Blockchain

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Lecture 26
SUMMARY

- Grasping Blockchain Fundamentals
- Taking a Look at How Blockchain Works
- Propelling Business with Blockchain
- Blockchain in Action: Use Cases

Grasping Blockchain Fundamentals

- What is Blockchain?
  - Blockchain is a shared, distributed ledger that facilitates the process of recording transactions and tracking assets in a business network. An asset can be tangible — a house, a car, cash, land — or intangible like intellectual property, such as patents, copyrights, or branding.

Grasping Blockchain Fundamentals

What are the shortcomings of current transaction systems

- Cash is useful only in local transactions and in relatively small amounts.
- The time between transaction and settlement can be long.
- Duplication of effort and the need for third-party validation and/or the presence of intermediaries add to the inefficiencies.
- Fraud, cyberattacks, and even simple mistakes add to the cost and complexity of doing business, and they expose all participants in the network to risk if a central system, such as a bank, is compromised.
- Credit card organizations have essentially created walled gardens with a high price of entry. Merchants must pay the high costs of onboarding, which often involves considerable paperwork and a time-consuming vetting process.
- Half of the people in the world don't have access to a bank account and have had to develop parallel payment systems to conduct transactions.

Grasping Blockchain Fundamentals

The emergence of bitcoin

One solution that has been developed to address the complexities, vulnerabilities, inefficiencies, and costs of current transaction systems is bitcoin — a digital currency that was launched in 2009 by a mysterious person (or persons) known only by the pseudonym Satoshi Nakamoto.

Bitcoin has several advantages over other current transaction systems, including the following:

- Cost-effective
- Efficient
- Safe and secure

Exploring a blockchain application

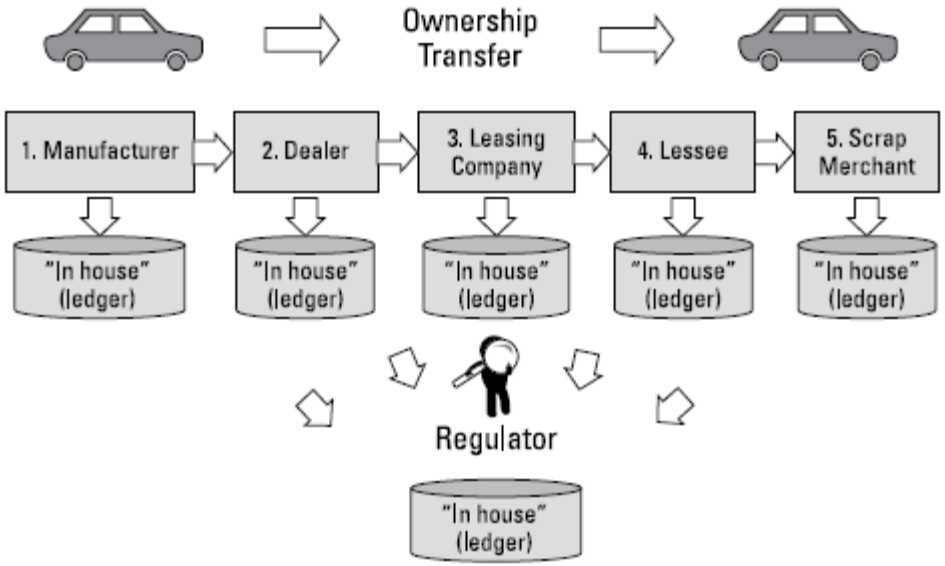

FIGURE 1-2: Tracking vehicle ownership without blockchain.

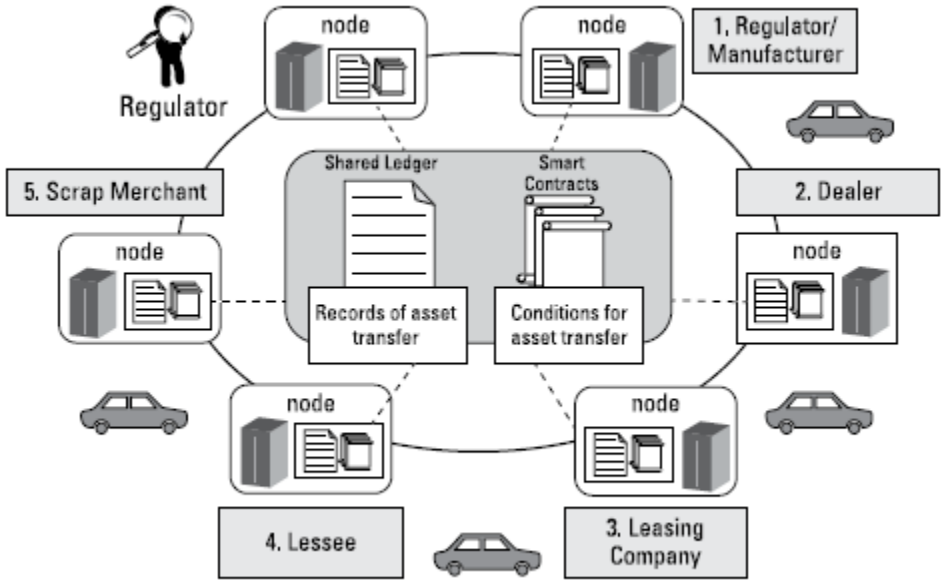

FIGURE 1-3: Tracking vehicle ownership with blockchain.

Recognizing the key benefits

For business, blockchain has the following specific benefits:

- Time savings
- Cost savings
- Tighter security
- Enhanced privacy
- Improved auditability
- Increased operational efficiency

Building trust with blockchain

Blockchain enhances trust across a business network. It's not that you cannot trust those who you conduct business with; it's that you do not need to when operating on a blockchain network. Blockchain builds trust through the following five attributes:

- Distributed and sustainable
- Secure, private, and indelible
- Transparent and auditable
- Consensus-based and transactional
- Orchestrated and flexible

Taking a Look at How Blockchain Works

- Why it's called "Blockchain"

Blockchain owes its name to the way it stores transaction data — in blocks that are linked together to form a chain (see Figure 2-1). As the number of transactions grows, so does the blockchain.

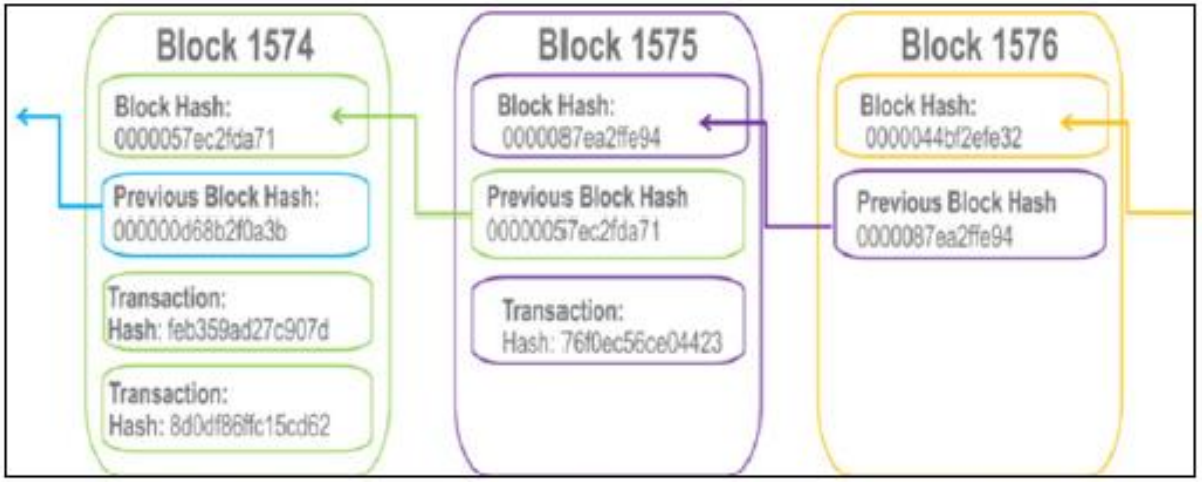

FIGURE 2-1: Blockchain stores transaction records in a series of connected blocks.

Taking a Look at How Blockchain Works

- What make a Blockchain suitable for business?

Four concepts that makes the blockchain suitable for business

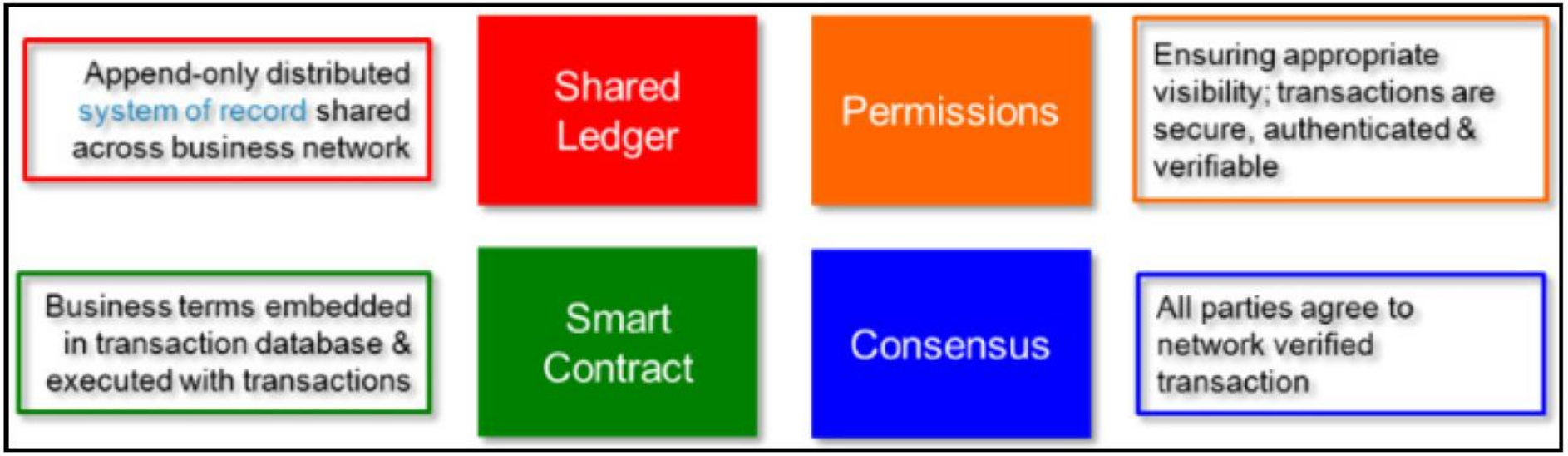

FIGURE 2-2: The key concepts of blockchain for business.

Shared Ledger

- Records all transactions across the business network; the shared ledger is the system of record, the single source of truth.
- It is shared among all participants in the network; through replication, each participant has a duplicate copy of the ledger
- It is permissioned, so participants see only those transactions they're authorized to view. Participants have identities that link them to transactions, but they can choose the transaction information that other participants are authorized to view.

Consensus

In a business network where participants are known and trusted, transactions can be verified and committed to the ledger through various means of consensus (agreement), including the following:

- Proof of stake
- Multi-signature
- Practical Byzantine Fault Tolerance (PBFT)

Smart Contracts

A smart contract is an agreement or set of rules that govern a business transaction; it's stored on the blockchain and is executed automatically as part of a transaction.

- Smart contracts may have many contractual clauses that could be made partially or fully self-executing, self-enforcing, or both.
- For example, a smart contract may define contractual conditions under which corporate bond transfer occurs or it may encapsulate the terms and conditions of travel insurance, which may be executed automatically when, for example, a flight is delayed by more than six hours.

Propelling Business with Blockchains

Blockchain technology has the potential to remove much of the remaining market friction — the speed bumps that throttle the pace of business.

Recognizing types of Market Friction

- Information frictions
- Interaction frictions
- Innovation frictions

Moving Closer to Friction-Free Business Networks

Reducing information friction

Uncertainty over the information needed to make business decisions often acts as a barrier to business. Blockchain has several properties that reduce information friction, including the following:

- Shared ledger
- Permissions
- Cryptography
- Consensus

Moving Closer to Friction-Free Business Networks

Easing interaction friction

Blockchain is particularly well-equipped to reduce interaction friction because it removes the barriers between participants in a transaction. Blockchain properties that reduce interaction friction include the following:

- Shared ledger
- State-based community
- Peer-to-Peer transactions
- Consensus
- Smart contracts

Moving Closer to Friction-Free Business Networks

Easing innovation friction

Blockchain is particularly well-equipped to reduce interaction friction because it removes the barriers between participants in a transaction. Blockchain properties that reduce interaction friction include the following:

- Eliminate the cost of complexity
- Reduce costs and delays of regulatory processes
- Expand opportunities

Blockchain in Action: Use Cases

One of the best ways to understand blockchain, appreciate its potential, and determine whether blockchain may be able to improve the way your organization conducts business is to look at potential use cases for blockchain.

- Financial Services
  - Commercial financing
  - Trade finance
  - Cross-border transactions
- Government
- Supply Chain Management
- Healthcare
- The Internet of Things (IoT)

Sources of this Presentation

Blockchain for Dummies, IBM Limited Edition

by Manav Gupta

Download link: http://csinvesting.org/wp-content/uploads/2018/06/Blockchain-for-Dummies.pdf