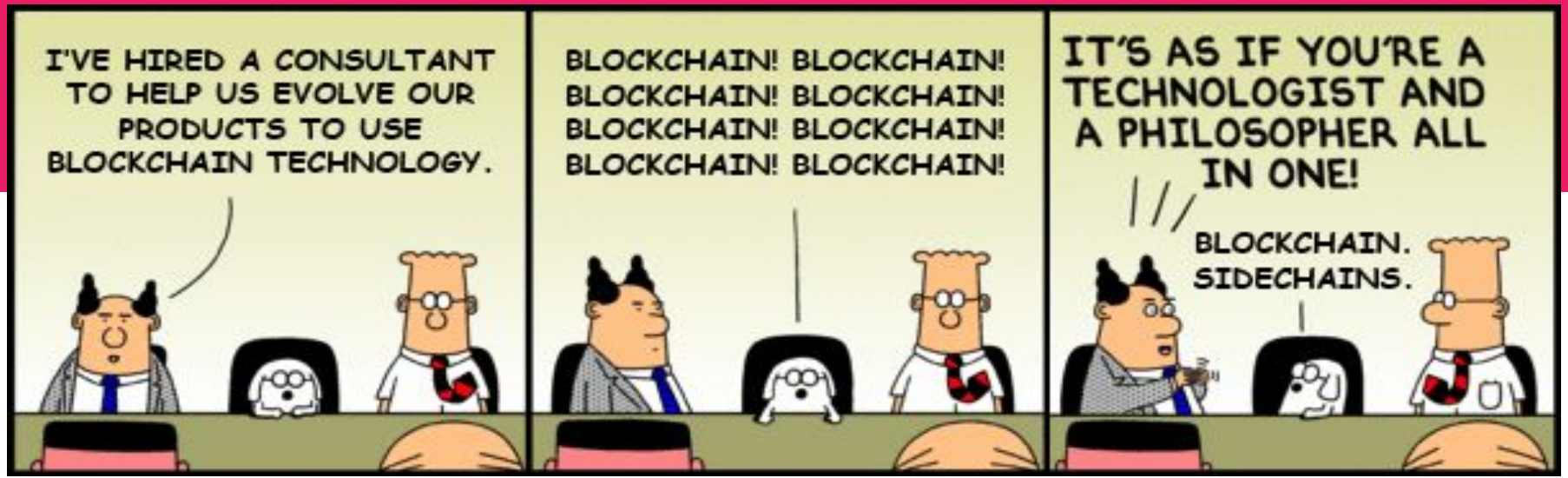
Blockchain as an institutional technology
– a real sharing economy at last?

Kirsten Hasberg ■ Ph.D. fellow, Aalborg University CPH ■ @energydemocracy

Entrepreneurship, Innovation and Business Models, CMI AAU, November 2th, 2017

about me


I'VE HIRED A CONSULTANT TO HELP US EVOLVE OUR PRODUCTS TO USE BLOCKCHAIN TECHNOLOGY.
BLOCKCHAIN! BLOCKCHAIN!
BLOCKCHAIN! BLOCKCHAIN!
BLOCKCHAIN! BLOCKCHAIN!
BLOCKCHAIN! BLOCKCHAIN!
IT'S AS IF YOU'RE A TECHNOLOGIST AND A PHILOSOPHER ALL IN ONE!
BLOCKCHAIN.
SIDECHAINS.

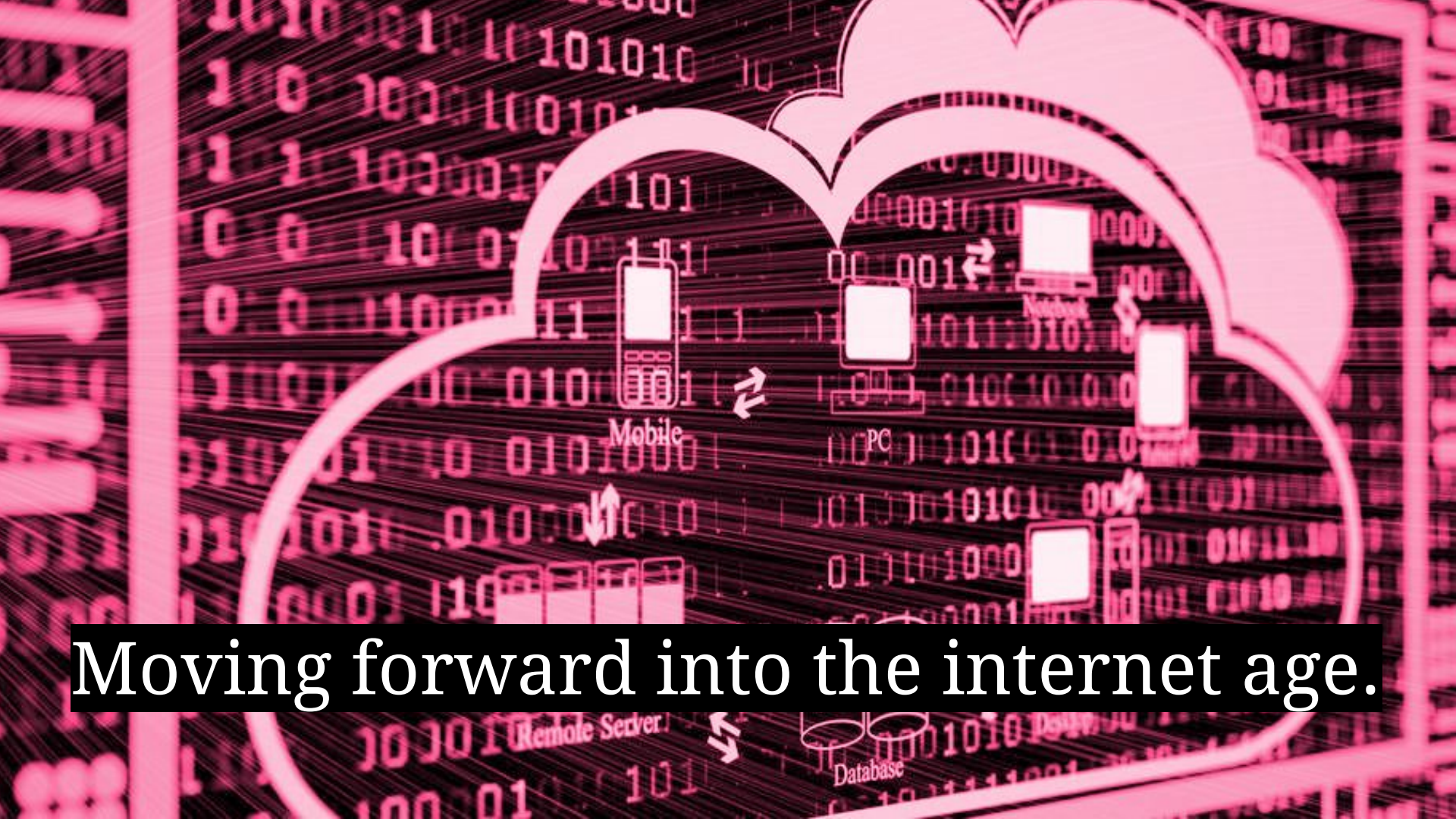
Energy Democracy @EnergyDemocracy · Mar 22

#factoryfireside I asked @vgcerf whether #blockchain is the biggest thing since the internet.He hopes we are not building our startup on it

1 6


Let’s start with the basics:
transactions and ledgers.


Transactions
are the atoms of
global commerce.
And have been
for hundreds of years.
12 Oct 1651. Received 4 fl.
from Florian for flowers.
16 Oct 1651. Paid 6 fl.
to Fiorentina for flour.
18 Oct 1651. Paid 12 fl.
to Fernando for flounders.
19 Oct 1651. Received 3 fl.
from Franziska for fowl.

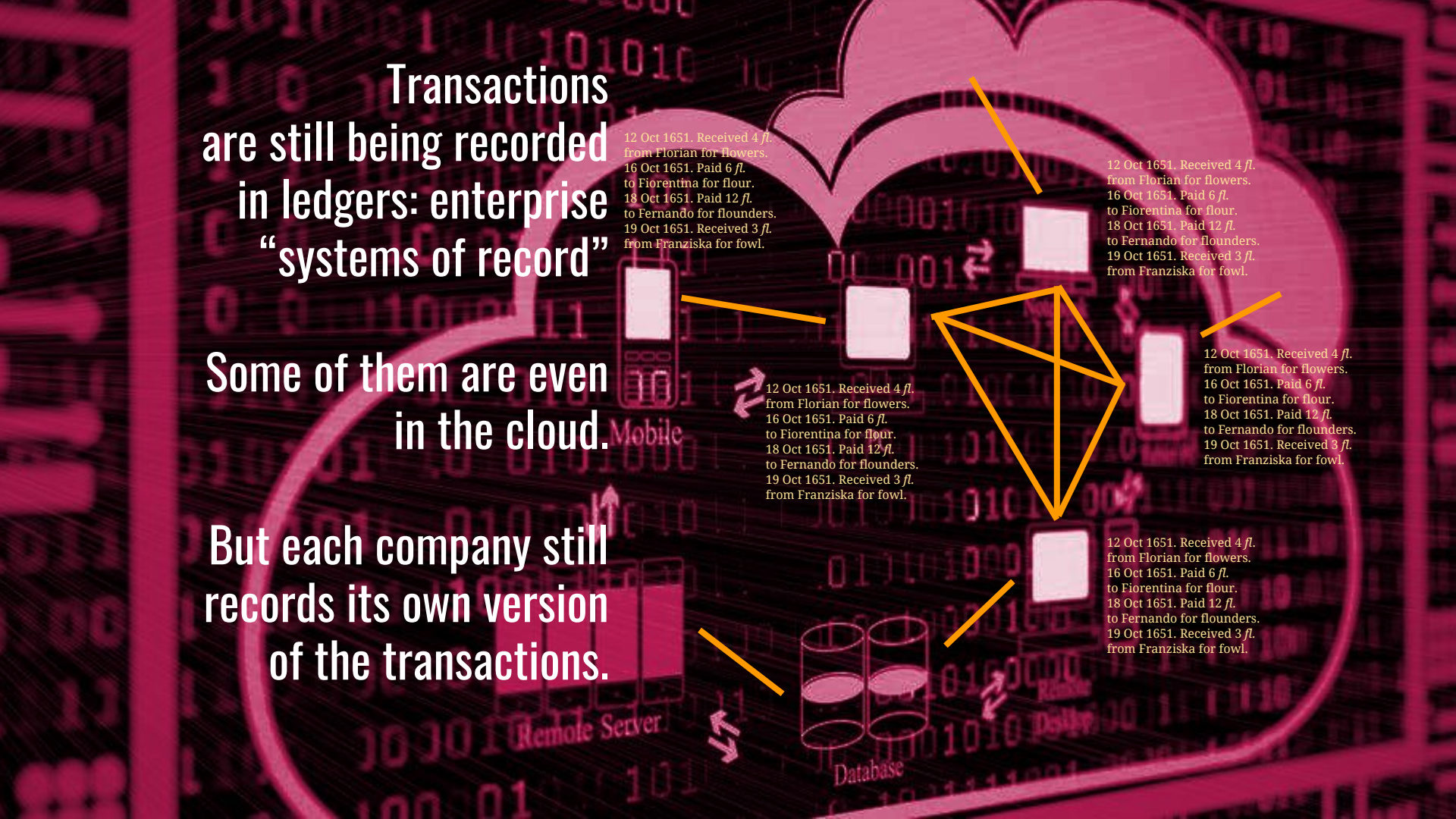


Moving forward into the internet age.

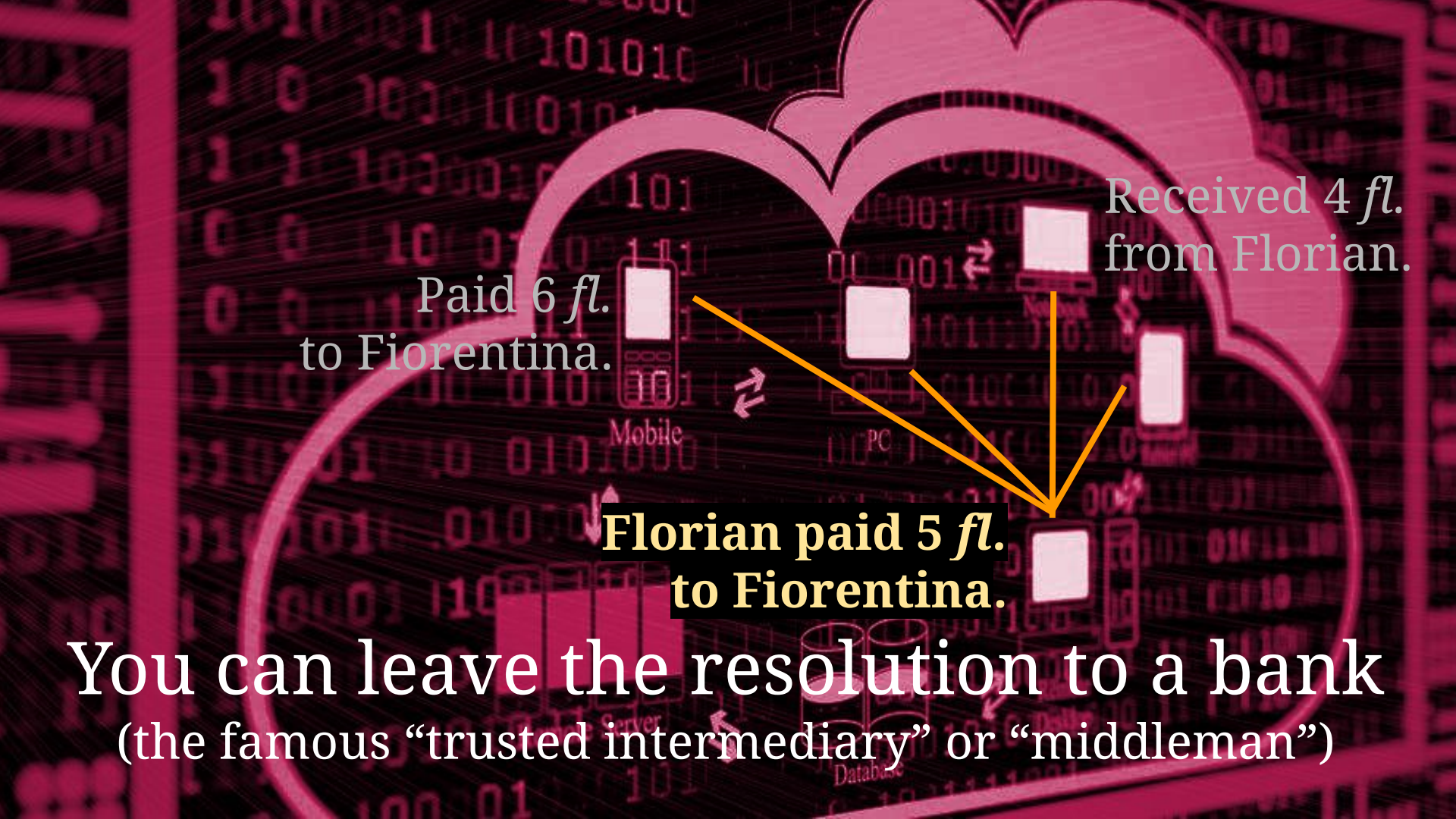
Transactions are still being recorded in ledgers: enterprise "systems of record"

Some of them are even in the cloud.

But each company still records its own version of the transactions.

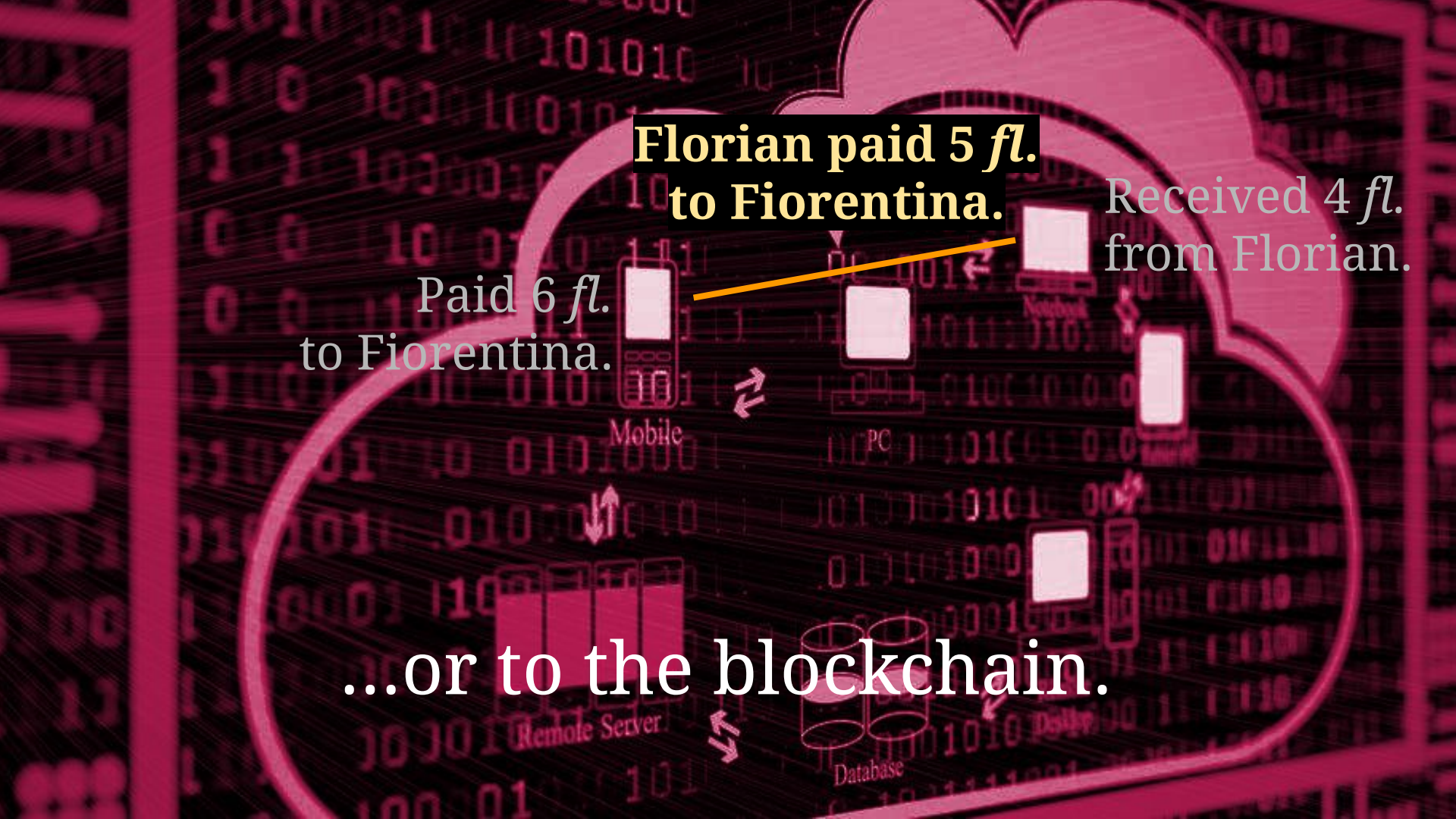


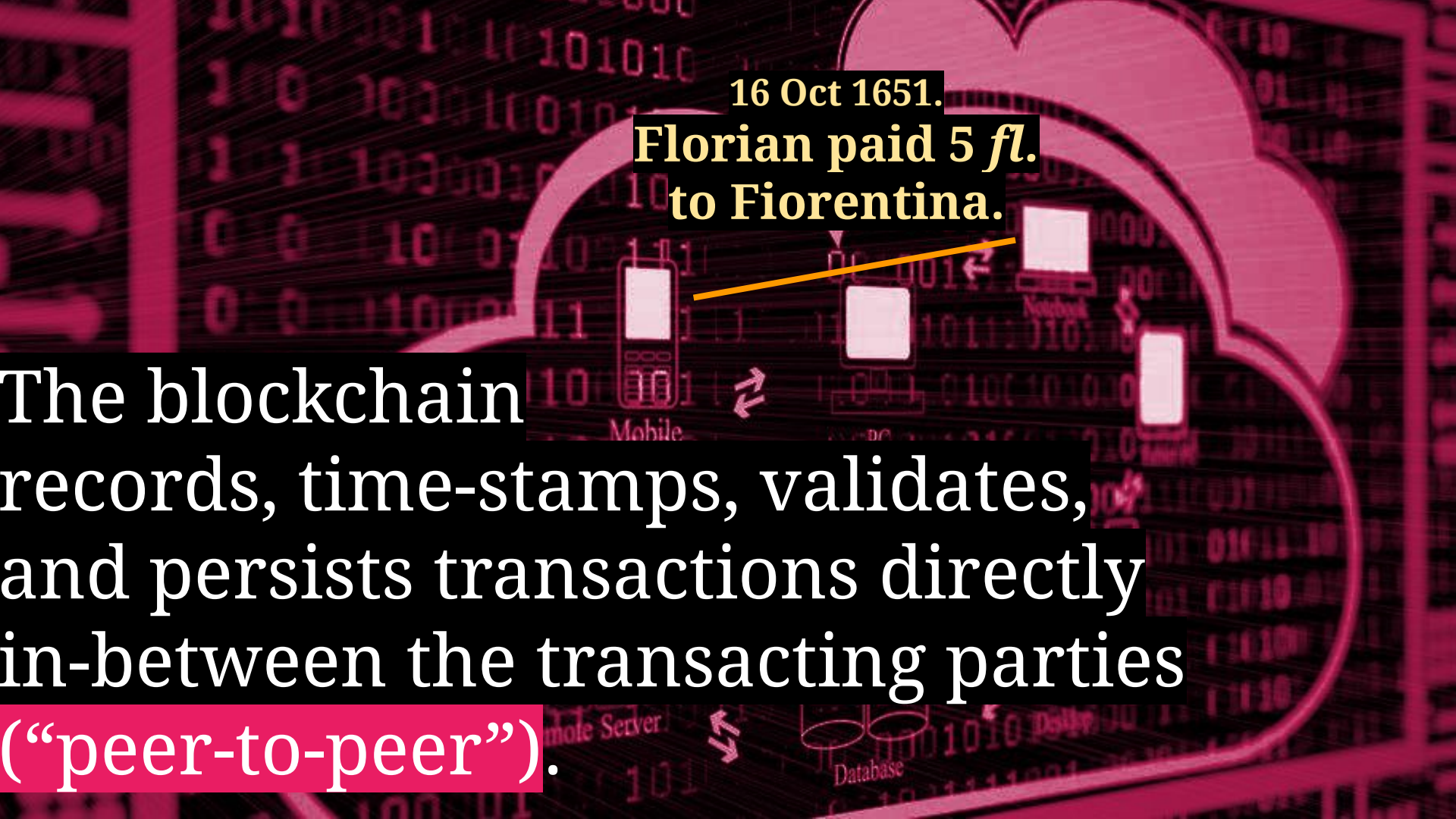
But what if there’s a conflict?



You can leave the resolution to a bank

(the famous “trusted intermediary” or “middleman”)


Florian paid 5 *fl.*
to Fiorentina.
Received 4 *fl.*
from Florian.
Paid 6 *fl.*
to Fiorentina.
Mobile
PC
Remote Server
Database
...or to the blockchain.



The blockchain records, time-stamps, validates, and persists transactions directly in-between the transacting parties (“peer-to-peer”).

What is a blockchain?

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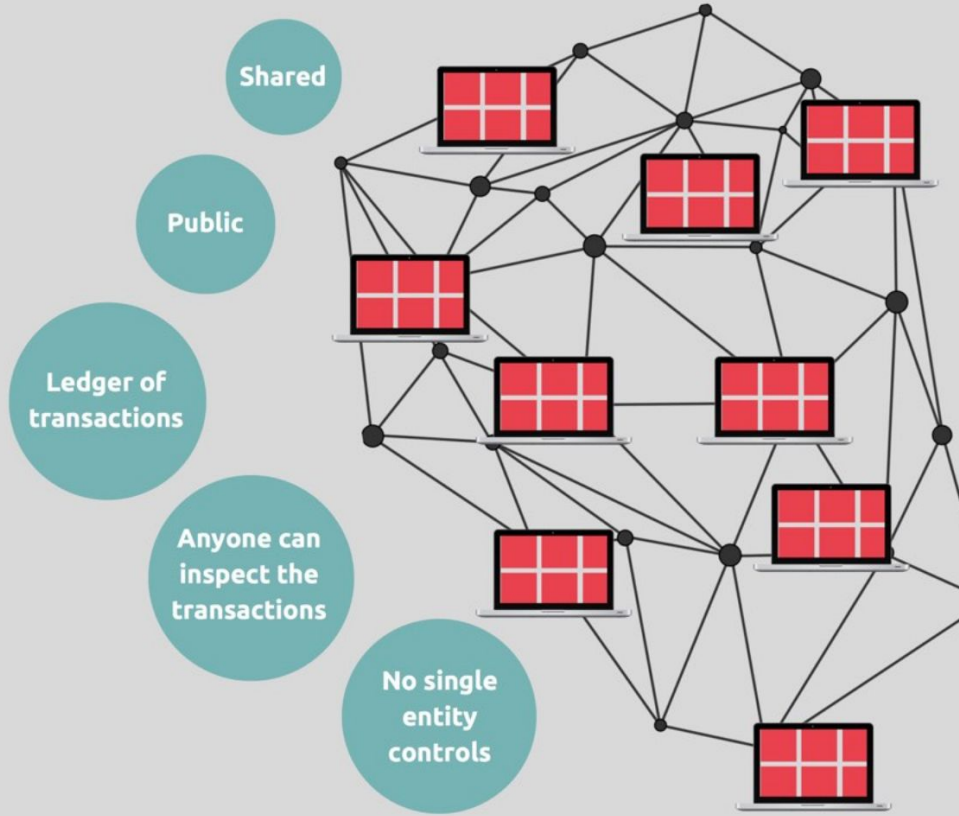
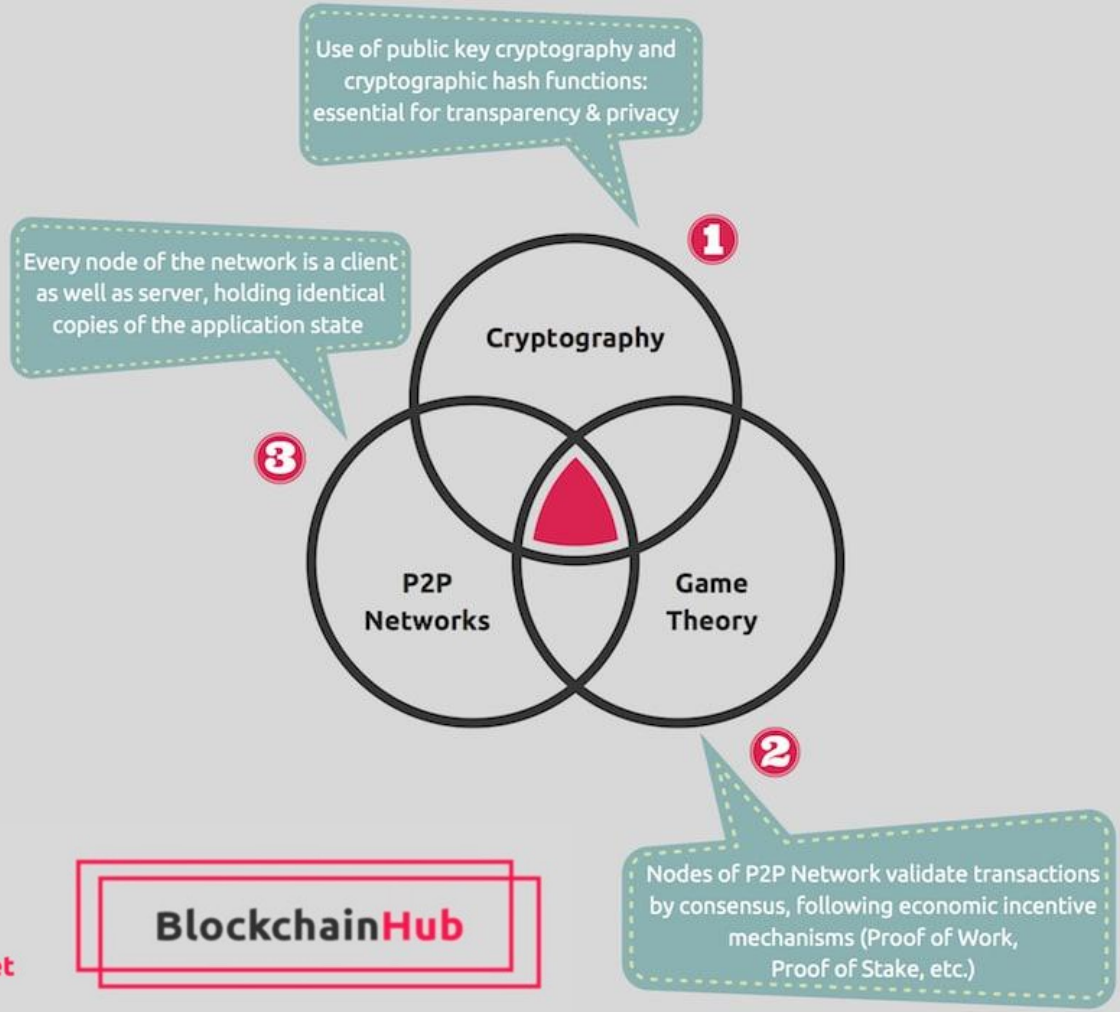
Like a Spreadsheet in the Sky



All network transactions get stored in the blockchain

Combination of three technologies



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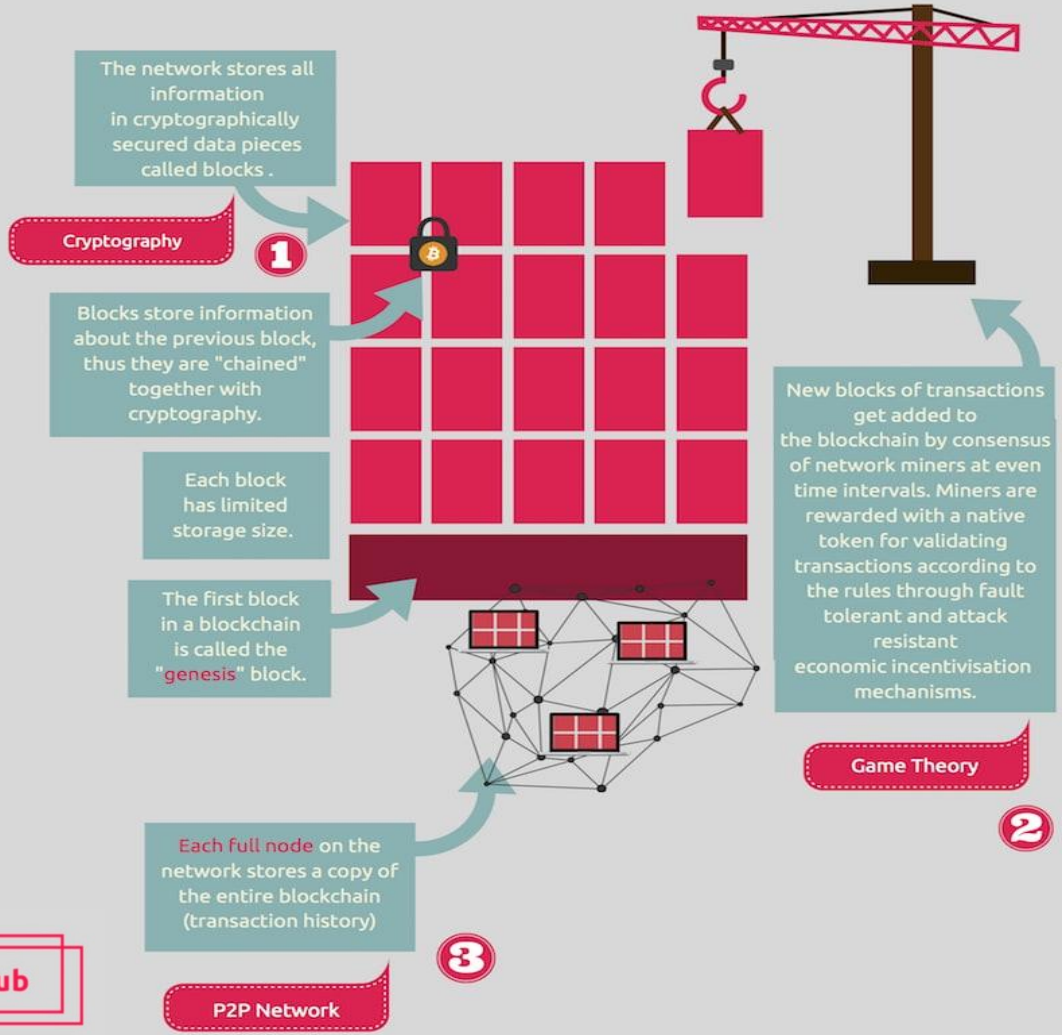
Why is it called a blockchain?



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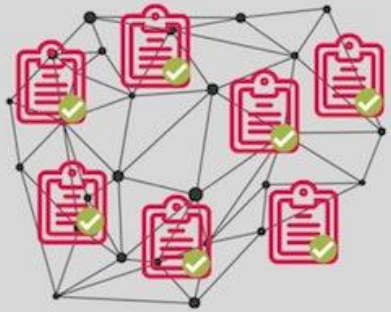
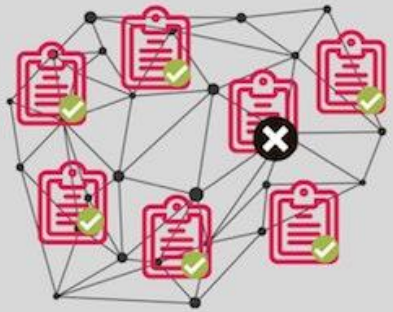
Why is Blockchain Tamper Resistant?



Each network participant keeps a copy of the entire blockchain - the file where all past transactions are recorded. Consensus of network validators verifies new transactions. In the Bitcoin network transactions are validated by network miners who are incentivised to verify transactions through PoW (Proof of Work).



If a malicious party makes unauthorized changes to his copy of the blockchain on one computer, other members of the network will refuse the transaction since that malicious version of the blockchain data will differ from the rest of the network.

To manipulate data on the blockchain, one will have to manipulate data on the majority of the network. This is possible, but prohibitively expensive, especially if you need to manipulate old data and go back many blocks!

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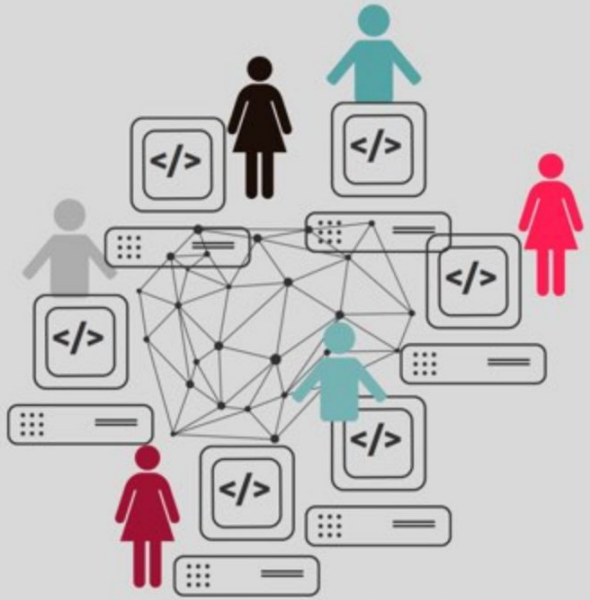
Data Monarchy <> Data Democracy

Server:
Unique Point of Failure!



P2P Network: If parts of the network fail, the rest of the network will still be functional and safe

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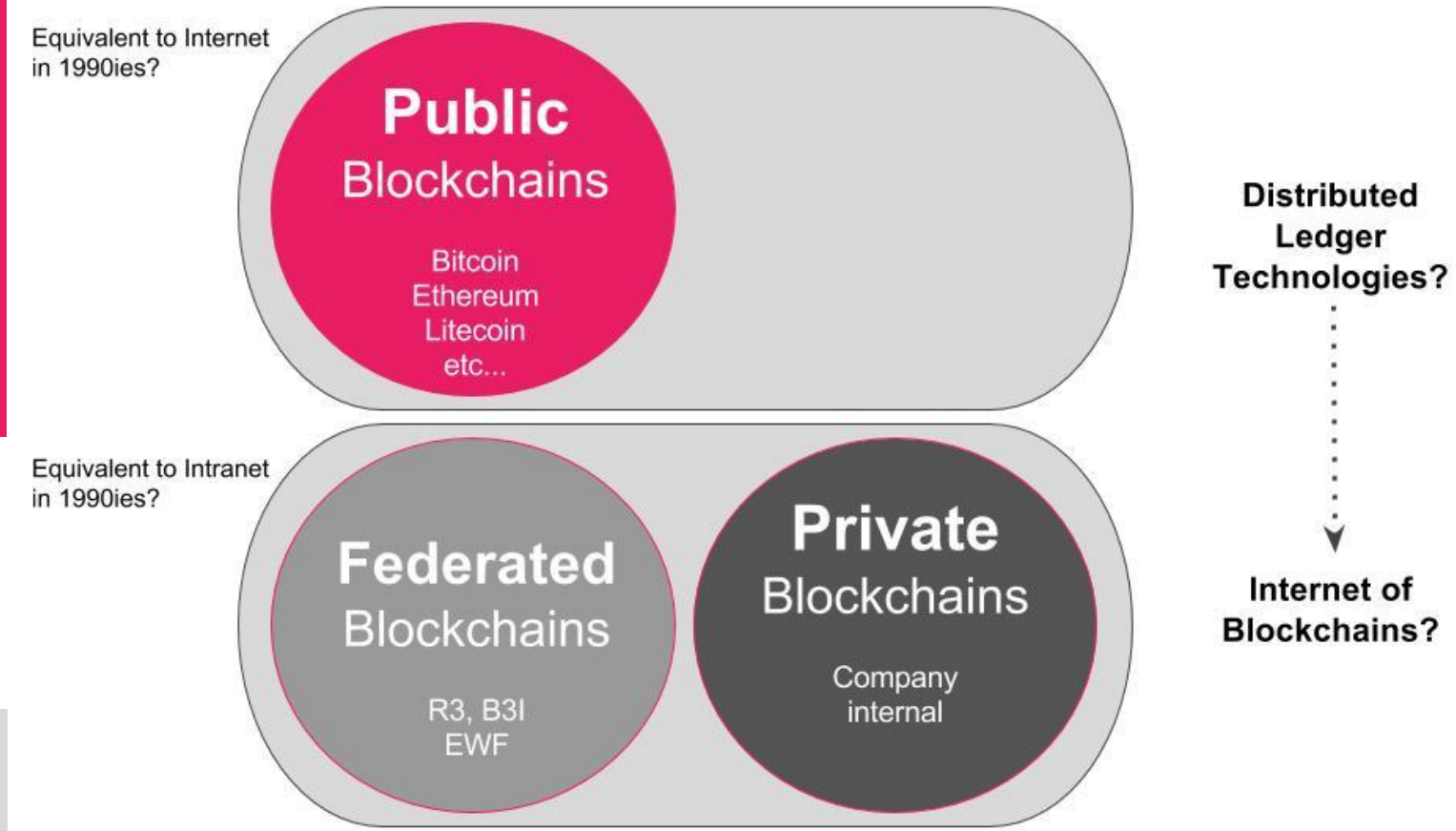
Types of blockchains



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Smart Contracts
not a new idea


Coffee

“Let’s commit now that if this event happens this transaction will be triggered automatically.”

…….

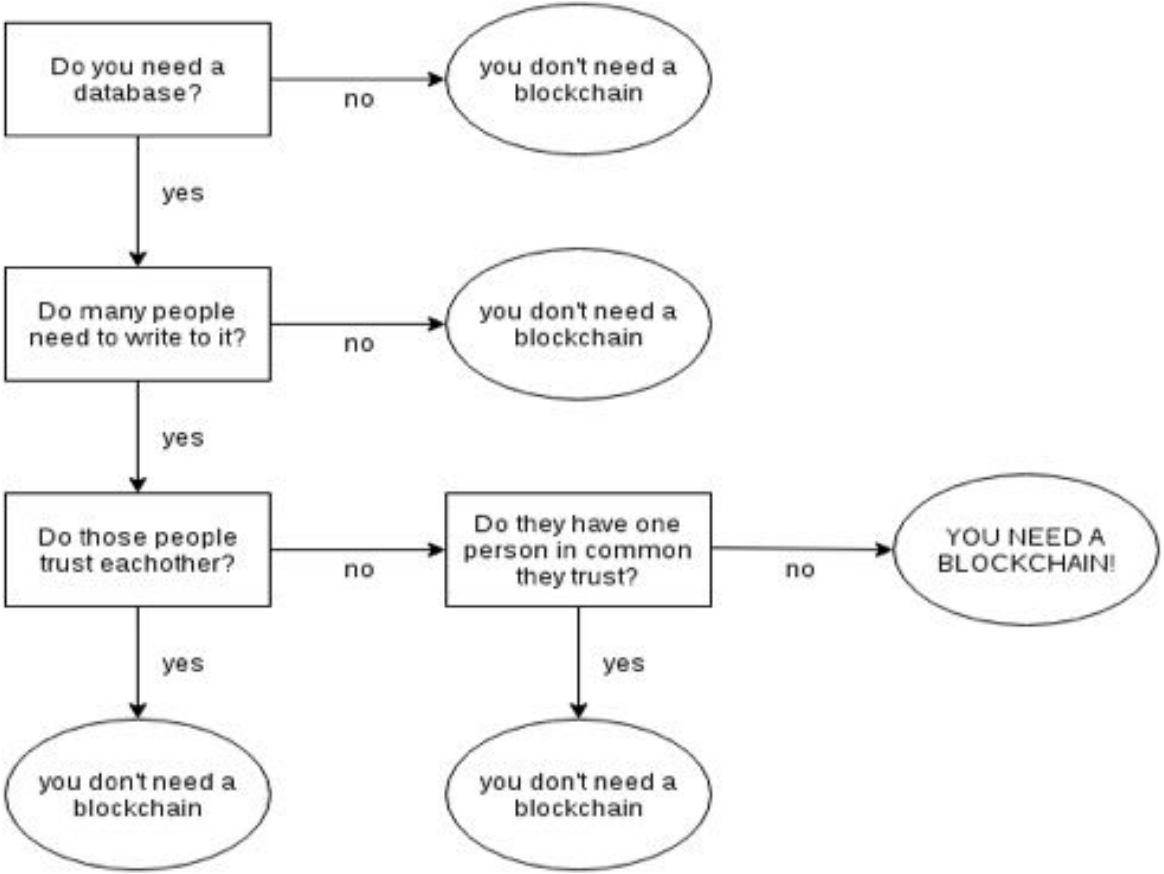
…….

Signed. Signed.


Enter Ethereum.


Ethereum uses a scripting language called Solidity to allow simple drafting of smart contracts which are executed (for a fee) on the Ethereum blockchain.

Finally the key question: (When) do you really need a blockchain?



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Why is blockchain more than another IT-solution?

Understanding Blockchain as an institutional technology - with two Nobel laureates in Economics

What are Institutions?

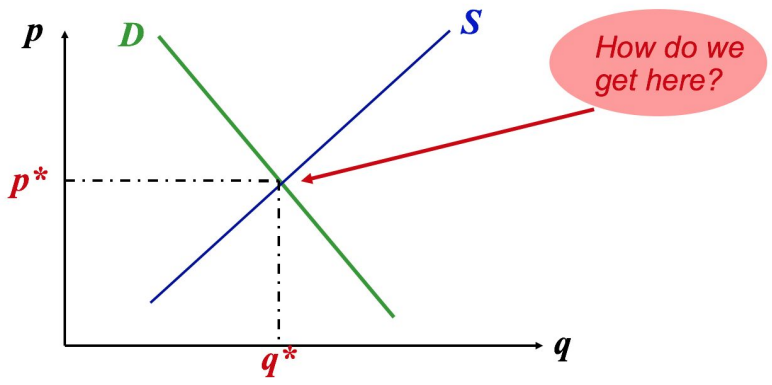
Institutions are...

"...rules of the game of society" (Douglas C. North)

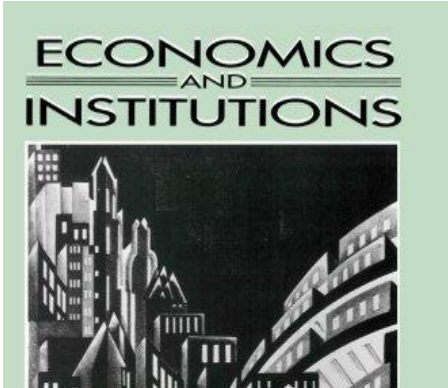
"...systems of established and prevalent social rules that structure social interactions"
(Geoffrey Hodgson)

Markets as institutions

More than a price mechanism



“A market is an organized and institutionalized exchange with a set of mechanisms and processes that structure, organise and legitimate the contractual agreements and property rights transfers (Hodgson 1988)



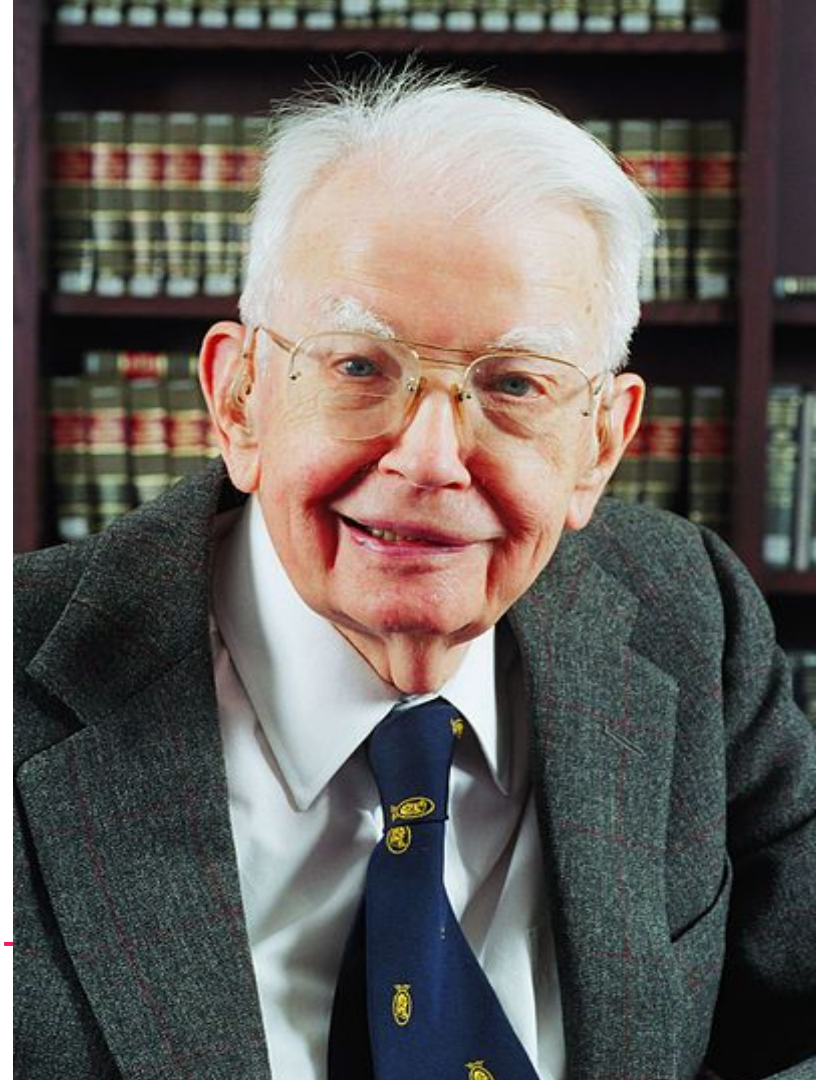
What is an institutional Technology?

How do we solve coordination problems?

The Nature of the Firm

By R. H. Coase

Economic theory has suffered in the past from a failure to state clearly its assumptions. Economists in building up a theory have often omitted to examine the foundations on which it was erected. This examination is, however, essential not only to prevent the misunderstanding and needless controversy which arise from a lack of knowledge



Markets vs. firms...

from Lee & Vonortas (2004). *Business Model Innovation in the Digital Economy*. p. 174

"Transaction costs theory (Coase, 1937; Williamson, 1975, 1985) suggests that a firm will tend to expand precisely to the point where "the costs of organizing an extra transaction within the firm become equal to the costs of carrying out the same transaction by means of an exchange on the open market."

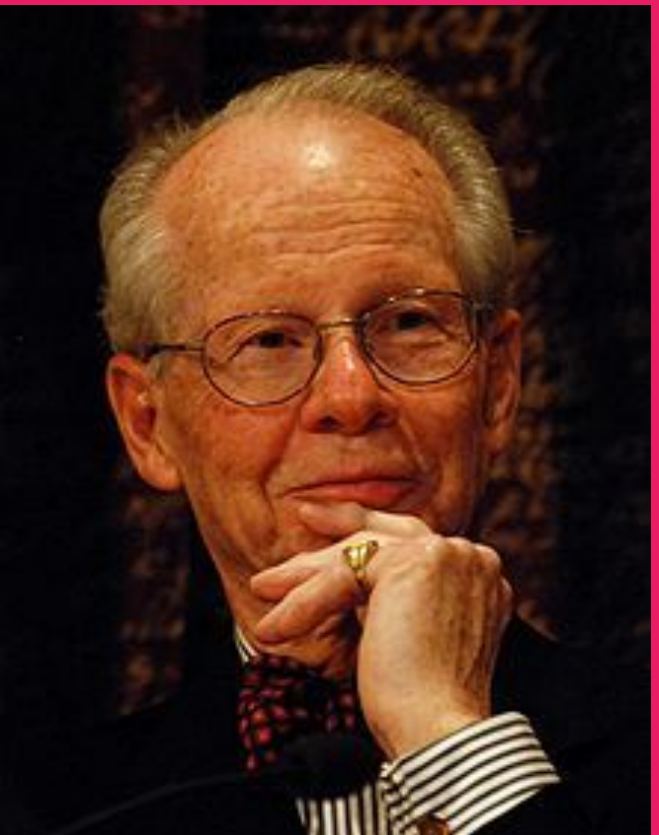
… or Blockchain: The third way

Source:Blockchains and the Boundaries of Self-Organized Economies: Predictions for the Future of Banking

"Blockchain is fundamentally a technology of decentralization and is therefore better understood as a *new institutional technology* for coordinating people - i.e., for making economic transactions –which then *competes with firms and markets."*

The impact of falling transaction costs on governance

Williamson on Governance



Governance structures are ''‘institutional arrangements serving public interests’.

According to Williamson (1985), Governance means to "organize transactions in order to minimize transaction costs"

Source: European Journal of Law and Economics (2005): Is Transaction Cost Economics Applicable to Public Governance?

Hypothesis: Peer-to-Peer Transactions without a middleman

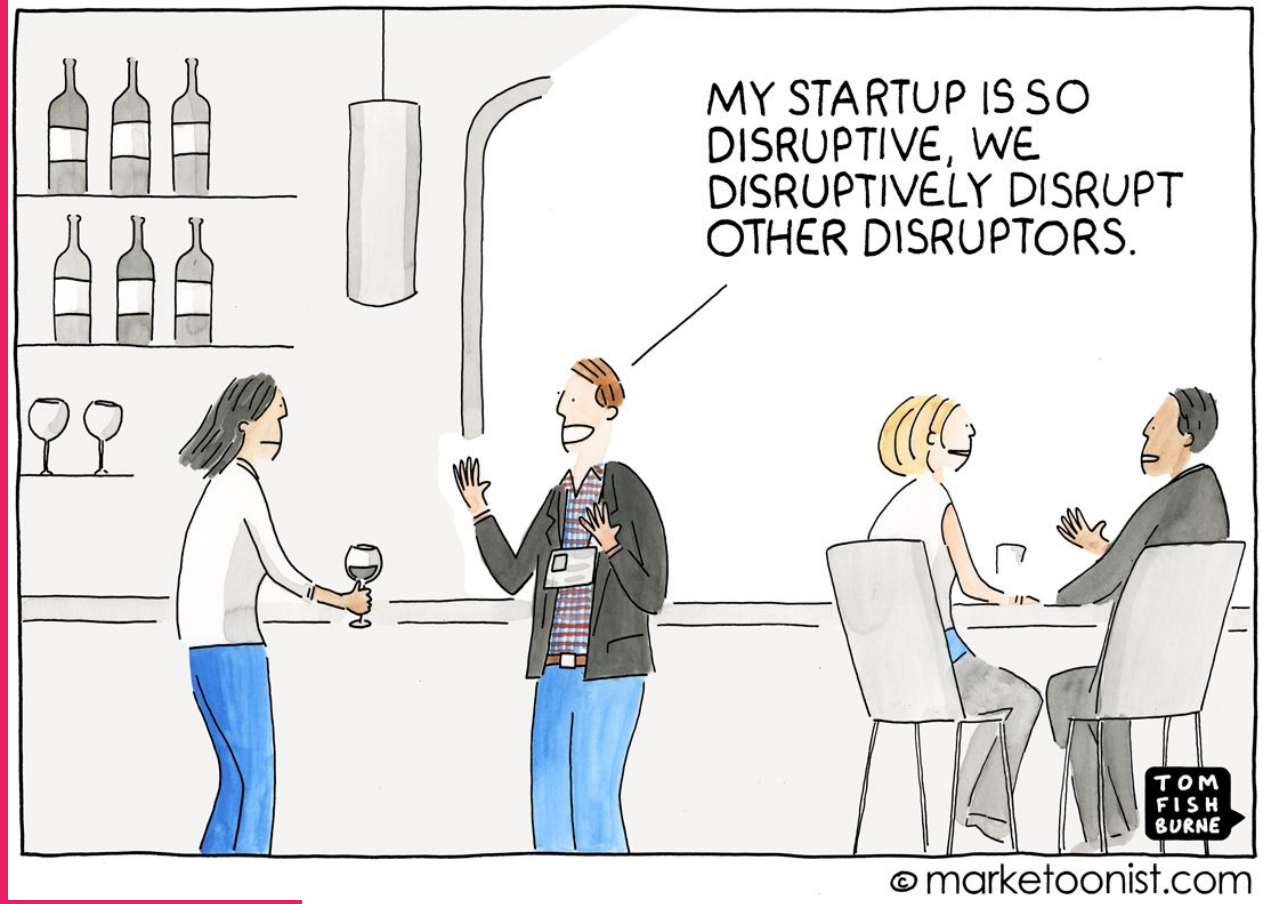
= Democratization of the energy sector

The haydays of today's disruptors, the intermediaries...

”Uber, the world's largest taxi company, owns no vehicles. Facebook, the world's most popular media owner, creates no content. Alibaba, the most valuable retailer, has no inventory. And Airbnb, the world's largest accommodation provider, owns no real estate. Something interesting is happening.”

Source: *Tom Goodwin, Havas Media, 3.3.2015, “The Battle Is For The Customer Interface”*

... might be over.

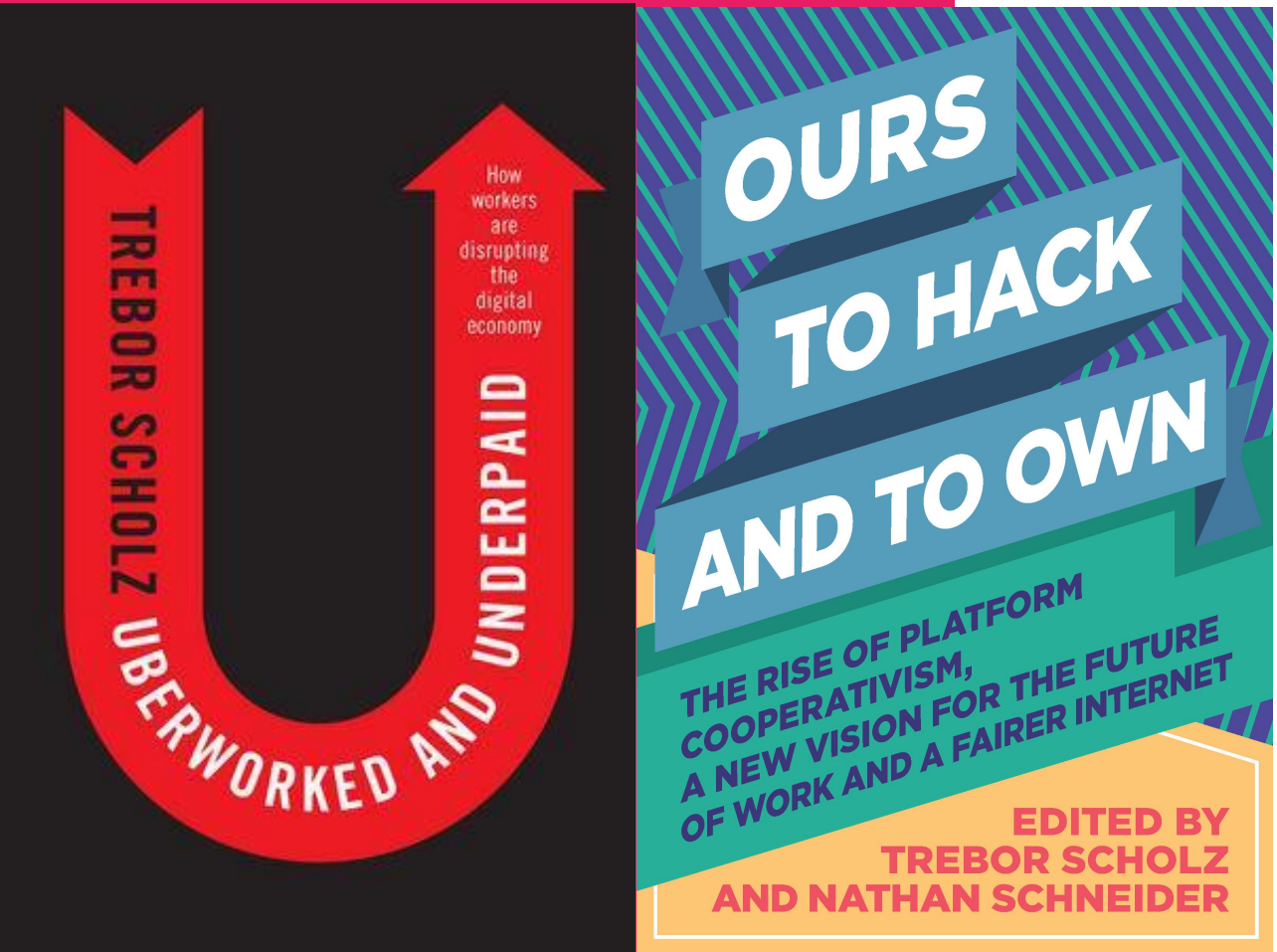


"Disruptive innovation describes a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up market, eventually displacing established competitors."

Source: claytonchristensen.com

Hypothesis: Peer-to-Peer Transactions without a middleman

= Democratization of the Sharing Economy



"Every Uber has an Unter"

Trebor Scholz

From aggregation economy...

Tapscott & Tapscott: Blockchain Revolution (2016)

"Today's sharing economy is "a nice notion (...). But these businesses have little to do with sharing. In fact, they are successful precisely because they do not share - they aggregate."

NETWORKED MONOPOLIES

THE PROCESS OF CROWDSOURCING MONOPOLY POWER

BUDDING NETWORK EFFECT

GROWING NETWORK UTILITY

FULL-FLEDGED NETWORKED MONOPOLY

… to a real sharing economy

Tapscott & Tapscott: Blockchain Revolution (2016)

"Imagine instead of the centralized company Airbnb, a distributed application - call it blokchain Airbnb or bAirbnb - essentially a cooperative owned by its members."

BUSINESS LANDSCAPE

A COMPARISON OF EXISTING AND EMERGENT BUSINESS MODELS

TRADITIONAL

Business model is based on resource extraction. Value is created by products or services. Consumers and workers have minimal power over technology.

PLATFORM

Not based on extraction. Value is created by users sharing content in an online network, giving them power over technology to communicate.

SHARING PLATFORM

Consciously not based on resource extraction, but rather on facilitating the exchange of resource. Value is created by users - consumers and workers - sharing access to underused assets or human resource as part of an online network. An intermediary connects users and oversees activity on a platform, but users have some power over technology to change how they live and work.

CO-OPERATIVE SHARING PLATFORM

Similar to a sharing platform, but the online network is co-operative. No intermediary is needed, in some cases because of blockchain technology. Users, but particularly workers, have power over technology to change how they live and work.

Blockchain as Commons 3.0

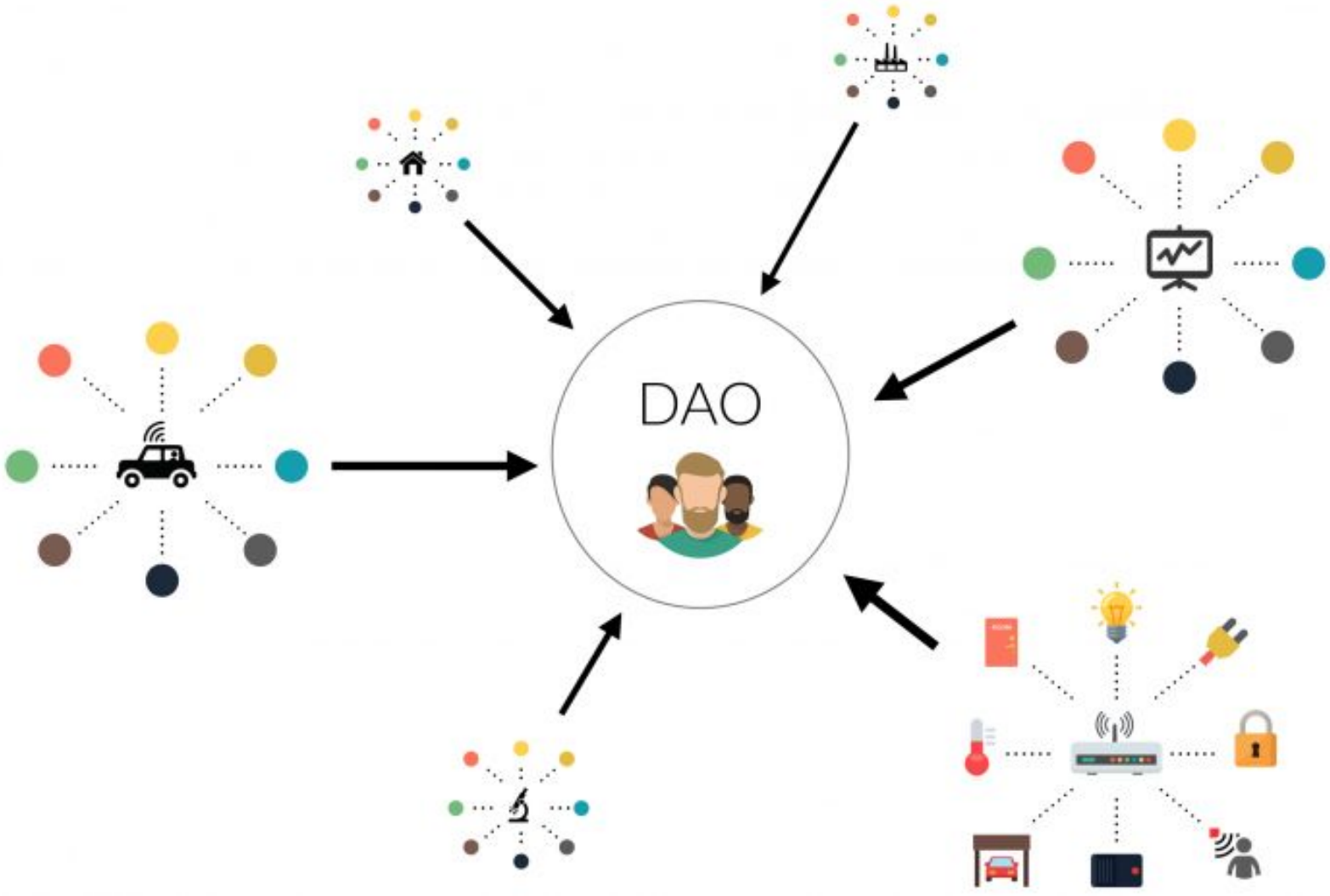
Source: Potts, De Filippi & Davidson: The Economics of Blockchain (2016)

"Blockchain is Commons 3.0 in that it provides a technical solution (cryptographic consensus) to the problem of cooperation in joint or group production at scale (...)"

?

Money without Banks

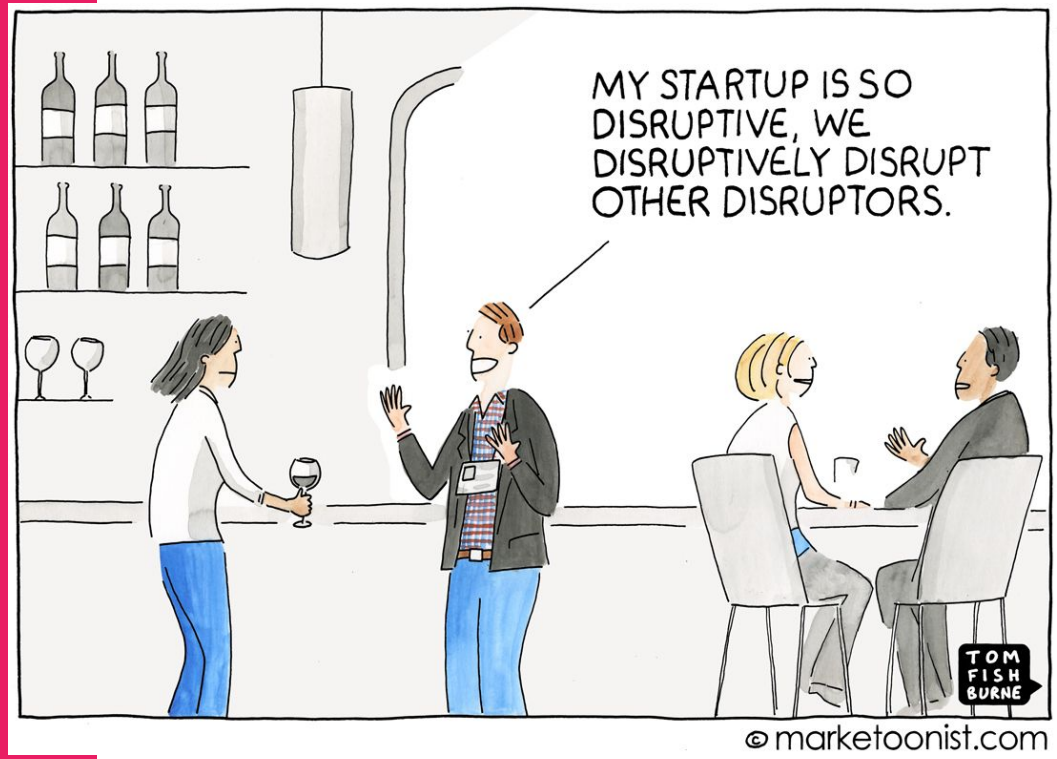
Companies without Managers


DAO

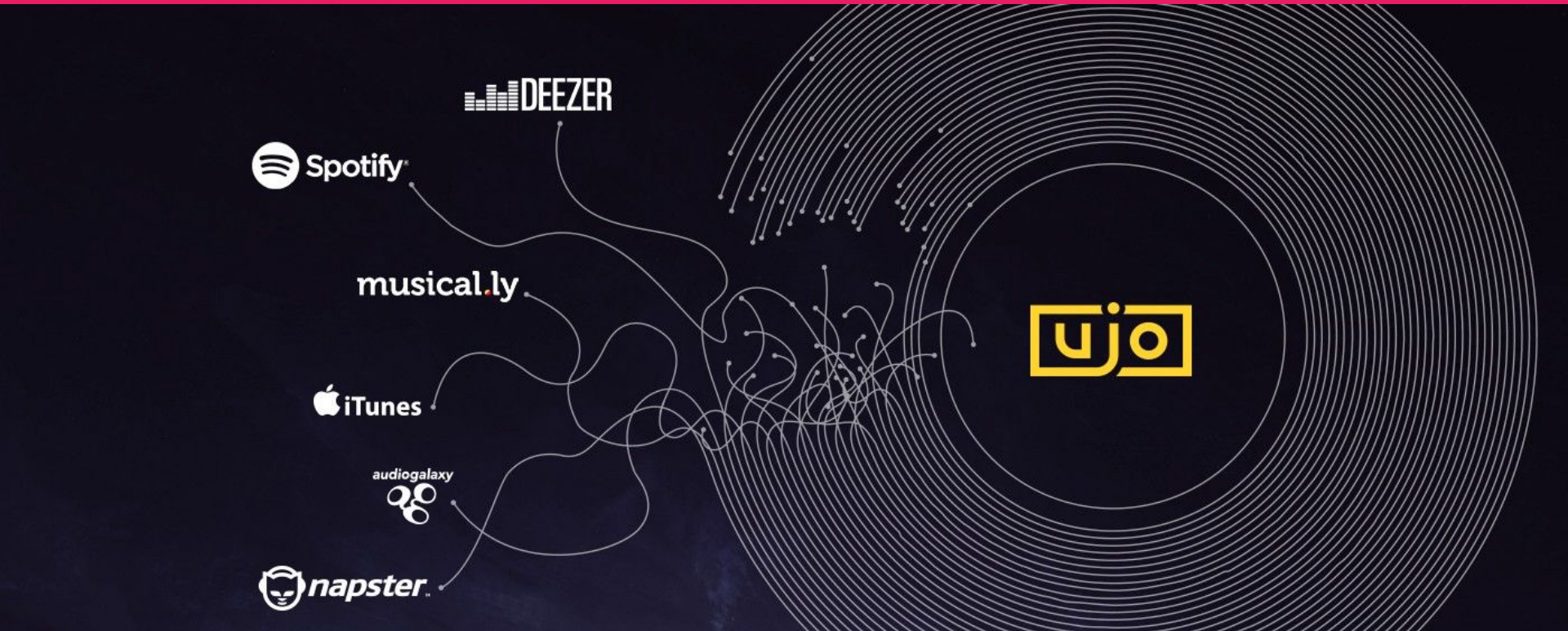
Nations without Politicians


BITNATION
GOVERNANCE 2.0

But also: Disruption of the Disruptors



“Spotify” without Spotify: Ujo Music



“Uber” without Uber:
La’Zooz

“Amazon” without Amazon: OpenBazaar

"Our goal with OpenBazaar 2.0 is to get it to be, with the exception of using bitcoin, ... an identical experience of what you’d see on Etsy. I think the 2.0 [version] is close to that."

CEO Brian Hoffman, February 2017

Energy without utilities

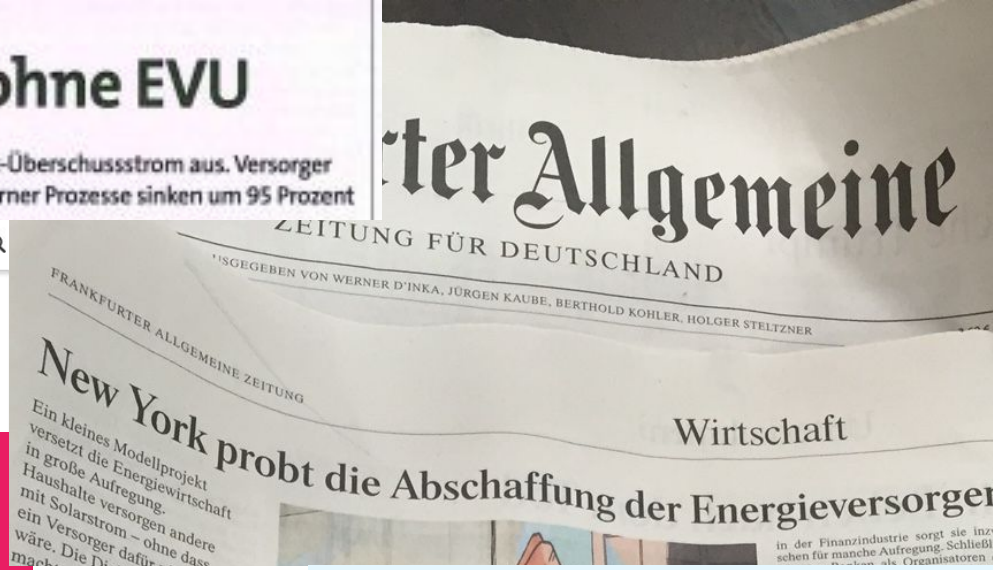
Blockchain: Energieversorgung ohne EVU

MATIONSTECHNOLOGIE In New York tauschen zehn Haushalte untereinander Photovoltaik-Überschussstrom aus. Versorger lierer bekommen davon nichts mit. Blockchain macht's möglich. Die Transaktionskosten interner Prozesse sinken um 95 Prozent

Politik Wirtschaft Panorama Sport München Bayern Kultur Wissen Digital Chancen Reise Auto Stil mehr...

14. August 2016, 18:11 Uhr Energie

Wie Blockchain-Technik das Energiesystem revolutionieren kann



WIRTSCHAFT _Blockchain

„Ein neues Geschäftsmodell für Anlagenbetreiber“

Programm

Blockchain-Tag für die Energiewelt 2016
23. Mai 2016 in Berlin

DENMARK:
The Energy Collective

DTU - Technical University of Denmark
http://the-energy-collective-project.com/

Professor: Deleøkonomi på vej i elforsyningen

Privat ejerskab af solceller og batterier åbner muligheden for at decentralisere
demokratisere elforsyningen på en helt ny og 'disruptiv' måde, mener DTU-pro

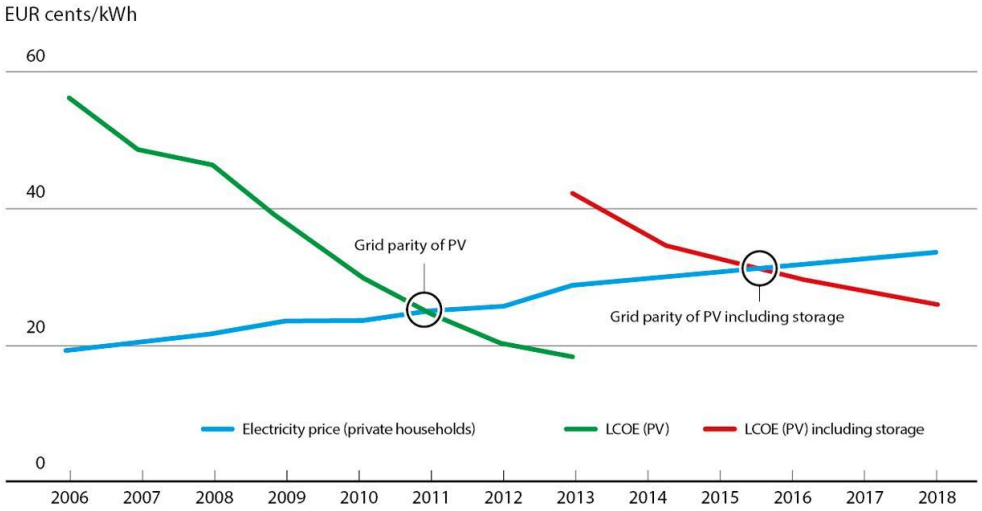
Af Sanne Wittrup Følg @Swittrup 12. feb 2017 kl. 14:00


Energy production is increasingly decentralized and community based…

…but grid balancing, trading and billing is still centralised, …

IRENA
International Renewable Energy Agency

FIGURE 5.17: GRID PARITY OF PV-STORAGE IN GERMANY



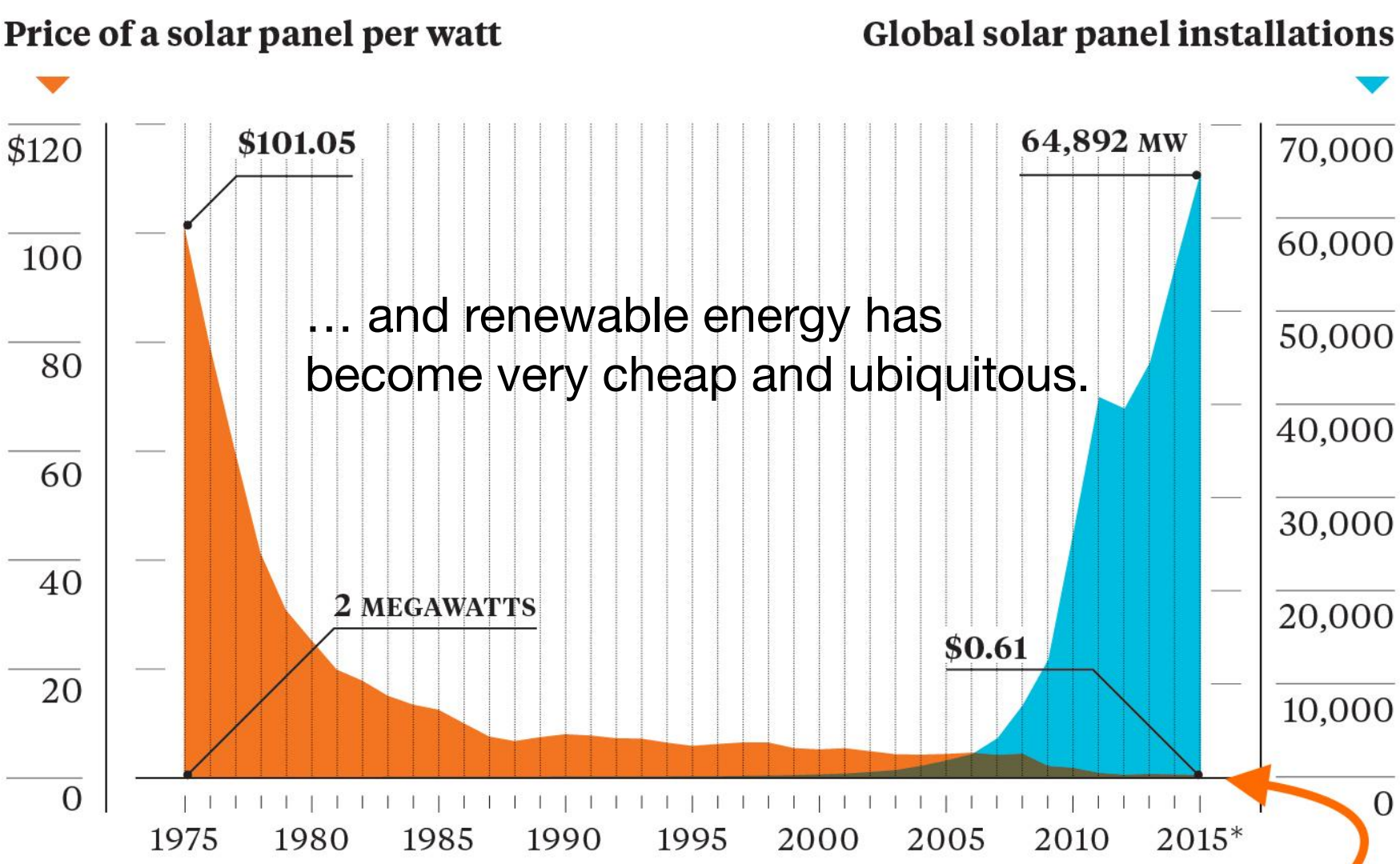
Source: EuPD Research/ BDEW 2013.

… although grid parity is here, …

June 2017, Germany:

1 kWh solar PV (on field) costs 5,66 EUR cent

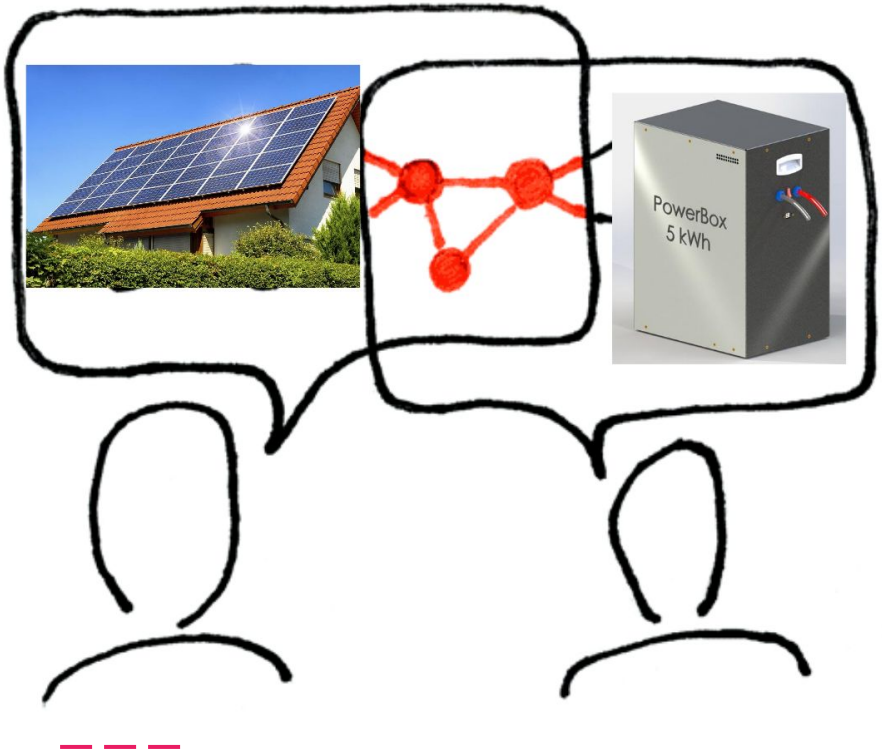
1 kWh mixed electricity from household retailer costs 29 EUR cent


Price of a solar panel per watt
Global solar panel installations
$120
100
80
60
40
20
0
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
$101.05
64,892 MW
2 MEGAWATTS
$0.61
… and renewable energy has become very cheap and ubiquitous.
1975
1980
1985
1990
1995
2000
2005
2010
2015*

People won’t accept being excluded from buying to cheap, renewable and local electricity for long.

Blockchain

… could allow prosumers to trade electricity locally, without a central intermediary.



Thank you!

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hasberg@plan.aau.dk