Roger

InterPlanetary File System

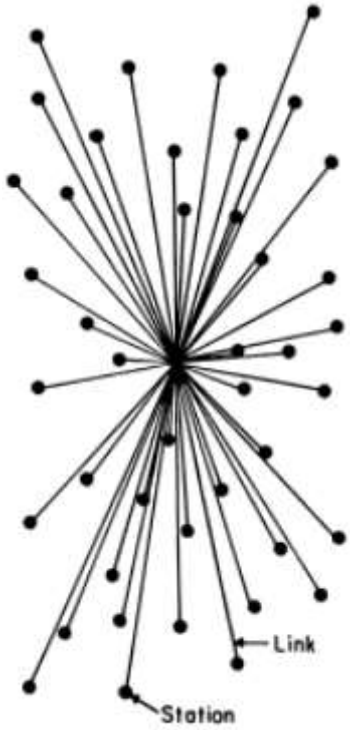
- **IPFS** is a protocol designed to create a permanent and decentralized method of storing and sharing files

- Faster, safer and more open web

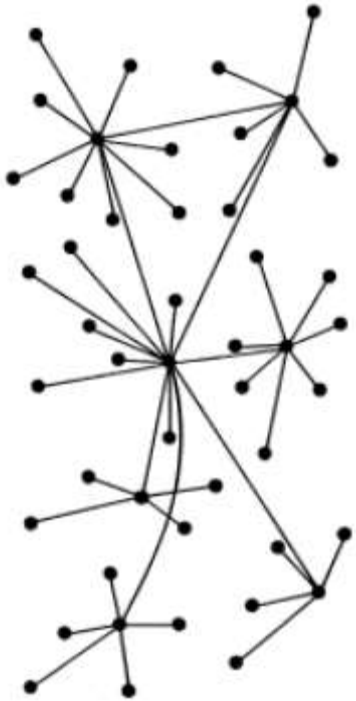
- IPFS aims to replace HTTP and build a better web for all of us

Network Topology

- Centralised
  - Single server
  - Difficult to scale
  - Single point of failure
- Decentralised
  - Multiple servers
  - Demand and failures better handled
  - Expensive



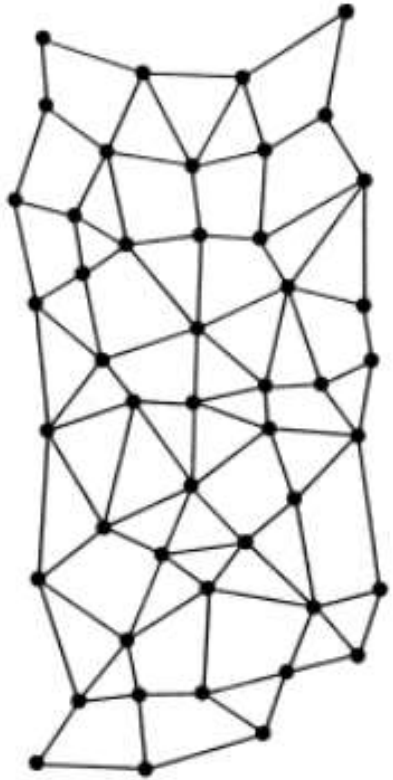
CENTRALIZED



DECENTRALIZED

IPFS Topology

- Fully distributed network
- Acts both server and client



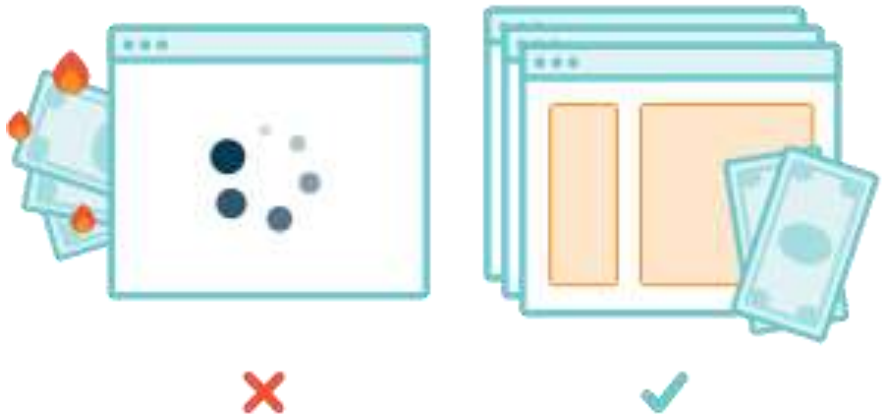
DISTRIBUTED

The web of tomorrow needs IPFS today

HTTP is inefficient and expensive

- HTTP downloads a file from a single computer at a time, instead of getting pieces from multiple computers simultaneously.

- IPFS makes it possible to distribute high volumes of data with high efficiency



Humanity’s history is deleted daily

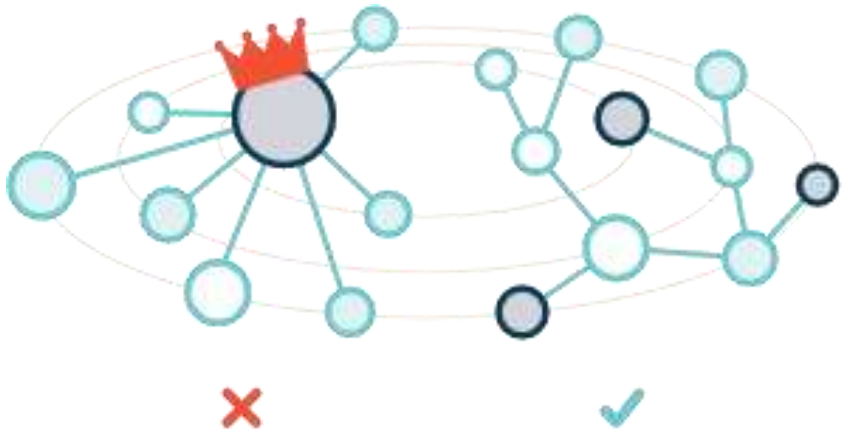
- The average lifespan of a web page is 100 days.

- IPFS provides historic versioning (like git) and makes it simple to set up resilient networks for mirroring of data.

The web’s centralization limits opportunity

- The Internet is a real accelerator of innovation. But the increasing consolidation of control is a threat to that.

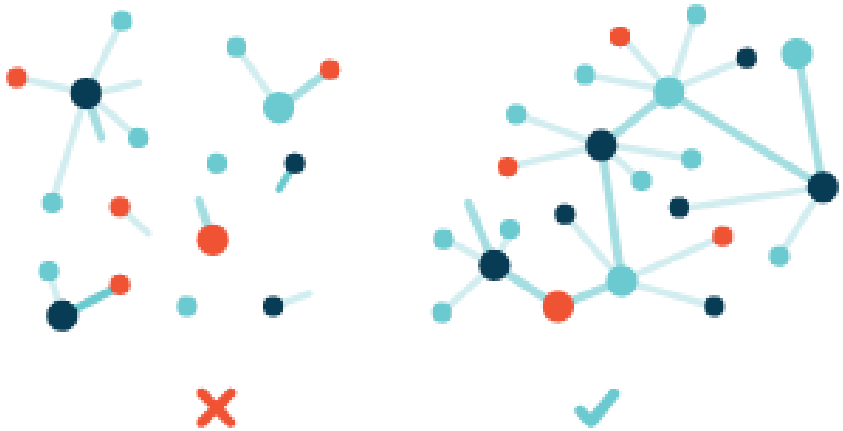
- IPFS remains true to the original vision of the open and flat web.



Our apps are addicted to the backbone

- All trivial compared to interplanetary networking.
  - Developing world
  - Offline
  - Natural disasters
  - Intermittent connections

- IPFS powers the creation of diversely resilient networks.



How IPFS works?

Application
Naming
MerkleDAG
Exchange
Routing
Network

Web

SFS

Git

BitTorrent

DHT

The  Stack

Application
Naming
MerkleDAG
Exchange
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DHT

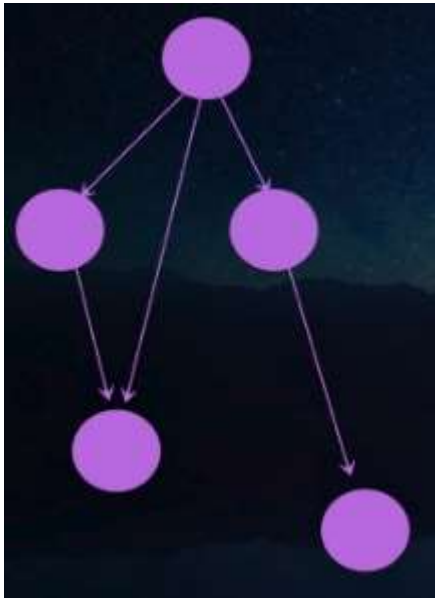
Using the Data

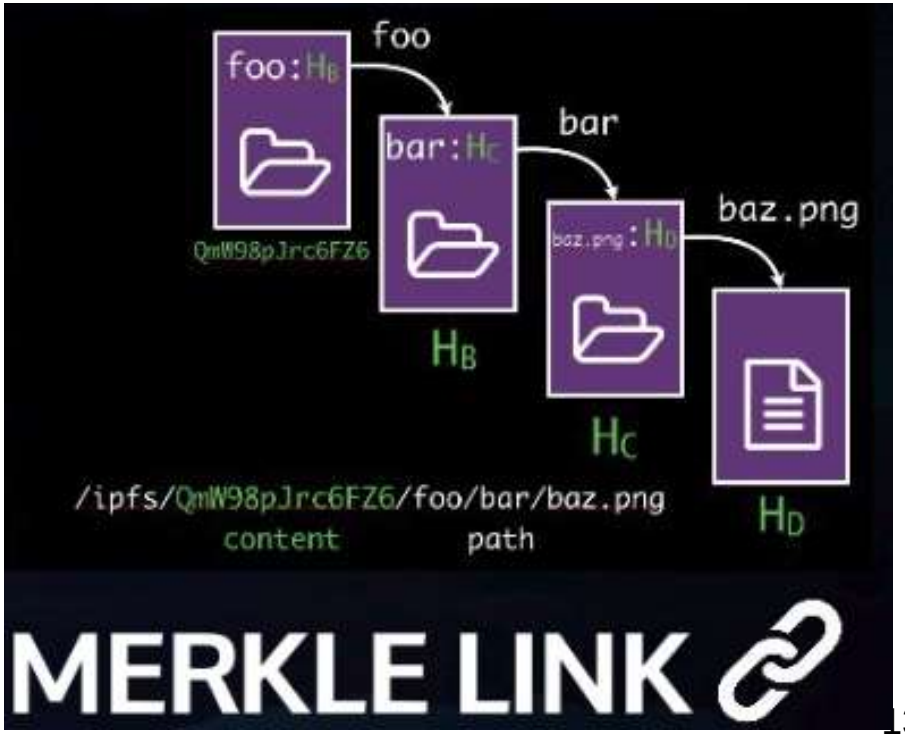
Defining the Data

Moving the Data

IPLD: InterPlanetary Linked Data

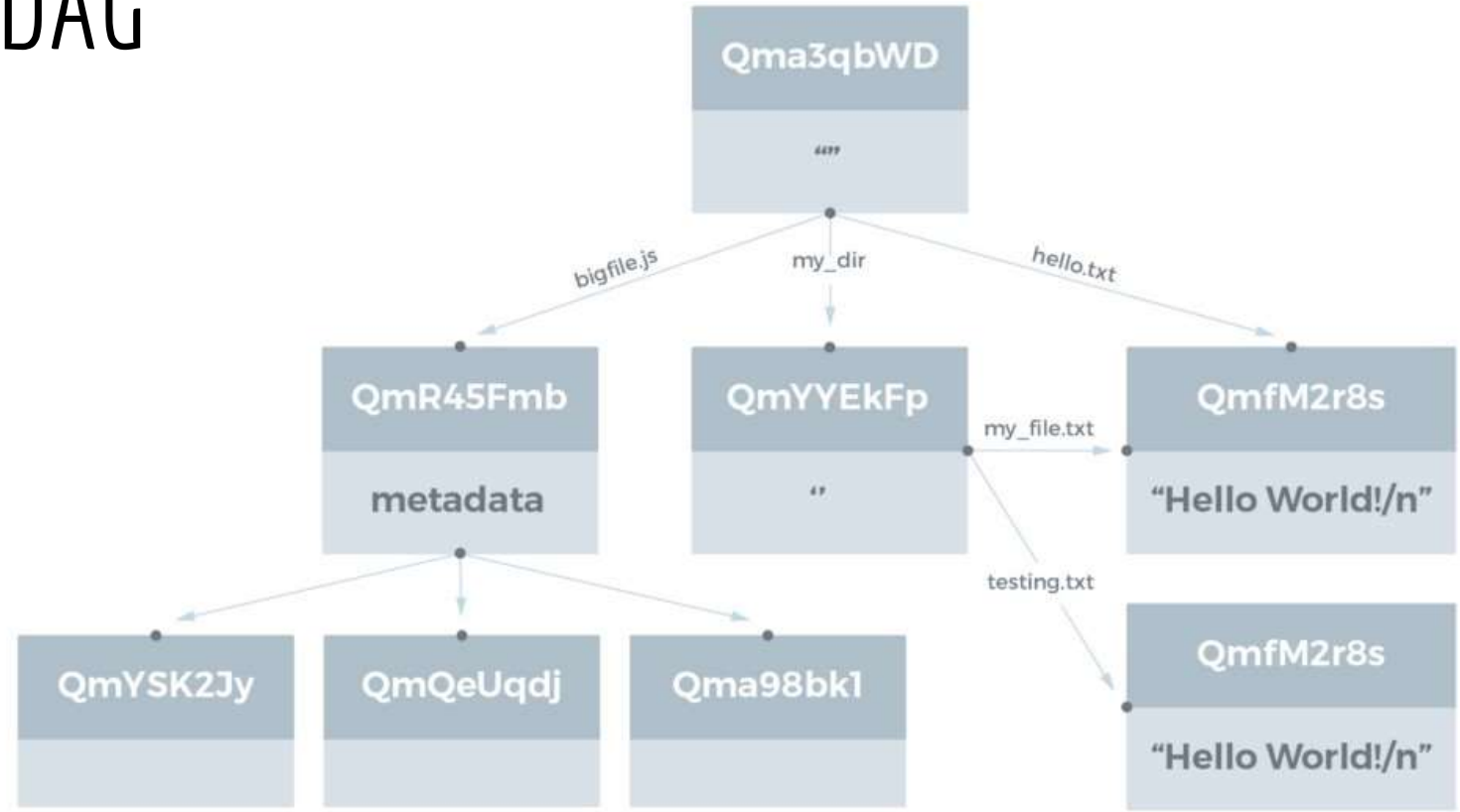
- Any data structure can be represented as a **DAG**





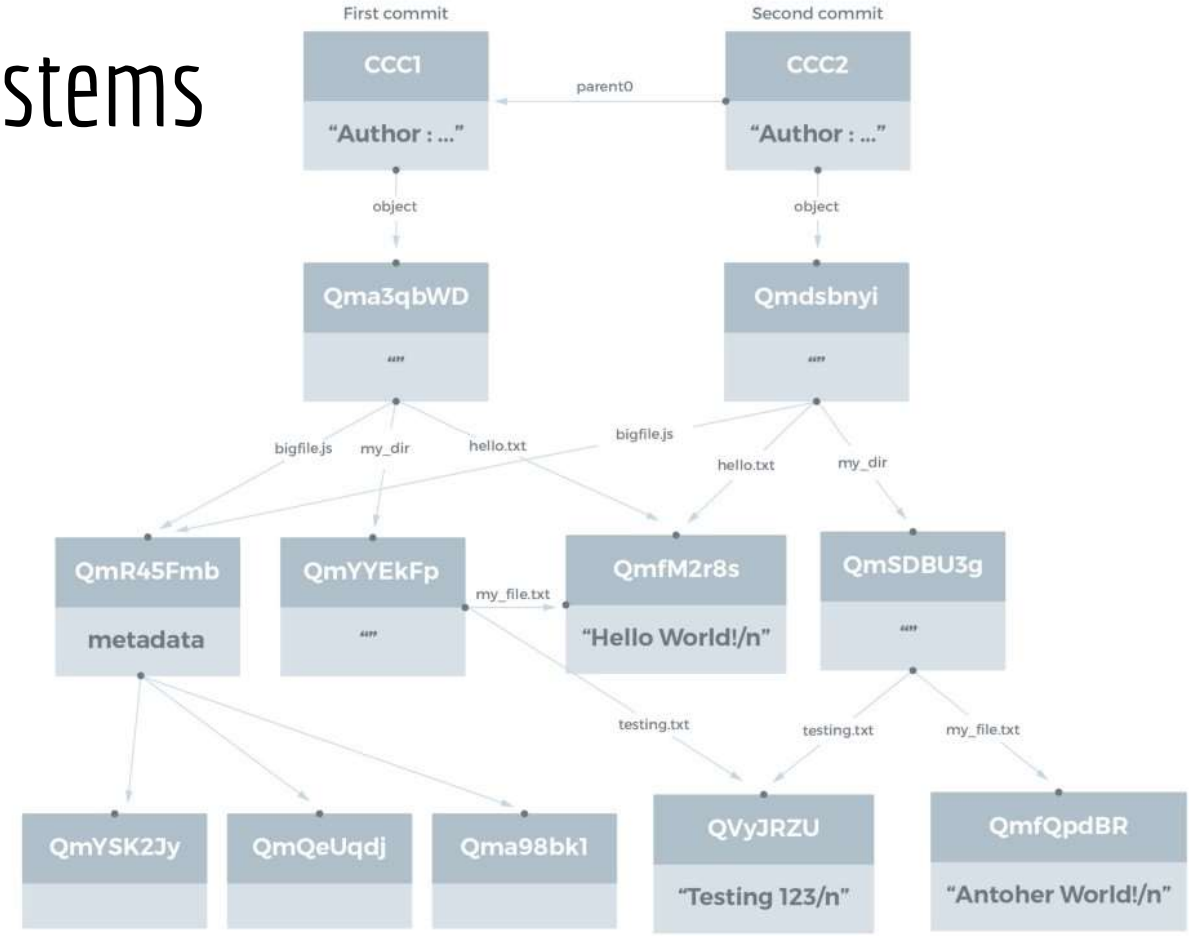
Merkle DAG

test_dir
- bigfile.js
- hello.txt
- my_dir
  - my_file.txt
  - testing.txt



Versioned file systems

test_dir
- bigfile.js
- hello.txt
- my_dir
  - my_file.txt
  - testing.txt



IPNS: InterPlanetary Name System

- **IPNS** is a way to add a small amount of mutability to the permanent immutability that is ipfs.
- Store a reference to an ipfs hash under the namespace of peerID (public key hash)

/ipns/Qmaaaaaaaaaaa

/ipfs/Qmbbbbbbbbbbbb/website_hash

Demo

Demo: Add / Cat / List files

```
# add / download single file
> ipfs add/get <FILE_PATH>

# cat file
> ipfs cat <FILE_HASH>

# add / download folder
> ipfs add/get -r <FOLDER_PATH>

# list folder
> ipfs ls -v <FOLDER_HASH>
```

Demo: Large file (› 256 KB)

```
# add / download large file
> ipfs add/get <FILE_PATH>

# get links of large file
> ipfs object get <FILE_HASH>
```

Demo: Pinning

```
# 1. add file
# 2. pin operating
> ipfs pin ls --type=all

# 3. remove cache
> ipfs pin rm -r <FILE_HASH>

# 4. remove cache
> ipfs repo gc
```

Demo: Playing videos

```
# add mp4 file
> ipfs add test.mp4

# playing video using browser
https://ipfs.io/ipfs/<VIDEO_HASH>
http://localhost:8080/ipfs/<VIDEO_HASH>
```

Demo: Git, even more distributed

```
# git clone (ex: bitmarklib)
> git clone --bare https://github.com/bitmark-inc/go-bitmarklib.git
> cd go-bitmarklib
> git update-server-info

# add git repo to IPFS
> ipfs add -r .

# try it
> git clone https://ipfs.io/ipfs/<GIT_HASH>
```

Demo: Inter-Planetary Naming System (IPNS)

```
# add file
# publish to the network
> ipfs name publish <FILE_HASH>

Published to <your peer ID>: <that hash>

# resolve
> ipfs name resolve <PEER_ID>

# try it
https://ipfs.io/ipns/<PEER_ID>
```

Demo: IPFS for websites

```
# 1. add website
> ipfs add -r <WEBSITE_FOLDER>

# 2. publish to the network
> ipfs name publish <WEBSITE_HASH>

# 3. try it
https://ipfs.io/ipns/<PEER_ID>
https://gateway.ipfs.io/ipns/<PEER_ID>
```

Appendix

Appendix

- Large file — 3.77 TB
  - https://gateway.ipfsstore.it:8443/ipfs/QmXd2t4WbhpDf643ija6byLE4q3L8GBQ3u773wWh5zVRT4

- Filecoin
  - $200 Million In 60 Minutes (257 million raised)

Thanks!
Any Quesions?