STATE OF EXCELLENCE

GFOASC Spring Conference
May 6, 2019
Columbia Convention Center

Money, Cryptocurrency & Blockchain Technology

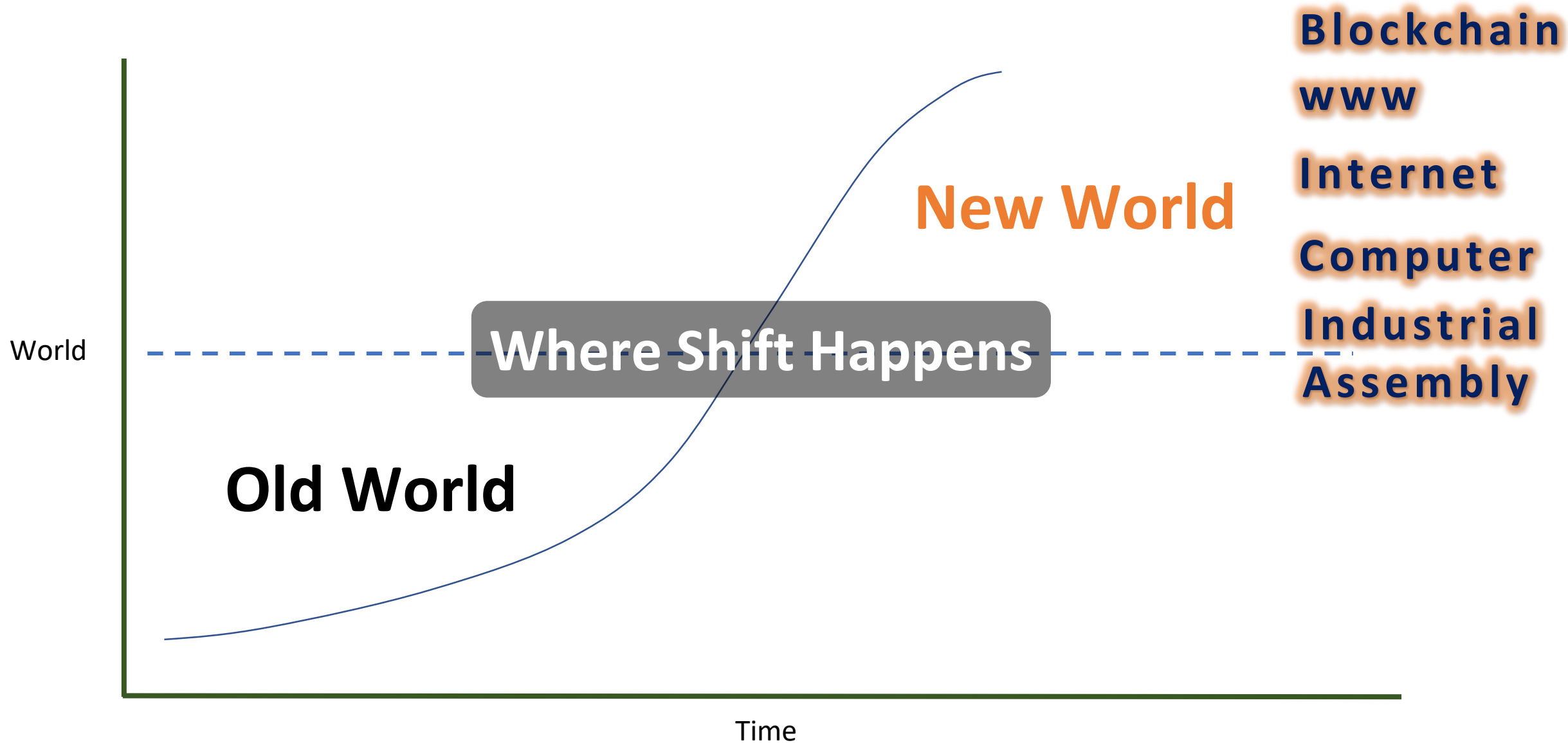# "Fifth Industrial Revolution"

World

Time

New World

Old World

Where Shift Happens

Blockchain
www
Internet
Computer
Industrial
Assembly

Blockchain is Phase 3 of Internet 3.0…

- Phase 1 was Dot Com , when companies learned how to **publish content**

- Phase 2 was Social Media, when individuals learned how to **exchange content**

- Phase 3 is Blockchain, when individuals learned how to **exchange value** online.

Will change our world in more fundamental ways.

Blockchains are rapidly becoming the foundation of the Fifth Industrial Revolution:

1. Being used to create distributed market structures to address security risks and eliminate single points of infrastructure failure.

2. Supplying regulators with real time data on financial flow and asset class risks improving oversight of international markets.

3. Integrating granular source tracking, identity management and concepts of digital scarcity horizontally and vertically through global supply chains.

4. 87% of C-level execs surveyed are considering adopting or are using Blockchain technology.

5. $8-12 billion reported potential annual savings for US banks utilizing Blockchain Technology.

6. Gartner predicts total business value-add of Blockchain to exceed $3.1 trillion by 2030.

7. Kodak share prices recently leaped 117% after announcing a new Blockchain initiative.

"We are sitting down around this table trying to decide whose lunch we are going to eat. Because blockchain's benefits come from decentralisation there is little point replacing one technology with another <u>without changing the business model</u>."

Richard Crook, Head of Emerging Technology
Royal Bank of Scotland

Source: Financial Time January 23, 2018

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Disintermediation

It essentially means "cutting out the middleman."

No competing with Amazon Distribution

Disintermediation via Blockchain

For example, to verify college transcripts…

All the records are verified by all peers together through collaborative decentralized algorithms.

Digital Cash known as Cryptocurrency

What is Digital Money?

1. Money is basically a measuring stick

2. The measuring stick can't be a part of what it is measuring, so what is money measuring?

3. Money is measuring the value of time

4. JOB fixes your value of time (per hour, annual salary)

5. Creative time is valued by the consumer (Baker)

6. Product is valued by Supply and Demand (Ford)

7. Before coin, we bartered

8. Replicas were first used in 1000BC China

9. First replica coin created in 600BC King of Lydia

10. First minted coin of gold in 1250 AD Florence

11. First paper replica in 1290 AD from China to Europe

12. First paper bank note in 1661 in Sweden

13. First digital money in 1860 by Western Union

What is Digital Money?

14. First Credit Card in 1946 by John Biggins

15. First **independent** digital money is E-Gold in 1996

16. First ind P2P digital money is WebMoney in 1998

17. Milton Friedman predicts trustless "eCash" in 1999

18. Later attempt is the Liberty Reserve in 2006, and

19. Perfect Money in 2007

Why did these initiatives Bust?

Double Spend Problem of Digital Currency

1. Double-spending is the problem where a currency can be spent more than once.

2. This is a flaw that is unique to digital currencies.

3. This is the number one reason that digital currency had never really taken hold in the market anywhere in the world.
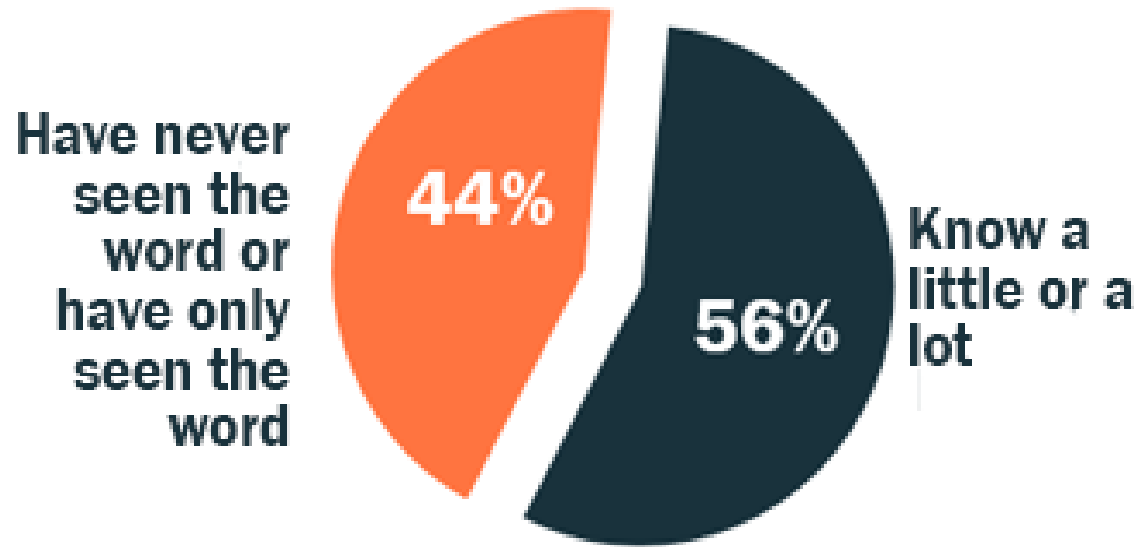
Creation of the Cryptocurrency

1. Bitcoin was first introduced in 2008 by Satoshi Nakamoto as a P2P **decentralized** digital currency utilizing cryptography solving double-spend
2. Cryptocurrencies are cryptographic based assets used as an:
   a) Instrument of exchange (Tokens as a security)
   b) Store of value (Bitcoin as a currency), and
   c) Units of account (ETH or EOS as a utility).
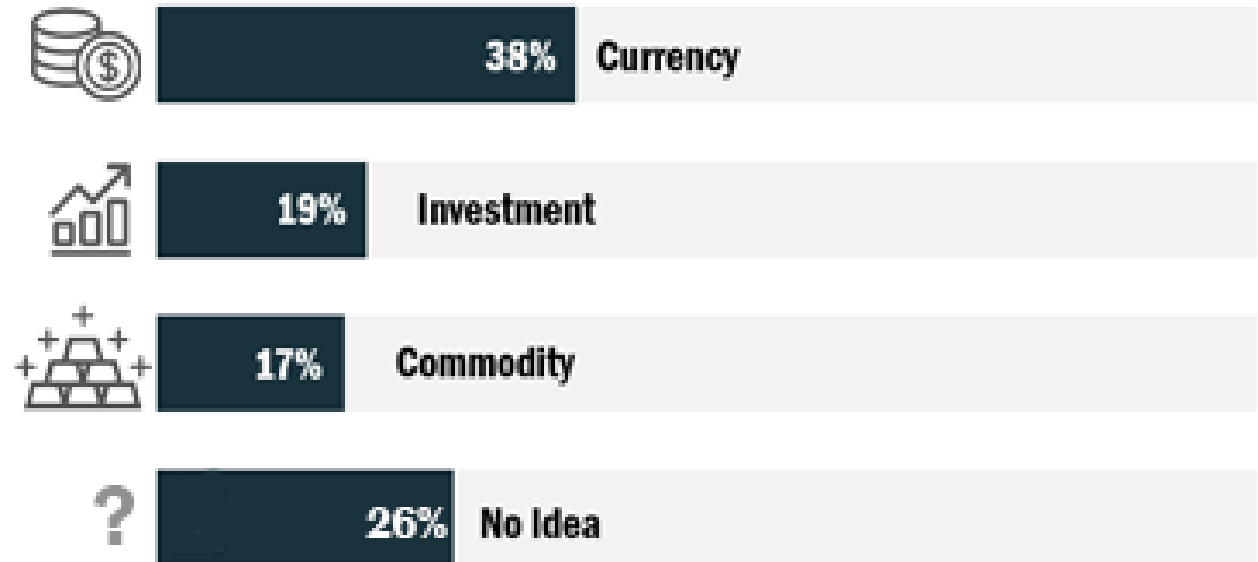
4. Think of Bitcoin as an electronic asset (oz of Gold)

5. A network of computers that keep track of an ever-growing list of all the Bitcoin payments

6. A file of transactions called a "**ledger**"

7. Value is created through transaction processing, referred to as "**mining**," which is performed by distributed processors called "**nodes**"

8. The technology is called Blockchain

Creation of the Cryptocurrency

Familiarity with cryptocurrency

Have never seen the word or have only seen the word — **44%**

Know a little or a lot — **56%**

Would describe cryptocurrency most like...

- **38%** Currency
- **19%** Investment
- **17%** Commodity
- **26%** No Idea

LOGICA

Creation of the Cryptocurrency

Sunday, Jan 07 2018, 19:02:00 UTC-05:00
● Market Cap: 828,537,000,000 USD
● 24h Vol: 43,567,500,000 USD

ay   7. Aug   16. Oct   25. Dec   5. Mar   14. May   23. Jul

Crypto Assets Compared to Traditional Assets

$93
Billion
Bitcoin

$171 Billion
Crypto-currency

$993
Billion
Amazon

$1.5
Trillion
USD

$7.5
Trillion
Gold

$30
Trillion
US Stocks

$40
Trillion
US Treasury

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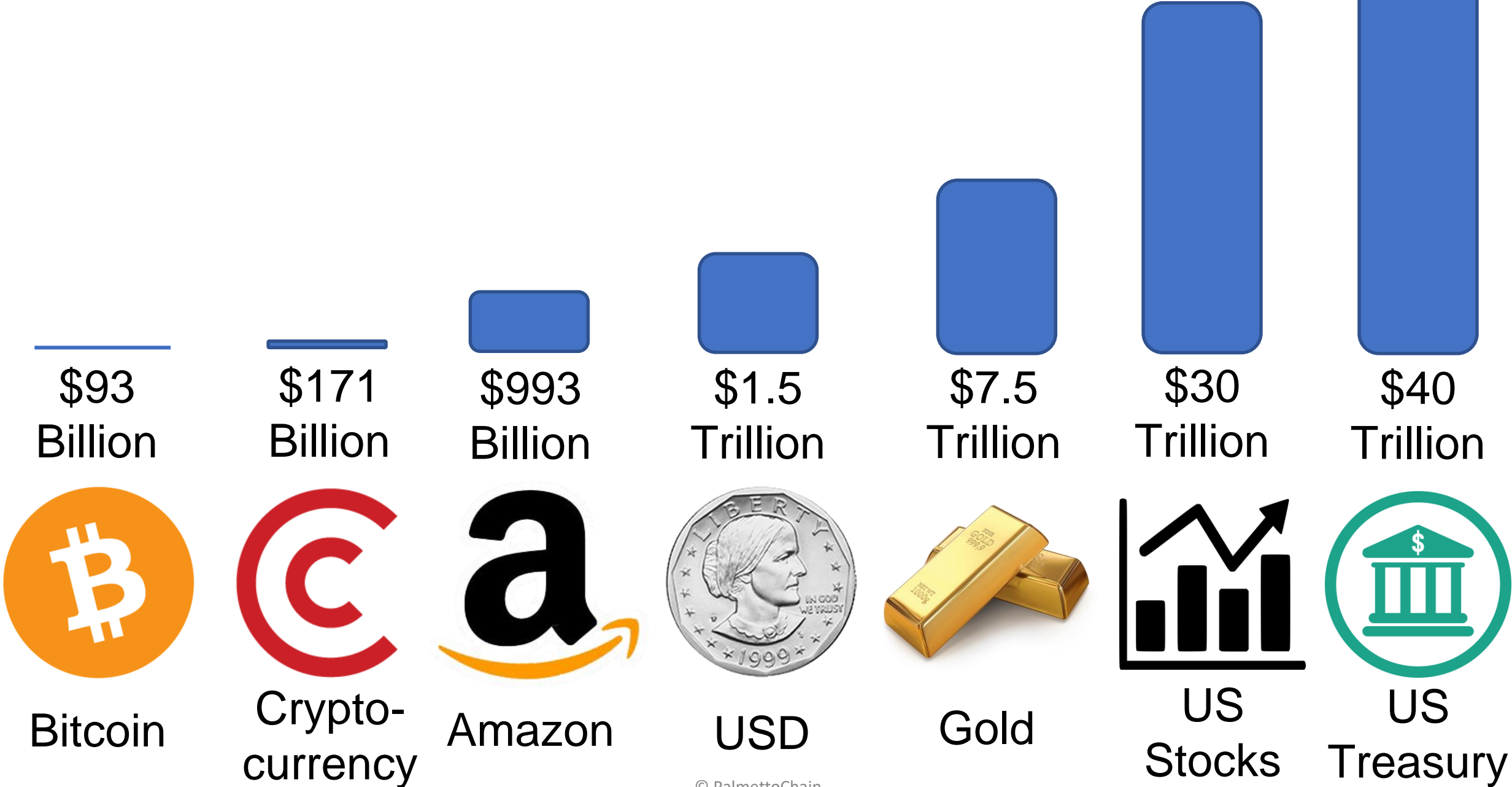
Consumers Who Own Cryptocurrency

Country	Own	Don't Own
Turkey	18%	82%
Romania	12%	88%
Poland	11%	89%
Spain	10%	90%
Czechia	9%	91%
USA	8%	92%
Austria	8%	92%
Germany	8%	92%
Italy	8%	92%
Australia	7%	93%
Netherlands	7%	93%
United Kingdom	6%	94%
France	6%	94%
Belgium	5%	95%
Luxembourg	4%	96%

statista

@StatistaCharts

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Blockchain is a cryptographic database maintained by a network of computers,
each of which stores a copy of the most up-to-date
version of the database.

What is Blockchain?

- Double Entry Ledger
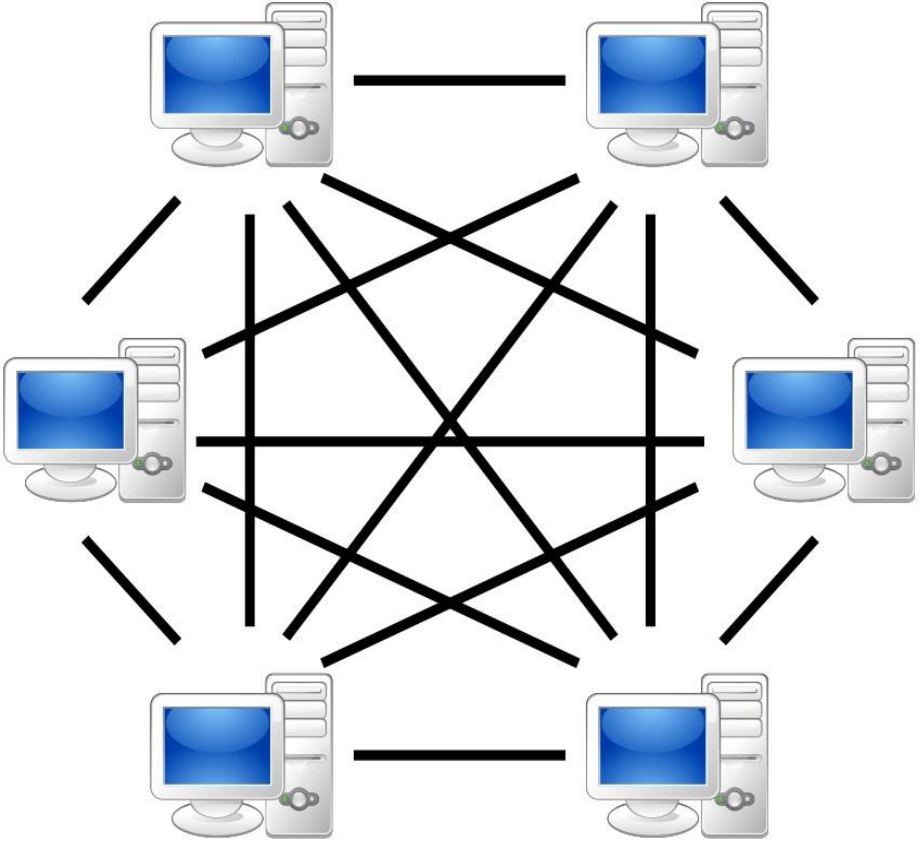- Block: transactions recorded within a period of time
- Blocks: added to the Blockchain in a linear order (add only)
- Node (Device) gets a full copy of the Blockchain
- Blockchain has complete information about all transactions from the genesis

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GENERAL LEDGER

ACCOUNT NAME: Cash

ACCOUNT NUMBER: 001

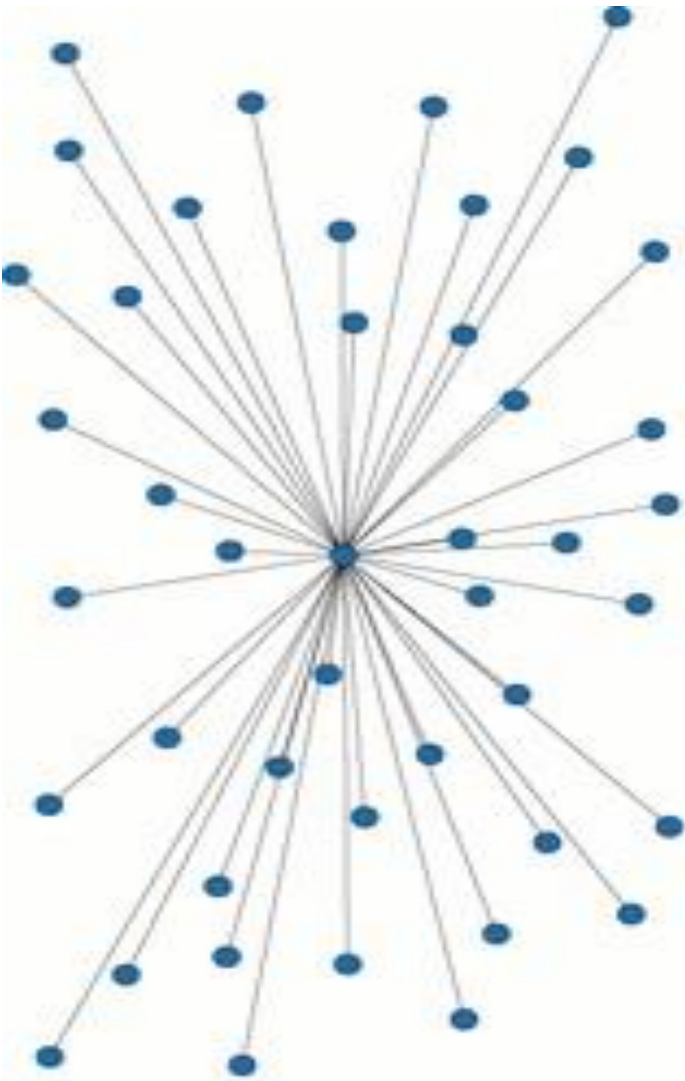| DATE	DESCRIPTION	JOURNAL #	DEBIT	CREDIT	BALANCE
4/20/2015	Check from friend	J1	$ 500.00		$500.00
4/21/2015	Paying a friend	J1		$ 200.00	$300.00

wikiHow to W

Server-based
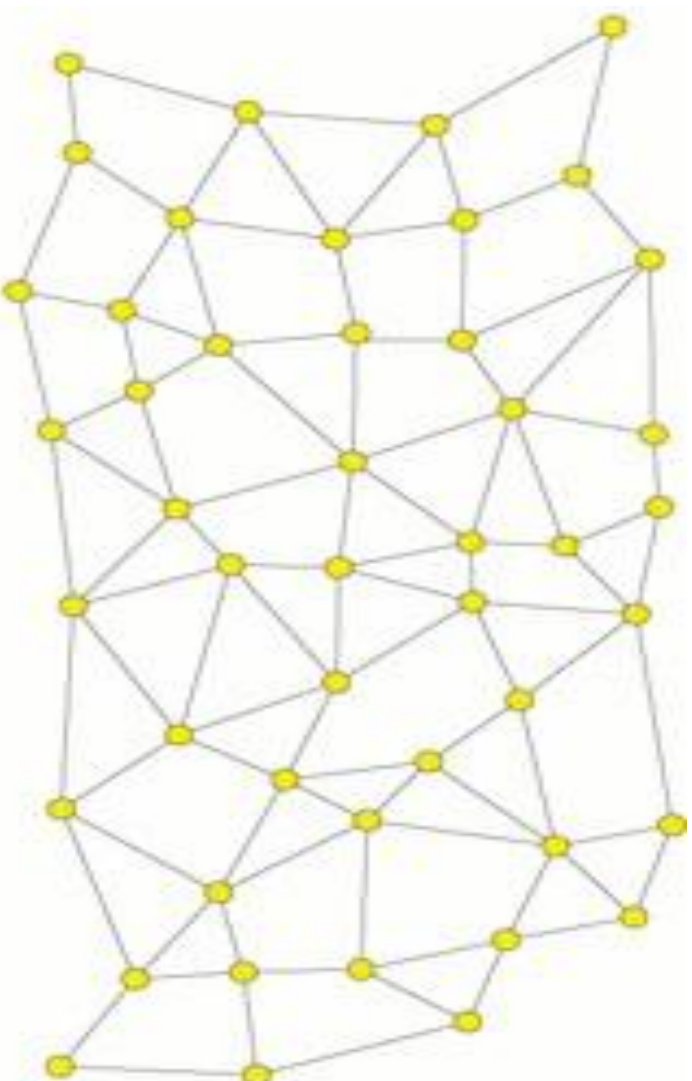
P2P-network

Peer to Peer Networking

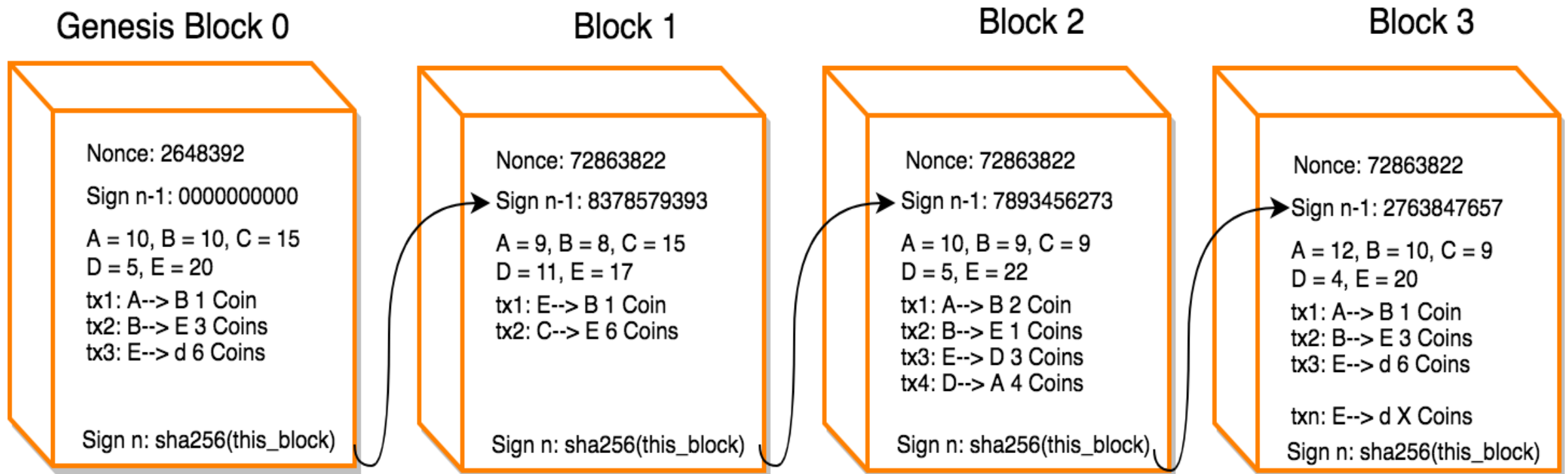Centralized   Decentralized   Distributed

What is Blockchain?

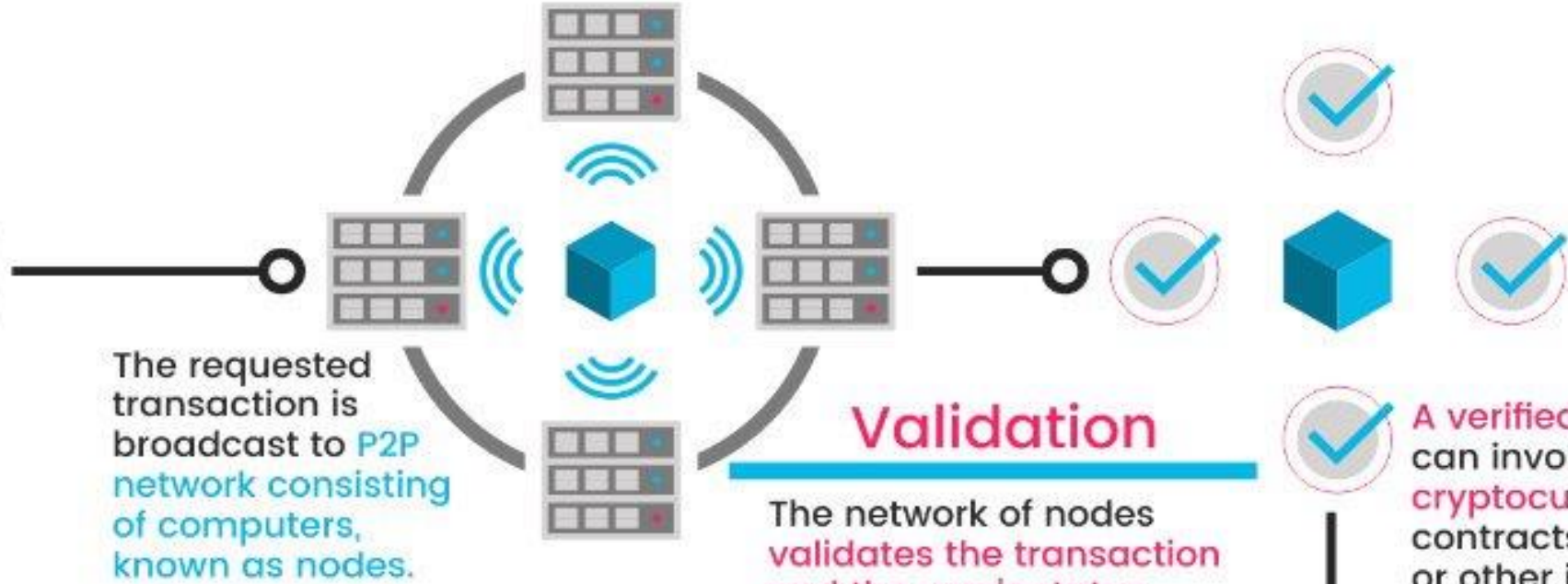Each block in a chain refers to previous blocks, like page numbers in a book.

Genesis Block 0

Nonce: 2648392

Sign n-1: 0000000000

A = 10, B = 10, C = 15
D = 5, E = 20

tx1: A--> B 1 Coin
tx2: B--> E 3 Coins
tx3: E--> d 6 Coins

Sign n: sha256(this_block)

Block 1

Nonce: 72863822

Sign n-1: 8378579393

A = 9, B = 8, C = 15
D = 11, E = 17

tx1: E--> B 1 Coin
tx2: C--> E 6 Coins

Sign n: sha256(this_block)

Block 2

Nonce: 72863822

Sign n-1: 7893456273

A = 10, B = 9, C = 9
D = 5, E = 22

tx1: A--> B 2 Coin
tx2: B--> E 1 Coins
tx3: E--> D 3 Coins
tx4: D--> A 4 Coins

Sign n: sha256(this_block)

Block 3

Nonce: 72863822

Sign n-1: 2763847657

A = 12, B = 10, C = 9
D = 4, E = 20

tx1: A--> B 1 Coin
tx2: B--> E 3 Coins
tx3: E--> d 6 Coins

txn: E--> d X Coins
Sign n: sha256(this_block)

Transactions through Blockchain

How it works:

Someone requests a transaction.

The requested transaction is broadcast to P2P network consisting of computers, known as nodes.

Validation

The network of nodes validates the transaction and the user's status using known algorithms.

A verified transaction can involve cryptocurrency, contracts, records, or other information.

Once verified, the transaction is combined with other transactions to create a new block of data for the ledger.

The new block is then added to the existing blockchain, in a way that is permanent and unalterable.

The transaction is complete.

3 Ways to Look at Blockchain

1. Alternative form of "**cool**" database that doesn't offer anything new ("Snake Oil")
2. Noticeable/significant/tremendous **improvement** in process execution, immutability of data, transaction speed, transparency, etc
3. **Fundamentally changing the way business is done around any transaction, creating decentralized, participant-based ecosystems and disintermediating the World as we know it**

Public Blockchain

1. Anyone can read without explicit authorization
2. Anyone can write without explicit authorization
3. More complex rules required for better security
4. Complex consensus algorithms
5. Computationally expensive to mine & add a block
6. Computational power is distributed globally
7. No one owns it
8. Examples: Bitcoin and Ethereum

Private Blockchain

1. Only authorized nodes can read the transaction data
2. Only authorized nodes can write to the Blockchain
3. Centrally controlled so security is easier
4. One authorized node may arbitrate for any dispute
5. Easy or computationally less expensive to add a block
6. One or more private entities own the Blockchain
7. More control by one Party instead of no one
8. Examples are IBM's Shipping Supply Chain Solution

19 Industries Set for Disruption

- Banking and Payments
- Cyber Security
- Supply Chain Management
- Forecasting
- Networking and the Internet of Things
- Insurance
- Private Transport and Ride Sharing
- Cloud Storage
- Charity

- Voting
- Government
- Public Benefits
- Healthcare
- Energy Management
- Online Music
- Retail
- Real Estate
- Crowd Funding
- Your Industry

Trust

Trust is the key element of blockchain technology.

When transactions are executed and settled on a distributed ledger, counterparties don't need to have an established trust relationship.

Some call this **Trustlessness**.

If each participant in the transaction trusts the blockchain itself then they don't need to directly trust each other.

Trust

In a decentralized blockchain solution, we don't need to trust an administrator or root owner to trust the data or the transaction.

Supply chains are centralized with many middlemen required to validate certain data points along the way

Farmer   Collector   Exporter   Broker   Importer   Processor   Distributor   End-User

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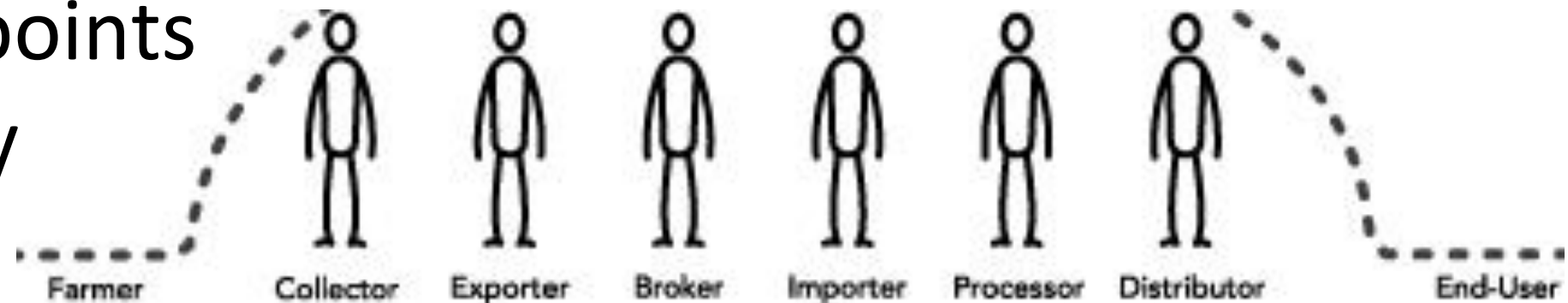
How do we trust the raw material available in inventory without trusting the inventory manager?

Blockchain-based ledgers
are maintained by multiple
nodes through consensus-
based algorithms,
replacing the
"middleman"

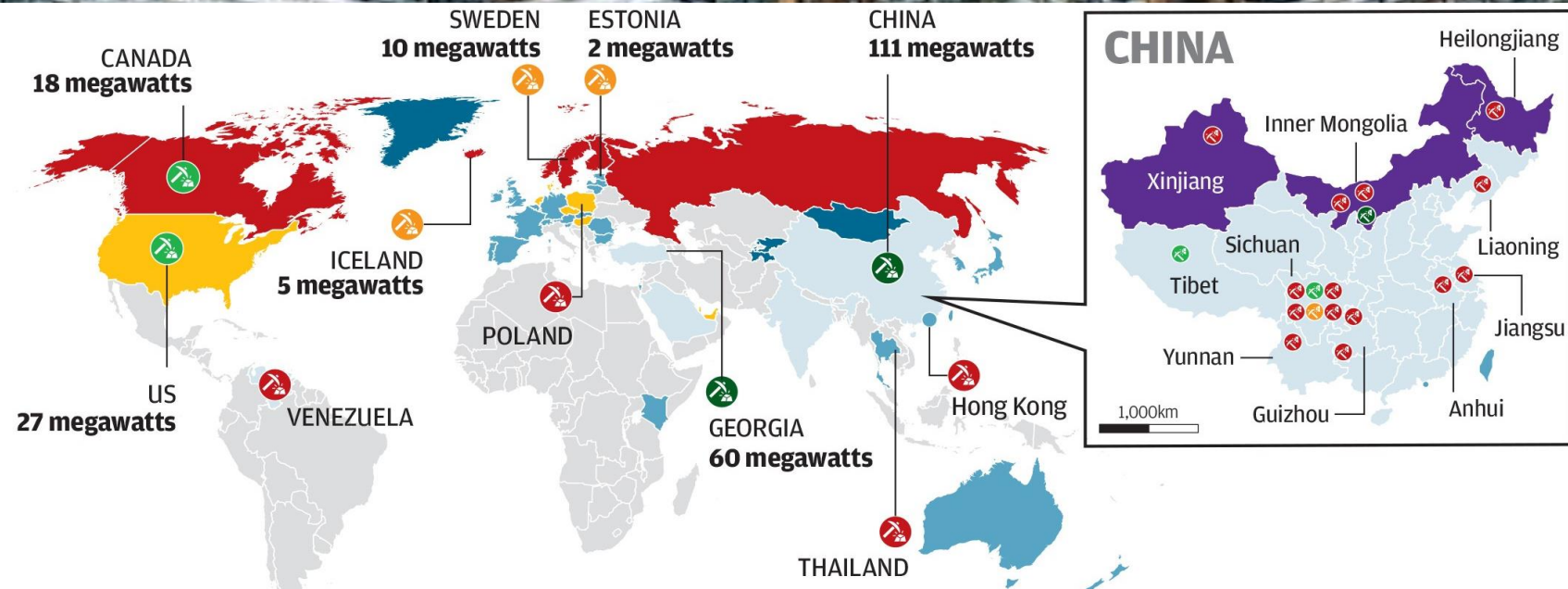Farmer   Collector   Exporter   Broker   Importer   Processor   Distributor   End-User
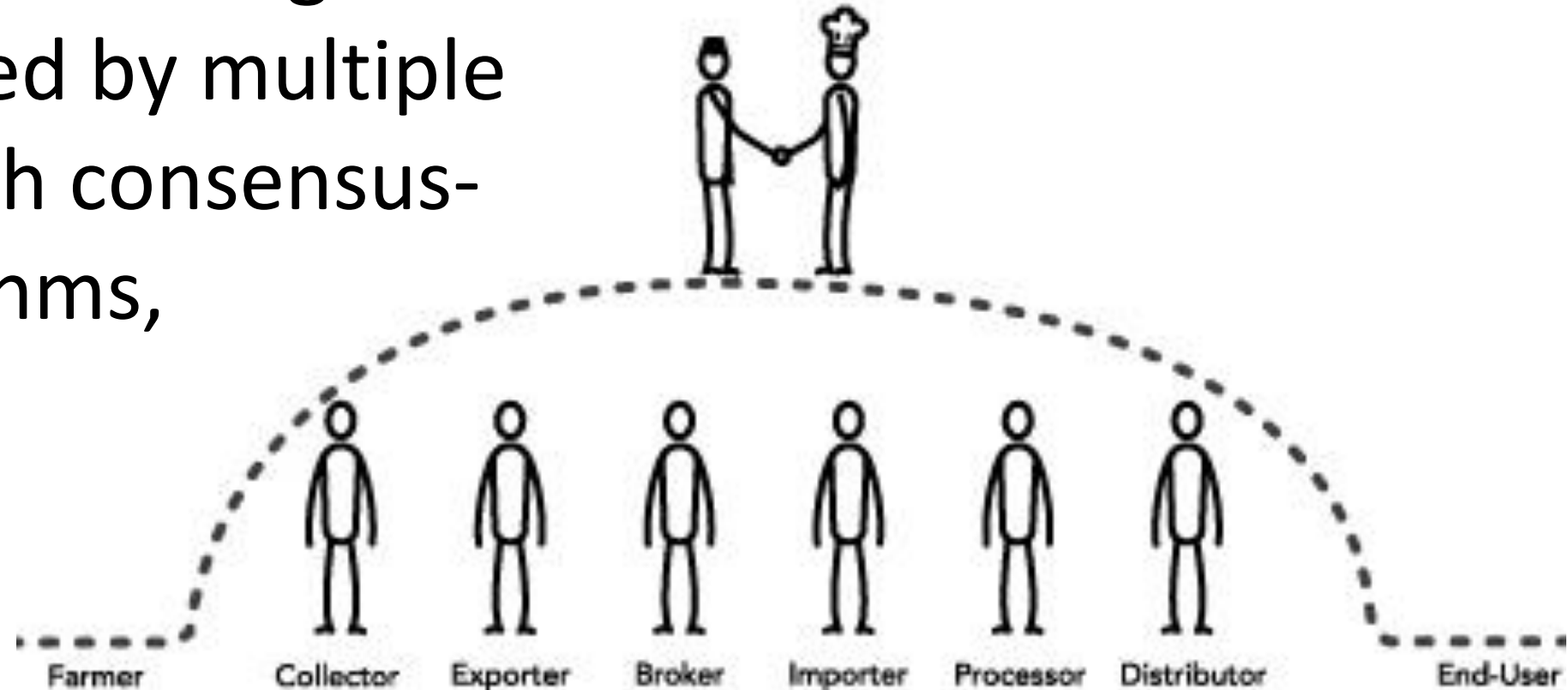
What is Blockchain Mining

Mining is the process of recording a pending transaction, then adding it to a new Block, which is then appended onto the Blockchain through a mathematical puzzle we call Proof-of-Work.

Miners get rewarded for this receiving new crypto tokens of that Blockchain.

- 5 ETH per Block in Ethereum
- 12.5 BTC per Block in Bitcoin

Types of Mining

## Solo Mining
Pool Mining
CPU Mining
GPU Mining
ASIC Mining

CANADA
18 megawatts

SWEDEN
10 megawatts

ESTONIA
2 megawatts

CHINA
111 megawatts

CHINA

Heilongjiang

Inner Mongolia

Xinjiang

Sichuan

Liaoning

Tibet

ICELAND
5 megawatts

POLAND

US
27 megawatts

VENEZUELA

GEORGIA
60 megawatts

Hong Kong

Yunnan

Guizhou

Anhui

Jiangsu

1,000km

THAILAND

What is Ethereum?

Initiated by Vitalik Buterin in Late 2013

Ethereum was launched on 30 July 2015

Open Source Blockchain-based distributed computing application platform mainly used to building and implementing smart contract functionality.
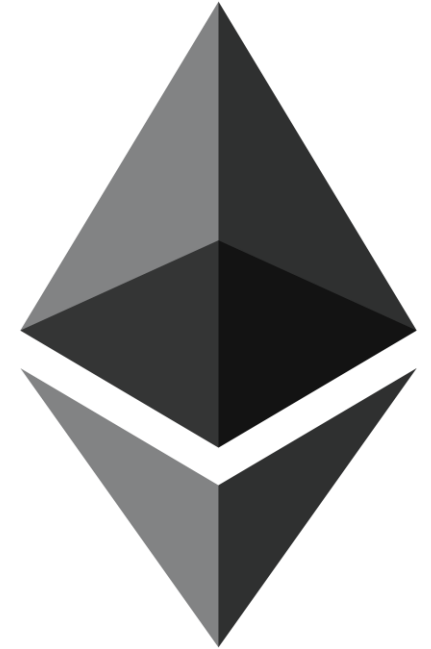
SMART CONTRACT

PARTIES > SMART CONTRACT > EXECUTION

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What are Smart Contracts?

Smart contract is a term used to describe computer program code that is capable of facilitating, executing, and enforcing the negotiation or performance of an agreement (i.e. contract) using Blockchain technology.

The entire process is automated and can act as a complement, or substitute, for legal contracts.

When to Use a Blockchain?

Store Immutably

- When things keep adding but older ones do not change
- For example: Court Judgments, Health Records

Decentralization

- When you want to decentralized the control
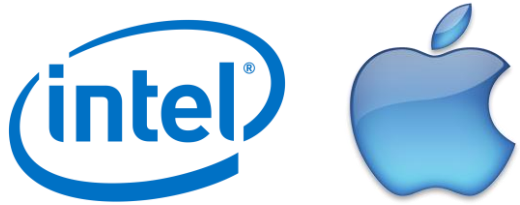- Example: User identity management system

Proof of Ownership

- When you want to prove that you are the owner of the digital document
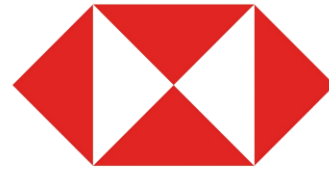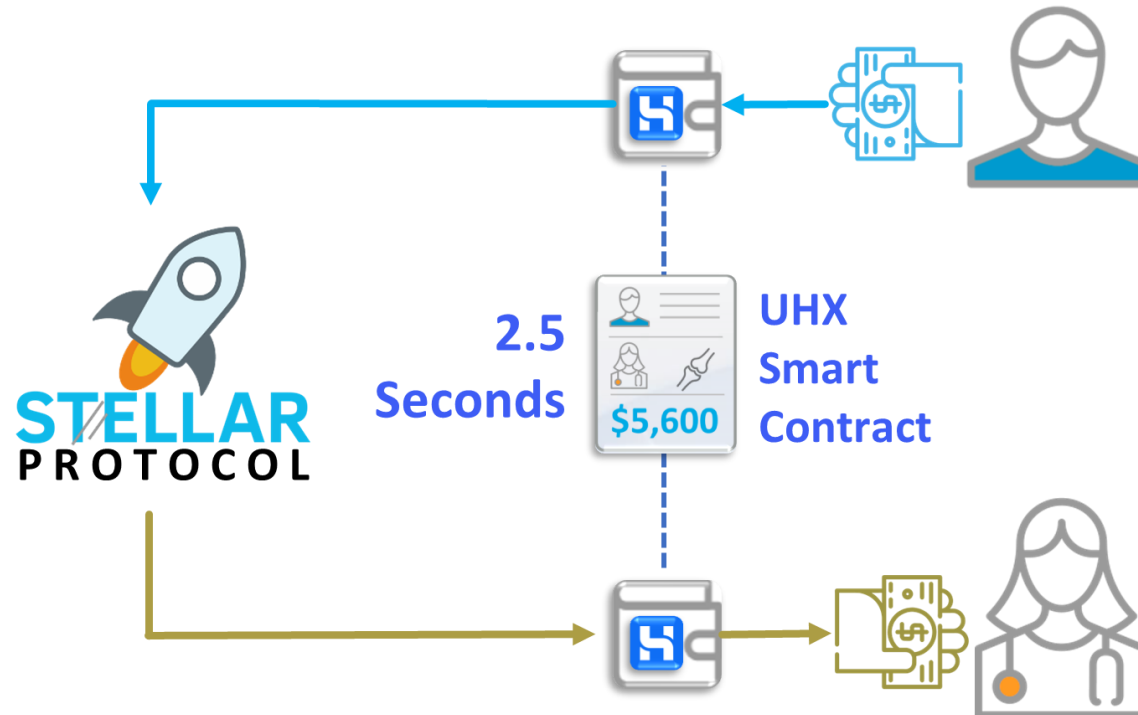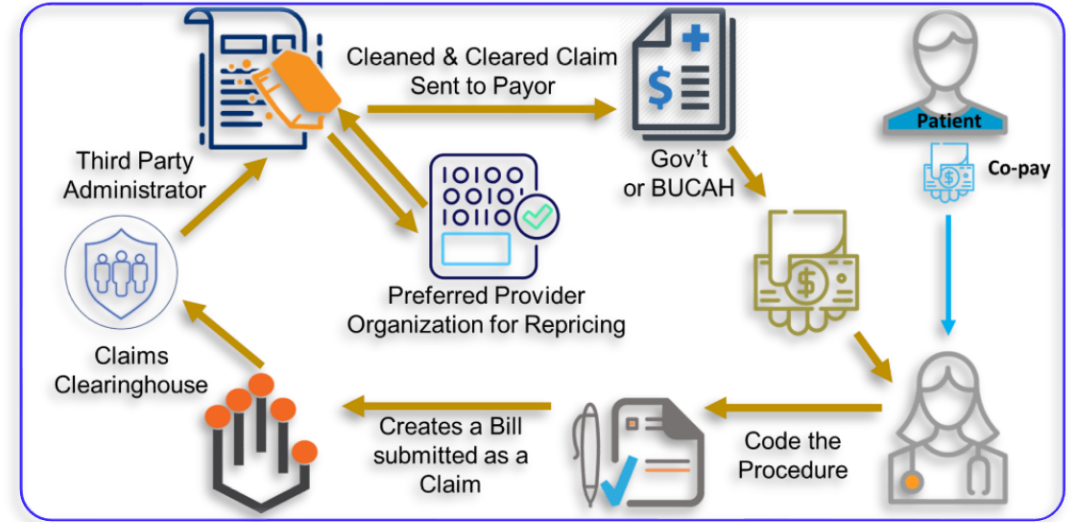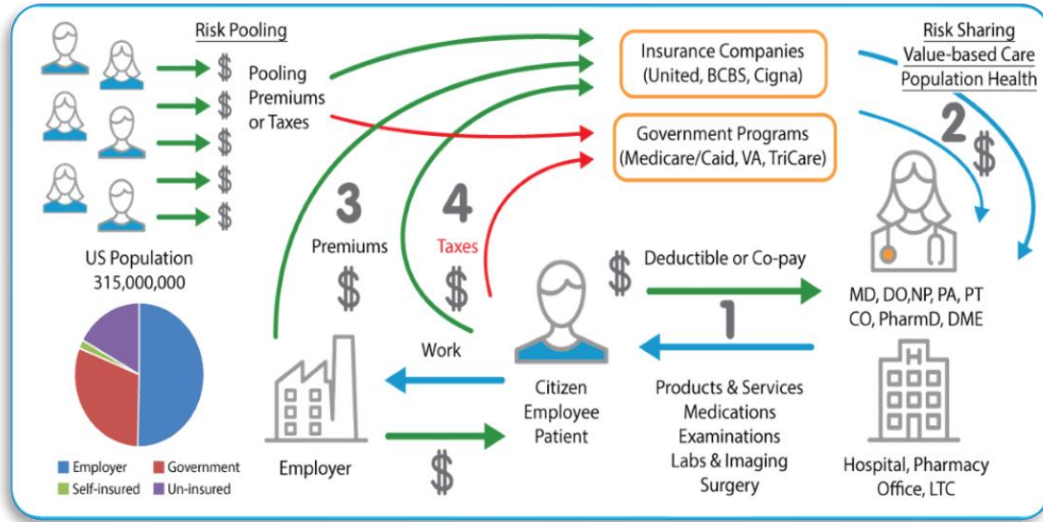- Example: **Property Deeds**

Healthcare Funding and Payment

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Smart Supply Chains

Global supply chain transactions pass through hundreds of interactions across multiple people, organizations, and countries.

- Maersk and IBM Introduce TradeLens
- Nestlé, French supermarket chain Carrefour and IBM
- Intel's seafood supply chain project
- Moyee Coffee and FairChain

Blockchain technology builds trust into the supply chain by providing a secure, distributed ledger that tracks information on goods, services, and transactions.
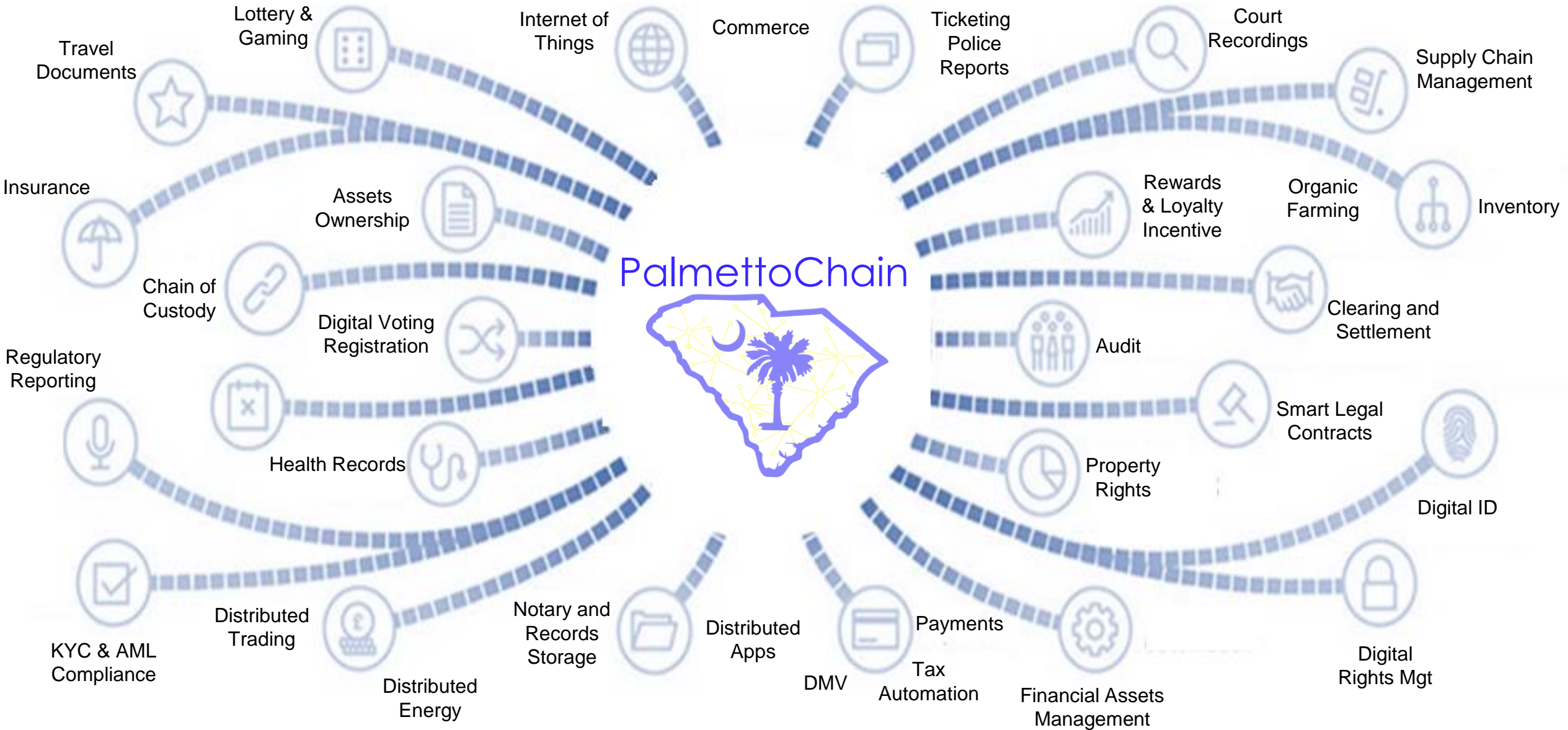
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Advocating for legislation to build the foundation so South Carolina may lead in being a friend of Blockchain Business

- *South Carolina Blockchain Industry Empowerment Act of 2019 in the form of H4351 & S738*

- *Proposed the Governor sponsor a Task Force to study the benefits of Blockchain and Cryptocurrency technology to the stakeholders and citizens of S.C.*

Ways to use Blockchain Technology in South Carolina

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Travel Documents

Lottery & Gaming

Internet of Things

Commerce

Ticketing Police Reports

Court Recordings

Supply Chain Management

Insurance

Assets Ownership

Rewards & Loyalty Incentive

Organic Farming

Inventory

Chain of Custody

Digital Voting Registration

Clearing and Settlement

Regulatory Reporting

Audit

Health Records

Smart Legal Contracts

Property Rights

Digital ID

KYC & AML Compliance

Distributed Trading

Notary and Records Storage

Distributed Apps

Payments

Financial Assets Management

Digital Rights Mgt

Distributed Energy

DMV

Tax Automation

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"Blockchain Movement"

Learn through Lyrics

People	Stellar	Electronic Cash
Hashing	Decentralized	Consensus
Ether	Trust the Chain	Middleman
Market Cap	UHX	Open Source
Wealth	DAO	No Sole
Secure	HODL	Ownership
Dash	Crypto	Consumers
Milton Friedman	Satoshi	Providers
Bitcoin	P2P	World