

# Introduction To Blockchain

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# About Me

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- Head of Blockchain in Agmo Studio Sdn Bhd
- Blockchain project involved:
  - GetCoinApp
    - First Malaysia BTC Broker (Bank Negara Malaysia Approved)
  - Blockchain Electronic Health Record
- I started my career as server developer.
  - Involved in industrial financial system
    - Hedging
    - Stock Market Prediction



**Jia Hui**

Head of Blockchain

# Today's Team

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**Jia Hui**

Trainer



**Steven**

Assistant



**Keng Ye**

Assistant

# Blockchain Very Important Concept

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Blockchain



is not



Bitcoin

Blockchain - a distributed ledger with consensus algorithm.

# Blockchain Characteristics

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- Distributed ~ **(Everywhere)**
- Immutable ~ **(Unable to change)**
- History
- Secure ~ **(Un-hackable)**

# Blockchain Ledger

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ledger definition



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About 37,200,000 results (0.60 seconds)

## Dictionary

Enter a word, e.g. 'pie'



# ledger

/ˈledʒə/

*noun*

1. a book or other collection of financial accounts.  
"the total balance of the purchases ledger"  
*synonyms:* [book](#), account book, record book, [register](#), [registry](#), [log](#); [More](#)
2. a flat stone slab covering a grave.  
"the ledger stone of William Averie"

*verb*

1. fish using a ledger.



Translations, word origin, and more definitions

[Feedback](#)





ledger definition blockchain



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About 1,160,000 results (0.46 seconds)

**DEFINITION** of 'Distributed **Ledgers**' A distributed **ledger** is a **database** that is consensually shared and synchronized across network spread across multiple sites, institutions or geographies. ... Underlying the distributed **ledger** technology is the **blockchain**, which is the technology that underlies **bitcoin**.

[Distributed Ledgers Definition | Investopedia](https://www.investopedia.com/terms/d/distributed-ledgers.asp)

<https://www.investopedia.com/terms/d/distributed-ledgers.asp>

About this result

Feedback

In a Blockchain world

Ledger = Database

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# Why is it called Ledger but not Database?

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# Database vs Blockchain Ledger

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Database	Blockchain Ledger
Insert	Insert
Update	No Update Operation
Delete	No Delete Operation

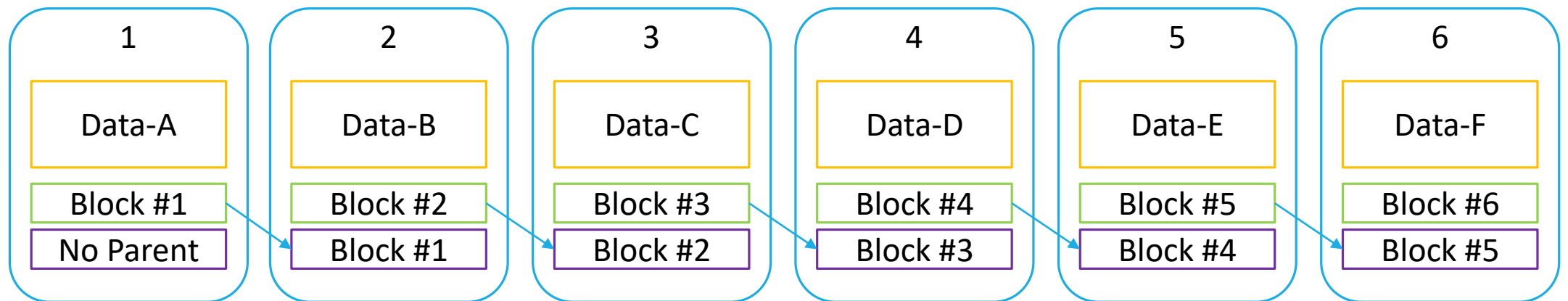
# Database

Results		Messages				
	TestId	TestPackageId	TestAssessmentId	CreatedDate	IsDelete	PriceInvoiceSet
1	1	1	1	2017-12-18 09:29:46.0642629	0	NULL
2	2	1	2	2017-12-18 09:30:49.1905448	0	NULL
3	3	2	3	2017-12-20 09:04:43.9236049	0	NULL
4	4	2	4	2017-12-20 15:28:33.0539960	0	NULL
5	5	2	5	2017-12-21 06:57:27.0786300	0	NULL
6	6	2	6	2017-12-21 06:59:49.3179740	0	NULL
7	7	2	7	2017-12-21 07:00:52.9165453	0	NULL
8	8	1	8	2017-12-26 07:29:11.9476683	0	NULL
9	9	2	9	2017-12-26 09:48:35.3988402	0	NULL
10	10	2	10	2017-12-27 04:26:05.5196349	0	NULL
11	11	2	11	2017-12-27 06:28:06.2765682	0	NULL
12	12	2	12	2017-12-27 07:05:04.2005123	0	NULL
13	13	1	13	2017-12-27 15:41:54.5532361	0	NULL
14	14	2	14	2017-12-28 03:21:43.2869986	0	NULL
15	15	2	15	2017-12-28 09:07:59.4291605	0	NULL
16	16	2	16	2017-12-28 09:24:48.9637165	0	NULL
17	17	2	17	2017-12-28 09:29:15.2944450	0	NULL
18	18	2	18	2017-12-28 09:30:18.1178699	0	NULL
19	19	2	19	2017-12-28 10:45:28.6061059	0	NULL
20	20	1	20	2017-12-28 10:48:48.3582380	0	NULL

Query executed successfully.

# Blockchain Ledger

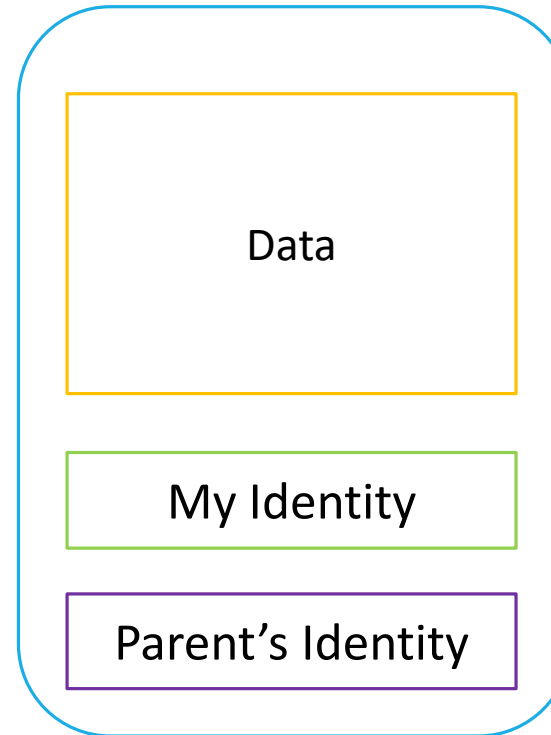
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# Block

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- Have data
- Have it's own identity
- Have parent's identity



# How to calculate identity?

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- SHA256 hash algorithm.
- SHA1 hash algorithm.
- MD5 hash algorithm.

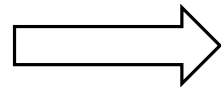


# Hash

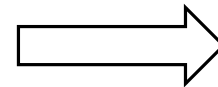
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Input

abcd



Hash  
Algorithm



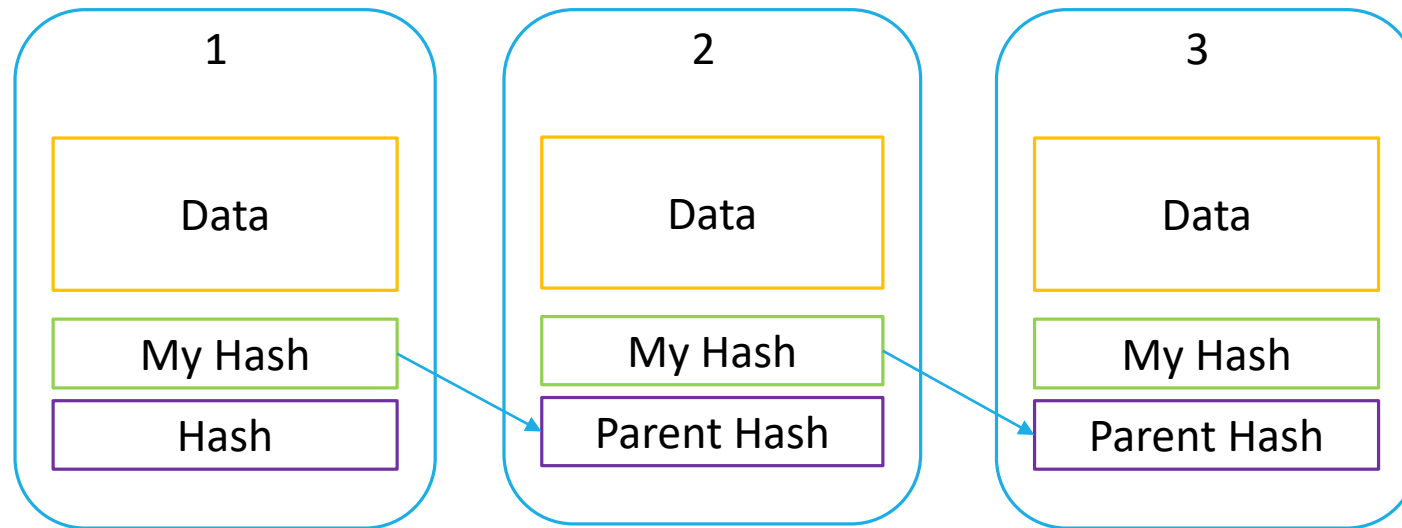
Output

0x1b29cd96f12

# Chain

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- Connect blocks
- Hash



# Why use ledger instead of database?

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- Once data is added, it is **impossible to change**.
- Once data is added, it **cannot be deleted**.

# Experience Blockchain Ledger

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<https://github.com/AgmoStudioSdnBhd/BlockchainDemo>

Blockchain - a distributed **ledger** with consensus algorithm.

- Database
- Have block and chain
- Linked together by hash

Blockchain - a distributed **ledger** with consensus algorithm.

# Blockchain Characteristics

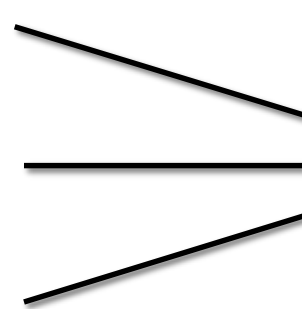
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- Distributed ~ **(Everywhere)**

- **Immutable**

- **History**

- **Secure**



# Distributed Network

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# Distributed Network (P2P Network)

D:0.01 k U:0.01 k - µTorrent 3.4.4

File Options Help

Upgrade to Pro

Torrents (24)

- Downloading (5)
- Seeding (15)
- Completed (19)
- Active (0)
- Inactive (24)

Labels

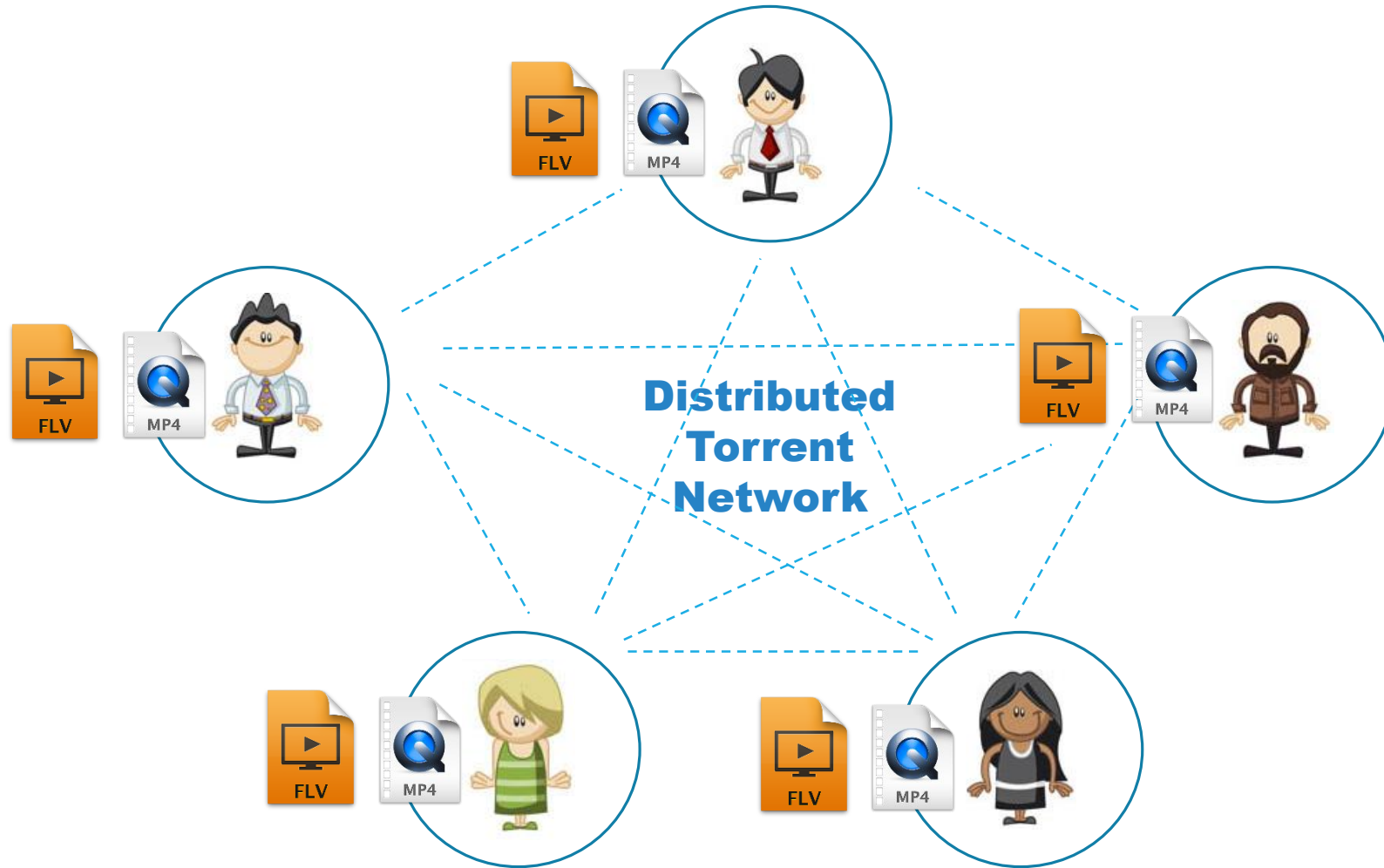
- No Label (24)

Feeds (0)

Devices (0)

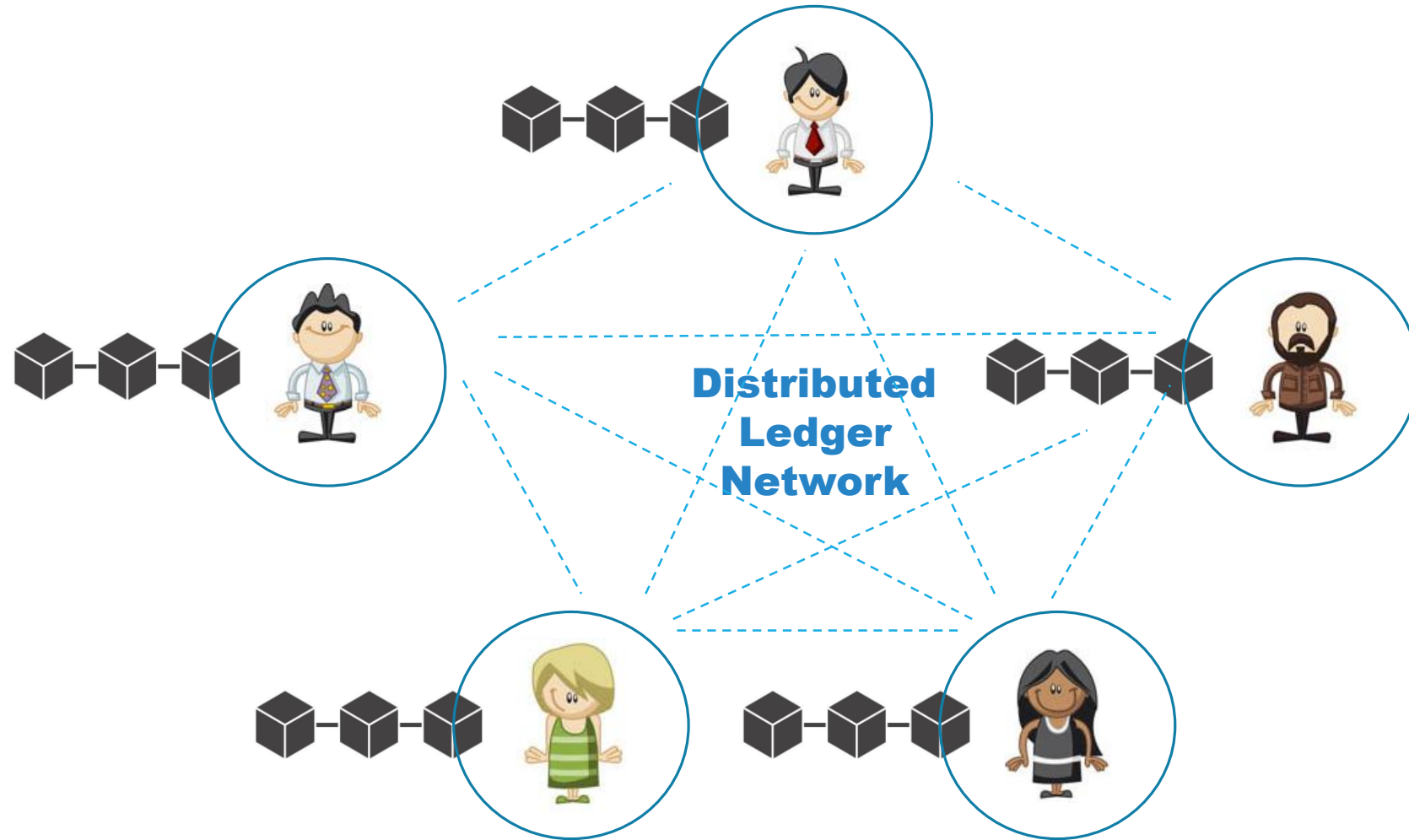
Advertisement

#	Name	Size	Downloaded	Status	Dov
5	Altitude (2017) 720p BrRip x264 - VPPV	751 MB	0 B	Connecting to peer	
4	Their.Finest.2016.BRRip.XViD-juggs	706 MB	0 B	Connecting to peer	
3	By Any Means 2017 720p WEBRip 600 MB - iExTV	601 MB	0 B	Connecting to peer	
2	Grey.Lady.2017.WEB-DL.x264-FGT	960 MB	104 MB	Connecting to peer	
1	The.Lost.City.of.Z.2016.WEB-DL.x264-FGT	1.18 GB	73.9 MB	Connecting to peer	
	Kevin.Hart.Presents.The.Next.Level.S01E02.James.Davis.720p....	384 MB	384 MB	Seeding	
	Power.S04E01.WEBRip.x264-RARBG	506 MB	506 MB	Seeding	
	The.Loch.S01E03.HDTV.x264-ORGANiC[rarbg]	241 MB	241 MB	Seeding	
	Poldark.2015.S03E03.HDTV.x264-RiVER[rarbg]	325 MB	325 MB	Seeding	
	Riviera.S01E10.HDTV.x264-FGT	402 MB	402 MB	Seeding	



# Distributed Ledger

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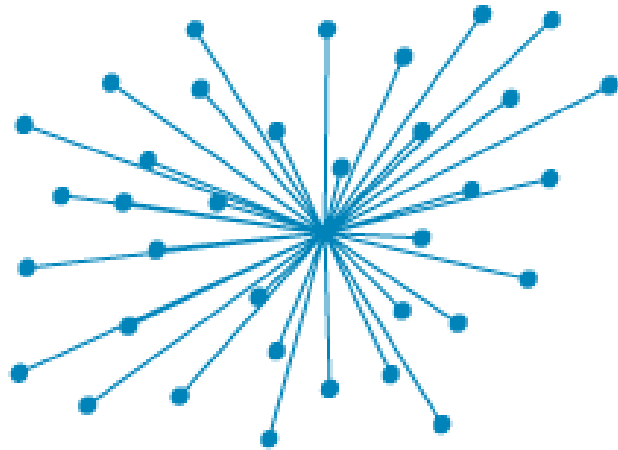
# What is so good being distributed?

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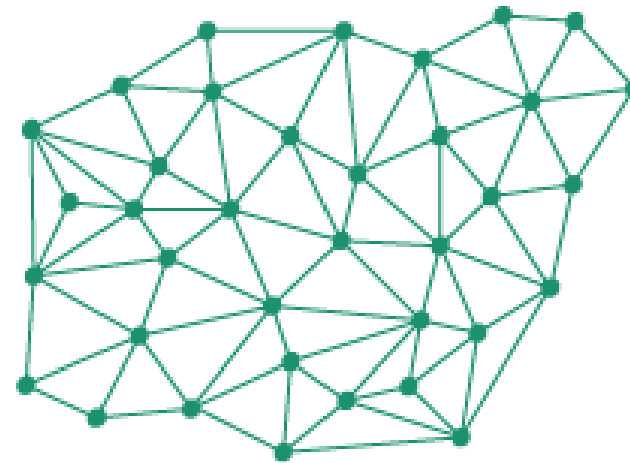
# Centralized vs Distributed

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CENTRALIZED



DISTRIBUTED



# Centralized vs Distributed

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## CENTRALIZED

- Data are stored in **one server**
- Data are not **secure**

## DISTRIBUTED

- Data are stored in every **nodes**
- Data are **secure**

# Blockchain Characteristics

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- Distributed
- Immutable
- History
- Secure



Distributed



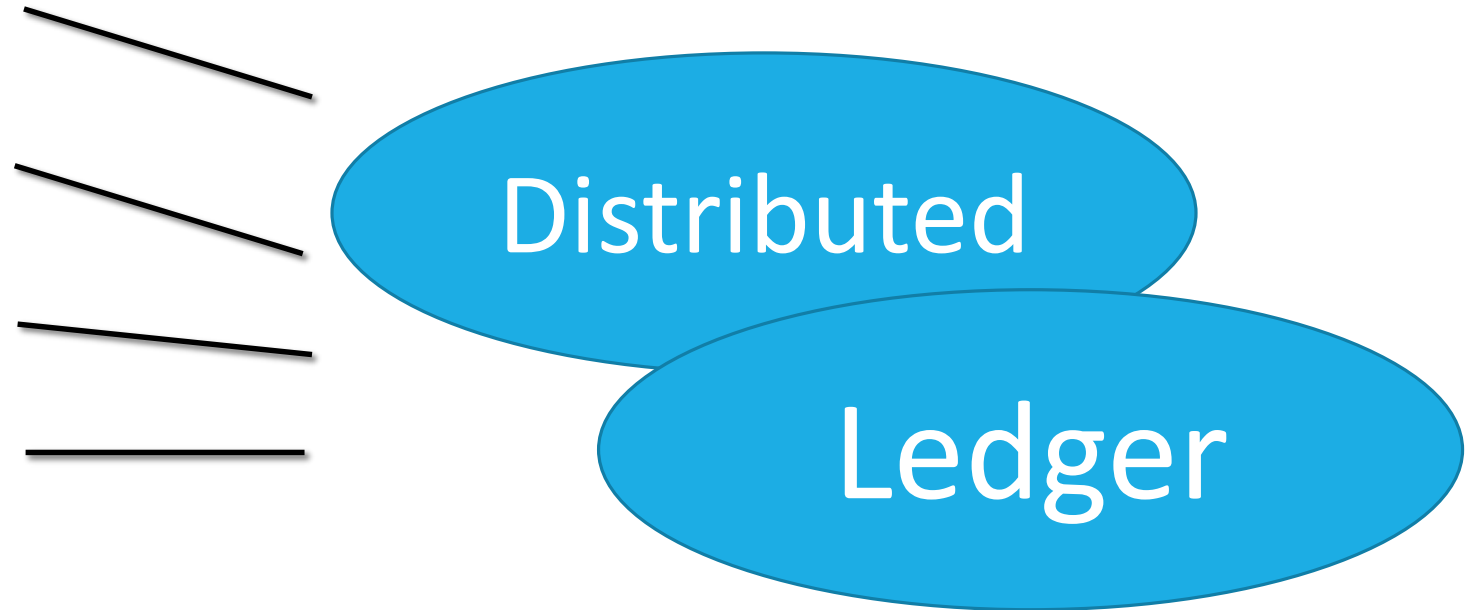
# Actually if you remember

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# Blockchain Characteristics

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- Distributed
- Immutable
- History
- Secure



# Why Blockchain instead of Distributed Ledger?

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- Many nodes instead of one server.
- Secure

- Database
- Have block and chain
- Linked together by hash

Blockchain - a **distributed ledger** with consensus algorithm.

# Consensus

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a fault-tolerant mechanism that is used in computer and Blockchain systems to achieve the necessary agreement on a single data value or a single state of the network among distributed processes or multi-agent systems. It is useful in record-keeping, among other things.

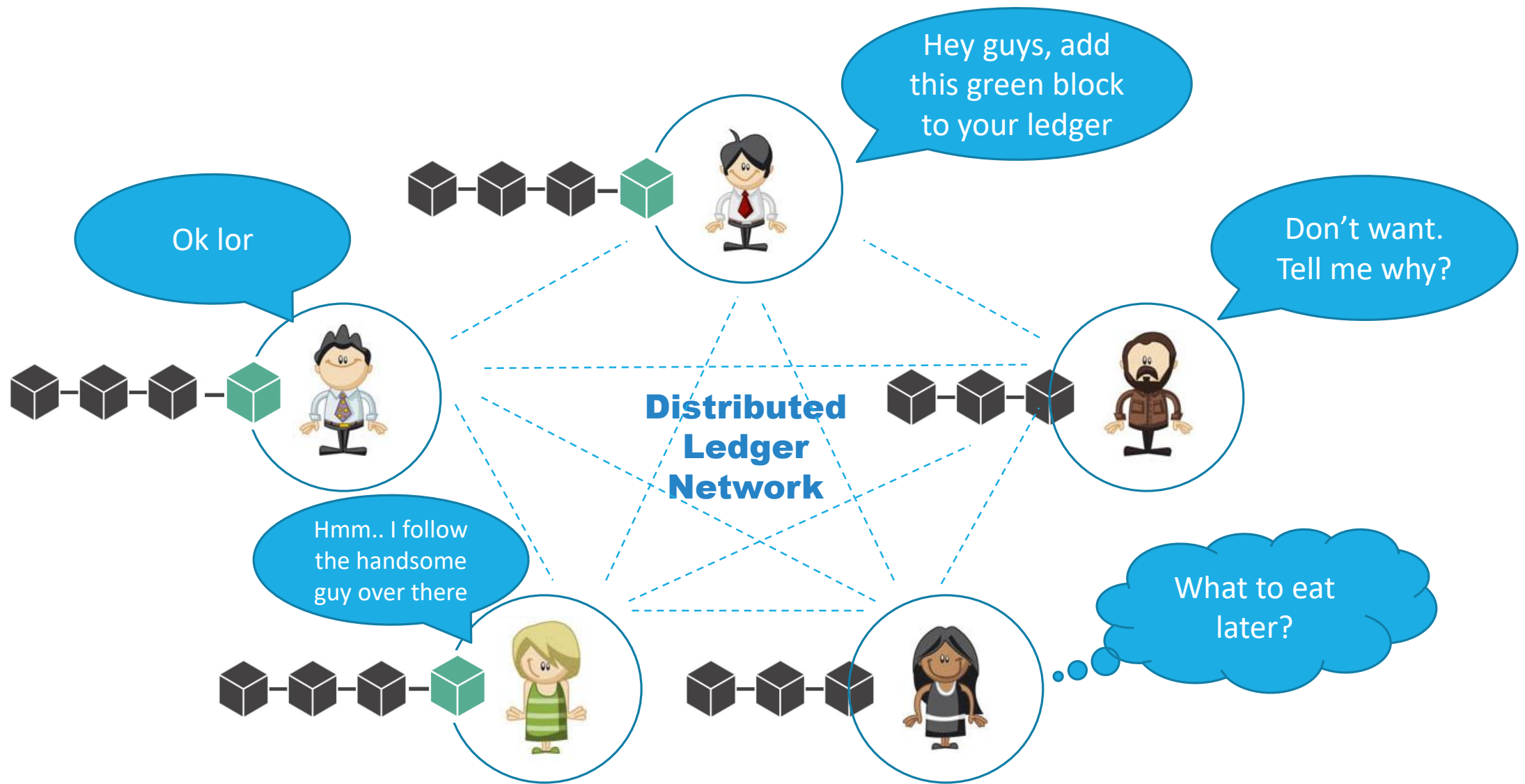
# Consensus (TL;DR)

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Making everyone happy.

**Without** consensus in a  
distributed ledger

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# How to make everyone happy?

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# Consensus Algorithm

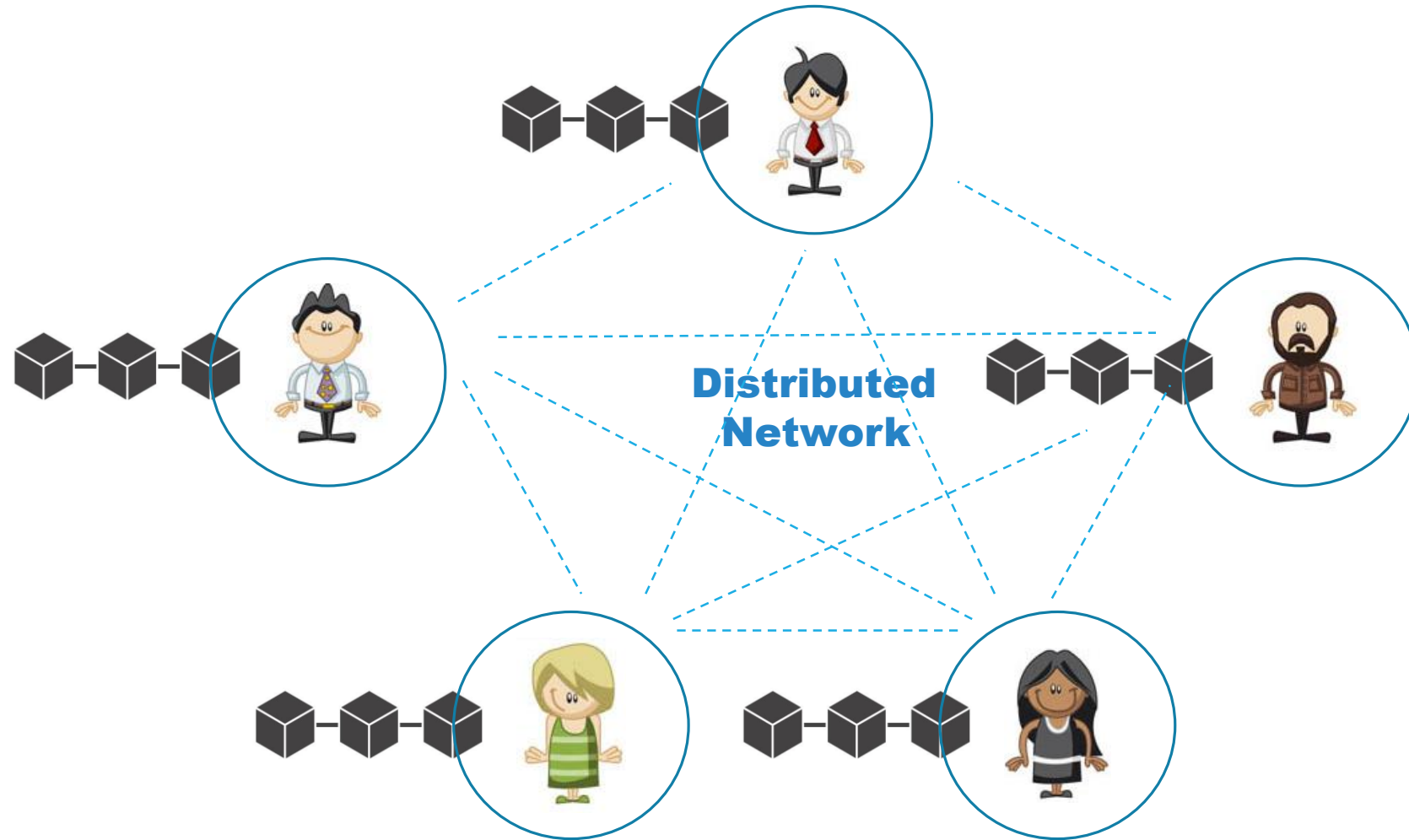
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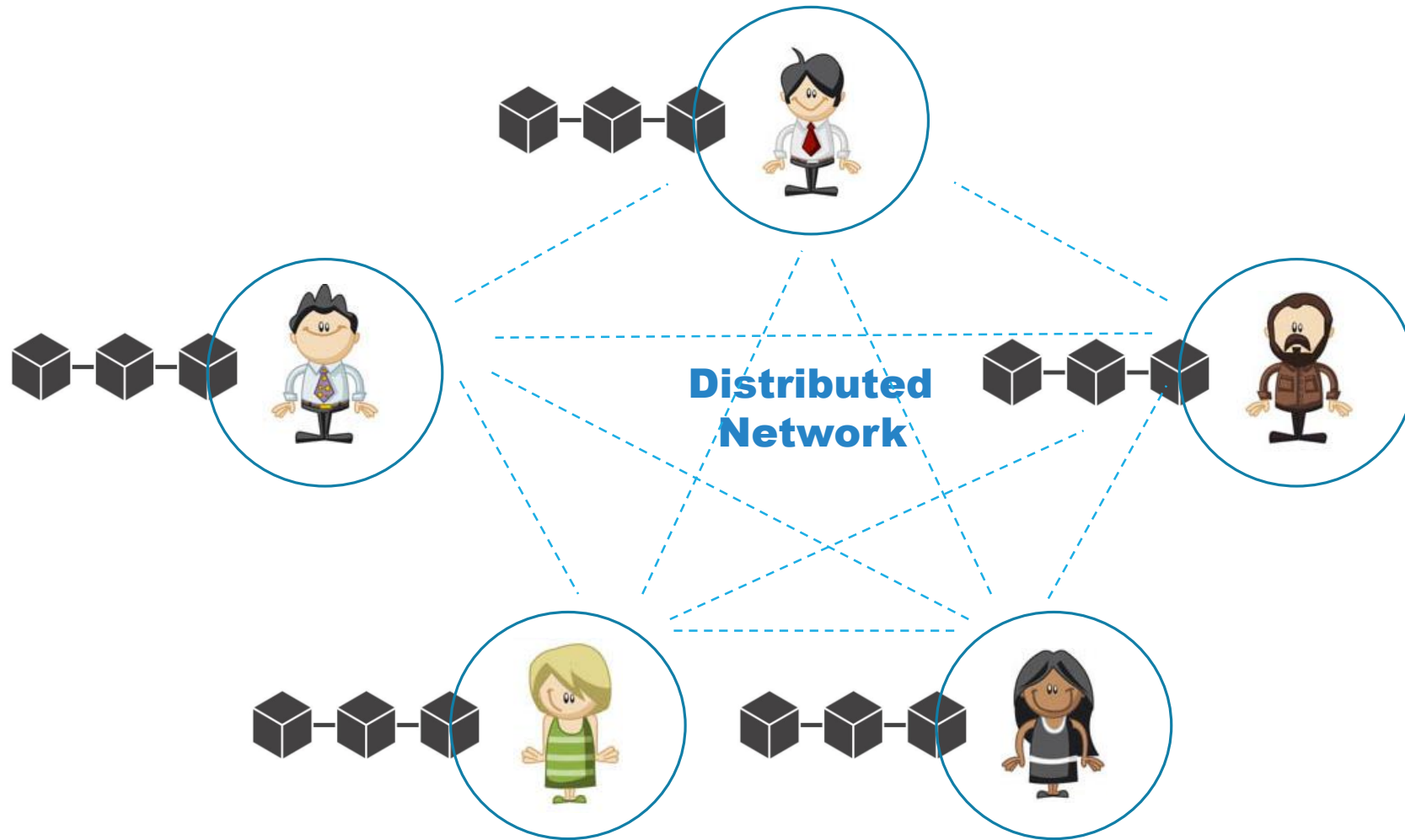
- Proof of Work
- Proof of Stake
- Proof of Elapsed Time
- Proof of Storage

# Proof of Work (PoW)

- A Consensus algorithm
- Used to **confirm transactions**
- **Produce new blocks** to the chain
- Have **miners**

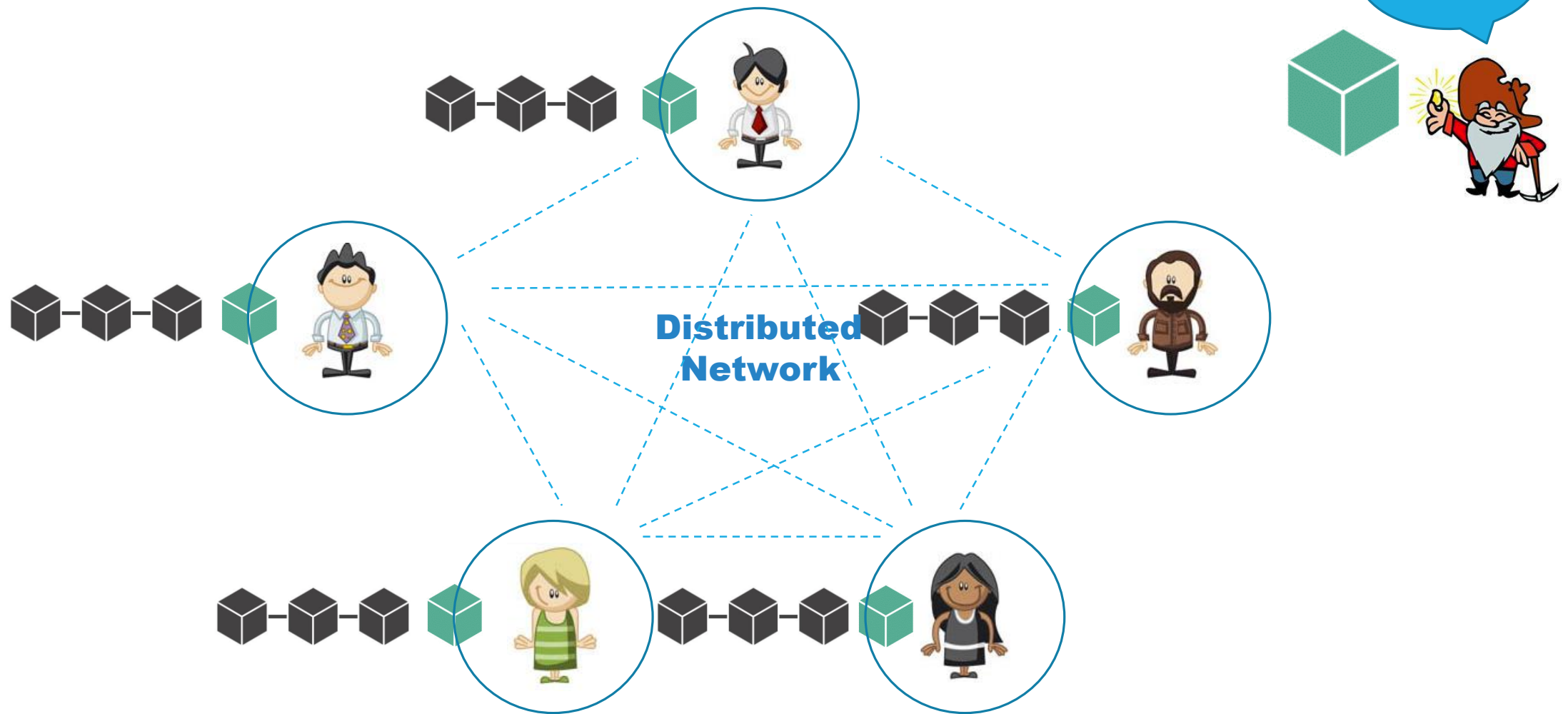


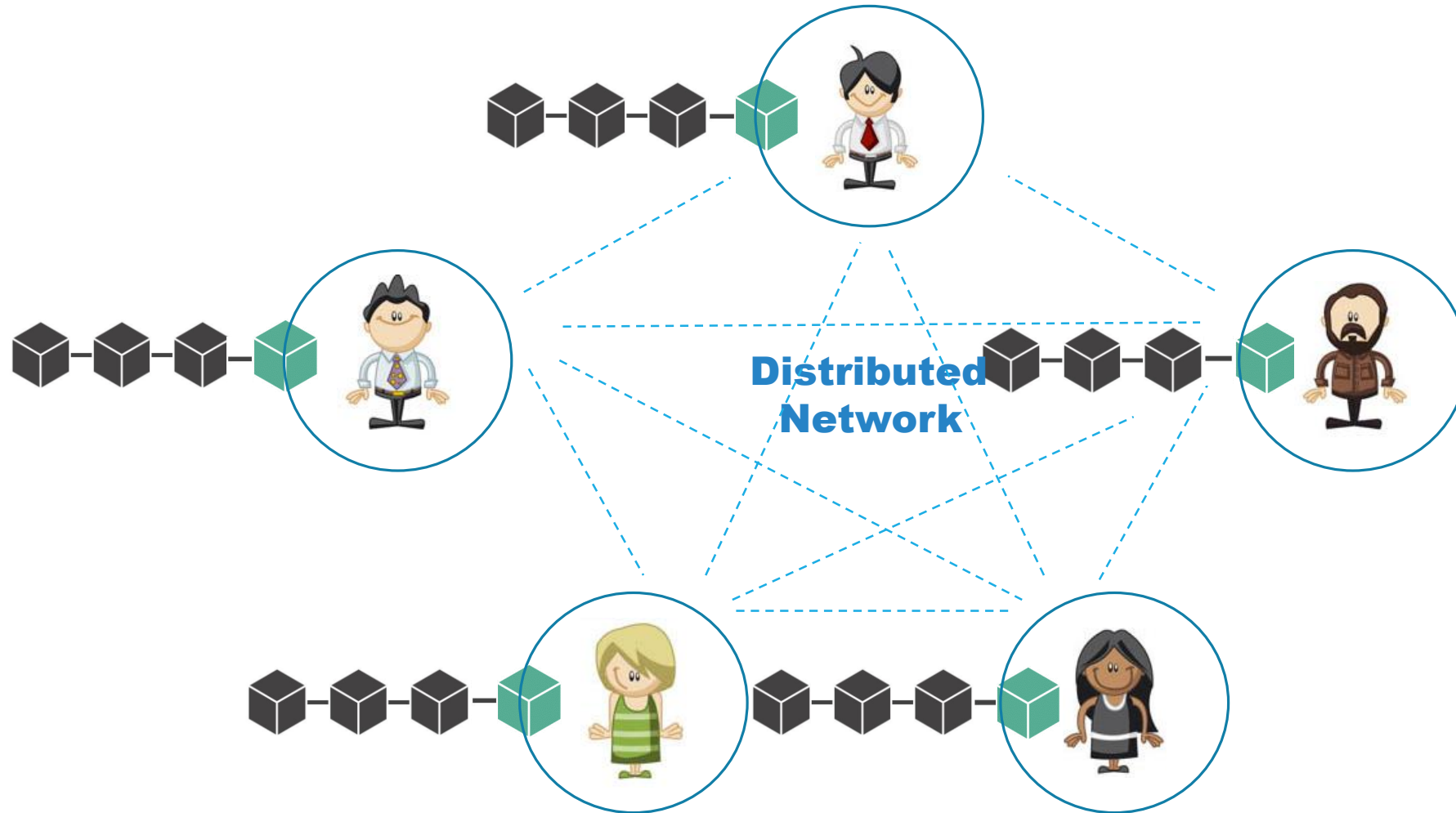




Hey, I found  
a new block







In **PoW consensus**  
algorithm, only the miner  
can make **everyone happy**  
to add new block.

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But remember, PoW is only  
one of an example to make  
everyone happy.

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# Consensus Algorithm

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- Proof of Work



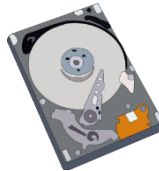
- Proof of Stake



- Proof of Elapsed Time



- Proof of Storage



# Experience Mining

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<https://github.com/AgmoStudioSdnBhd/BlockchainDemo>

- Many nodes instead of one server.
- Secure

- Database
- Have block and chain
- Linked together by hash

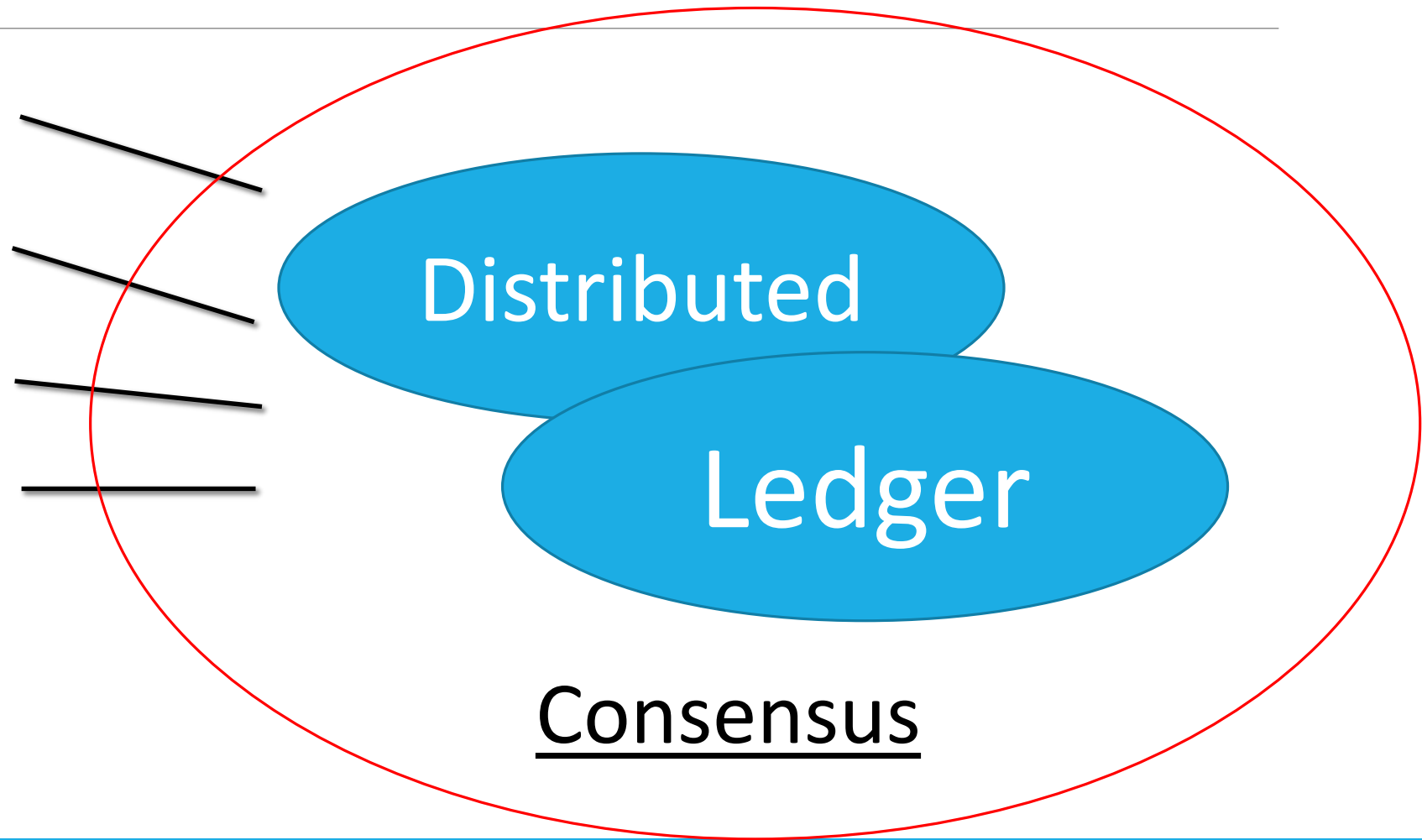
Blockchain - a **distributed ledger** with **consensus** algorithm.

- To make everyone happy.
- To make sure everyone have the same data.
- Have many ways

# Blockchain Characteristics

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- Distributed
- Immutable
- History
- Secure+++



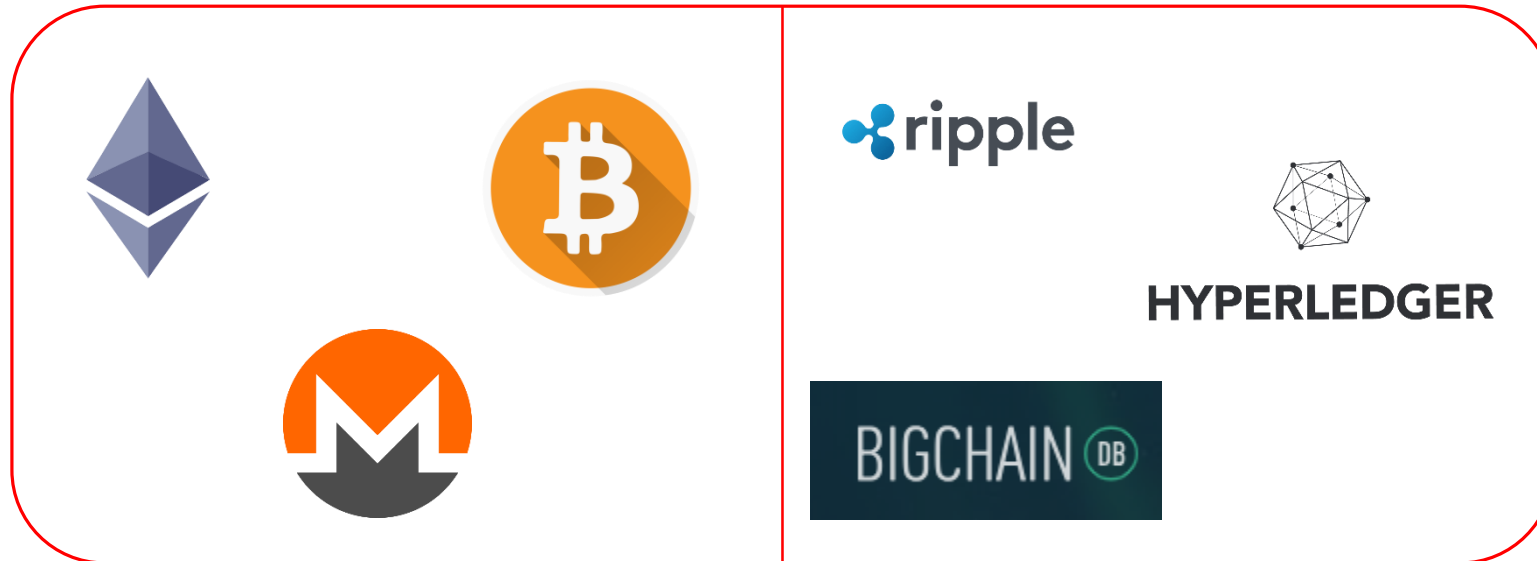
# Type of Blockchain

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Public

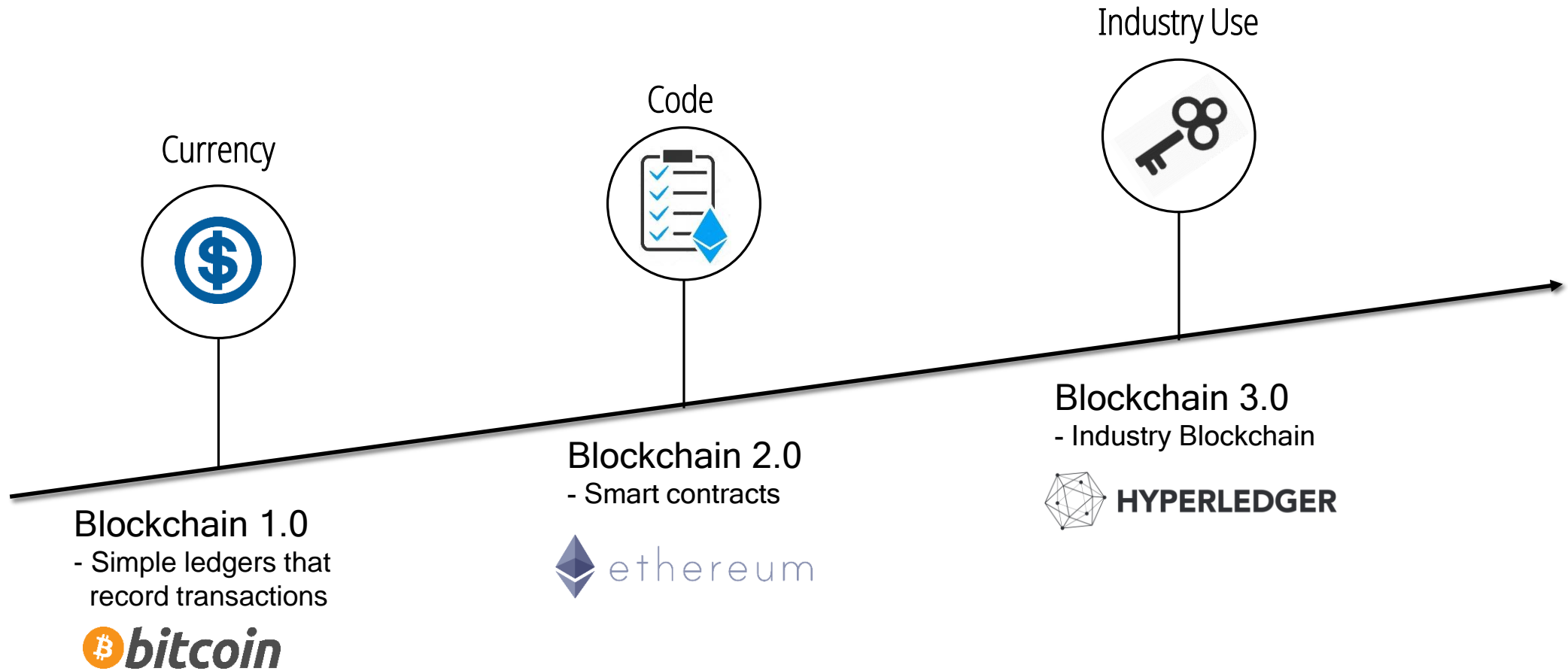
Private

Permission-less



Permissioned

# Evolution of Blockchain



# Blockchain Use-Cases

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- UTAR – Blockchain Graduation Certificate

- Source : <https://www.utar.edu.my/deas/index.jsp?fcid=388&fcontentid=1878&f2ndcontentid=191345>

- Blockchain Property Management – Swedish

- Source: <https://cointelegraph.com/news/swedish-government-land-registry-soon-to-conduct-first-blockchain-property-transaction>



# 50+ BLOCKCHAIN REAL WORLD USE CASES

**GOVERNMENT**

Essentia develops world's first blockchain solution to manage international logistics hub together with Traffic Labs and the Finnish Government

essentia.one

**IDENTIFICATION**

Voter registration is being facilitated via a blockchain project in Switzerland spearheaded by Uport.

uport

**MOBILE PAYMENTS**

The blockchain ledger that Ripple uses has been latched onto by a group of Japanese banks, who will be using it for quick mobile payments.

ripple

**INSURANCE**

A smart contract-based blockchain is being used by Insurer American International Group Inc as a means of saving costs and increasing transparency.

AIG

**ENDANGERED SPECIES PROTECTION**

The protection of endangered species is being facilitated via a blockchain project that records the activities of these rare animals.

**CARBON OFFSETS**

IBM is using the Hyperledger Fabric blockchain in China to monitor carbon offset trading.

IBM HYPERLEDGER

**ENTERPRISE**

Ethereum's blockchain can be accessed as a cloud-based service courtesy of Microsoft Azure.

Microsoft Azure

**BORDER CONTROL**

Essentia has devised a border control system that would use blockchain to store passenger data in the Netherlands.

essentia.one

**SUPPLY CHAINS**

IBM and Walmart have partnered in China to create a blockchain project that will monitor food safety.

IBM Walmart

**HEALTHCARE**

A number of healthcare systems that store data on the blockchain have been pioneered including MedRec.

MEDREC

**SHIPPING**

Shipping is a natural fit for blockchain, and Maersk have been trialling a blockchainbased project within the maritime logistics industry.

MÆRSK

**REAL ESTATE**

Blockchain is now being used to complete real estate deals, the first of which was conducted in Kiev by Propy.

PROPY

**ENERGY**

Essentia is developing a test project that will help energy suppliers track the distribution of their resources in real time, whilst maintaining data confidentiality.

essentia.one

**LAND REGISTRY**

Land registry titles are now being stored on the blockchain in Georgia in a project developed by the National Agency of Public Registry.

NATIONAL AGENCY OF PUBLIC REGISTRY

**COMPUTATION**

Digital Currency Group are helping Amazon Web Services examine ways in which the distributed ledger technology can help improve database security.

DIGITAL CURRENCY GROUP

**ADVERTISING**

New York Interactive Advertising Exchange has been experimenting with blockchain as a means of providing an ads marketplace for publishers.

NYIAX

**BORDER CONTROL**

Essentia is developing a blockchain project for border control that will allow customs agents to record passenger data from an array of inputs and safely store it.

essentia.one

**JOURNALISM**

Decentralized journalism, as enabled by blockchain technology, has the potential to prevent censorship and increase transparency as Civil has shown.

CIVIL

**WASTE MANAGEMENT**

Waltonchain is using RFID technology to store waste management data on the blockchain in China.

**ENERGY**

Food importation is another industry where blockchain is proving its worth, with Louis Dreyfus Co trialling a soybean importation operation using this technology.

LDC

**DIAMONDS**

The De Beers Group is using blockchain to track the importation and sale of diamonds.

DE BEERS

**FINE ART**

By storing certificates of authenticity on the blockchain, it's possible to dramatically reduce art forgeries, as one blockchain project is proving.

**NATIONAL SECURITY**

For the past two years, the US Department of Homeland Security has been using blockchain to record and safely store data captured from its security cameras.

U.S. DEPARTMENT OF HOMELAND SECURITY

**TOURISM**

In a bid to boost its tourism economy, Hawaii is examining ways in which blockchain-based cryptocurrencies can be adopted throughout the US state.

STATE OF HAWAII

**TAXATION**

In China, a tax-based initiative is using blockchain to store tax records and electronic invoices led by Miaocai Network.

**ENERGY**

Chile's National Energy Commission has started using blockchain technology as a way of certifying data pertaining to the country's energy usage as it seeks to update its electrical infrastructure.

CNE COMISIÓN NACIONAL DE ENERGÍA

**RAILWAYS**

Russian rail operator Novotrans is storing inventory data on a blockchain pertaining to repair requests and rolling stock.

НОВОТРАНС

**ENTERPRISE**

Google is building its own blockchain which will be integrated into its cloud-based services, enabling businesses to store data on it, and to request their own white label version developed by Alphabet Inc.

Google Alphabet

**MUSIC**

Arbit is a blockchain-based project led by former Guns N Roses drummer Matt Sorum seeking a fairer way to reward musicians for their creative efforts.

arbit

**FISHING**

Blockchain technology has been used to provide a transparent record of where fish was caught, as a means of ensuring it was legally landed.

# Thank you

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