Blockchain's Challenges In Real Life

Blockchain & Healthcare Workshop

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November 2008: an obscure paper appeared

Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
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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.

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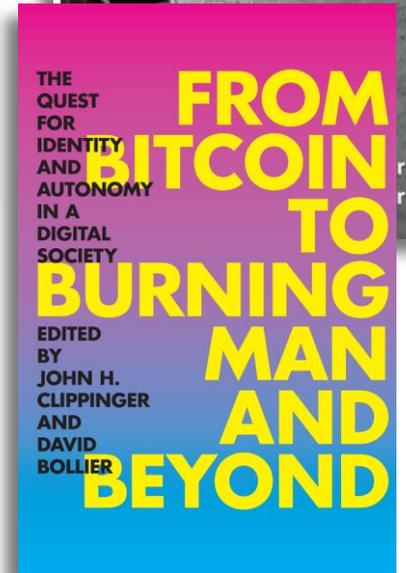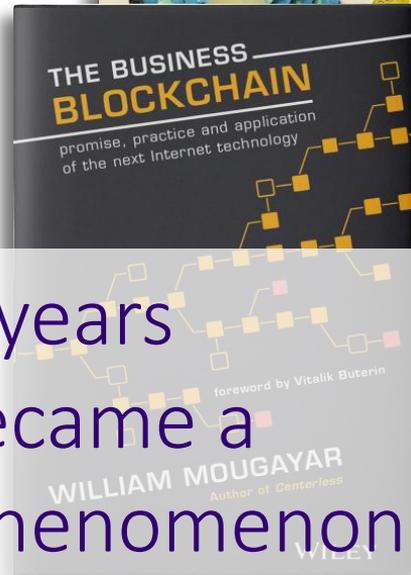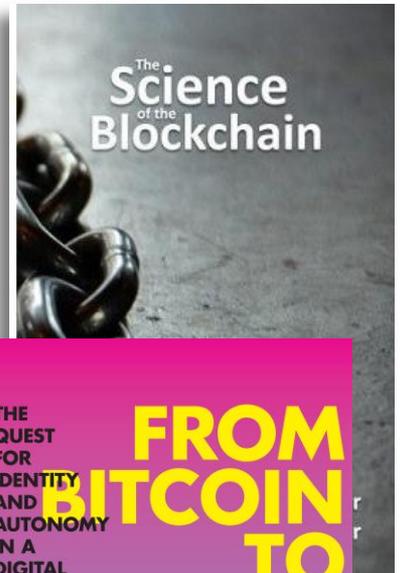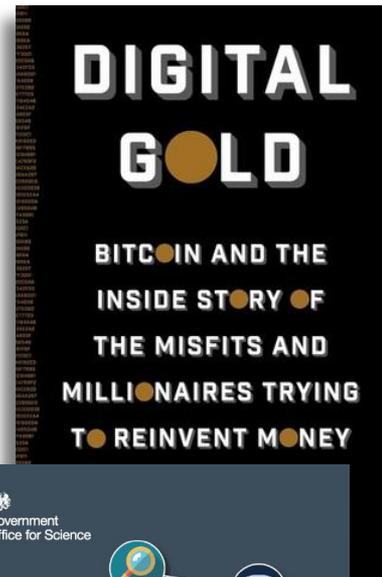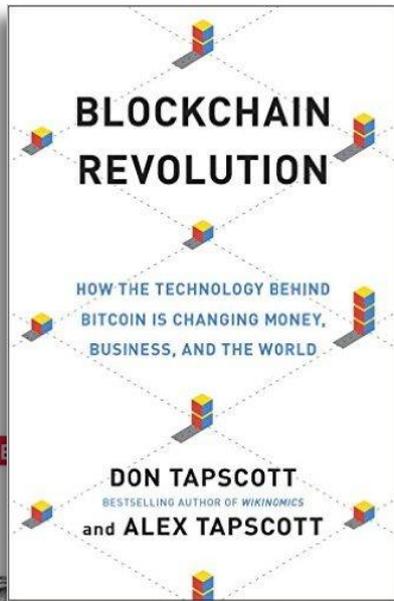
Within a few years blockchain became a publication phenomenon.

BLOCKCHAIN REVOLUTION

HOW THE TECHNOLOGY BEHIND BITCOIN IS CHANGING MONEY, BUSINESS, AND THE WORLD

DON TAPSCOTT
BESTSELLING AUTHOR OF *WIKINOMICS*
and ALEX TAPSCOTT

The Economist

OCTOBER 31ST-NOVEMBER 6TH 2015   Economist.com

007 and the spectre of Britain's past
Turkey votes to the sound of bombs
Those ever-creative accountants
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Coywolves: the new superpredator

The trust machine

How the technology behind bitcoin could change the world

DIGITAL GOLD

BITCOIN AND THE INSIDE STORY OF THE MISFITS AND MILLIONAIRES TRYING TO REINVENT MONEY

The Science of the Blockchain

THE BUSINESS BLOCKCHAIN
promise, practice and application of the next Internet technology

foreword by Vitalik Buterin

WILLIAM MOUGAYAR
Author of *Centerless*

WILEY

Melanie Swan

BLUEPRINT FOR A NEW ECONOMY

O'REI

Government Office for Science

Distributed Ledger Technology: beyond block chain

A report by the UK Government Chief Scientific Adviser

THE QUEST FOR IDENTITY AND AUTONOMY IN A DIGITAL SOCIETY

EDITED BY JOHN H. CLIPPINGER AND DAVID BOLLIER

FROM BITCOIN TO BURNING MAN AND BEYOND

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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 an of dollars in locked capital for infrastructure development according to an a

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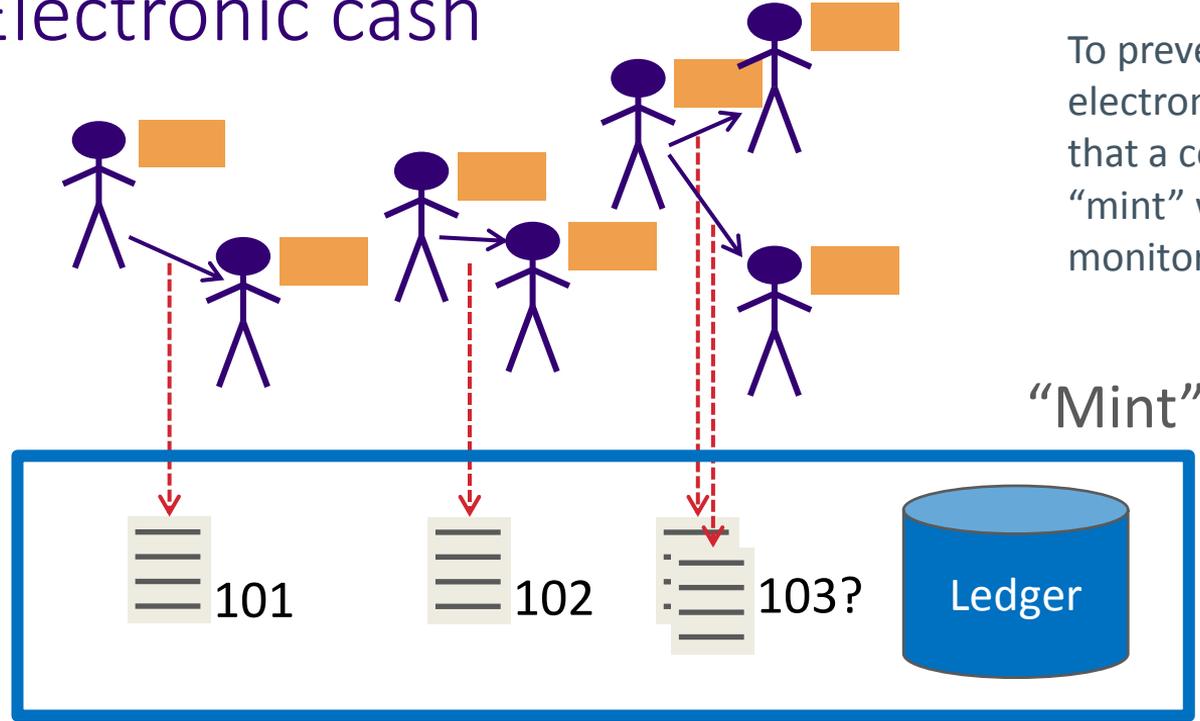
Electronic cash

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.

"Mint"

101 102 103? Ledger

Blockchain 1.0

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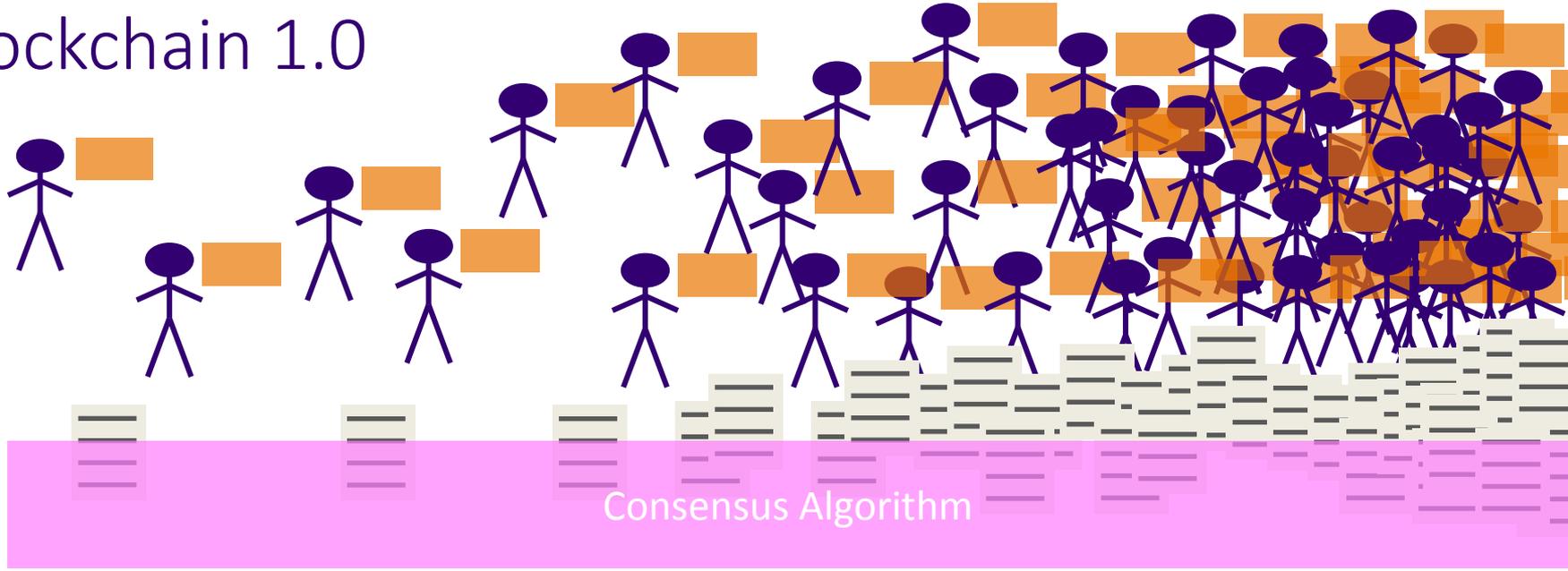
Nakamoto got rid of the central umpire by crowd-sourcing the monitoring of all transactions, to reach consensus on their order.

Bitcoin "Mining"

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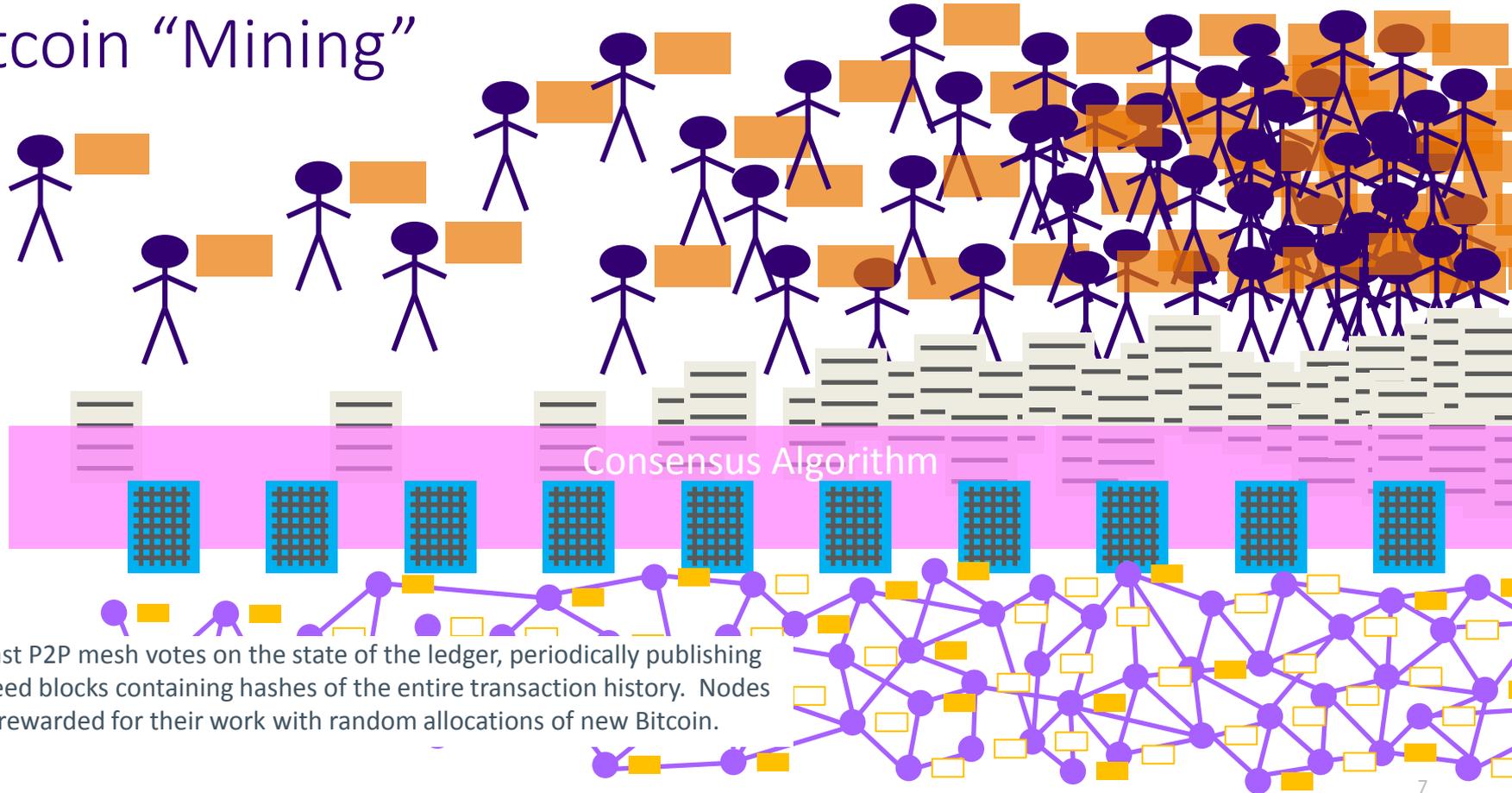
A vast P2P mesh votes on the state of the ledger, periodically publishing agreed blocks containing hashes of the entire transaction history. Nodes are rewarded for their work with random allocations of new Bitcoin.

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Other Applications

Bitcoin APIs allow other data

- Land Titles
- Diamonds
- Marriages
- Sneakers
- Identities
- Health Records

But Blockchain was designed for digital only.
- BTC account holders self register
- Physical assets need registering *off-chain*
- No *native* "Internet of Value".

Consensus Algorithm
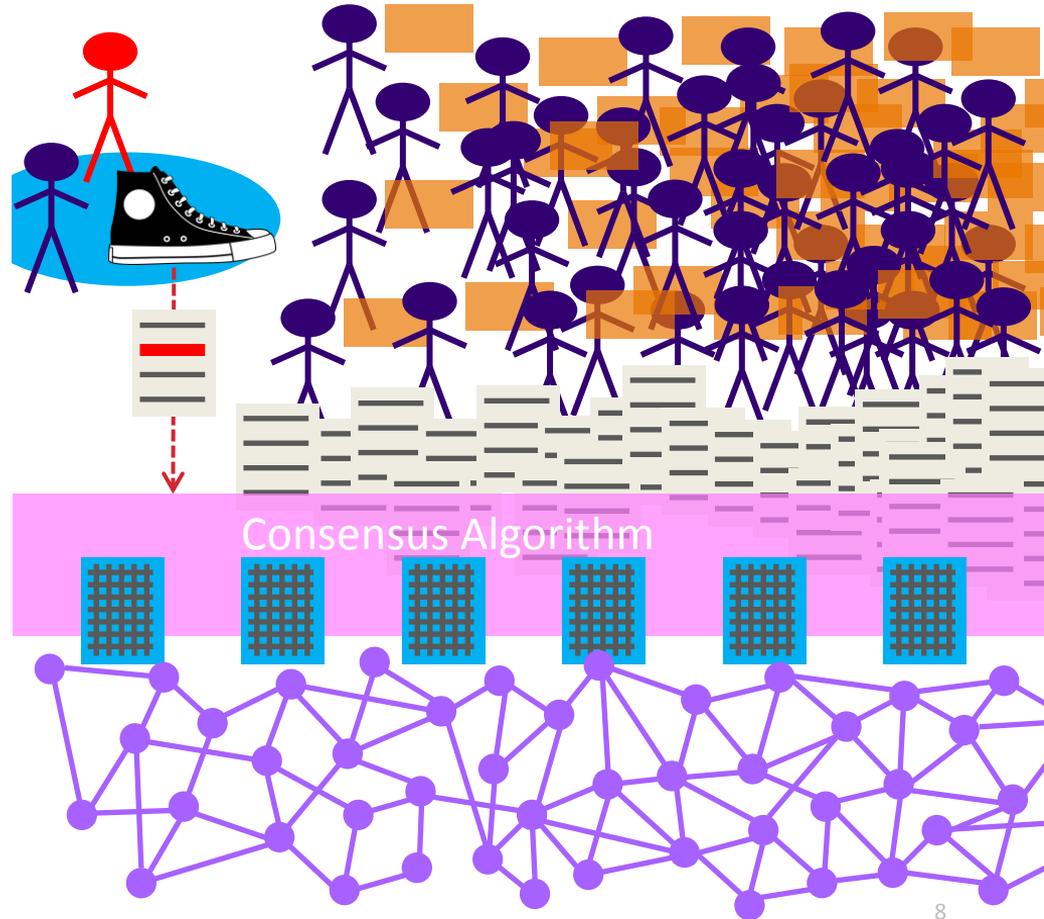
Healthcare

Availability
Important for health but is global decentralization going too far?

Confidentiality
Leads to permissioned or private chains, with smaller pools and weaker security. And key management is huge challenge.

Authority
Blockchain is trust-less, but healthcare is inherently hierarchical.
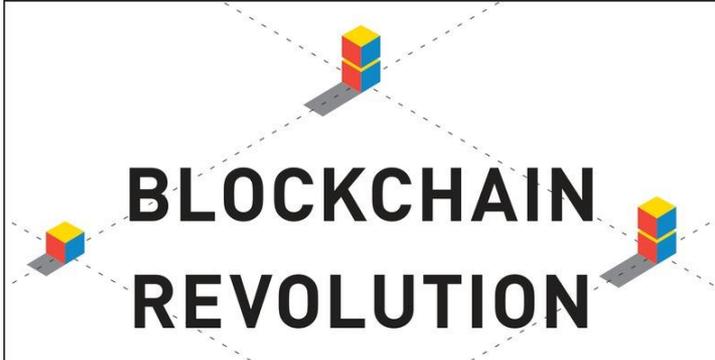
BLOCKCHAIN REVOLUTION

"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,"[18] 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
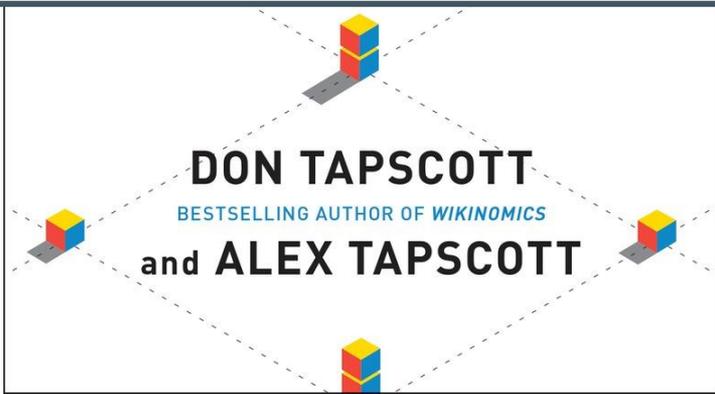
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Inspiration

The *Merkle's Puzzles* or the *Wright Bros Flyer* of crypto currency (Merkle's Puzzles was a thought experiment that inspired public key cryptography).

It legitimizes decentralised architectures, one of the holy grails of computing.

BTC does address many needs of the unbanked; seems to have some potential to destabilize banking.

But only disruptive for disruption's sake?

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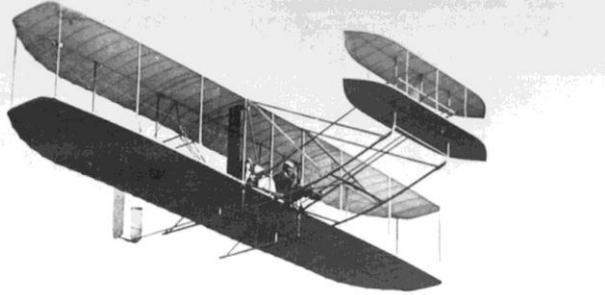
Only the beginning

The Blockchan is no "Internet of Value".

But decentralised consensus is important.
Expect much R&D into consensus algorithms.

What problems are we trying to solve?
How are we trying to solve them?

Follow the big joint ventures & consortia:
- R3
- Hyperledger
- Microsoft Ethereum BaaS.

Solid R&D on consensus in identity
- Ping Identity / Swirlds

Thank you.

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