

# How Healthy is Blockchain?

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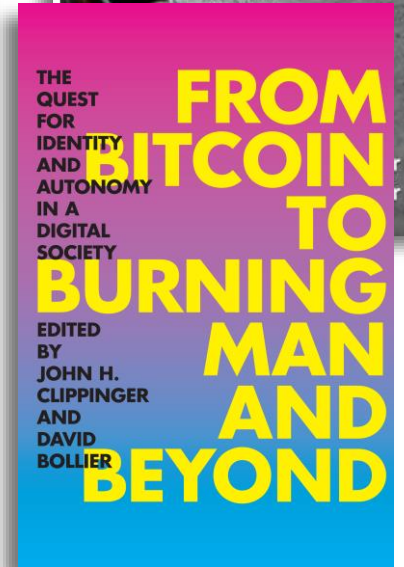
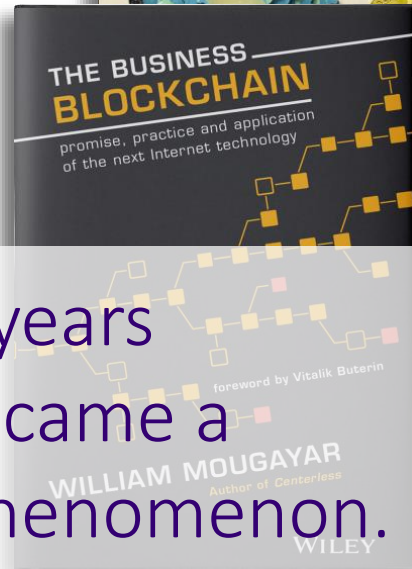
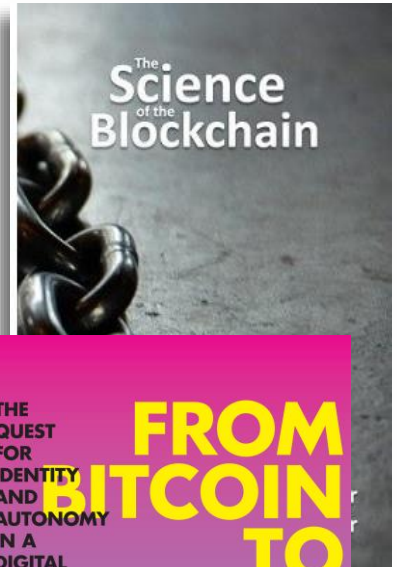
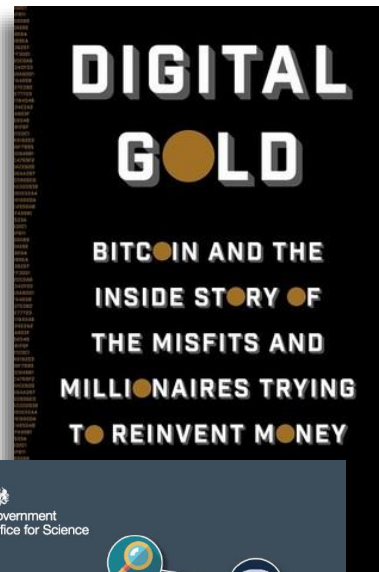
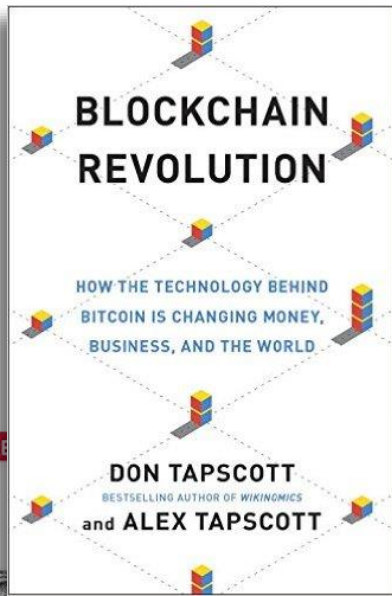
November 2008

An obscure paper  
appeared

## Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto  
satoshin@gmx.com  
www.bitcoin.org

**Abstract.** A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network.



Within a few years  
blockchain became a  
publication phenomenon.

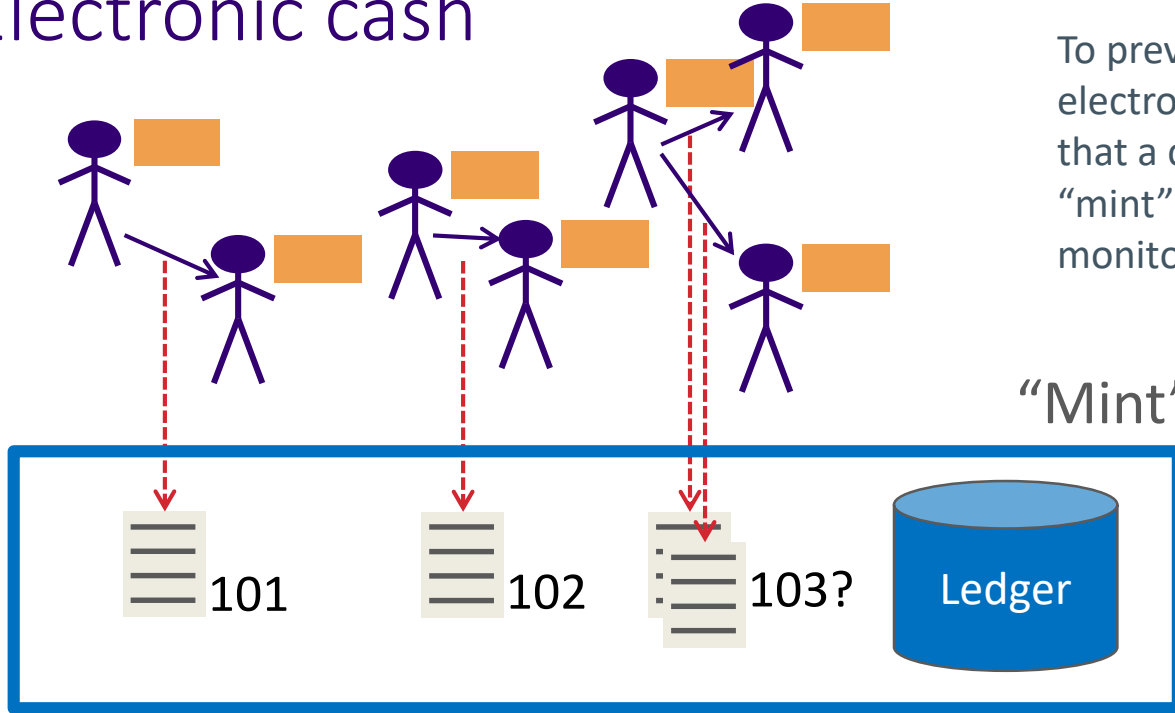
Far beyond payments, a vast array of use cases for blockchain have been proposed, many of them frankly preposterous.

Blockchain is a name for the software underpinning bitcoin that uses complex cryptography and distributed ledgers — copies of records in multiple places — to regulate, record, and enable transactions using bitcoin. In effect, it lets users — the “crowd” — police the monetary system without any central bank or regulator.

A new Blockchain-based initiative in Africa aims to stamp out corruption and release billions of dollars in locked capital for infrastructure development according to an analysis.

Blockchain coupled with near field communication (NFC), could help automate breathing apparatus. It could eventually provide unlimited communication channels when block size is no longer an issue. It is successfully reduced. In cases of discrepancy, simply referring to data stored on the blockchain.

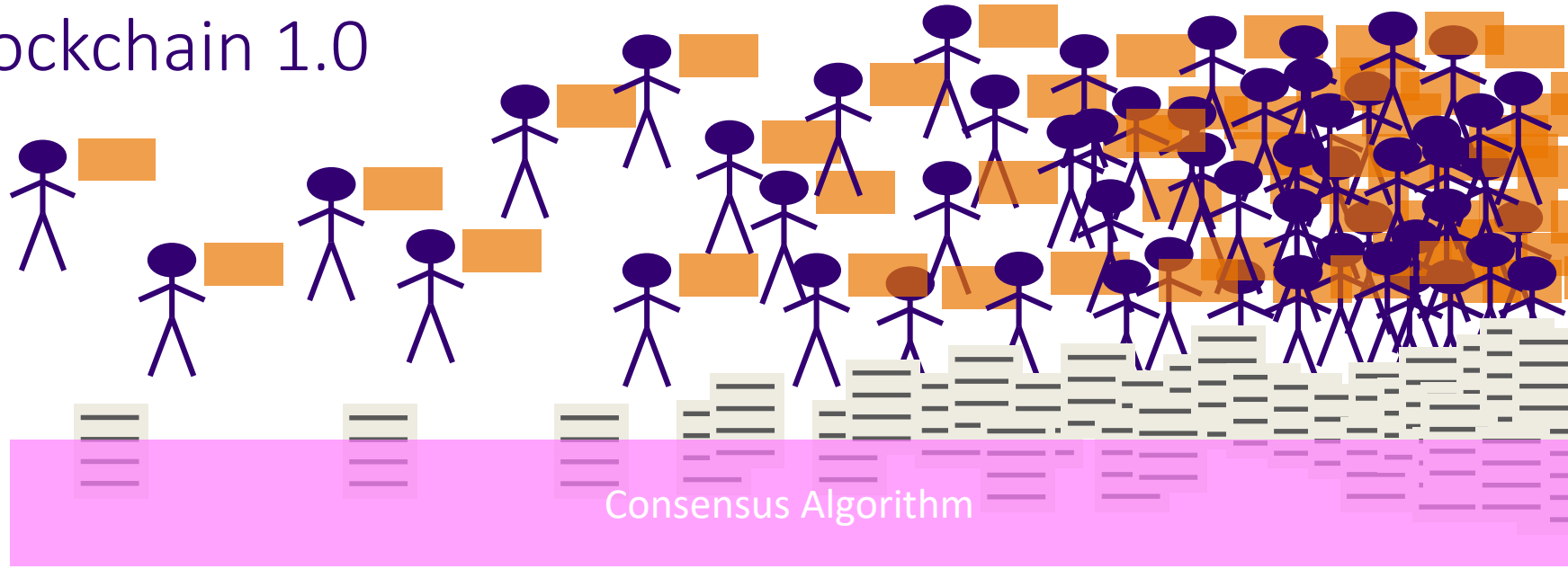
# Electronic cash



To prevent double spend of electronic cash it was long thought that a central digital reserve bank or "mint" would be required, to monitor all transactions.

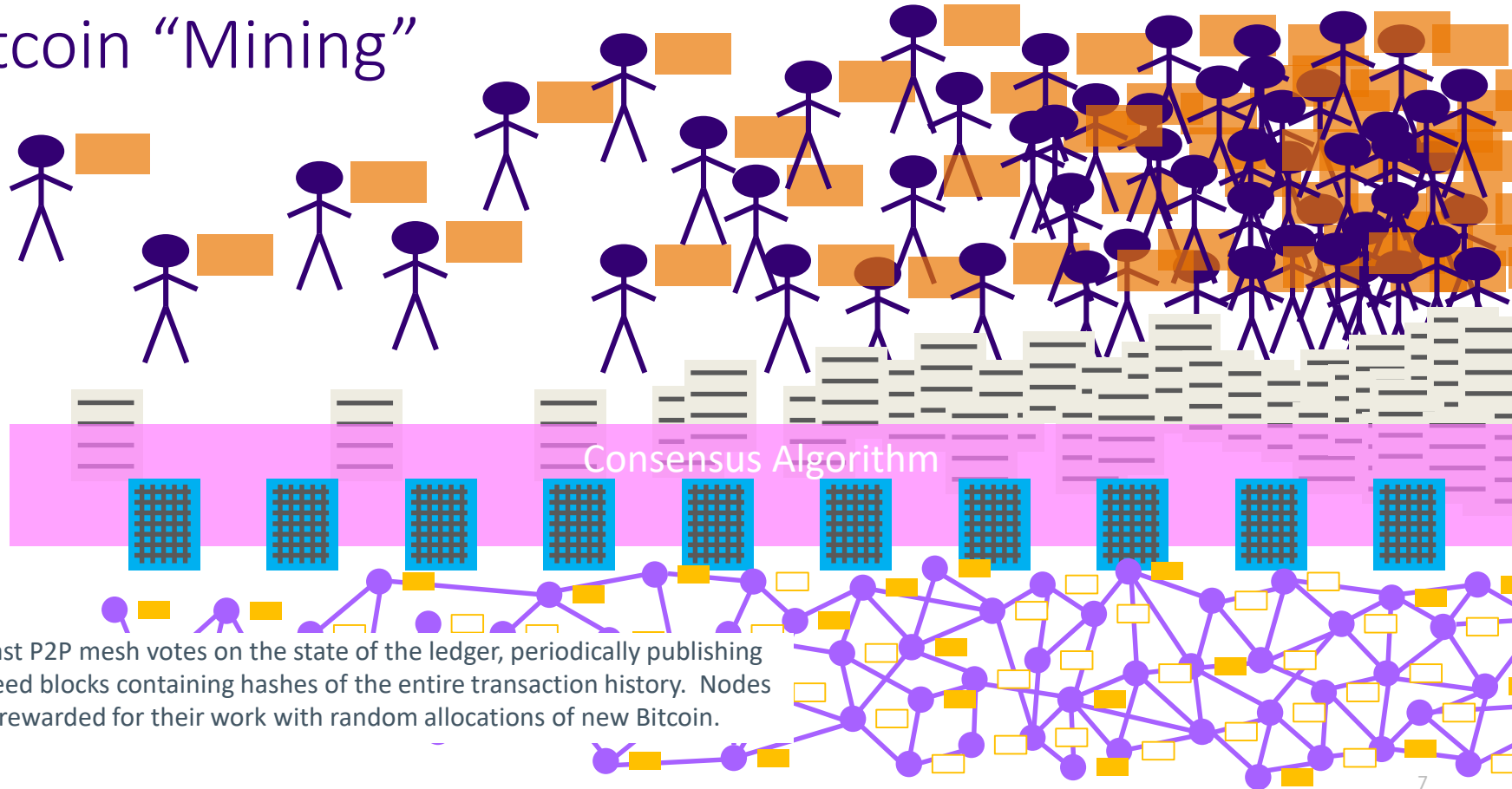


# Blockchain 1.0



Nakamoto got rid of the central umpire by crowd-sourcing the monitoring of all transactions, to reach consensus on their order.

# Bitcoin "Mining"



A vast P2P mesh votes on the state of the ledger, periodically publishing agreed blocks containing hashes of the entire transaction history. Nodes are rewarded for their work with random allocations of new Bitcoin.

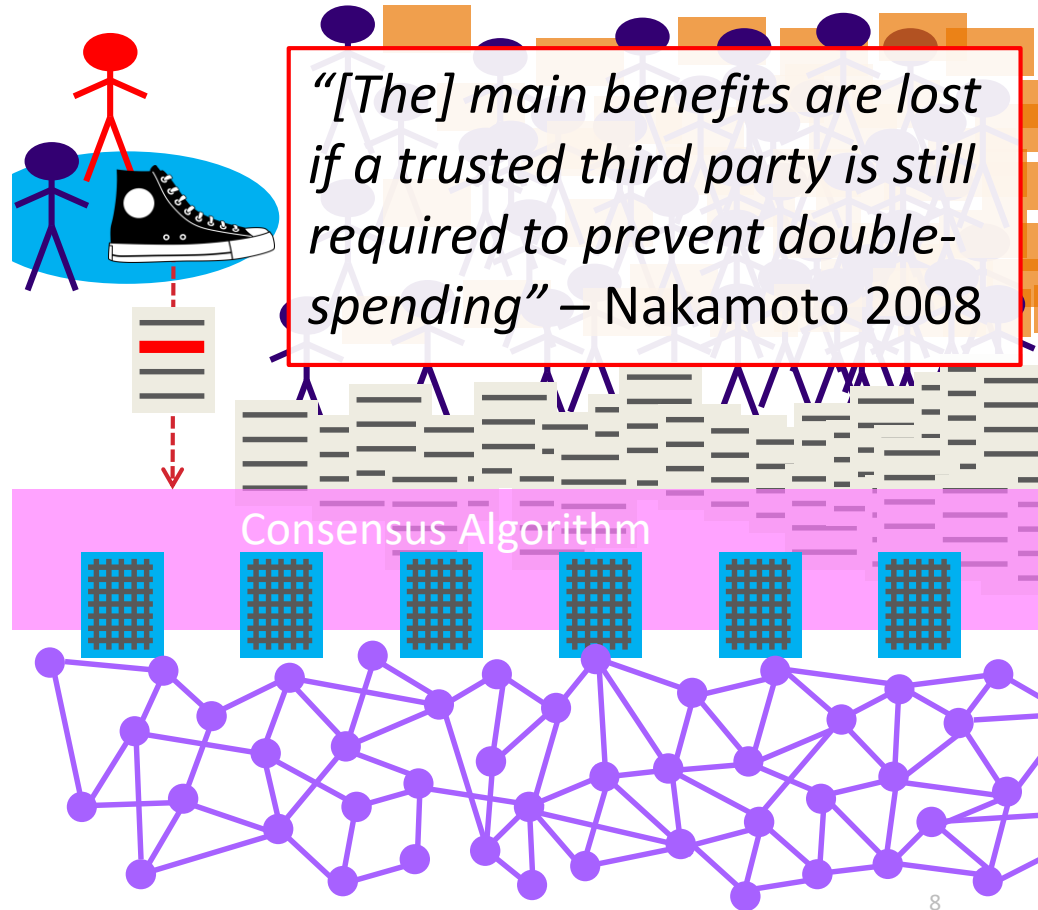
# Other Applications

Bitcoin APIs allow other data

- Land Titles
- Diamonds
- Marriages
- Collectible sneakers
- Identities
- Health Records

But Blockchain was designed for digital only.

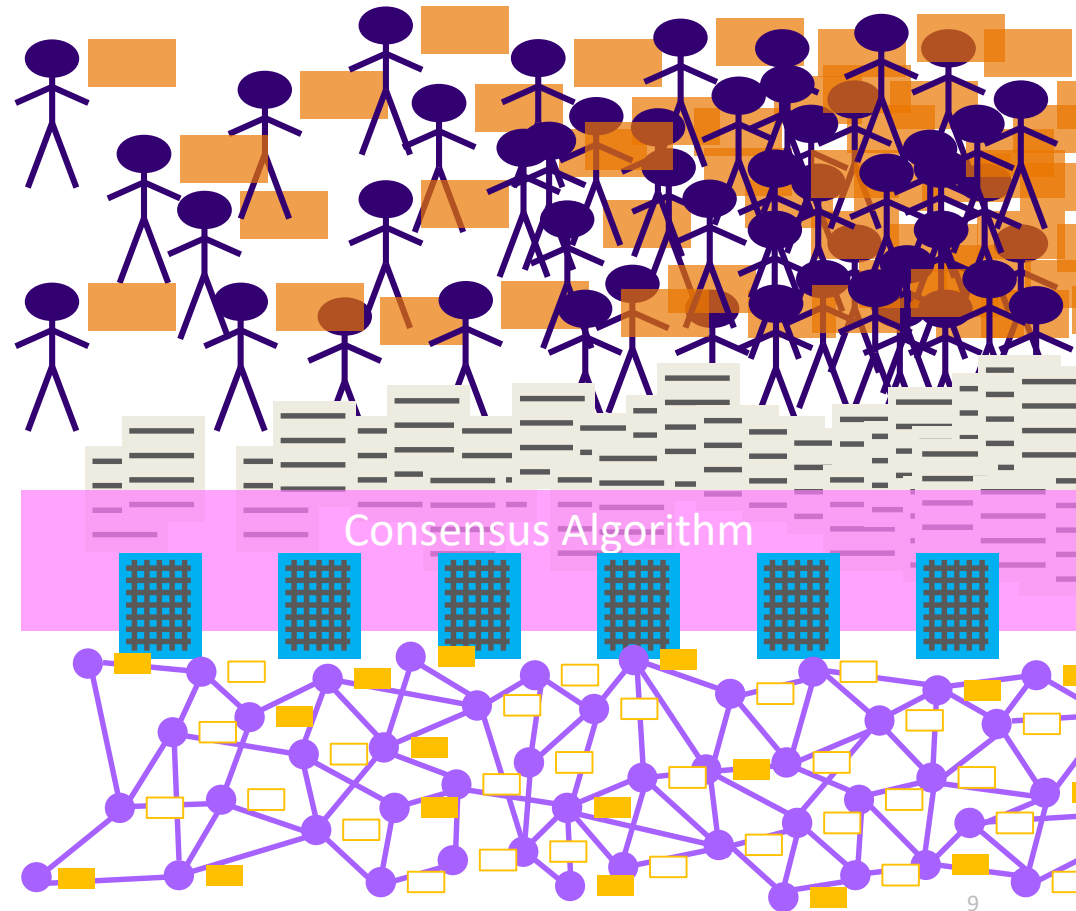
- BTC account holders self register
- Physical assets need registering *off-chain*.





# Blockchain 1.0 in Summary

- Permissionless
- “Anonymous”
- Decentralized
- Available
- Discoverable
- Transparent
- “Trustless”



# Healthcare

## Consensus

Only about the order of entries!

## Availability

Yes, but suitable for patient data?

## Confidentiality

Requires *key management*  
and administrators.

## Authority

Blockchain is trust-less  
Healthcare is inherently hierarchical.

A graphic with the text 'BLOCKCHAIN REVOLUTION' in large, bold, black letters. The text is centered within a diamond shape formed by dashed lines. At each of the four vertices of the diamond, there is a small icon of a stack of three colored blocks (yellow, red, blue) on a grey base.

# BLOCKCHAIN REVOLUTION

“Today you need an organization with endowed rights to provide you with an identity, like a bank card, a frequent flyer card, or a credit card,”<sup>18</sup> said Carlos Moreira of WISEKey. Your parents gave you a name, the **state-licensed obstetrician or midwife** who delivered you took your footprint and vouched for your weight and length, and both parties attested to the time, date, and place of your arrival by signing your birth certificate. Now they can record this certificate on the blockchain and link birth announcements

A graphic with the authors' names 'DON TAPSCOTT' and 'ALEX TAPSCOTT' in large, bold, black letters. The text is centered within a diamond shape formed by dashed lines. At each of the four vertices of the diamond, there is a small icon of a stack of three colored blocks (yellow, red, blue) on a grey base. Below 'DON TAPSCOTT' is the text 'BESTSELLING AUTHOR OF WIKINOMICS' in a smaller, blue font.

**DON TAPSCOTT**  
BESTSELLING AUTHOR OF *WIKINOMICS*  
and **ALEX TAPSCOTT**

## ONC Blockchain Challenge

- Address ONC Interoperability Roadmap, Pt. Centred Outcomes Research (PCOR) & Precision Medicine Initiative (PMI)
- 70+ submissions; 15 winners
- Showcased September 2016

## Blockchain Healthcare Workshop

- Big ideas!
- But many concerns
- Semantic interoperability?
- Patient data on blockchain?
- Really reduce data siloes?
- Key Management?

*1<sup>st</sup> Gen blockchain too anarchic for healthcare.*

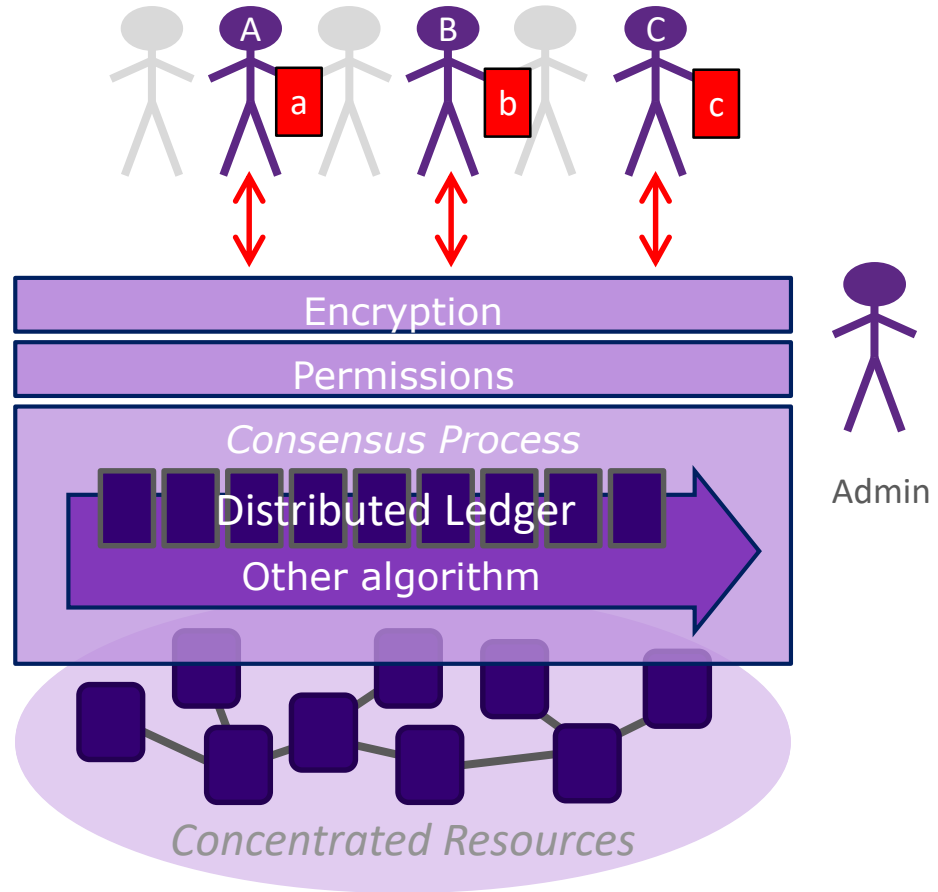
# Third Generation Synchronous Ledger Tech

- Distributed but concentrated
- Administered
- Focus on key management
- Focus on permissions
- People & Process inherent
- Shift to managed services

*Hyperledger Fabric*

*IBM HPBN*

*Microsoft BaaS*





## Synchronous Ledger Technology Services

Synchronous Ledger Technologies, derived from blockchain principles, are evolving rapidly and becoming available in various forms

Q3 2017

# SYNCHRONOUS LEDGER TECHNOLOGY LABS

DELOITTE  
HYPERLEDGER  
IBM HSBN

CONSTELLATION  
ShortList™

6  
solutions  
to know

WIPRO  
MICROSOFT AZURE BAAS  
R3

# Inspiration

The “Wright Brothers’ *Flyer* of cryptocurrency”

Disruptive value?

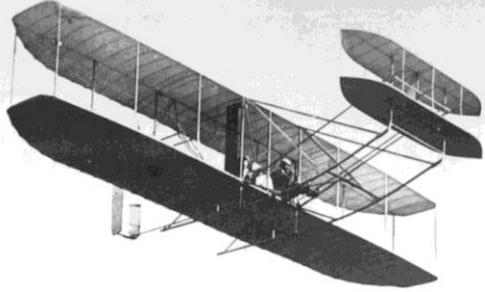
BTC addresses some of the unbanked.  
Seems to destabilize some banking.

1<sup>st</sup> Gen very selective decentralization  
Restricted asset class – digital only

3<sup>rd</sup> Gen synchronizes multiparty data sets  
Huge impact in trade, supply chains







# Only the beginning

What problem are we trying to solve?

Powerful joint ventures & consortia

Solid R&D

**What will really change the world?**



# Thank you.

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