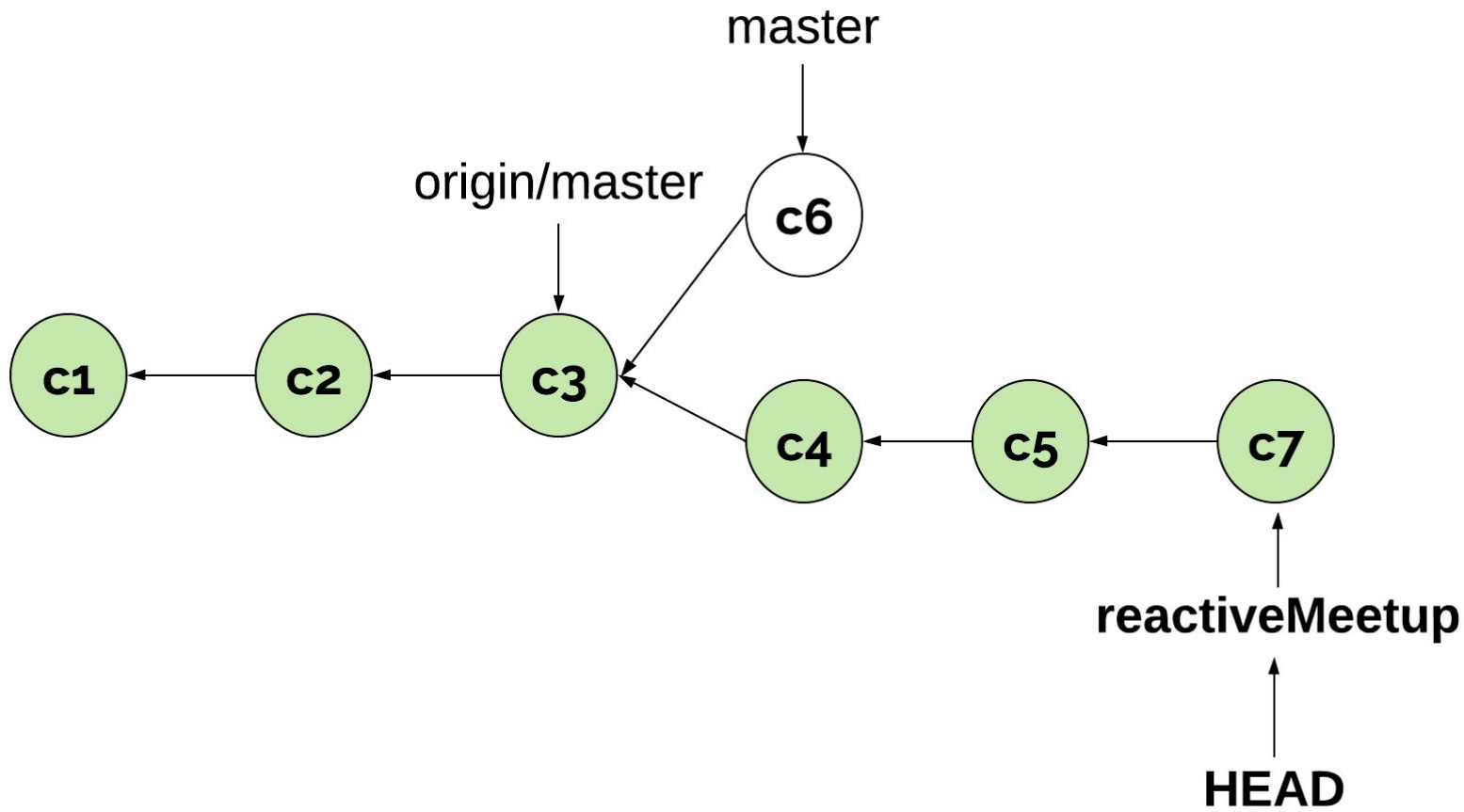


git reset --hard HEAD~1

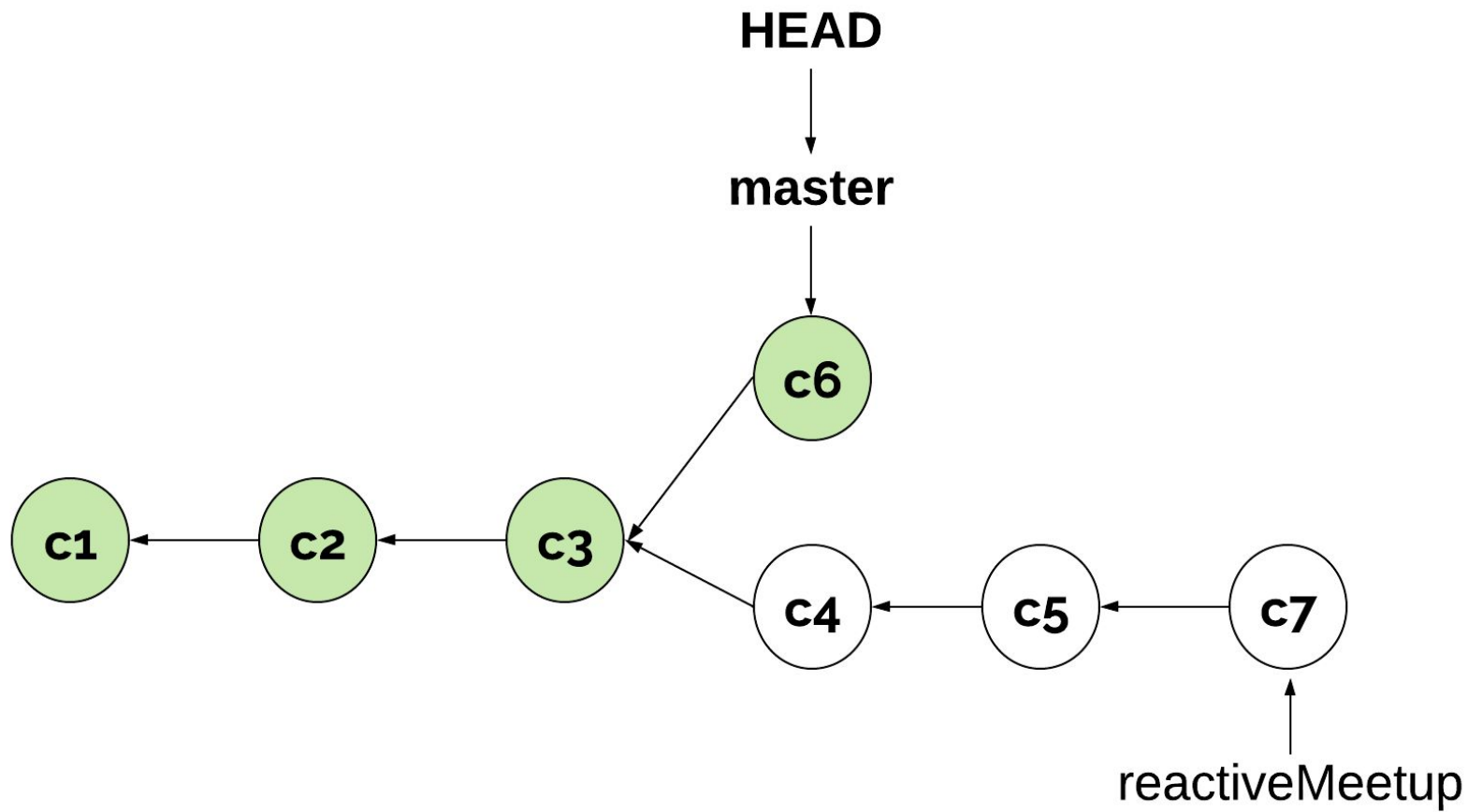
```
$ git reset --hard HEAD~1  
HEAD is now at 805b4be2 Update vacuumlabs-reasonml.mdx
```

Merging



- Switch branch to *master*



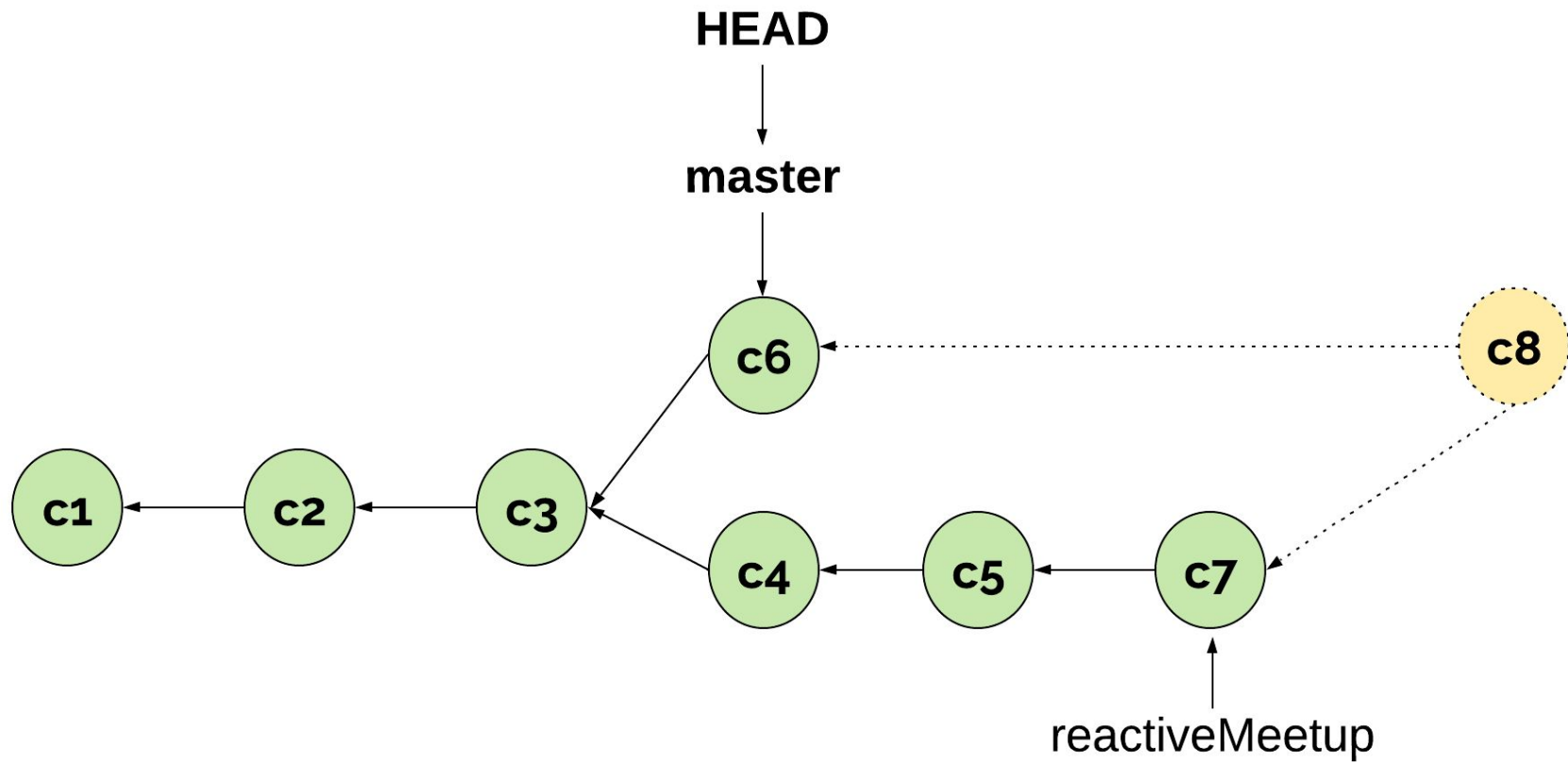
- Switch branch to *master*
- Merge *reactiveMeetup* into *master*

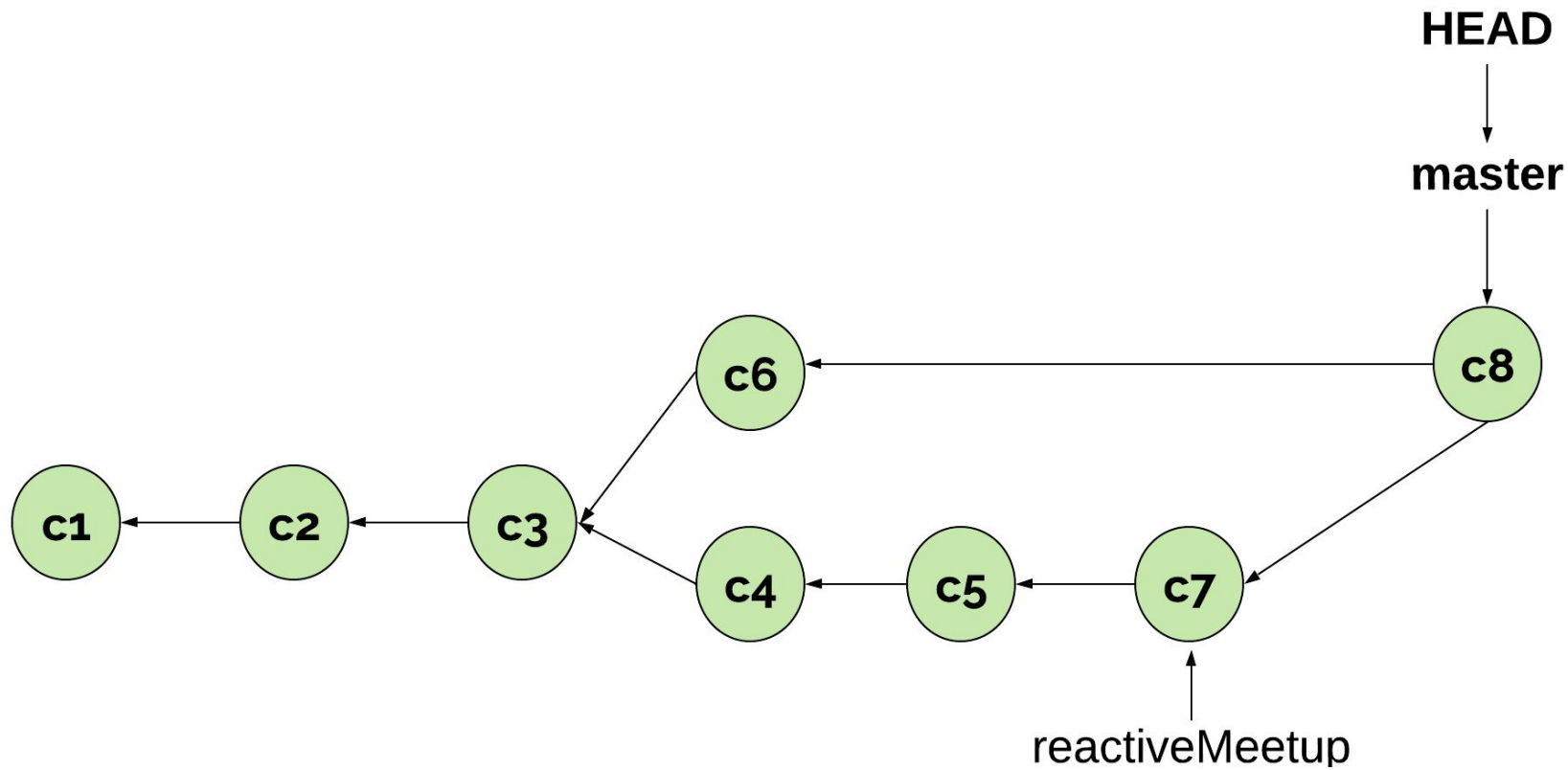
git merge reactiveMeetup

- Switch branch to *master*
- Merge *reactiveMeetup* into *master*

git merge reactiveMeetup

- If any merge conflicts, resolve!





- Git is definitely not as scary as you think

- Git is definitely not as scary as you think
- <https://git-scm.com/doc>
- [Git Pro Book](#)

**And.... that's how you can
tame the 'Git'saurus!**