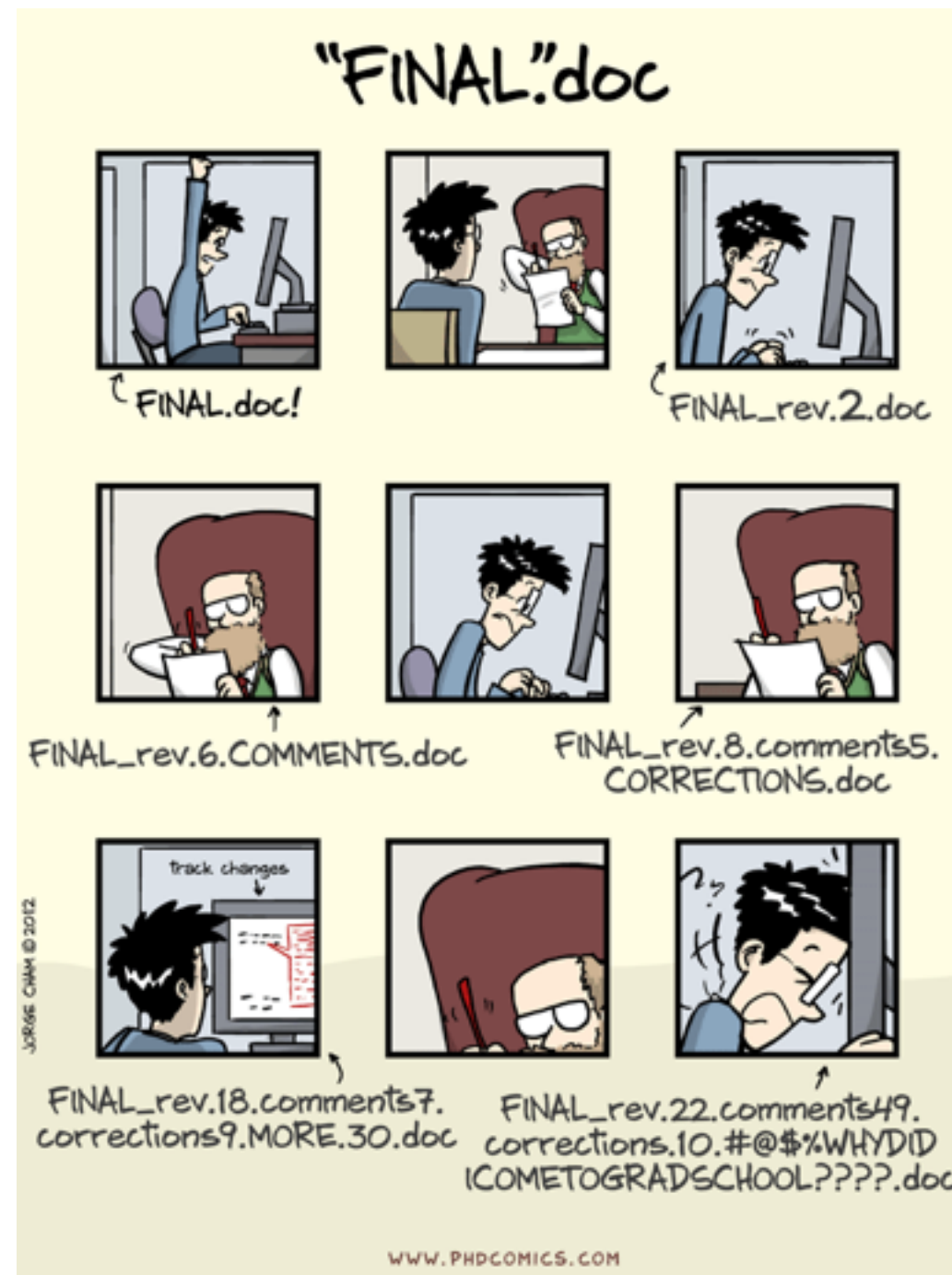


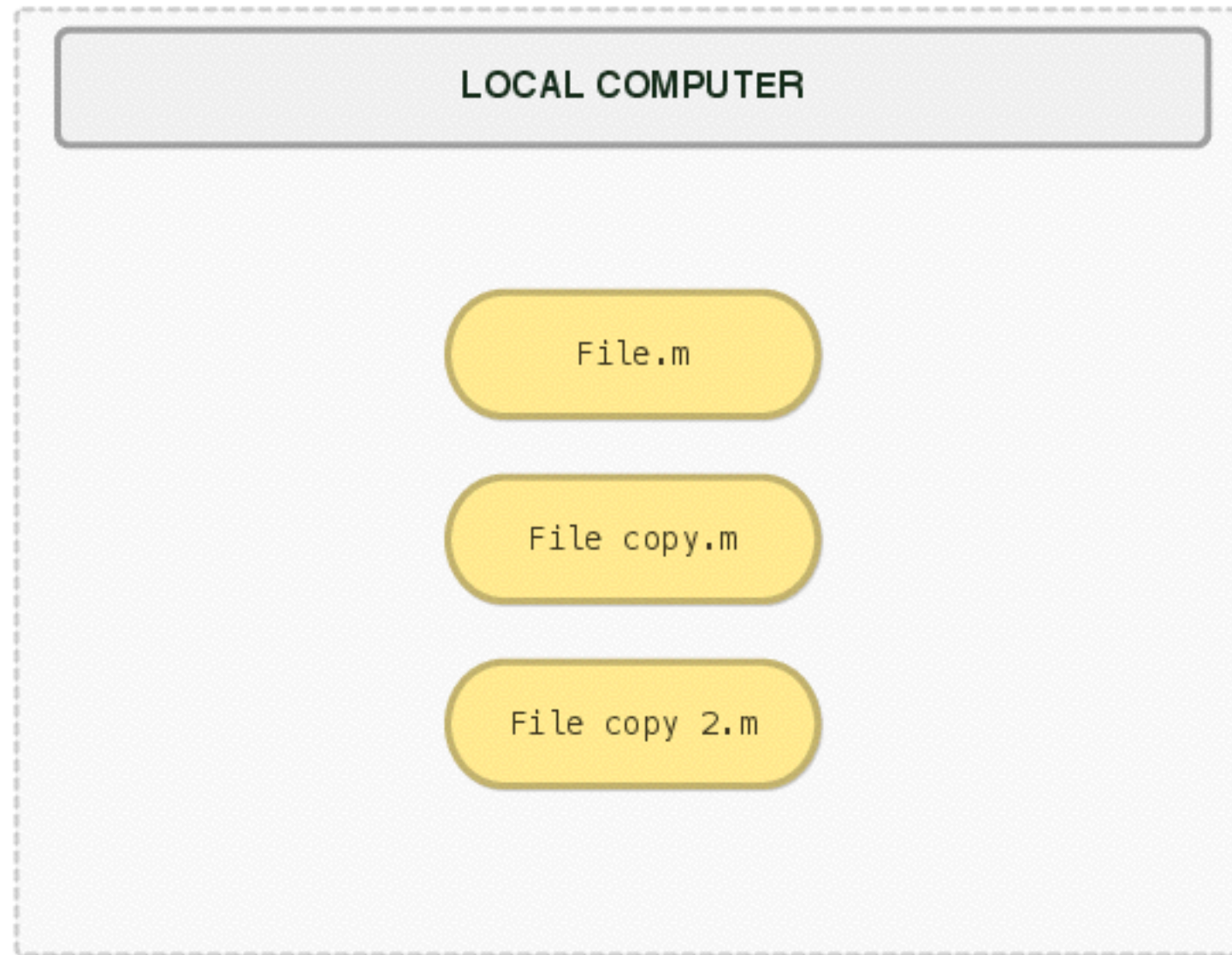
Nicola Cavallini

Basic Git
(adapted from Luca Heltai,
adapted from Patrick Hogan)

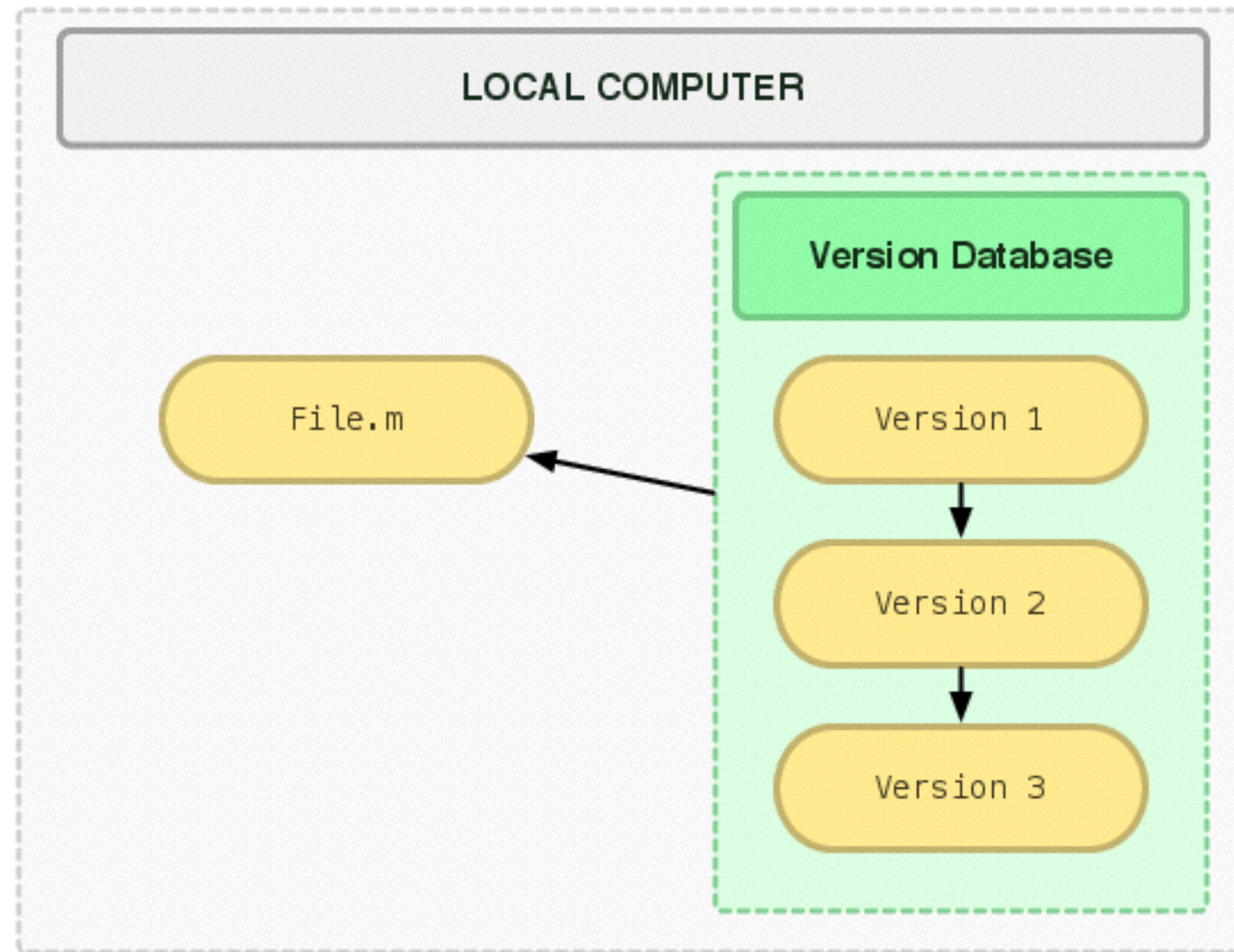
Why Version Control?



Local Filesystem

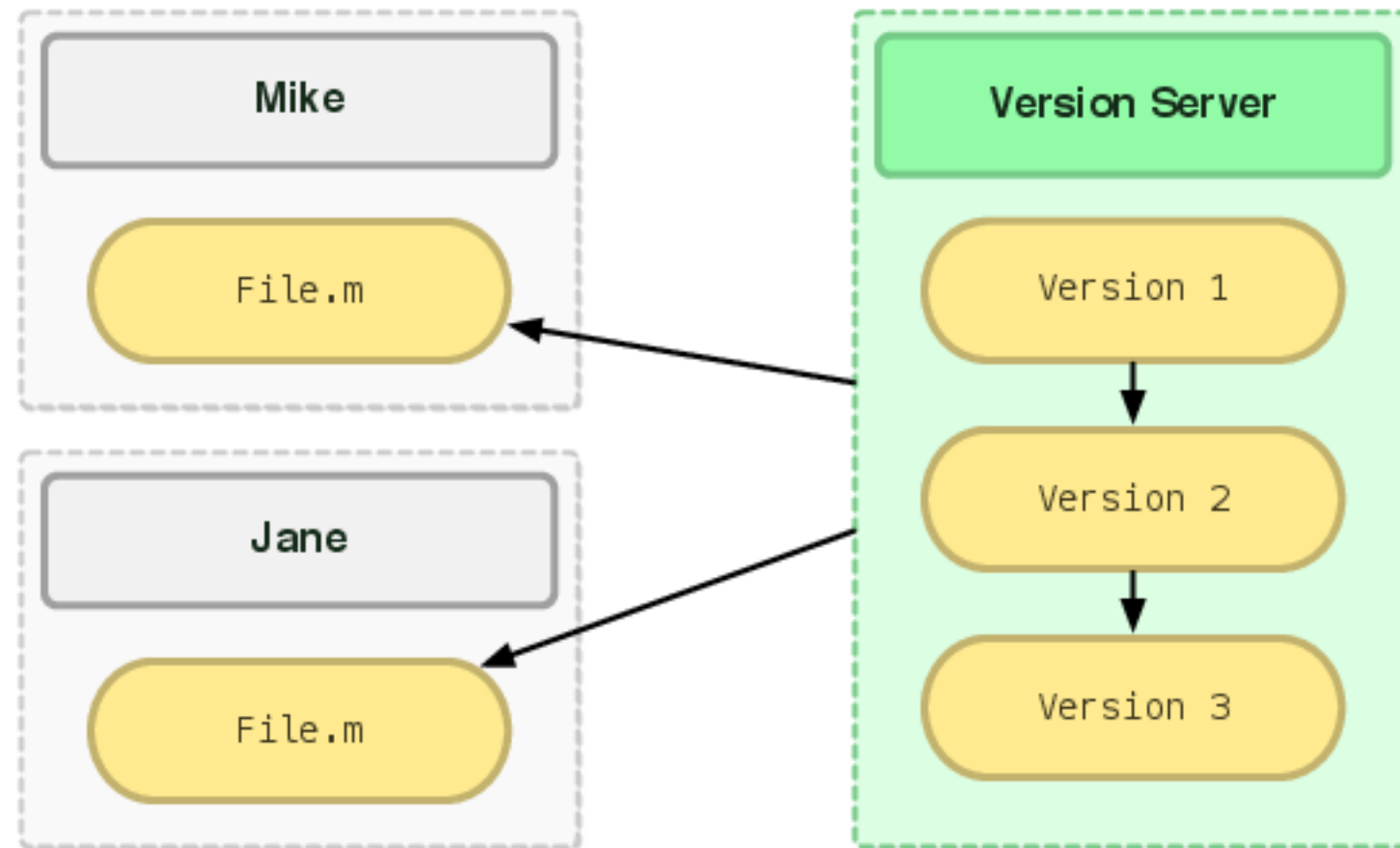


LOCAL Version Control System



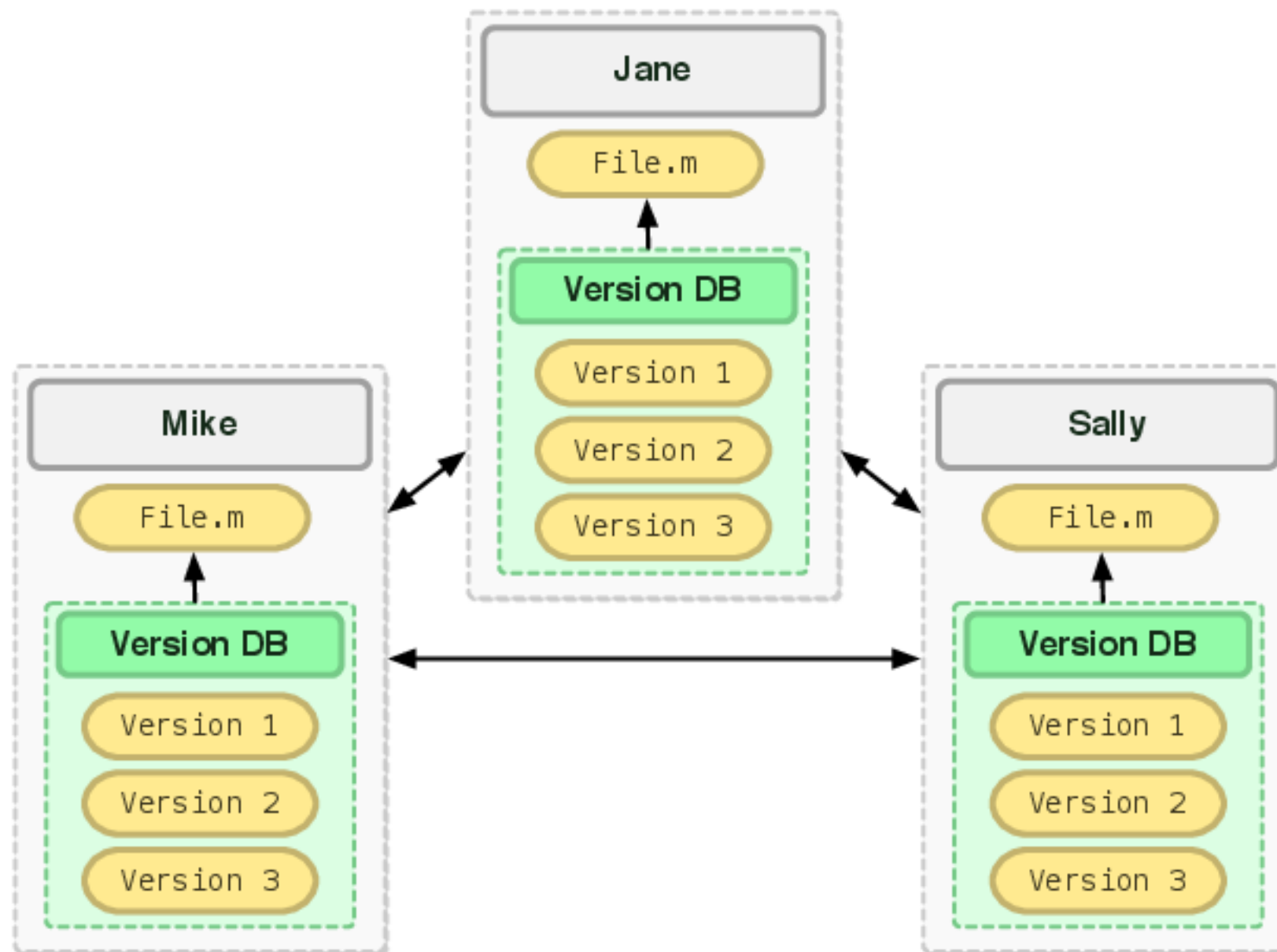
RCS: one image for each file or directory,
each one with its own history.

CENTRALIZED Version Control System



CVS: centralized version of RCS,
with tags that address single version for each file or dir.

DISTRIBUTED Version Control System



Everything is Local

(Almost)

No Network Required

Create Repo

Status

Commit

Revisions

Merge

Diff

Branch

History

Rebase

Bisect

Tag

Local Sync

Advantages

Everything is Fast

Everything is Transparent

Every Clone is a Backup

You Can Work Offline

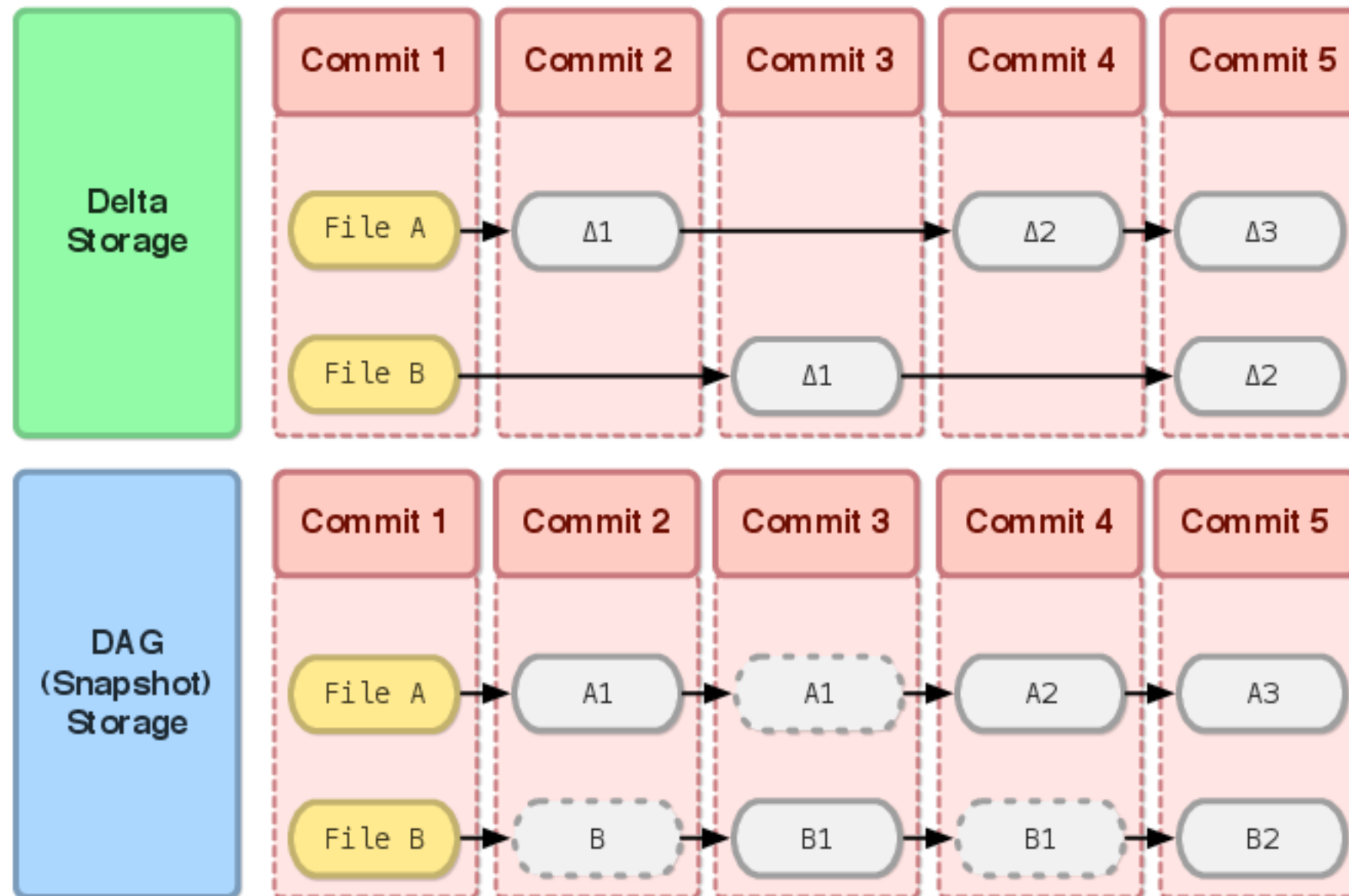
Storage

Delta Storage

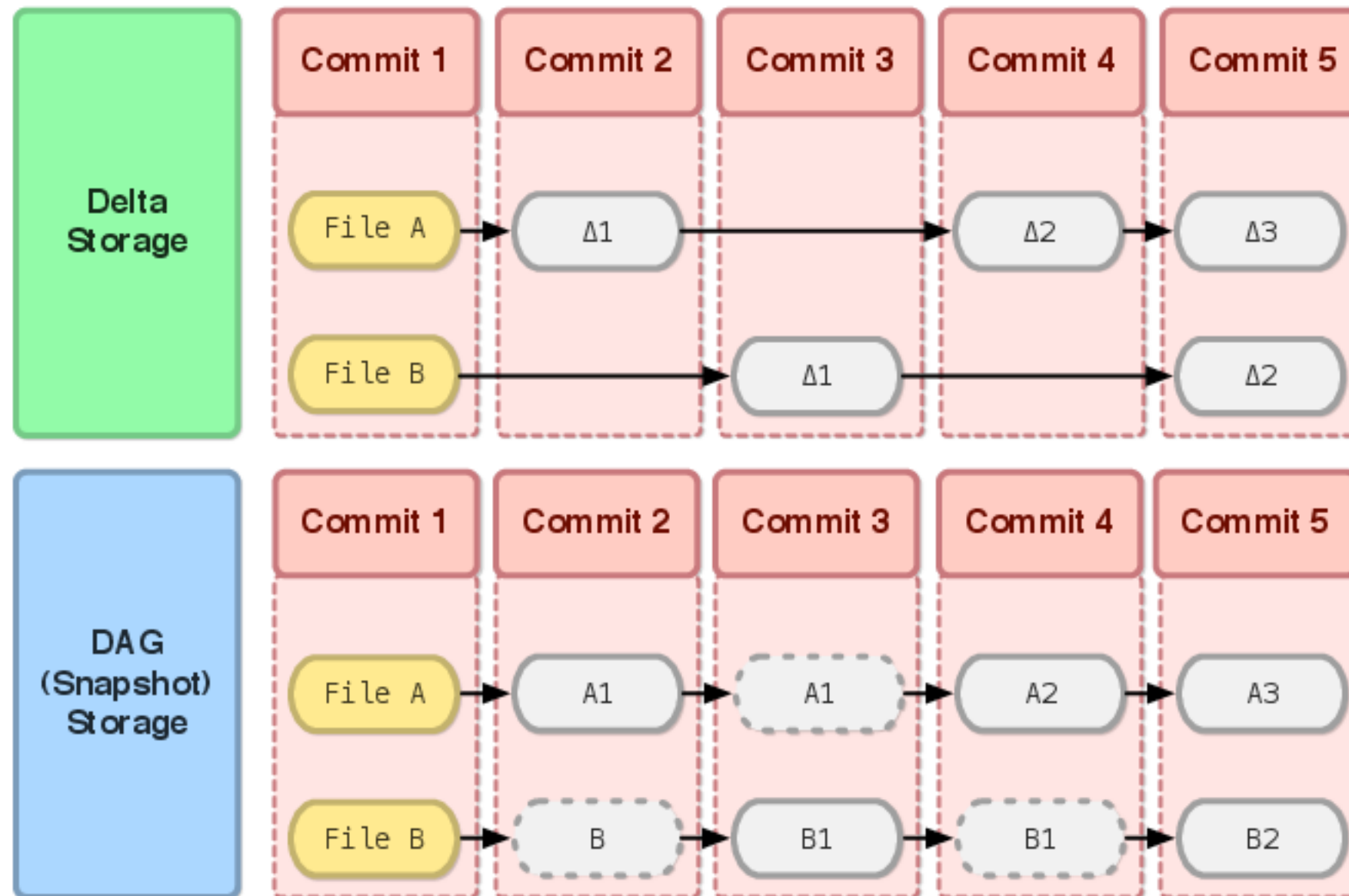
Snapshot Storage

(a.k.a. Direct Acyclic Graph)

Delta vs. Snapshot

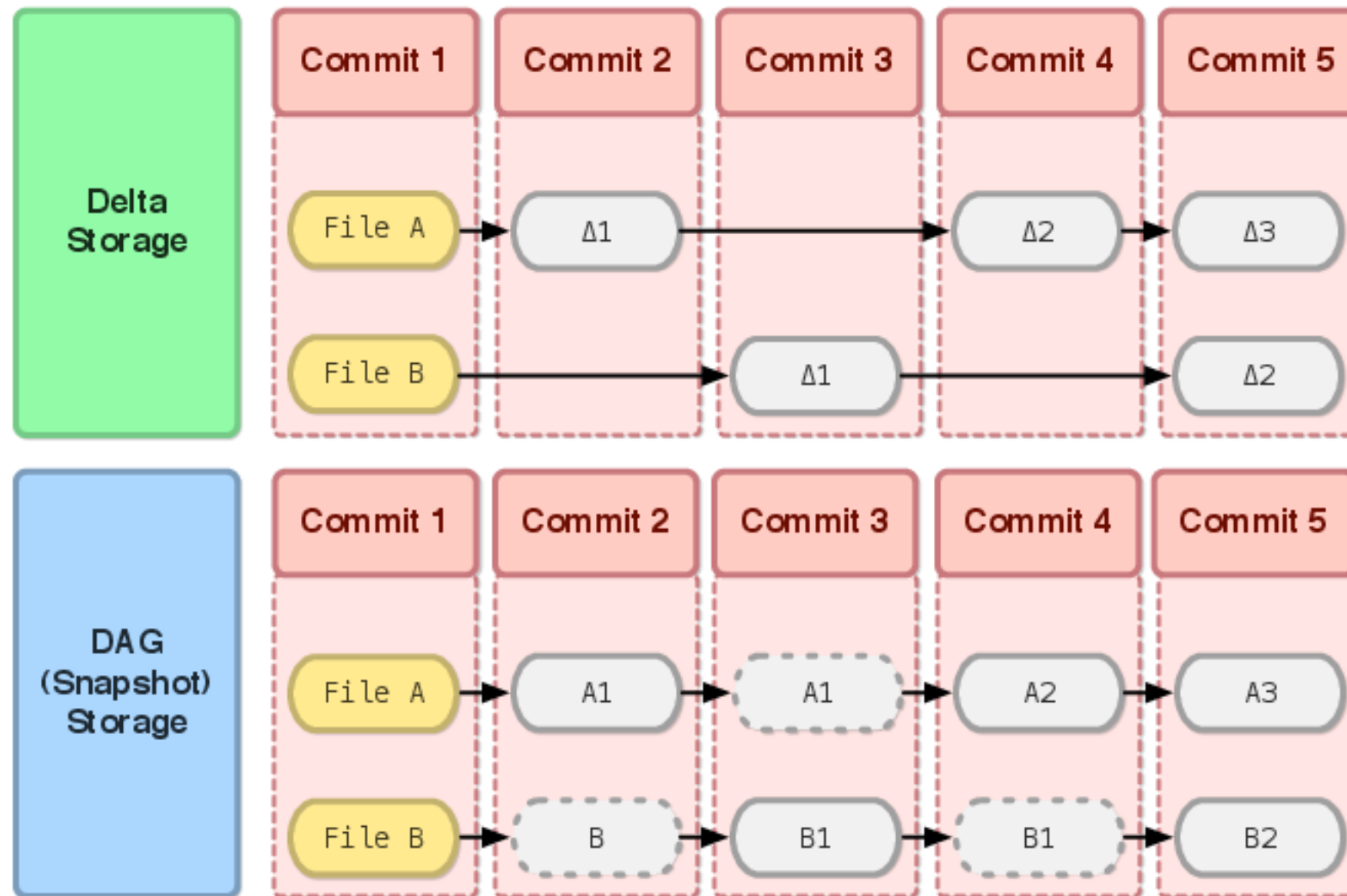


Delta vs. Snapshot

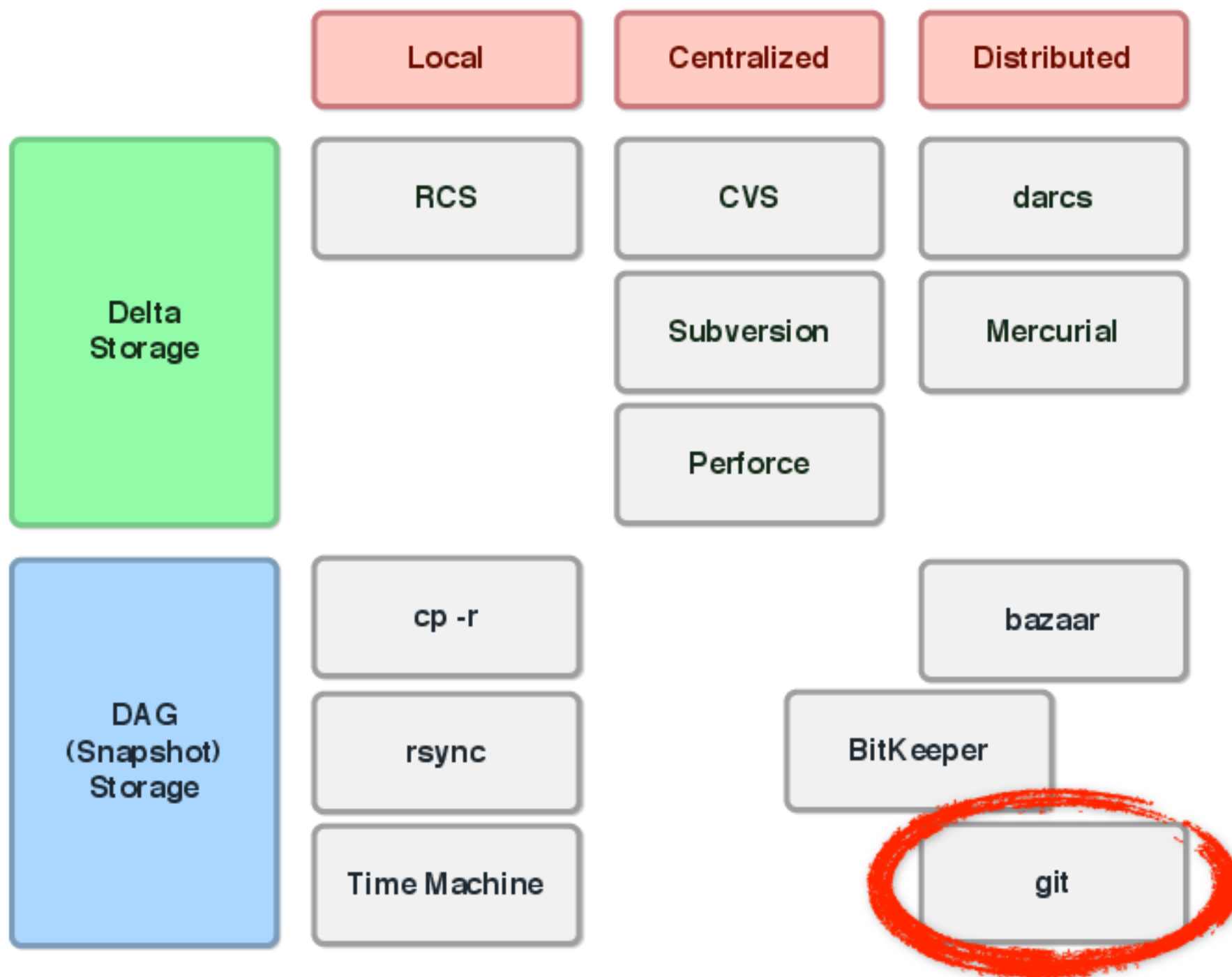


DELTA STORAGE, commit 3 and 4 are:
useless chunks of data.

Delta vs. Snapshot



**SNAPSHOTS STORAGE, commit 3 and 4 are:
independent repository versions.**



About Git

Git in a Nutshell

Free and Open Source

Distributed Version Control System

Designed to Handle Large Projects

Fast and Efficient

Excellent Branching and Merging

Projects Using Git

Git

Linux

Perl

Eclipse

Qt

Rails

Android

PostgreSQL

KDE

Gnome

Under The Hood

Git Directory

```
$ ls -lA
-rw-r--r--@ 1 pbhogan staff 21508 Jul  3 15:21 .DS_Store
drwxr-xr-x 14 pbhogan staff  476 Jul  3 14:46 .git
-rw-r--r--@ 1 pbhogan staff  115 Aug 11 2010 .gitignore
-rw-r--r--@ 1 pbhogan staff  439 Dec 27 2010 Info.plist
drwxr-xr-x 17 pbhogan staff  578 Feb  6 10:54 Resources
drwxr-xr-x  7 pbhogan staff  238 Jul 18 2010 Source
...
```

Git Directory

```
$ tree .git
.git
├── HEAD
├── config
├── description
├── hooks
│   ├── post-commit.sample
│   └── ...
├── info
│   └── exclude
├── objects
│   ├── info
│   └── pack
└── refs
    ├── heads
    └── tags
```

**.git only in root of
Working Directory
(unlike Subversion)**

Git Directory

Configuration File

Hooks

Object Database

References

Index

Object Database

Four Object Types

Object Database

blob

tree

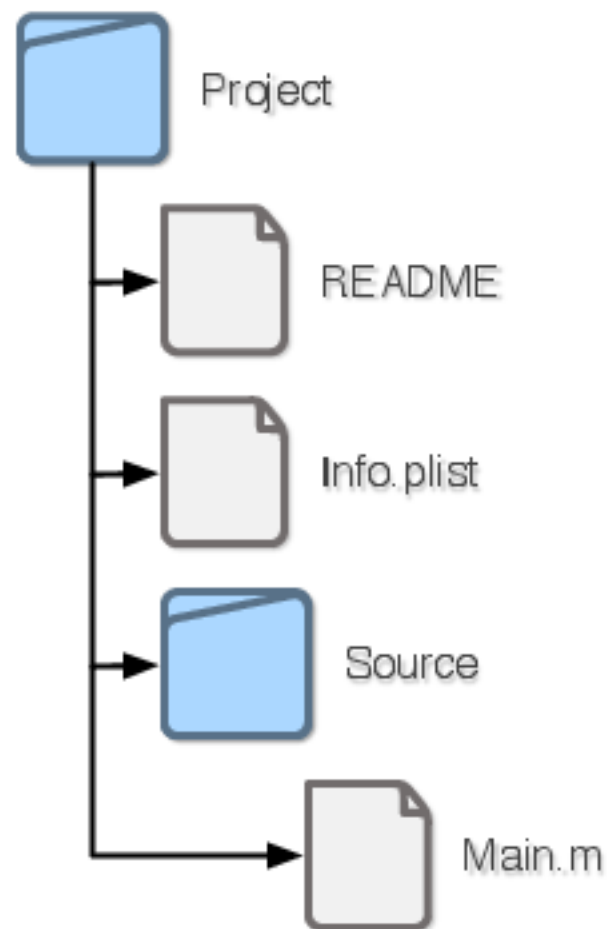
commit

tag

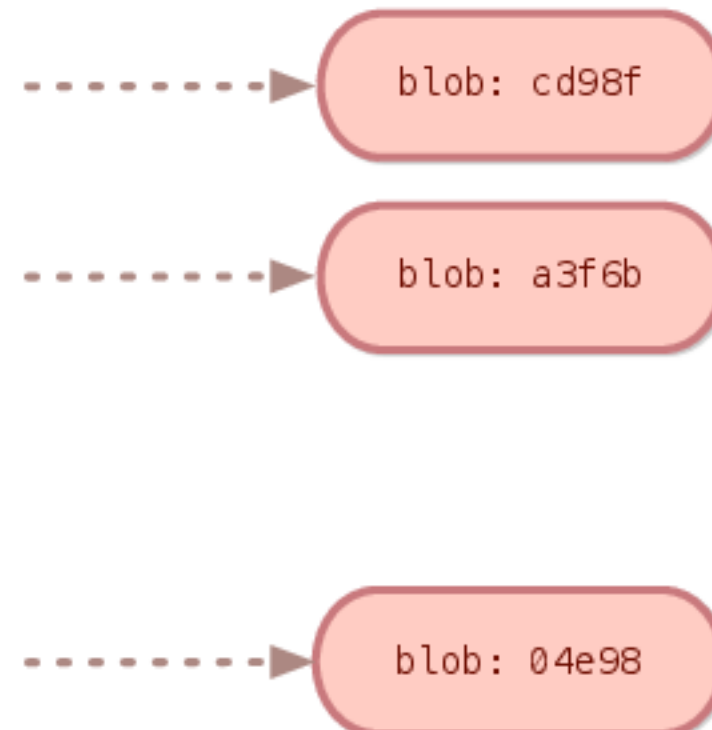
Object Database

blob

Working Directory



Git Directory



Object Database

blob

blob 109\0

```
#import <Cocoa/Cocoa.h>

int main(int argc, const char *argv[])
{
    return NSApplicationMain(argc, argv);
}
```

Object Database

blob

tree

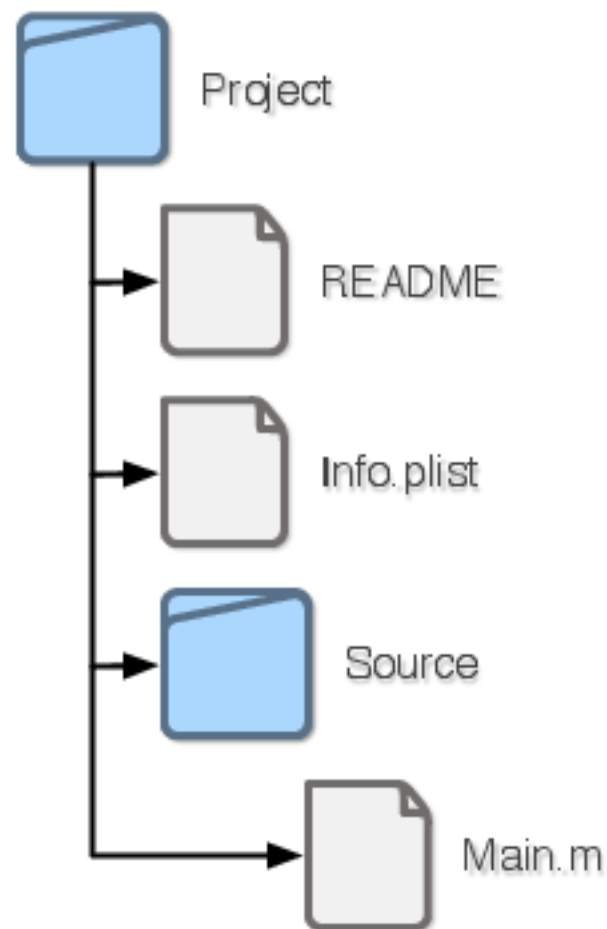
commit

tag

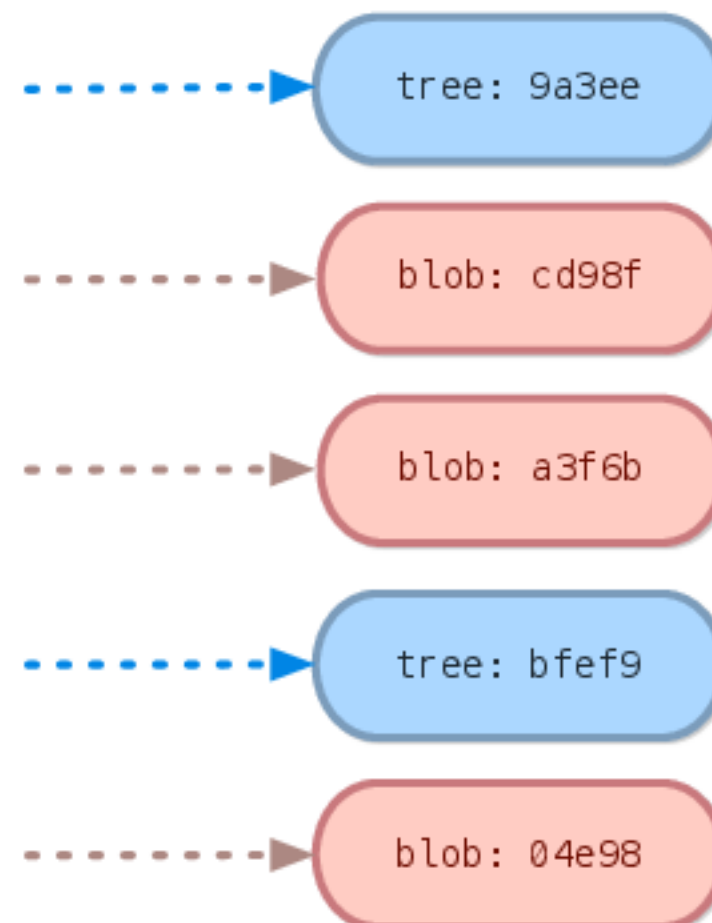
Object Database

tree

Working Directory



Git Directory



Object Database

tree

```
tree 84\0
```

```
100644 blob cd98f    README
100644 blob a3f6b    Info.plist
040000 tree bfef9    Source
```

Object Database

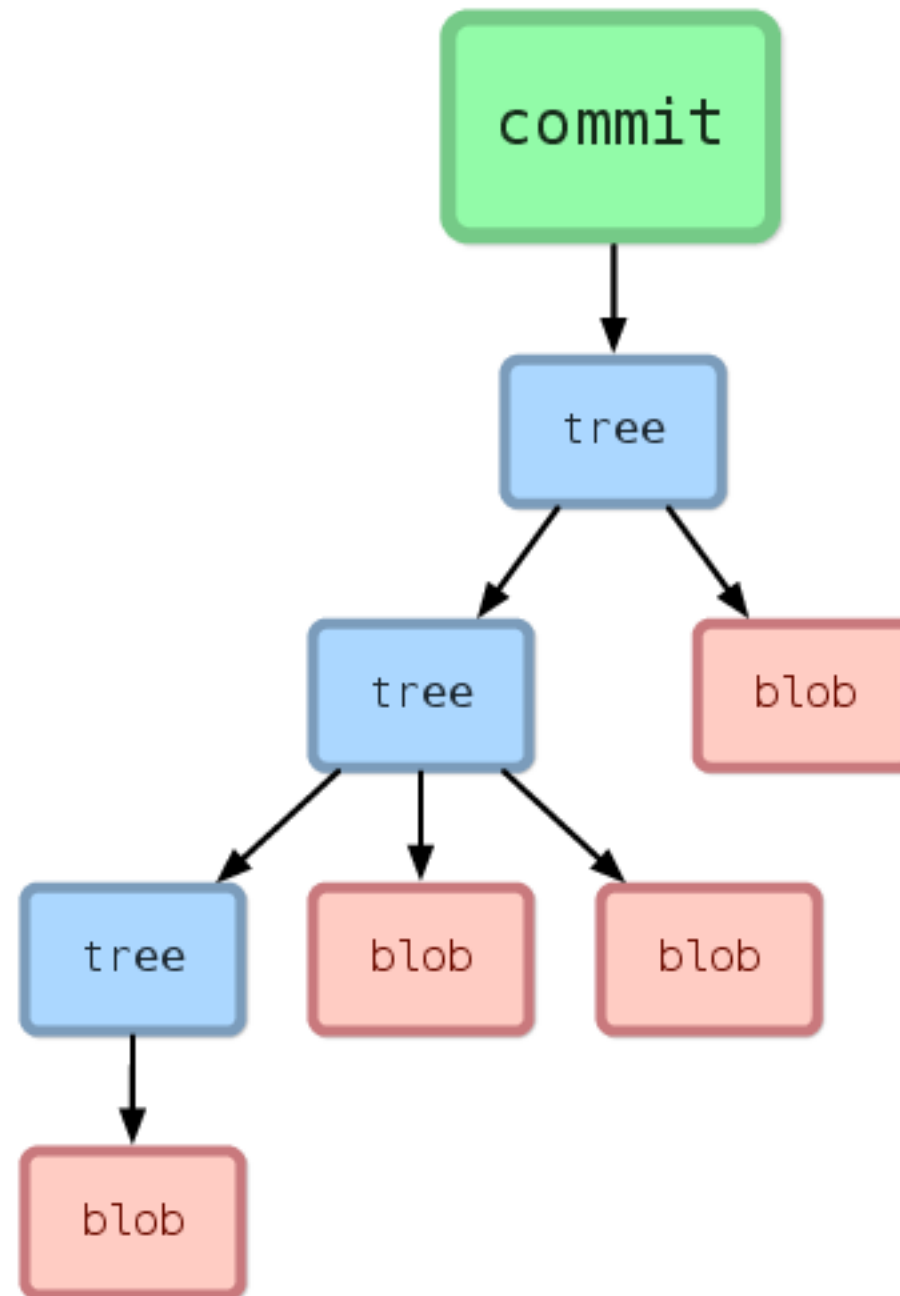
blob

tree

commit

tag

Object Database



Object Database

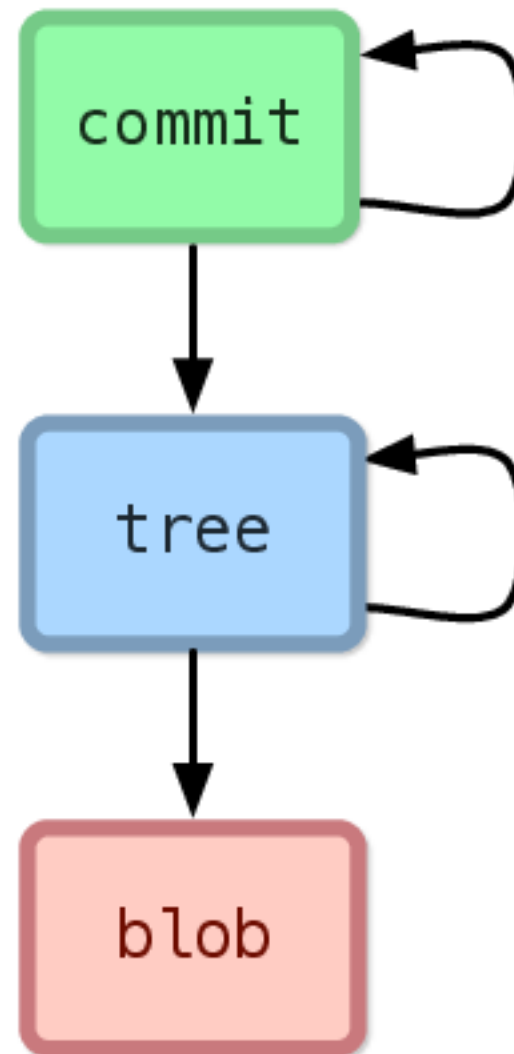
commit

```
commit 155\0
```

```
tree 9a3ee
parent fb39e
author Patrick Hogan <pbhogan@gmail.com> 1311810904
committer Patrick Hogan <pbhogan@gmail.com> 1311810904

Fixed a typo in README.
```

Object Database



Object Database

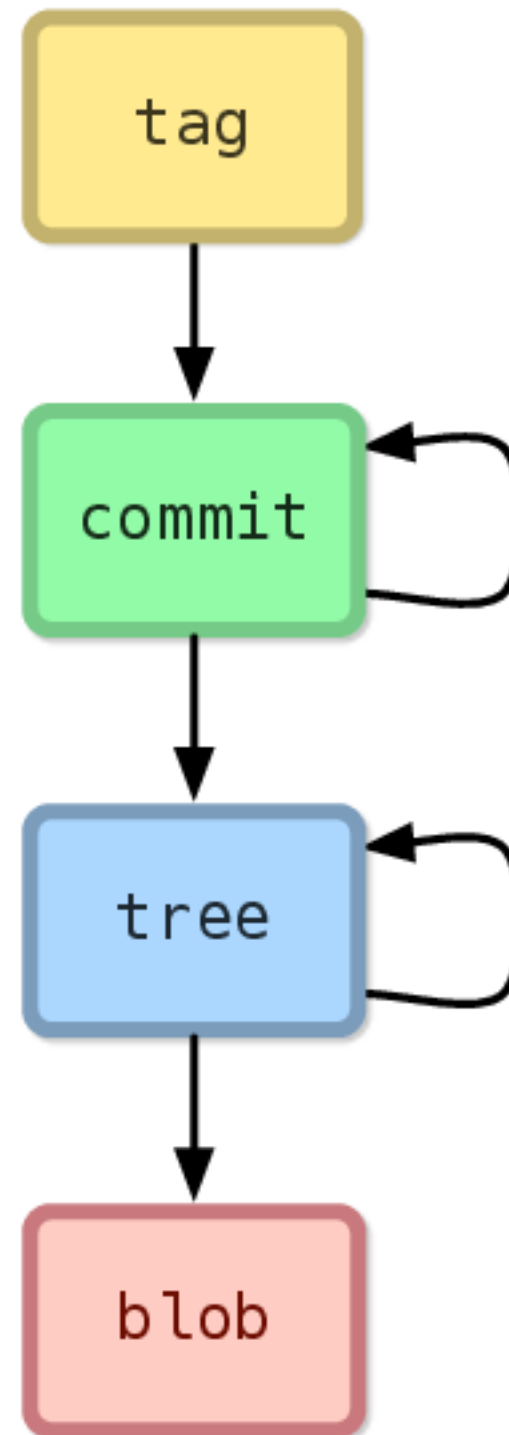
blob

tree

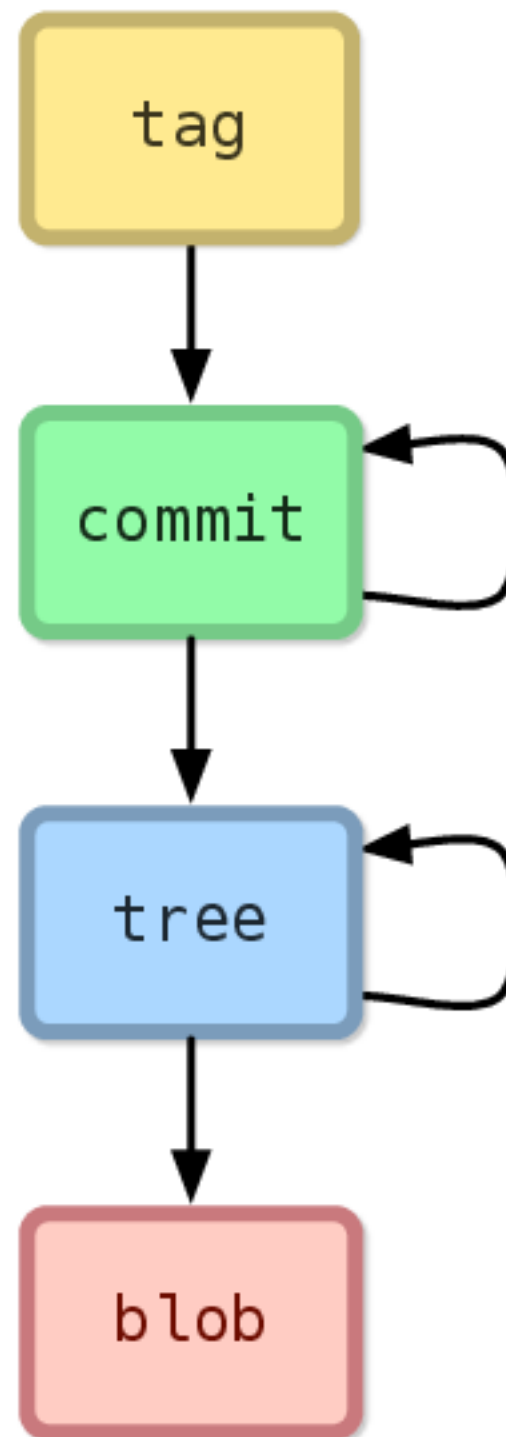
commit

tag

Object Database

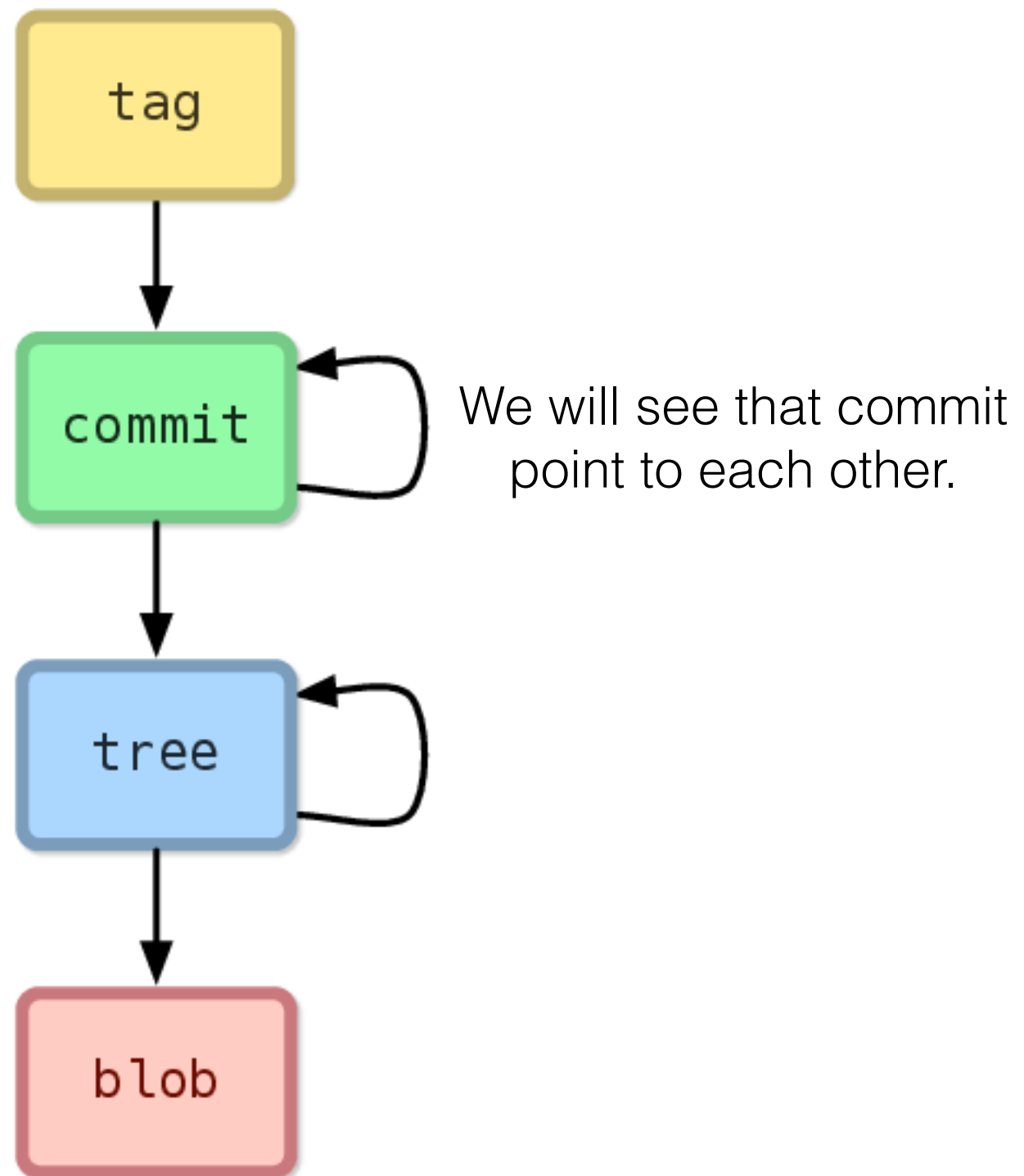


Object Database

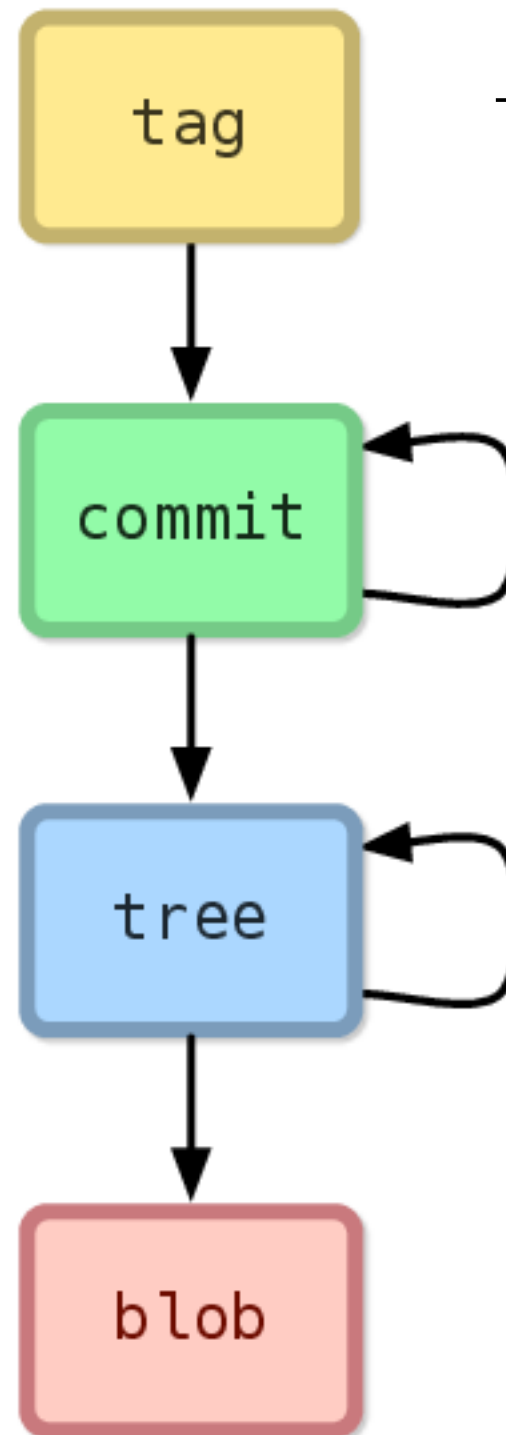


We saw that tree point to each other.

Object Database



Object Database



Tag is a pointer to a commit.

Object Database

tag

```
tag 121\0
```

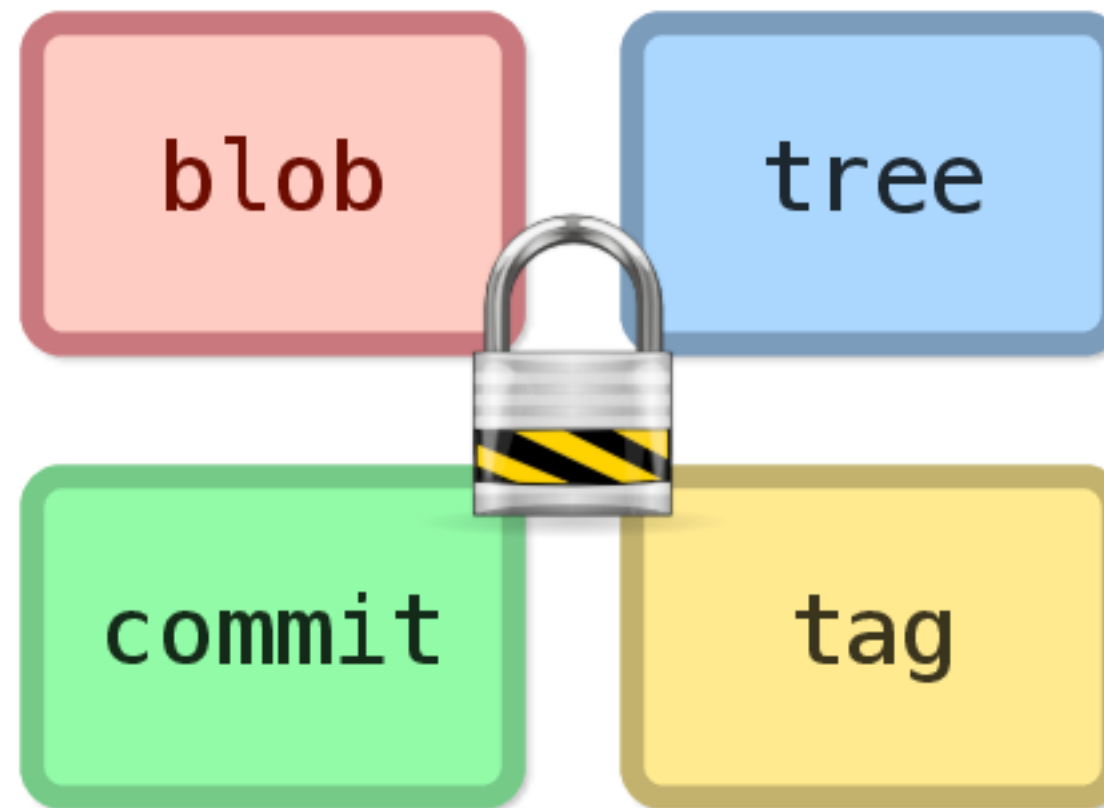
```
object e4d23e
type commit
tag v1.2.0
tagger Patrick Hogan <pbhogan@gmail.com> 1311810904

Version 1.2 release -- FINALLY!
```

.git/objects/20/c71174453dc760692cd1461275bf0cf feb772f

.git/refs/tags/v1.2.0

Object Database



Immutable!

Never Removes Data

(Almost)

"Rewriting History" **Writes Alternate History**

Git Directory

Configuration File

Hooks

Object Database

References

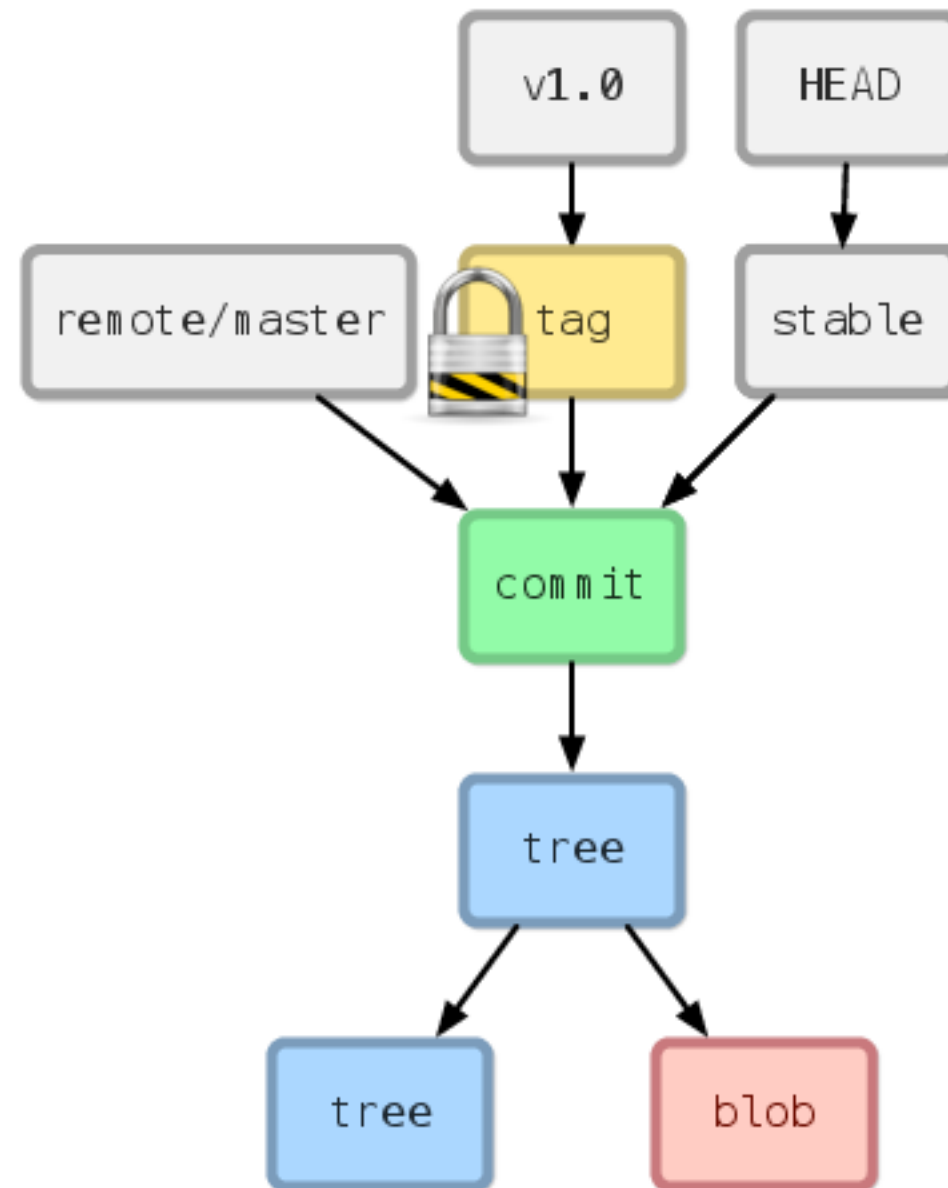
Index

References

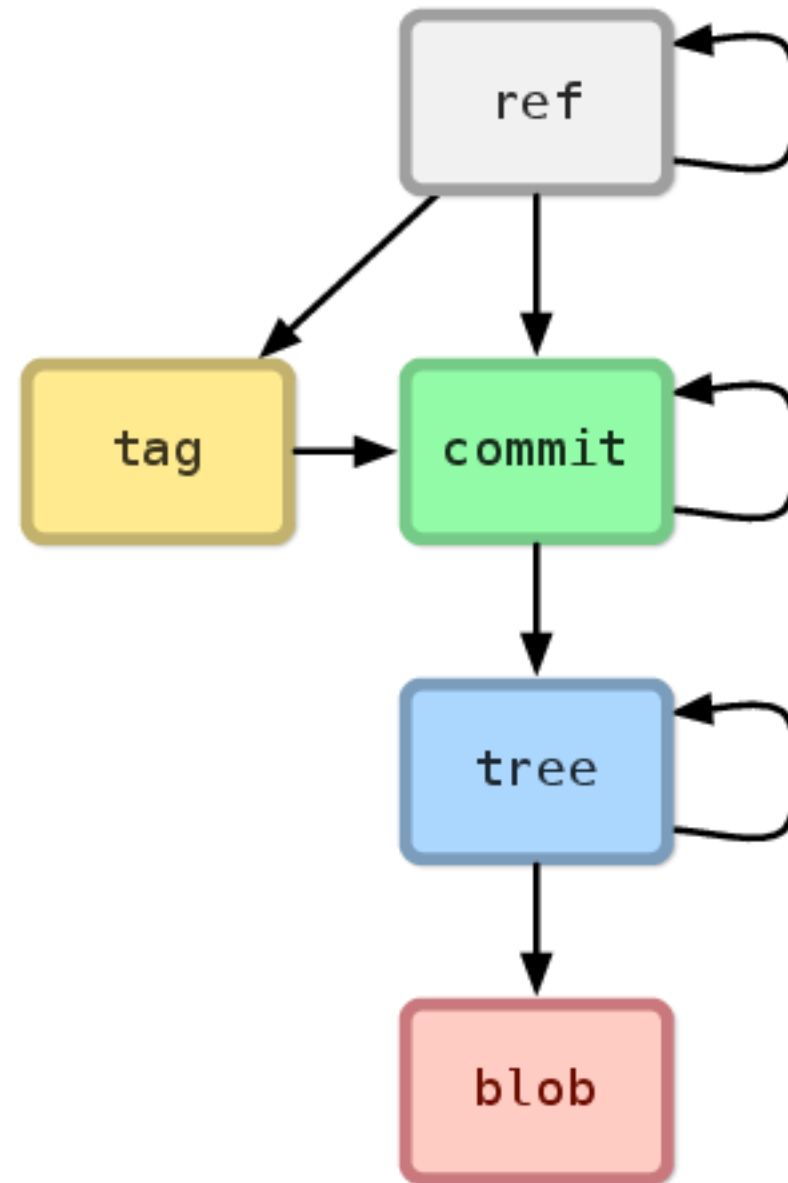
References

**Lightweight, Movable
Pointers to Commits**
(and other things)

References

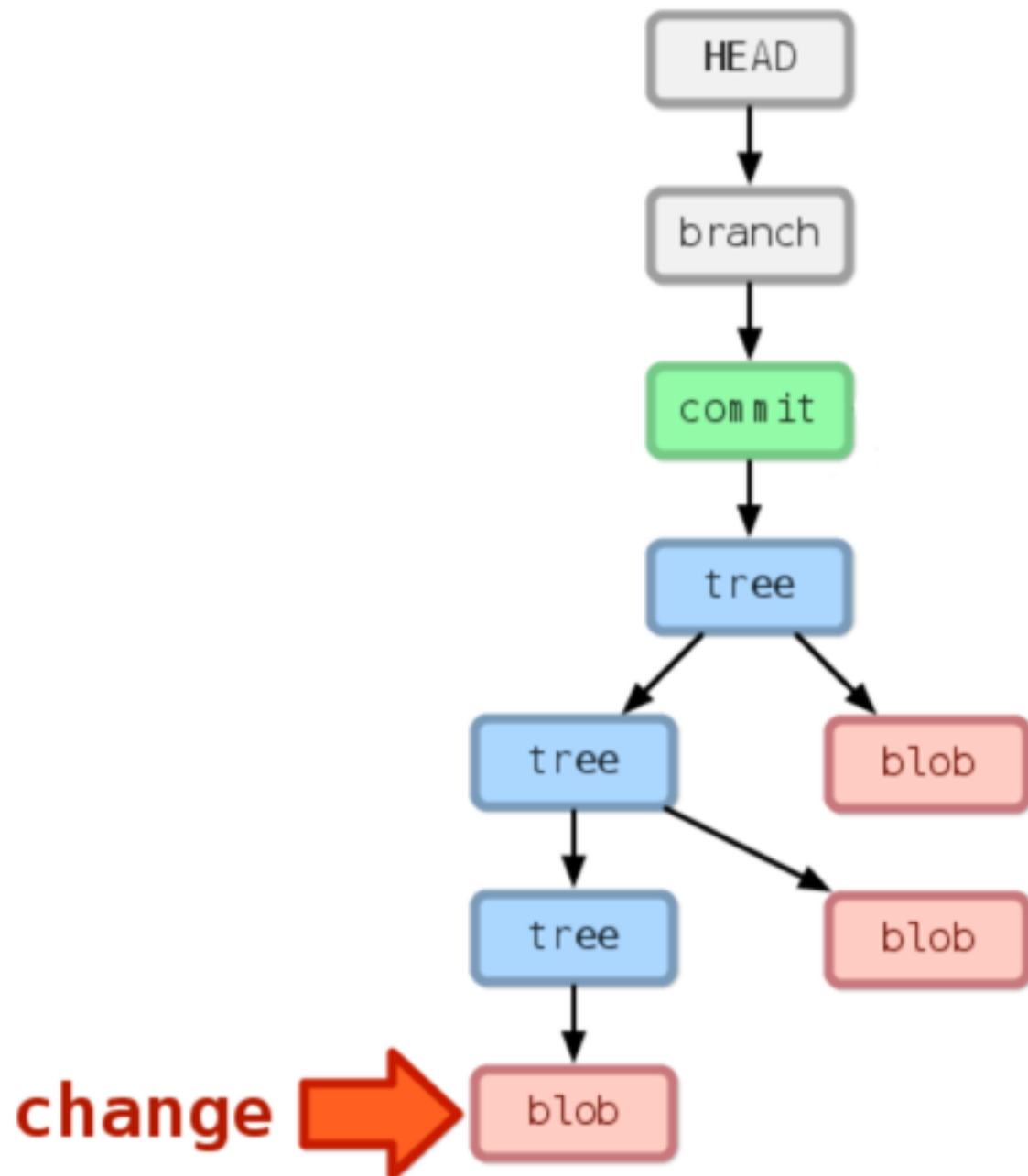


References

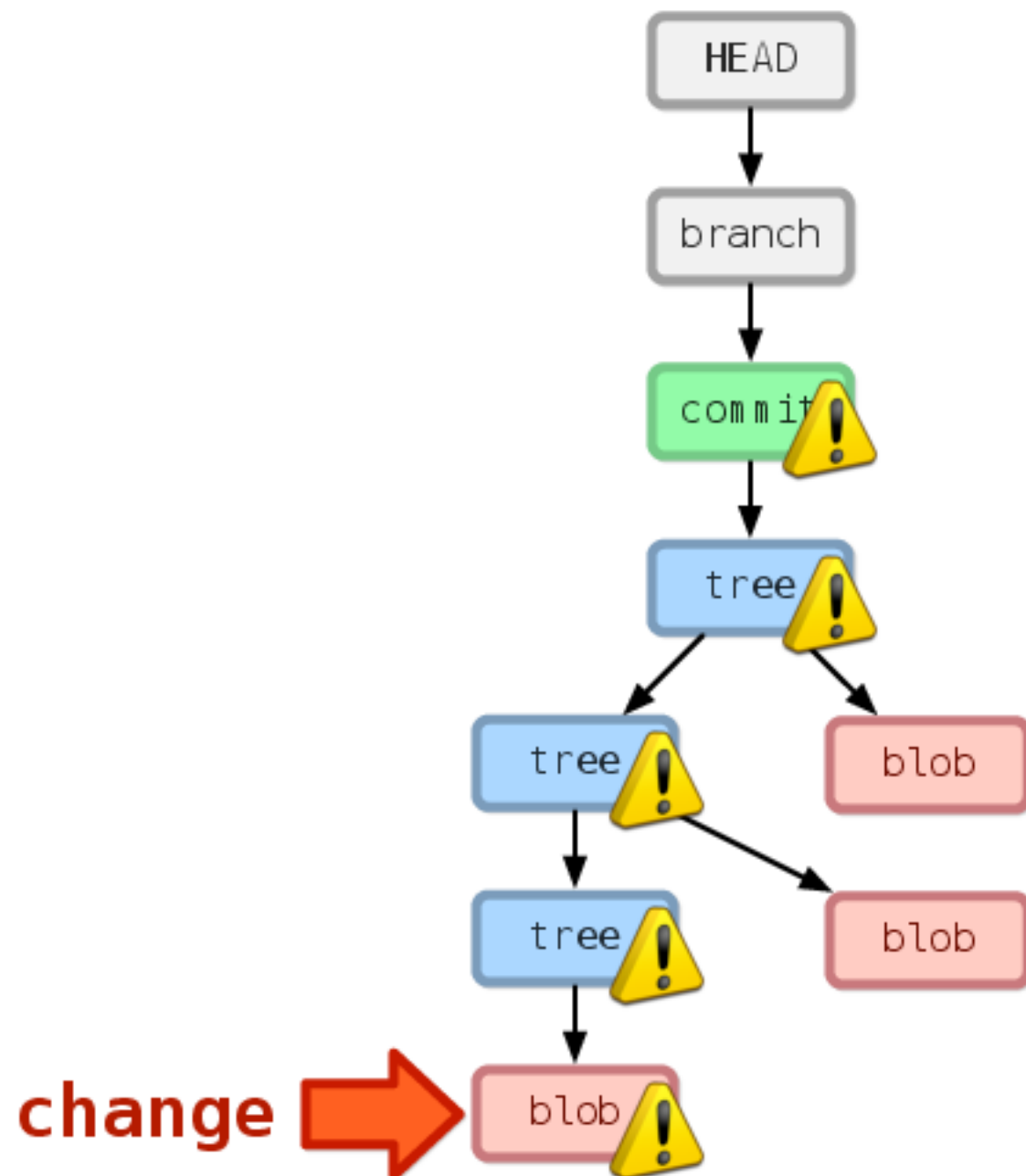


Scenario

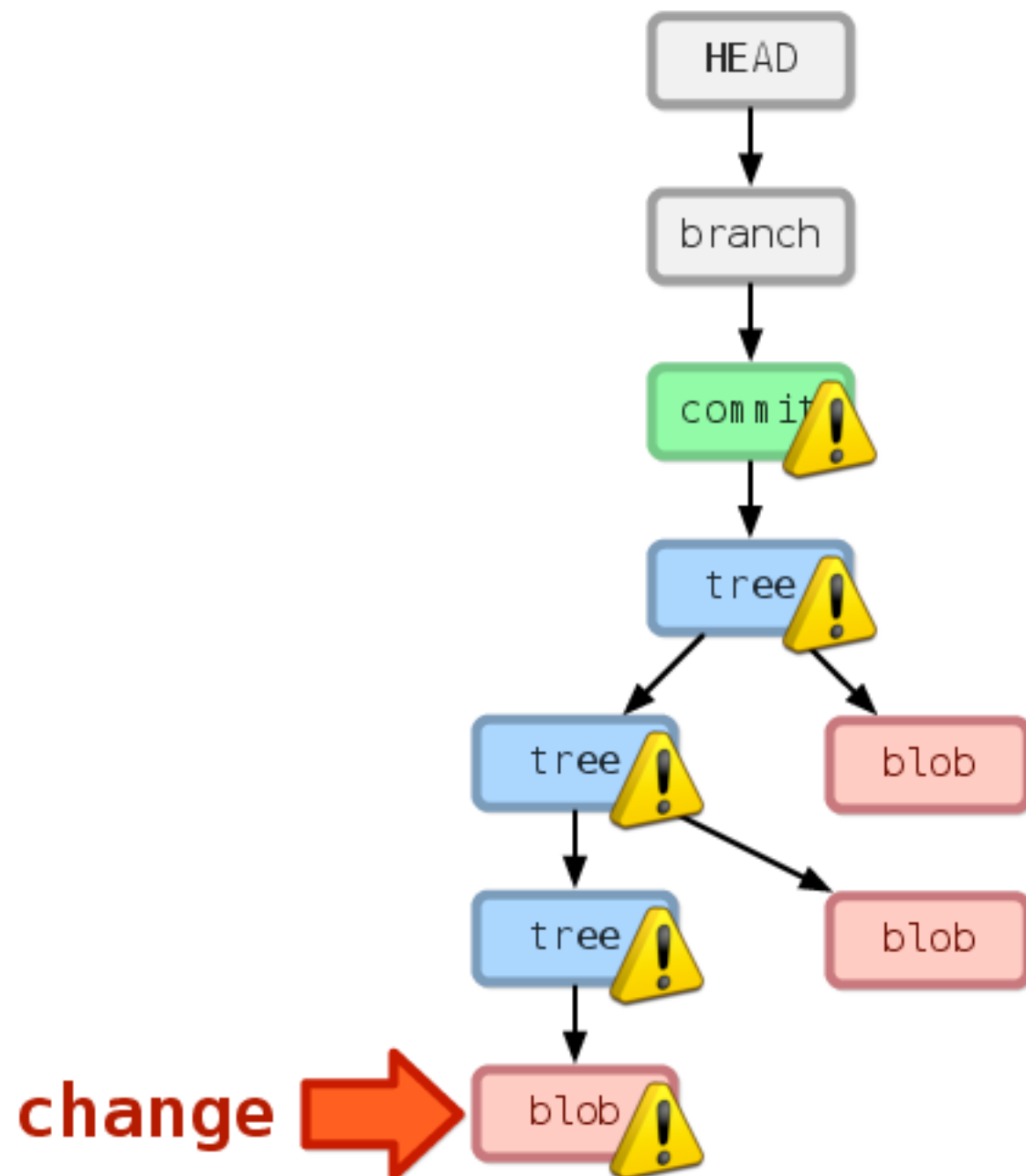
Scenario



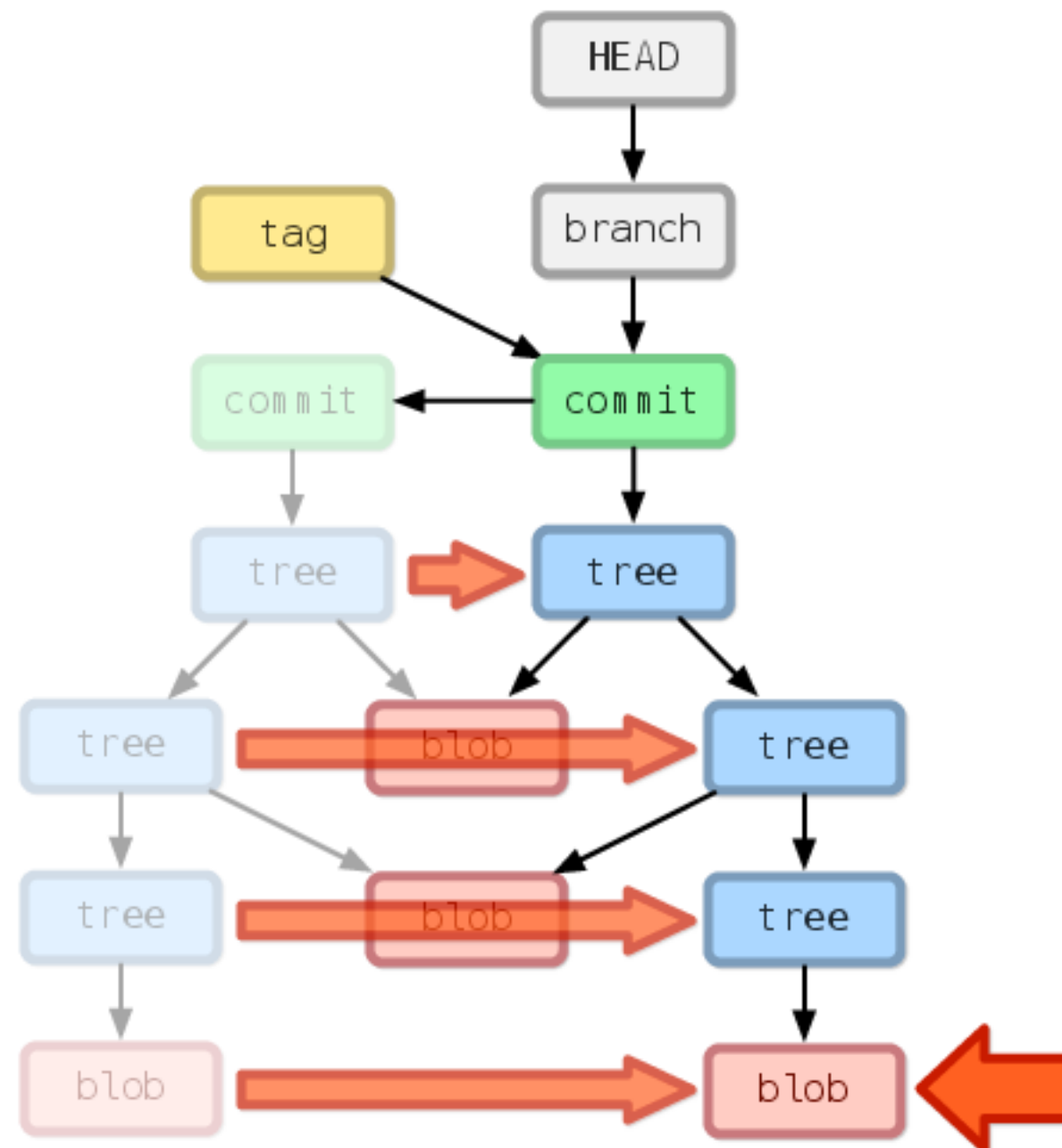
Scenario



Scenario

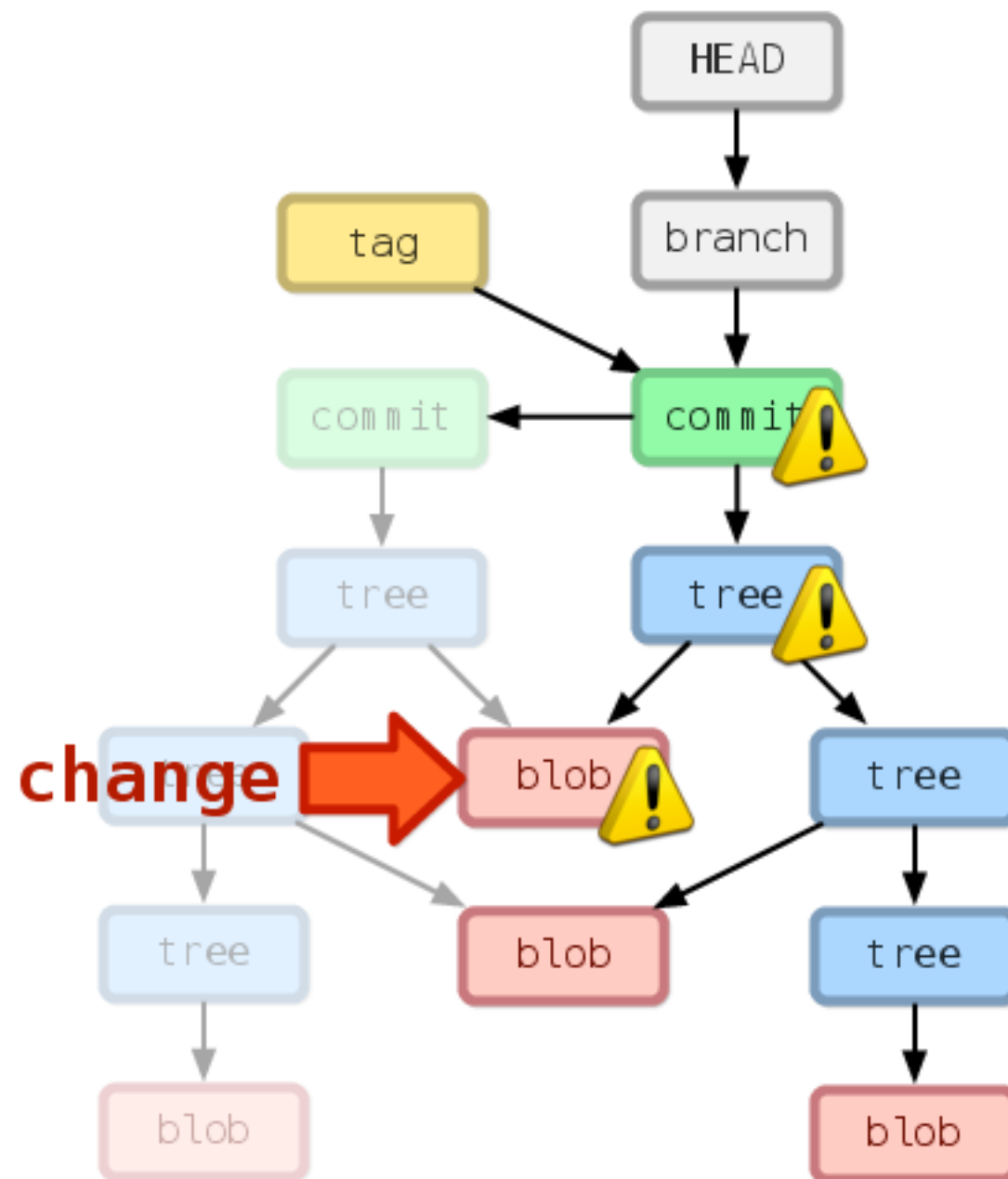


Scenario

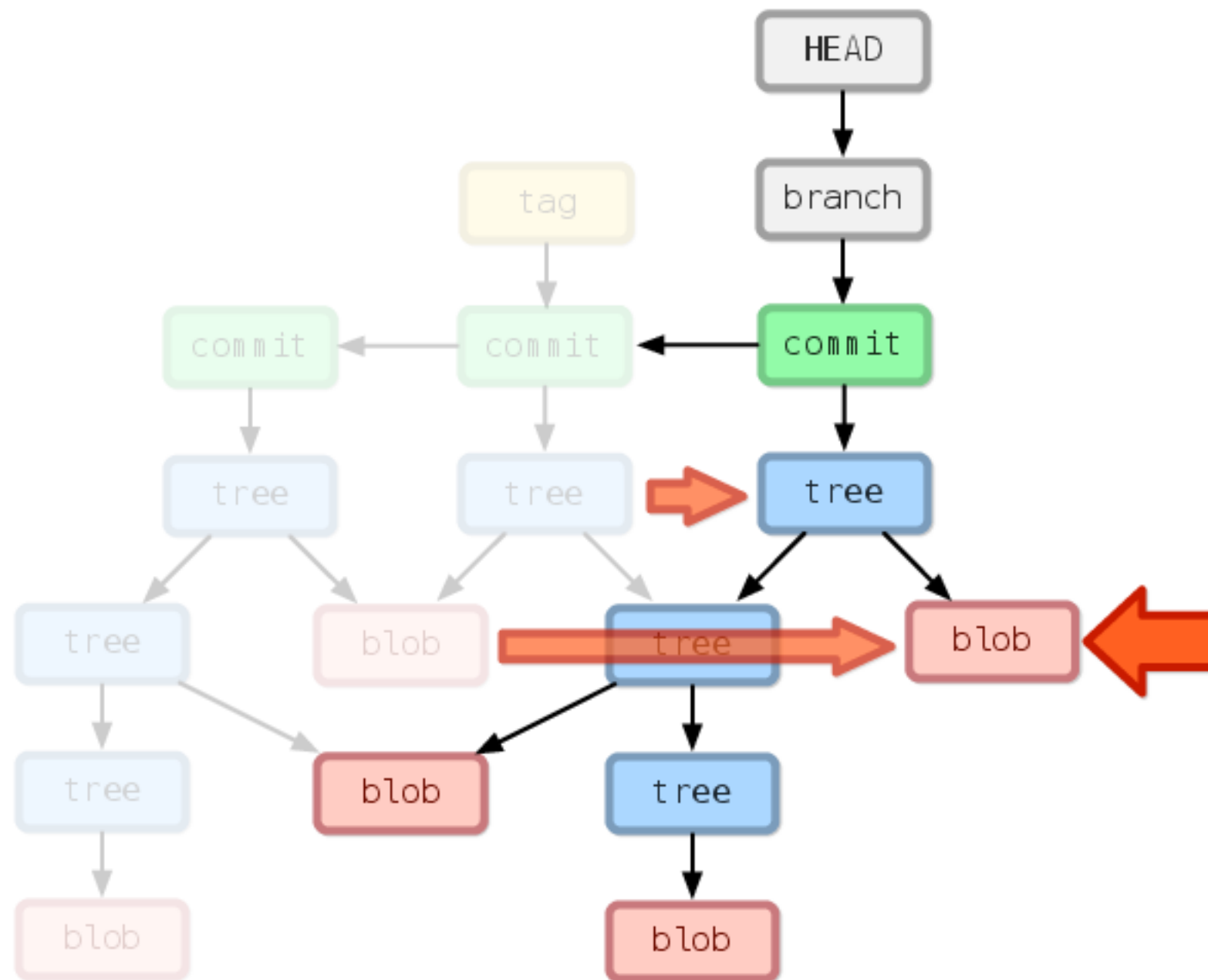


new objects

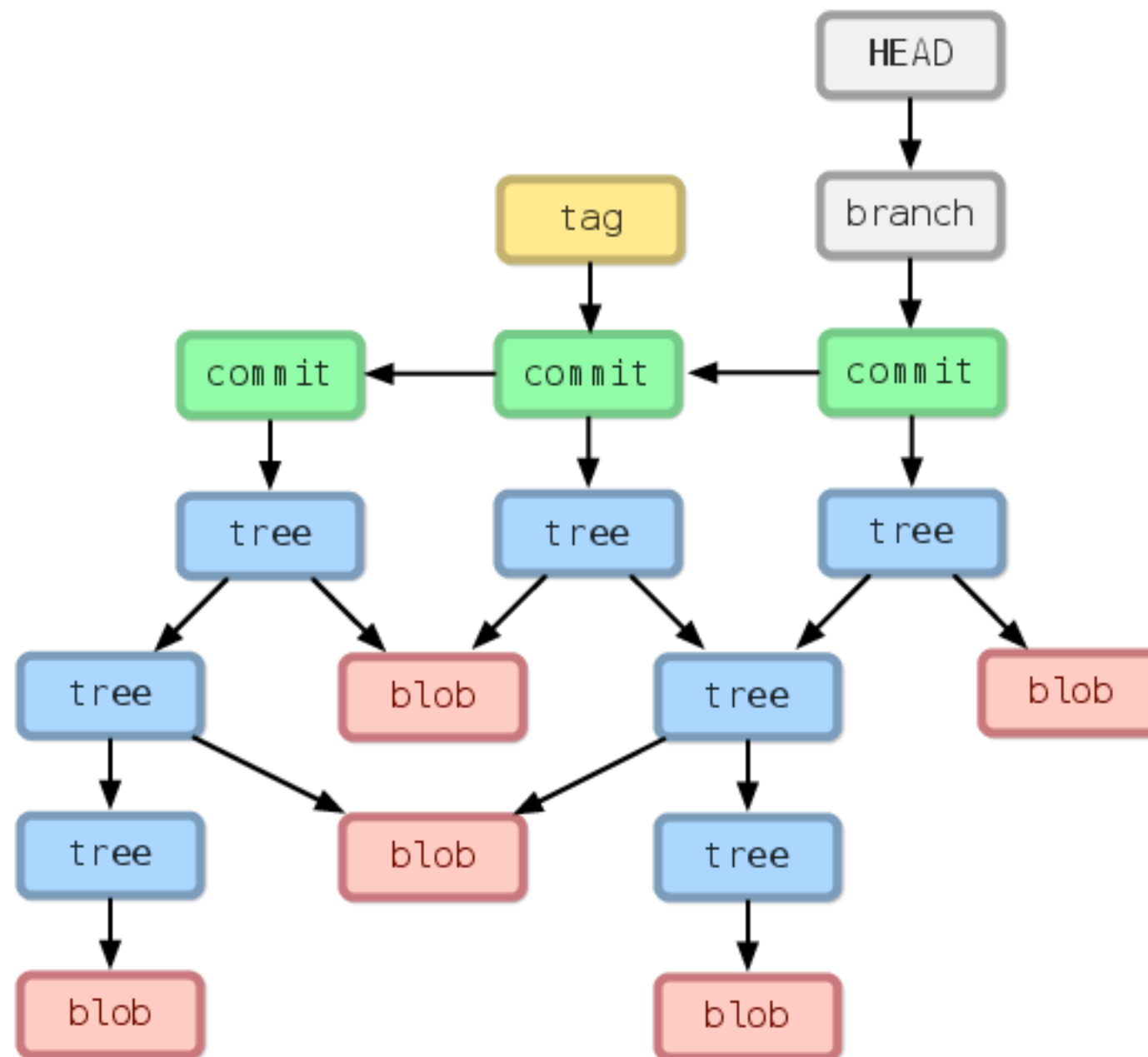
Scenario



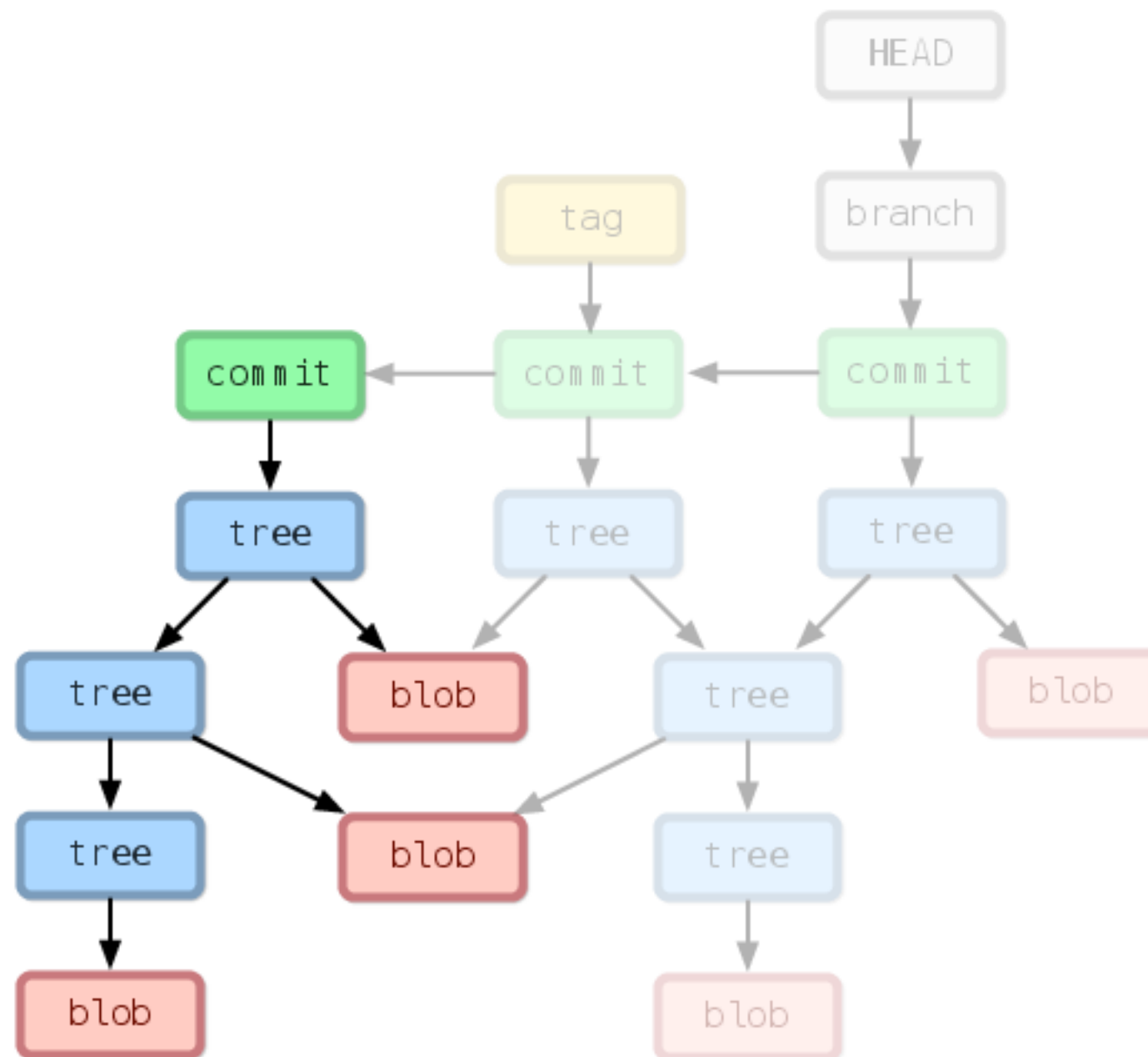
Scenario



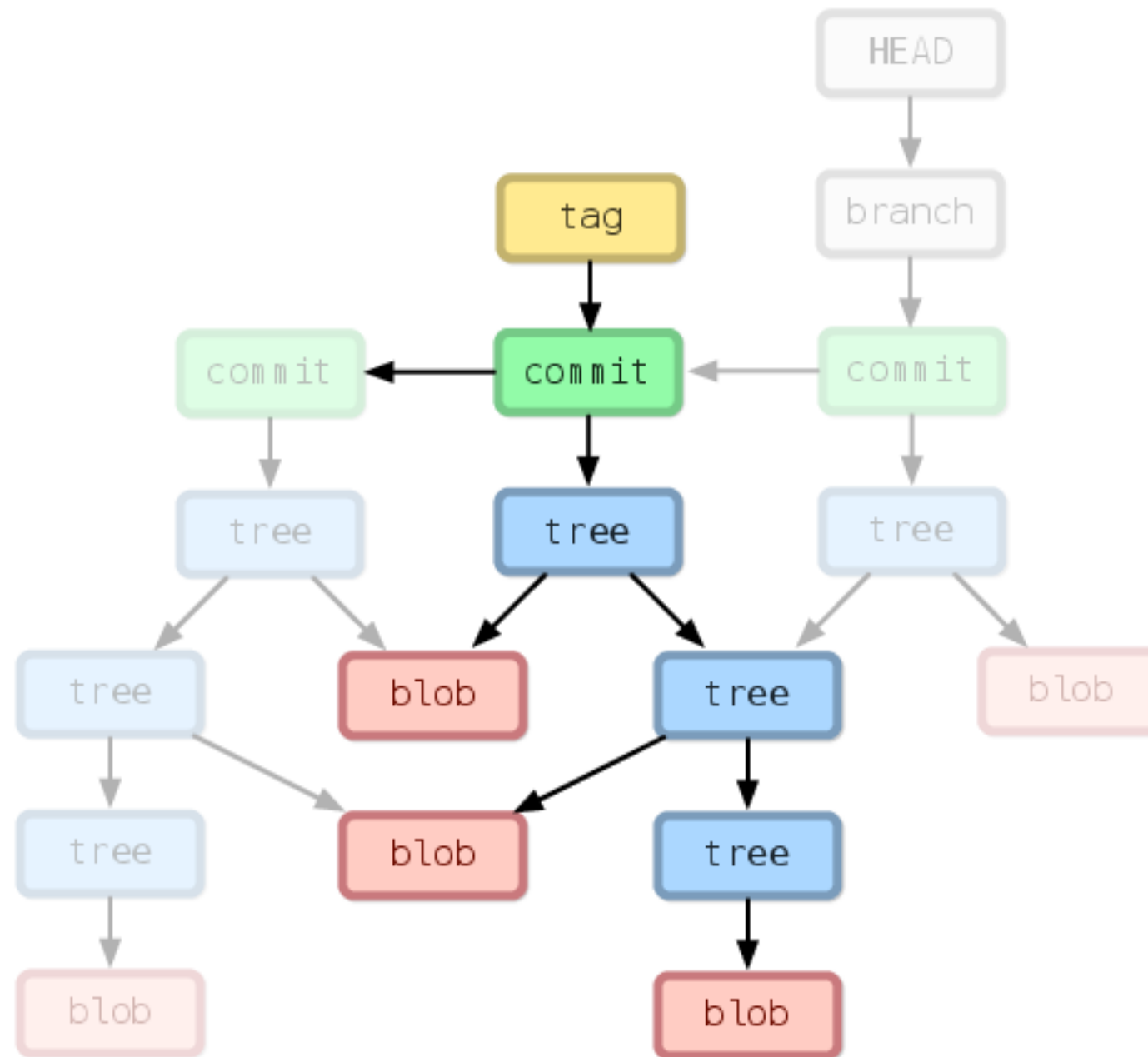
Scenario



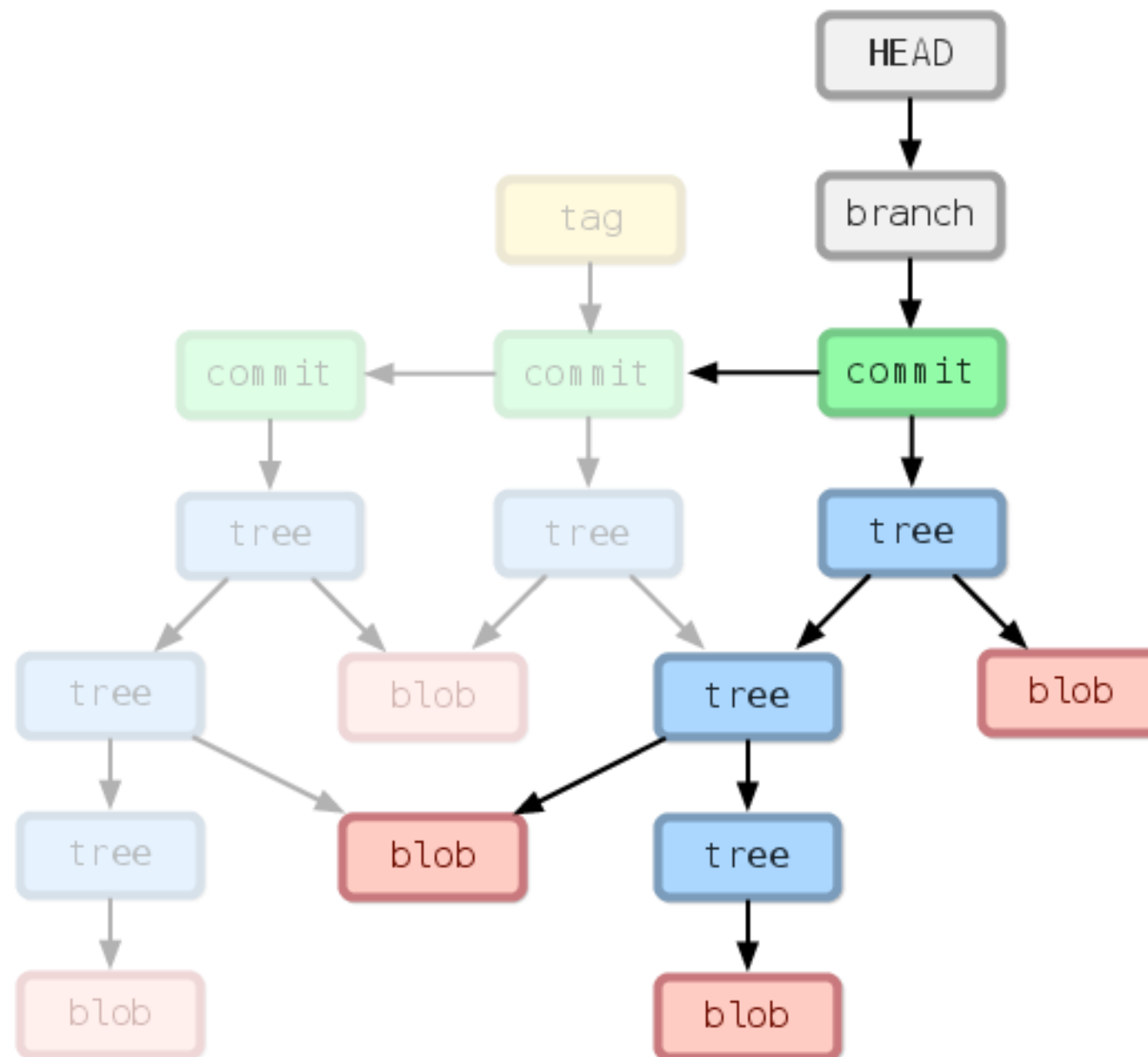
Scenario



Scenario



Scenario



Git Directory

Configuration File

Hooks

Object Database

References

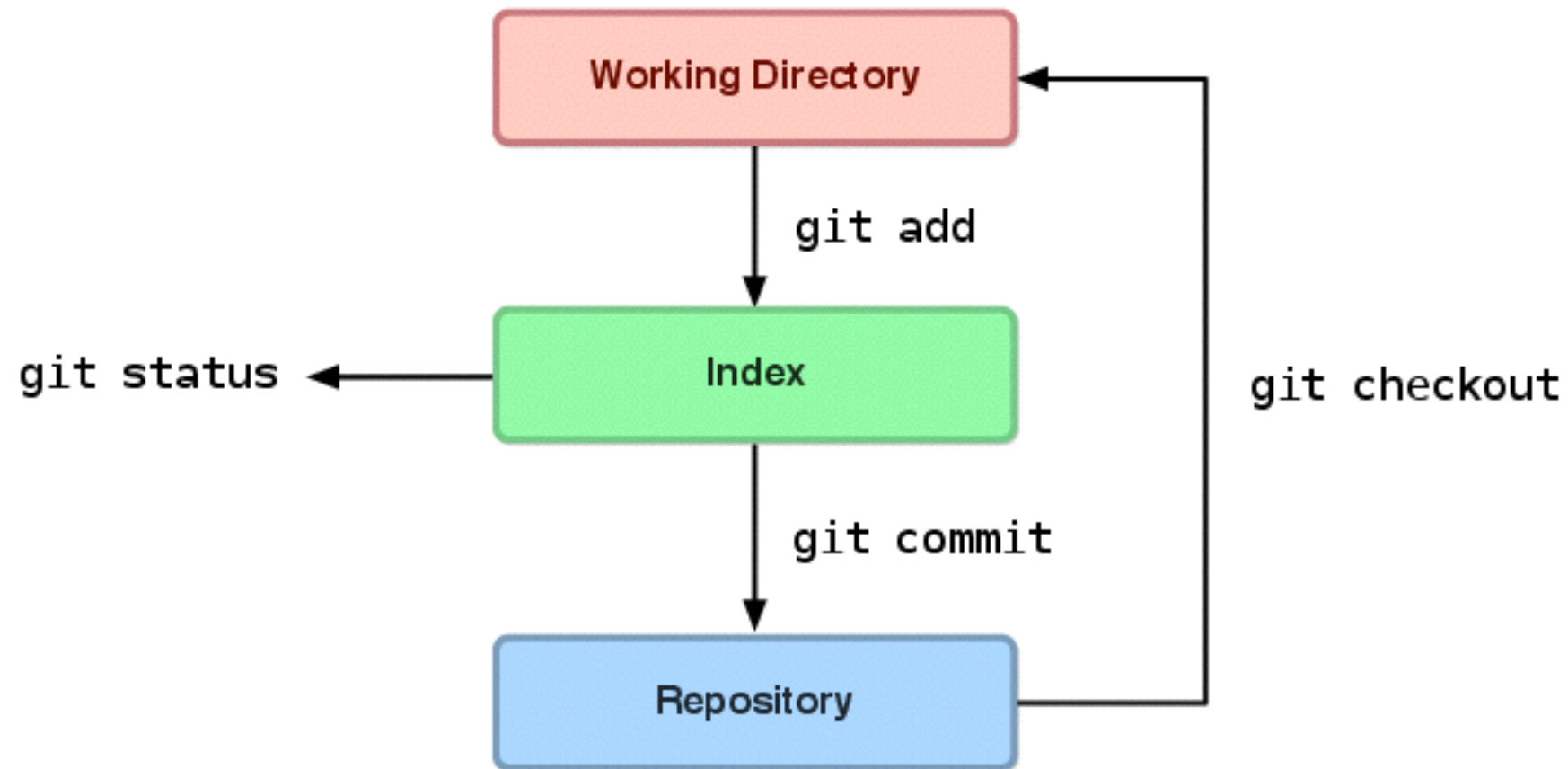
Index

Index

Index

== Staging Area

Index



Index FTW

No Need To Commit All At Once

Pick (Stage) Logical Units to Commit

Helps You Review Your Changes

Lets You Write Your History Cleanly