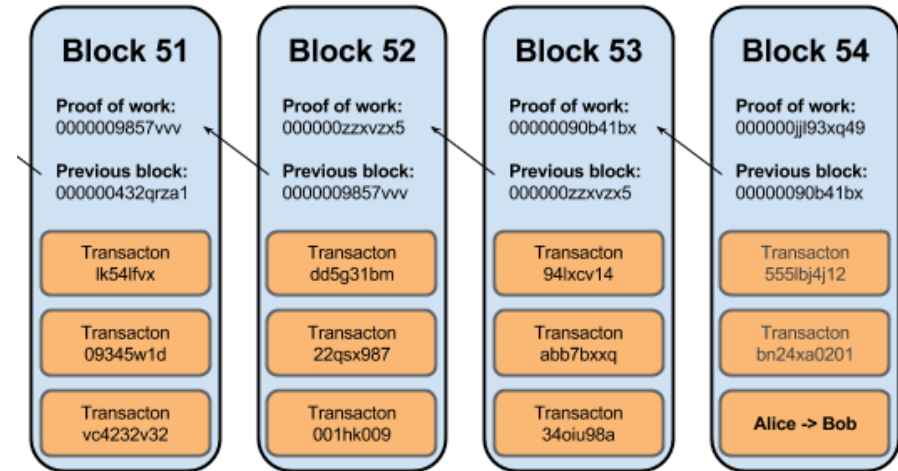# Blockchain Introduction

Devendra Chaudhari
**Managing Solution Architect**

22 Dev 2016

What Is Blockchain Technology?

A Blockchain is a type of distributed ledger, comprised of unchangeable, digitally recorded data(transactions) in packages called blocks. These blocks are linked to each other to form a chain.

Block 51	Block 52	Block 53	Block 54
Proof of work: 0000009857vvv	**Proof of work:** 000000zzxvzx5	**Proof of work:** 00000090b41bx	**Proof of work:** 000000jjl93xq49
Previous block: 000000432qrza1	**Previous block:** 0000009857vvv	**Previous block:** 000000zzxvzx5	**Previous block:** 00000090b41bx
Transacton lk54lfvx	Transacton dd5g31bm	Transacton 94lxcv14	Transacton 555lbj4j12
Transacton 09345w1d	Transacton 22qsx987	Transacton abb7bxxq	Transacton bn24xa0201
Transacton vc4232v32	Transacton 001hk009	Transacton 34oiu98a	Alice -> Bob

Distributed ledgers or decentralised databases are systems that enabled parties who dont fully trust each other to form and maintain consensus about the existence, status and evolution of a set of shared facts spread across multiple sites/countries/institutions (nodes)
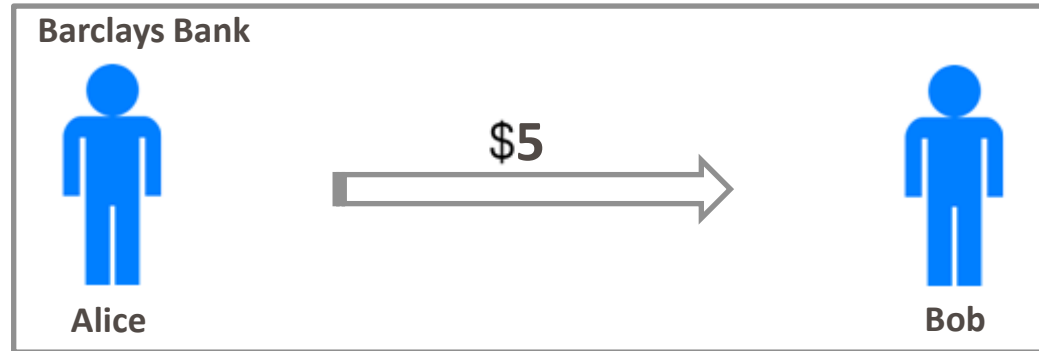
centralized   partially decentralized   fully decentralized

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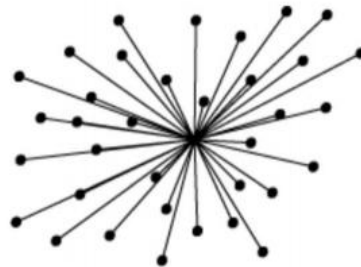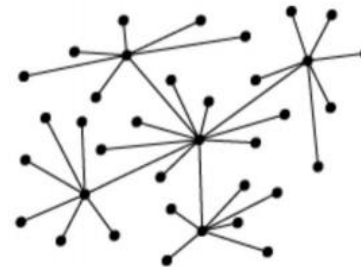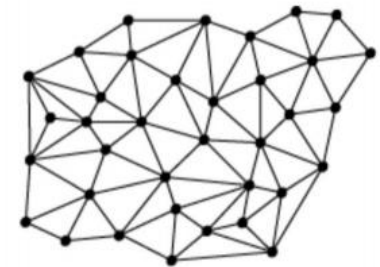
Blockchain example

Current world scenario: Transaction within same bank:

Barclays Bank

Alice → $5 → Bob

Barclays Ledger before transaction :

Id	Holder	Currency	Amount
1	Alice	USD	10
2	Bob	USD	5

Barclays Ledger after transaction :

Id	Holder	Currency	Amount
1	Alice	USD	5
2	Bob	USD	10

Blockchain example (contd..)

Current World Scenario: Transaction between different banks:

Barclays Bank		HSBC Bank
Alice	$5 →	Charlie
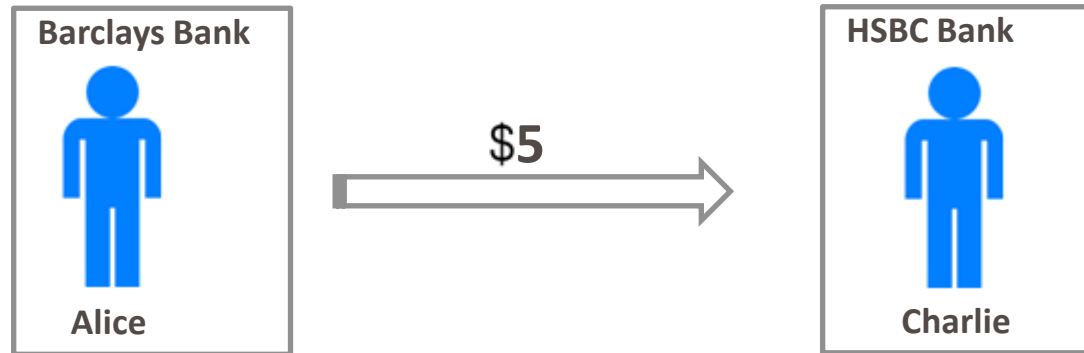
Barclays Ledger before transaction :

Id	Holder	Currency	Amount
1	Alice	USD	10
2	HSBC	USD	1000

HSBC Ledger before transaction :

Id	Holder	Currency	Amount
1	Charlie	USD	5
2	Barclays	USD	-1000

Barclays Ledger after transaction :

Id	Holder	Currency	Amount
1	Alice	USD	5
2	HSBC	USD	995

HSBC Ledger after transaction :

Id	Holder	Currency	Amount
1	Charlie	USD	10
2	Barclays	USD	-995

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Blockchain example (contd..)

Blockchain World Scenario: Transaction between different banks:

Barclays Bank		HSBC Bank
Alice	$5 →	Charlie
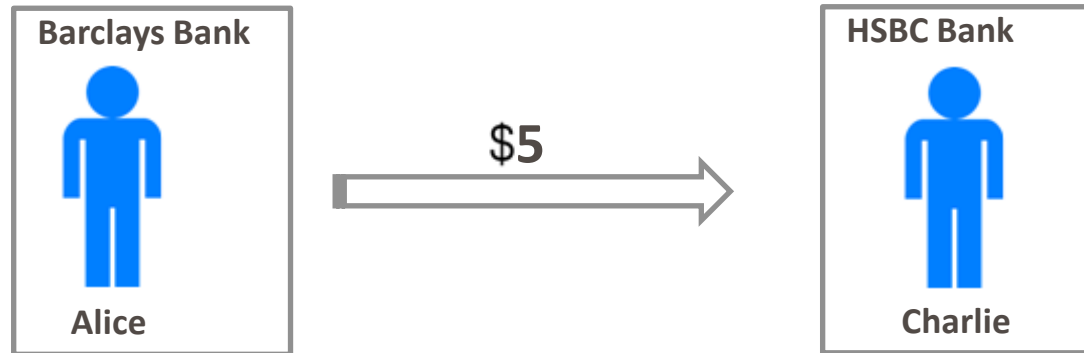
Distributed Ledger before transaction :

Id	Issuer	Holder	Currency	Amount
1	Barclays	Alice	USD	10
2	HSBC	Charlie	USD	5

Distributed Ledger after transaction :

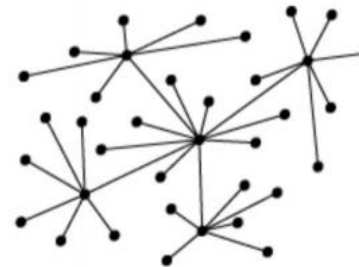| Id	Issuer	Holder	Currency	Amount
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What Is Blockchain Technology? Lets revisit again…

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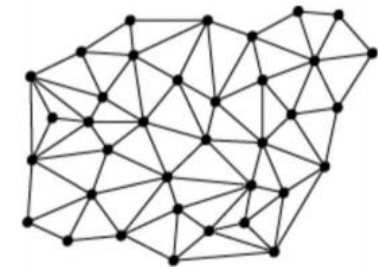
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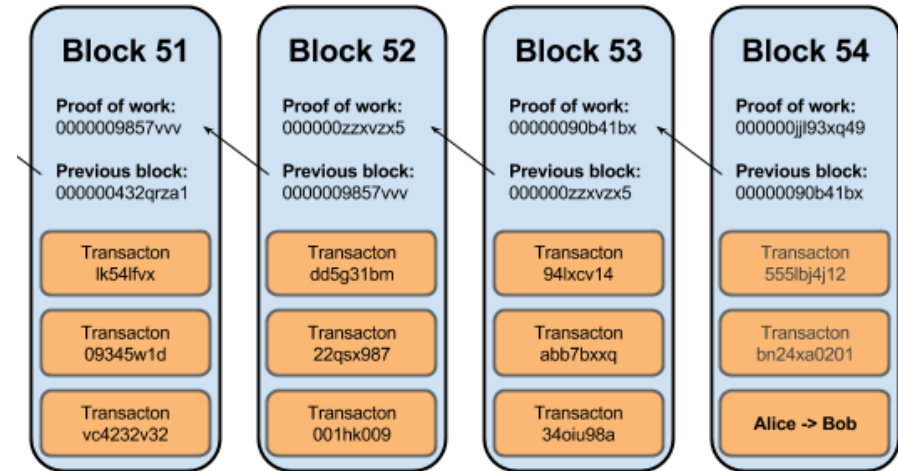
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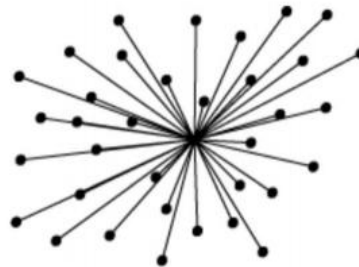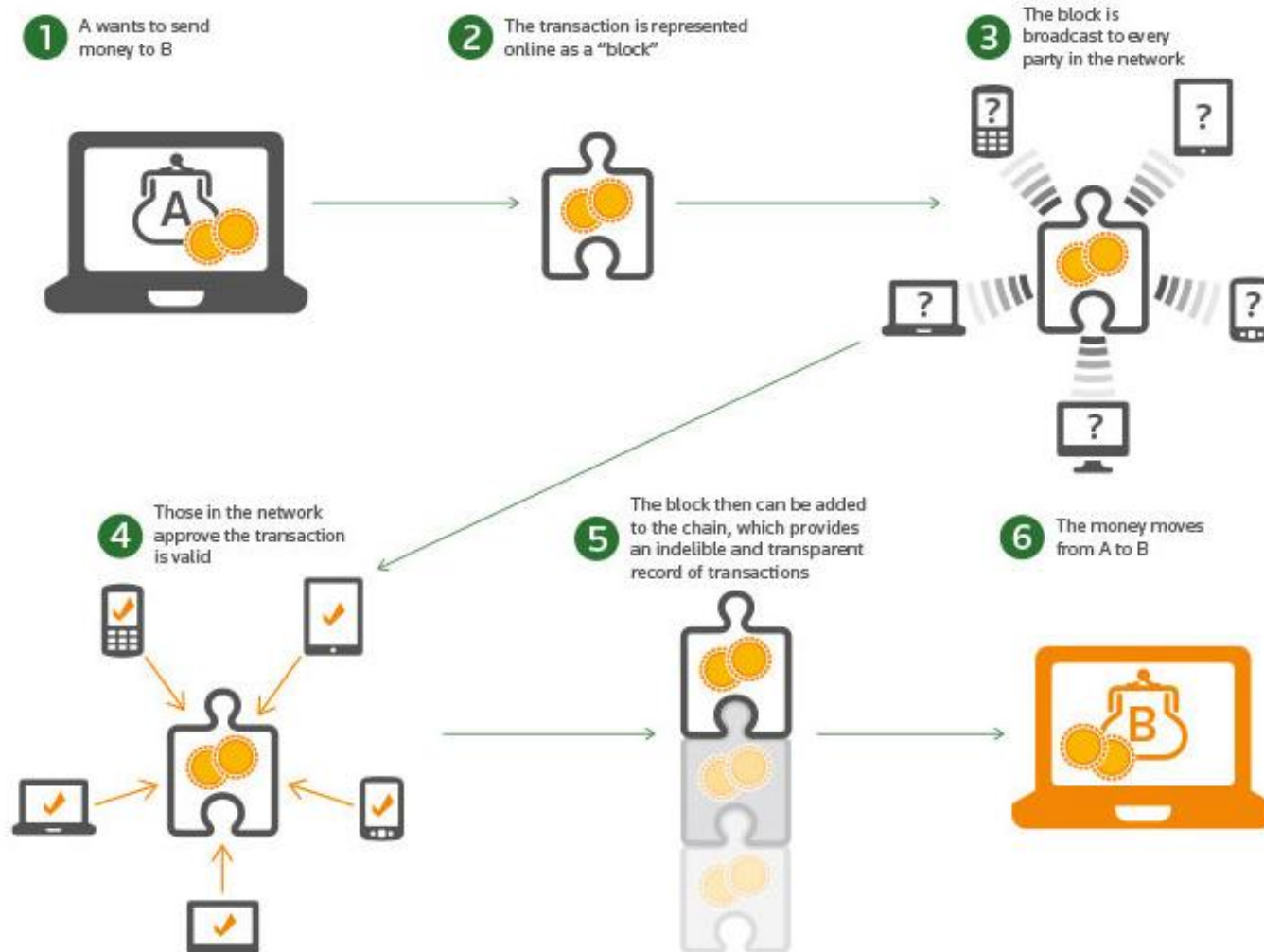
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How Bitcoin Blockchain Works?

① A wants to send money to B

② The transaction is represented online as a "block"

③ The block is broadcast to every party in the network

④ Those in the network approve the transaction is valid

⑤ The block then can be added to the chain, which provides an indelible and transparent record of transactions

⑥ The money moves from A to B

Need for Distributed Ledgers… The Finance IT problem statement…

Problem Statement - In finance, parties don't fully trust each other but need to build consensus among them about shared facts – agreements, contracts, deals and so on.
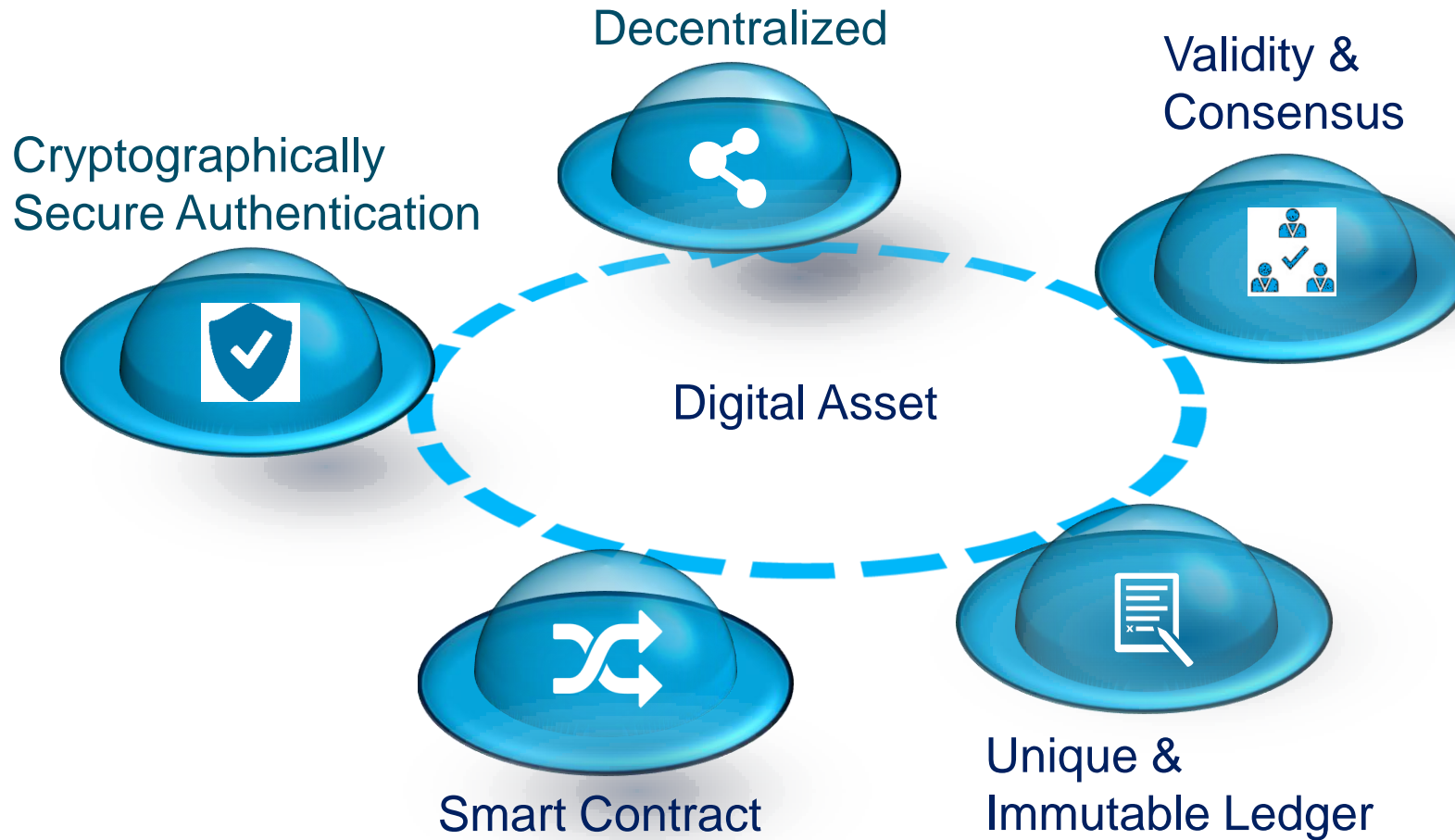
Key Issues with existing Finance IT systems – f
- proliferation of systems that exists between financial institutions f
- the same information is recorded in multiple places by different parties in different systems all slightly different
- there is a huge amount of work through reconciliation, matching to bring their systems back into consensus
- the existing platforms or solutions are not designed to solve the problem statement
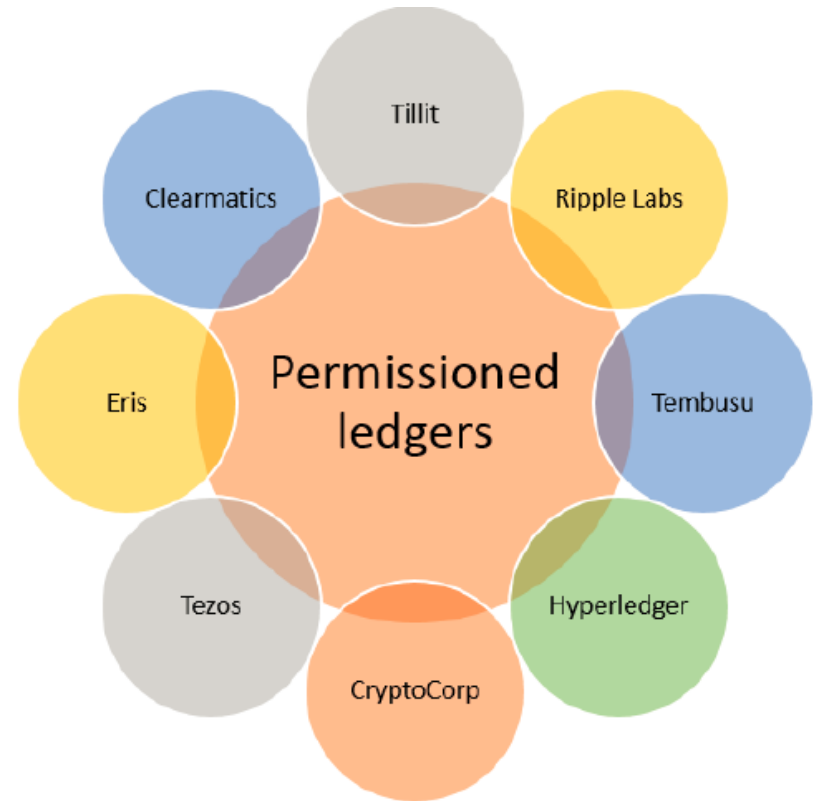
The Distributed Ledger Technology can bring in consensus and remove those discrepancies, those duplication and those errors in the existing IT systems resulting in
- same data "view" across all shared parties
- reduction in cost and duplication out of IT systems
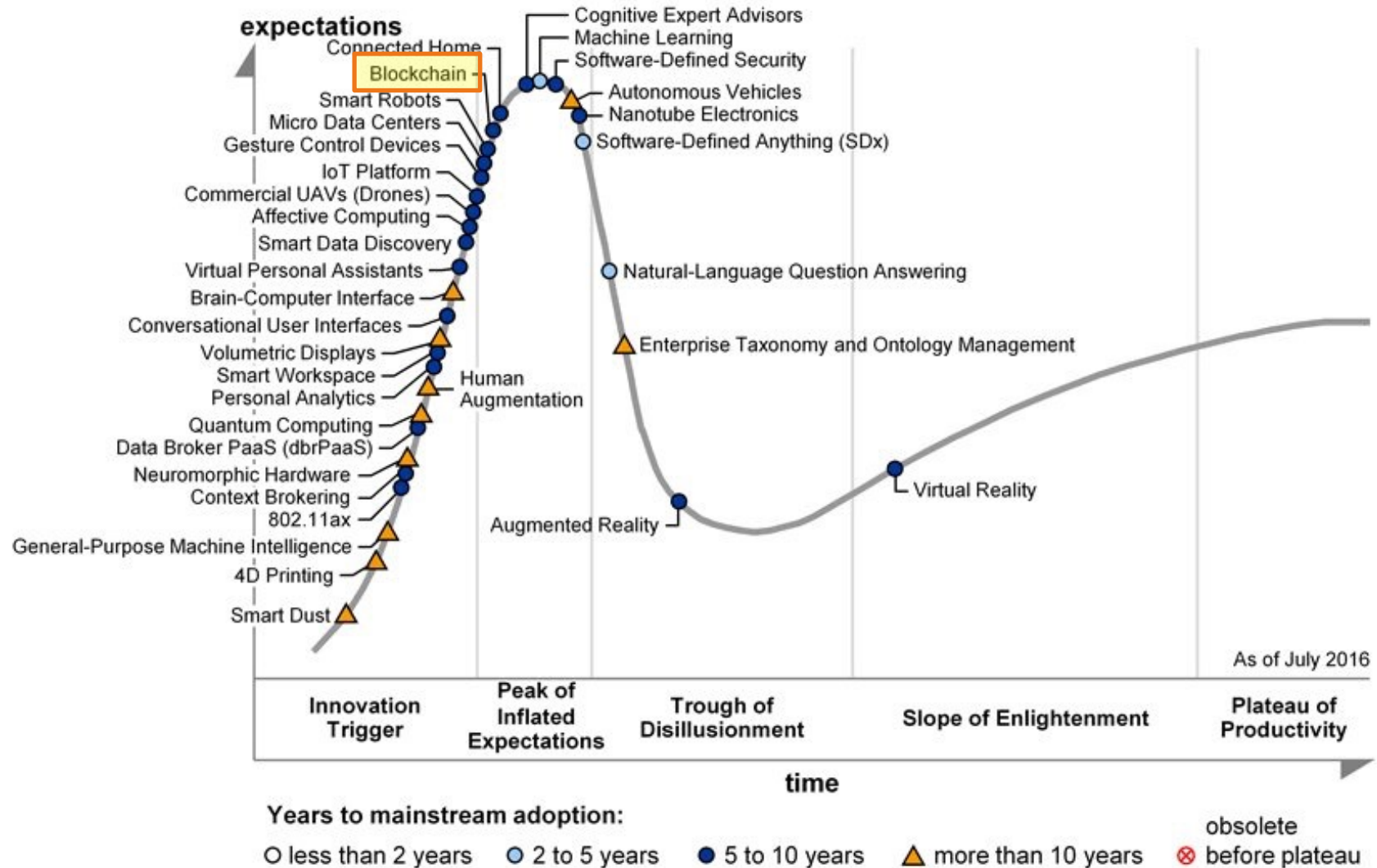- same data processing logic across all shared parties to process the data (smart contract)

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What are the major Blockchain Components ?

Decentralized

Validity & Consensus

Cryptographically Secure Authentication

Digital Asset

Smart Contract

Unique & Immutable Ledger

Types of Distributed Ledgers

Gartner Emerging Technology Hype Cycle July 2016

Benefits of Blockchain Implementation

Reduce Cost

- Removes cost of intermediaries
- Smart contracts reduce manual processing, re-work and processing errors

75 %	Potential savings projected by a leading insurer with implementing a Catastrophe Bond on a blockchain.
$20B	Blockchain technologies could reduce banks' infrastructural costs by $15-20bn a year by 2022.

Increase Revenue

- New Products and Services

$10B	UBS donated blockchain-based trading platform to be used to raise $10B selling social impact bonds.
2M	Grammy nominated artist Imogen Heap launched her single 'Tiny Human' on a blockchain based platform Ujo Music to her 2M Twitter followers.

Reduce Risk

- No single point of failure or attack
- Non-repudiability reduces risk of fraud
- Immutability and provenance preserves audit trail

360º	A leading insurer is looking to implement a KYC solution to build a 360º Customer view on a blockchain.
$10B	Global spend on Anti-Money Laundering compliance alone is estimated at $10B.

Increase Speed and Customer Satisfaction

- Allows T+0 settlement
- Simplifies supply chain removing intermediaries
- Guarantees supply chain provenance

0	Several trading houses are looking to leverage blockchain technologies to allow T+0 trade settlements.

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What use cases are suited for Blockchain?

- **Lightweight financial systems:** A Financial system which will allow a group of financial entities to transact and exchange assets between them

- **Provenance tracking:** Tracking the origin and movement of high value assets across a supply chain

- **Interorganizational record keeping:** Blockchain can provide a mechanism for collectively recording and notarizing any type of data, whose meaning can be financial or otherwise

- **Multiparty aggregation:** This usecase is techinically same as above but the motivation is different - to overcome the infrastructural difficulty of combining information from a large number of separate sources

Issues/Concerns of Blockchain

- Blockchains are not suited for high frequency transaction volumes. A Bitcoin transaction, by design, will get one confirmation after an average of 10 minutes.

- Irreversible transactions (e.g. the DAO Hack)

- Shift from centralized authority to and autonomous, digital and decentralized network for trusted P2P transactions challenges societal and economic norms

- High Deployment cost as the size of decentralized ledger will be bigger than the centralized ledger

Blockchain Technologies

- **Eris (Monax)**: Platform to connect to various blockchains in a standardized way without the need to learn new commands when switching from one blockchain to another.

- **Ethereum**: Public blockchain platform that can run smart contracts. Has its own cryptocurrency - Ether

- **Hyperledger** - Hyperledger is a permissioned, shared ledger developed as part of Linux Foundation. There are currently two incubator projects under the Hyperledger umbrella: "Fabric" and "Sawtooth Lake.

- **Corda** – Corda is a distributed ledger platform designed from the ground up to record, manage and synchronise financial agreements between regulated financial institutions.

- **BigchainDB** - BigchainDB is "a scalable blockchain database" capable of one million writes per second. It is built upon a big data distributed database (RethinkDB) and is capable of blockchain characteristics - decentralized control, immutability, creation and movement of digital assets

Q & A