Blockchain: The Hype and the Hope

Rich Napoli, CEO
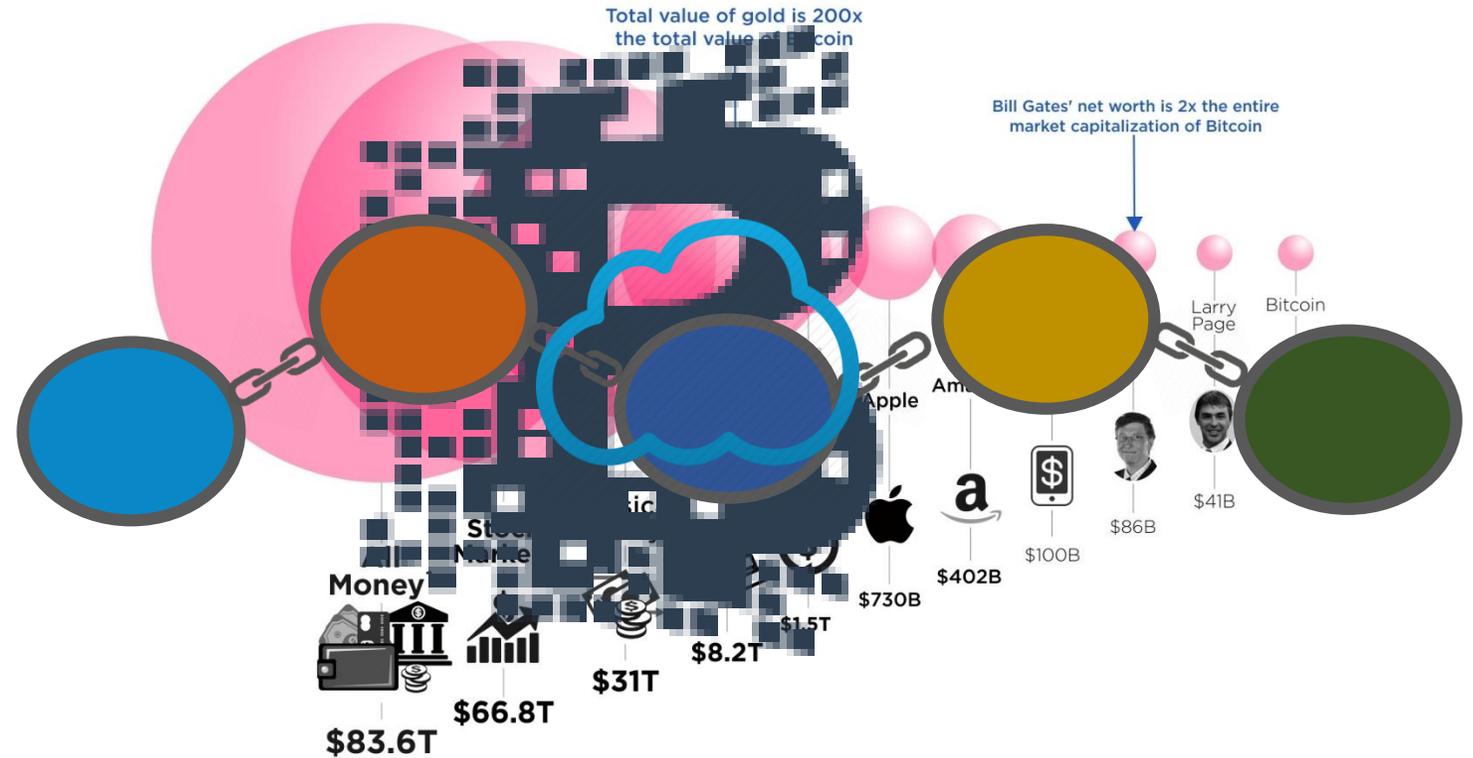
Blockchain Hype Goes Mainstream
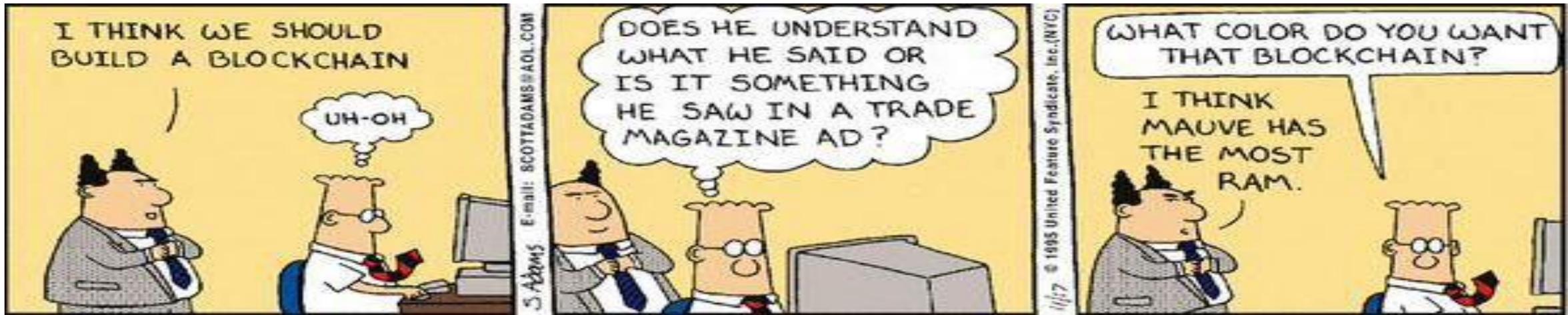
Blockchain Hype

- As big as the Internet

- Will eliminate all clerical jobs

- Will eliminate the need for most lawyers

- Will eliminate the need for cash

- Cannot be hacked

- Will be hacked… by China

Blockchain Hope

Will create a system of <u>digital trust between unrelated parties</u>:

- **Track** movement of food and drugs to ensure safety.

- Allow for easy **verification** of property titles.

- Provide for 'smart contracts' that can **verify** terms and payments.

- **Eliminate** fraud in luxury items by proving provenance.

Supplier

Customer

France

USA

Digital Trust
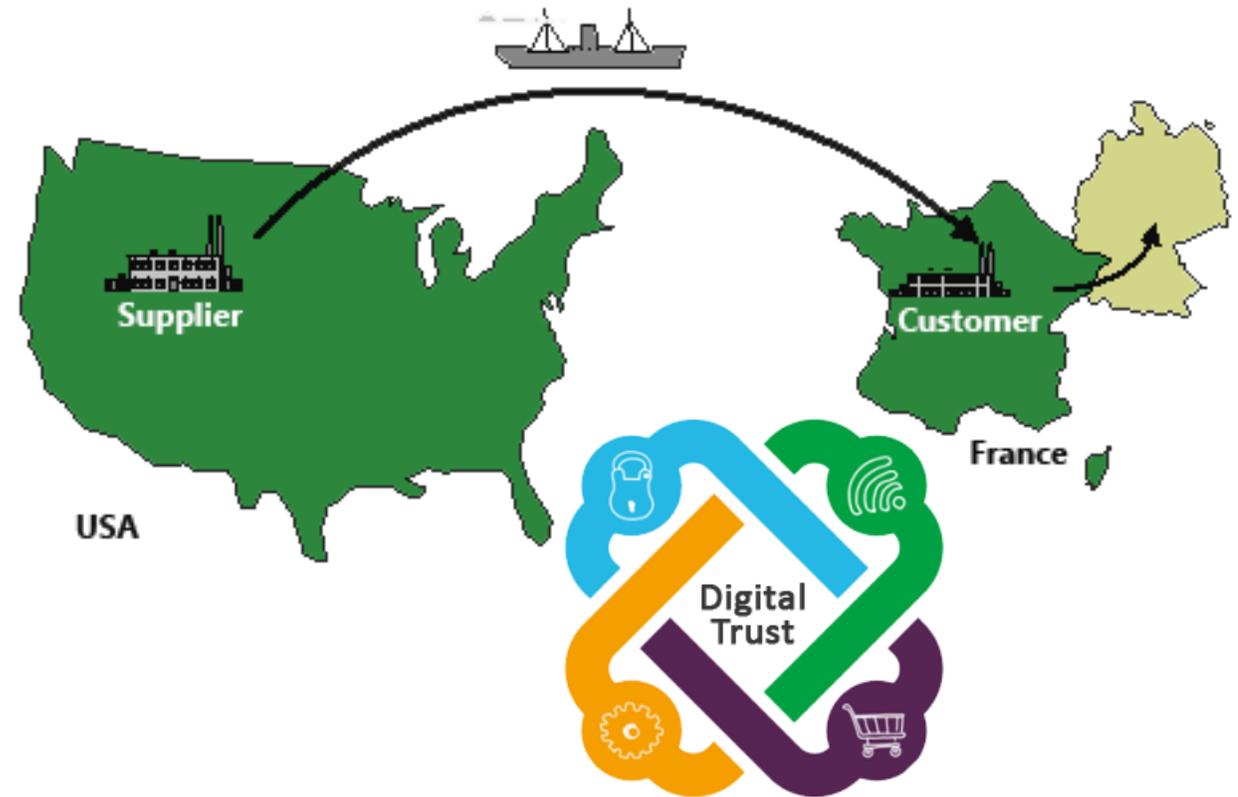
Blockchain Hope

Will reduce redundant systems needed when there is no trust:

- Duplicate ledgers of transactions
- Reconciliation processes
- Intermediaries
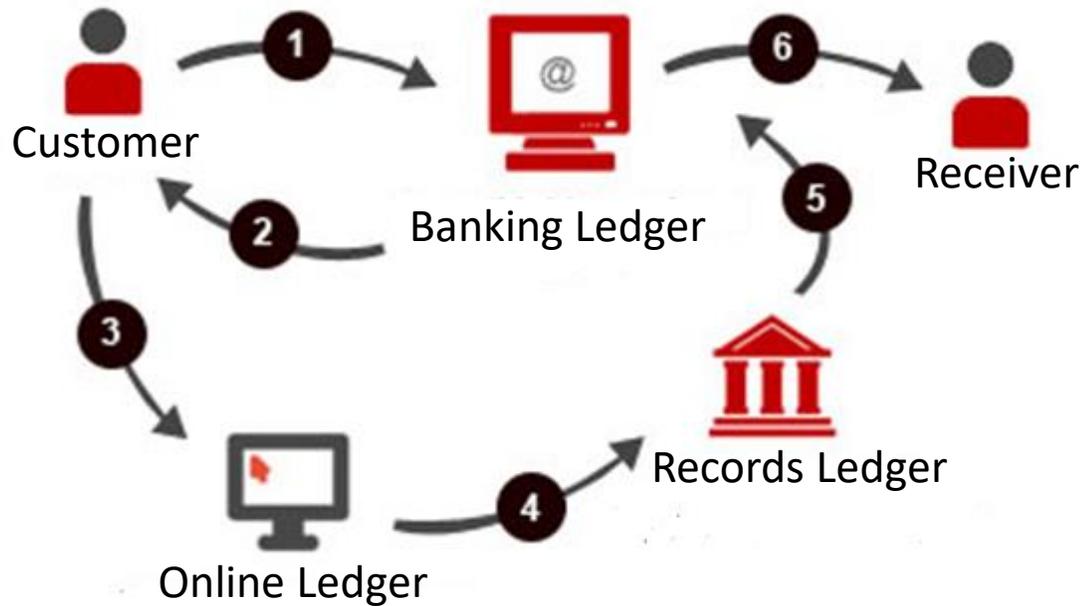
Current Process

Blockchain Process

Blockchain Hope

Will allow for <u>entirely new business models and products:</u>

- Lease car parts rather than purchasing them outright with the car.

- Lease spare equipment due to better fixed asset management.
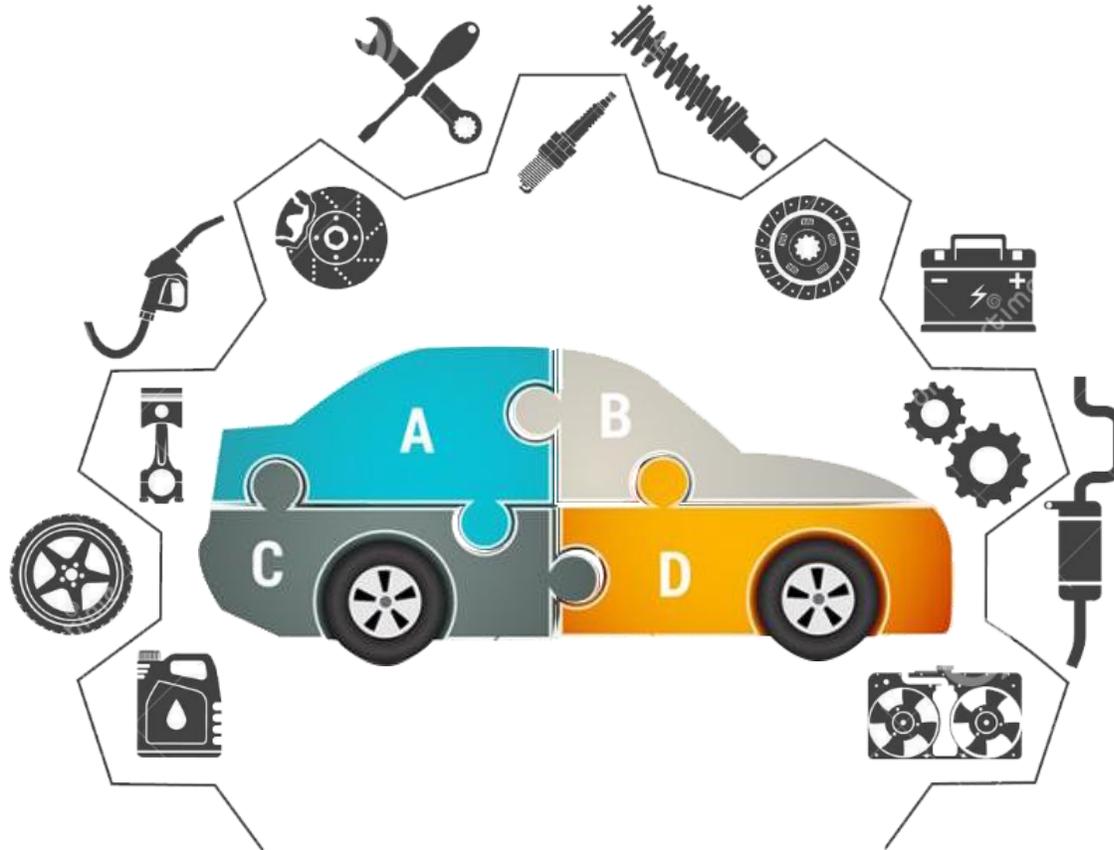
What is Blockchain?

- Blockchain is not a thing but a software concept—it must be implemented somewhere, like bitcoin.

- Blockchain was first theorized in the 1990s and first used by Bitcoin in 2011.

- Blockchain is a store of records (a ledger) with the following characteristics:

Cryptographically secure, not easy to hack

Not controlled by any single party

Write once, append only. This means you can't change what's been recorded.

Distributed and replicated across many sites and servers

Records come in blocks and are chained together in a sequence, thus blockchain.

Can't Change

Secure

Distributed

Independent

Long-Lasting

Some Simple Examples of its Potential

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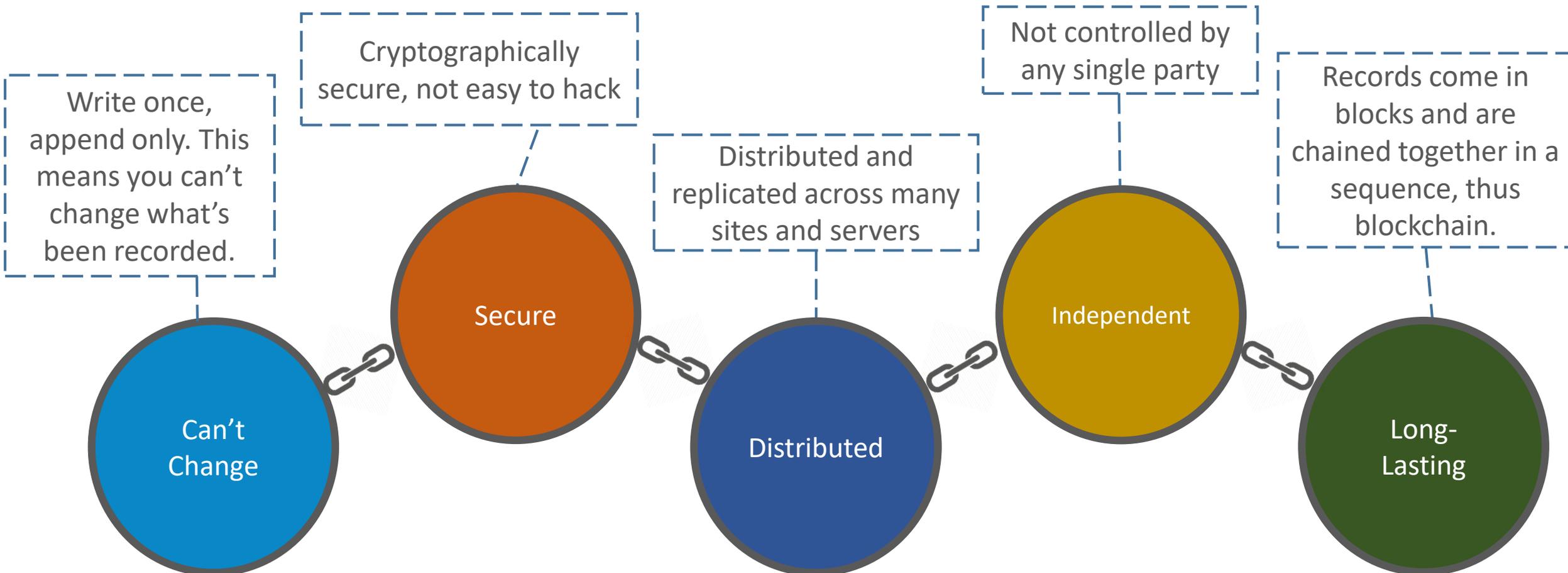
Balancing a Checkbook

You record transactions—checks, deposits, withdrawals.

Your bank records transactions—payroll deposits, transfers, checks, ATM fees, etc.

You have to match them up and resolve discrepancies.

Ha ha

FEE NOTICE
The owner of this ATM adds an ATM useage fee.
FEE: $3.00
Do you want to continue this transaction?
YES   NO

BUT

BANK

Common Ledger

☑ Blockchain would eliminate this with only one ledger in the cloud, used by you AND your bank.

Some Simple Examples of its Potential

Going to a New Doctor

**You have to remember and write down your entire medical history.**

You will forget some medications!
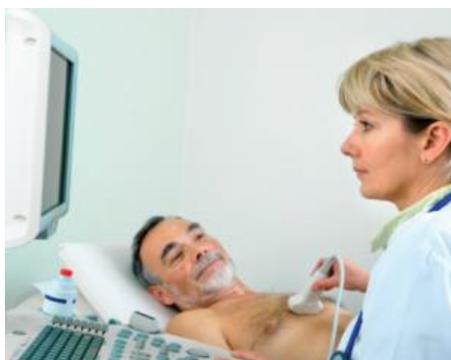
Your doctor will perform tests, prescribe medicine and do surgery.

Over time, you will forget some of what your doctor did.

Going to a New Doctor

But...

Common Ledger
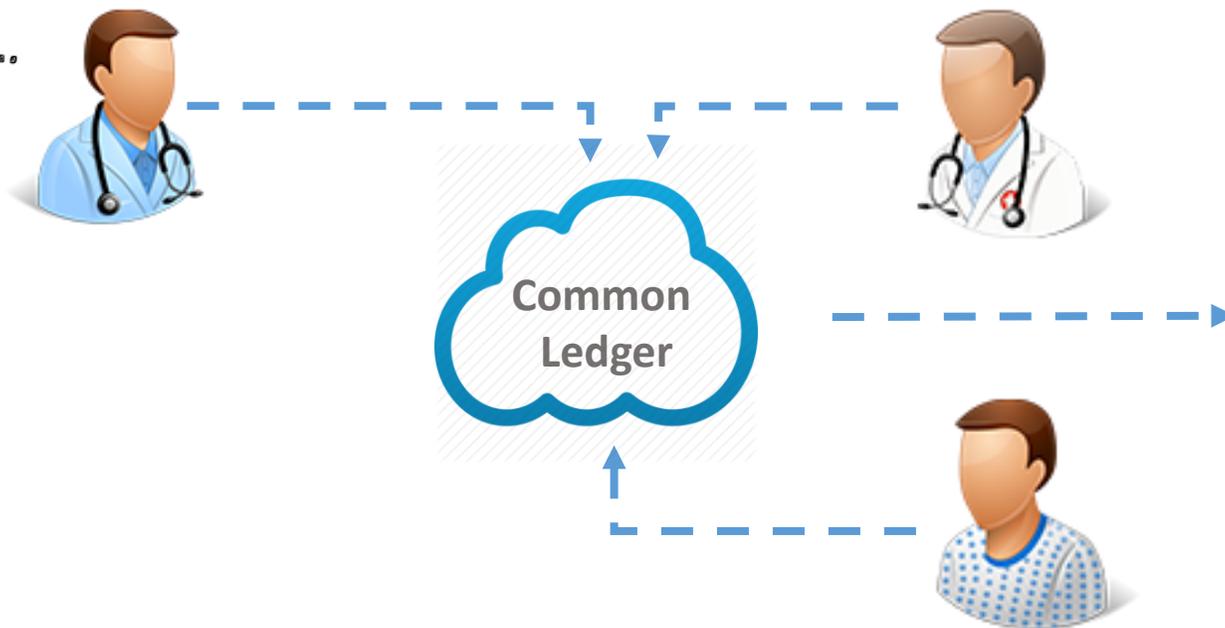
☑ Cloud has your lifelong history

☑ Easy access management

☑ Share medications/medical records

☑ Self-service

How Blockchain Works: A Bitcoin Example

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ObjectFrontier Software

- Bitcoin is a type of **currency built on top of blockchain technology.**

- Bitcoins only **exists digitally**. There are no paper or coin monies.

- Bitcoins **can be transf**... no bank involved.

- Bitcoins are **accepted by many vendors** now.

- There are **bitcoin exchange networks** that help individuals transfer bitcoins.

What is Bitcoin?

Bitcoin Exchange Network

- **This is a network of connected servers**, all agreeing to the rules and processes of how bitcoin works and using the same software.

- This network is **peer-to-peer**, meaning no one server is in charge.

- **Anyone can join the network,** which is anonymously open to all.

- **All nodes on the network contain the same information** on the composition of all the blocks that have been agreed upon in the chain.

- **Two types of nodes:**
    - **Regular**
        - Can accept, validate, and propagate transactions
    - **Miners**
        - Do the mathematical calculations (**hashing**) to figure out the next entry in blockchain and are compensated for their efforts
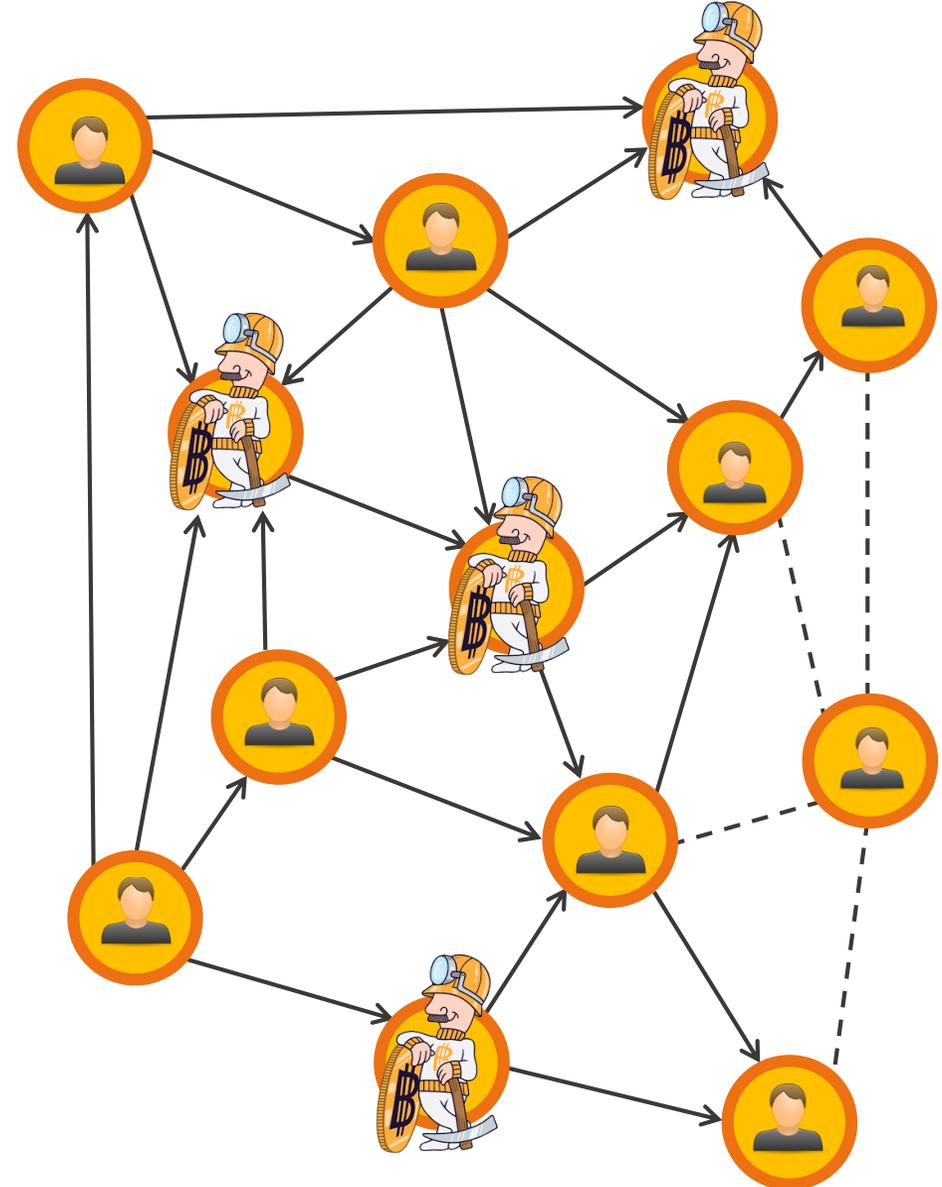
A Side Note to Explain Hashing

- A hash is a mathematical way of boiling down a whole set of data to a single, unique number.

- For example, take my name—**RICH**—and turn it into a number based on the position of each letter in the alphabet:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

+   +   +   =   **38**

- Real-world hashes are much more complicated and produce unique numbers, but the essence is the same.

- Blocks of bitcoin transactions are hashed down to a single number.

A Side Note to Explain Hashing

- These blocks are chained together such that the hash number for the newest blockchain is calculated by adding it to the hash for the previous block.

- For example, you could hash my last name using my first name as a starting point:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
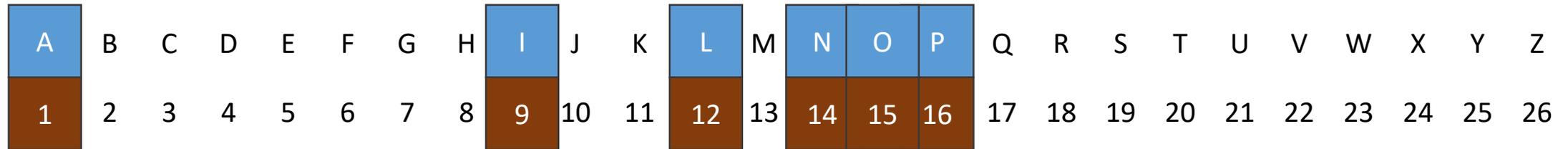
$+ \quad + \quad + \quad + \quad + \quad = \quad \textbf{67}$

R	I	C	H
18	9	3	8	**38**

$+$

N	A	P	O	L	I
14	1	16	15	12	9	**67**

$= \quad \textbf{105}$

A Side Note to Explain Hashing

- Again, assuming each hash value is unique, then the hash of the sum of them is also unique.

- KEY POINT HERE – If I tried to change the spelling of my name to **Mitch**, the hash value would be different for both the first and second hashes. Keep this in mind as we go on.

M	I	T	C	H
13	9	20	3	8

53

+

N	A	P	O	L	I
14	1	16	15	12	9

67

= **120**

**Alice wants to give 10 bitcoins to Bob
(perhaps as payment for goods and services received)**

Alice has some bitcoins in her private account (can be purchased on exchange).

Alice initiates a request to transfer 10 bitcoins to Bob.
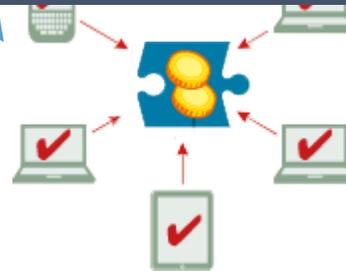
That request is verified to make sure Alice actually has the 10 bitcoins. If the request is good, then that transaction is available to be grouped into a block with other transactions.

Bob

How Blockchain Works: Bitcoin Example

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10 minutes of high-powered computing to calculate hash #

Earning bitcoin currency as a reward

Recording the copy of the blockchain

Can only append to the end of a blockchain
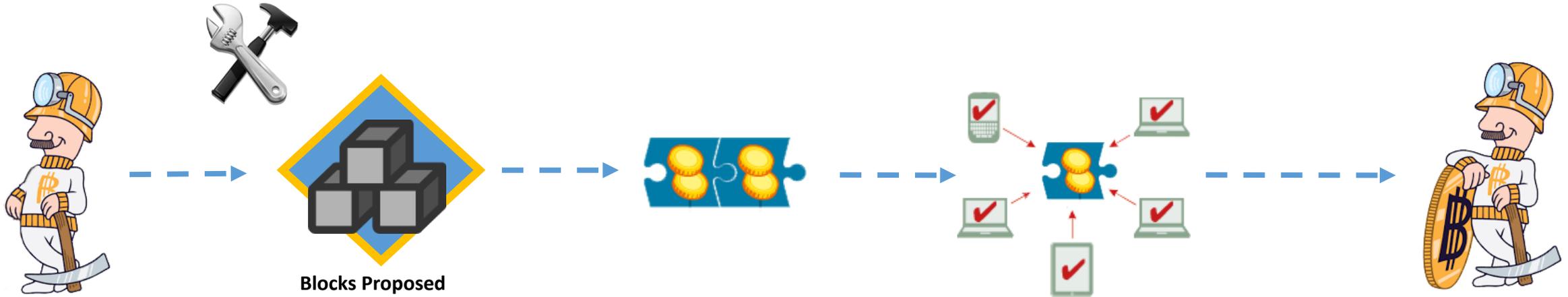
Blocks Proposed

Miners
- Add the transaction between Alice and Bob to a block.
- Solve a difficult hashing problem to get the right to add a block to the blockchain.

The miner proposes the block out to the network and has it validated.

The new block is now appended to the chain of previous blocks and becomes the starting point for any new blocks.

The transaction between Alice and Bob is now complete and everyone agrees it happened.

Miners are rewarded with new bitcoins

Some Popular Businesses That Accept Bitcoin

- **Microsoft** – Users can buy content with Bitcoin on Xbox and Windows store

- **Subway** – Eat fresh

- **Reddit** – You can buy premium features there with bitcoins

- **Virgin Galactic** – Richard Branson company that includes Virgin Mobile and Virgin Airline

- **Expedia.com** – Online travel booking agency

- **Overstock.com** – A company that sells big ticket items at lower prices due to overstocking

- **Gyft** – Buy giftcards using Bitcoin

- **Newegg.com** – Online electronics retailer now uses bitpay to accept bitcoin as payment

Value of Blockchain in Bitcoin Usage

- No central clearing authority like a bank or country is involved…yet.

- It's trusted because of the network consensus:
    - Multiple validations of transactions, blocks, and nodes from multiple sources

- No changing history:
    - Once it's done it's done, so it's good for a long-term recording of events (called immutability).

- Anonymity because no one knows who you are:
    - Private keys make sure of that.

Why Blockchain is Important

- **Valuable When:**
  - Multiple parties need access to the same data
  - The data needs to be updated periodically
  - Assurance that data is not tampered
  - No single central authority desired
- Blockchain can greatly simplify and accelerate business transactions.

Smart Contracts: Another Use of Blockchain

- **A smart contract keeps the agreed-to terms of a contract between two parties in a blockchain, along with the rules of transaction.**

- Think of a vending machine as a very simple smart contract:
  - You put in money and make a selection.
  - It dispenses the goods and any change.

- Now, imagine this being done with a full contract:
  - You deliver 100 refrigerators on a truck.
  - Once someone verifies that and records the receipt on a blockchain, the contract knows to issue a payment to you for a specified amount and does so automatically.
  - No attorneys or accountants are involved.
  - A full record of events is kept, so there is no chance for a dispute or holdbacks.

Agreed-to terms of a contract between two parties

# Blockchain Platforms and Smart Contracts

Ethereum

- Is a public blockchain

- Is a major player backed by Ethereum foundation

- Provides a language called Solidity to create smart contracts

- The terms are entered as part of a blockchain transaction

Hyperledger

- Is a private blockchain

- Is preferred by enterprises backed by Linux foundation

- Is a growing network for permissioned blockchain that implement contracts

- Go language used for smart contract development
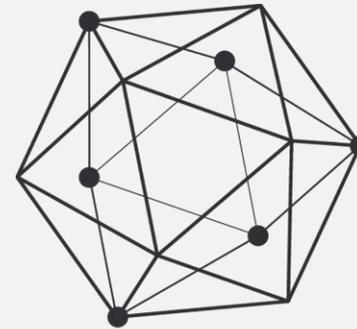
How Blockchain Can Be Used

Real Estate

- Owner of property is recorded at time of sale.
- Any mortgage or other lien information is also tracked.
- It's very easy to see who owns what, so the need for title insurance goes way down.

Logistics Tracking

- Cars
- Jewelry
- Artwork
- A good analogy is a FedEx tracking number that survives indefinitely and tells you where something is at any point.

Food Management

- Digitally track movement of food products to ensure freshness and safety.
  - Growers
  - Distributers
  - Retailers
  - Consumers

Sale and Leasing

- Sale and leasing of used equipment
  - Record equipment information, maintenance records, and current status.
  - Blockchain lets unrelated companies solve trust issues.
  - Think of the used car industry here!

Chain of Custody for High-Value Assets

How Blockchain Can Be Used

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### Government

- IRS tax history of taxpayers
- Government-issued bonds

Automobile

- Tokenization of real-world assets
- Common ledger for services, history maintenance, recording accidents, etc.

Healthcare

- Your individual health records are all stored in one place.
- You can provide your doctors with access to append to your health records.

Banking/Finance

- Digital currencies backed by government
- Insurance companies' proof of continuous coverage
- Smart loan program for financial services

Permanent Record Keeping

Who's Active Now in Blockchain

- **CHINA!!!**
  - Number one user of blockchain worldwide – 95% of total
  - Have moved from…
    - Blockchain 1.0—digital currencies to…
    - Blockchain 2.0 –digital assets and smart currencies

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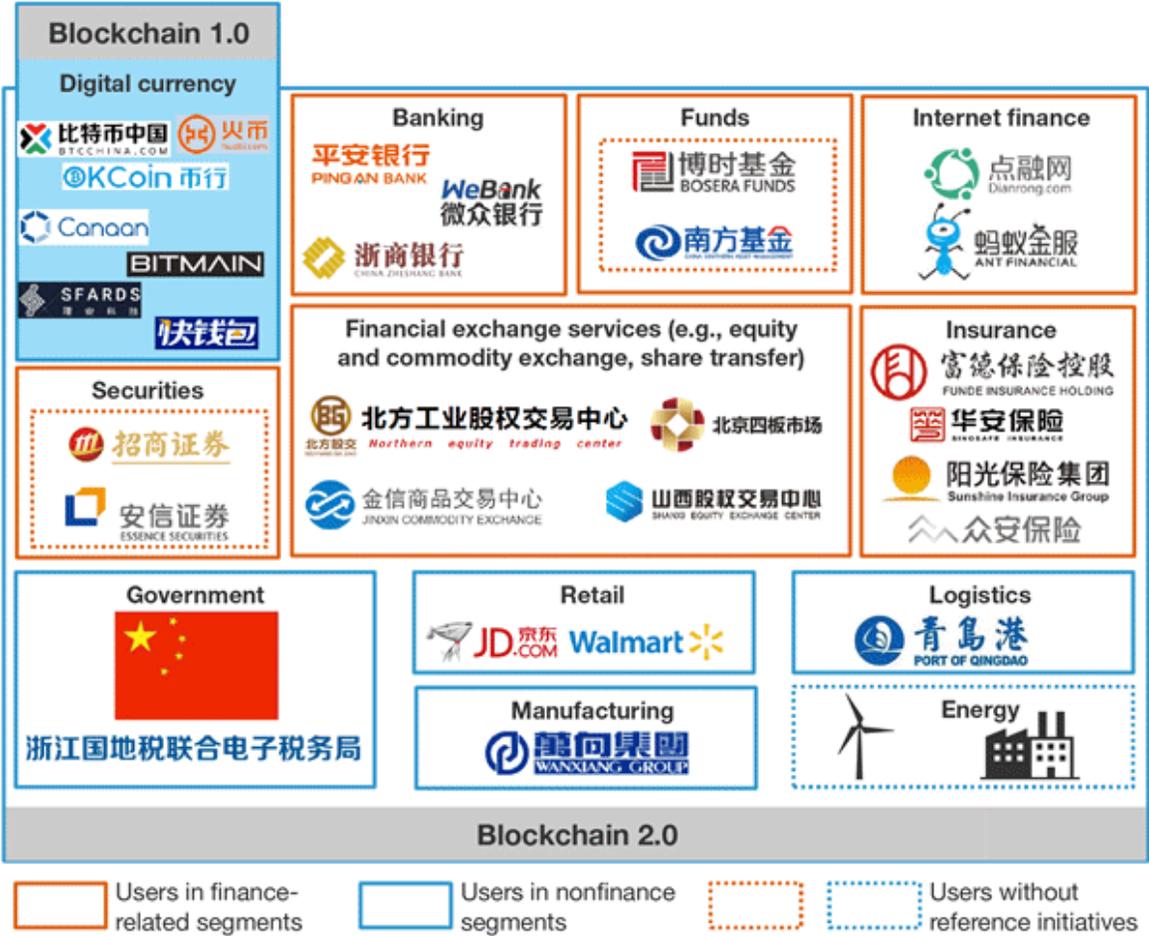
Who's Active Now in Blockchain

- Wall Street
  - There is a huge opportunity to eliminate all the reconciliations needed to settle a trade.
  - All major players are investing heavily in blockchain.
 - The first systems are rolling out next year.
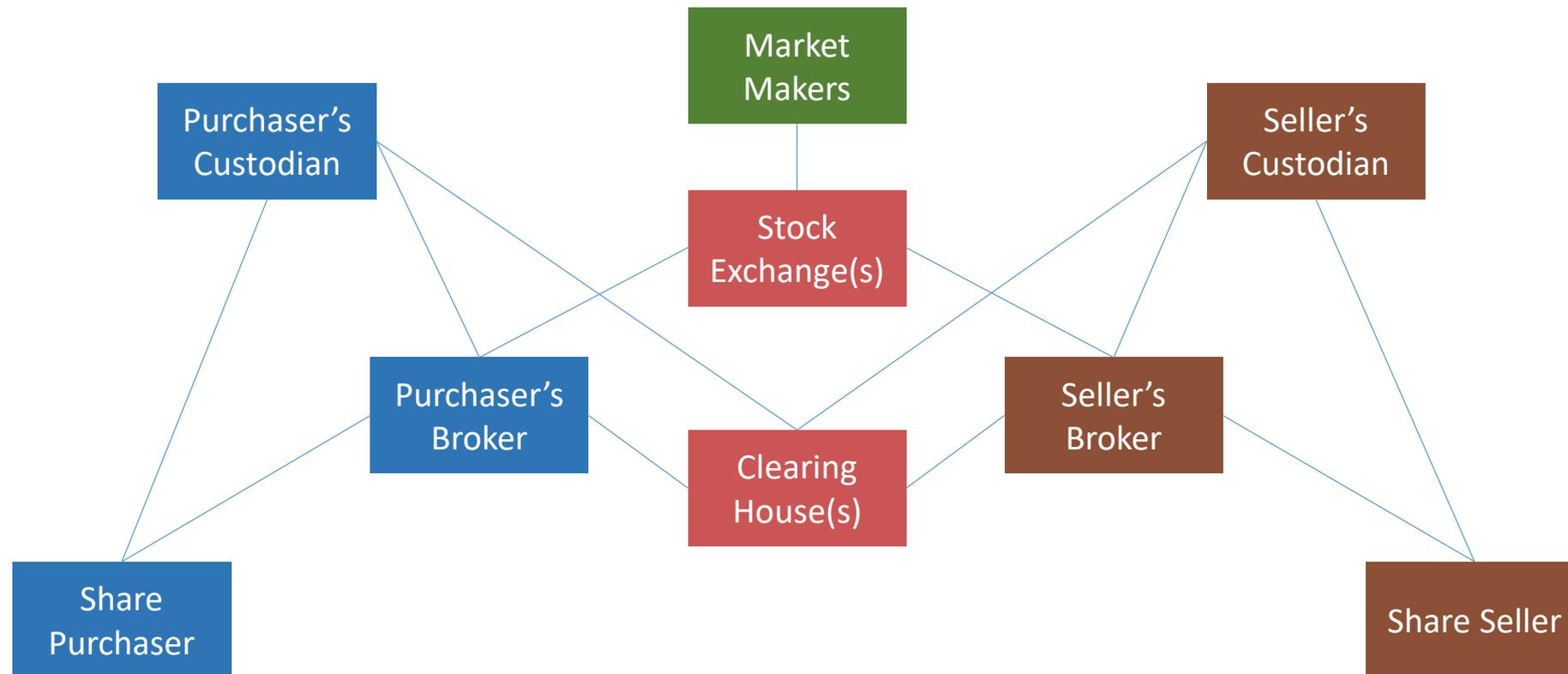
- **Healthcare Industry**
  - Consolidated electronic health records (EHR) represent a big cost savings.
  - Integration of all players, devices, and supplies:
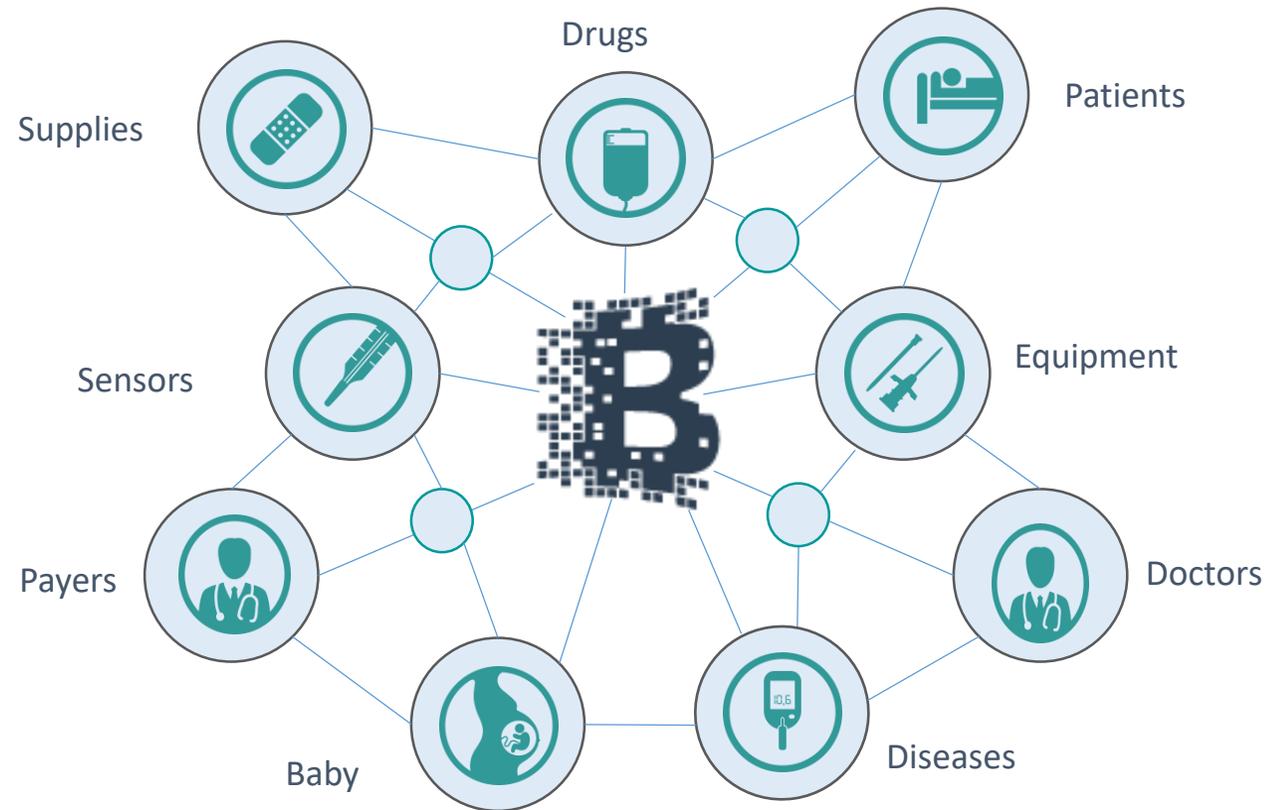
- Better healthcare due to better history keeping
- Pharma and payers are investing heavily in blockchain now.

What Should You Do about Blockchain?
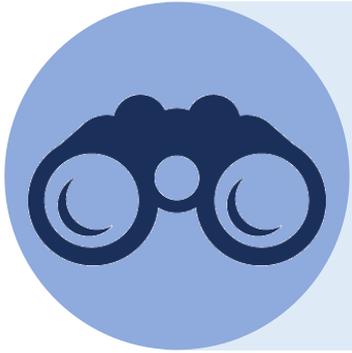
You don't need to jump in or catch up just yet.

- This is like the Internet of the late '80s. Blockchain has a long way to go, but it will go faster than the growth of the Internet did.
- Read, analyze, and look for impacts.

Look at it strategically first.

- How will your industry change with this?
- What are the risks to your business?
- What opportunities exist?
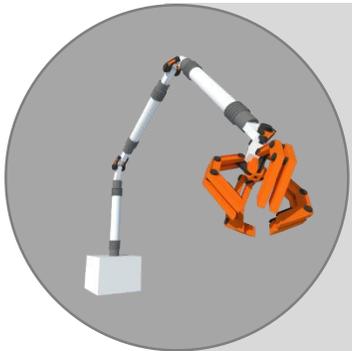
Start small—do a prototype.

- Focus on business pain points.
- Join a blockchain committee in your industry.
- Stay involved in the blockchain ecosystem.

On to the LAB

Digitization of Real-World Assets
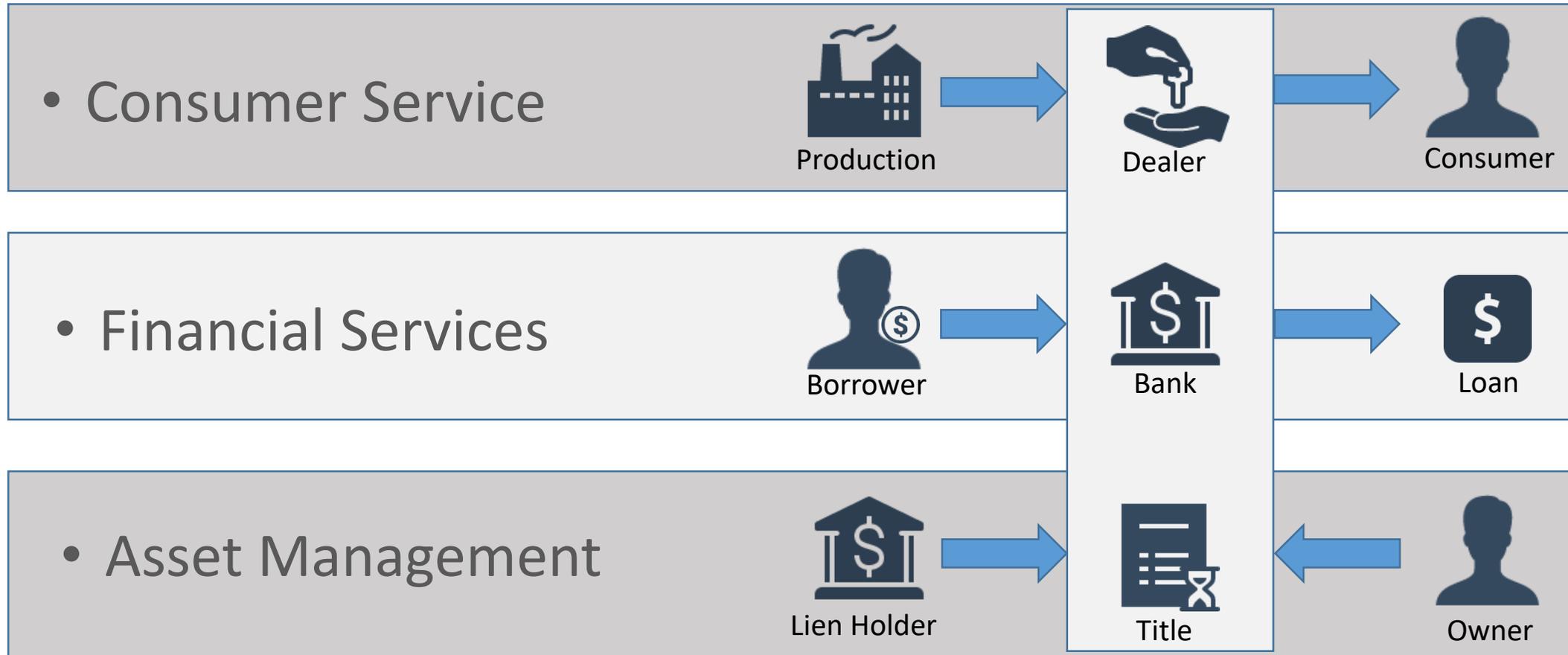
Demonstration: Digitization of Real-World Assets

Blockchain Marketplace for Consumers/Car Buyers
Blockchain Marketplace:
- How blockchain can be used by manufacturers to reach out to consumers without the dealers.

Smart Contracts for Auto Loans
Smart Loan Contracts:
- Banks to establish and run auto loan programs (or organizations)
- Consumers to get the loan amount, buy and make monthly payments

Asset Management Using Blockchain and Smart Contracts
Smart Title:
- To tokenize a real-world asset, which is a car in this case
- To transfer ownership
- To record the history of services and accidents

Production

Borrower

Lien Holder

Consumer

Loan

Owner
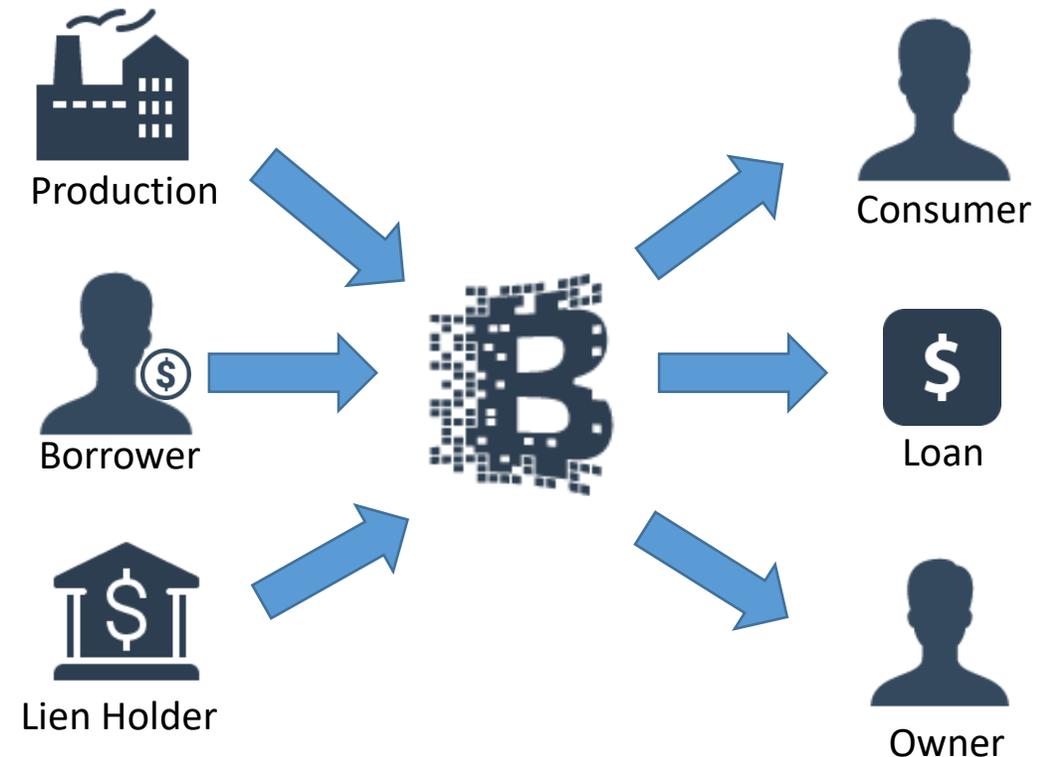
All Transactions are in Ethers
1 Ether = $290 TODAY

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Why Did We Present?

- OFS is a digital product engineering company.

- We build innovative offerings that drive revenue for our clients.

- We work with large and small companies to help execute their digital transformation strategies.

- We explore new technologies, like blockchain, to see how we can use them to help our clients.

- We have 500+ engineers across the U.S. and India.

Learn more from us about blockchain in our two-part blog series at www.objectfrontier.com/blog/.
Get in touch with us at contactus@objectfrontier.com.

THANK YOU