

Almost Done!

inching to the finish line...

Where are we?

What is Git?

Basic Git Usage

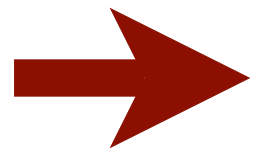
Intermediate Git Usage

Git Branching

Working with Repo & Gerrit

Advanced Git Usage

Git Internals



Git Maintenance

Git Servers

Garbage Collection

```
$ git gc
```

git gc

removes unreachable objects

moves loose objects into packfiles

makes some commands faster

```
$ git gc --auto
```

configuring gc

gc.auto

gc.autopacklimit

gc.pruneExpire

gc.aggressiveWindow

Repository Integrity


```
$ git fsck
```

git fsck options

--verbose

--full

--unreachable

cool git fsck errors

- dangling <type> <object>
- unreachable <type> <object>

```
$ git fsck
```

```
dangling blob 20c49ae386d1748692b427455528d8738a31568b
```

```
dangling blob 6bc9c1695a6778ec5ef48cee86960e2d6dfd6b68
```

```
dangling blob d6893d7793dc84608b7c74913d2a94a78038cd10
```

```
dangling tree d3cdcb5baf81ad8d0acf5116371e588d72c356d7
```

```
dangling blob 09ce750b00c6e8c43f8aca445ddad12aca084434
```

```
dangling blob 2f5a75d52298422311969d56dc62a85228a8d1f6
```

```
dangling blob 9d73e8c864c896ed41be1cbdec44d33be4811a21
```

```
dangling commit e194f2dbf2dd75ce05325ffb9ec55402be405105
```

```
dangling blob 9df7d2ac92cec9260466fa05ee1b2b24632a247c
```

```
dangling blob e3fa35445a8ee52e5c4bf9984f9a74735407011d
```

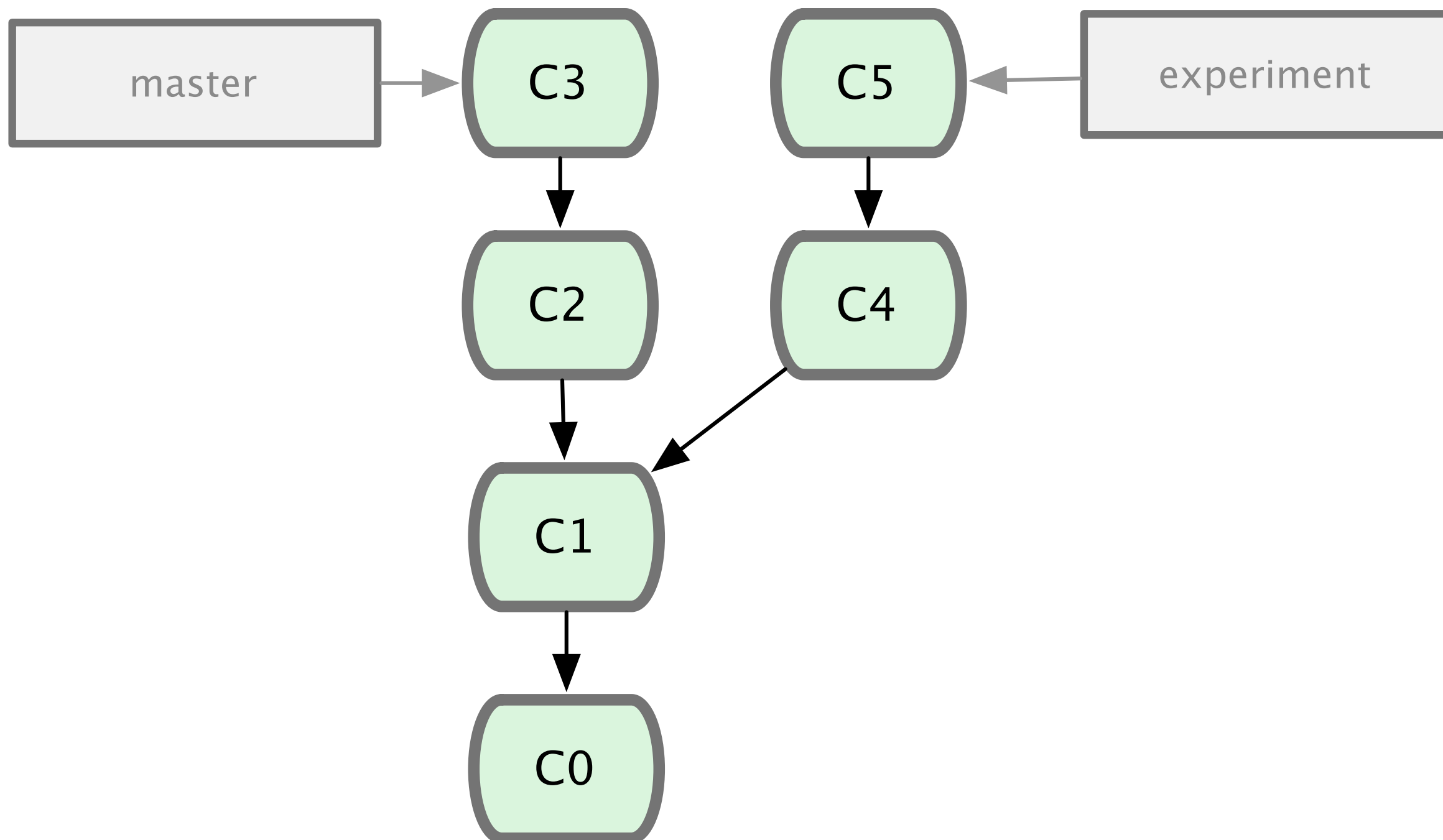
uncool git fsck errors

- missing <type> <object>
- sha1 mismatch <object>

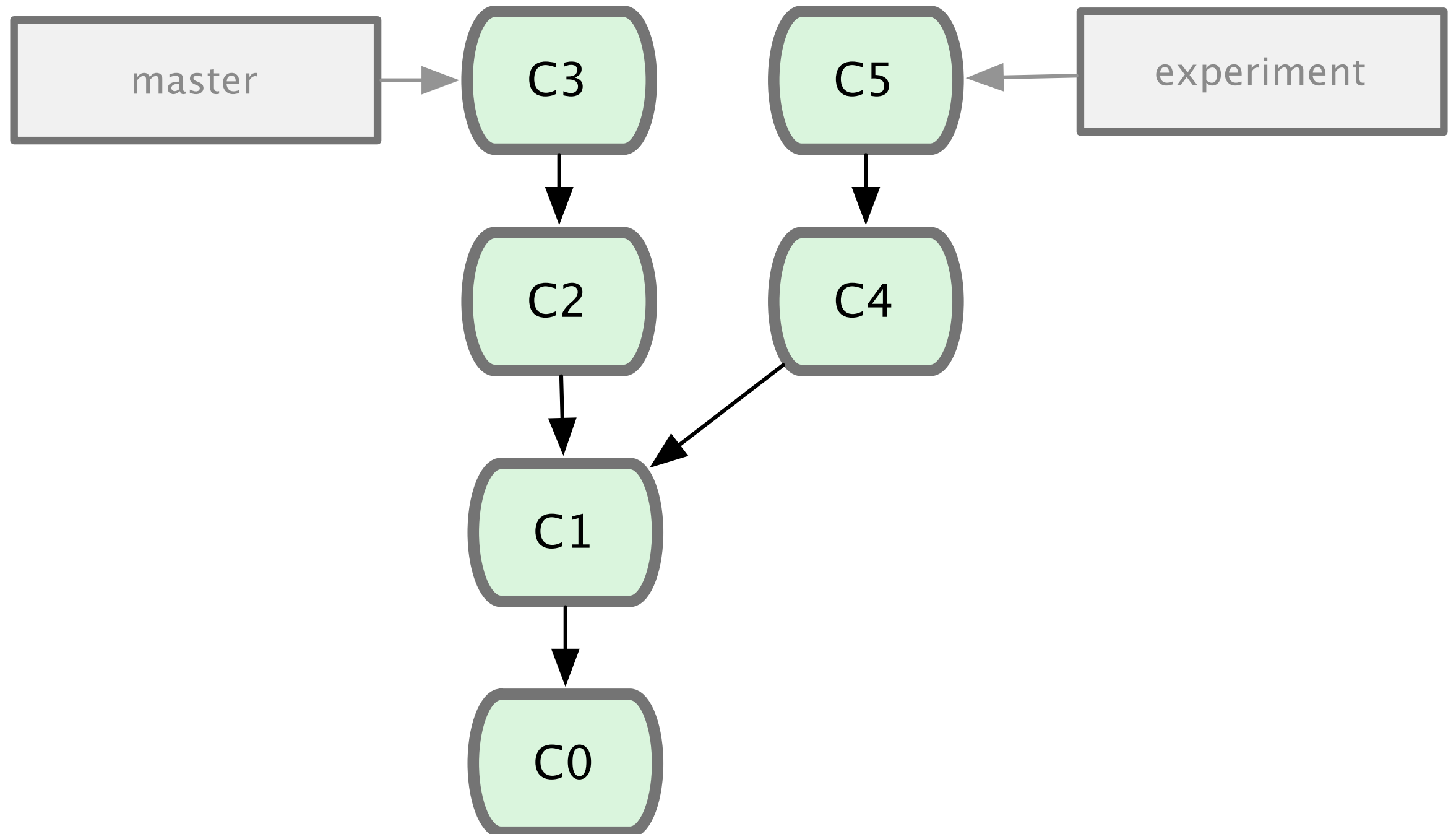
```
$ git fsck --full
```

Data Recovery

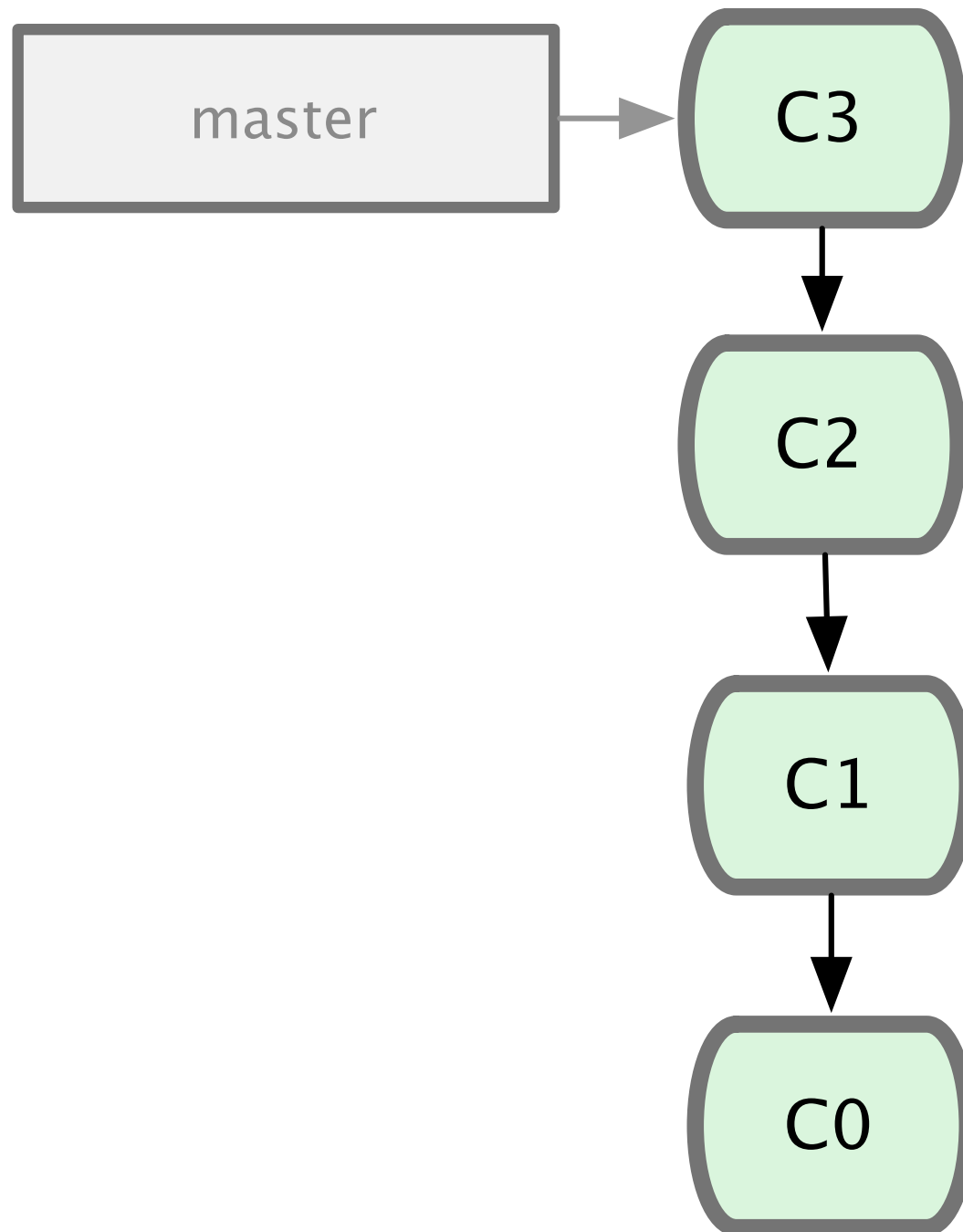
getting a deleted
branch back

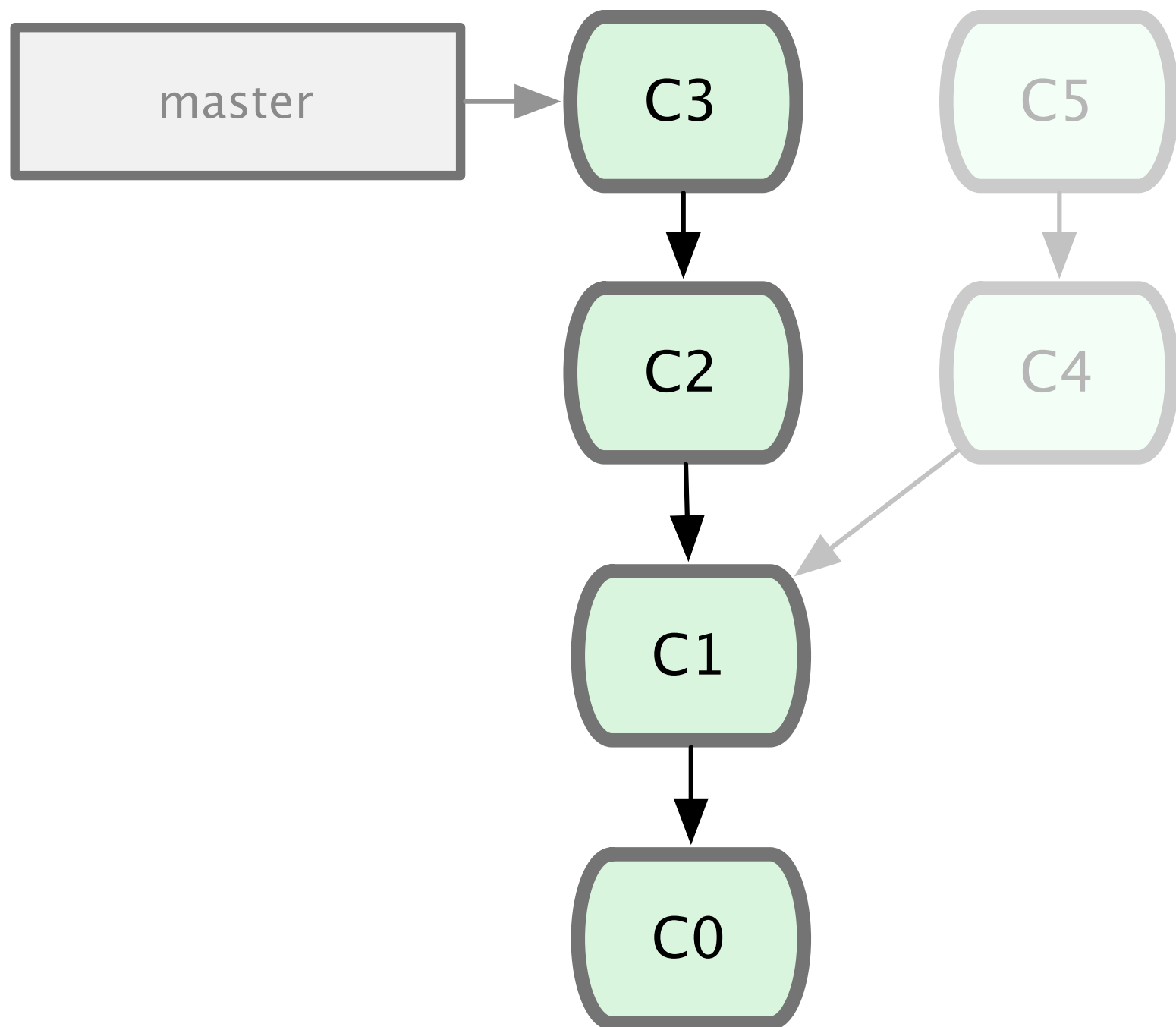


git branch -D experiment

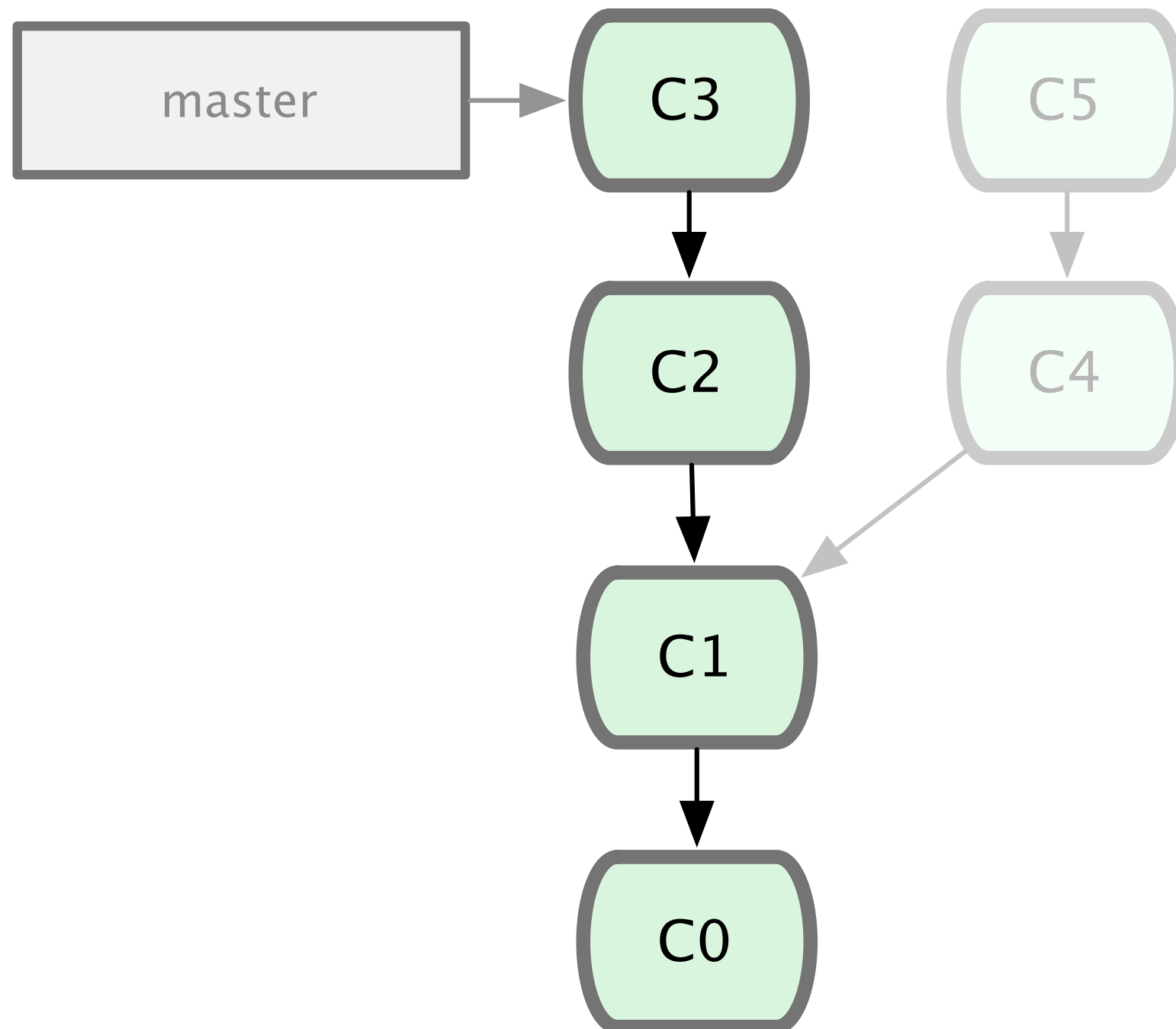


git branch -D experiment

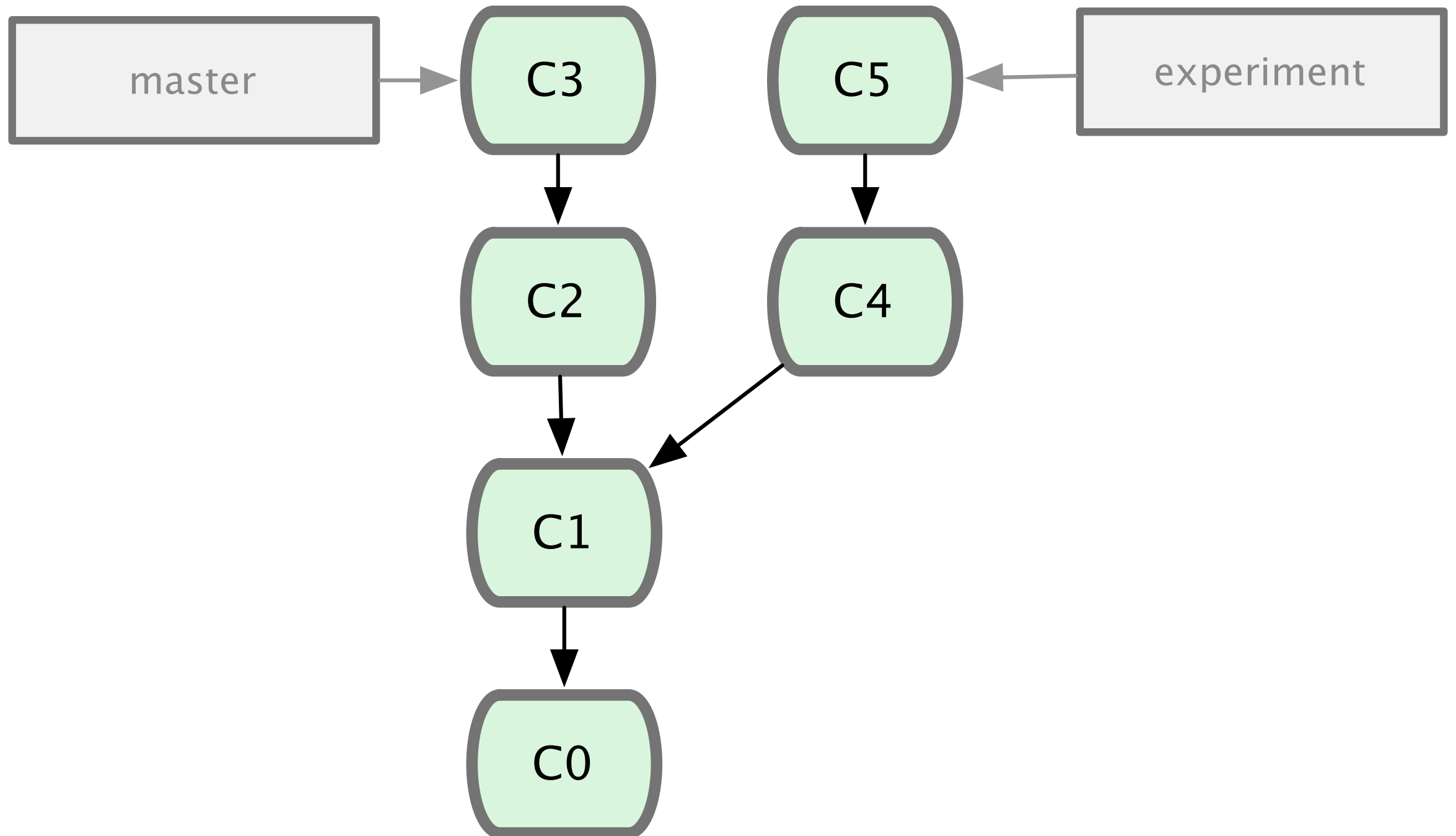




git branch experiment C5



git branch experiment C5



finding “C5”

finding the SHA


```
$ git reflog
```

fc66bc6... HEAD@{0}: checkout: moving from f71ce38690acf49c1f3c9bea38e09d82a5ce6014 to master
f71ce38... HEAD@{1}: checkout: moving from b047b02ea83310a70fd603dc8cd7a6cd13d15c04 to f71ce38690acf49c1
b047b02... HEAD@{2}: checkout: moving from ecb6e1bc347ccecc5f9350d878ce677feb13d3b2 to b047b02ea83310a70
ecb6e1b... HEAD@{3}: checkout: moving from master to ecb6e1bc347ccecc5f9350d878ce677feb13d3b2
fc66bc6... HEAD@{4}: checkout: moving from master to master
fc66bc6... HEAD@{5}: merge origin/master: Fast forward
2249250... HEAD@{6}: merge origin/master: Fast forward
ae1e638... HEAD@{7}: checkout: moving from wiki2 to master
d5e367c... HEAD@{8}: commit: better?
b3ca8e4... HEAD@{9}: commit (merge): Merge branch 'master' into wiki2
f160a1e... HEAD@{10}: checkout: moving from master to wiki2
ae1e638... HEAD@{11}: merge origin/master: Merge made by recursive.
8aad4a3... HEAD@{12}: commit: error catching for search
263eba1... HEAD@{13}: merge solrrepo: Fast forward

```
$ git fsck --lost-found
```

```
$ git fsck --lost-found
dangling blob 20c49ae386d1748692b427455528d8738a31568b
dangling blob 6bc9c1695a6778ec5ef48cee86960e2d6dfd6b68
dangling blob d6893d7793dc84608b7c74913d2a94a78038cd10
dangling tree d3cdcb5baf81ad8d0acf5116371e588d72c356d7
dangling blob 09ce750b00c6e8c43f8aca445ddad12aca084434
dangling blob 2f5a75d52298422311969d56dc62a85228a8d1f6
dangling blob 9d73e8c864c896ed41be1cbdec44d33be4811a21
dangling commit e194f2dbf2dd75ce05325ffb9ec55402be405105
dangling blob 9df7d2ac92cec9260466fa05ee1b2b24632a247c
dangling blob e3fa35445a8ee52e5c4bf9984f9a74735407011d
```

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$ git fsck --lost-found
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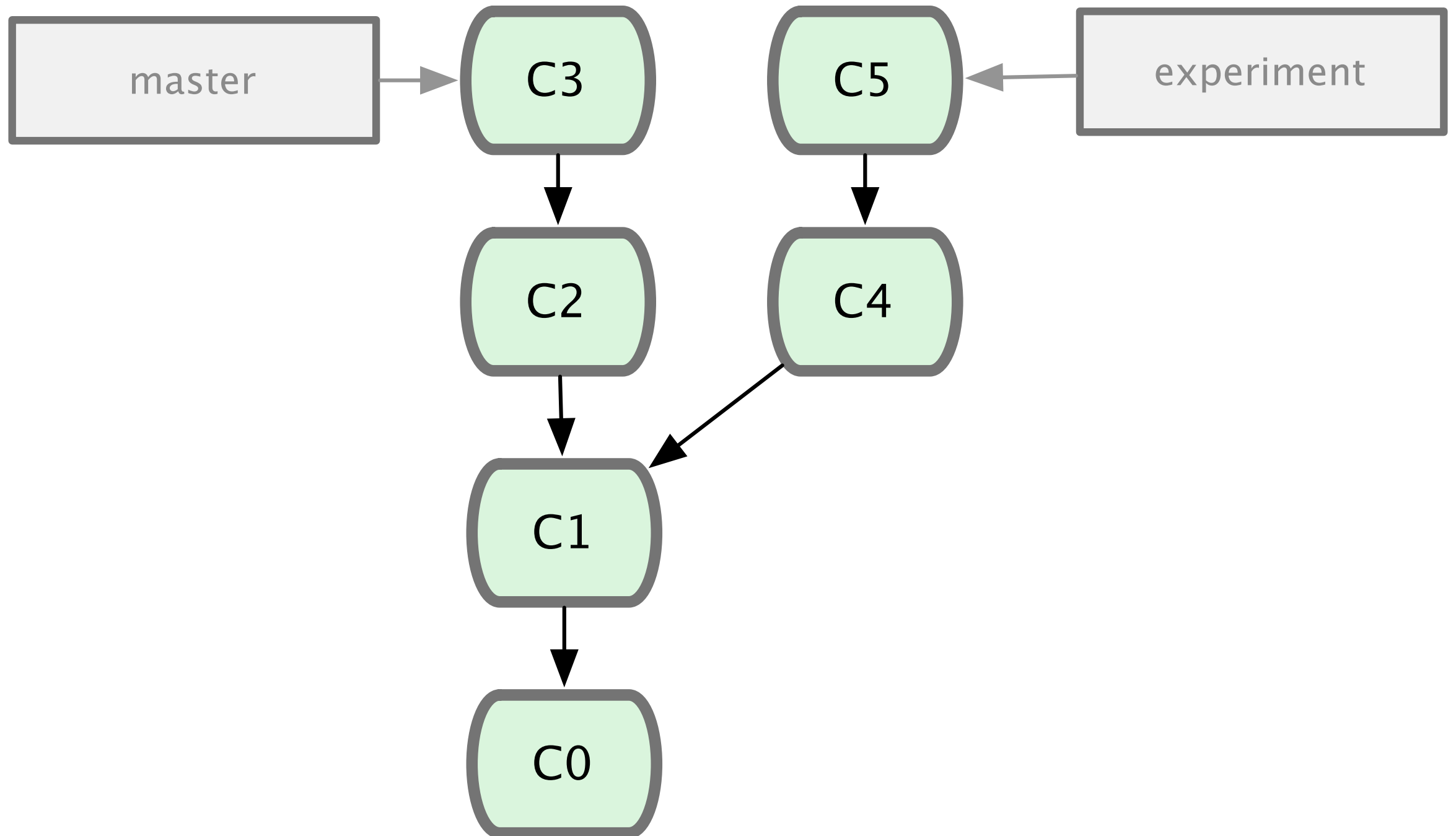
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dangling commit e194f2dbf2dd75ce05325ffb9ec55402be405105
```

```
dangling blob 9df7d2ac92cec9260466fa05ee1b2b24632a247c
```

```
dangling blob e3fa35445a8ee52e5c4bf9984f9a74735407011d
```

git branch experiment SHA

git branch experiment C5



repository corruption

re-clone

copy corrupted objects
from a good repo

```
cp -Rf ../good_repo/.git/objects*  
      .git/objects/
```

```
$ tree -a
```

```
.
|-- .git
|   |-- COMMIT_EDITMSG
|   |-- HEAD
|   |-- branches
|   |-- config
|   |-- description
|   |-- hooks
|   |   |-- applypatch-msg.sample
|   |   `-- update.sample
|   |-- index
|   |-- info
|   |   `-- exclude
|   |-- logs
|   |   |-- HEAD
|   |   `-- refs
|   |       |-- heads
|   |       `-- master
|   |-- objects
|   |   |-- 32/09658ac8d80bc9726d3a33d77e3dfc5fe6035e
|   |   |-- 53/9cd7886a627841d525a78d45cbc6396be20b41
|   |   |-- e6/9de29bb2d1d6434b8b29ae775ad8c2e48c5391
|   |   |-- info
|   |   `-- pack
|   |-- refs
|   |   |-- heads
|   |   |   `-- master
|   |   `-- tags
|   `-- remotes
`-- hello_world.rb
```

17 directories, 33 files

git gc

git fsck

git reflog

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Demo

Where are we?

What is Git?

Basic Git Usage

Intermediate Git Usage

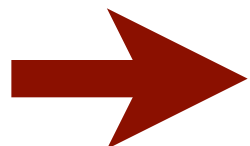
Git Branching

Working with Repo & Gerrit

Advanced Git Usage

Git Internals

Git Maintenance



Git Servers

Git Servers

The Protocols

ssh

ssh

secure

no special server daemon

user based permissions

can push over it

setting up git over ssh

- set up ssh

```
$ ls /opt
AlarmClock.git
GoogleSearch.git
Phone.git
Browser.git
HTMLViewer.git
Settings.git
...
```

```
$ ls /opt  
AlarmClock.git  
GoogleSearch.git  
Phone.git  
Browser.git  
HTMLViewer.git  
Settings.git  
...
```

```
git clone schacon@gitserver:/opt/AlarmClock.git
```

```
$ ls /opt  
AlarmClock.git  
GoogleSearch.git  
Phone.git  
Browser.git  
HTMLViewer.git  
Settings.git  
...
```

```
git clone schacon@gitserver:/opt/AlarmClock.git  
ssh schacon@gitserver
```

http/s

http/s

simple

low server resources

slower / less efficient

no user based permissions

setting up git over http

- put repositories under DocumentRoot
- run 'git update-server-info' after each commit

```
$ ls /var/www  
AlarmClock.git  
GoogleSearch.git  
Phone.git  
Browser.git  
HTMLViewer.git  
Settings.git  
...
```

```
$ ls /var/www  
AlarmClock.git  
GoogleSearch.git  
Phone.git  
Browser.git  
HTMLViewer.git  
Settings.git  
...
```

```
git clone http://gitserver/AlarmClock.git
```

git

git://

efficient

fast

relatively more difficult setup

insecure

no push

setting up git over git://

- setup git-daemon as inetd server
- touch git-daemon-export-ok

Server Hooks


```
$ tree -a
```

```
.  
|-- .git  
|   |-- HEAD  
|   |-- branches  
|   |-- config  
|   |-- description  
|   |-- hooks  
|       |-- post-commit.sample  
|       |-- post-receive.sample  
|       |-- ...  
|       |-- pre-rebase.sample  
|       `-- update.sample  
|   |-- info  
|       `-- exclude  
|   |-- objects  
|       |-- info  
|       `-- pack  
|   |-- refs  
|       |-- heads  
|       `-- tags  
|   `-- remotes  
`-- hello_world.rb
```

11 directories, 25 files

```
mv .git/hooks/[hookname].sample  
   .git/hooks/[hookname]
```

```
mv .git/hooks/[hookname].sample  
   .git/hooks/[hookname]
```

```
chmod a+x .git/hooks/[hookname]
```

```
$ cat .git/hooks/post-update.sample
```

```
$ cat .git/hooks/post-update.sample
#!/bin/sh
#
# An example hook script to prepare
# a packed repository for use over
# dumb transports.
#
exec git-update-server-info
```

Local Hooks

pre-commit

commit-msg

post-checkout

Server Hooks

pre-receive

post-receive

update

post-update

Demo

Review

git init

git clone

git add

git commit

git remote

git config

git pull

git fetch

git push

git diff

git log

git branch

git checkout

git stash

git tag

gitk

git show

git blame

git rebase

git filter-branch

git cherry-pick

git reset

git bisect

git gc

git fsck

git reflog

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git init

git clone

git add

git commit

git remote

git config

git pull

git fetch

git push

git diff

git log

git branch

git checkout

git stash

git tag

gitk

git show

git blame

git rebase

git filter-branch

git cherry-pick

git reset

git bisect

git gc

git fsck

git reflog

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Resources

git-scm.com

gitcasts.com

#git / #github on IRC

peepcode - git book and screencast

source.android.com

schacon@gmail.com