



IPFS

The InterPlanetary File System



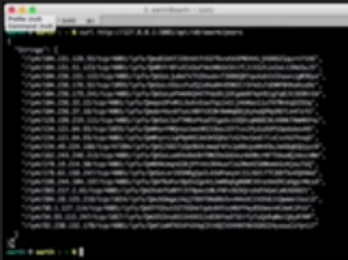
ipfs node



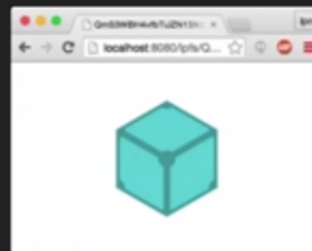
cli



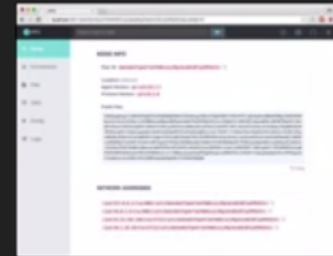
library



http api



http/ipfs
gateway



webui

```
go get -u github.com/ipfs/go-ipfs/cmd/ipfs
```

ipfs

ipfs version

ipfs init

ipfs daemon

```
echo 'Hello IPFS!' > hello.txt
```

```
ipfs add hello.txt
```


ipfs cat QmYWAifyw2V5dEq7c5GgdSPffeKoYXQZggnYzw5RbXpig4

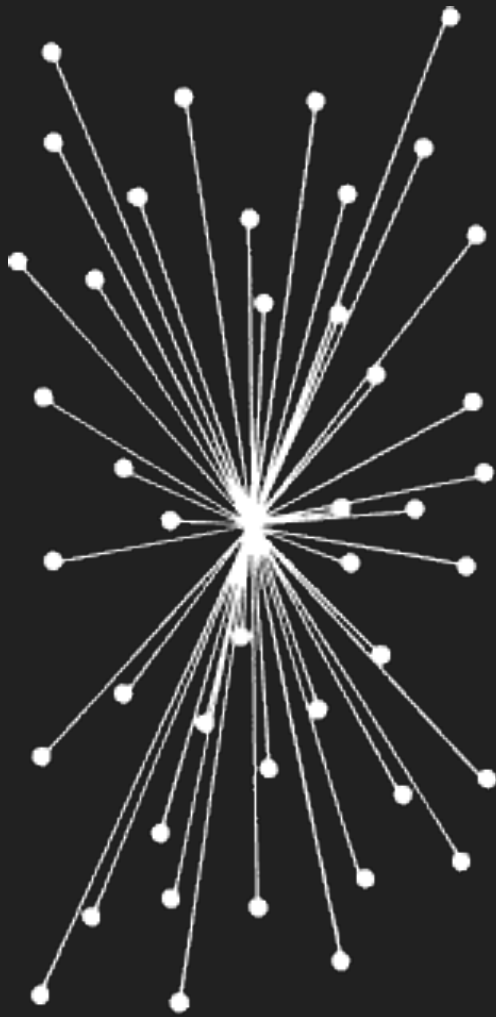
ipfs swarm peers

<http://localhost:8080/ipfs/QmYWAifyw2V5dEq7c5GgdSPffeKoYXQZggnYzw5RbXpig4>

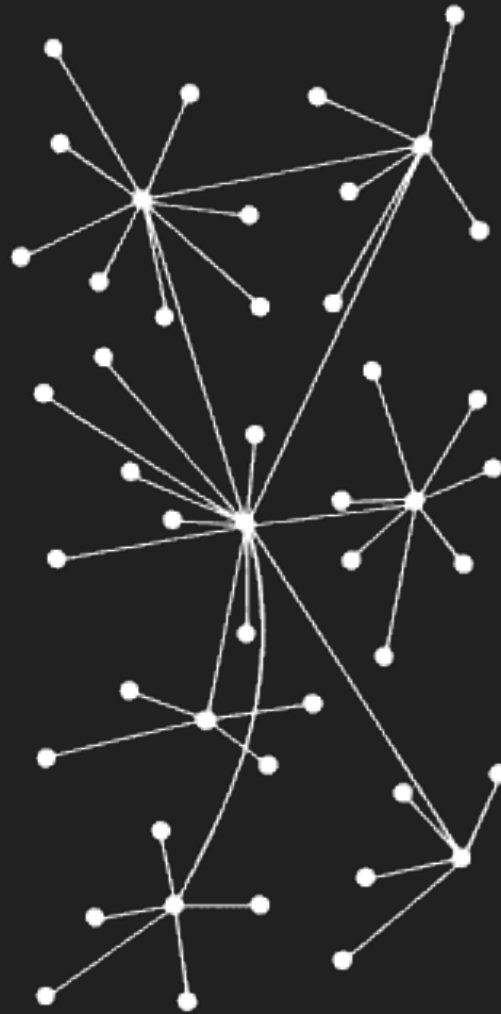
<http://gateway.ipfs.io/ipfs/QmYWAifyw2V5dEq7c5GgdSPffeKoYXQZggnYzw5RbXpig4>

ipfs add -r directory

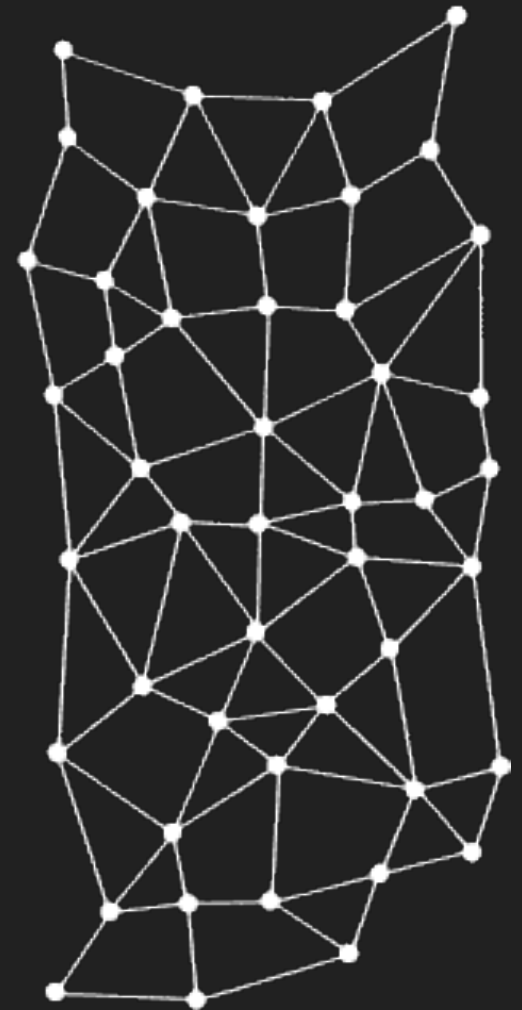
<http://gateway.ipfs.io/ipfs/QmeYYwD4y4DgVVdAzhT7wW5vrvmbKPQj8wcV2pAzjbj886>



CENTRALIZED



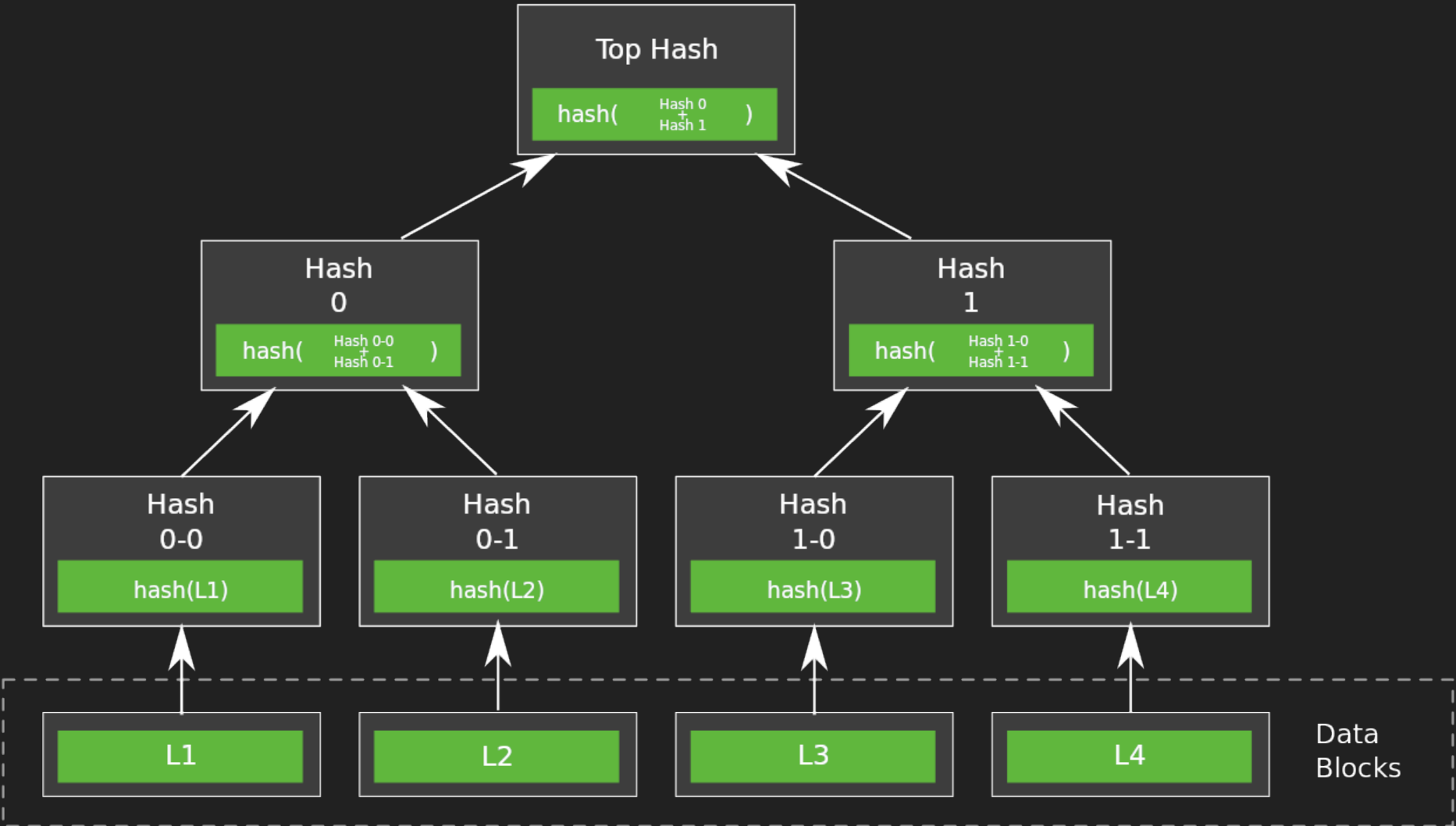
DECENTRALIZED



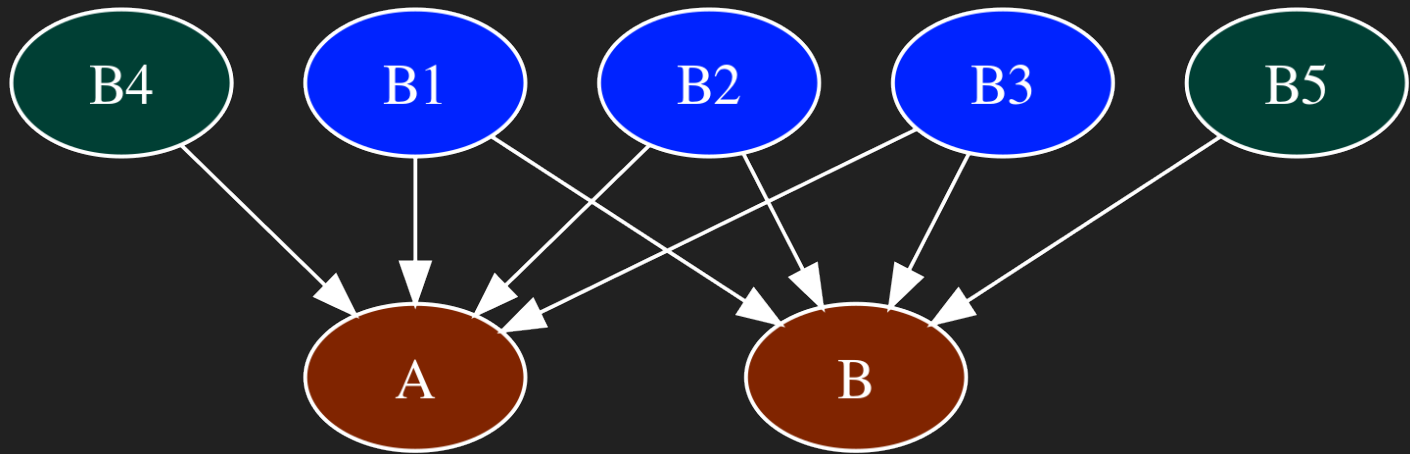
DISTRIBUTED

<http://localhost:5001/webui>

Under the hood







Under the hood

- MerkleDAG (Directed Acyclic Graph) [Git]
- Multihash (Q = SHA256 in Base58)
- DHT (Distributed Hash Table) [Kademlia]
- Bitswap (data block exchange) [BitTorrent]

IPFS is a protocol

- defines a content-addressed file system
- coordinates content delivery
- combines Kademlia + BitTorrent + Git

IPFS is a web

- can be used to view documents like the web
- files accessible via HTTP at

`http://gateway.ipfs.io/ipfs/<path>`

- browsers or extensions can learn to use `ipfs://` directly
- hash-addressed content guarantees authenticity

IPFS is modular

- connection layer over any network protocol
- routing layer
- uses a routing layer DHT
- uses a path-based naming service
- uses bittorrent-inspired block exchange

IPFS uses crypto

- cryptographic-hash content addressing
- block-level deduplication
- file integrity + versioning
- filesystem-level encryption + signing support

IPFS is peer-to-peer

- worldwide peer-to-peer file transfers
- completely decentralized architecture
- **NO** central point of failure

IPFS is a content delivery network

- caching-friendly (content-hash naming)
- bittorrent-based bandwidth distribution

IPFS has a name service

- IPNS, an SFS inspired name system

peer identity: QmdX9aYHdMEbPQT1YfvYbPvcYXAQe554bzuoZhLo2dVMra

- global namespace based on PKI
- serves to build trust chains
- compatible with other NSes
- can map DNS, .onion, .bit, etc to IPNS

ipfs.pics

Thank you!

ipfs.io