

FIG. 1 – Centralized, Decentralized and Distributed Networks

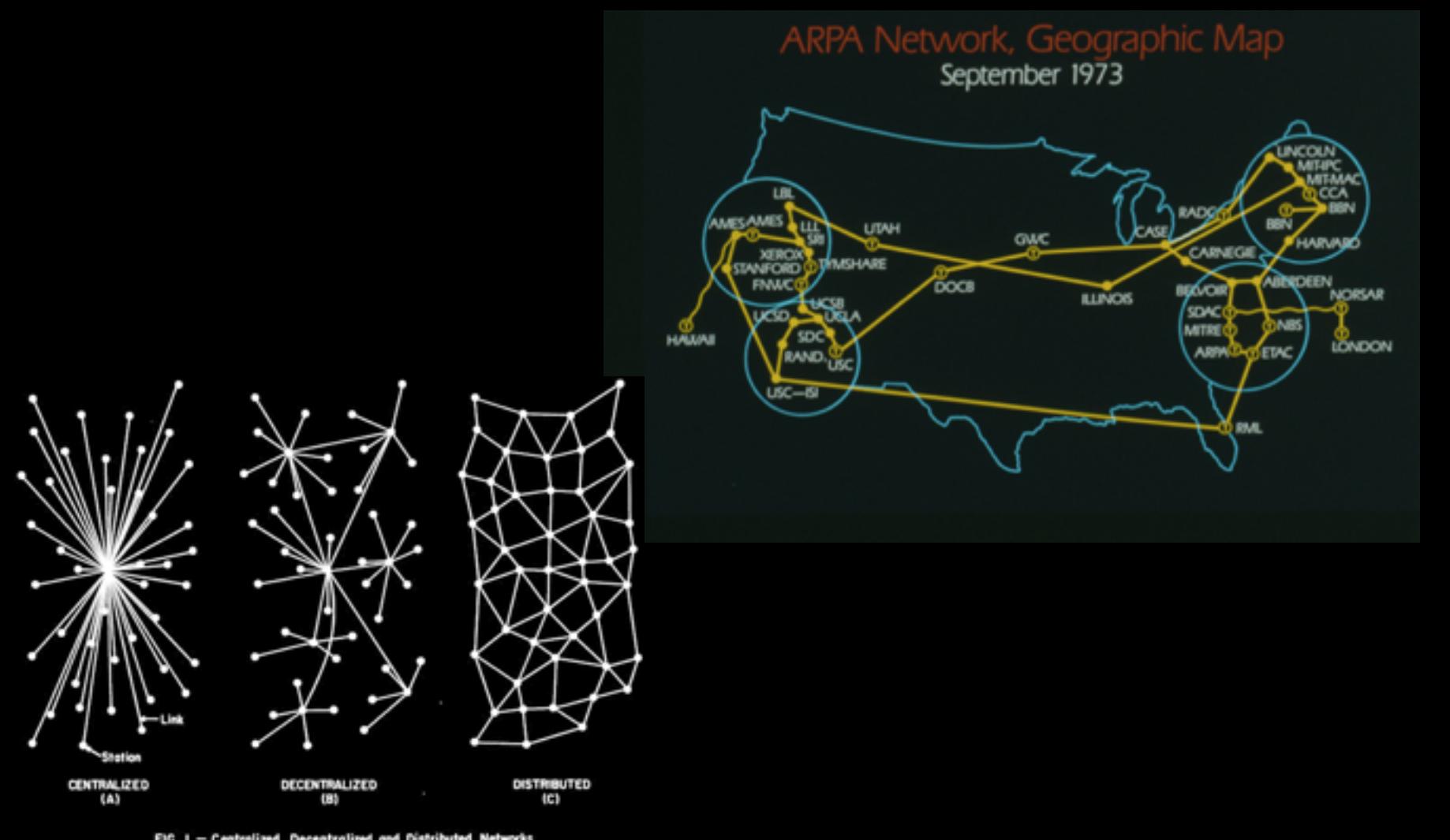


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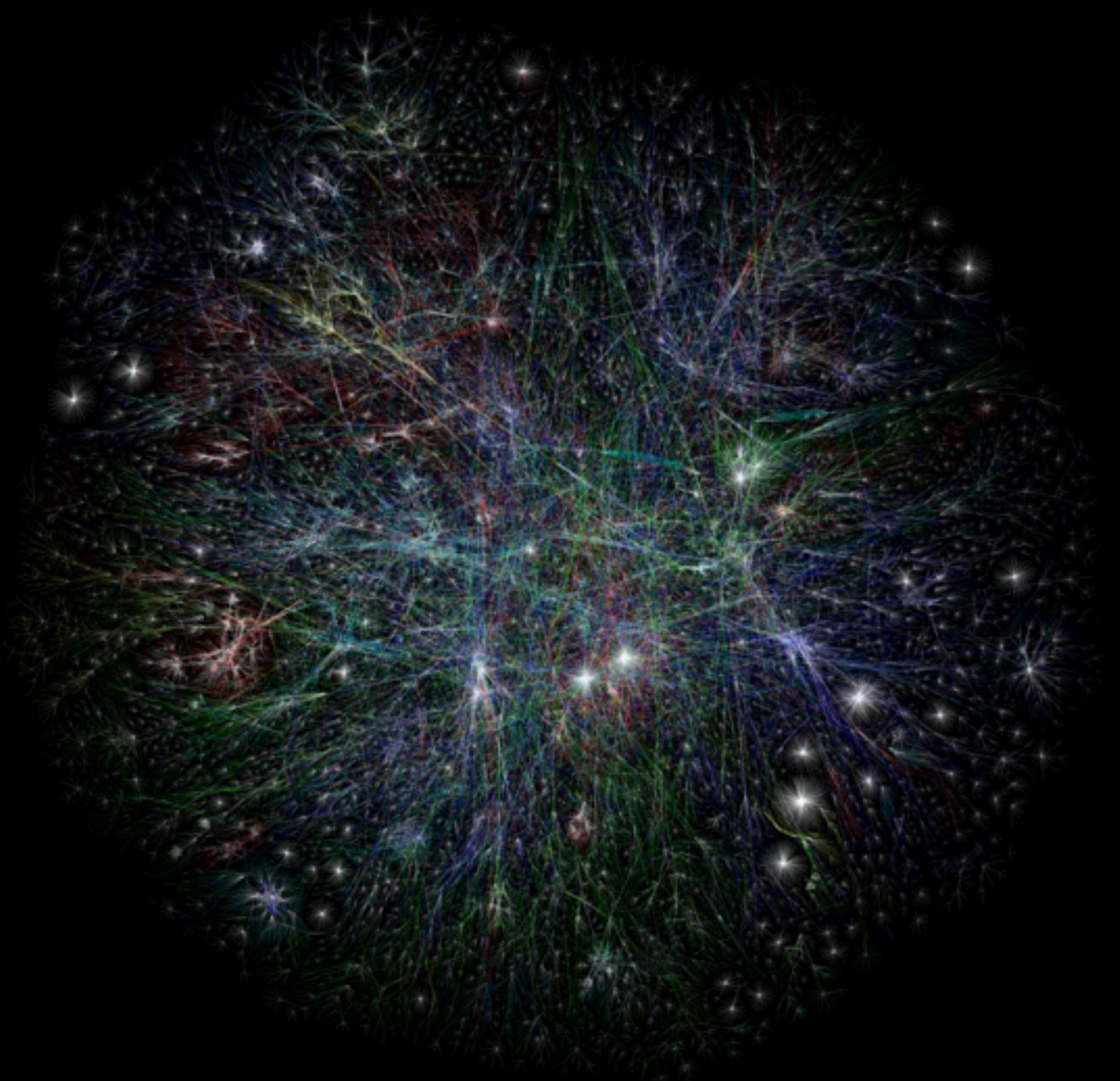
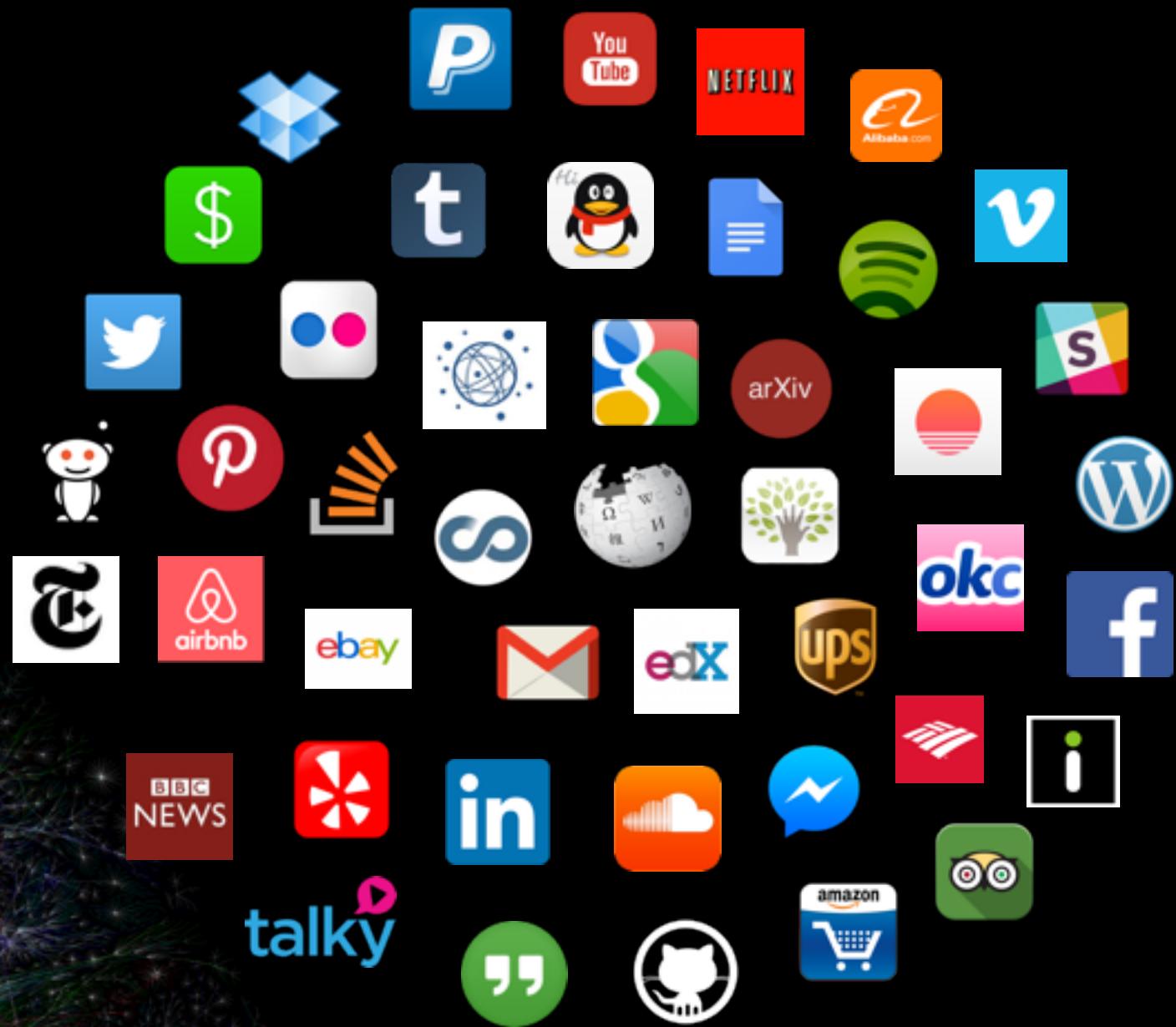
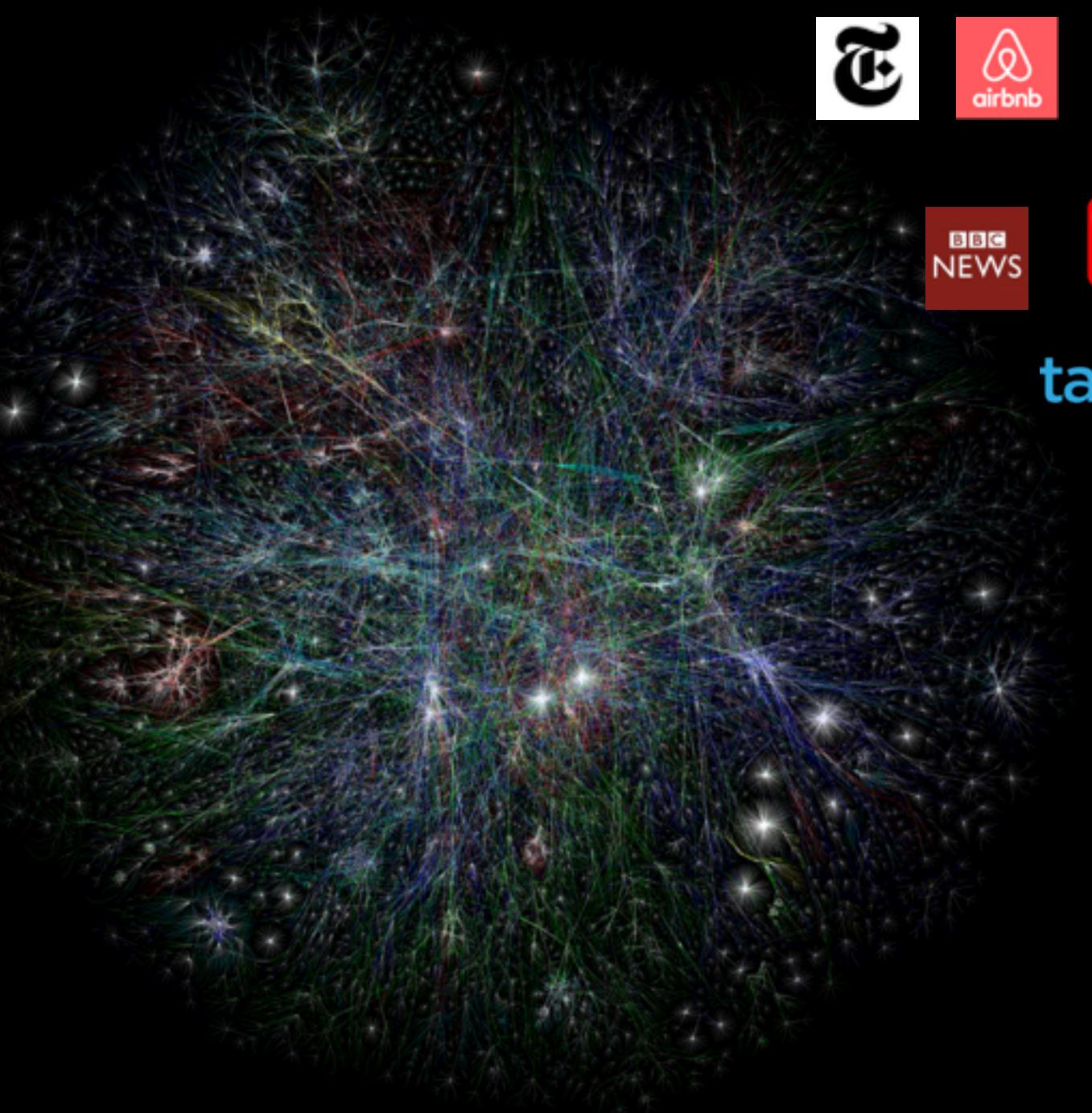
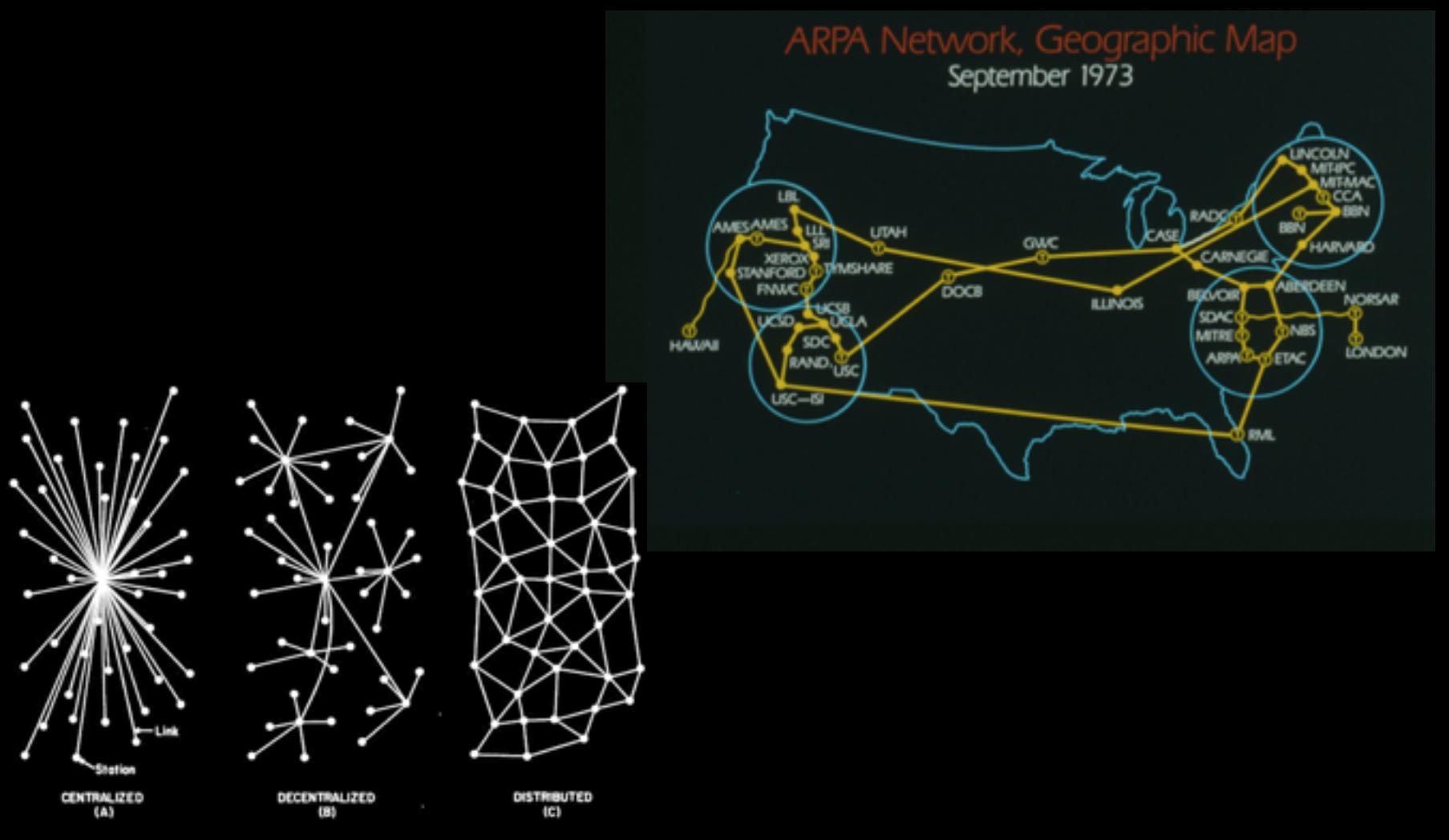


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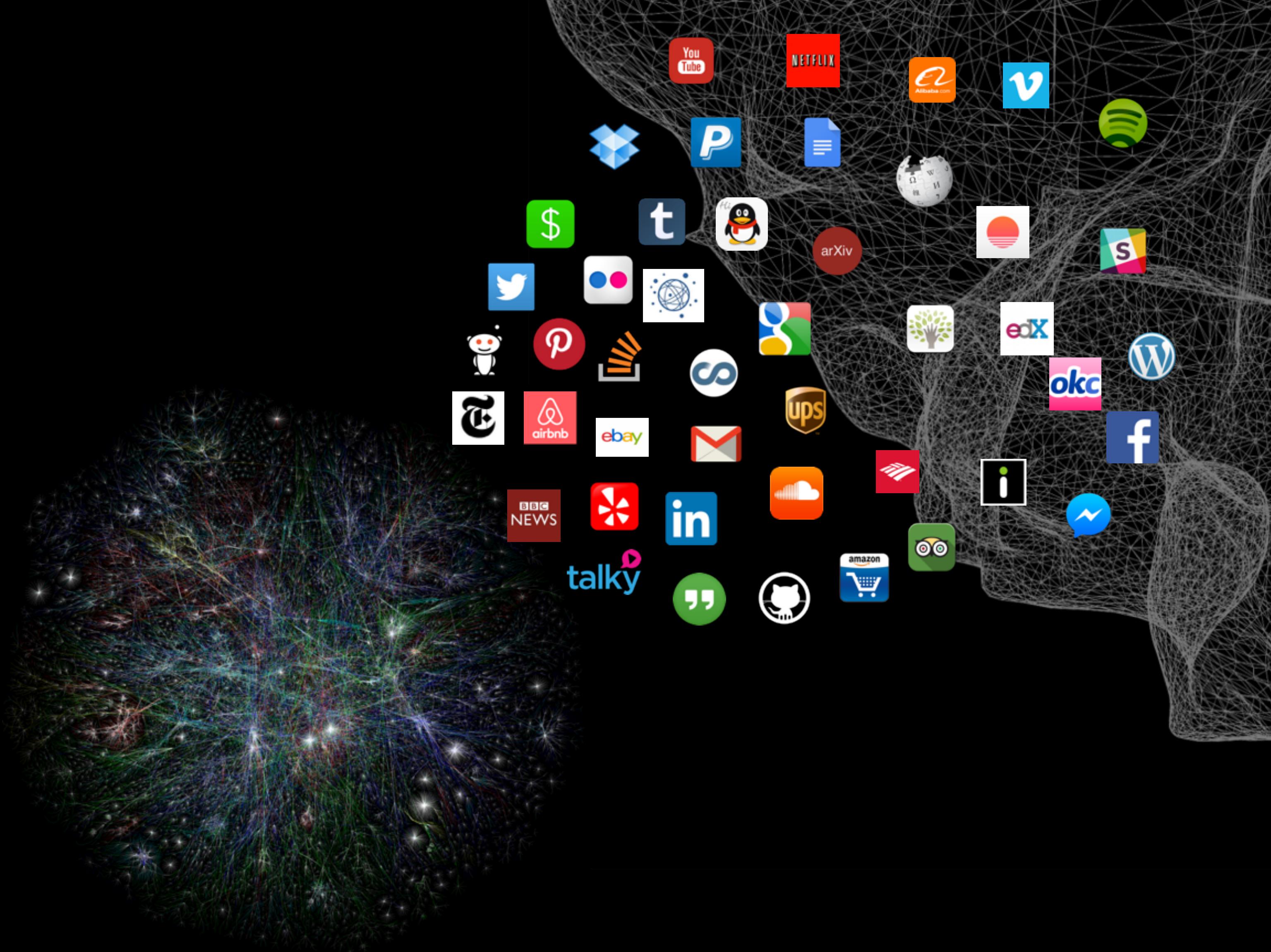
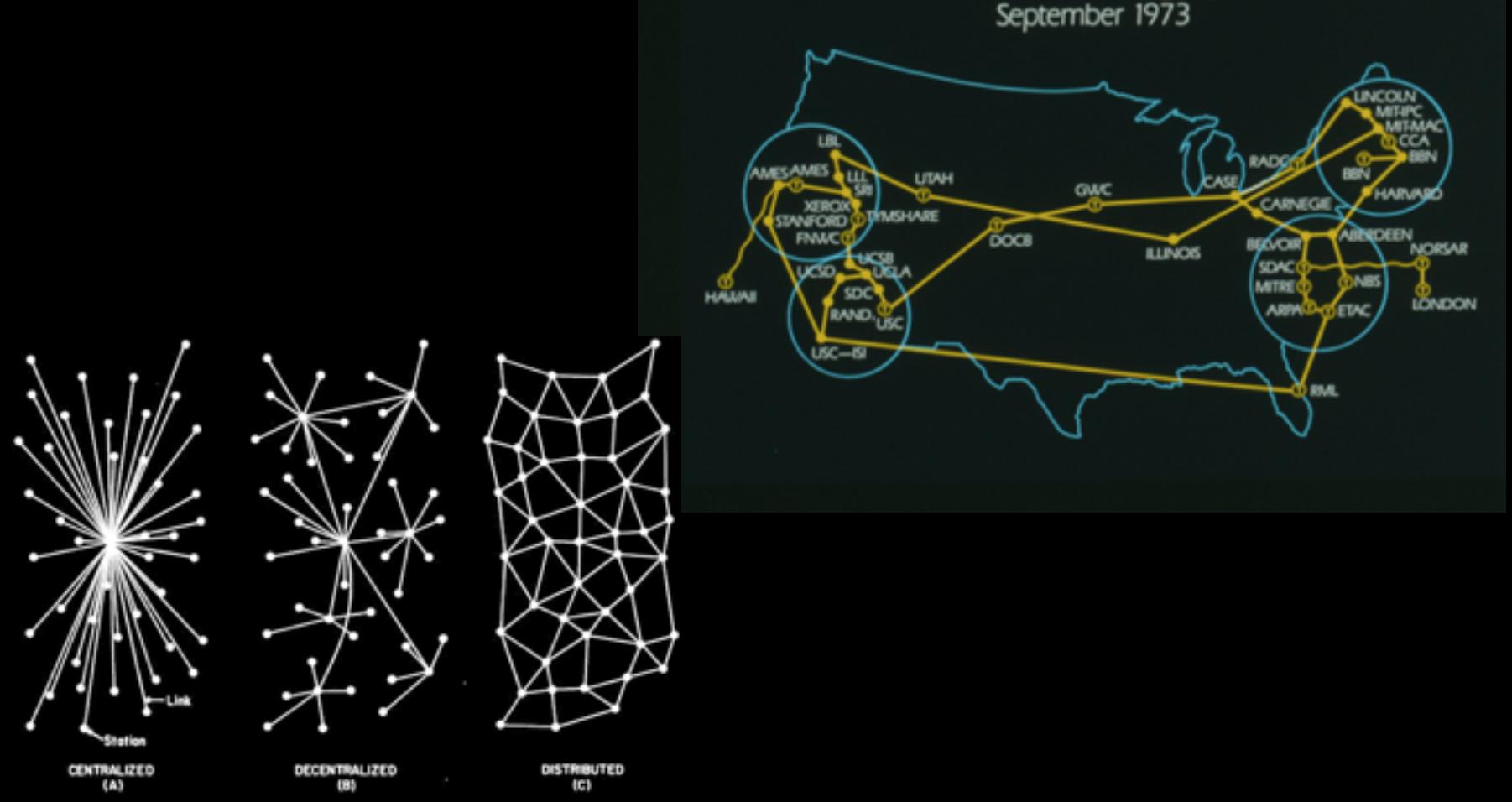
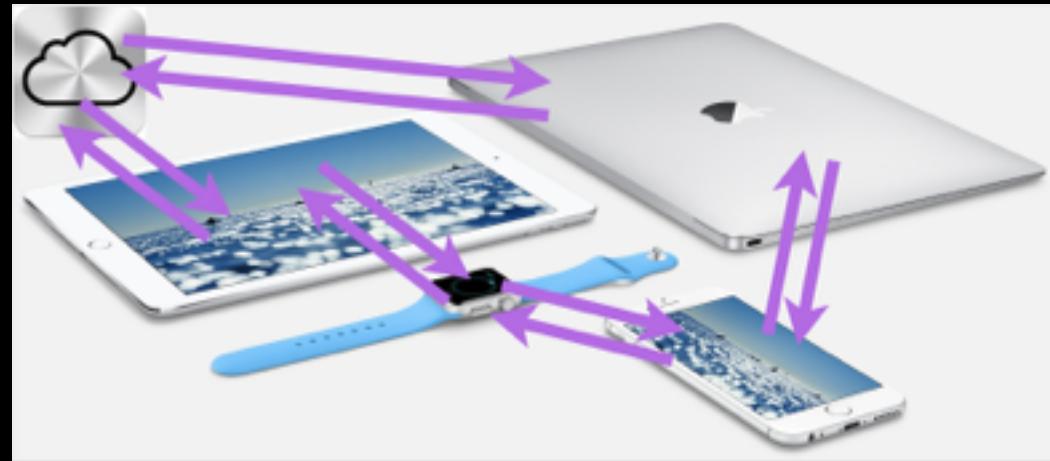


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# the web has problems



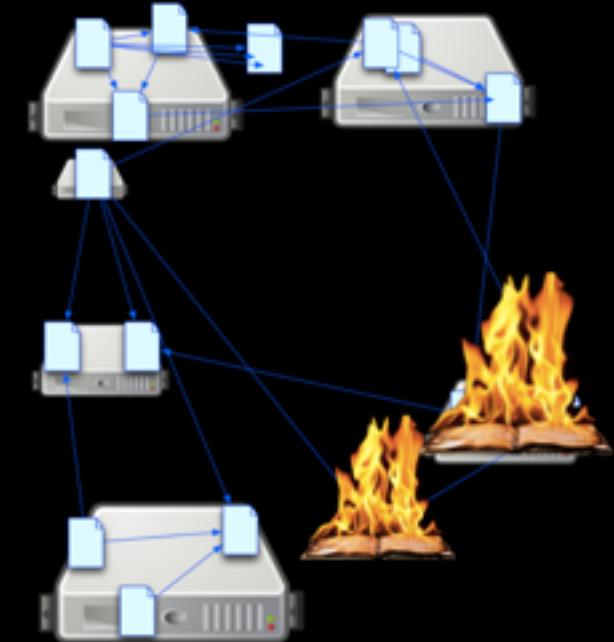
bad in mobile and IoT



censorship



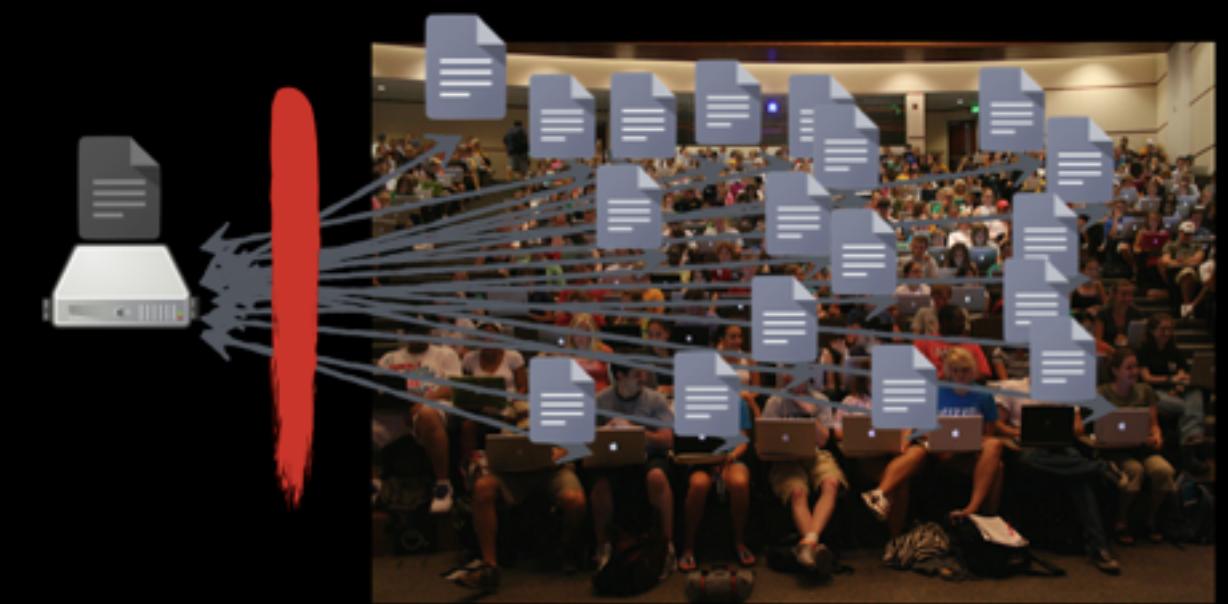
huge inefficiencies



links break

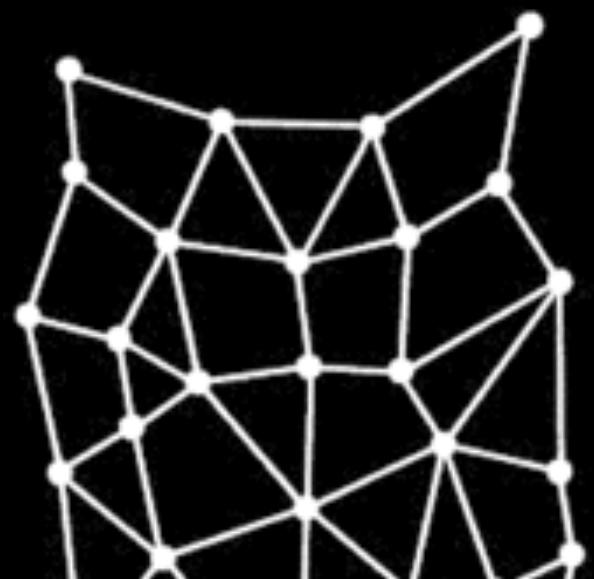


bad security model



no offline use

# IPFS makes the web:



Distributed



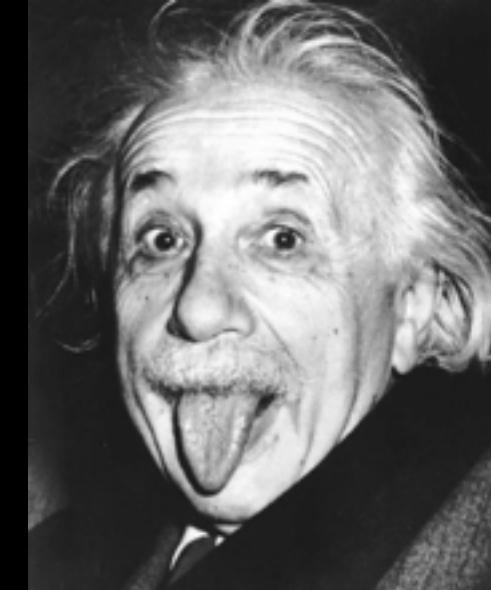
Faster



Permanent



Safer



Smarter



Offline



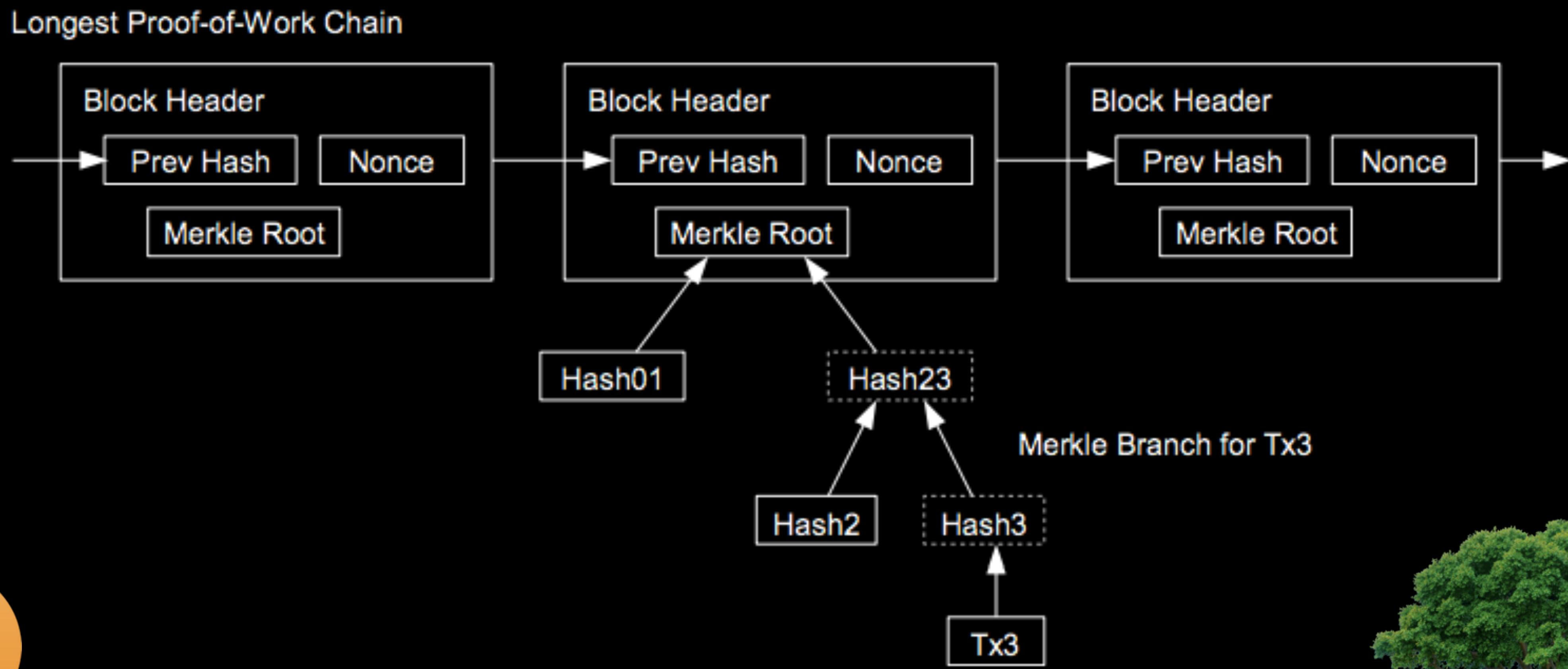
Protocol to upgrade the web  
Foundational internet technology



a web of merkle-links



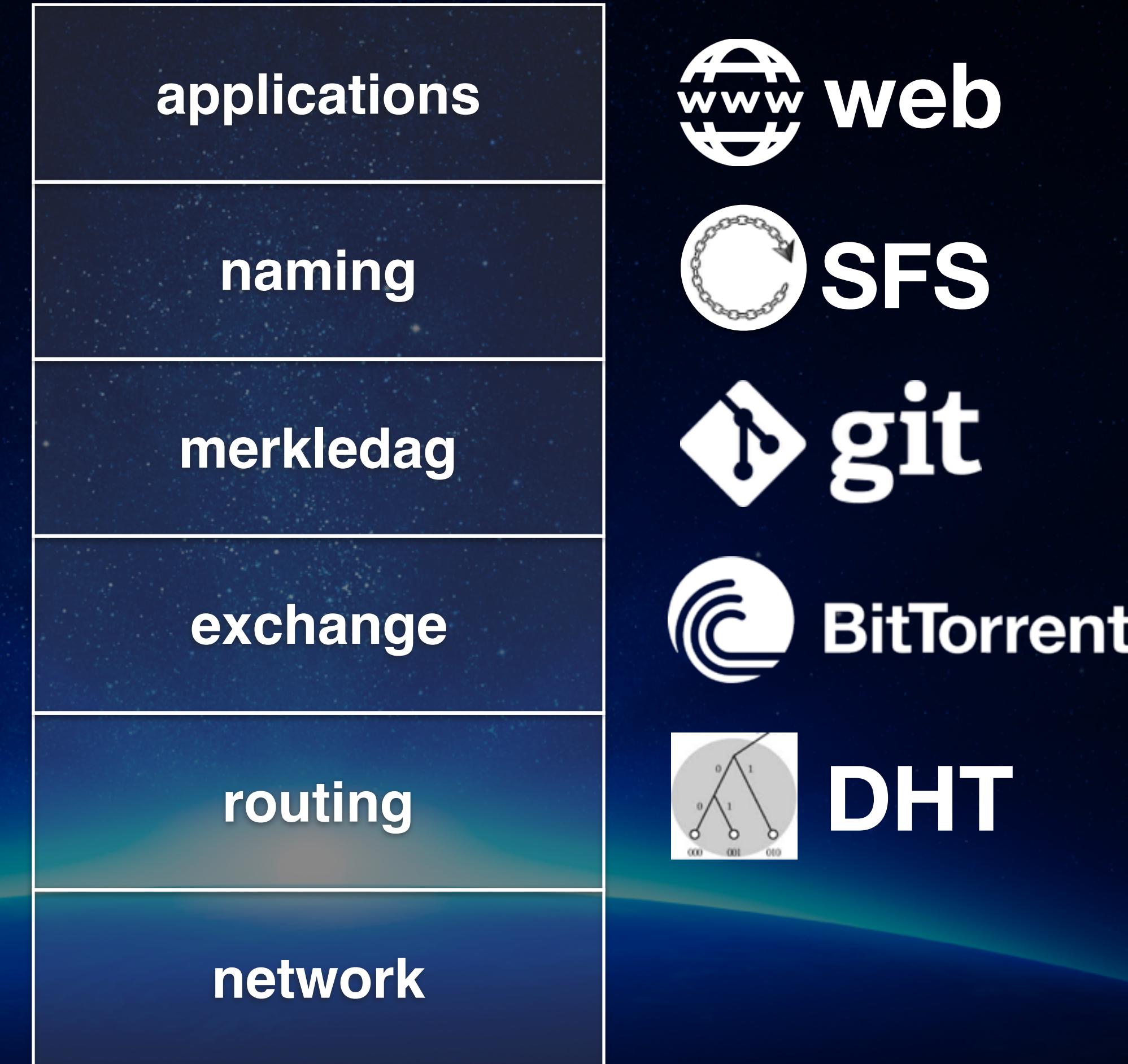
# git's merkle-tree is the data structure behind **bitcoin's** security properties **bittorrent's**



# IPFS is like a forest of linked merkle-trees



# The IPFS Stack



# The IPFS Stack

IPNS  
IPLD

libp2p

applications

naming

merkldag

exchange

routing

network

Using the Data

Defining the Data

Moving the Data

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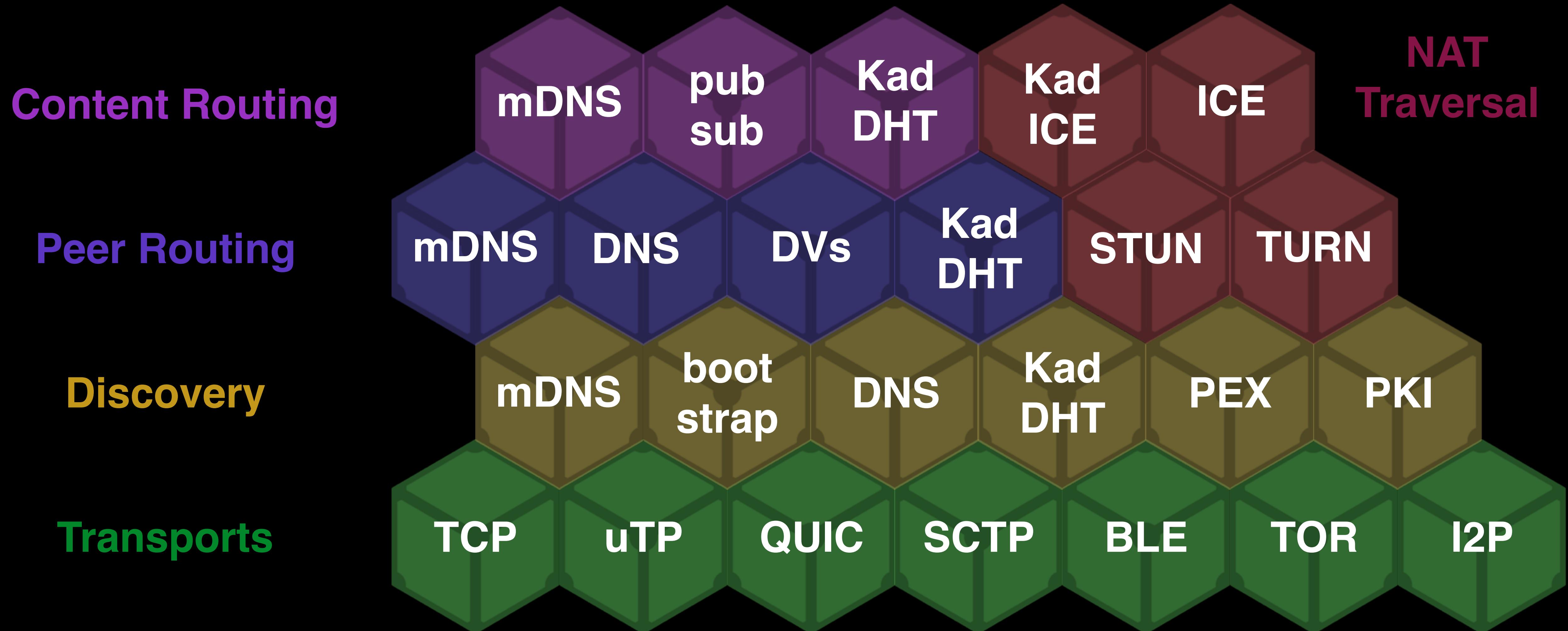
# libp2p - a collection of peer-to-peer protocols

for finding peers, and connecting to them

for finding content, and transferring it



# libp2p - a collection of peer-to-peer protocols



# libp2p

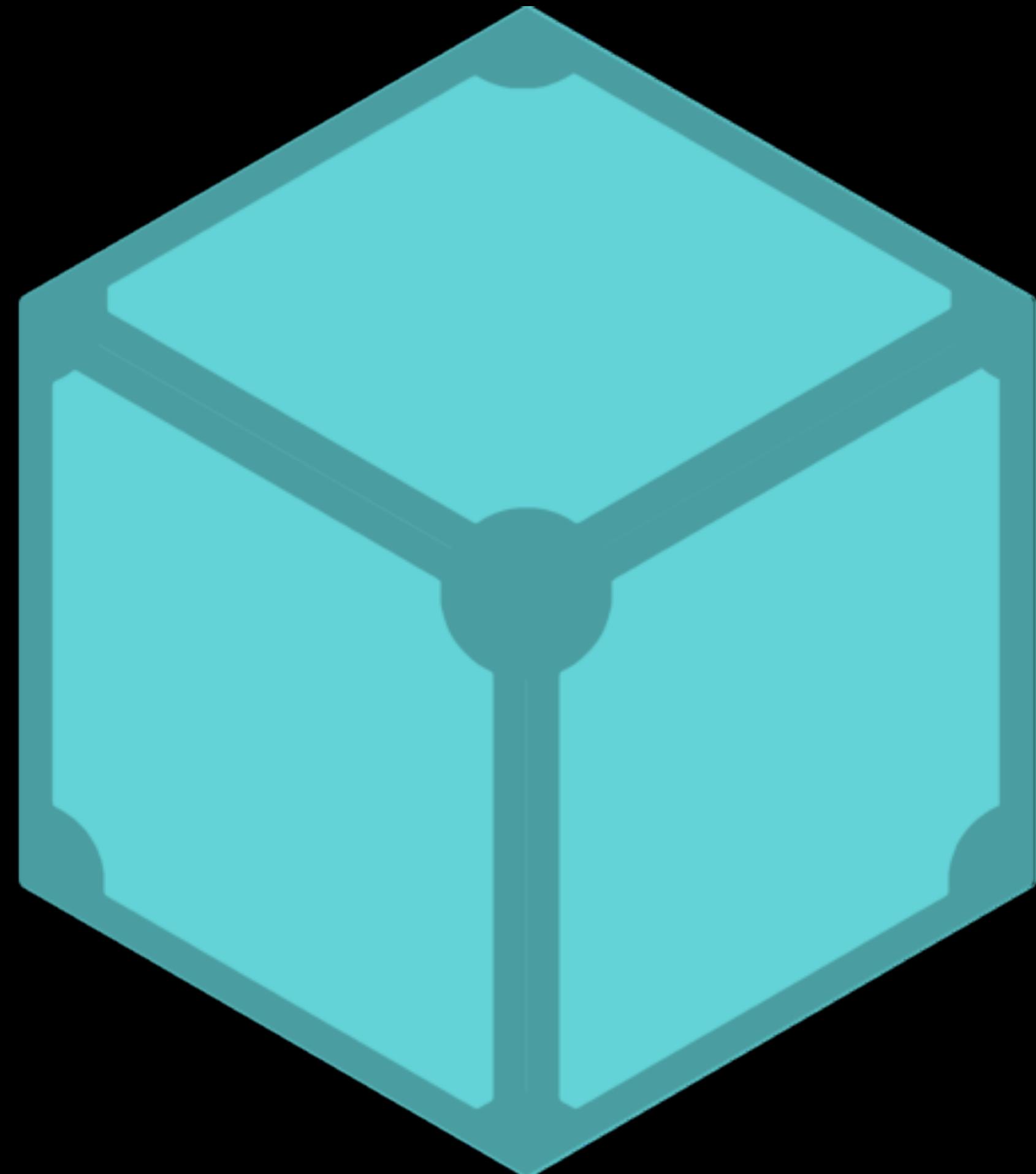
Content Routing

Peer Routing

Discovery

Transports

NAT Traversal



# libp2p

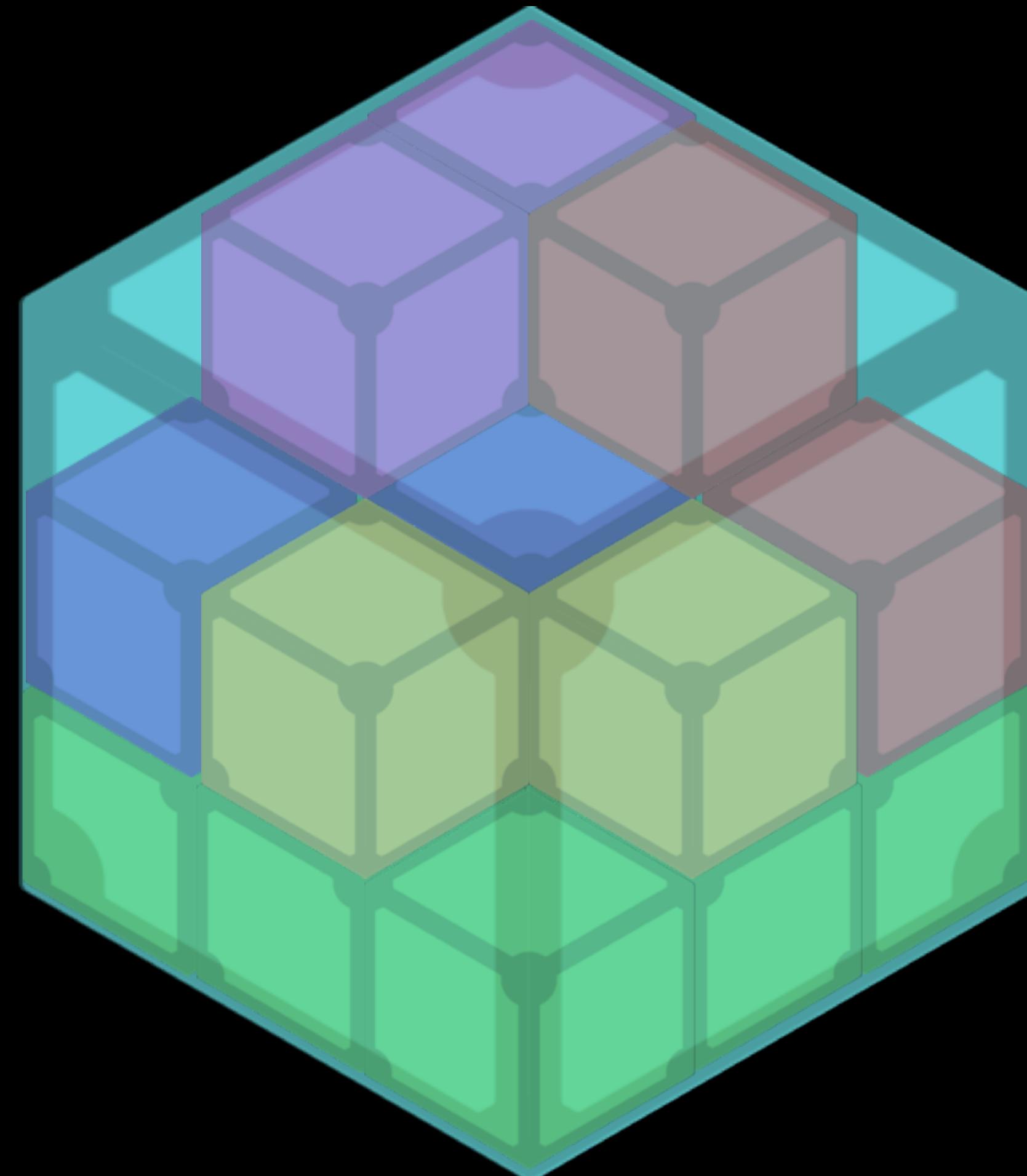
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applications

Etherpad

Websites

Mediachain

Orbit

uPort

naming

IPNS

IPLD

exchange

Bitswap

routing

Kad DHT

mDNS

network

CJDNS

UDT

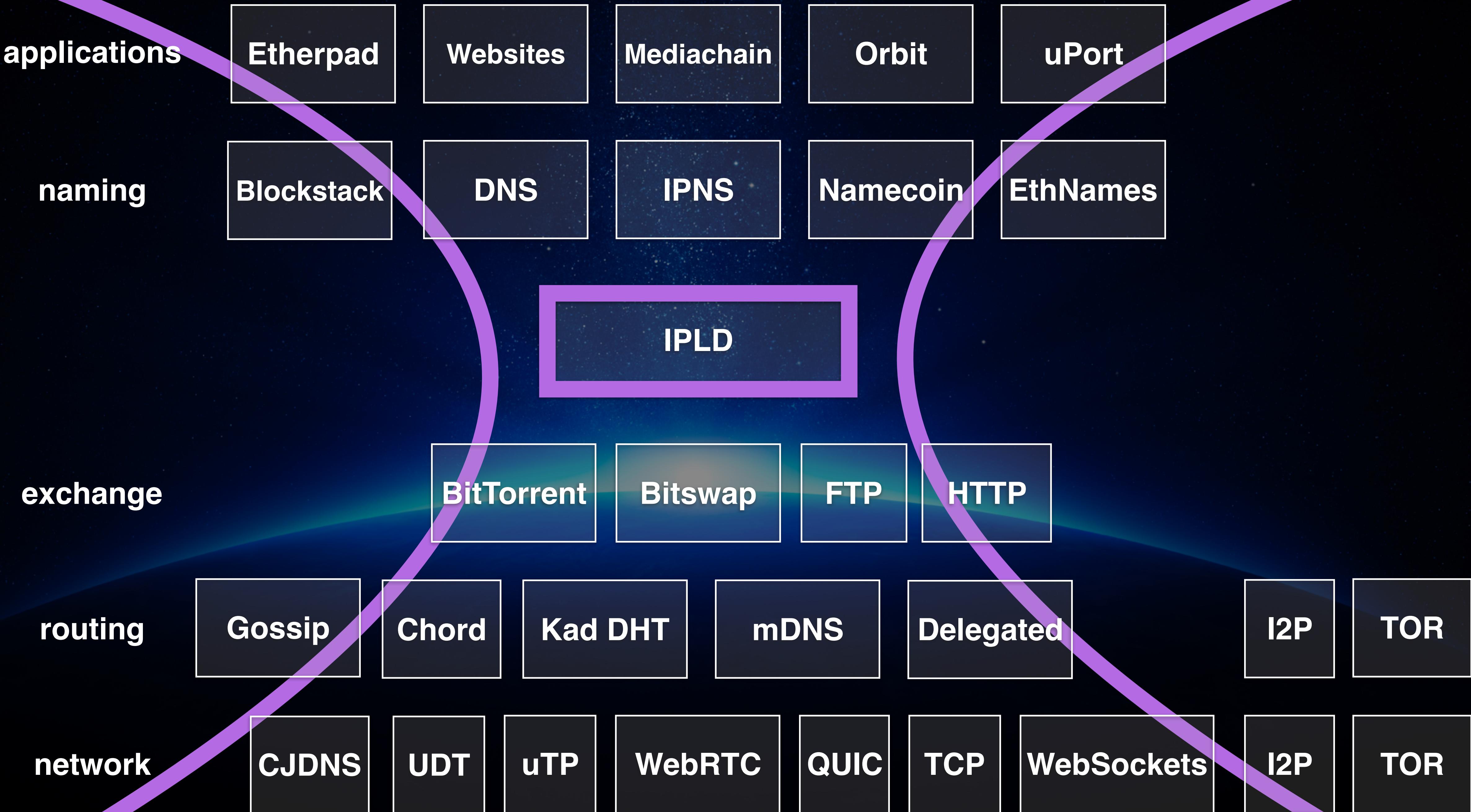
uTP

WebRTC

QUIC

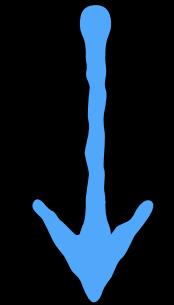
TCP

WebSockets



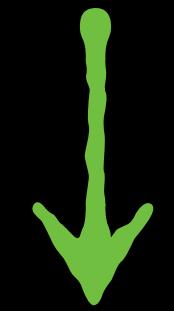
**dns name**

/dns/example.com/foo/bar/baz.png  
/ipns/example.com/foo/bar/baz.png



**key name**

/ipns/QmYJPtosPTfoC/foo/bar/baz.png



**content addr**

/ipfs/QmW98pJrc6FZ6/foo/bar/baz.png

fs:/ipfs/QmW98pJrc6FZ6/foo/bar/baz.png

ipfs:/ipfs/QmW98pJrc6FZ6/foo/bar/baz.png

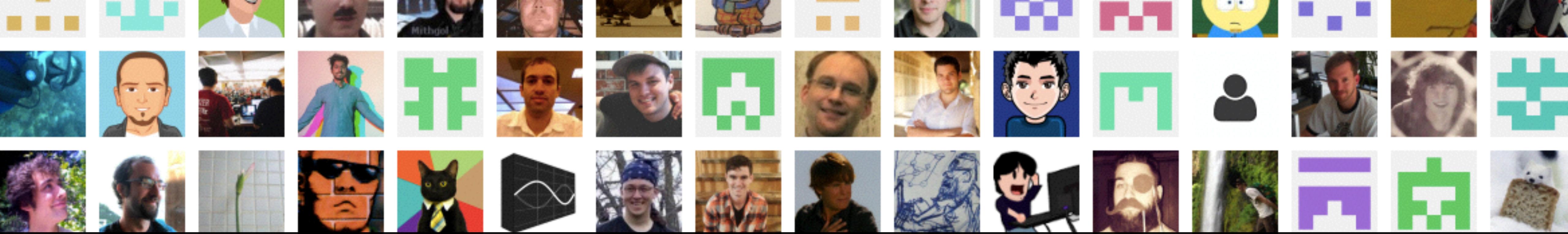
live ipfs network already distributed all over the world

>2000 ipfs nodes in jan (bitcoin is ~10k, bittorrent >30M)

500,000,000+ files

500,000,000+ files

500,000+ docker pulls



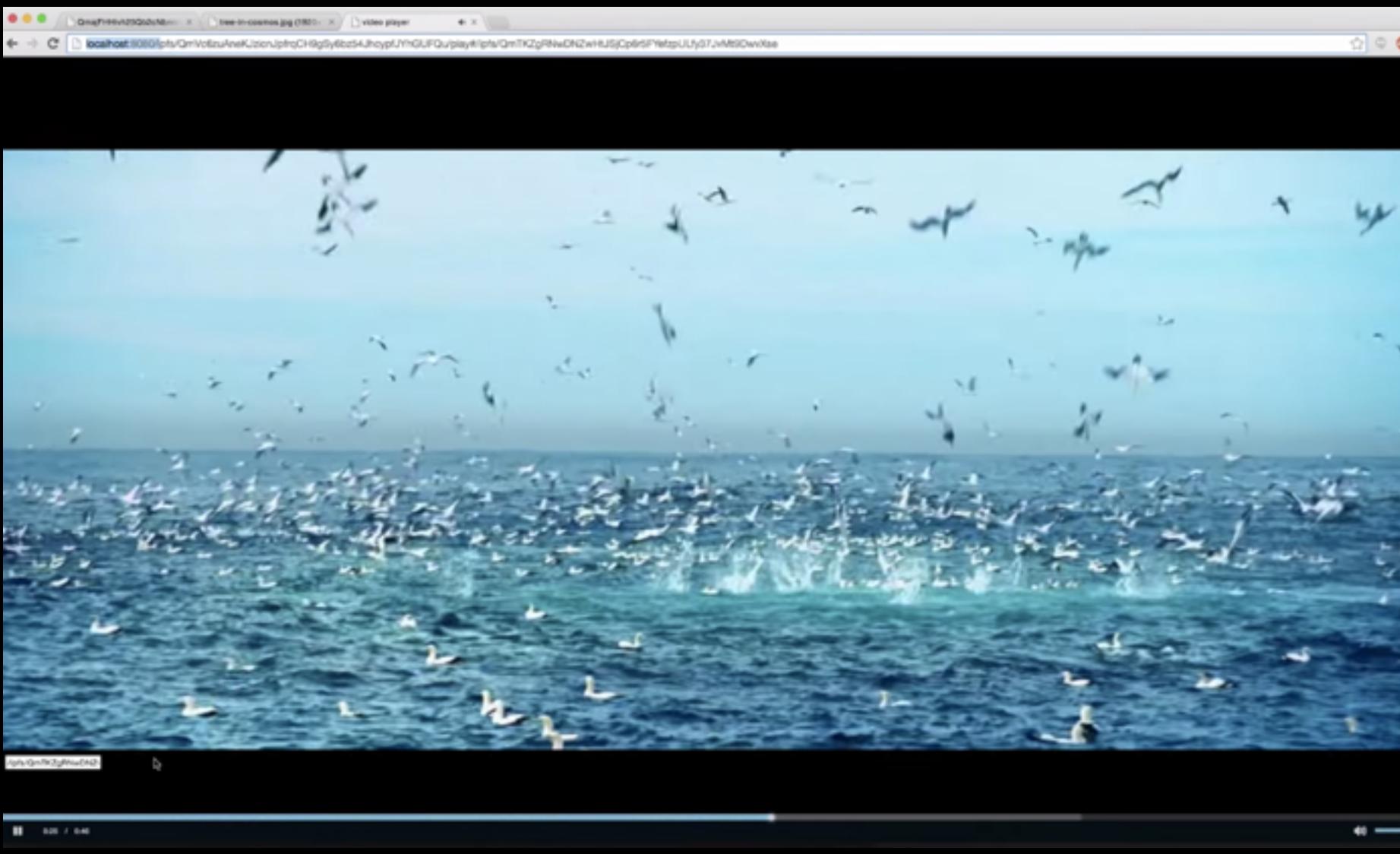
large open source project

375+ contributors

70+ contribute weekly

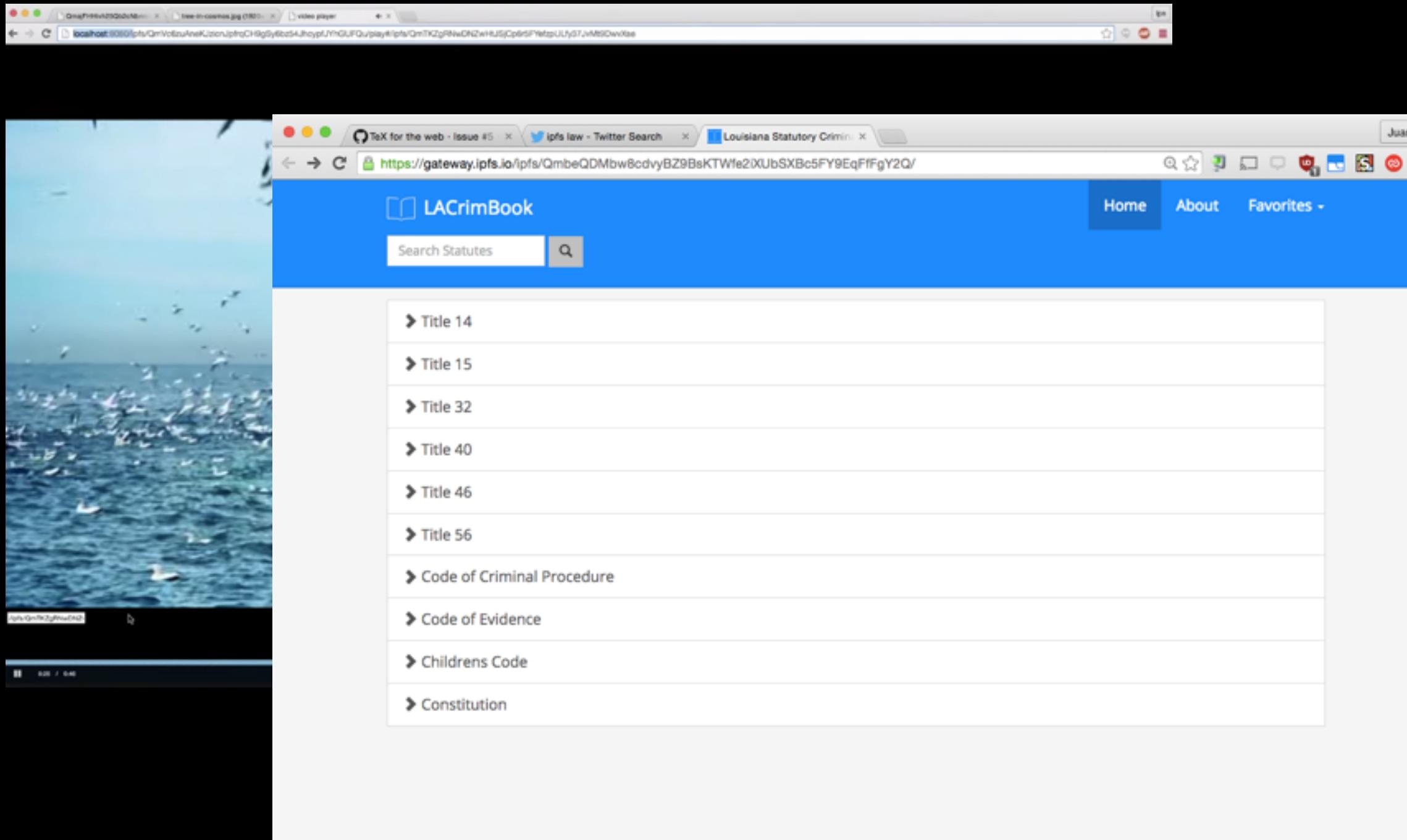


# Live Examples



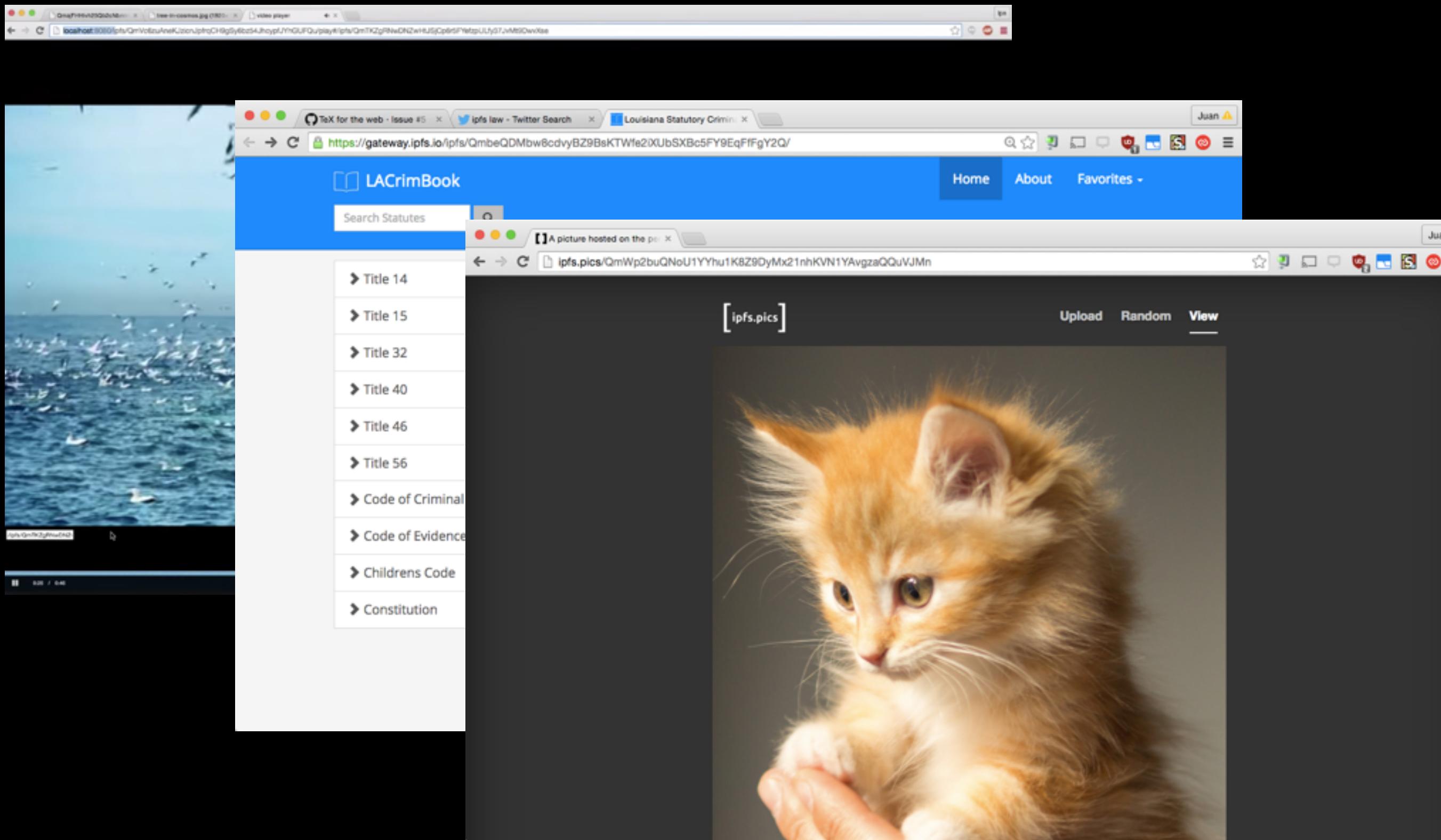
# video distribution + streaming

# legal documents



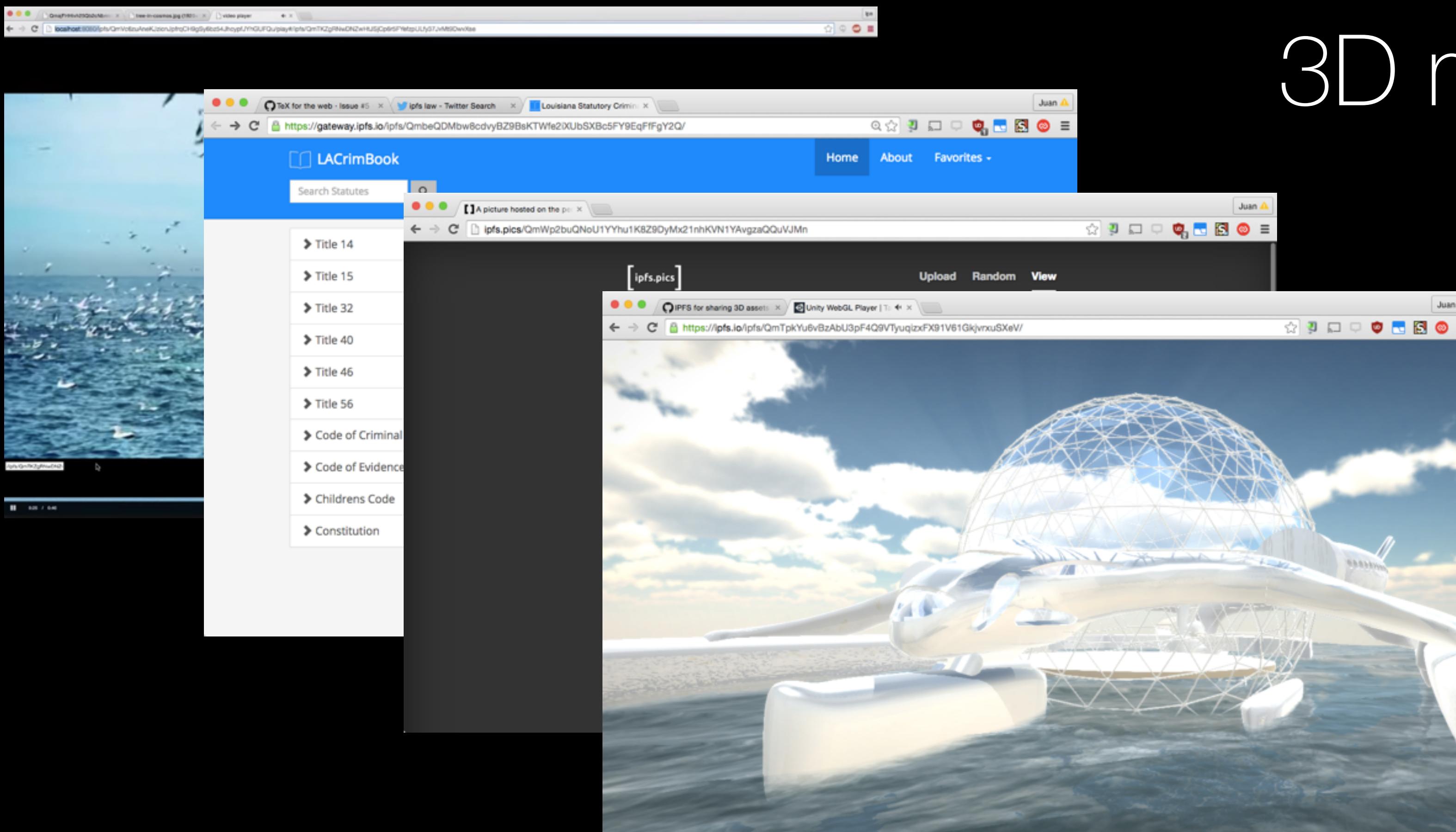
## Live Examples

# ipfs.pics (imgur-like)



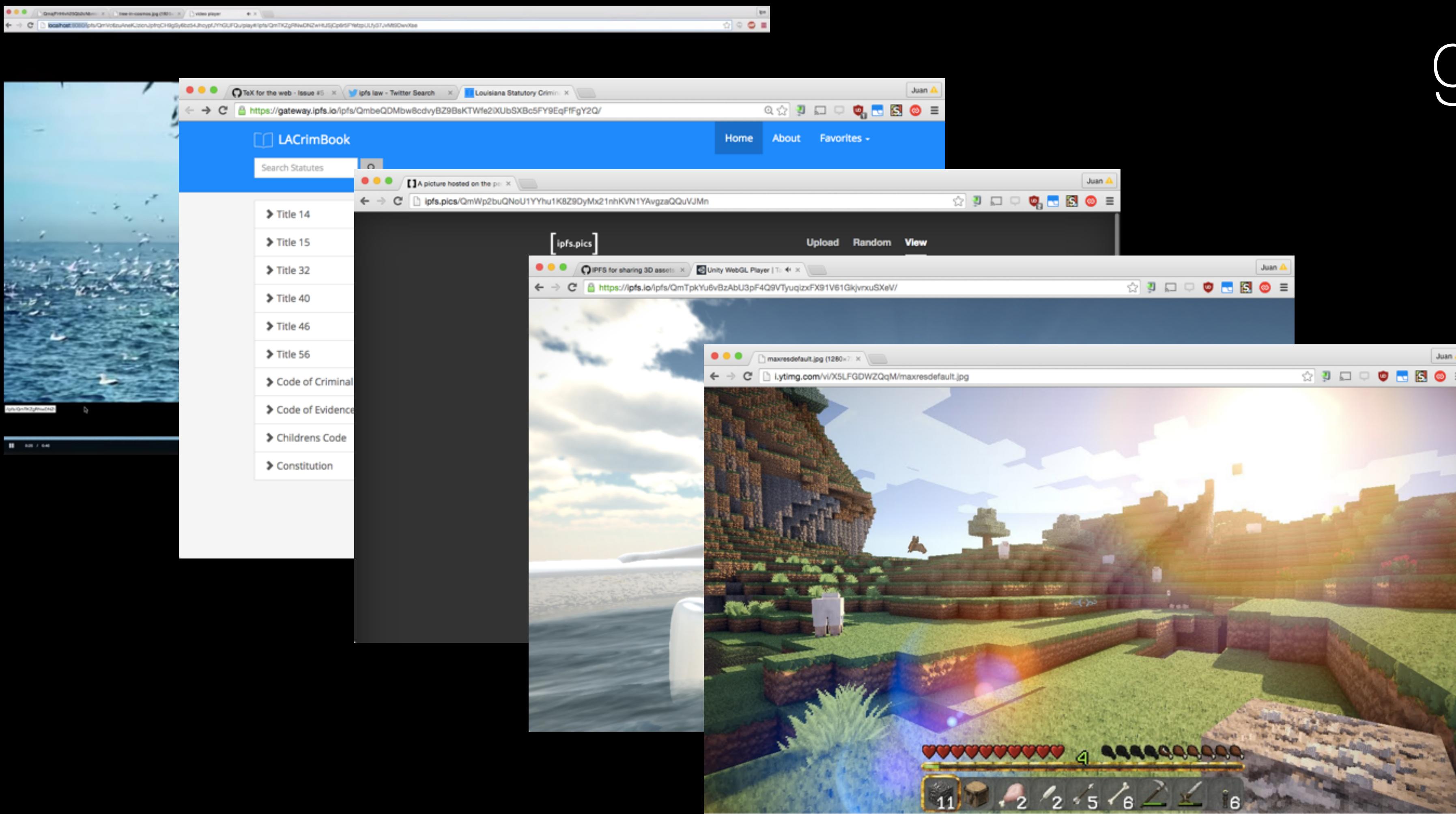
## Live Examples

# 3D models (they're big!)



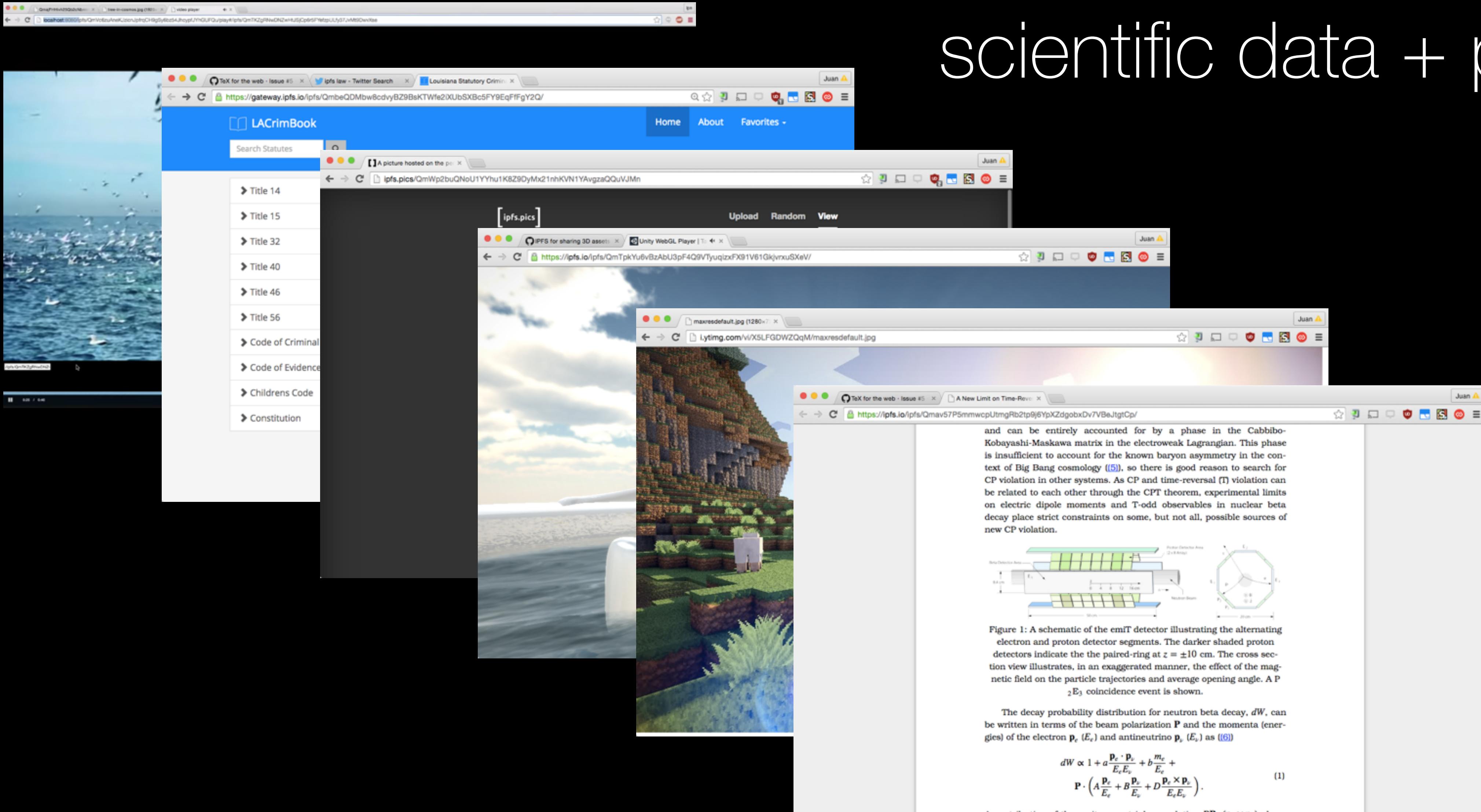
## Live Examples

# games



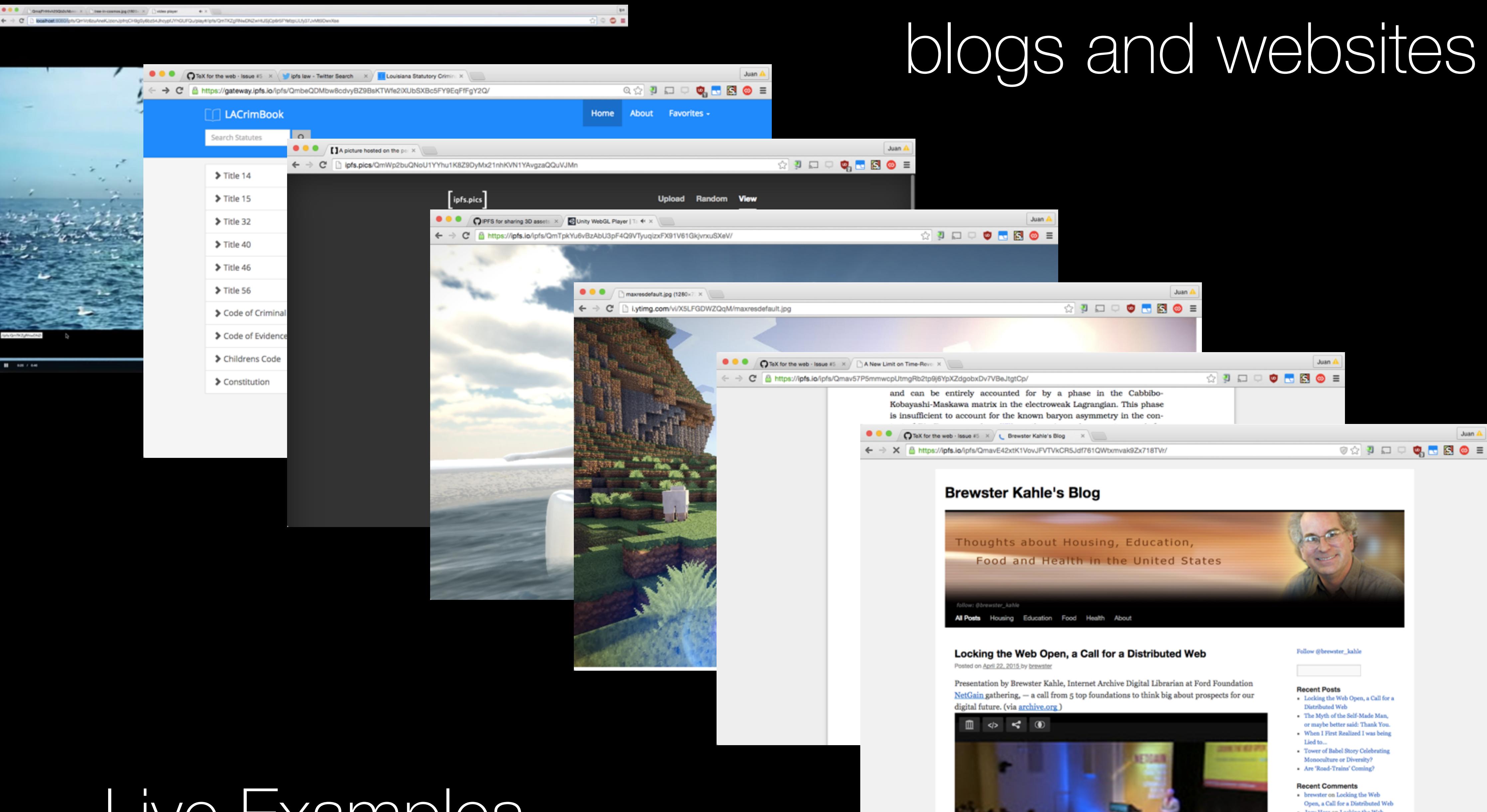
# Live Examples

# scientific data + papers



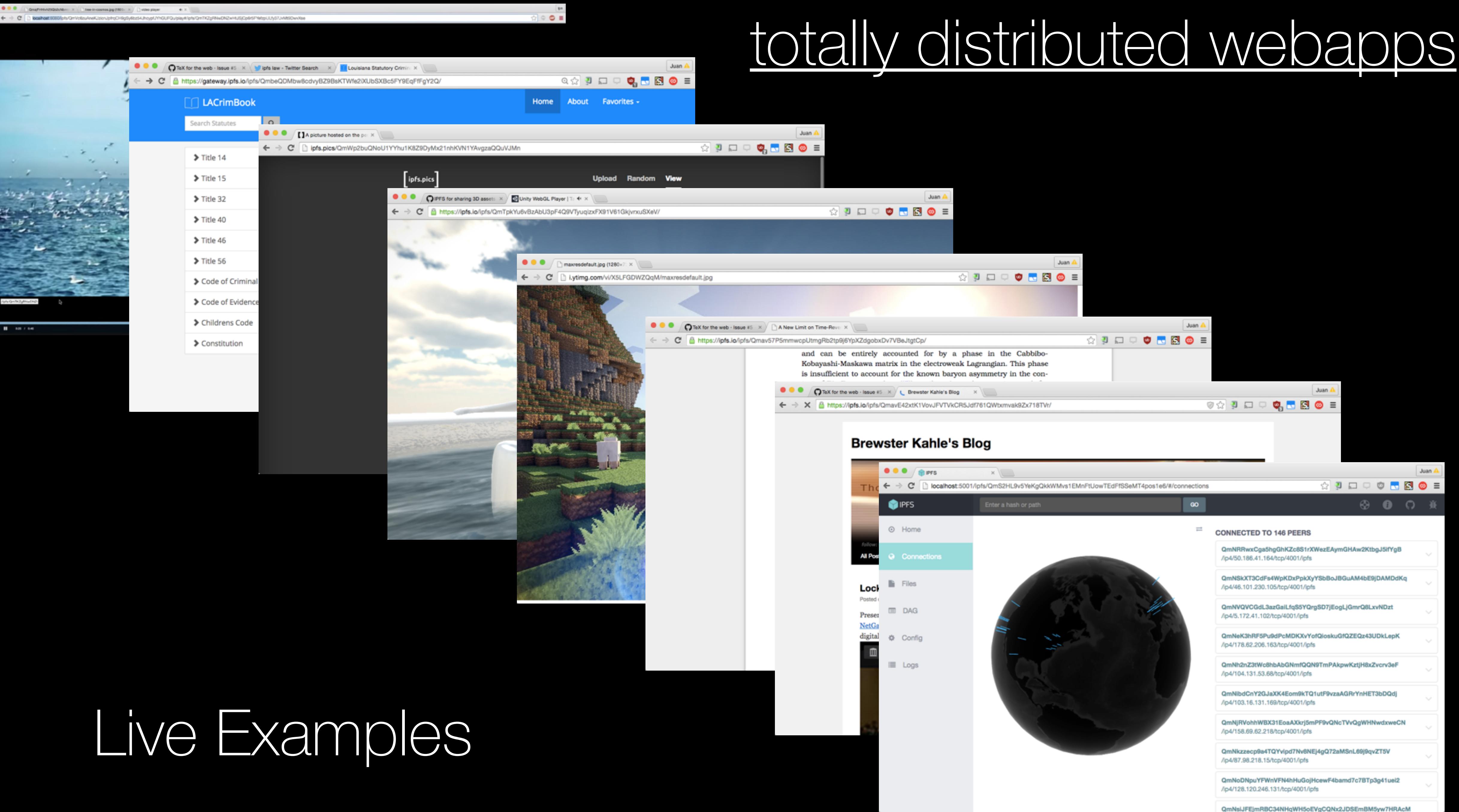
## Live Examples

# blogs and websites



# Live Examples

# totally distributed webapps



# distributed webapps

- app code stored + distributed with ipfs
- app data stored + distributed with ipfs
- browsers can connect to each other
- no origin servers!
- no central point of failure
- everything end-to-end encrypted
- app "lives on the network"

examples: forums, chat, messaging,  
cms, blogs, github, ...

The collage includes:

- A screenshot of a web browser showing a permanent board on the IPFS/Ethereum platform, featuring a text input field and a file/dropzone area.
- A terminal window titled '#ipfs' displaying a log of messages between users haad, naza, and itrader.
- A large globe visualization showing the distribution of IPFS nodes across the world map.
- A sidebar menu with options for DAG, Config, and Logs.
- A list of IPFS file hashes and their corresponding URLs.

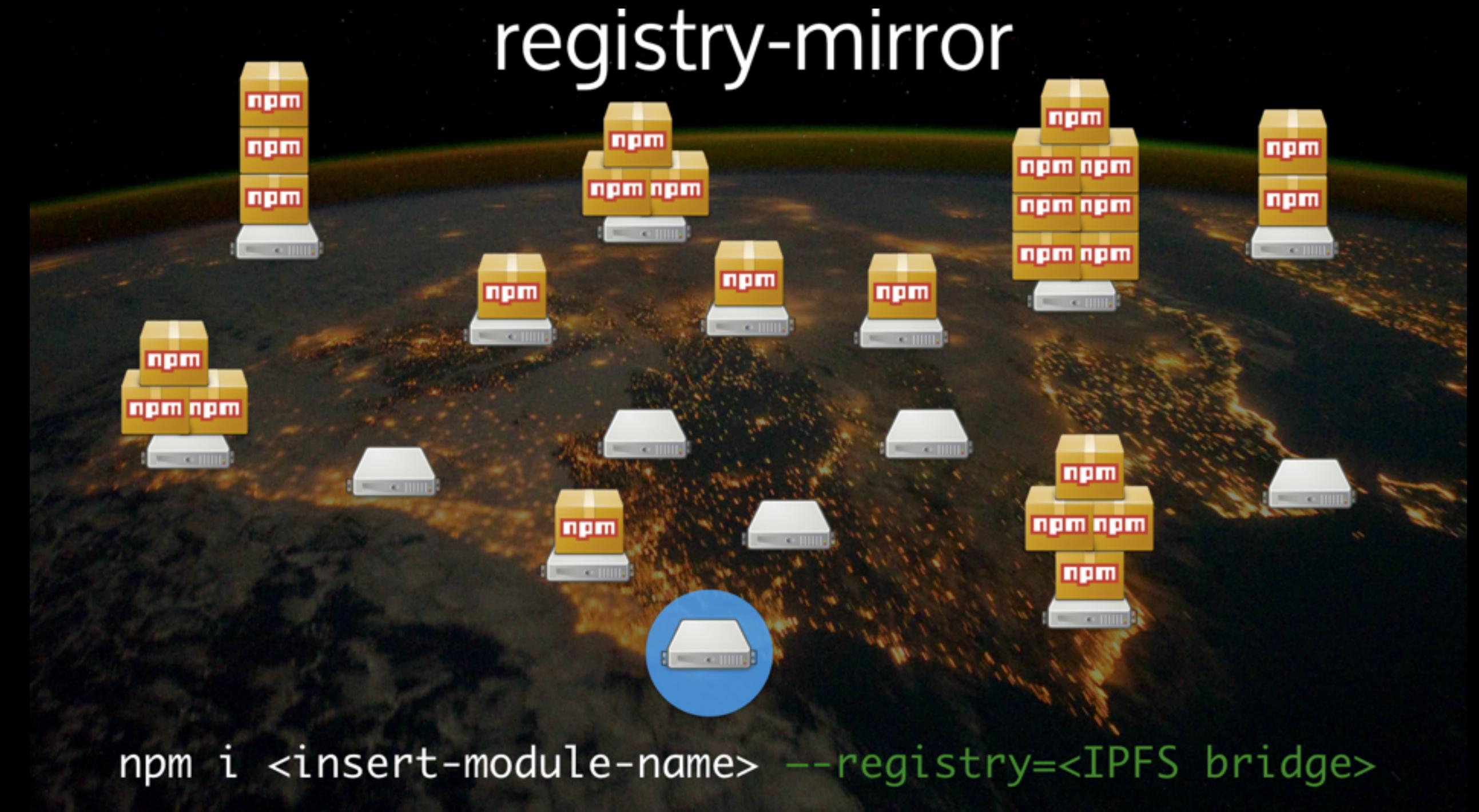
# used for package managers

- distributed / peer-to-peer
- cryptographically verified links
- digitally signed links
- "everyone is a mirror"
- save lots of bandwidth
- versioning built in

already working with:

npm, pypi, apt, pacman, nix

more coming soon



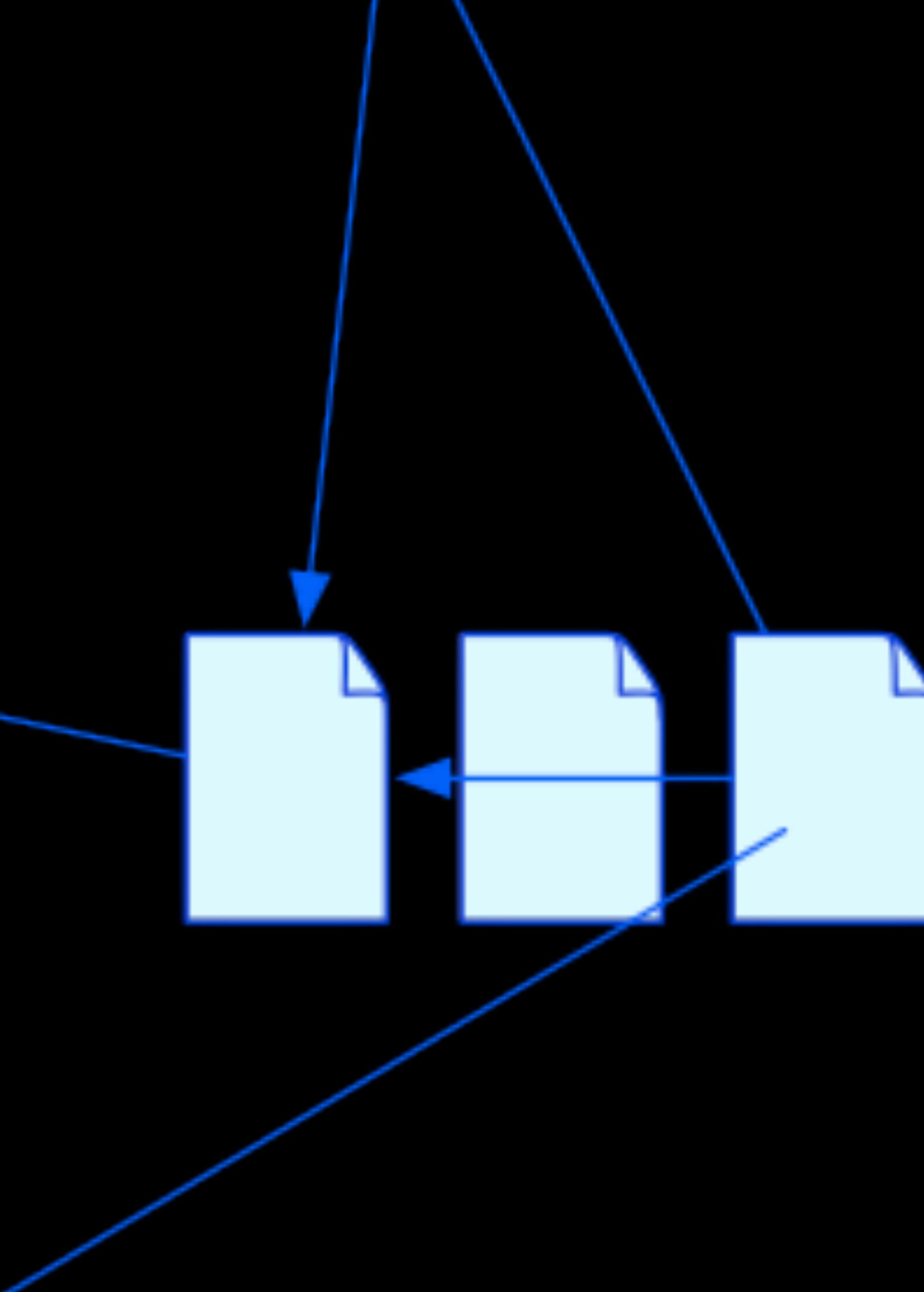
# used for secure documents

- content addressed hash links
- digitally signed links
- trustless ledgers
- permanent links
- secure document web

already in use at:

- **banks**
- legal archives
- blockchain companies
- smart contract apps

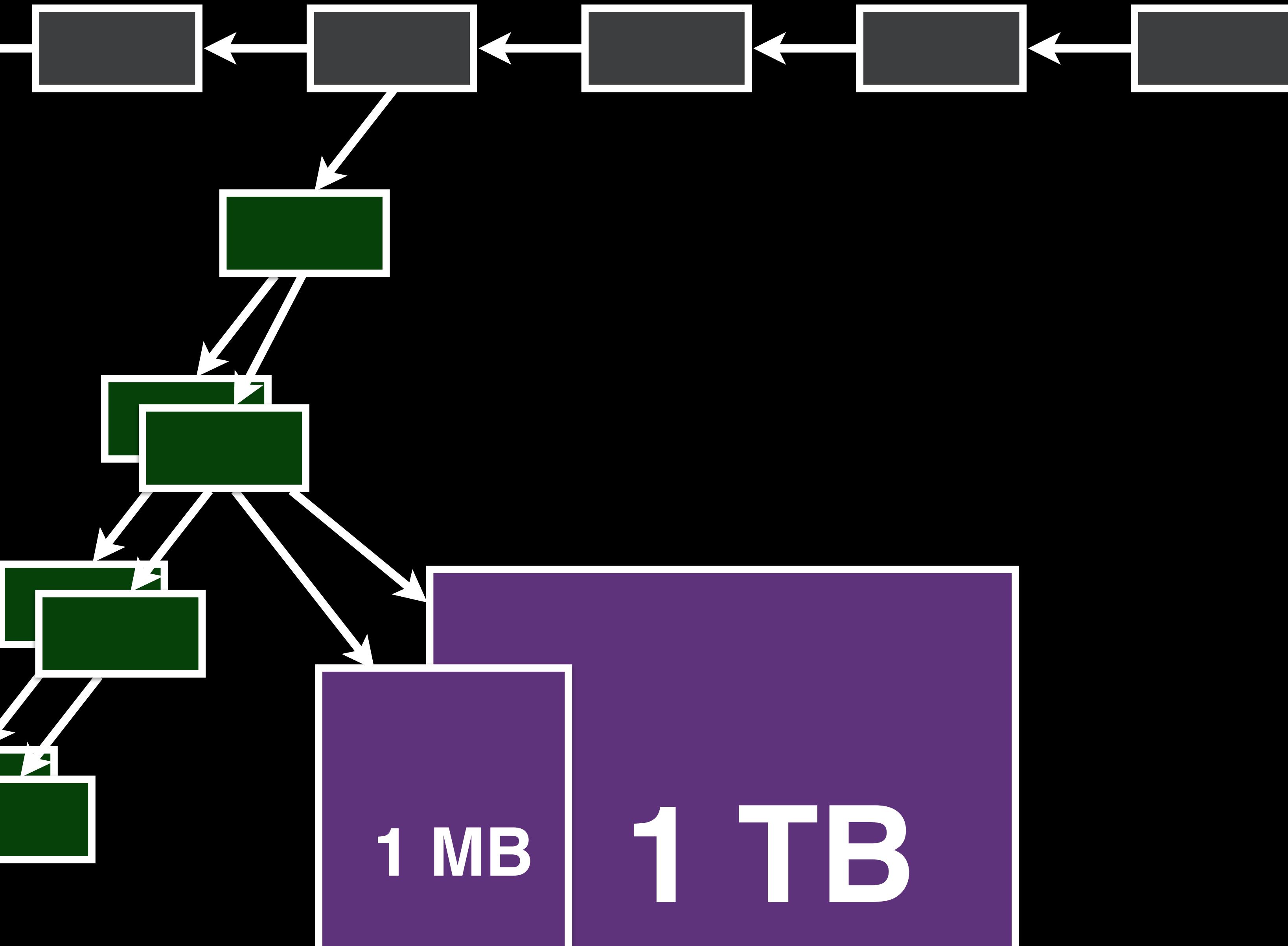




**give digital information  
*print-like qualities.***

- references are to the work, not the copy
- any copy is authoritative
- anybody can choose to archive it
- anybody can read it later
- anybody can replicate it

# used to extend blockchains



- Legal Records
- Personal Files
- Contracts
- Code
- Email
- “Anything”



# IPFS is bundled in FreeNAS

market leader OS for Network Attached Storage devices



# used to archive data of



0 1 3 6 2 7  
: OE 13  
. IS 20  
23 12  
10 22 11 21



CiteSeer<sup>x</sup><sub>β</sub>

used by dozens of co's/org's



ALEXANDRIA

