Does Blockchain mean higher transparency in the financial sector?

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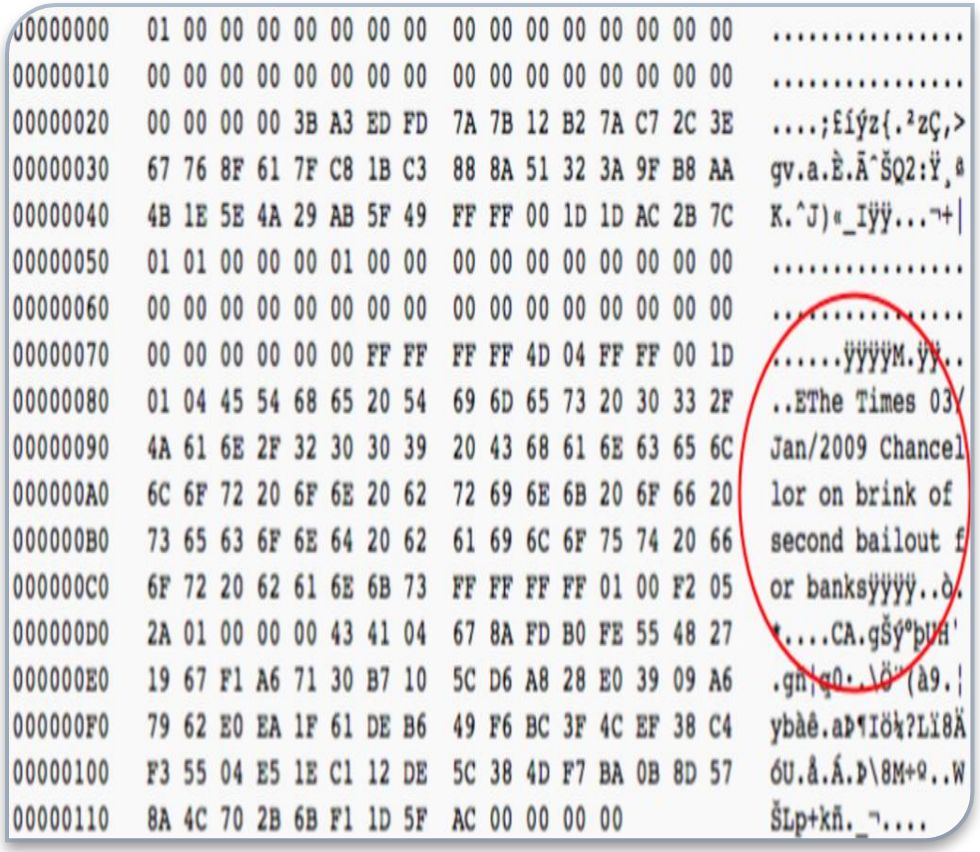
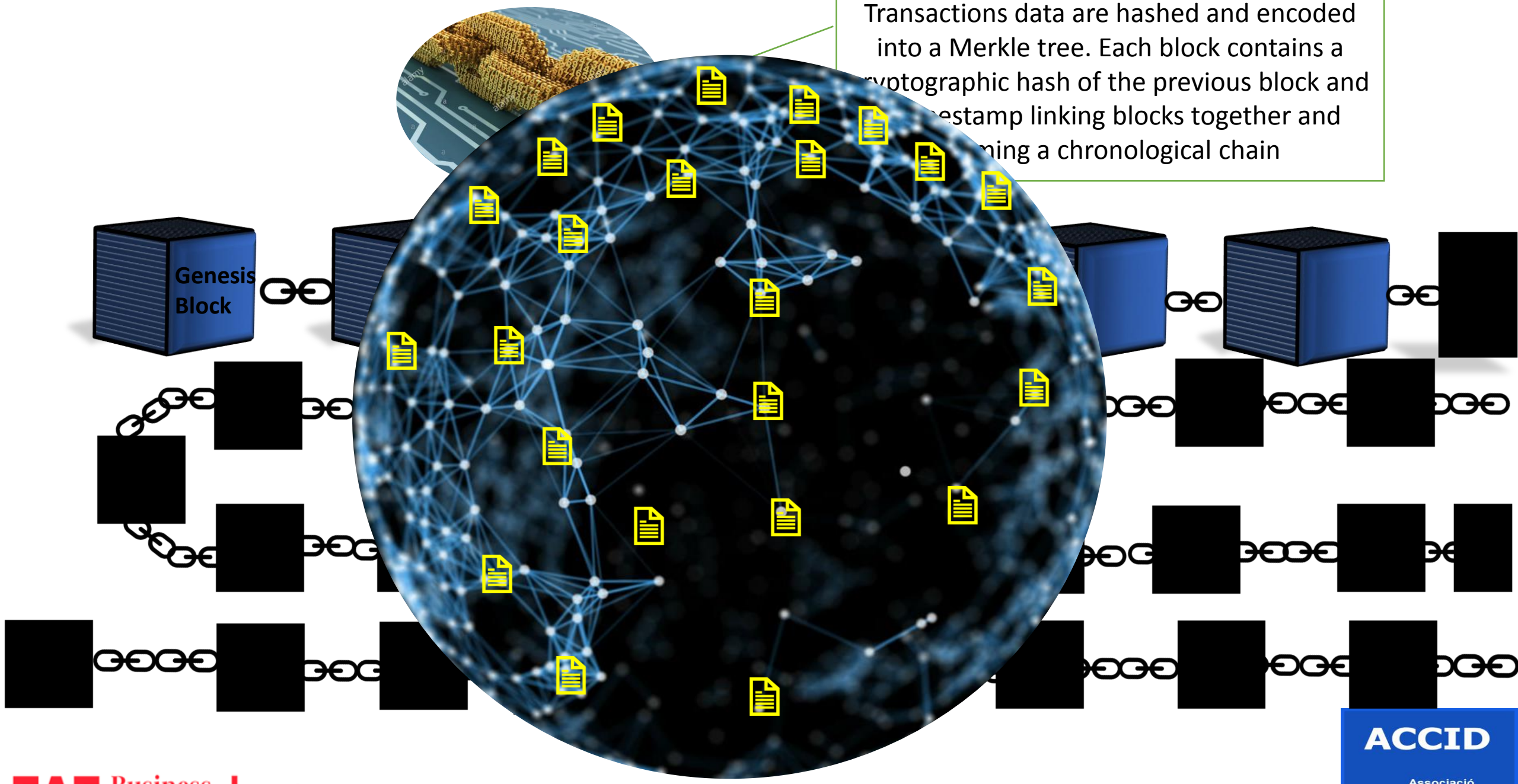
What is blockchain?

- Blockchain known to be a type of Distributed Ledger technology (DLT)
- Created in 2008 by Satoshi Nakamoto
- It is a combination of distributed timestamping, digital signatures, P2P networking, cryptographic hashing, Merkle tree, in addition to others



Transactions data are hashed and encoded into a Merkle tree. Each block contains a
yptographic hash of the previous block and
estamp linking blocks together and
ming a chronological chain



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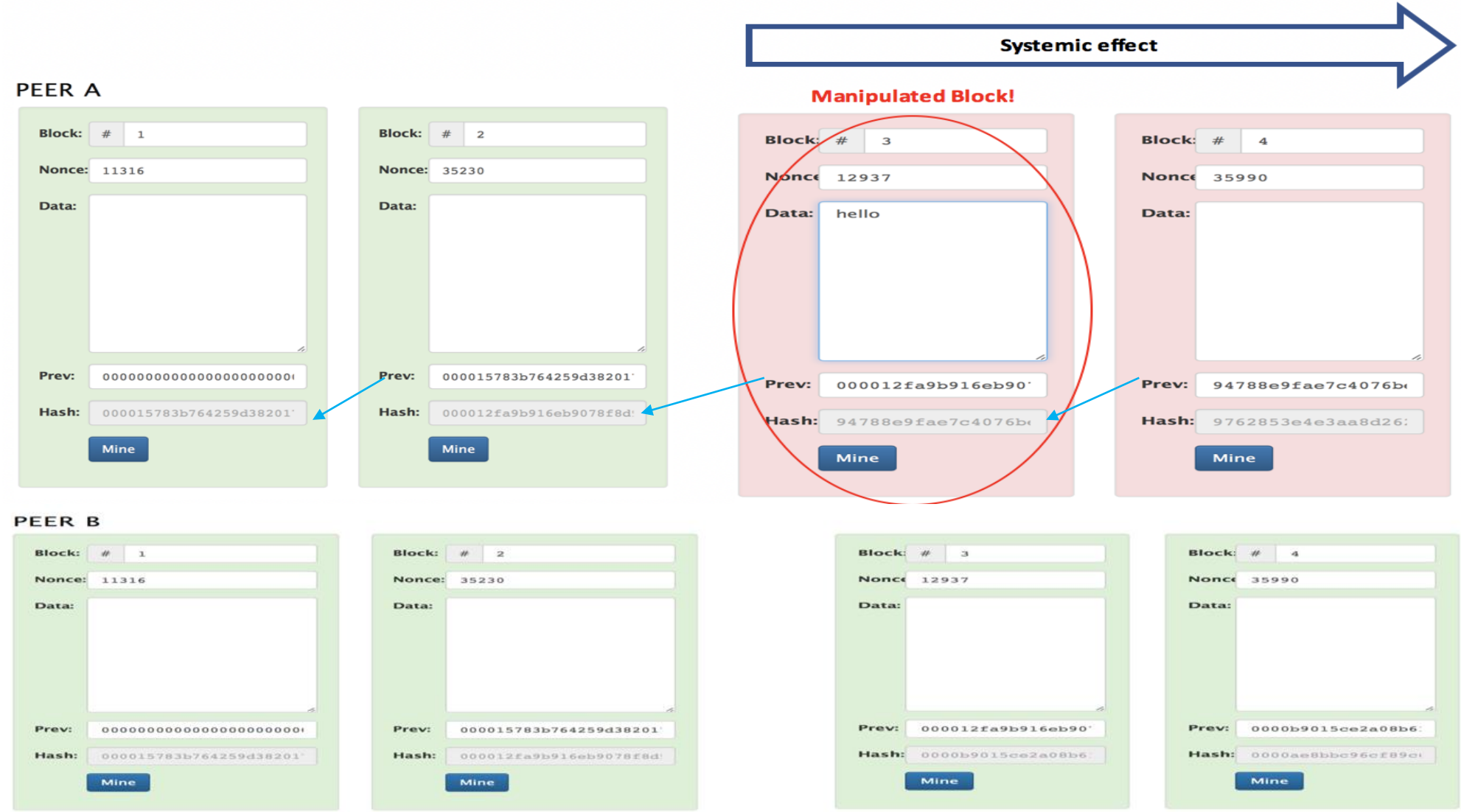
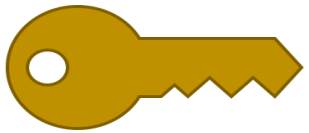
How it works?



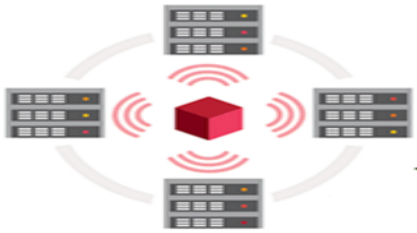
Public key & private key



- Public key is associated with digital identity of participants in the system and it’s entirely different from the private key, and there’s no way to extract the private key from it, therefore, it can be published.
- The private key is used to authorize transactions by the owner of the account, this key is used as a validation signature to process transactions by the owner.
- Miners cannot transfer assets or records without the consent (i.e. digital signature) of the owner, manipulation or fraud can be detected immediately by other nodes.

Transaction validation process

Someone requests a transaction



The requested transaction is **broadcasted to a P2P network consisting of computers**, known as nodes

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

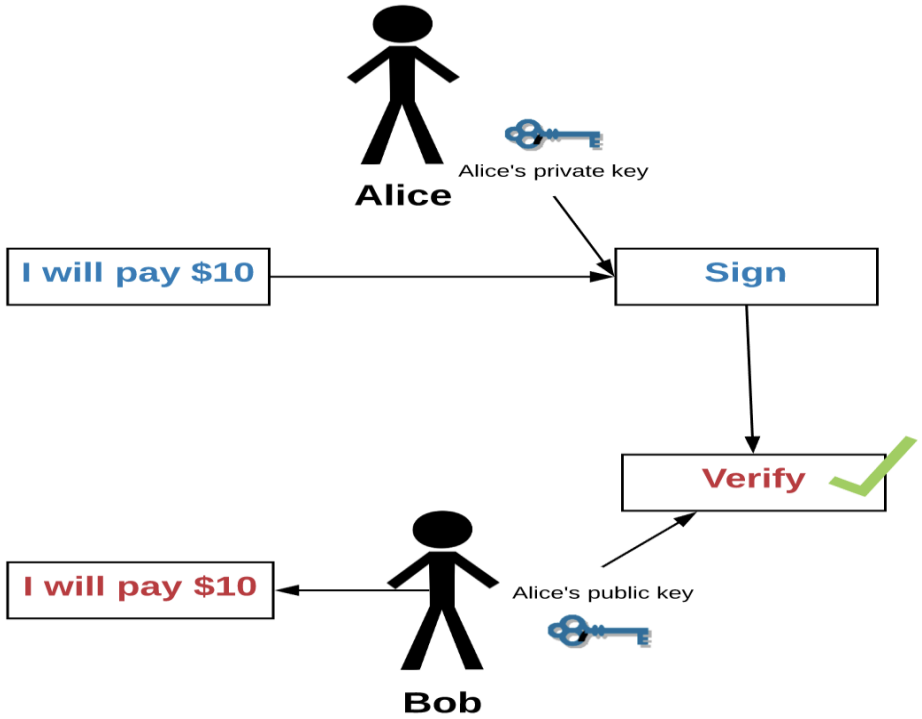
The transaction is complete

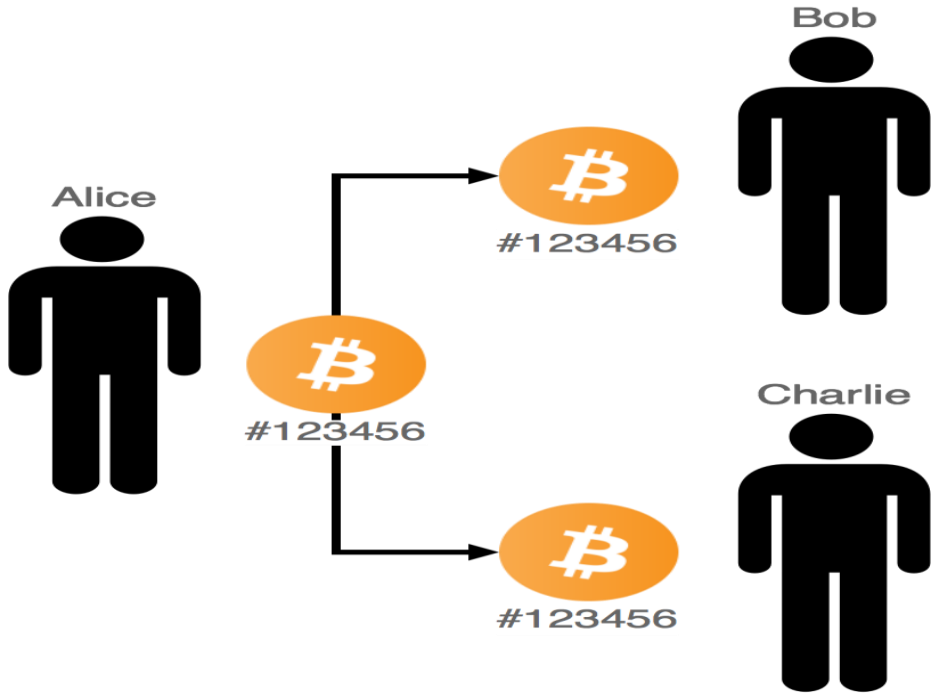
The new block is then added to the existing blockchain, in a way that is permanent and unalterable

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

Image source: https://www.ecoinnomy.com/blockchain/

Double-spending problem





Costs associated with the centralized system

- Cross border payments are costly and time consuming
- Transactions in the foreign exchange market alone sum up to a total of $4.8 trillion on a daily basis
- Remittances market has been witnessing global growth since 2016 from $601 billion to $616 billion in 2018
- The cost of financial fraud has been estimated to more than $4 trillion in 2016 alone. In order to guarantee a transactions authenticity, intermediaries such as courts, lawyers and auditors are needed to verify and detect any misbehavior

Potential in the financial industry (1/2)

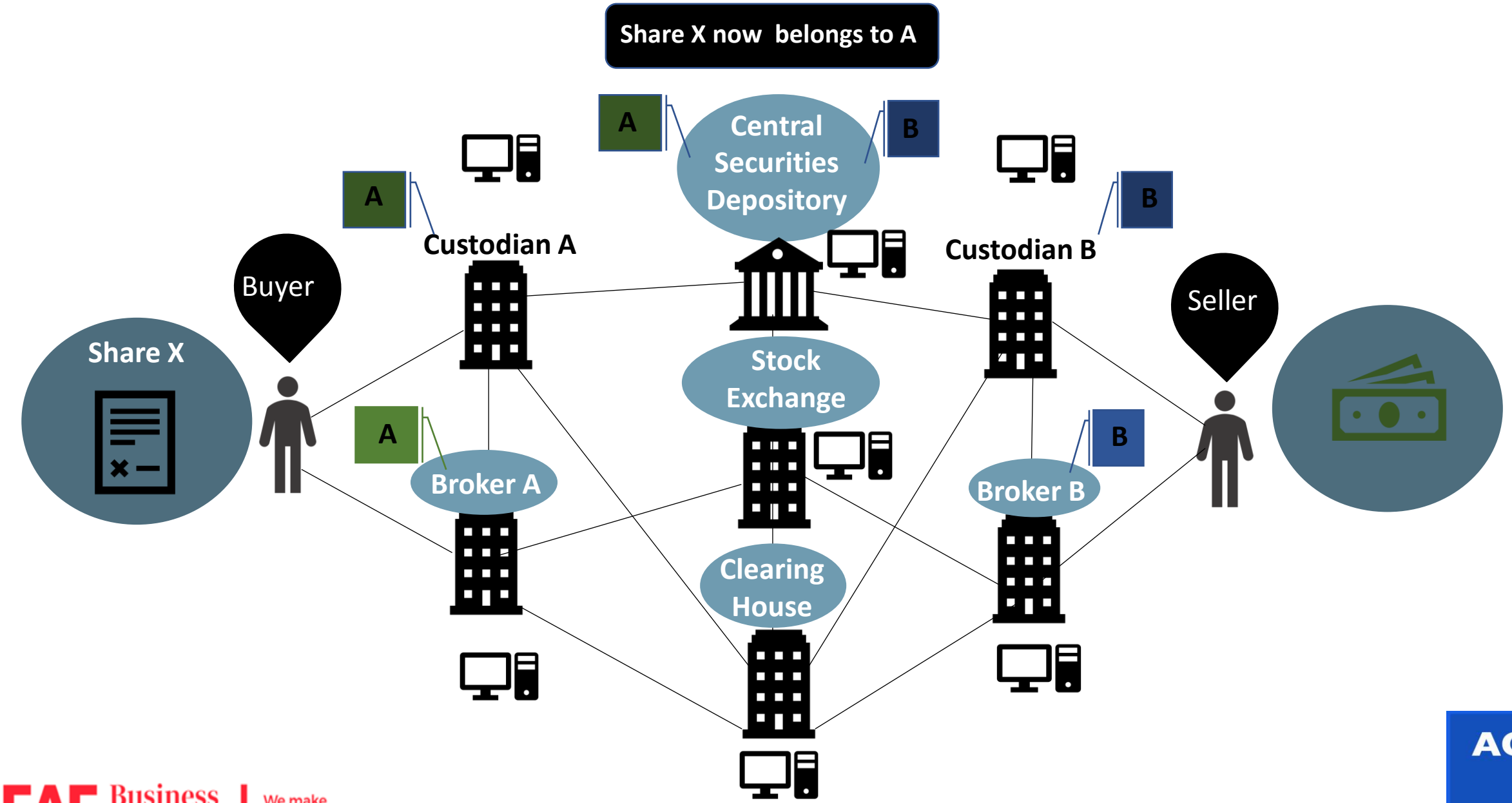
Blockchain technology is associated with a reduction in two key costs:

The **cost of verification**, and the **cost of networking** (Catalini and Gans, 2016).

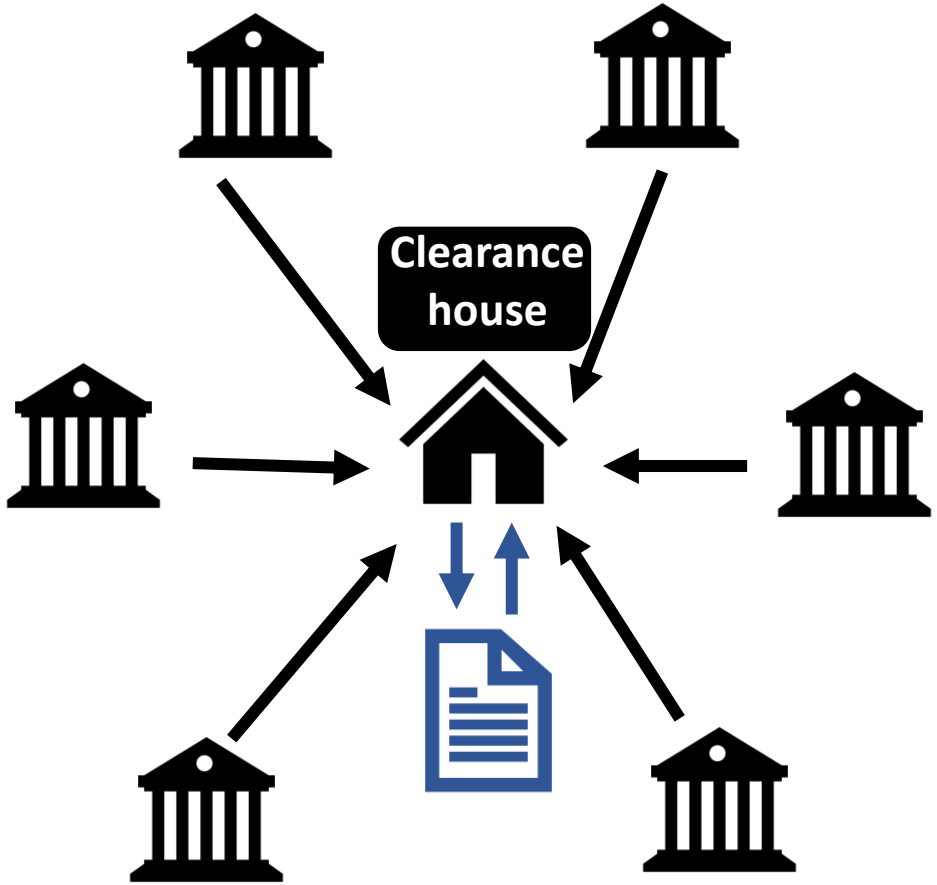
- Costs associated with verifying transactions on a distributed ledger are almost down to zero
- The second statement is emphasizing the concept of no third parties are needed for verification

Potential in the financial industry (2/2)

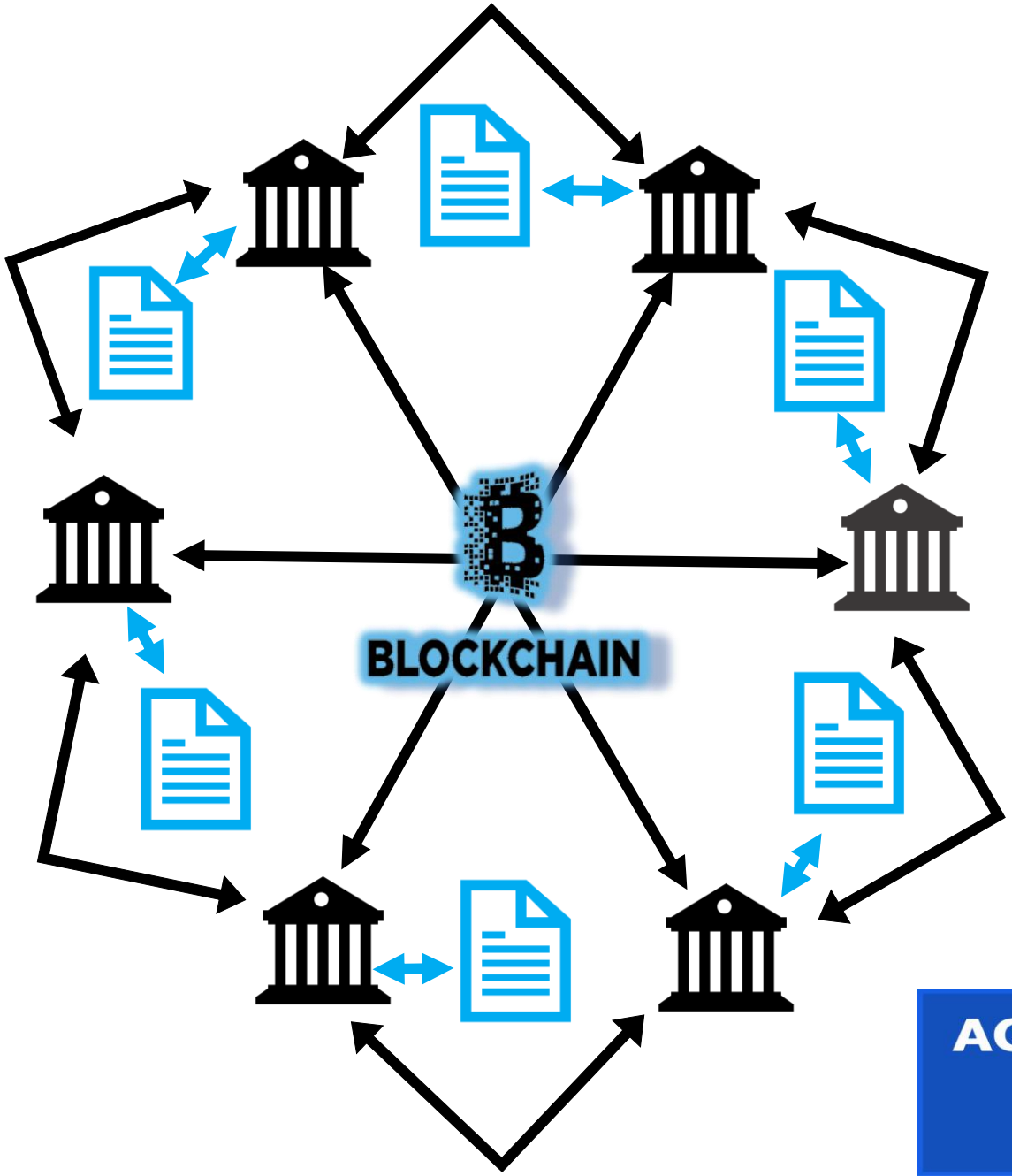
- Blockchain reduces transaction costs that range from 5-20% to less than 1% where a reduction of only 5% will result in $16 billion in annual savings.
- Blockchain presents significant reduction in processing and bookkeeping around 50%-80%
- A report by Santander estimated savings of up to $20 billion per year for banks by 2022
- Utilizing this technology in the banking sector has the potential of increasing profits significantly by increasing their efficiency and automation.



Conventional transaction clearance



Blockchain-based transaction clearance



Banking industry

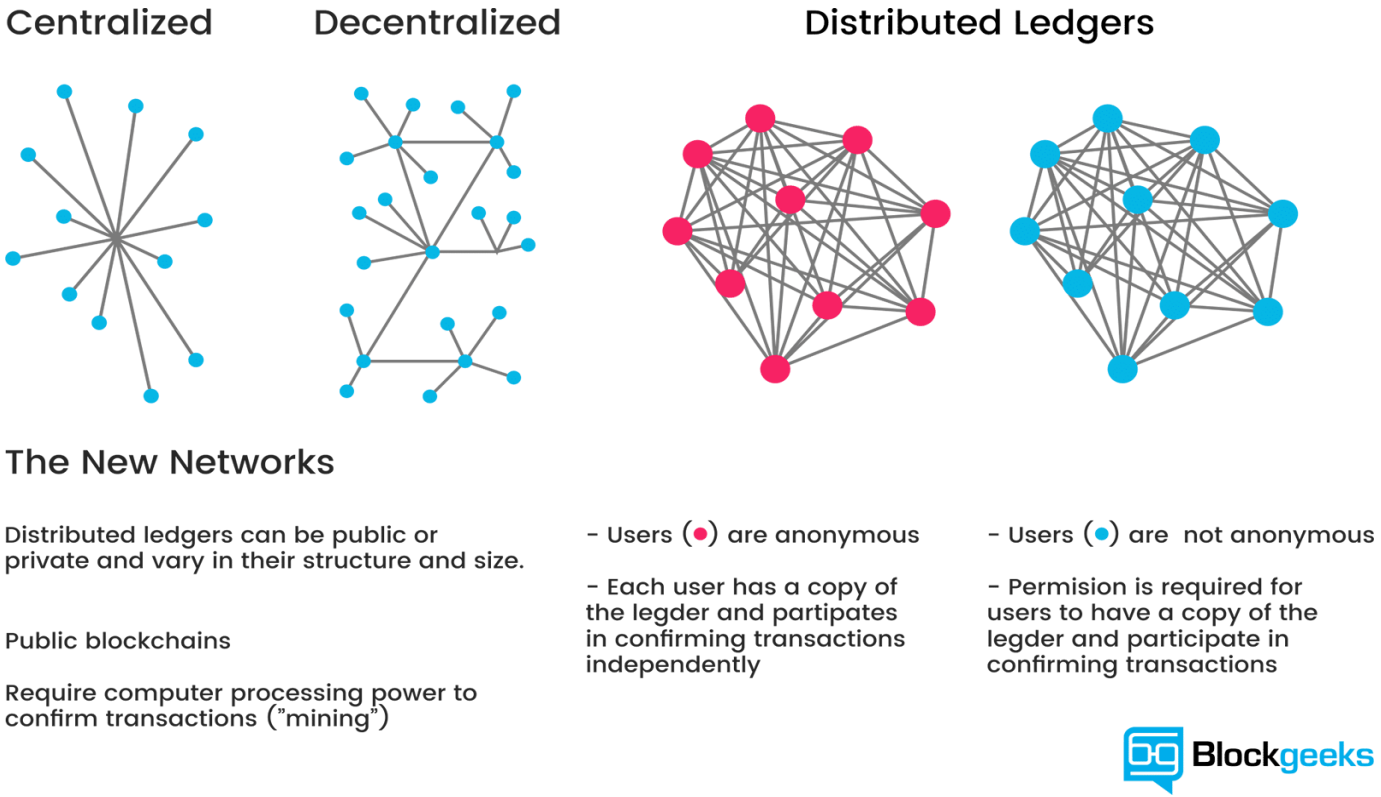
- Head of Santander InnoVentures, informed that they have further identified 20-25 use cases where the underlying technology can be applied in the banking industry, including:

  - Corporate payments
  - Crowdfunding
  - SME post-trade operations
  - Share registry
  - Cross border remittance and Foreign Exchange

- Central banks have observed great appeal in this. However, they are more hesitant to issue a virtual currency that will consequently narrow the banking system that could potentially lead to making sections of the financial industry “redundant”

Types of blockchains

- Public blockchain
- Private blockchain
- Consortium blockchain
- Federated blockchain



Public blockchain (1/2)

- Public blockchain is a decentralised platform that has no restriction on participation, reading, processing or submitting transactions to be incorporated in the blockchain.

- Users are free to participate and create blocks of transaction and get involved in the validation/mining process.

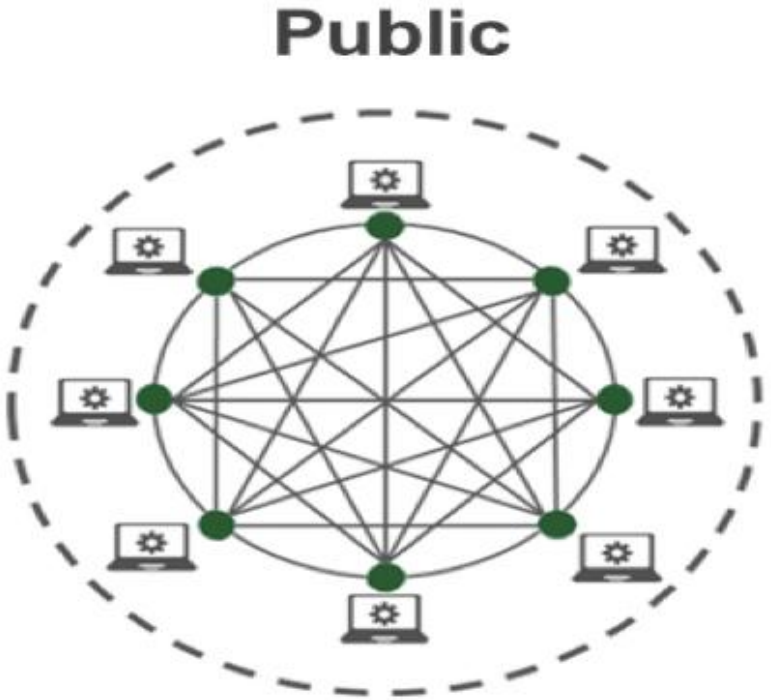


Image source: https://medium.com/applicature/utilization-of-distributed-technologies-for-custom-solutions-public-private-and-hybrid-570a1e14852

Public blockchain (2/2)

Pros:

- Everyone can access and download a copy of the ledger
- Trustlessness
- Distributed authority
- Security is maintained and updated by the network
- Immutable records
- Transparency

Cons:

- Anonymous identities
- Ability to commit illicit activities
- Irreversibility of transactions or modification once a block has been added to the chain
- Electricity consumption of the consensus algorithm is equivalent to Austria

Consortium blockchain (1/2)

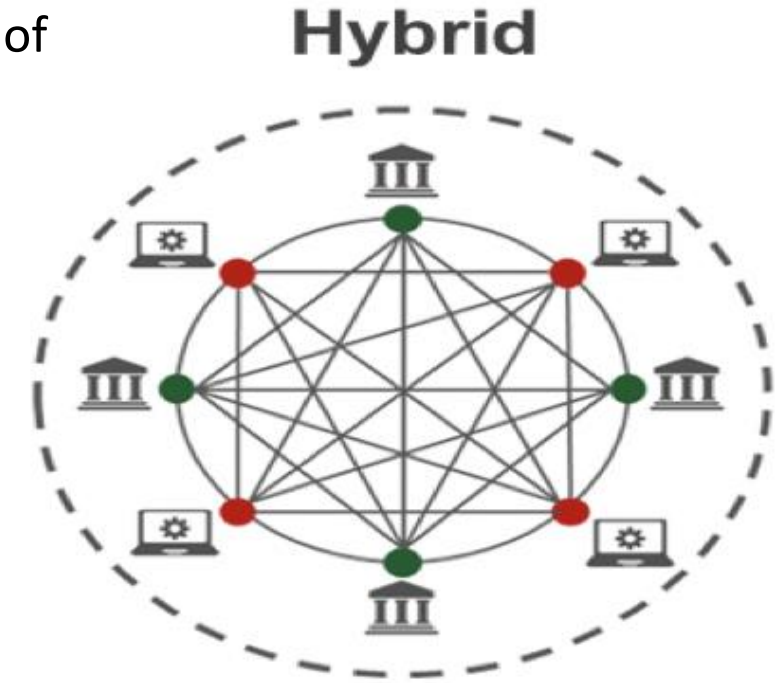
A consortium blockchain is partially private blockchain, where direct access to data and submission of transactions is restricted to a specified list of entities with known identities who are allowed to process transactions

permissioned blockchain is divided into three tiers of accessibility:

1. Users are only able to access transactions that directly involves them

2. Restrictions based on both creating new blocks of transactions and proposing new transactions to be included into the blockchain.

3. Restriction to a limited number of institutions such as Banks, granting their clients access to read their transactions to guarantee the safety of the client's funds (full Access is granted to central parties).



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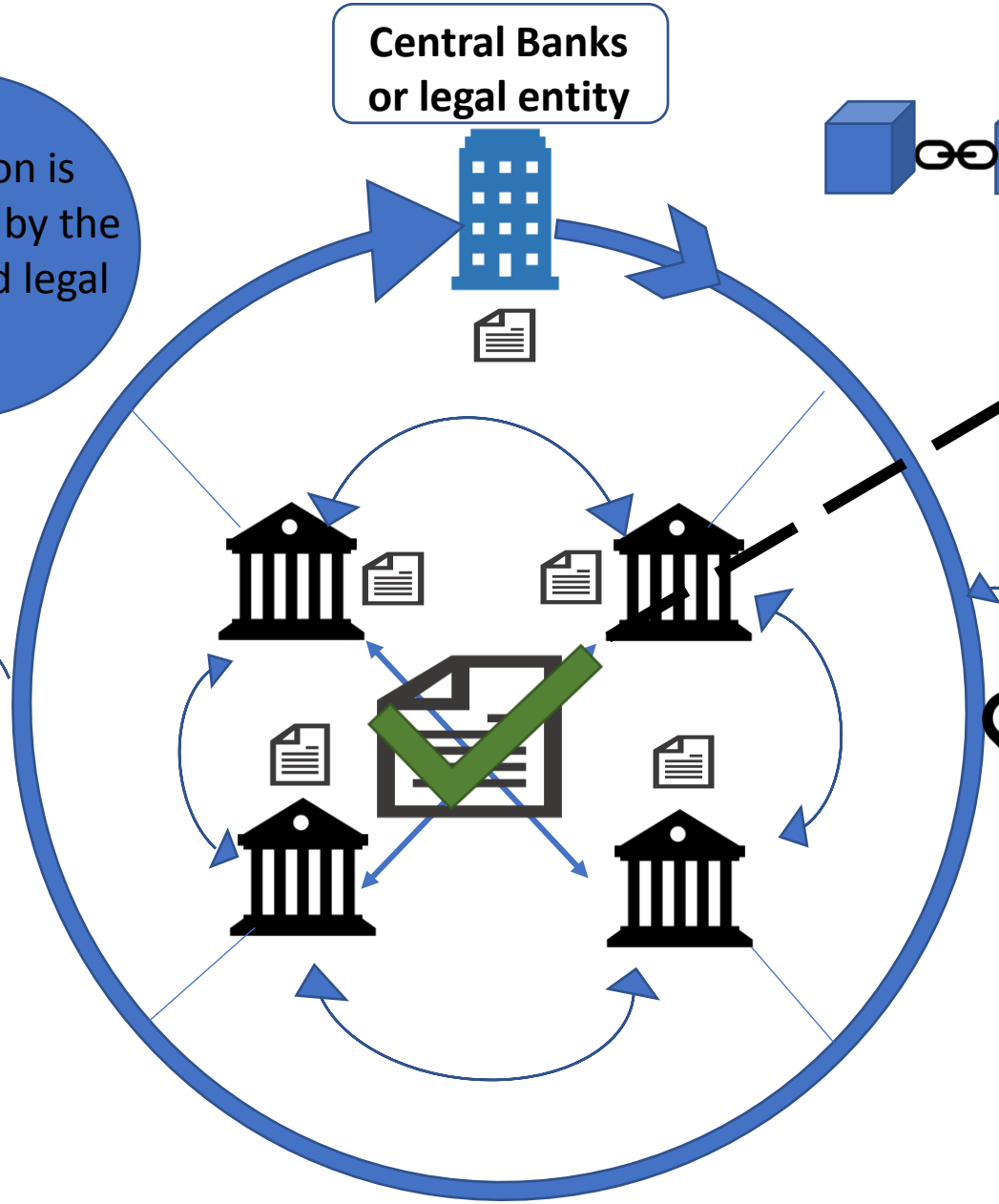
permissioned Blockchain transaction

Transaction is validated by the Banks and legal entities



- Inserts the Public key of the receiver
- Amount to be paid
- Signs the transaction with her private key

- Decrypts the message using his private key and receives the money

Payer A

Receiver B

Consortium blockchain (2/2)

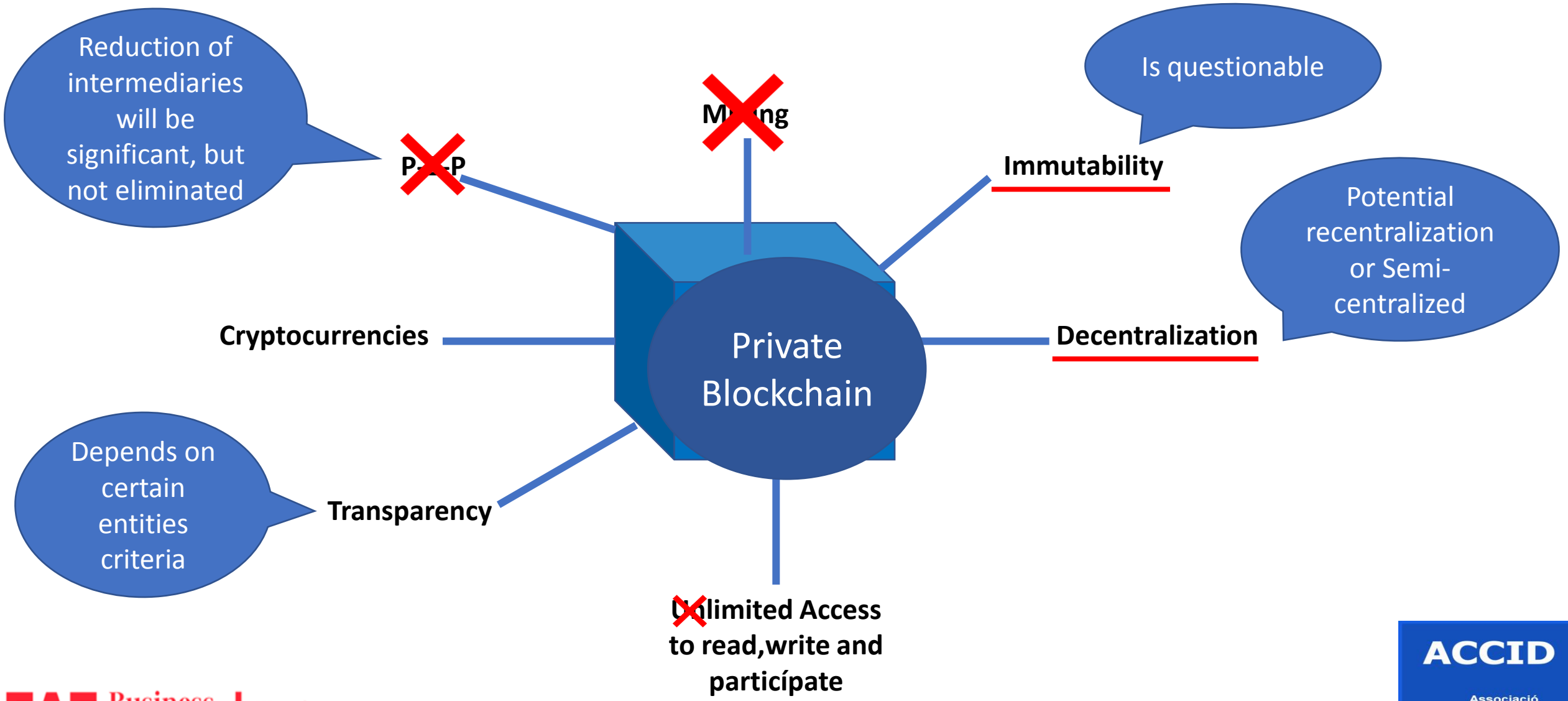
Pros:

- Partial centralization will result in validation efficiency
- Reduction in transactional costs
- Modification can be implemented (data is not immutable)
- Elimination of power consuming economic game

Cons:

- Accessibility is centralized restricted to certain parties of the organization
- Modification and validation is restricted to central authority
- Level of security is low in comparison to public blockchain
- Flexible transparency

Private vs Public blockchains



Blockchain's misconceptions

- One of the strategies used by the notorious investment bank Lehman brothers was to run two parallel ledger to hide their debt and overestimate the value of their assets to deceive regulators and the.

- The existence of blockchain back then would have helped with the maintenance of records in order due to scalability limits of the existing bookkeeping system as Lehman's balance sheets grew in complexity and tracking records of assets to their origin became extremely obscure.

Consortium blockchains & financial institutions

- A permissioned blockchain can aid central banks in the process of decision making and managing monetary policy.
- The platform will allow for the central bank to make a clear precise decision based on the transparency provided such as monitoring the impact of lowering interest rates
- Regulators can also have access and monitor the performance of banks to see whether banks are taking on excessive risk and the possibility of an upcoming credit crunch

Regulations & legal issues

- Judicial problems arise due to the anonymity of the bitcoin miners
- Agreeing to the level of transparency provided by DLT raised two main issues:
    - Data privacy
    - Insider trading and market abuse

- **Data privacy**
  - The distribution of private data under some jurisdiction are subject to heavy penalties for violating the data protection laws
  - Once inaccurate or private data is stored on a DLT it would be extremely difficult if not impossible to delete
  - Immutability contradicts the human's right law "the right to be forgotten", victims instead will turn to damages compensation instead
  - Difficulty in halting fraudulent transfers or removing them from the chain after they are posted
  - Tampering data prior to being stored on blockchain

- **Insider trading and market abuse**
  - The ESMA (European Securities and Market Authority) is concerned with the transparency and public features of Blockchain that may allow and ease the process for unlawful acts concerning excessive manipulation of records, recent trades, inventory levels and manipulation of prices.

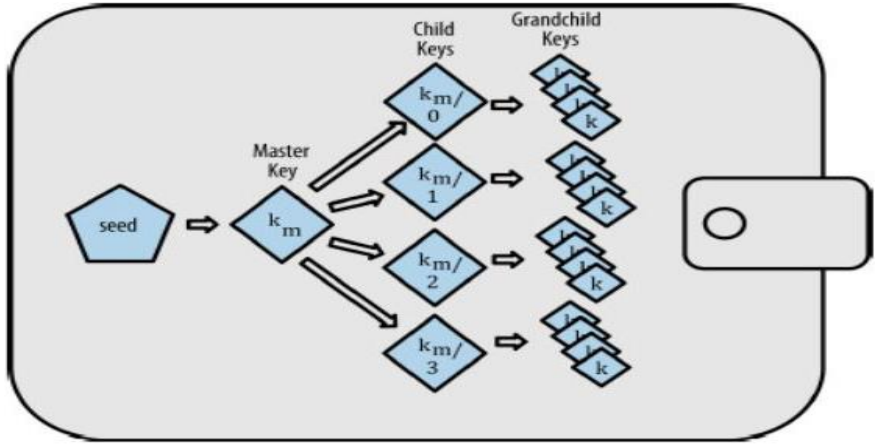
Cyberattacks

- MTGox, a Japanese bitcoin exchange, reported a hack that resulted in a total loss of 850,000BTC. The loss amounted to $473 million when the declared bankruptcy.

- The Luxembourg and London based Bitstamp suffered a loss around 19,000BTC, that is, $5.1 million

- Ease of traceability with public keys lead to the creation of HD wallets that generate new public key for every transactions in order to increase anonymity

- The decentralized nature and lack of supervision has allowed for this technology to be an easy way for buying illegal drugs and weapons on the dark web e.g. *Silk Road*



Transparency

Transparency in blockchain defines the ability to view public addresses where you will be able to access transaction history, assets, etc without limitations or boundaries. Which has never existed within the financial system

- Consortium blockchains are not as transparent as public
- Law clashes with the technology due to anonymity
- Transparency can be greatly decreased or even eliminated by setting accessibility and viewing restrictions
- The consensus power consuming algorithm poses centralization threats

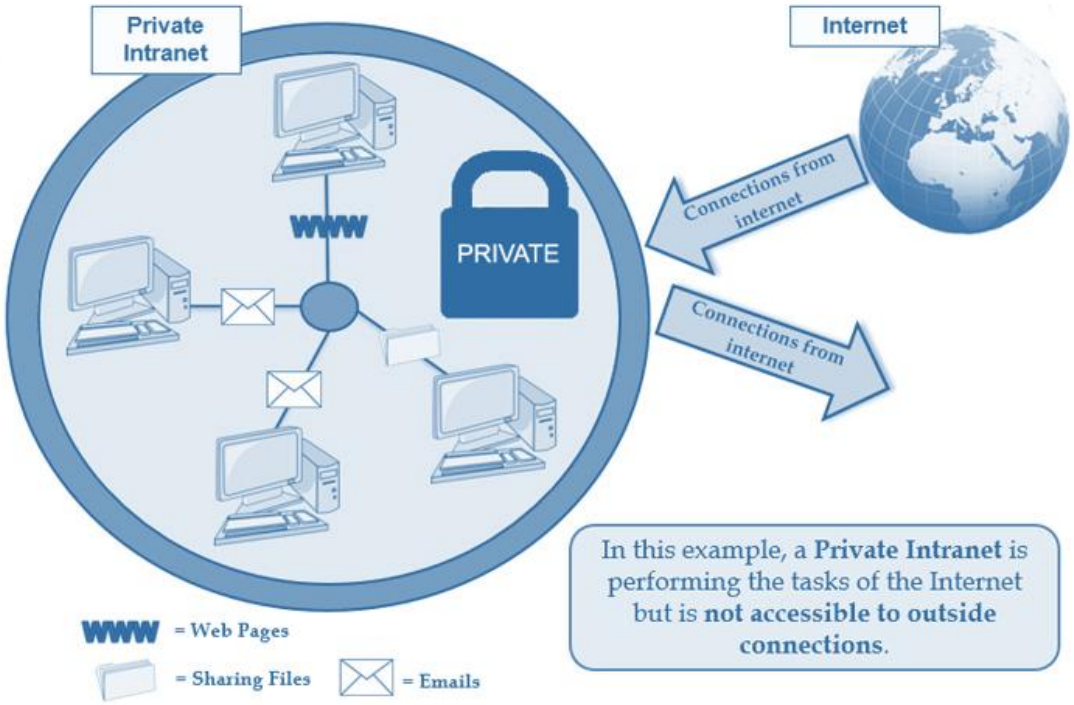
Blockchain increasing transparency?

- The incentive mechanism is authenticating the legitimacy of the fund transfer of the transacting parties without any additional information regarding identity, location or the source of funds.
- The technology appears to promote controlled tailored transparency enabling its users taking full advantage of handling their accounts and transactions
- In a private blockchain, the same public key will need to be utilized in order to link the account to the owner, otherwise transparency will turn into opacity and tracking the account will be nearly impossible, and more challenging than the existing system.
- Both private and public blockchains require regulation in order to impose transparency

Several banks are hesitant with experimenting/adopting the technology due to :

- Compatibility and efficiency
- Initial investment requirement
- Changes and upgrades requirements
- Existing systems and operations
- Maintenance, regulation and control

Conclusion



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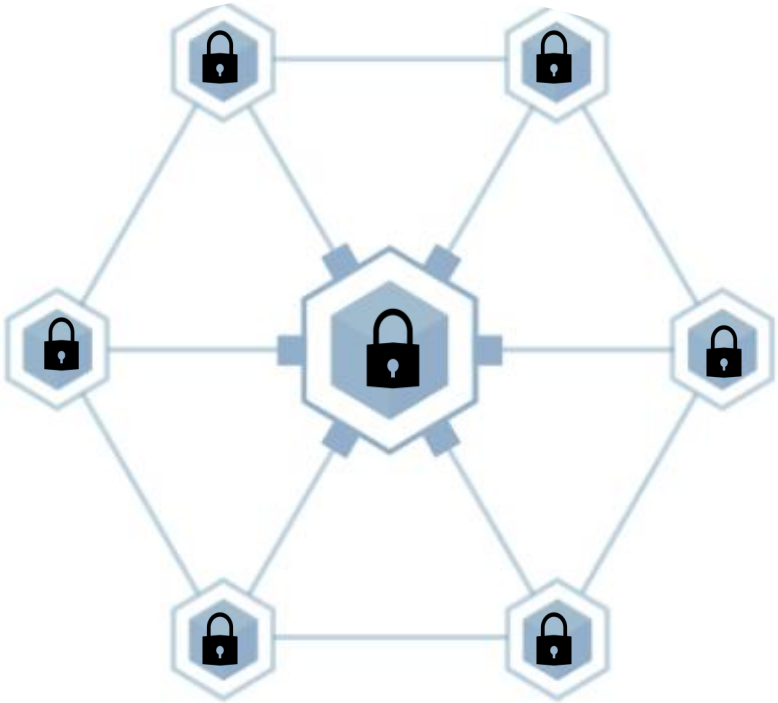
Private/consortium Blockchains



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