

Mango



Git on Ethereum, IPFS and Swarm.

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Why do I need Mango?

- 1) Do not want to trust a central repository.
- 2) Proof of existence for source code.
- 3) Storing large files.
- 4) Ethereum is building decentralised systems. Its source should be available in a decentralised manner.

What is Git?

A content addressable filesystem.

What is Swarm?

A content addressable filesystem.

What is IPFS?

A content addressable filesystem.

THIS IS GIT. IT TRACKS COLLABORATIVE WORK
ON PROJECTS THROUGH A BEAUTIFUL
DISTRIBUTED GRAPH THEORY TREE MODEL.

COOL. HOW DO WE USE IT?

NO IDEA. JUST MEMORIZE THESE SHELL
COMMANDS AND TYPE THEM TO SYNC UP.
IF YOU GET ERRORS, SAVE YOUR WORK
ELSEWHERE, DELETE THE PROJECT,
AND DOWNLOAD A FRESH COPY.



Git objects

Store data

```
$ git hash-object -w devcon2.md
```

```
d79f0a214ae164d0e77ece772854e28c1836f71b
```

Print data

```
$ git cat-file -p d79f0a214ae164d0e77ece772854e28c1836f71b
```

```
Hello Ethereum! Hello Shanghai!
```

Git objects #2

The data stored in the filesystem

```
$ hexdump -C .git/objects/d7/9f0a214ae164d0e77ece772854e28c1836f71b
```

```
00000000  78 01 4b ca c9 4f 52 30  36 64 f0 48 cd c9 c9 57  |x.K..OR06d.H...W|
```

```
00000010  70 2d c9 48 2d 4a 2d cd  55 54 80 f0 83 33 12 f3  |p-.H-J-.UT...3..|
```

```
00000020  d2 33 12 33 15 01 fe cf  0d 10                          |.3.3.....|
```

```
0000002a
```

Git trees

Create tree object

```
$ git update-index --add --cacheinfo 100644 \
```

```
d79f0a214ae164d0e77ece772854e28c1836f71b devcon2.md
```

```
$ git write-tree
```

```
3dcec41f9ab8b5d87a42bb83d9a0a35c3c2c6e3f
```

Print tree object

```
$ git cat-file -p 3dcec41f9ab8b5d87a42bb83d9a0a35c3c2c6e3f
```

```
100644 blob d79f0a214ae164d0e77ece772854e28c1836f71b    devcon2.md
```

Git commit

Creating a commit

```
$ git commit-tree -m "First commit" 3dcec41f9ab8b5d87a42bb83d9a0a35c3c2c6e3f  
d4323789047cae130c7dc1bab17c9de7e8792946
```


Git commit #2

Displaying a commit

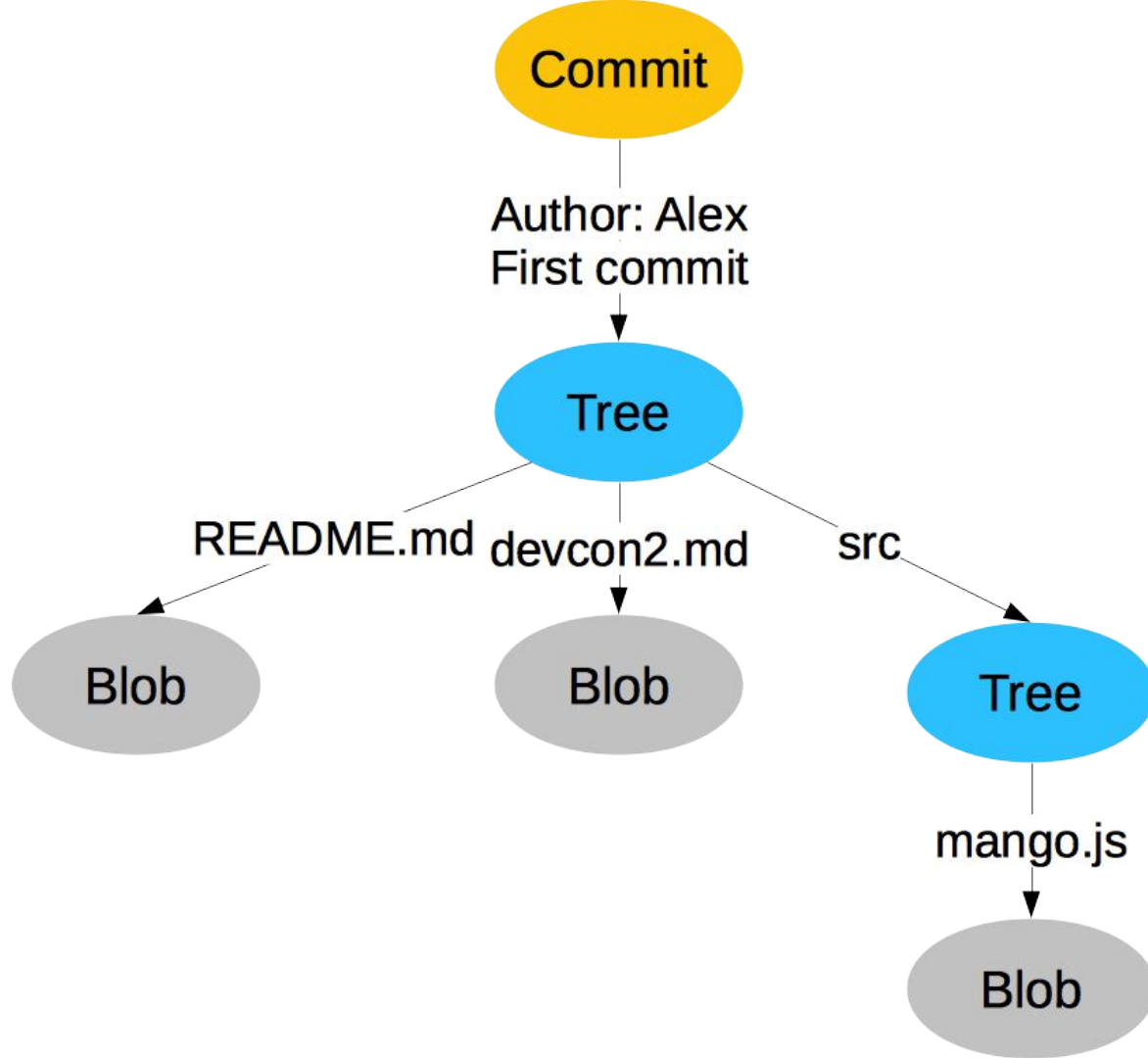
```
$ git cat-file -p d4323789047cae130c7dc1bab17c9de7e8792946
```

```
tree 3dcec41f9ab8b5d87a42bb83d9a0a35c3c2c6e3f
```

```
author Alex Beregszaszi <alex@rtfs.hu> 1474051806 +0100
```

```
committer Alex Beregszaszi <alex@rtfs.hu> 1474051806 +0100
```

```
First commit
```



Naive implementation

Store everything in a contract

Cost: 50M gas in total for a simple repo

Practical implementation

Store objects in content addressable systems: IPFS or Swarm

Issue: need to map Git identifiers

Snapshots

A mapping of Git SHA1 to IPFS/Swarm object hashes

QmYyXoGe9dBQHFPMEct5593Sk4TQ7ScUiLphxuDv7caLt6 : d79f0a214ae164d0e77ece772854e28c1836f71b
QmZpa1PSgjcU4PTwt7Gs9GAsQSzfNZyeW4b7VVZDY6AbJy : d4323789047cae130c7dc1bab17c9de7e8792946

Where is Ethereum used?

A `git push` only stores the following in a contract:

- The commit hash for the branch
- Link to the updated object tree in IPFS or Swarm

A `push` takes about 140.000 gas.

What is Mango?

- 1) Defines the semantics for IPFS/Swarm
- 2) Defines the contract interface (see `MangoRepoInterface.sol`)
- 3) Provides a git backend implementation
- 4) Provides a CLI to create repos

Repo contract

- 1) Every Git repository has its own contract
- 2) Access control and other features are up to the actual implementation
- 3) There is a simple implementation in Mango CLI

CLI #1

Create a repository

```
$ mango-admin create
```

```
Initialising...
```

```
Creating new repository with administrator  
0xaf8843081fd0dc1c4b12053d0ec123a10b91de0e
```

```
Sent transaction:  
0xe95567ee6fdee21e02061ef6e33f2659943509ca5af5d953dc987ad118ed57fc
```

```
Repository created: 0x8add9d064bbd29f3118f11ee46abe0ad9e45aa59
```

CLI #2

Adding a new user

```
$ mango-admin --repo 0x8add9d064bbd29f3118f11ee46abe0ad9e45aa59 authorize  
0x01d3400d88796f893e8183036b047c9e2474080b
```

```
Initialising...
```

```
Authorizing 0x01d3400d88796f893e8183036b047c9e2474080b for  
0x8add9d064bbd29f3118f11ee46abe0ad9e45aa59 as committer
```

```
Sent transaction:
```

```
0xb80a66ec59a923245d91ce8f112519fb0270cbd5cd13bfa1f379aa0f06a601f7
```

Uploading an existing repo

```
$ git remote add mango mango://0x8add9d064bbd29f3118f11ee46abe0ad9e45aa59
```

```
$ git push mango master
```

```
Counting objects: 17, done.
```

```
Delta compression using up to 4 threads.
```

```
Compressing objects: 100% (17/17), done.
```

```
Writing objects: 100% (17/17), 5.21 KiB | 0 bytes/s, done.
```

```
Total 17 (delta 7), reused 0 (delta 0)
```

```
To mango://0x8add9d064bbd29f3118f11ee46abe0ad9e45aa59
```

```
* [new branch]      master -> master
```

Cloning a repository

```
$ git clone mango://0x8add9d064bbd29f3118f11ee46abe0ad9e45aa59
```

```
Cloning into '0x8add9d064bbd29f3118f11ee46abe0ad9e45aa59'...
```

```
Receiving objects: 100% (17/17), 10.59 KiB | 0 bytes/s, done.
```

```
Checking connectivity... done.
```

ENS

Integration should give names such as `solidity.ethereum.mango.eth`

Status of Mango

Is it a replacement of Github yet?

Future of Mango

- 1) Store release notes within git
- 2) Store issues within git
- 3) Store pull requests within git (+ Github-style forking!)
- 4) Create user friendly web frontends

visit github.com/axic/mango