# Blockchain concepts:

- Bitcoin
- Blockchain 101

**Discount Coupon Link to UDEMY course:**

https://www.udemy.com/ethereum-dapp/?couponCode=ETHDAPP101

This deck is part of a online course on "Ethereum: Design and Development of Decentralized Apps.

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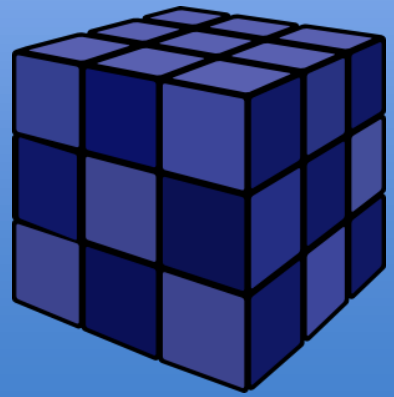


# World Wide Web

# Peer-to-Peer

napster™

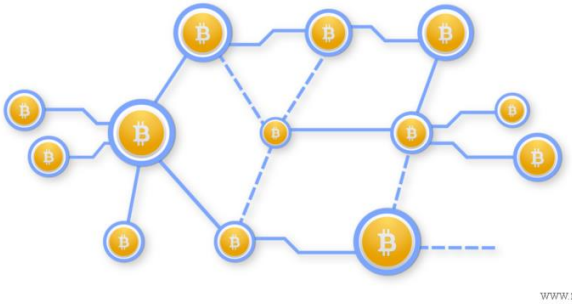
*1999*

Bittorrent

*2001*


= Digital Currency

- Not physical i.e., not printed like $, Euros ….
  - Coin has identity & owner
  - Owner can spend the coin
- Community controls it not the governments !!!
  - Algorithms & Mathematics → Protocols & Rules




- Bitcoin network is public
  - Source code is open source

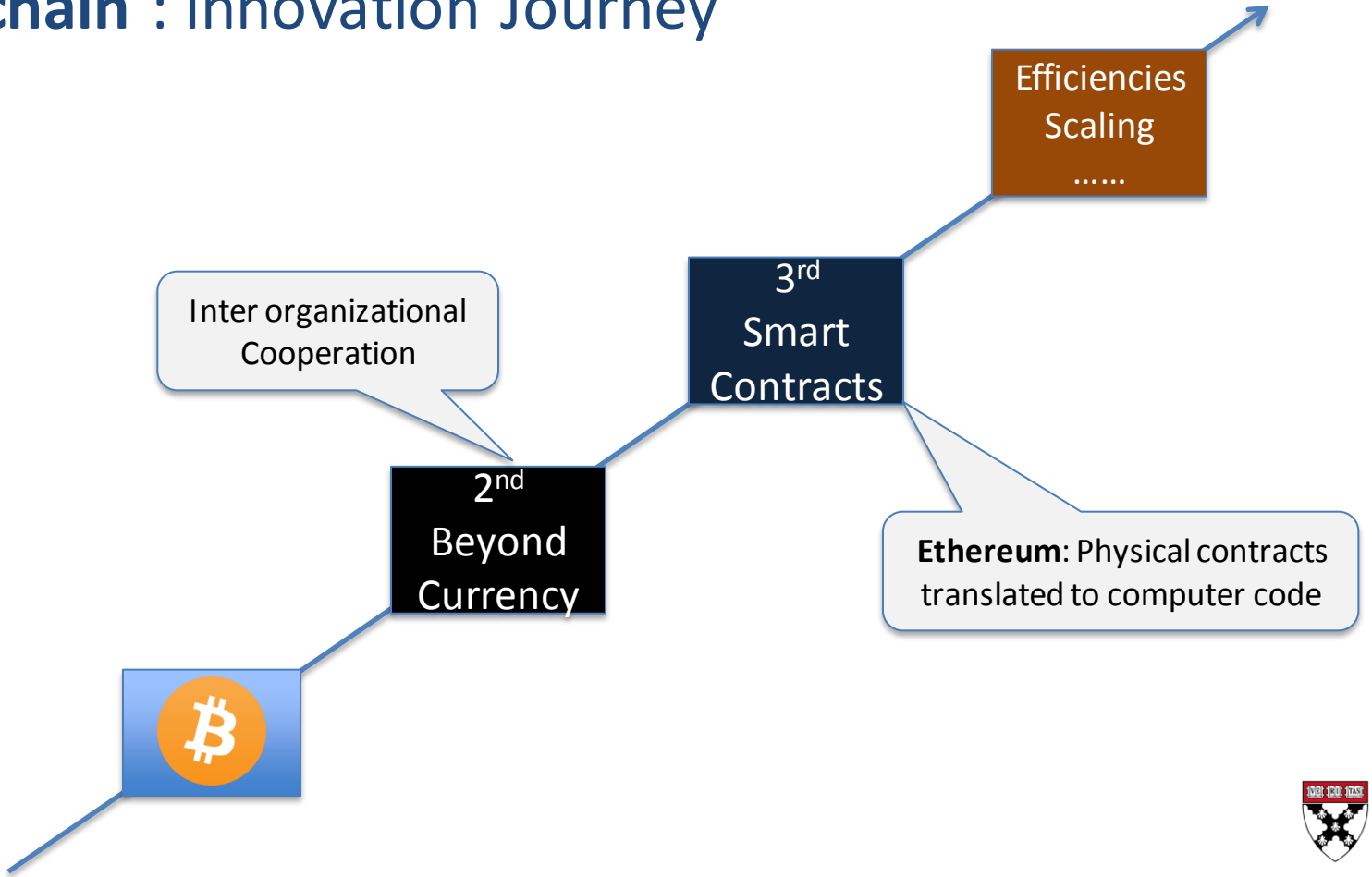
- Owner uses private key to spend bitcoins
- Public ledger: All bitcoin exchanges are visible to everyone on the network
- Transfer/Spending of coins require very little fee
- Transactions are validated by miners who get rewarded


- **Bitcoin** was designed by Satoshi Nakamoto

"A Peer-to-Peer Electronic Cash System"
*2008*

*The term **block chain** was coined by Satoshi in this paper*

# **Blockchain** : Innovation Journey




Harvard Business Review

https://hbr.org/2017/02/a-brief-history-of-blockchain

# Blockchain?

- **Decentralized** system for **exchange of value**
  - Uses a shared **distributed ledger**
  - Transaction **immutability** achieved by way of **blocks & chaining**
  - Leverages **consensus** mechanism for validating the transactions
  - Uses **cryptography** for trust, accountability, security

Value

May be exchanged for

Registers

Transfer ownership

Transfer ownership

Tx Asset Created

Tx Asset Transferred to Dealership

Tx Asset Transferred to Customer

Ethereum

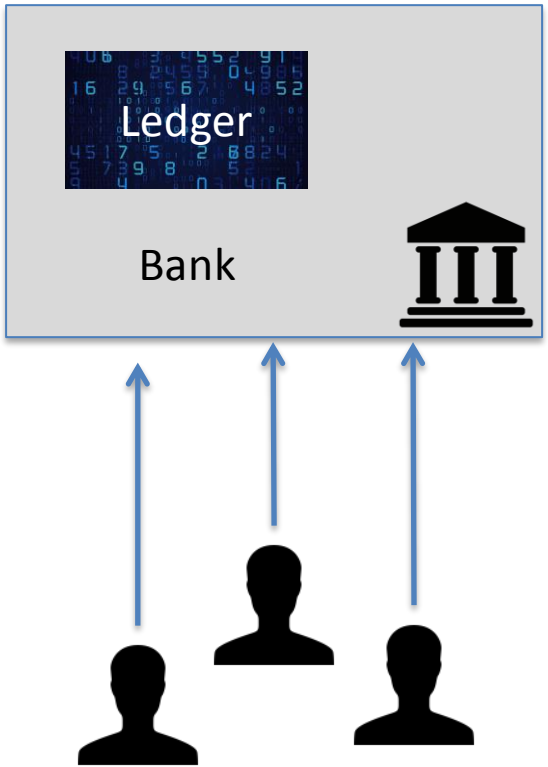
Who owns the car?

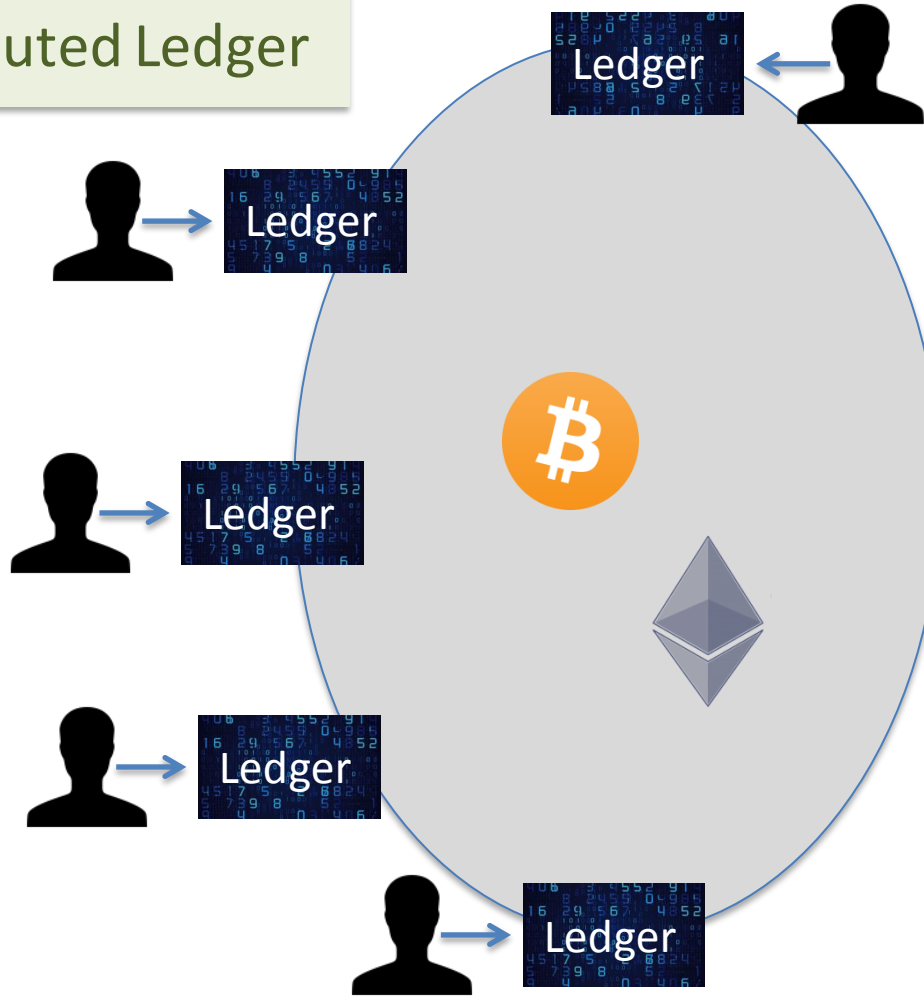
History of car?

# Traditional Ledger

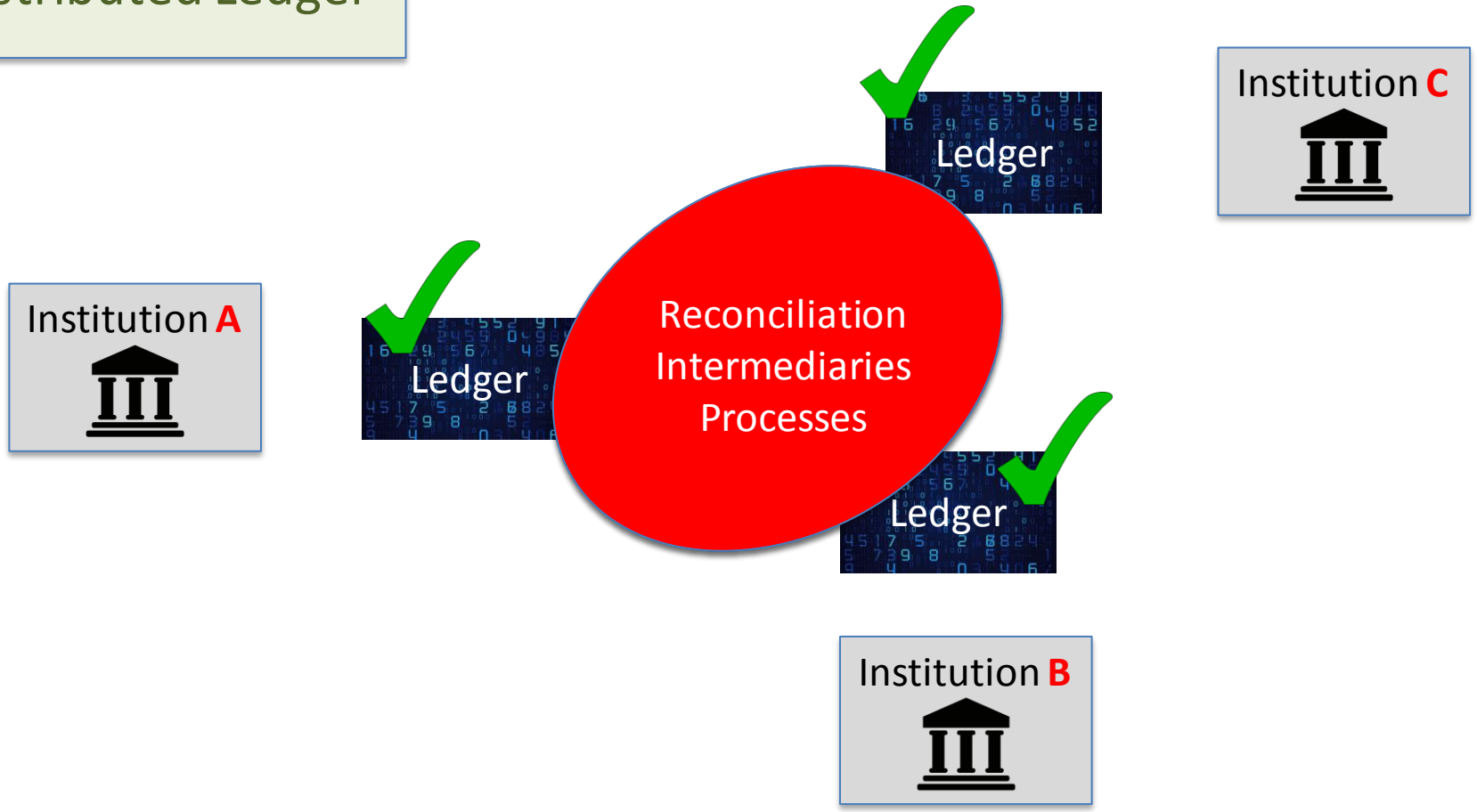
Vs.

# Distributed Ledger



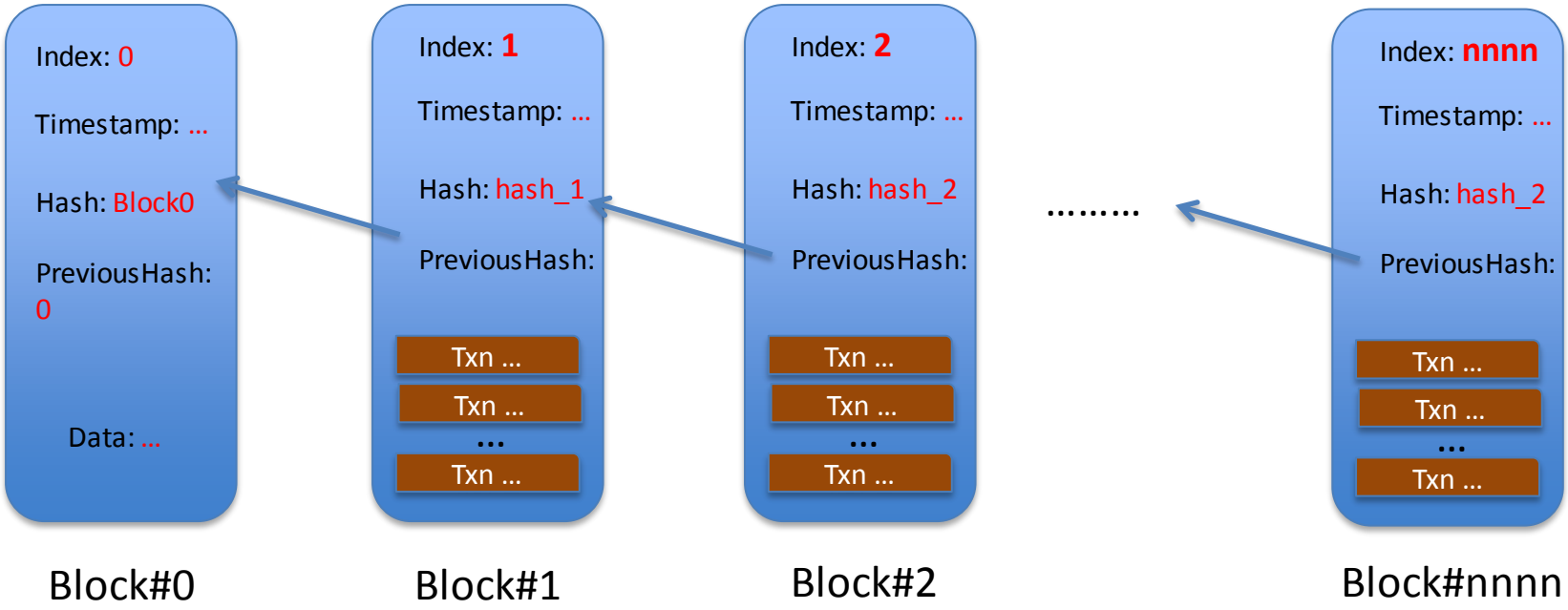



# Distributed Ledger



# Blocks & Chaining

- Data added to the ledger CANNOT be Updated Or Deleted



# Consensus

- Distributed Ledger = Distributed Database

How do you ensure that data is consistent across the network?

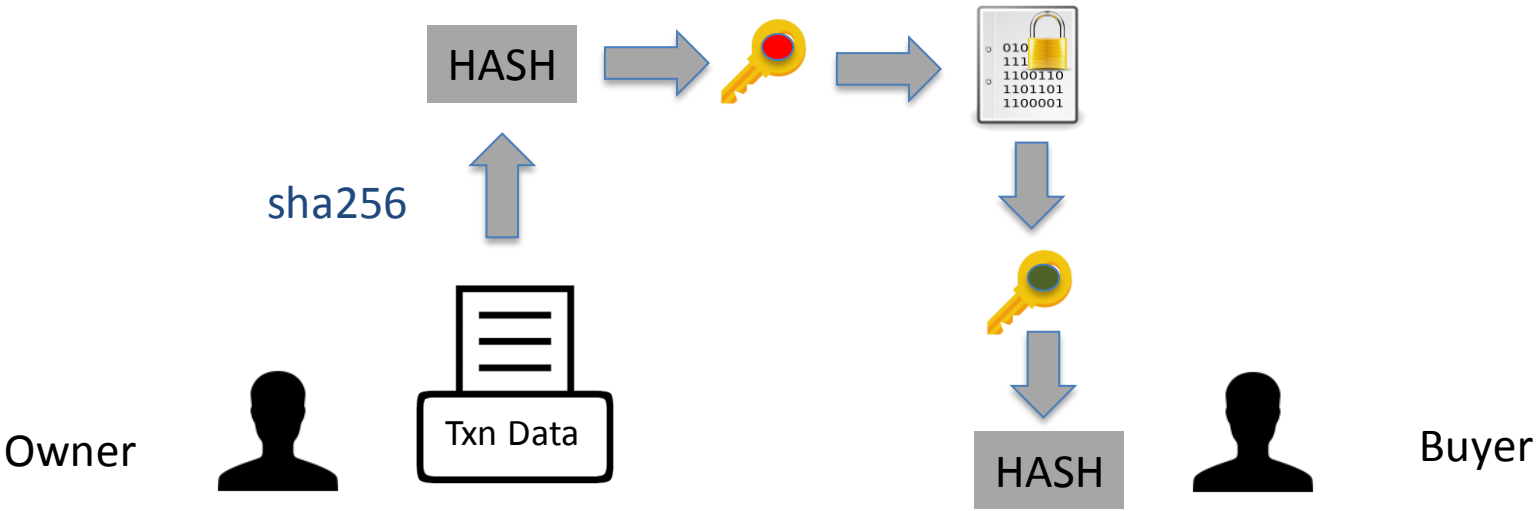
- Consensus = Protocol by which peers agree on state of ledger
  - Ensures all peers in the network has exactly the same copy of ledger
  - Fraudulent transactions kept out of the ledger
  - Guarantees to record transactions in chronological order

Proof of work | Proof of stake | Tendermint

# Cryptography

- Participants have a Public/Private key pair

- Transaction is signed by the owner of asset with private key
  - Anyone can validate the transaction with owner's public key



# Blockchain concepts:

- Bitcoin Vs Ethereum
- Intro to Smart Contracts & Transactions

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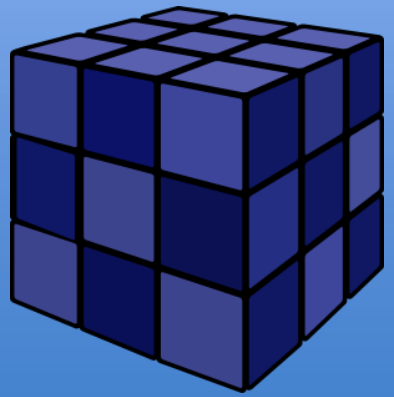


# Ethereum 101

- Permission less Public **Blockchain** network like Bitcoin

- Distributed data storage

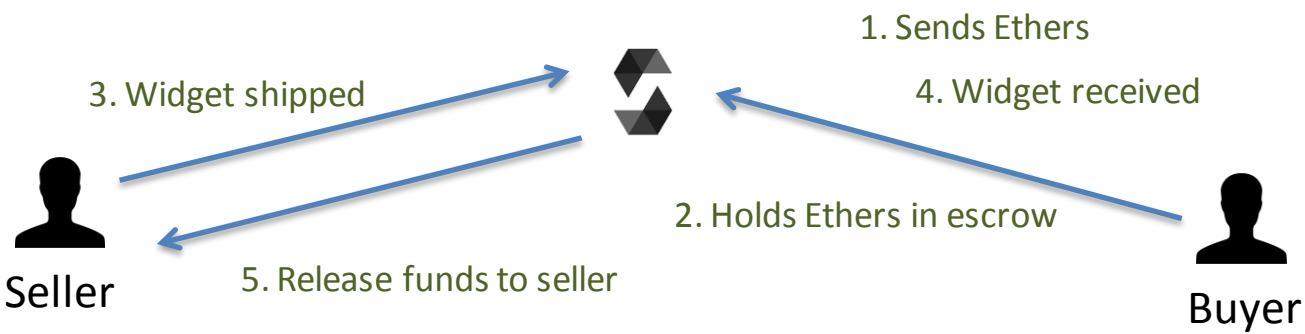
- Distributed data storage + **Computing**

| | | |
|---|---|---|
| Value token: | Bitcoin (BTC) | Ether (ETH) |
| Block time: | 10 minutes | 14 seconds |
| Block size: | Maximum 1 MB | Depends (~2KB) |
| Scripting: | None | **Smart contracts** |

# Smart Contract?

- Computer code, written in multiple languages

- Contract lives on the network
- Enforces rules
- Performs negotiated actions

# How does it work?

- Wallet for managing Ethers
  - Smart contracts
- Decentralized Apps (DAPP)
  - Interact with contracts on n/w
  - Execution is not free