

A Public Database for the Planet

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BIGCHAIN DB IPDB
INTERPLANETARY DATABASE





A photograph of a row of five large, cylindrical industrial storage tanks. The tanks are made of a light-colored metal and are arranged in a line. They are supported by a blue steel truss walkway. In the background, there is a white building with a corrugated roof and some windows. The sky is clear and blue.

Here's
your
personal
data

“My conclusion is that whatever you put on the internet you lose it.

Maybe keep the rights, but lose the power over it.”

-User on Shapeways blog
(3D printing marketplace)



Current systems of power are creating unequal outcomes

Creative works are backwards

Others' stuff – hard to use legally, pay \$

Your stuff – hard *not* to lose

Your data isn't really yours

Walled gardens – you can't share how you want

Data silos – You can't take it with you if you want to leave

What if you had a place – a database – to put your stuff

And no single entity owned or controlled that database

Instead, it was a **shared database** for the planet?





Elements of a shared global database

1. Blockchain Database SW:
combines best of traditional
DBs & blockchains.

2. Network running the
software, with thoughtful
governance

BIGCHAIN DB

iPDB
INTERPLANETARY DATABASE



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BIGCHAIN DB

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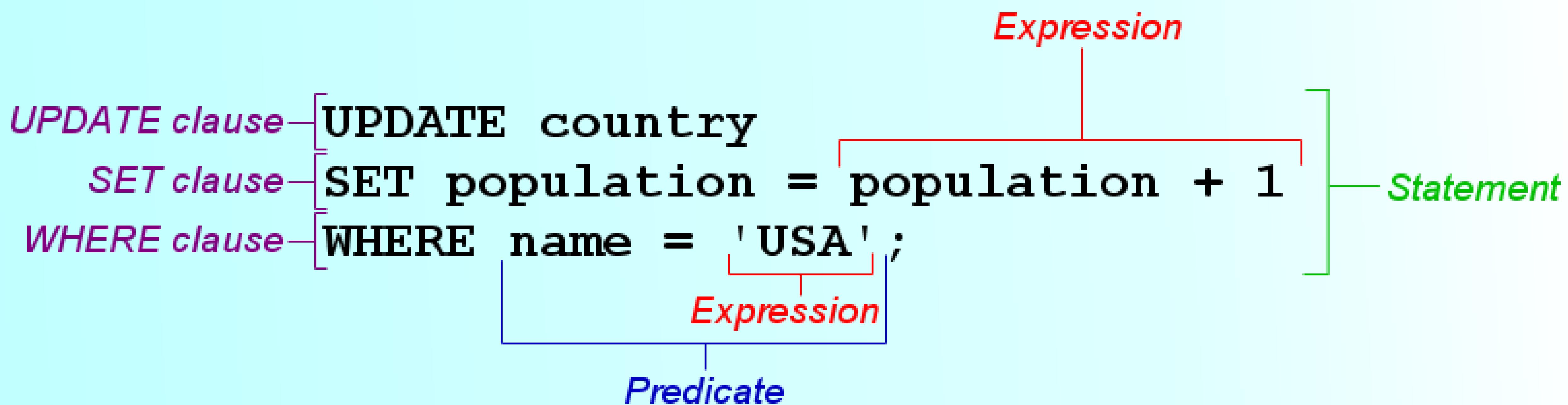
IPDB
INTERPLANETARY DATABASE

What's the difference between a database and a csv file?
Querying. From M's of records, find the relevant ones.

1 Line of standard code, optimized

Vs

50-500 lines of slow custom code, unoptimized





The first “Blue Ocean” DBs: Relational DBs
Benefits: powerful structured querying
Winner: Oracle, 80s and 90s



The next “Blue Ocean” DB: Website-ready DBs

New benefits: lightweight for startups

Winner: MySQL, early 2000s





The next “Blue Ocean” DB: **Distributed / NoSQL DBs**
New benefits: “Big data” scale, flexible schemas
Winner: MongoDB, late 2000s-now



How do “big data” databases scale?

Answer: Distribute storage across many machines, i.e. sharding



A “consensus” algorithm keeps distributed nodes in sync.

How well do “big data” distributed DBs scale?



Writes/s

1,200,000

800,000

600,000

400,000

200,000

0

0

50

100

150

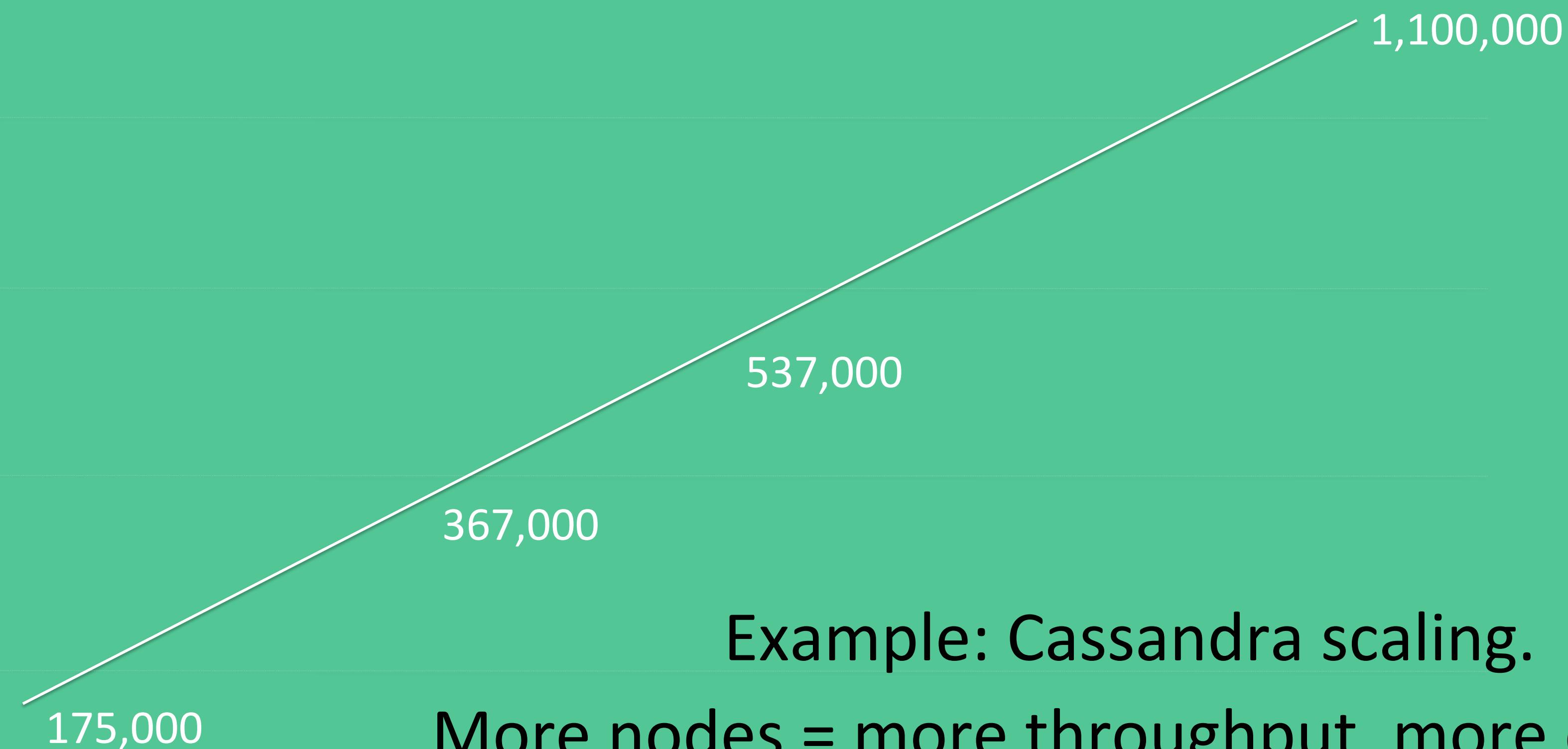
200

250

300

350

Nodes



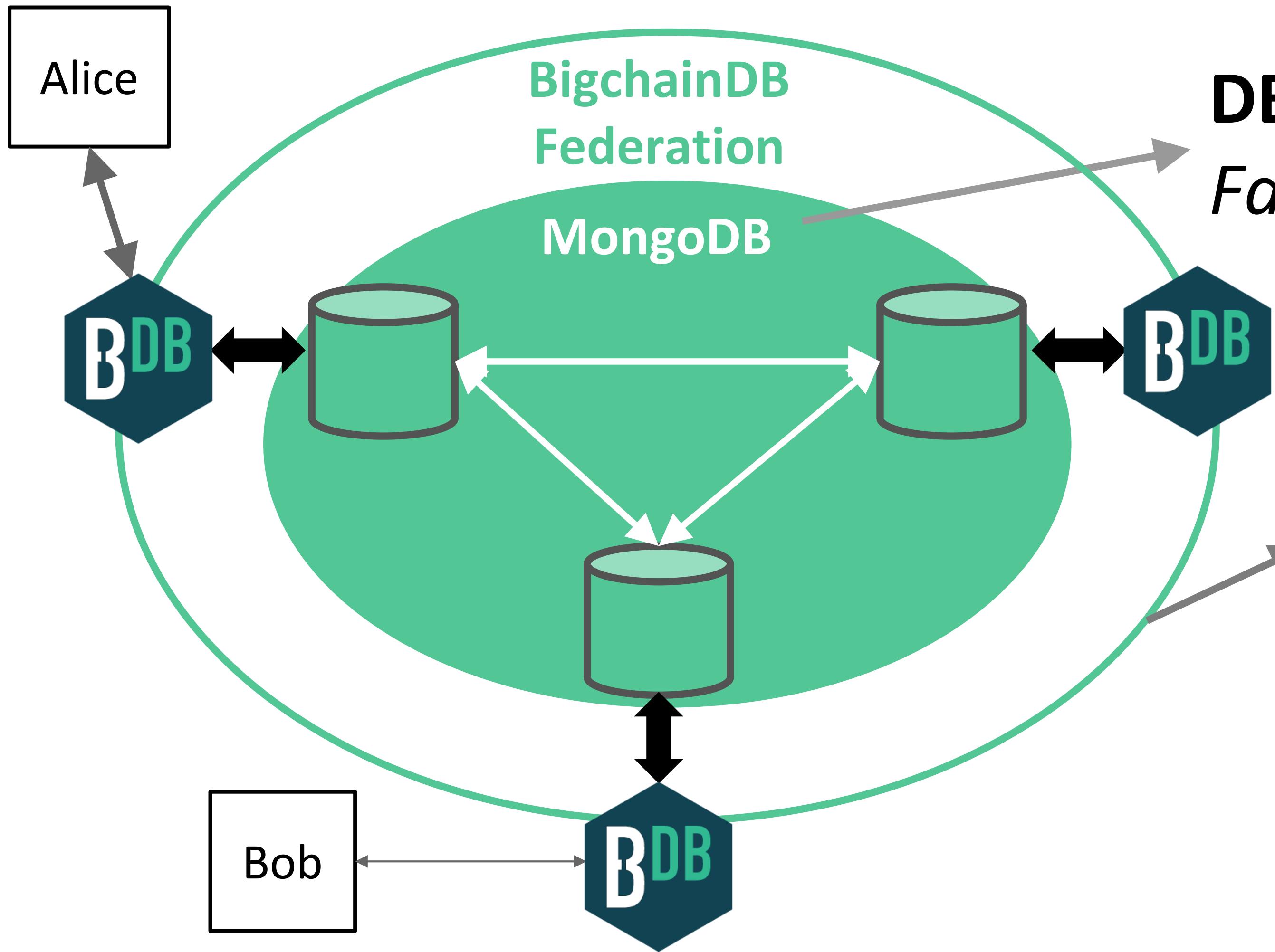
Example: Cassandra scaling.

More nodes = more throughput, more capacity!



The next blue ocean DB: *blockchain* database
New benefits: decentralized, immutable, native assets
Who: BigchainDB

BigchainDB Architecture: Two-Layer consensus



DB consensus

Fault-tolerant consensus

Blockchain consensus

*Add tolerance to
double-spends + other
byzantine faults*

BigchainDB: best of traditional DBs & blockchains = a blockchain database



	Traditional blockchains	Traditional Dist. Databases	BigchainDB
Immutability	✓		✓
Decentralized Control	✓		✓
Native Assets	✓		✓
Scalable		✓	✓
Queryability		✓	✓
Operationalized		✓	✓

Open source at github.com/bigchaindb



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- For everyone, everywhere
- Free until heavy usage, then pay web service style
- Caretakers collectively run a non-profit foundation
- Caretakers operate validating nodes

IDPB Caretakers



Long-standing commitment to the decentralized internet

To avoid \$ capture: At least half non-profit

To avoid jurisdiction capture: Fewer than half in any given country

IPDB Caretakers (so far)

Not-for-profit



Internet Archive
COALA
Dyne.org
OpenMedia
KictaNet
UnMonastery
Human Data Commons
OuiShare

For-profit



BigchainDB
Monax
Protocol Labs (IPFS)
SmartContract.com
Tendermint



Getting Started: bigchaindb.com → Quickstart



We're hiring!

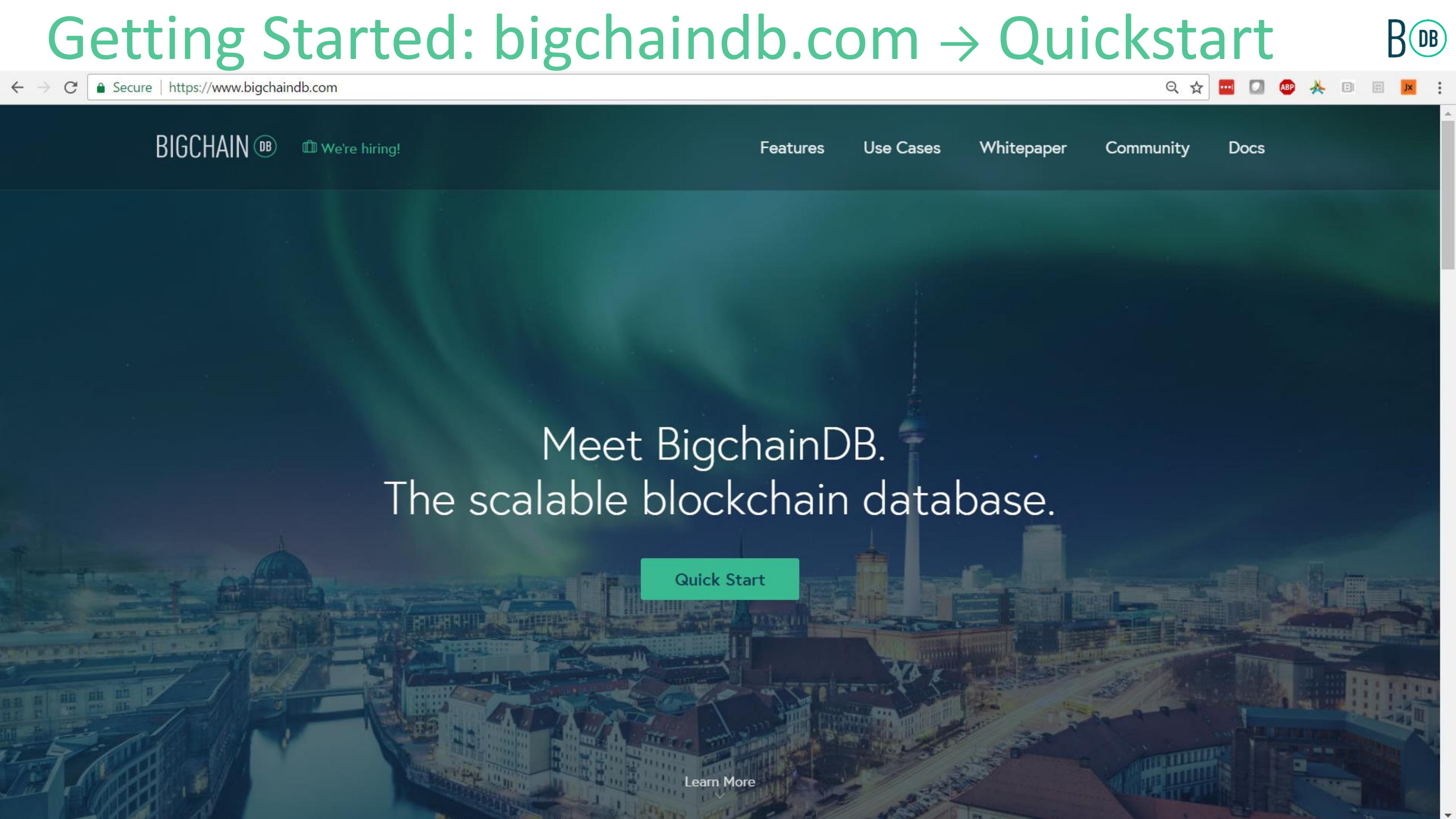
Features

Use Cases

Whitepaper

Community

Docs



Meet BigchainDB.
The scalable blockchain database.

Quick Start

Learn More

5.2. Create a Digital Asset



```
from bigchaindb import crypto

# Create a test user
testuser1_priv, testuser1_pub = crypto.generate_key_pair()

# Define a digital asset data payload
digital_asset_payload = {'msg': 'Hello BigchainDB!'}

# A create transaction uses the operation 'CREATE' and has no inputs
tx = b.create_transaction(b.me, testuser1_pub, None, 'CREATE', payload=digital_

# ALL transactions need to be signed by the user creating the transaction
tx_signed = b.sign_transaction(tx, b.me_private)

# Write the transaction to the bigchain.
# The transaction will be stored in a backlog where it will be validated,
# included in a block, and written to the bigchain
b.write_transaction(tx_signed)
```

5.3. Read the Creation Transaction from the DB



```
# Retrieve a transaction from the bigchain
tx_retrieved = b.get_transaction(tx_signed['id'])

tx_retrieved
{
    // Content Addressable identifier
    "id": "811f13e...ec6f46729",

    // One of "CREATE" or "TRANSFER"
    "operation": "CREATE",

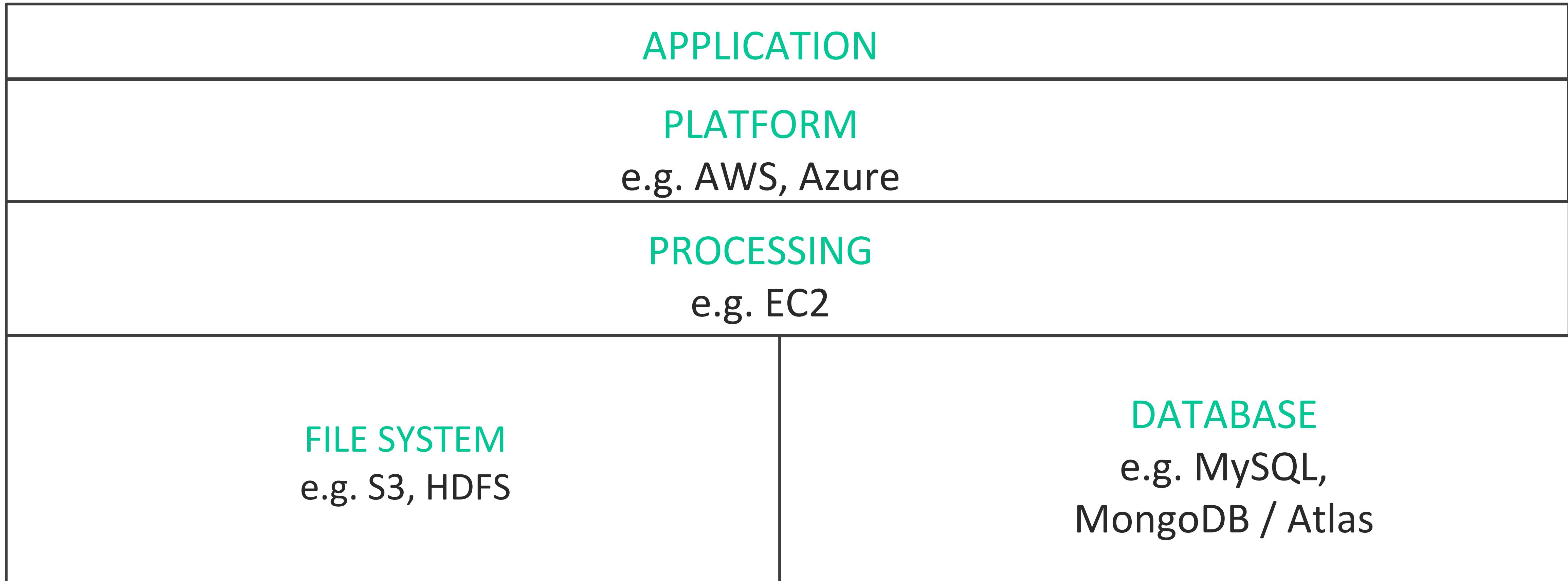
    // Description of asset being created
    "asset": {
        "data": {
            "definition": "Asset definition"
        }
    },
}

// Each input contains a fulfillment to a previous output
"inputs": [
    {
        "fulfillment": "cf:4:__Y_Um6H7...",
        "fulfills": null,
        "owners_before": [
            "JEAkEJqLbbgDRAtMm8YAjGp759Aq2qTn9eaEHUj2XePE"
        ]
    }
],
]

// Each output defines an amount of an asset, and cryptographic
// conditions to be able to transfer it
"outputs": [
```

The Stack

Centralized (but distributed) compute infrastructure



Partly decentralized compute infrastructure (the silly way)

APPLICATION

PLATFORM

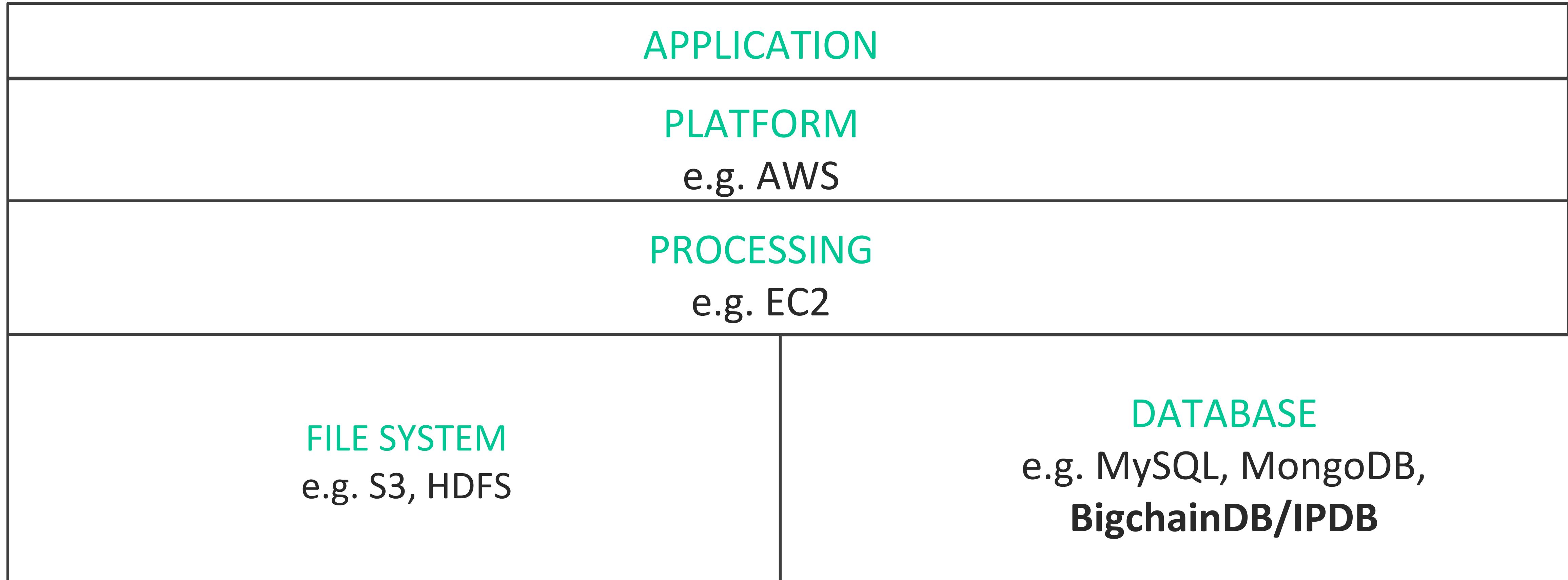
e.g. AWS

“Blockchain”

e.g. Bitcoin



Partly decentralized compute infrastructure

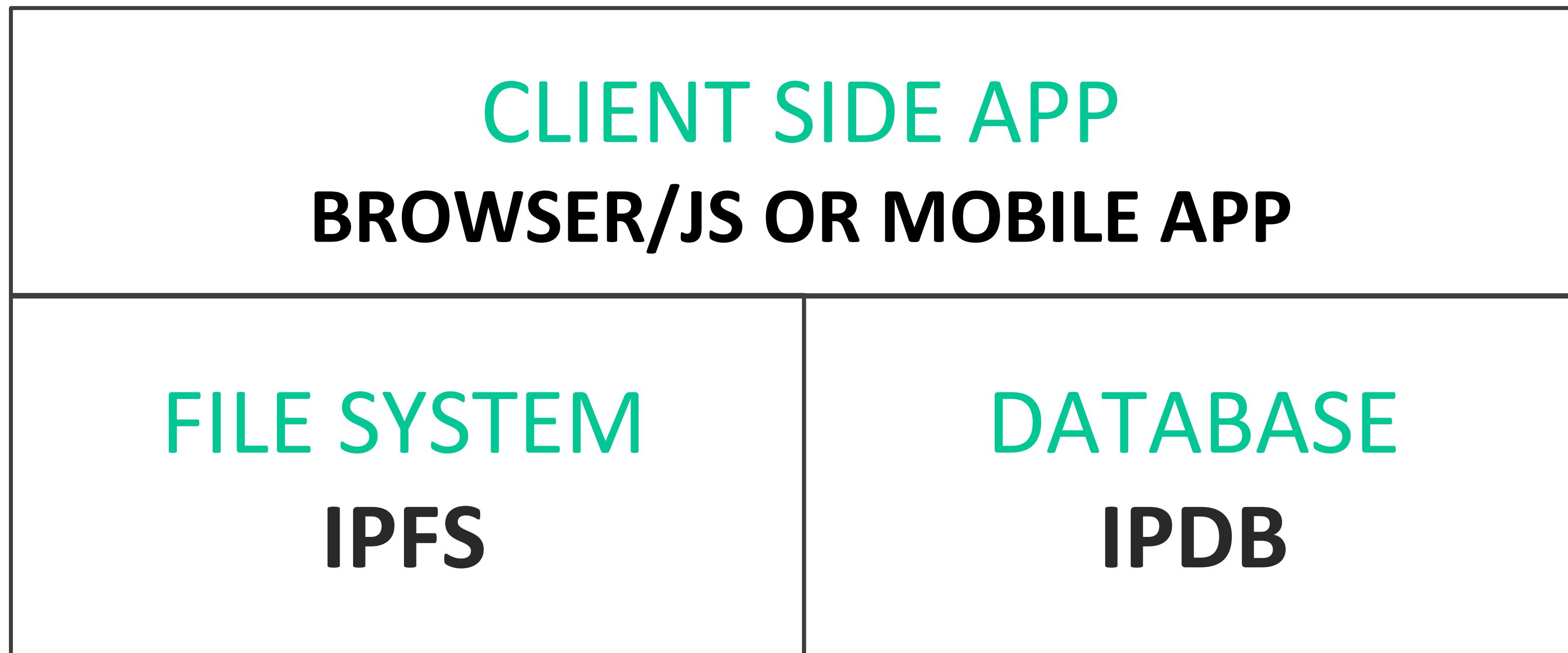


Fully decentralized compute infrastructure



APPLICATION		
PLATFORM e.g. AWS, Azure, Monax , BlockApps		
PROCESSING e.g. EC2, Ethereum , Hyperledger , Tendermint , Lisk		
FILE SYSTEM e.g. S3, HDFS, IPFS	DATABASE e.g. MySQL, MongoDB/Atlas BigchainDB/IPDB	E-GOLD / E-CASH Bitcoin , zcash

Dead-simple yet fully decentralized AWS without the AWS!



Use Cases

scribe

Vertical:
IP – Digital art

Value proposition:
Enables creators of digital art to get
compensated, via claiming attribution &
licensing

Certificate Of Authenticity

As of 30 November 2015, 17:36:00 GMT, Masha McConaghy is the owner.
To verify current owner, please visit <http://scri.be/1luAOpo>



Currency

Date: 2014
Edition: 3 of 100
Created by: Dan Perjovschi
Owner: Masha McConaghy

ARTWORK DETAILS

Artwork ID: 17uZBwSbLGfxY3vRRMWzF5PMjFVNc1tkQ2
File: currency-2014.jpg (499 KB)

PROVENANCE/OWNERSHIP HISTORY

Apr. 30, 2015, 12:36:19 - Registered by mail@cointemporary.com
May. 01, 2015, 09:46:08 - Transferred to admin
May. 08, 2015, 13:04:59 - Transferred to trent
Nov. 27, 2015, 19:35:14 - Transferred to Masha McConaghy

CRYPTOGRAPHIC STAMP

Use the summary and signature below to authenticate this certificate:
<http://scri.be/1Szr45Q>

Summary: Dan Perjovschi*Currency*3/100*2014*2015Apr30-12:36:19

Signature: 438B24CE06182FA3AA82BC285F867D03FB73F3BCC0F73FDBA6
EC2BFF7088E011E60355B7DC75D5745A9D5CA2A8115512FF835
C4ABEF6869BF6A991668A820F3FB03A48C6A9E05834716F6500
68E8E07E5266620BA815948DC265605D23FAF016CB46ACD4BC
BE75F08D0DEBD7AF55E4CB085B9A0A14583F135DBB399121B24
ED1L

Authenticated by scribe®



Authenteq

Vertical:
Identity

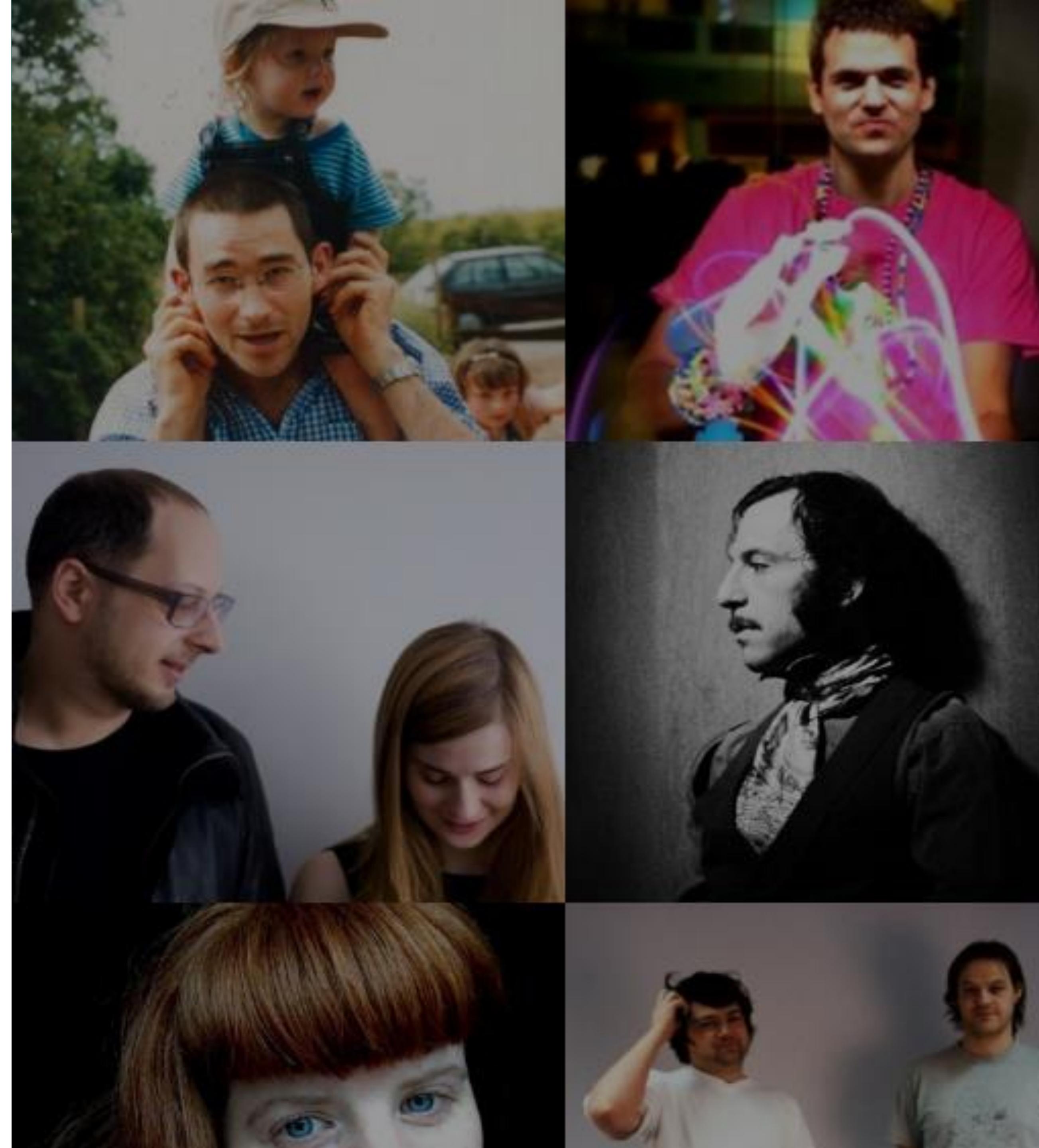
Value proposition:
Low-friction assurance, sovereign personal
data



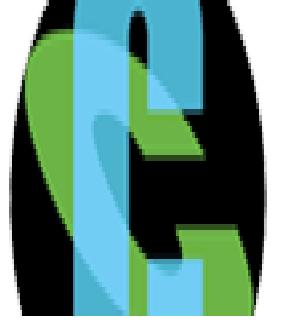
res()nate

Vertical:
IP – Music rights

Value proposition:
A streaming service owned by all



GENESIS OF THINGS



Cognizant



3D
MAKERS
ZONE.



Vertical:

Secure online platform for industrial
3d printing.
E.g. for airline spare parts

Value proposition:

Find and contract the best 3d printer
Securely transfer production files
Set up contracts to regulate, track, and
automate access



BenBen

Vertical:
Government – Land Registry

Value proposition:
Low-cost registry, less risk of corruption

WELCOME TO



Blockchain Powered Land Services in Ghana

ARE YOU READY?

Recruit

Vertical:
ID - Education Credentials

Value proposition:
reduce fraudulent degrees, lower HR
friction





innogy



riddle&code

Volkswagen
Financial Services



Vertical:
Vehicle maintenance

Value proposition:
Track life cycle of automobile
(e.g. to avoid buying lemons; more)

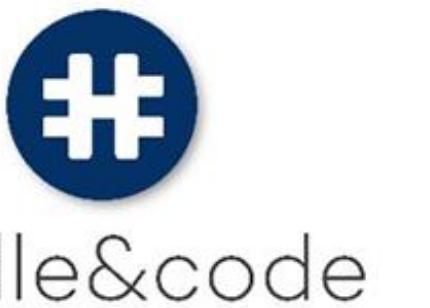




Vertical:
Supply Chain / Health

Value proposition:
government-mandated
transparent \$ flow





Vertical:
Luxury garments

Value proposition:
Guaranteed genuine articles for consumer
Reconnect mfr. with consumer



A few more

IP for software licensing – License.Rocks

Financial network interoperability – Interledger / Ripple

Loyalty and Reward System – CapGemini

Another 10+ supply chain engagements with big auto, etc.

Financial Infrastructure – 17 POCs with one partner

Voting – SettleMint

Provenance of big data for training AI models - <coming soon>

National identity system (>10M people) - <coming soon>

Fix social media filter bubble – <coming soon>

Personal data consent / GDPR – <coming soon>

Data & model exchange for self-driving cars - <coming soon>

<<waiting list on IPDB – 250+ orgs>>



Let's improve the planet using technology as a lever
With a shared database for the planet
For personal data, compensating creators, and more

bigchaindb.com
ipdb.foundation

@trentmc0