
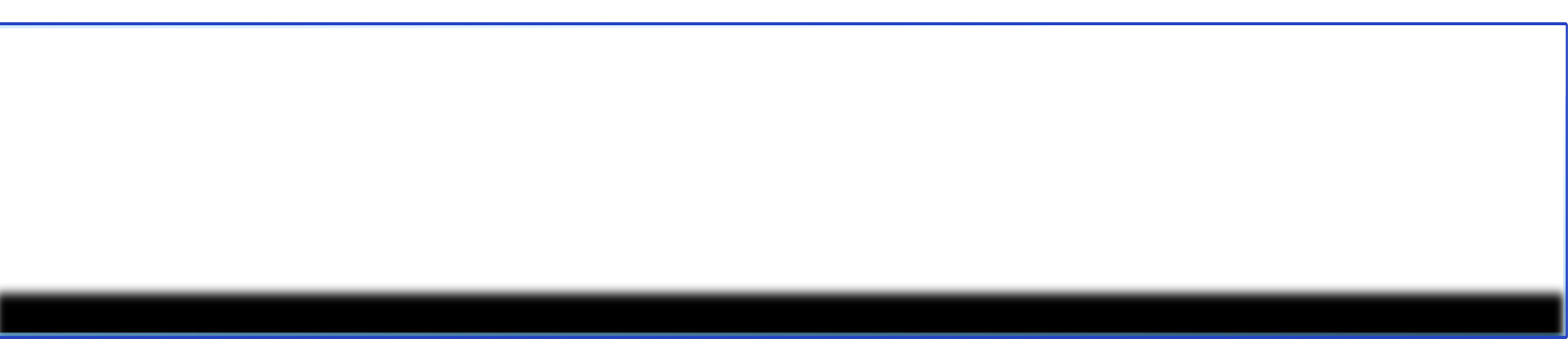




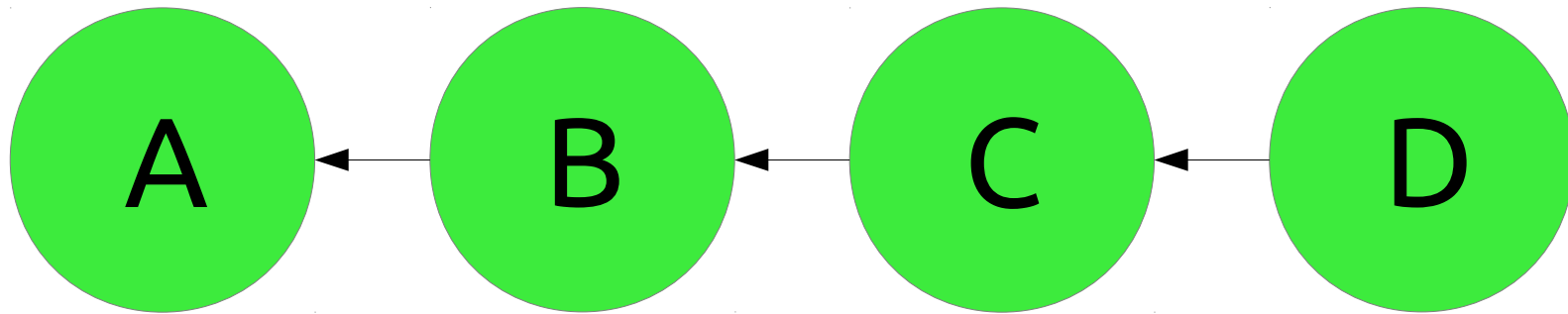
Chris Marshall

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- Git 'Database'
 - Modifying Immutability
 - Git Objects
 - Building a Repo

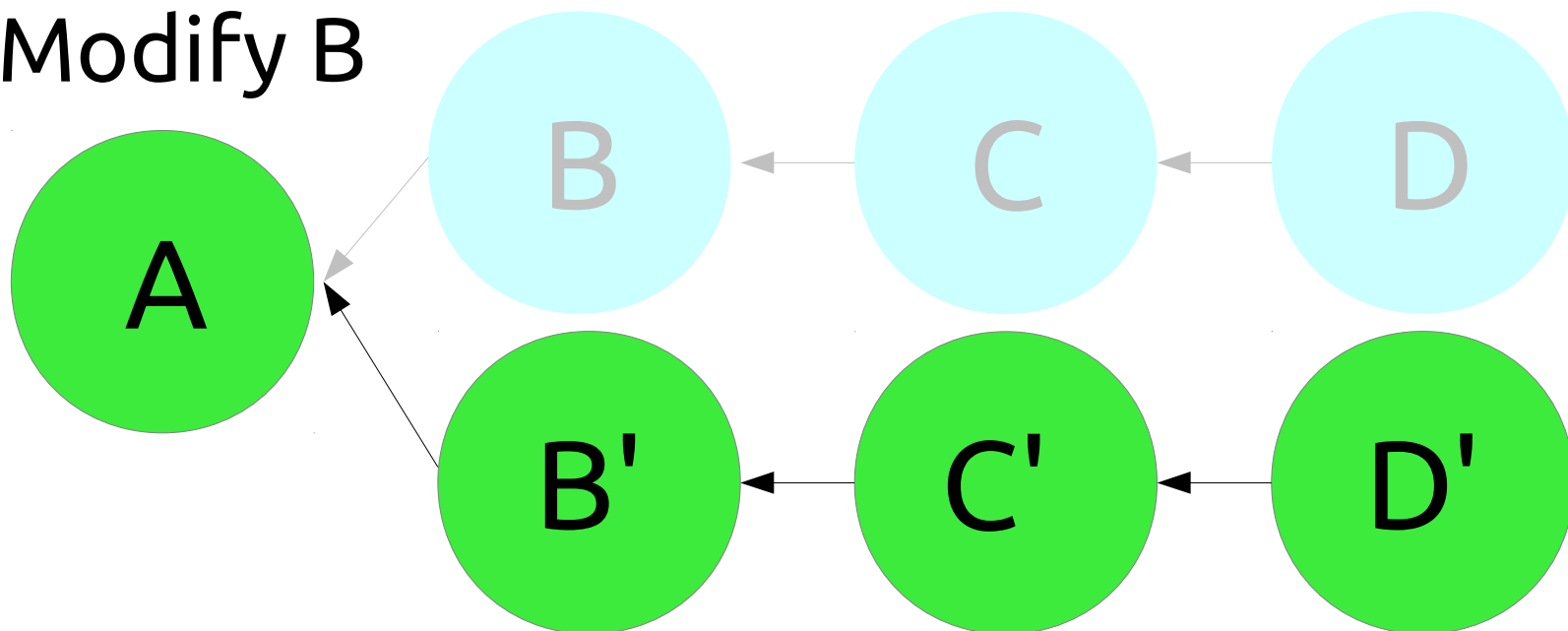
- Key:Value Pairs
- Files in `.git/objects`
- Arbitrary Data
 - Not files, but content/data
- Format: header + content => SHA1
- SHA1 is the key
 - First 2 chars make up subdirectory
 - Other 38 are the filename
- Compressed with zlib

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- How to change what can't be changed?
 - Start with what we know
 - Commits and Rebasing
 - Each subsequent commit is *based-on* the previous
 - Edit a commit mid-stream it affects all child commits

- Interactive Rebase



- Modify B





A diagram illustrating the components of a version control system. At the top is a long, thin black rectangle with a blue border. Below it, on the left, is a red rectangle labeled 'Blob'. To the right of the 'Blob' is a purple rounded rectangle labeled 'Tree'. To the right of the 'Tree' is a green circle labeled 'Commit'. To the right of the 'Commit' is a light blue downward-pointing arrow labeled 'Refs'.

Blob

Tree

Commit

Refs



Blob

- The data, or 'files'
- File names are not stored, only content
- Reusable

Blob

```
$ git cat-file -p e550257c3794e1e9b8455914f8d416f6823bc0e1
class Guitar

  def downstrum
    [ 'E', 'A', 'D', 'G', 'B', 'e' ].each do |string|
      puts string
    end
  end
end
```




Tree

- The 'directories'
- Created when adding files to index
- Lists of:
 - Blobs, and their file names
 - Other trees and their names

- Literally, each commit has its parent as a part of it

```
$ git cat-file -p a9b794
tree 2efb67d21382e385fd45aa231b433f4b301d5019
parent 2d8ac79aa5f861f6ba5873120e8683a64d85f6e4
author Chris Marshall <chris@chrismar035.com> 1346874625 -0400
committer Chris Marshall <chris@chrismar035.com> 1346874952 -0400
```

```
Add truthiness to README
```

Tree

```
$ git cat-file -p 2efb67d21382e385fd45aa231b433f4b301d5019
100644 blob b788b1299a0b85abd62012821d5286cd4eadf585 .gitconfig
100644 blob 8bb8211d6d3a6a36982428a9d2abb58b5955fdea README.mkd
040000 tree 063aaf208d43a82cd3b6ea1972f4de268e31b620 lib
100644 blob d9425eb2238e1175d91be09eaed4096352f81c26 script.mkd
100644 blob e69de29bb2d1d6434b8b29ae775ad8c2e48c5391 tempfile
040000 tree 942715e416be806995c1c8a53bf10ad869f9f74e vim
```



Commit

- Markers for each version of the repo
- Contain single 'root' tree SHA1
- Metadata
 - Committer & author
 - Timestamp
 - Message
 - Parent(s)



Refs

- 'Pointers' to commits
 - Branches
 - Tags
 - HEAD
 - Remotes

- Not stored in 'db' but plain text files
- Analogous to node pointers in Singly Linked Lists

```
$ cat .git/refs/heads/master  
812b7af43685081182a52e073f7b3e0ad01f3fab
```

```
project_root/  
.git  
README.mkd
```

1b62
tree 4096

995c
tree 29bb

← master

75d8
tree ad8c

4096
8b12 README.mkd
f9f7 lib

29bb
d942 README.mkd
f9f7 lib

ad8c
8b12 README.mkd

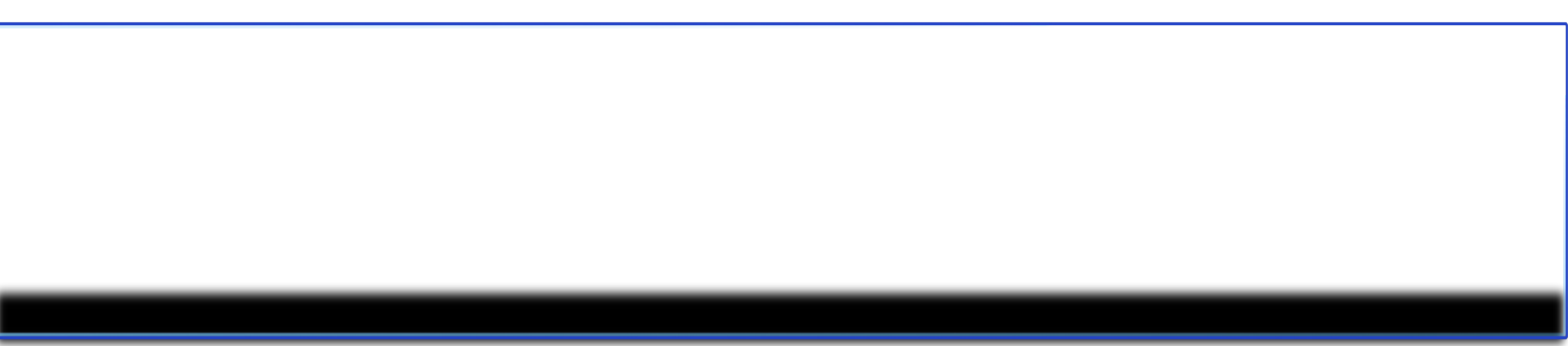
f9f7
15e4 guitar.rb

8b12

15e4

d942

*New blob
with
modified
contents of
README*

- 
- Pro Git Chapter 9
 - Git Internals – Pedro Melo
 - Git from the bottom up – John Wiegley
 - Fast Intro to Git Internals



Chris Marshall

chrismar035.com

[@chrismar035](https://twitter.com/chrismar035)

chris.marshall@mobiledefense.com