IPFS & Filecoin: A new Home for Research Data
Who this talk is for

Researchers, scientists, analysts, developers, etc

- who work with large datasets and are looking for better (OSS) tools for storing & sharing that data
- who care about community-owned data, data provenance, data accessibility, and/or long-term data preservation
3 stories

Resiliency

Verifiability

Collaboration
Air quality data collected daily at a few of the sites in Deer Park, near Houston, Texas
NYC Capital Project Detail Data Geometries

This is a lookup table for associating a geographic point geometry (latitude & longitude) with each project ID in the dataset chriswhong/nyc_capital_project_detail_data.

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We need volunteers to geocode projects in other parts of the city. If you're interested, let me know and you can claim a district! @qri_io
So how did they do it?
What is web3?

Web 1.0
read-only
static

Internet
wires, network

Web 2.0
read-write
interactive

Web 3.0
read-write-trust
verifiable
What is web3?
Web 3.0 is a broad movement and a group of associated technologies aiming to make the web and the internet more decentralized, verifiable, and secure.

The goals of Web 3.0 include (a) trustless infrastructure; (b) removing intermediaries; and (c) giving users power and ownership over their data, identity, security, and transactions.

The technologies add capabilities and functionality for securely linking data and programs, cryptographic verifiability, transaction processing, P2P connectivity, and trustless interoperability. They also provide decentralized computation and storage, enabling fully autonomous applications (dapps).

The movement includes many blockchain and dweb projects, as well as some linked data efforts.
Verifiable

able to be checked or demonstrated to be true
FIG. 1 — Centralized, Decentralized and Distributed Networks
Web3 Stack

- Protocol-extensible user-interface cradle ("browser")
- Protocol-extensible developer tools, APIs & languages
- Second layer protocols:
  - State channels
  - Oracles
  - Encrypted storage
  - Plasma protocols
  - Storage incentivization
  - Heavy computation
  - Distributed secret management
  - Governance
- Zero and low-trust interaction protocols (blockchains, DAGs):
  - Zero and low-trust interaction platforms (shared security)
  - Data distribution protocols
- Peer-to-peer (p2p) Internet overlay protocols
- Platform-neutral computation description language
- Transient data pub/sub messaging
Web3 Stack

Protocol-extensible user-interface cradle ("browser")

Protocol-extensible developer tools, APIs & languages

Second layer protocols
- State channels
- Oracles
- Encrypted storage
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- Storage incentivization
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- Governance

Zero and low-trust interaction protocols (blockchains, DAGs)
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- Data distribution protocols
- Transient data pub/sub messaging

Peer-to-peer (p2p)
Internet overlay protocols

Platform-neutral computation description language
content addressing

peer-to-peer file sharing
IPFS makes the web work peer-to-peer
domain name  
/dns/example.com/foo/bar/baz.png

color address  /ipfs/QmW98pJrc6FZ6/foo/bar/baz.png
IPFS powers the Distributed Web

A peer-to-peer hypermedia protocol designed to make the web faster, safer, and more open.

Get started  How it works
Problems

IPFS

Addresses

emerging networks

censorship

huge inefficiency

no offline use

bad security model

links break
content addressing

peer-to-peer networking
DHTs

peer-to-peer file sharing
libp2p is a modular network stack for p2p protocols
Filecoin is the decentralized storage network for web3 and beyond.
The Mission of Filecoin

to create a decentralized, efficient, and robust foundation for humanity’s information.
Filecoin is a...

- Decentralized storage network
- Decentralized storage protocols
- Payment mechanism
- Thriving ecosystem
**Clients** want storage

**Network** manages

**Miners** provide storage
The **Network** acts as an intermediary between **Clients** and **Miners**.
The Network checks miners are storing data over time

\[ \pi = \text{Proof-of-Spacetime} \]
The Network pays out to Miners over time
Clients & Miners must be able to trust the Network to preserve data
Filecoin Network Roles

Clients want storage

Miners provide storage

Core Developers & Ecosystem Partners
Filecoin: Decentralized Storage Network

IPFS: Distributed Web Protocol

IPLD: authenticated data model & formats

libp2p: modular p2p networking library

Multiformats: future-proofing & upgradability
IPFS and Filecoin Ecosystems:

### Applications and Clients
- Fleek
- Slate
- Connext
- Block Rocket
- Unstoppable Domains
- Genaro
- Civic
- Huobi
- UNUS Seil
- Qasar
- Dapper Labs
- ConsenSys
- Ethereum Foundation
- Gitcoin
- Protocol Labs
- Open Source Foundation
- Surfing
- CoinSafe
- Pegasys
- Ceramic
- Civic
- Huobi
- UNUS Seil
- Qasar
- Dapper Labs
- ConsenSys
- Ethereum Foundation
- Gitcoin
- Protocol Labs
- Open Source Foundation
- Surfing

### Token Infrastructure
- MetaMask
- Trust Wallet
- Ledger
- Zondax
- Fleek
- Unstoppable Domains
- Genaro
- Civic
- Huobi
- UNUS Seil
- Qasar
- Dapper Labs
- ConsenSys
- Ethereum Foundation
- Gitcoin
- Protocol Labs
- Open Source Foundation
- Surfing

### Collaborators
- Ecosystem collaborators
  - IPFS
  - MetaMask
  - Trust Wallet
  - Ledger
  - Zondax
  - Fleek
  - Unstoppable Domains
  - Genaro
  - Civic
  - Huobi
  - UNUS Seil
  - Qasar
  - Dapper Labs
  - ConsenSys
  - Ethereum Foundation
  - Gitcoin
  - Protocol Labs
  - Open Source Foundation
  - Surfing

### Developer Tools
- For App Developers
  - Truffle
  - Fission
  - Ceramic
  - Fleek
  - Unstoppable Domains
  - Genaro
  - Civic
  - Huobi
  - UNUS Seil
  - Qasar
  - Dapper Labs
  - ConsenSys
  - Ethereum Foundation
  - Gitcoin
  - Protocol Labs
  - Open Source Foundation
  - Surfing

### Other
- dappkit
- Simple Au Water
- Stake Fish
How these stories become possible on web3
Archiving and Distributing Precious Data
from these organizations and many more
3 ways it’s getting easier in 2021

Filecoin Plus
Incentivizing Useful Storage on Filecoin

Powergate v2.0.0 is here!
<table>
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<tr>
<th>File Name</th>
<th>Size (KB)</th>
<th>Networks</th>
<th>Storage Dest Status</th>
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The algorithms bundle by Rogério Bento

Rogério Bento
ribento@univ.isep.pt
August 24, 2019

The algorithms bundle contains a collection of algorithms, which are implemented in various programming languages. These algorithms are useful for solving problems in computer science, mathematics, and engineering. The bundle includes both fundamental algorithms, such as sorting and searching, and more advanced techniques for tasks like graph traversal. Each algorithm is accompanied by a brief description and documentation, making it accessible to learners at different levels of expertise.

Usage:
- Coral.png
- Fes.png
- Gardens.png
- Java.png
- Klings.png
- Maths.png
- Methods.png
- Models.png
- Notes.png
- Operations.png
- Other.png
- People.png
- Programs.png
- Queues.png
- Relax.png
- Rules.png
- Search.png
- Schemes.png
- Studies.png
- Traffic.png
- Trans.png
- Urban.png
- Vectors.png
- Wires.png
- Yards.png

For more information, visit slate.host.
We’d love to hear from you!

- Tell us about your top pain-points!
- Suggest additional tools & capabilities
- Get involved in pilots and hackathons applying these new tools to your research/datasets/work
- Help build new applications on this stack!
Thanks!

Get in touch:  

@momack28
Today

- Who this talk is for
- What is web3 or “the distributed web”
- What are IPFS & Filecoin
- 3 reasons IPFS & Filecoin may be a great fit for you
- Tools to get started