A Public Database for the Planet

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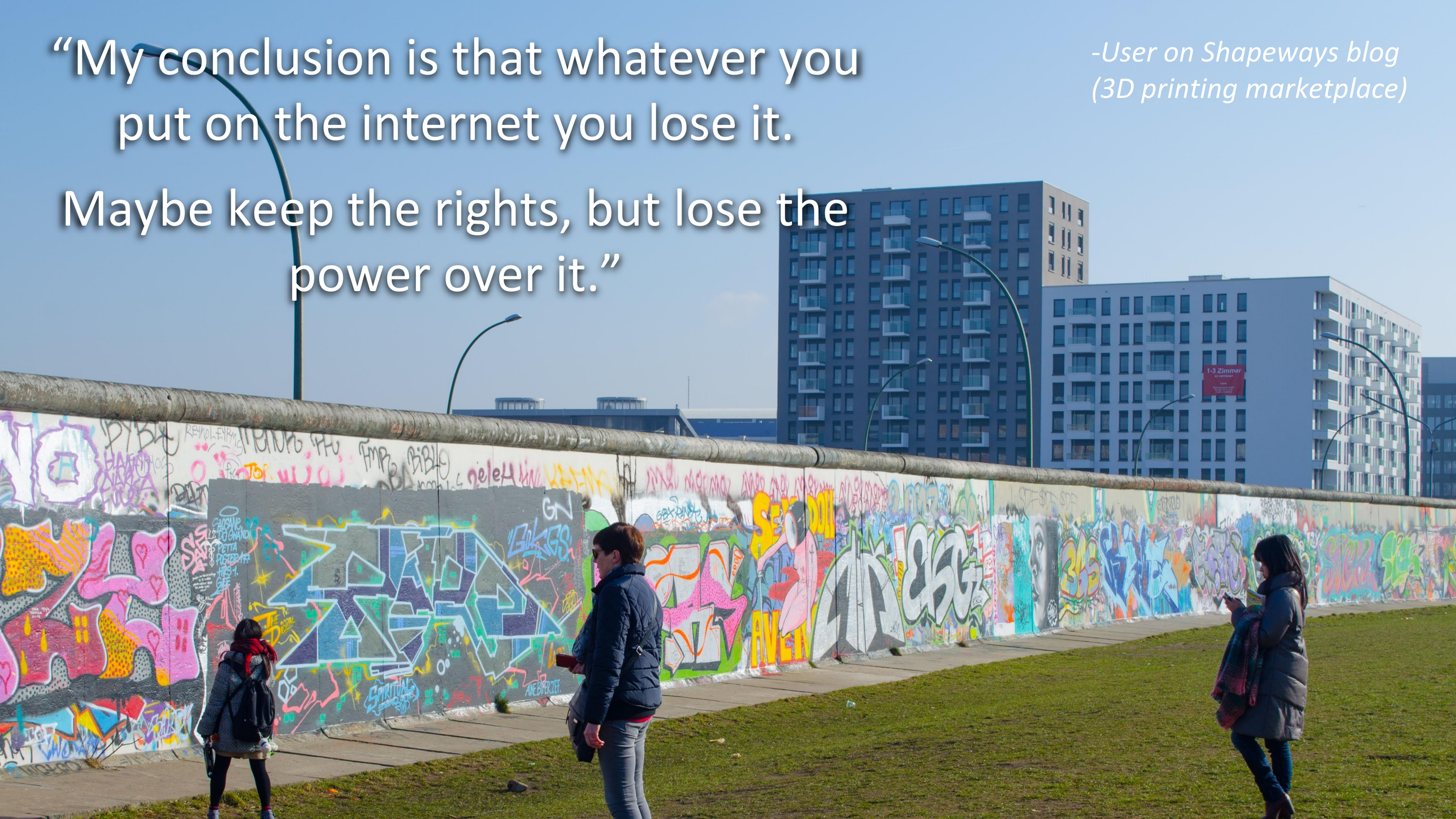
BIGCHAINDB

IPDB
INTERPLANETARY DATABASE

Motivation


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

Imagine a more equitable society, where…

Creativity is encouraged

- Creators are fairly compensated
- The cultural commons is protected

Your identity is yours

- You own your personal data
- You manage your reputation
- Your choose what to share and what stays private

And more

- Equal opportunity for banking
- Know where your atoms come from

Current systems of power
are creating unequal outcomes

We believe that
technology & governance,
designed appropriately,
can help communities
build a more equitable society

Towards a more equitable society

What can help?

Shared global compute infrastructure

- Decentralized: No single entity owns or controls
- Self-sustaining
- Planetary scale
- All the pieces: processing, file system, database

To develop shared global compute infrastructure,

we must first understand the *status quo* of infrastructure,

…and how to change it accordingly.

Status quo compute infrastructure

Modern apps use processing, file system, database

CONNECT NETWORKS
e.g. TCP/IP

APPLICATION

PLATFORM
e.g. AWS, Azure

PROCESSING
e.g. EC2

FILE SYSTEM
e.g. S3, HDFS

DATABASE
e.g. MySQL, MongoDB

Towards **decentralized** compute infrastructure

CONNECT NETWORKS e.g. TCP/IP	APPLICATION	
	PLATFORM e.g. AWS, Azure	
	PROCESSING e.g. EC2	
	FILE SYSTEM e.g. S3, HDFS	DATABASE e.g. MySQL, MongoDB **Bitcoin blockchain?**

Towards **decentralized** compute infrastructure

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e.g. TCP/IP

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DATABASE
e.g. MySQL, MongoDB

e-gold / e-cash
Bitcoin

Towards **decentralized** compute infrastructure

CONNECT NETWORKS
e.g. TCP/IP, **Interledger**

APPLICATION

PLATFORM
e.g. AWS, Azure, **Eris/Monax, BlockApps**

PROCESSING
e.g. EC2, **Ethereum, Hyperledger, Tendermint, Lisk**

FILE SYSTEM	DATABASE	e-gold / e-cash
e.g. S3, HDFS, **IPFS**	e.g. MySQL, MongoDB	**Bitcoin, zcash**

Towards **decentralized** compute infrastructure

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FILE SYSTEM	DATABASE	e-gold / e-cash
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Towards **decentralized** compute infrastructure

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FILE SYSTEM	DATABASE	e-gold / e-cash
e.g. S3, HDFS, **IPFS**	e.g. MySQL, MongoDB **BigchainDB + IPDB**	**Bitcoin, zcash**

Elements of a planetary-scale database

1. Blockchain Database

SW: combines best of traditional DBs & blockchains.

BIGCHAIN DB

2. Network running the software, with thoughtful **governance**

IPDB
INTERPLANETARY DATABASE

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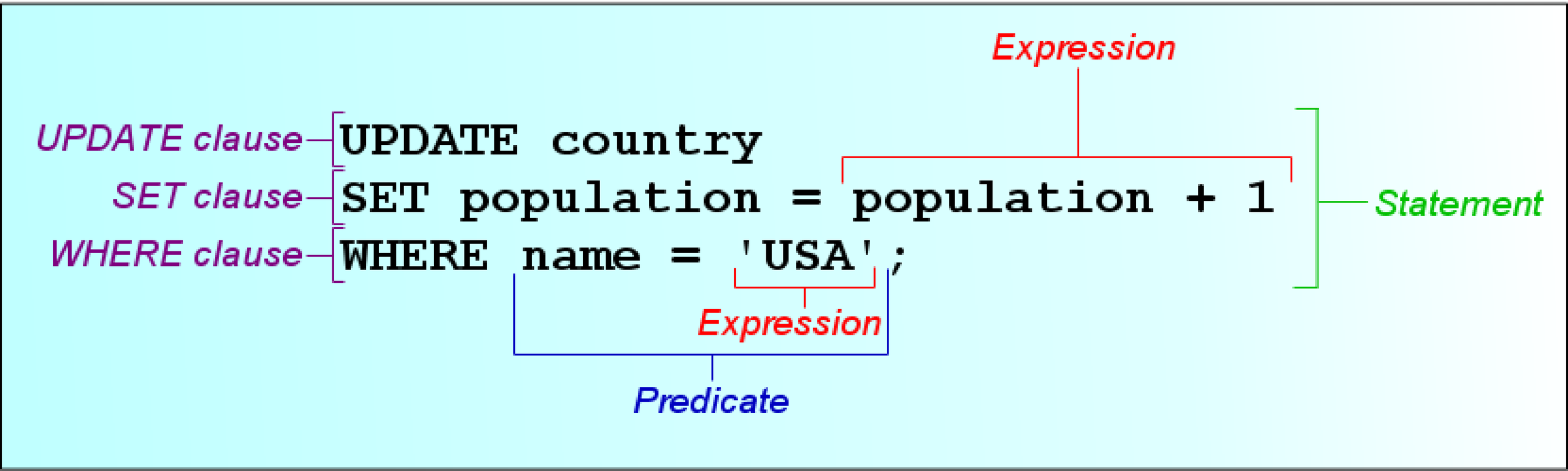
What's the difference between a database and a csv file? Querying. From M's of records, find the relevant ones.

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

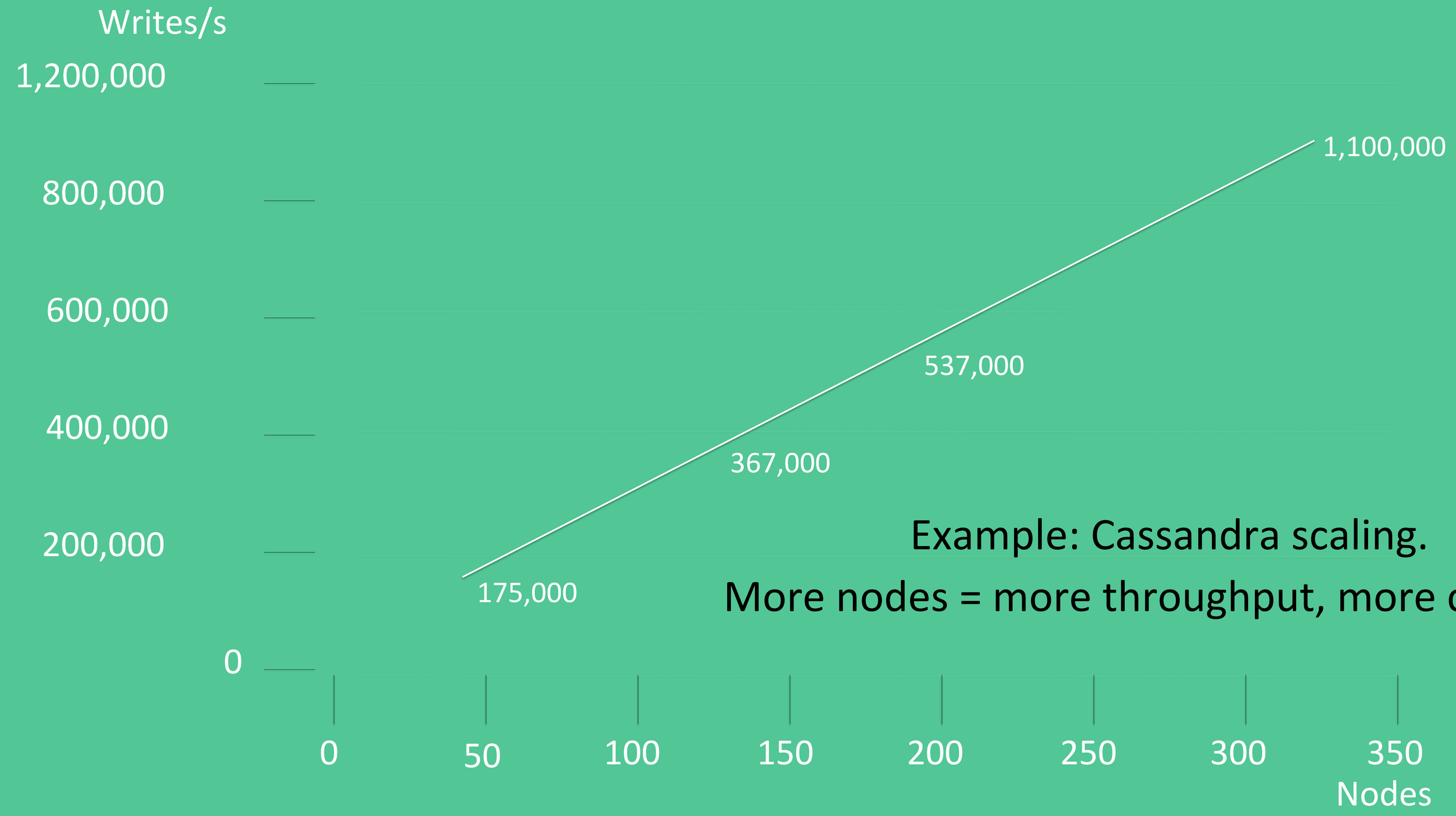
New benefits: “Big data” scale, flexible schemas

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?



Example: Cassandra scaling.

More nodes = more throughput, more capacity!

The next blue ocean DB: *blockchain* database

New benefits: decentralized, immutable, native assets

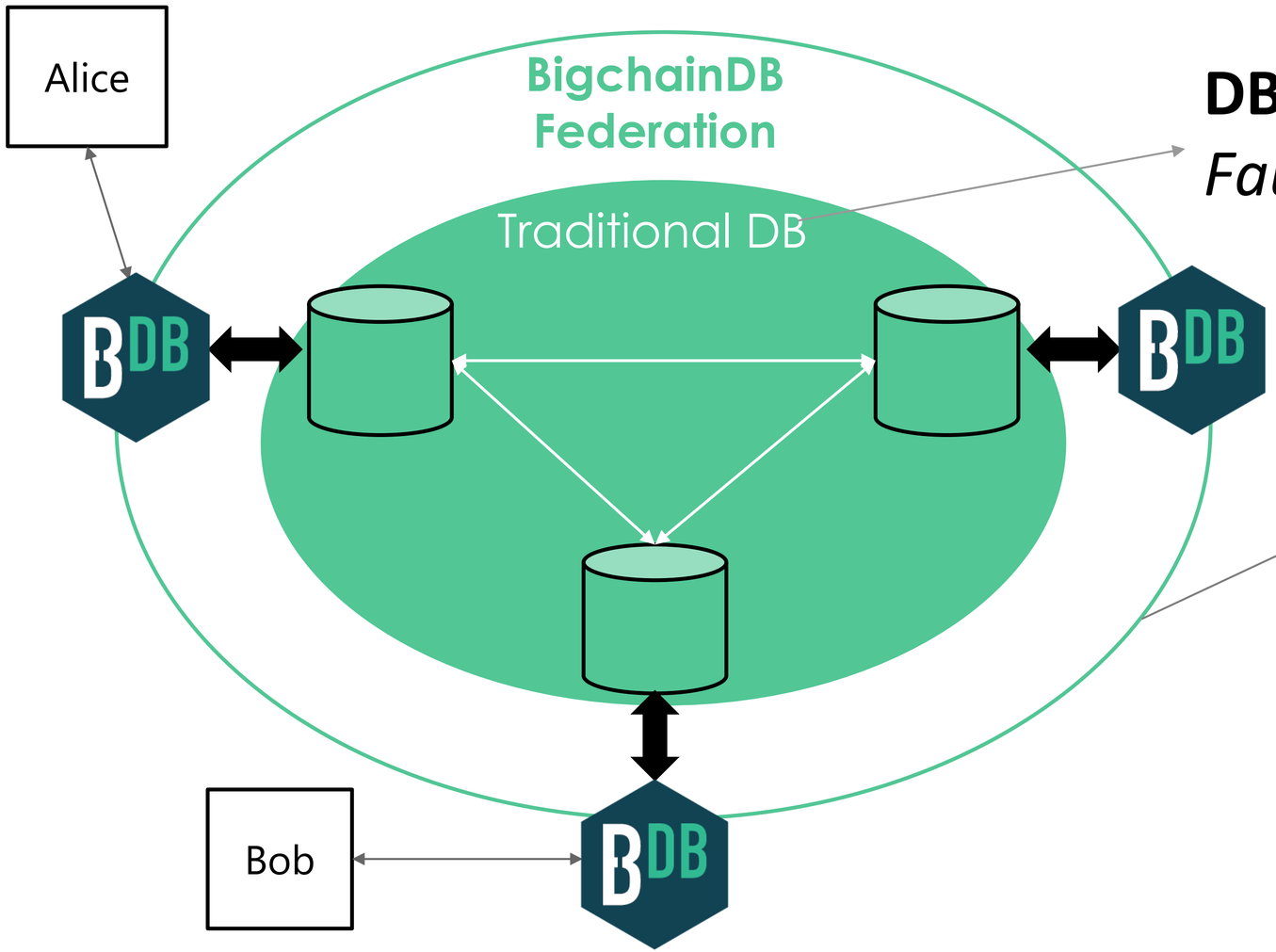
Who: BigchainDB

How to build a scalable blockchain database (BigchainDB)

1. Start with an enterprise-grade distributed DB, e.g. MongoDB
2. Engineer in blockchain characteristics

Decentralized / Shared Control	• Each DB node is a federation node
Immutable / Audit Trails	• Hash Previous Blocks • Append-only
Native assets	• “Own” = have private key • Asset lives on the database

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 Databases	BigchainDB
Immutability	✓		✓
Decentralized Control	✓		✓
Native Assets	✓		✓
Scalable		✓	✓
Queryability		✓	✓
Operationalized		✓	✓

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IPDB
INTERPLANETARY DATABASE

IPDB

INTERPLANETARY DATABASE

- For everyone, everywhere
- Free until heavy usage, then pay web service style
- Initial tech is BigchainDB
- Member caretakers will operate validating nodes

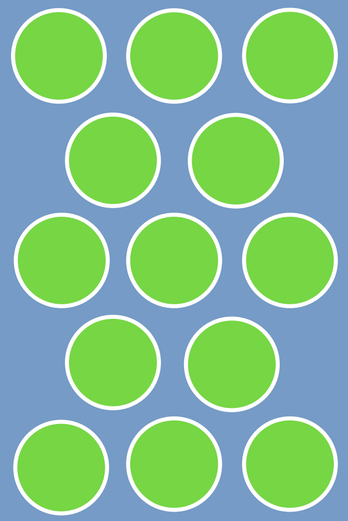
IDPB Caretakers

Long-standing commitment to the decentralized internet

At least half non-profit

Fewer than half in any given country

Caretakers (so far)



Not-for-profit

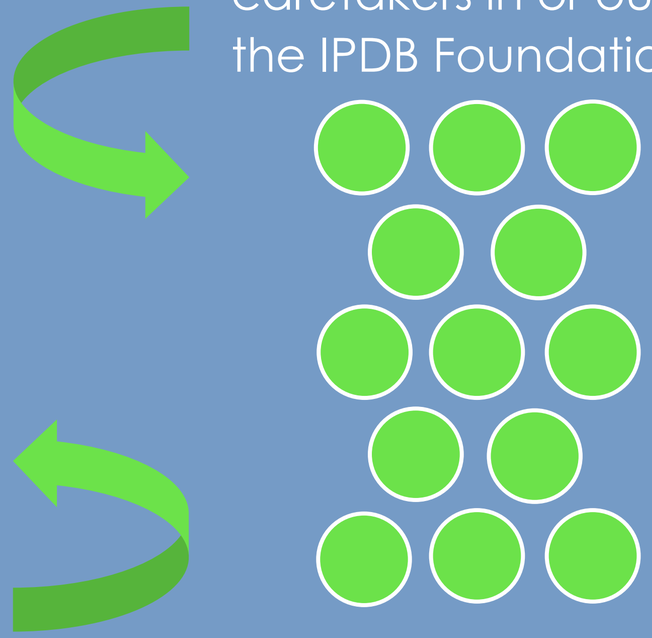
Blockstack
COALA
Dyne.org
Internet Archive
OpenMedia
UnMonastery

For-profit

ascribe / BigchainDB
Consensys
Eris Industries
Protocol Labs (IPFS)
SmartContract.com
Synereo
Tendermint

Governance: caretakers at the heart

Caretakers vote caretakers in or out of the IPDB Foundation.



... And operate the validating nodes in the network.

Caretakers elect a board.

Board hires a director for management duties.

Yes, this could be a DAO.

But not yet. Walk before we run.

Use Cases

res( )nate

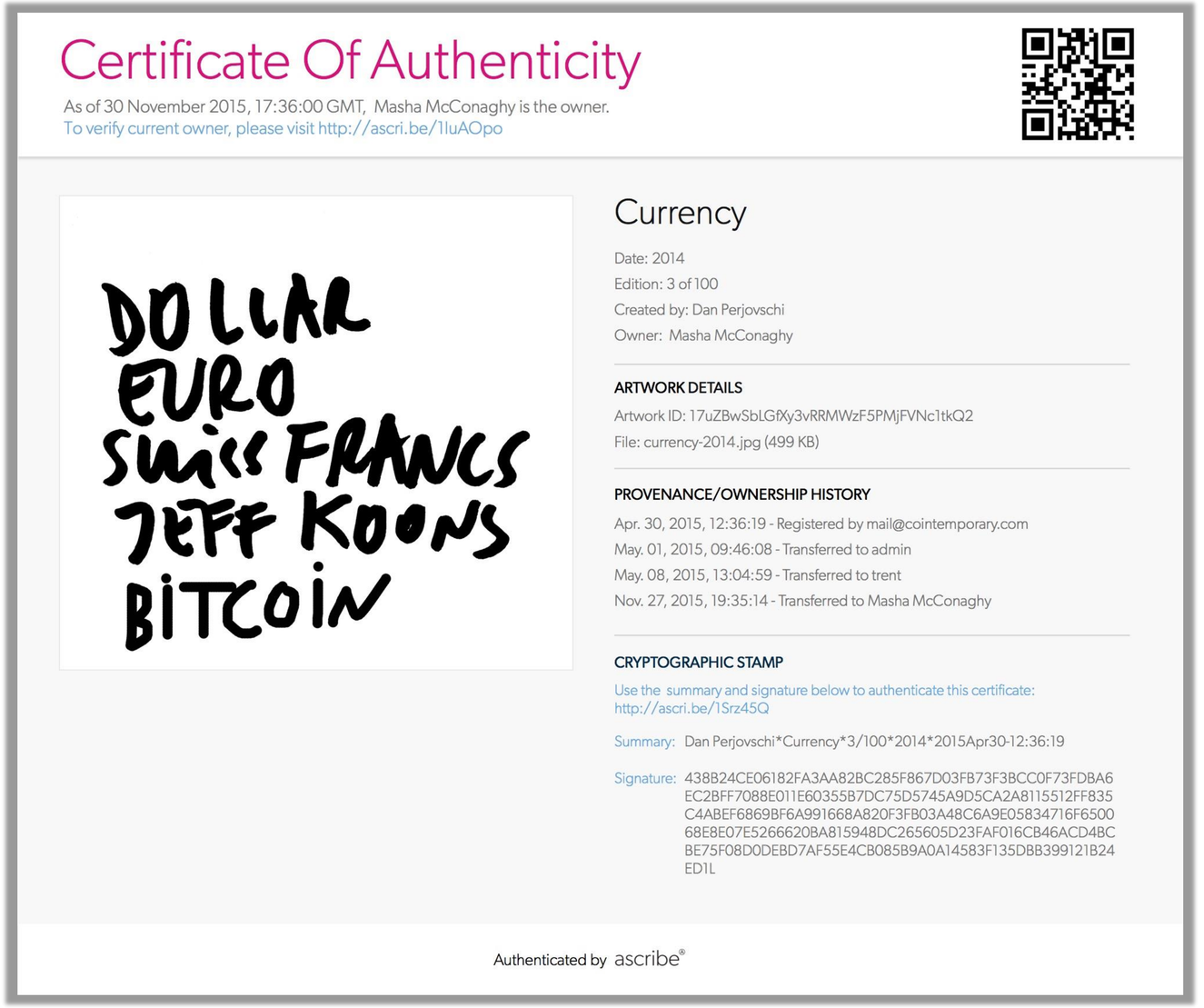
Vertical:
IP – Music rights

Value proposition:
A streaming service owned by all

ascribe

Vertical:
IP – Digital art

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



Authenteq

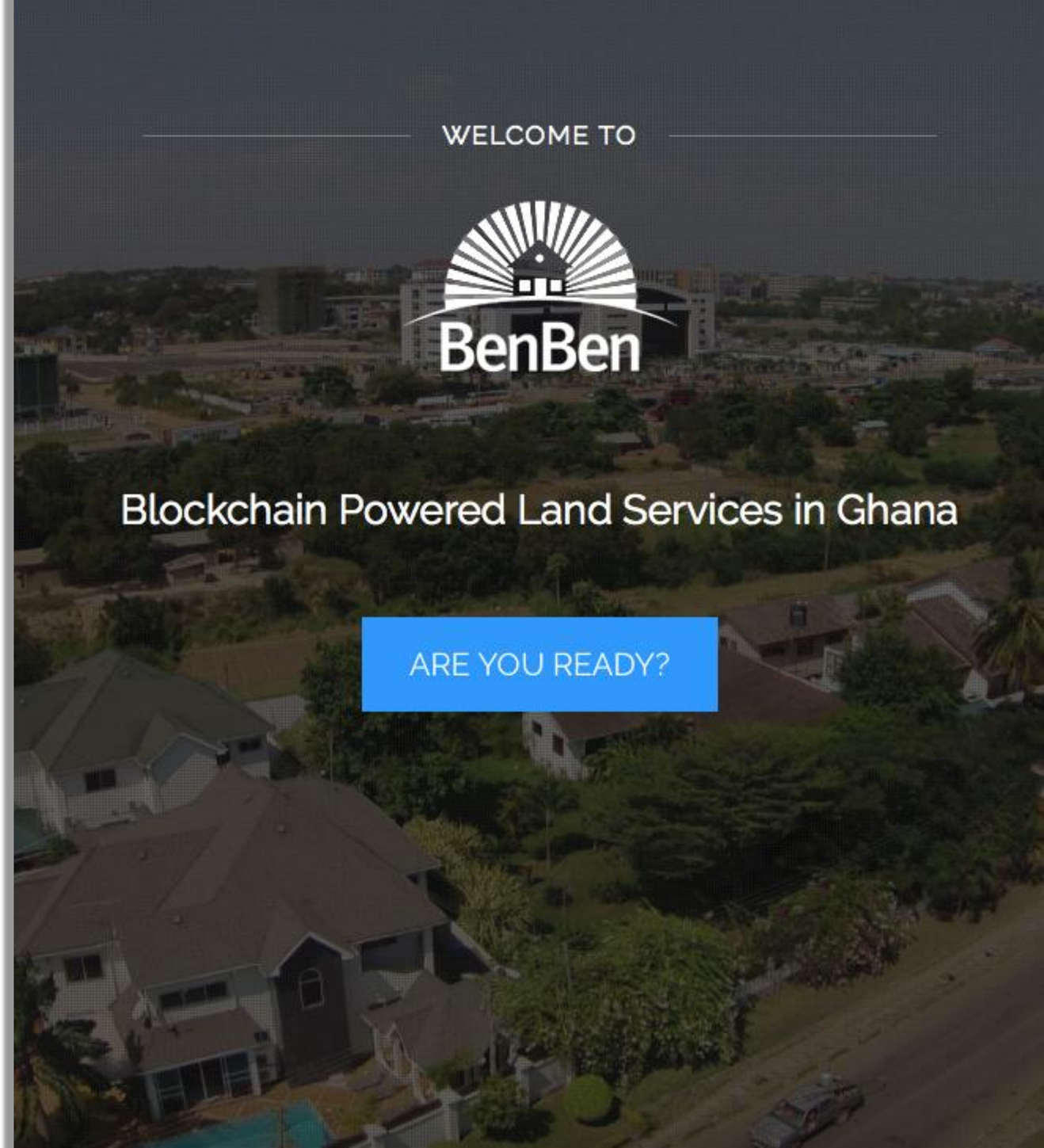
Vertical:
Identity

Value proposition:
Low-friction assurance, sovereign personal data

BenBen

Vertical:
Government – Land Registry

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



Recruit

Vertical:
ID - Education Credentials

Value proposition:
reduce fraudulent degrees, lower HR friction

RWE

Vertical:
Energy

Value proposition:
manage $ flow in energy deregulation

Tangent90

Vertical:
Supply Chain / Health

Value proposition:
government-mandated
transparent $ flow

We started with:

Current systems of power
are creating unequal outcomes

But… technology & governance,
designed appropriately,
can help communities
build a more equitable society

Together, we're building **decentralized** compute infrastructure + applications

PLATFORM e.g. **Resonate, ascribe, Authenteq, Recruit, BenBen**		
PLATFORM e.g. AWS, Azure, **Eris/Tendermint**		
PROCESSING e.g. EC2, **Ethereum, Hyperledger**		
FILE SYSTEM e.g. S3, HDFS, **IPFS**	DATABASE e.g. MySQL, MongoDB **BigchainDB + IPDB**	e-gold / e-cash **Bitcoin**
CONNECT NETWORKS e.g. TCP/IP, **Interledger**		

Planetary scale trust for human scale development.

For personal data, compensating creators, and more.

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bigchaindb.com
ipdb.foundation