Version Control with Git

What is version control?

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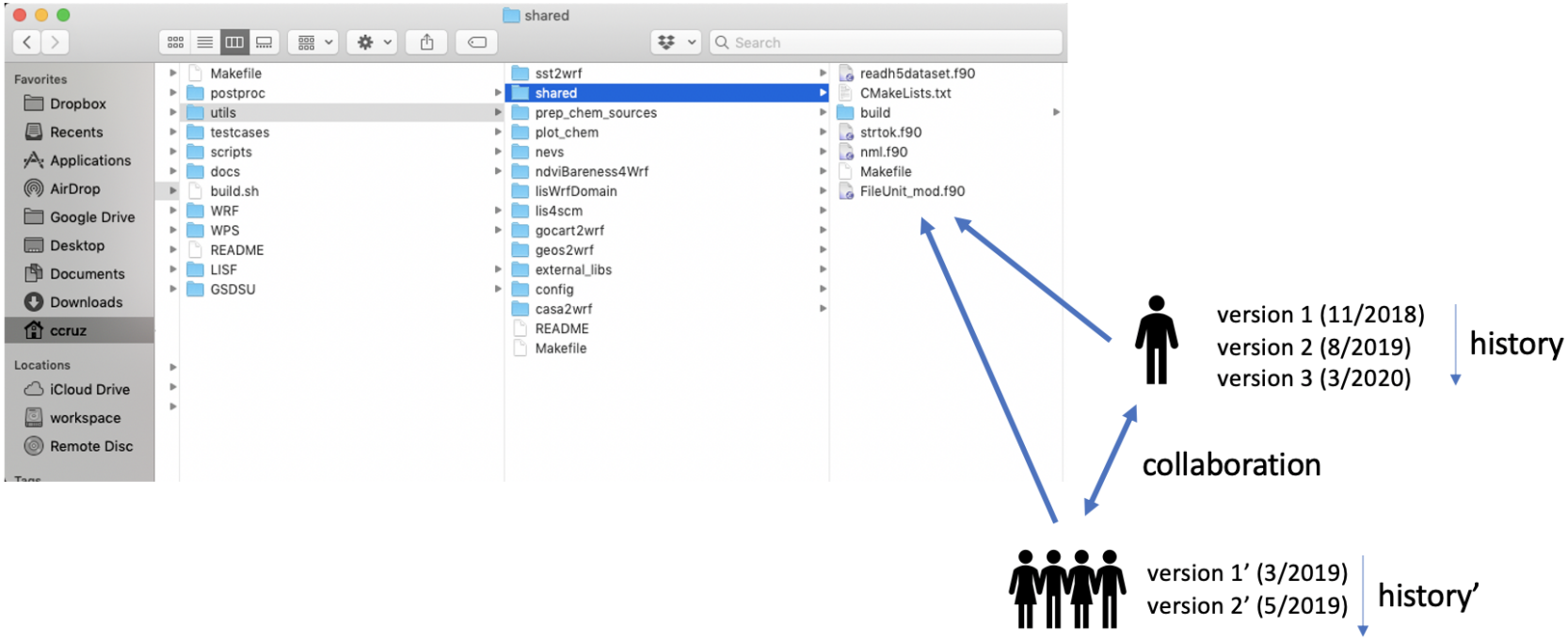


Centralized version control systems

In a central VCS there is **one** repository containing the master version (the "trunk") of the source code.

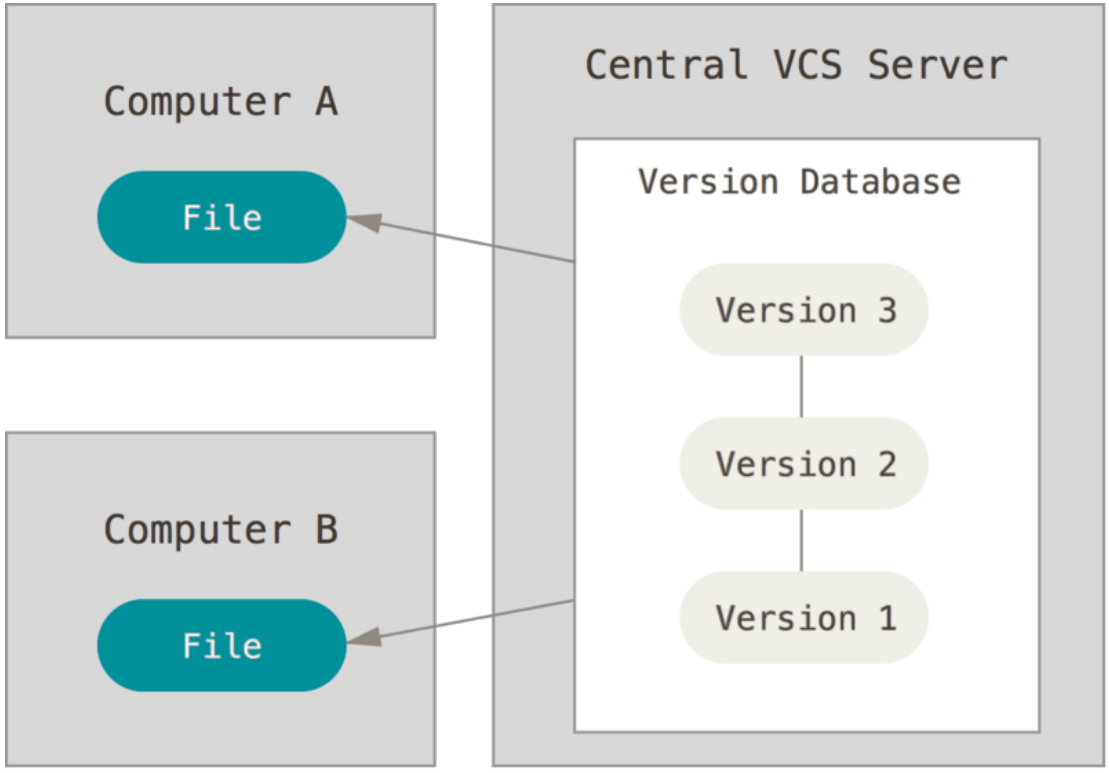


Image source: `https://git-scm.com`

Example: SCCS, RCS, CVS, SVN

Distributed version control systems

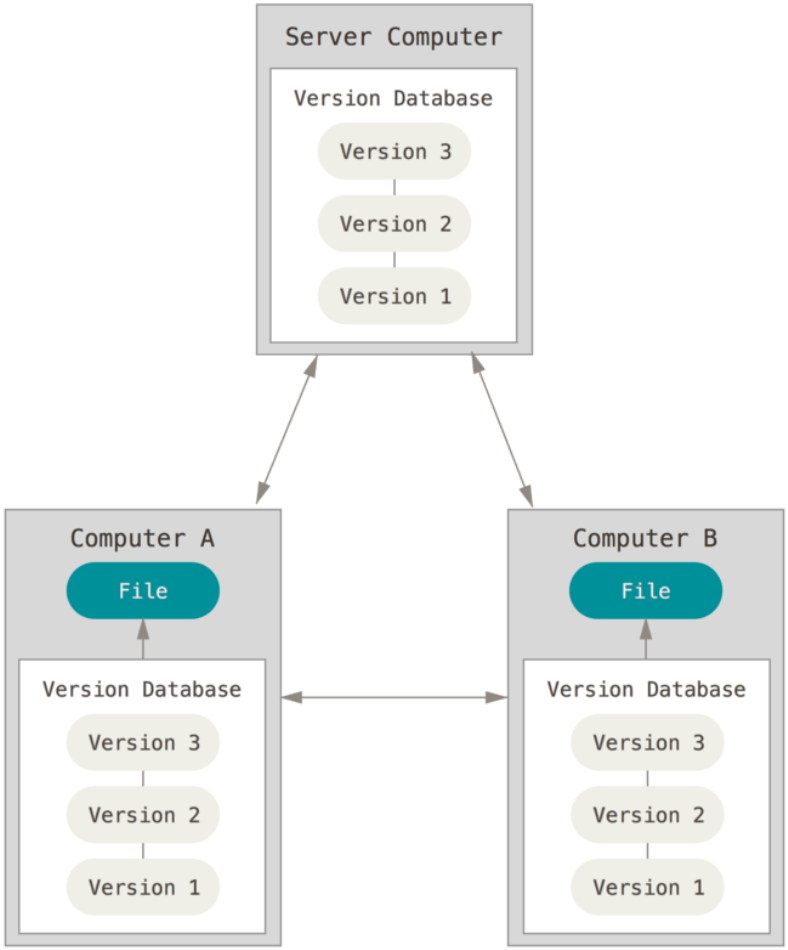
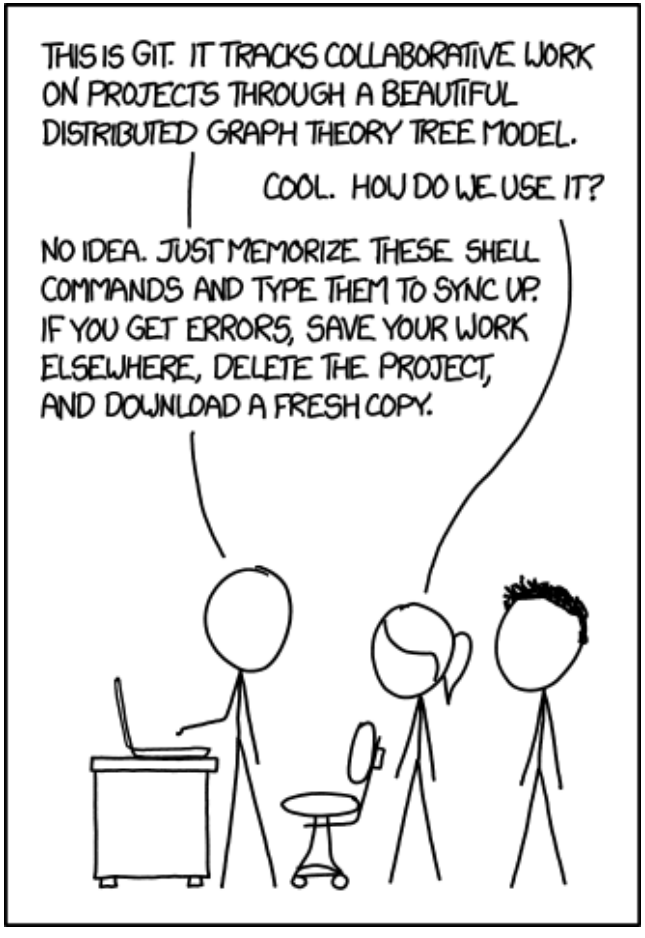


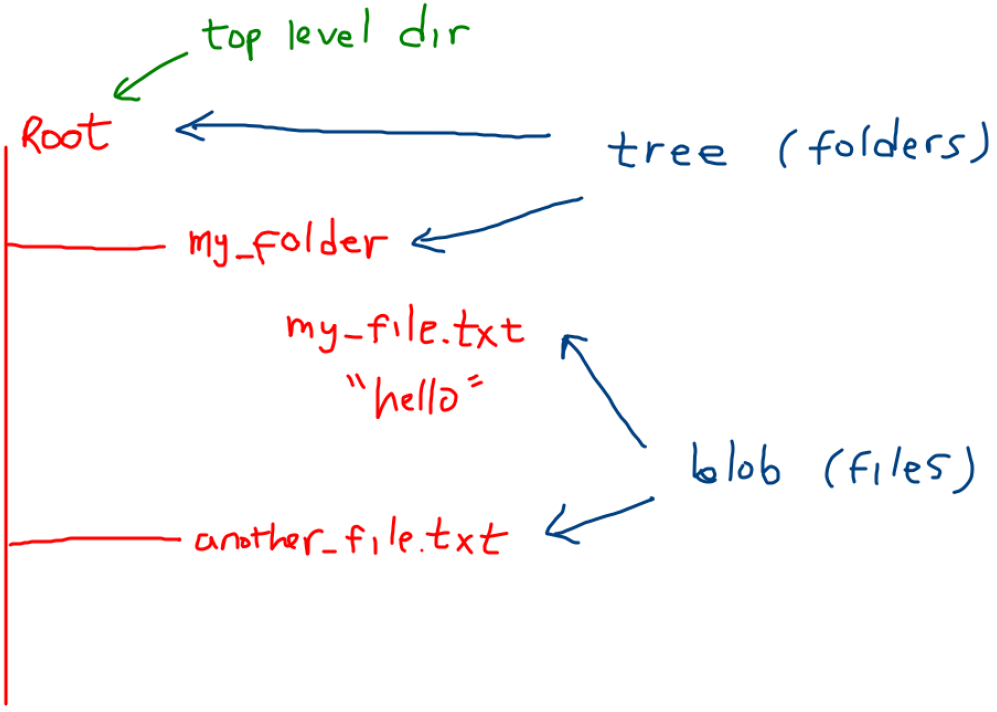
Image source: https://git-scm.com

Example: Git, Mercurial

The Git concept



The Git Model



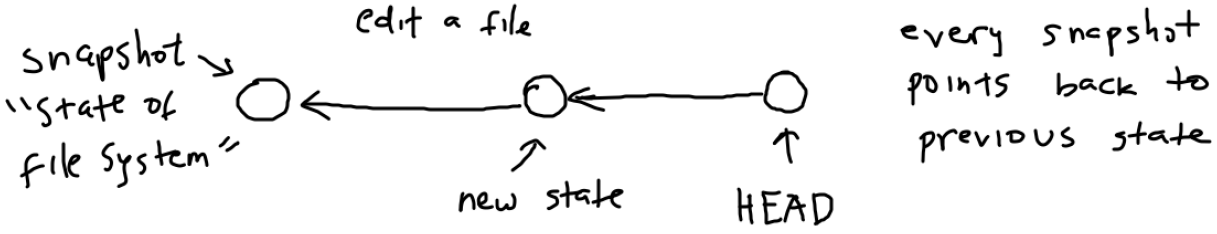
Git Data Model

Recursive data structure of tree + blob

NASA
SSAI

The Git Model

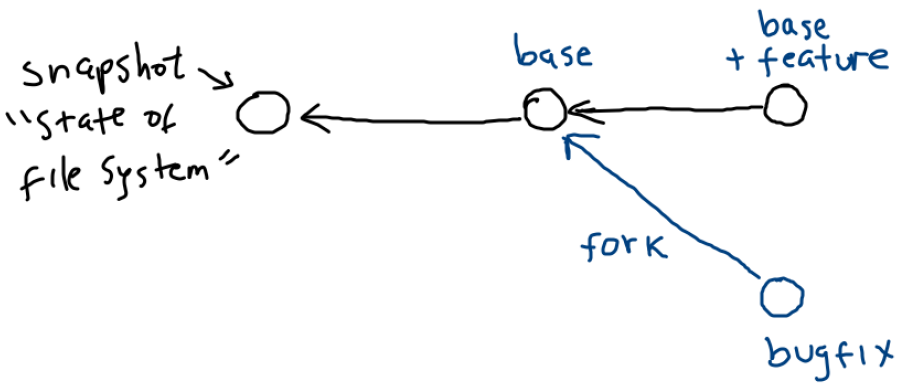
How do we model this?



Linear history

The Git Model

How do we model this?



The Git Model

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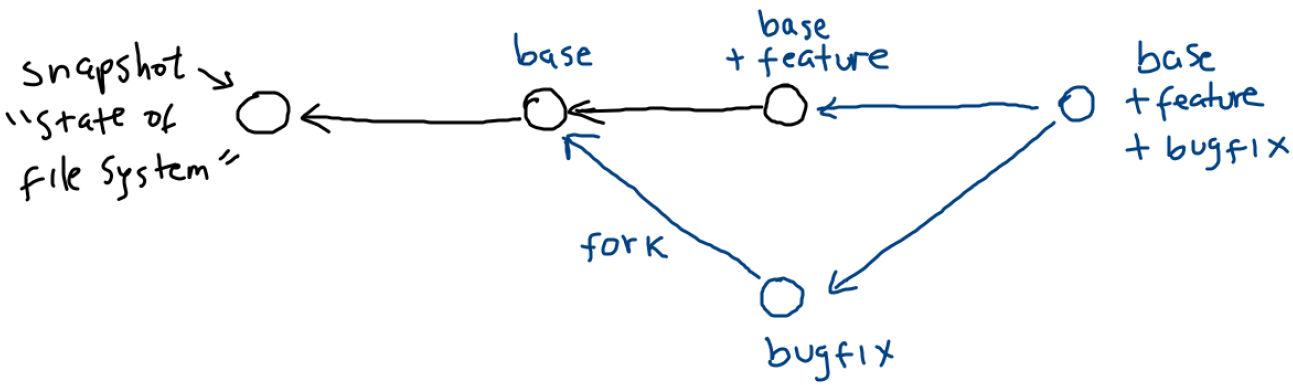
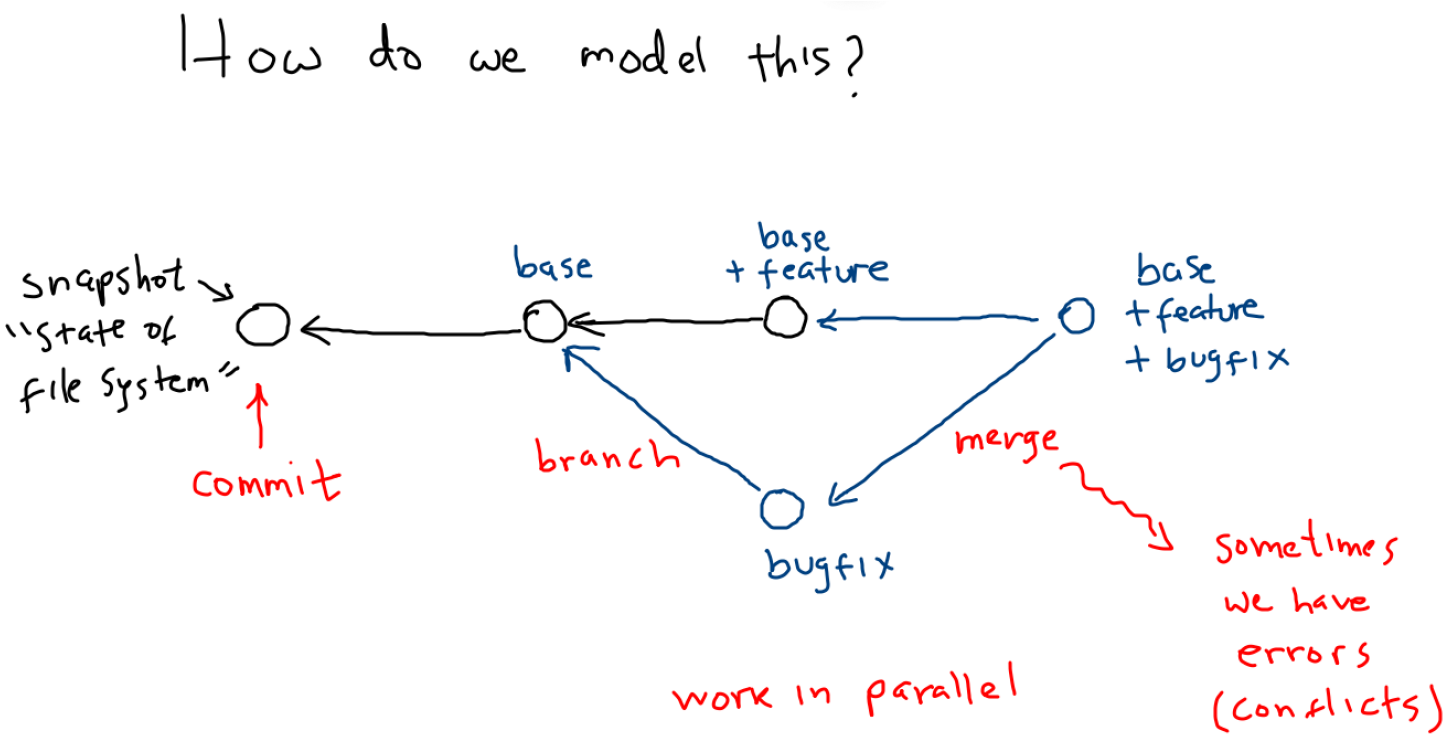


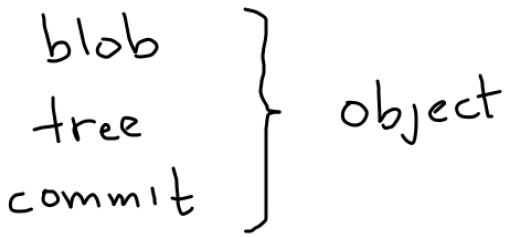
NASA
SSAI

The Git Model



The Git Model

How is this represented ?



NASA
SSAI

The Git Model

How is this represented ?

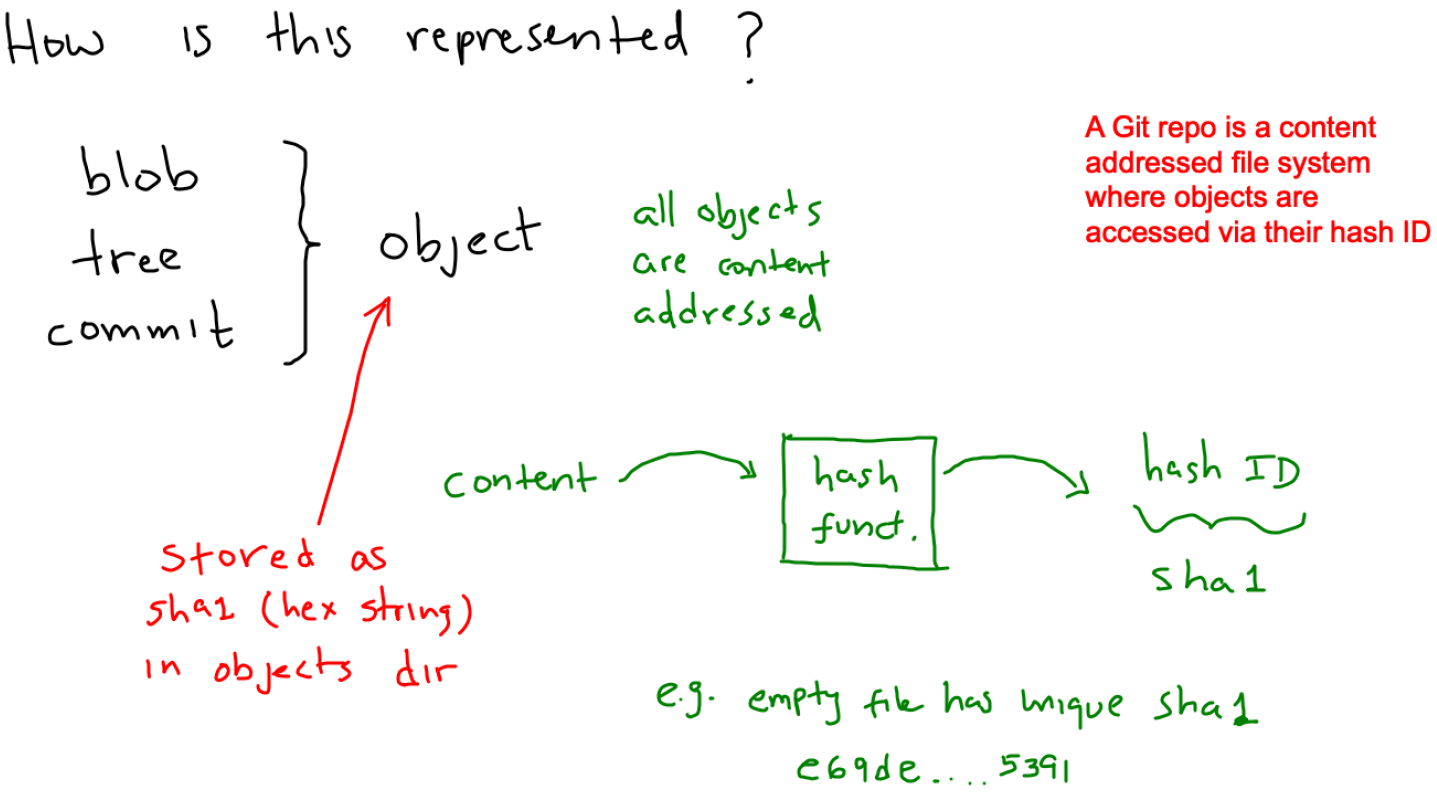
blob
tree
commit
} object

all objects are content addressed

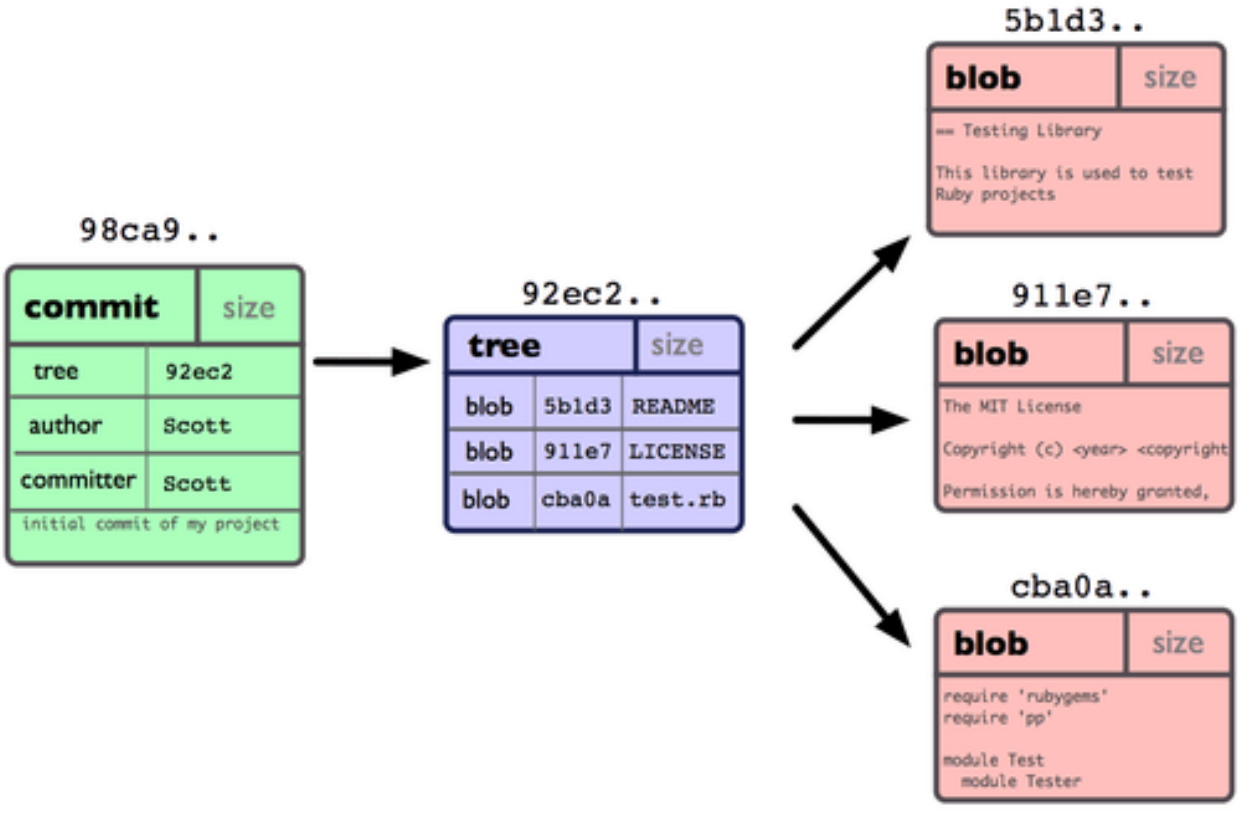
e.g. empty file has unique sha1
e69de....5391

NASA
SSAI

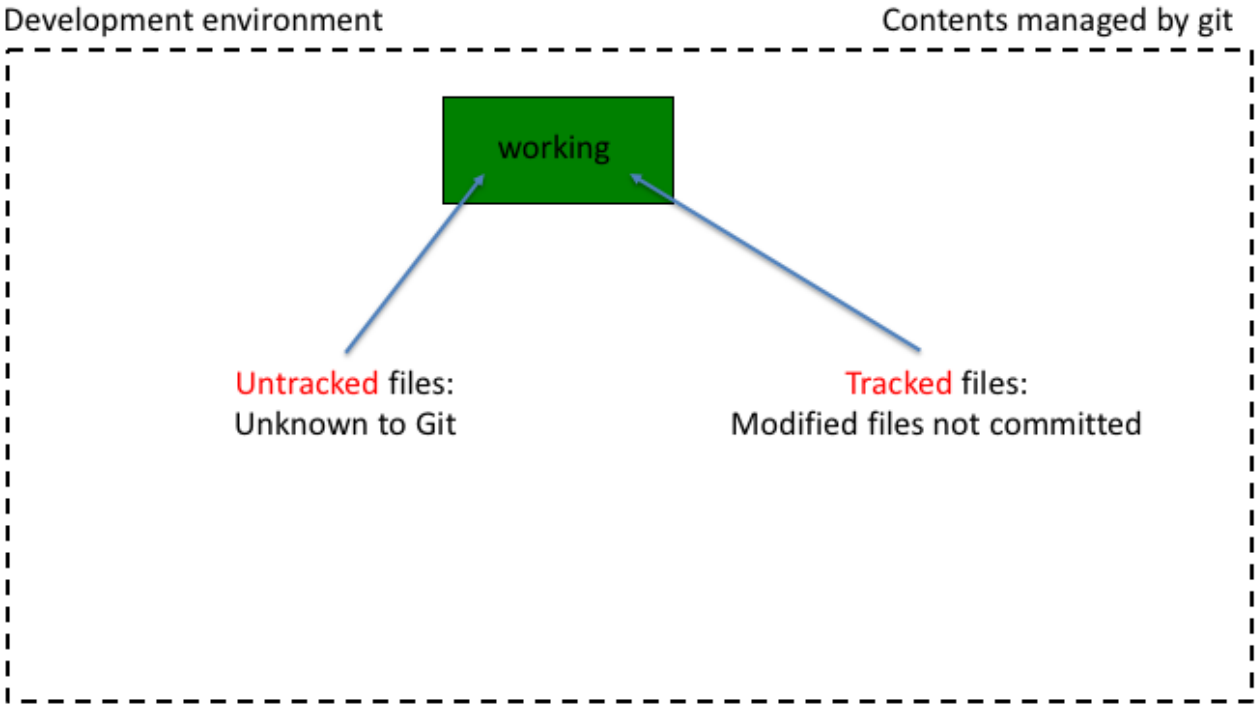
The Git Model



The Git model

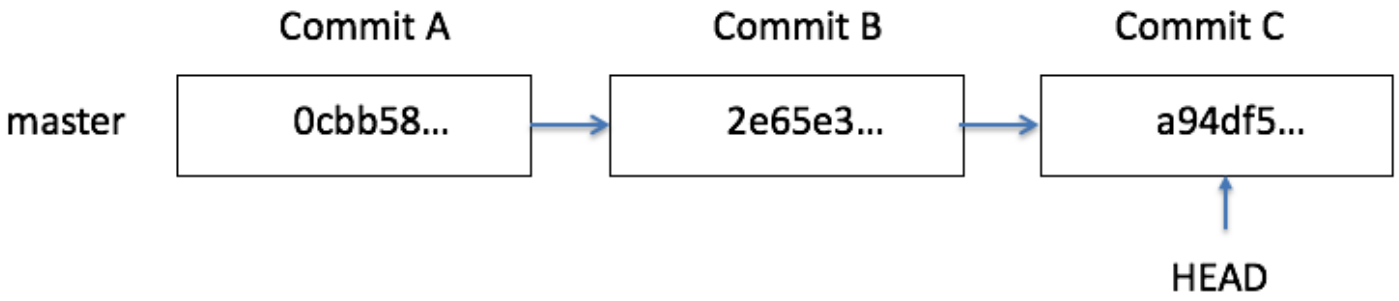


The Git Setup



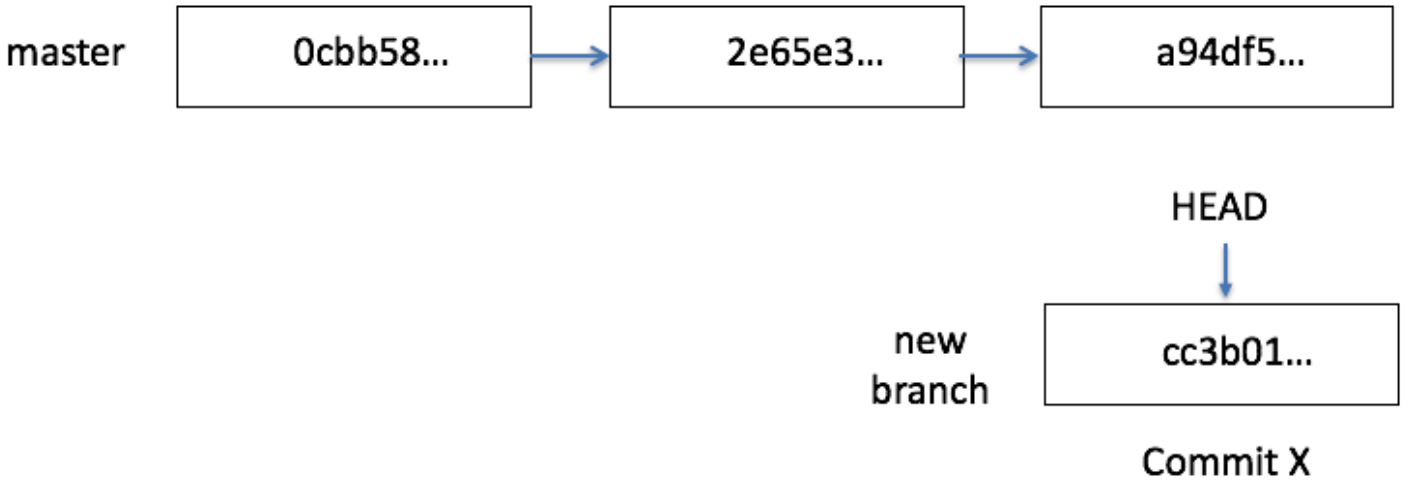
Branching

Commits are repository snapshots



Branching

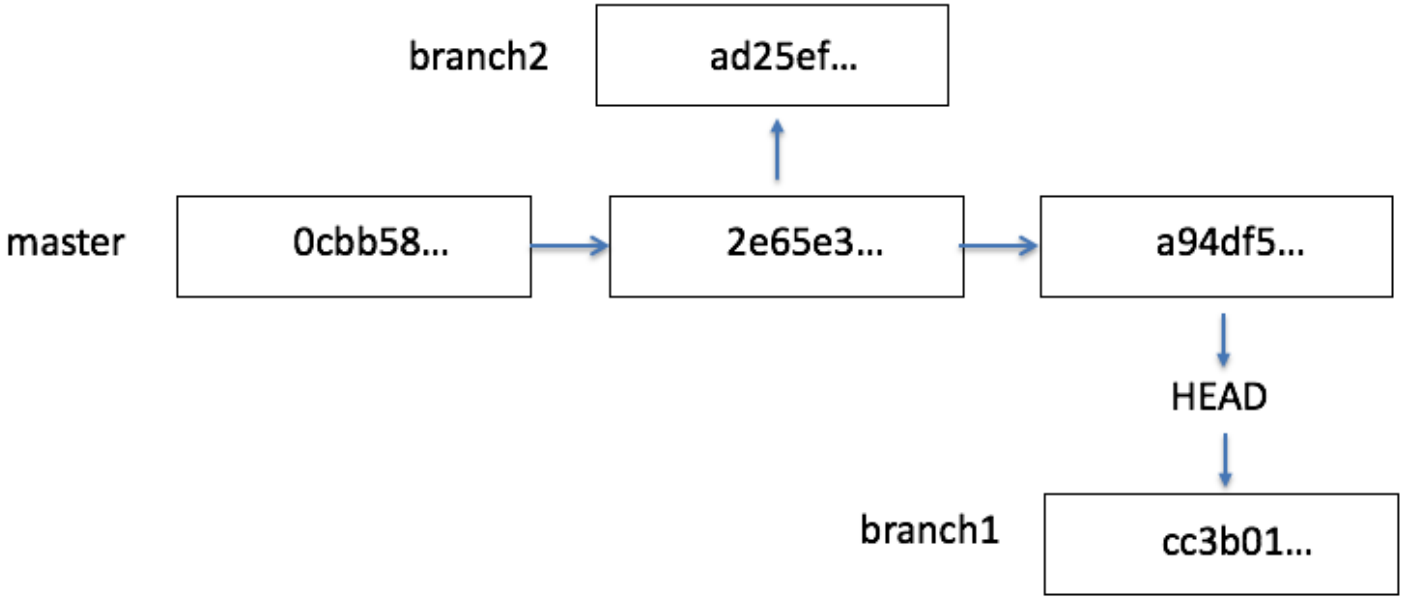
A branch is a pointer to commit - not a full copy.



HEAD points to tip of current branch in repository

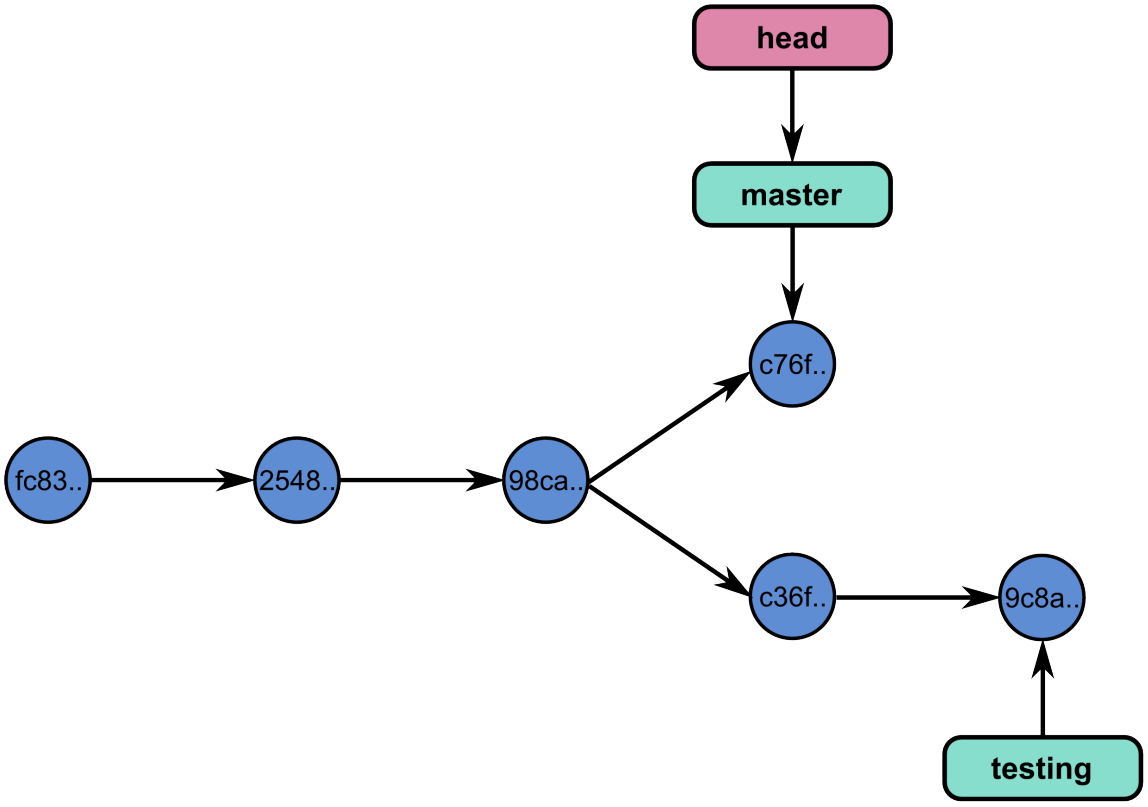
Branching

Can have many branches



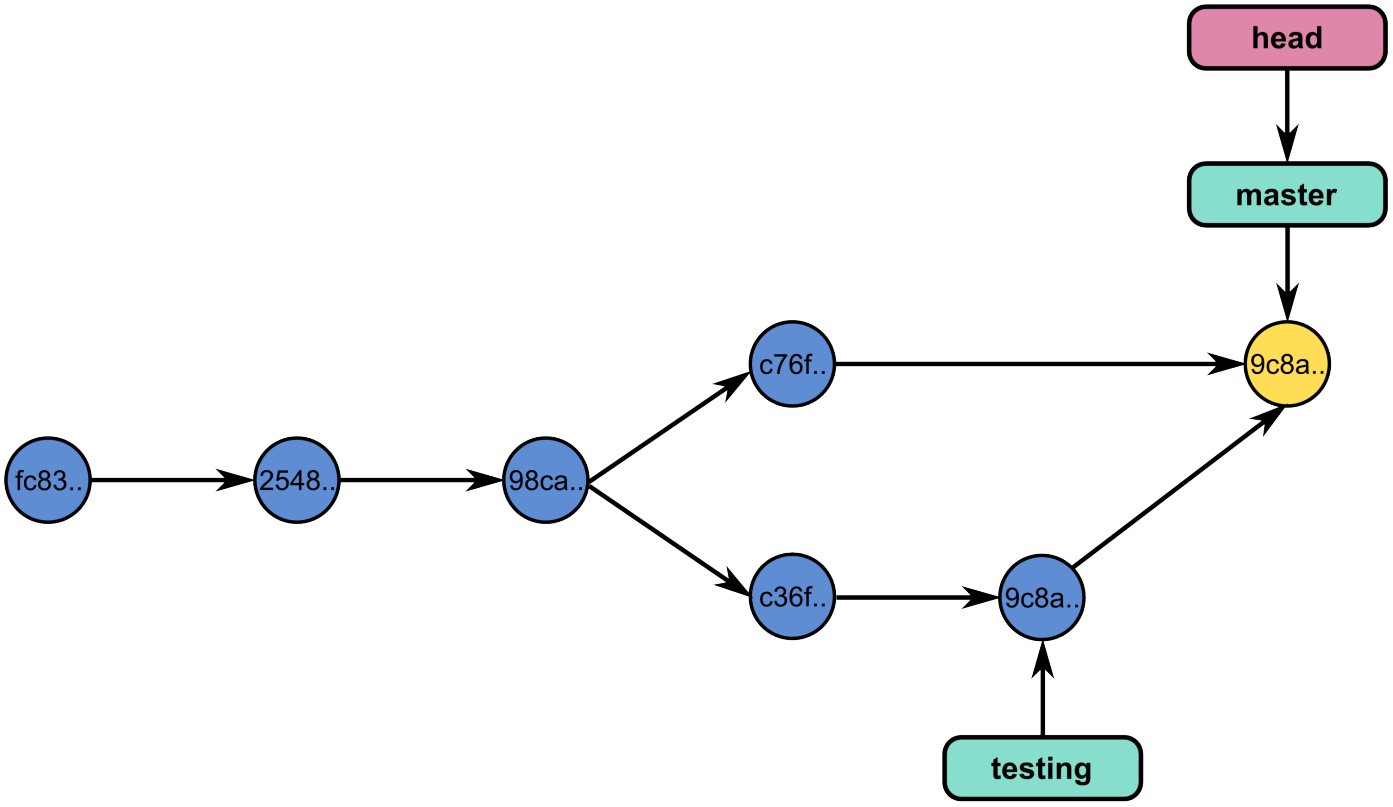
Merging

We have two branches

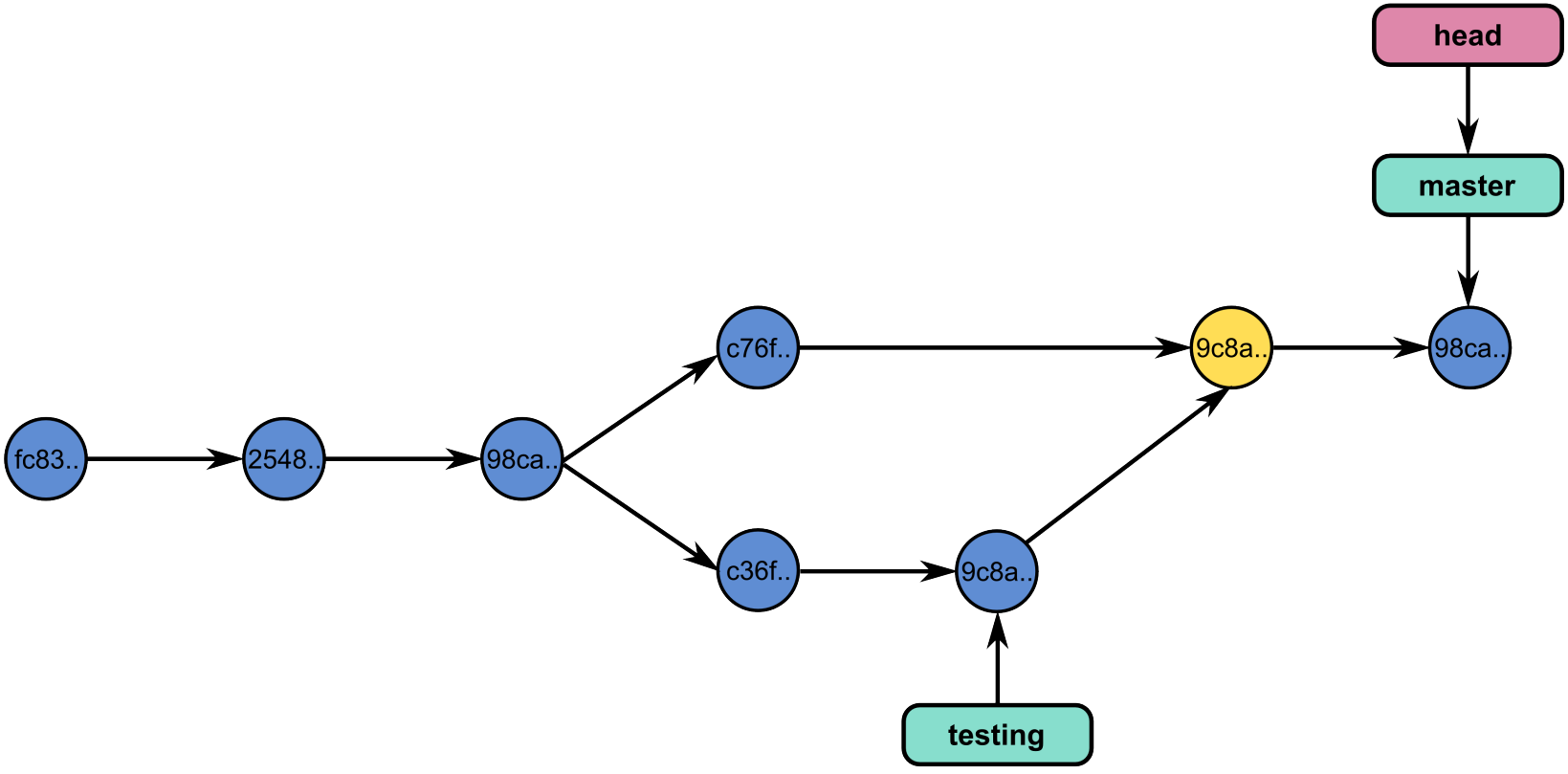


Merging

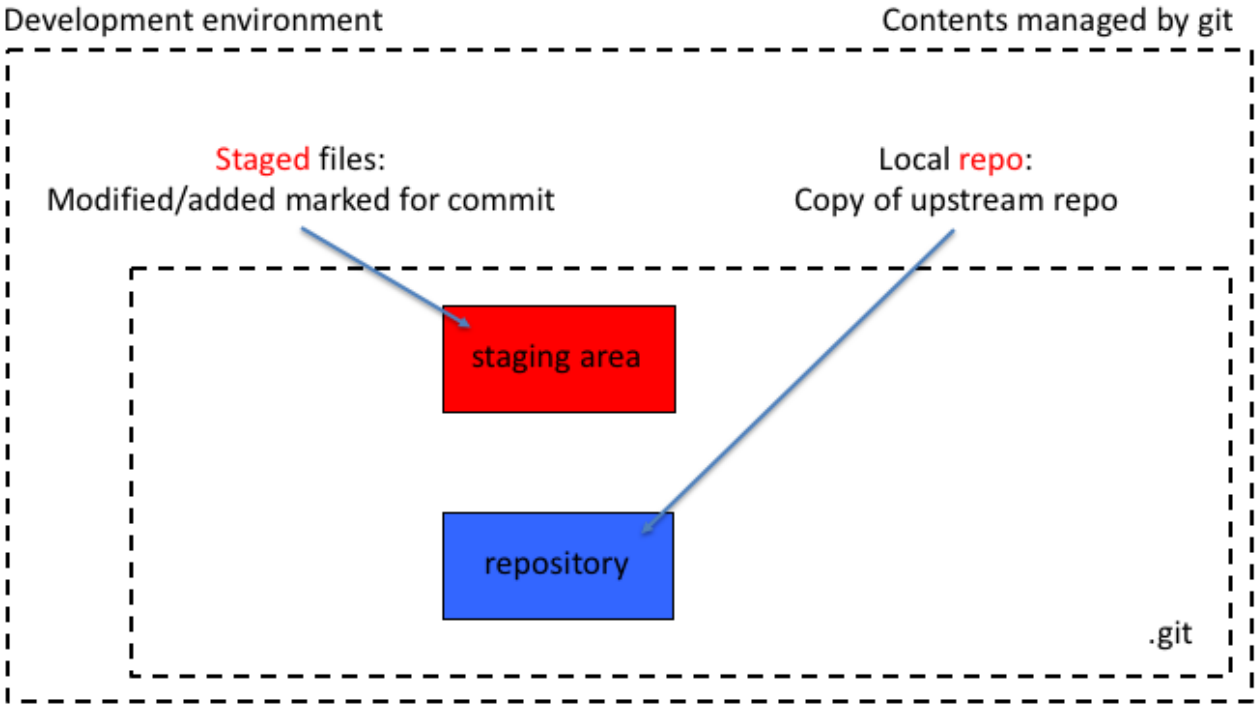
Merge testing into master



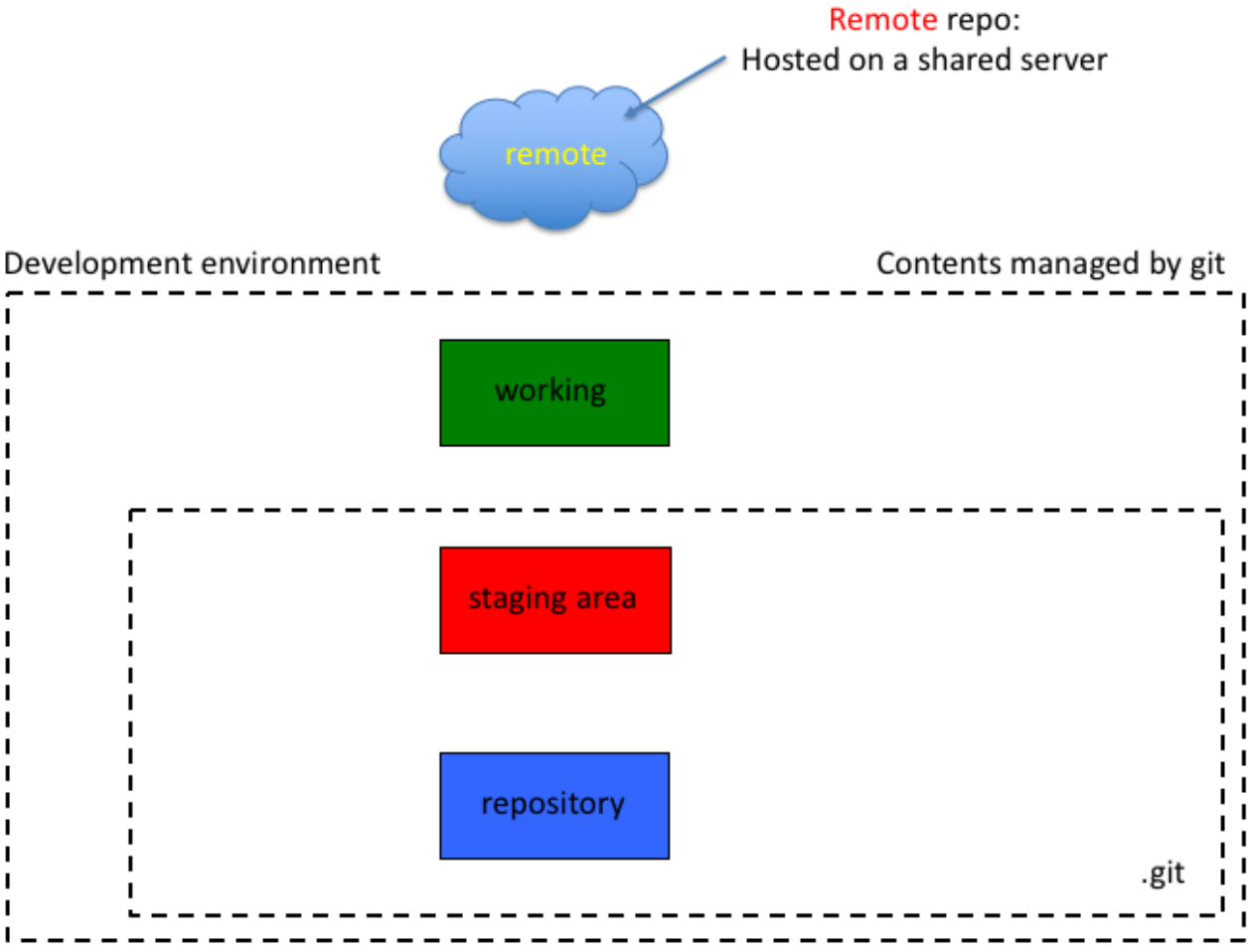
Merging



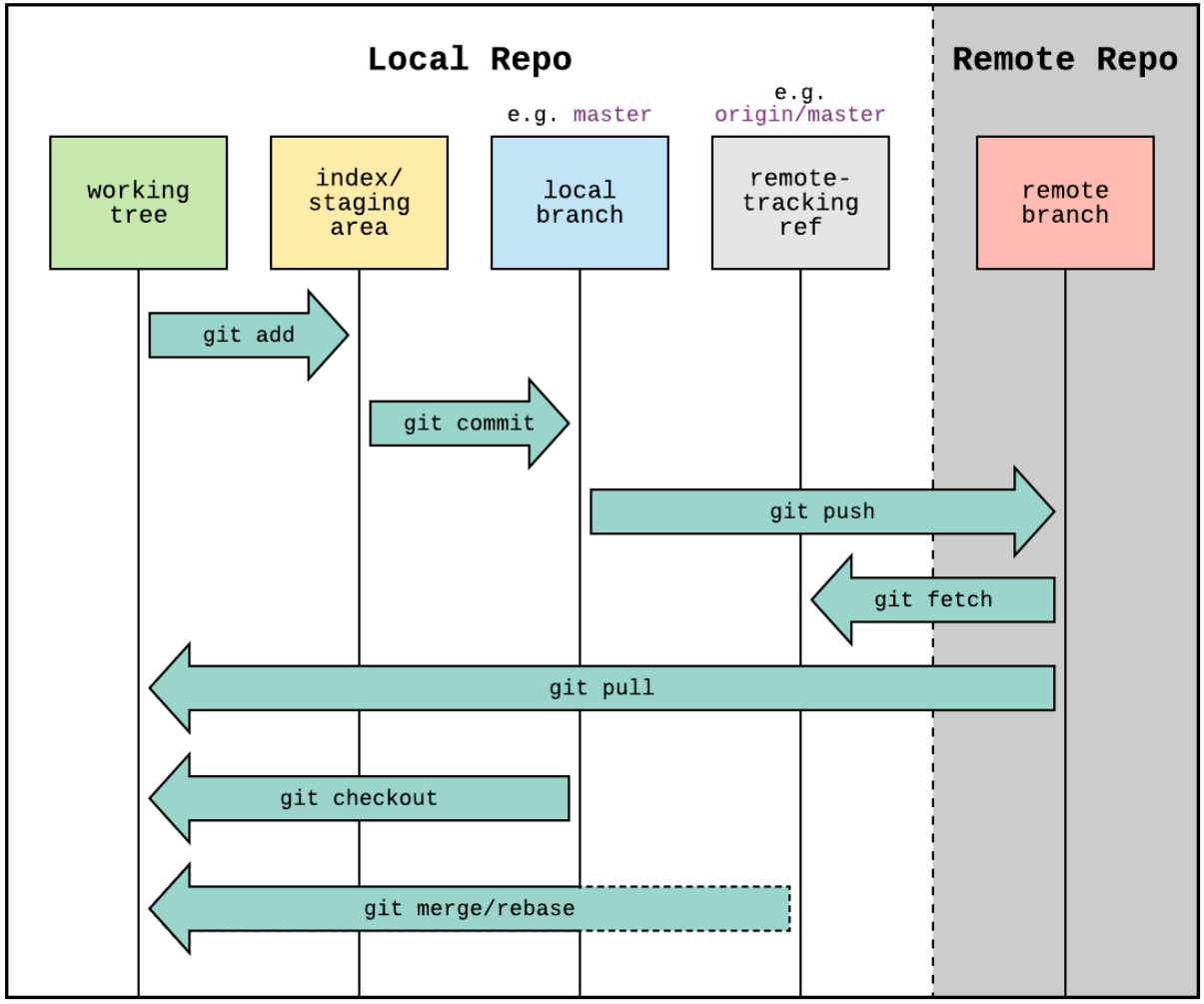
Remotes


Development environment
Contents managed by git
Staged files:
Modified/added marked for commit
Local repo:
Copy of upstream repo
staging area
repository
.git

Remotes


Remote repo:
Hosted on a shared server
remote
Development environment
Contents managed by git
working
staging area
repository
.git

Git workflow



Resources

- Git Community Book
- Pro Git
- A Visual Git Reference
- Git Cheat Sheet