Blockchain Technology

Overview, Brief History & Applications.

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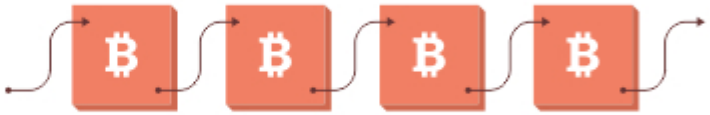
Blockchain Technology - What is it?

- **Blockchain** is a peer-to-peer public ledger maintained by a network of computers without the need for a central authority.
- It consists of:
  - Transaction
  - Transaction record
  - Transaction verification and storage system



- It is a distributed database that maintains a **chain** (i.e. chronologically ordered) of **blocks** (i.e. records).

> Blockchain Technology - Characteristics?

- Openness
  - Database is open, in principle, to anyone.
  - Based on open source software technology.
- Decentralization
  - Decentralized ledger
  - Distributed Networking
- Security
  - Encryption using Public Key Cryptography.
  - Hash function.
- Resilience
  - Archiving information
  - Database replication
- And many more: Immutability, consensus, traceability…

> Blockchain Technology - Example: bitcoin

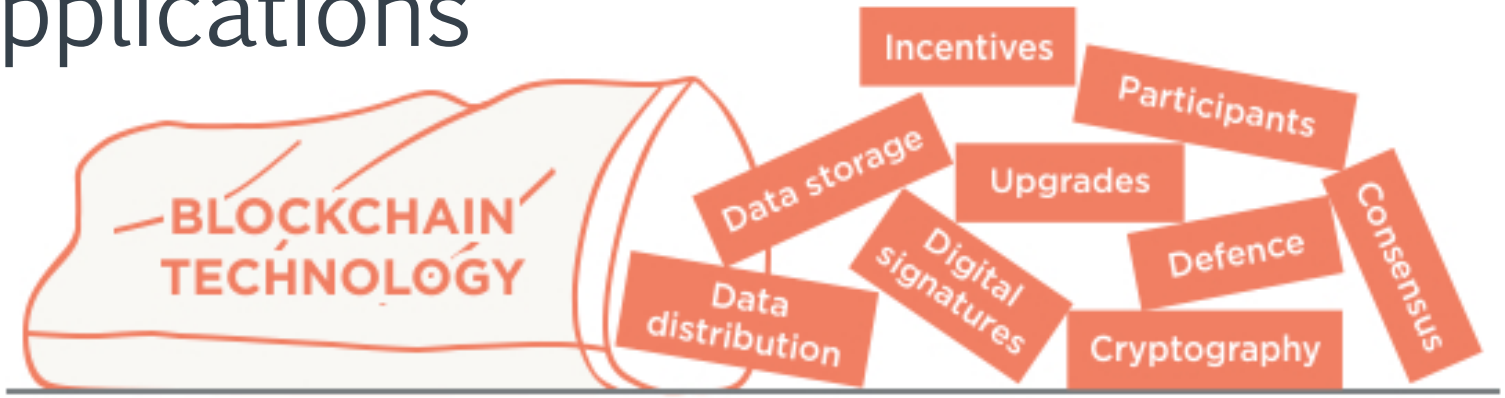
› Famous example of a blockchain Technology is bitcoin

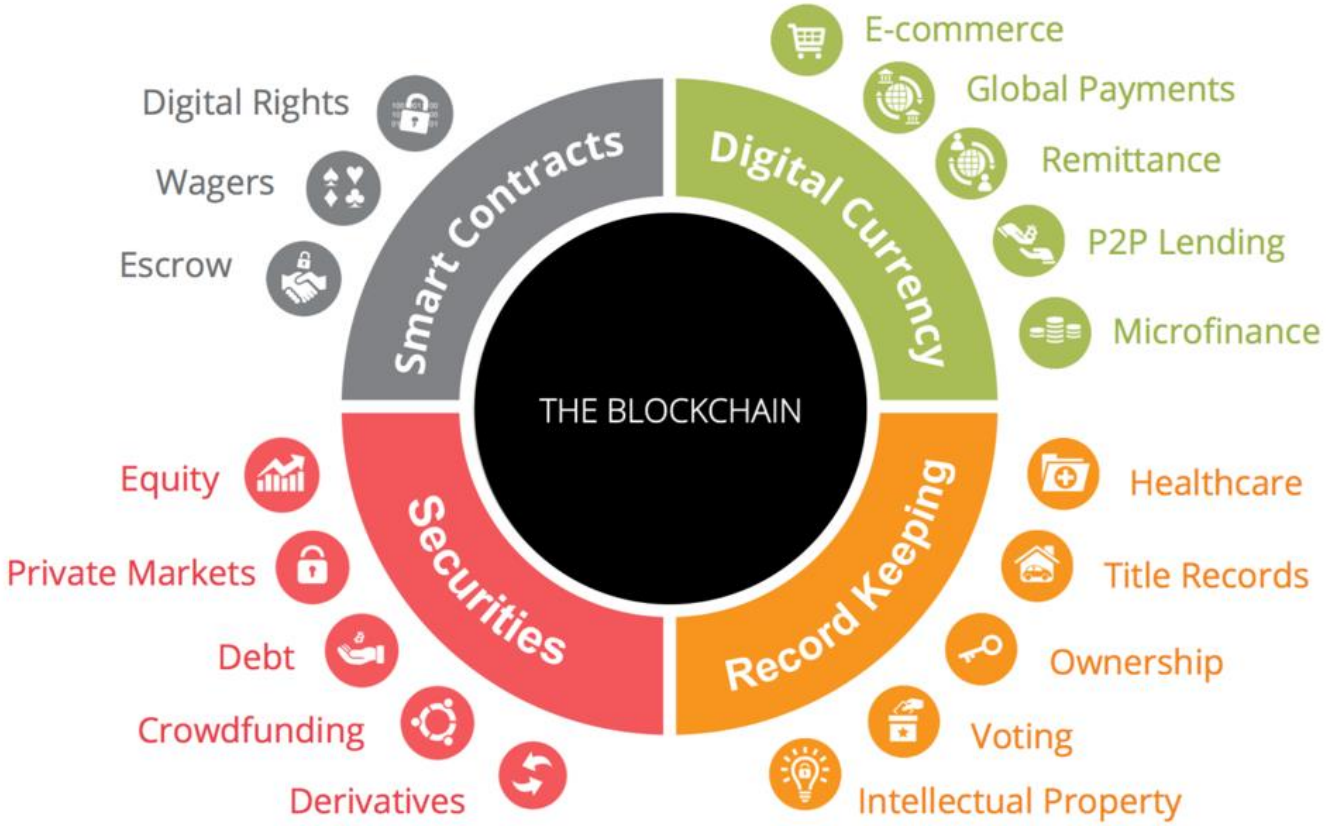
› Bitcoin is
  – A cryptocurrency (first ever), i.e. currency using cryptography to secure transactions and control the creation of new units.
  – A payment system, used for transfer of monetary value.

Brief History of Blockchain Technology

- **1991 – 1998:** First work on a cryptographically secured chain of blocks.
- **1998: Nick Szabo** introduced ***bit gold*** as mechanism for a decentralized digital currency and smart contracts.
- **2000: Stefan Konst** introduced a general cryptographic theory of secured chains.
- **2008: Satoshi Nakamoto** introduced **bitcoin** as the first conceptualization of the blockchain technology.
- 2014: start of **Blockchain 2.0**, the second-generation block chain technology with new application (e.g. intellectual property, social inequality).

> Applications





Applications - Finance

- Cryptocurrency:
  - Digital currency using cryptographic encryption
  - E.g. Bitcoin, Ethereum (at first), Dash (formerly XCoin), etc.
- Smart Contracts
  - Computer protocols to facilitate executing contracts.
  - E.g. The DAO (distributed autonomous organization), Ethereum, R3, Blockstream, RSK, etc.
- Funding

> Applications
- Financial Companies

> Applications
- Internet of Things, IoT

› Digital Identity
  – Computer information for entity (person, organization, device) identification.
  – E.g. Shocard, Internet-of-People (by ConsenSys).

› IoT security
  – Reduce IoT Vulnerabilities
  – E.g. Cryptotronix, IOTA, Chain of Things (CoT).

> Applications - Others (ideas)

› Distributed DNS
  – DNS management using blockchain ledgers.
  – E.g. ICANN DNSSE.

› Funders-NGOs Match-making
  – Matching NGOs with funders for social services and humanitarian aids.
  – E.g. The Bright Web (from tech4d.org)

› International Technical Organization
  – IEEE Blockchain Summit
  – ISOC's Blockchain Special Interest Group (ISOC-BSIG)

Conclusions

- Blockchain is a relatively new technology in the Internet.
- It has very desirable characteristics in an internet service.
- It also has a wide range of applications with great implications on internet services.
- However, blockchain technology has several challenges that needs to be solved such as scalability, regulation (ICANN?), integration, privacy, etc.

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Thank you!

Questions?