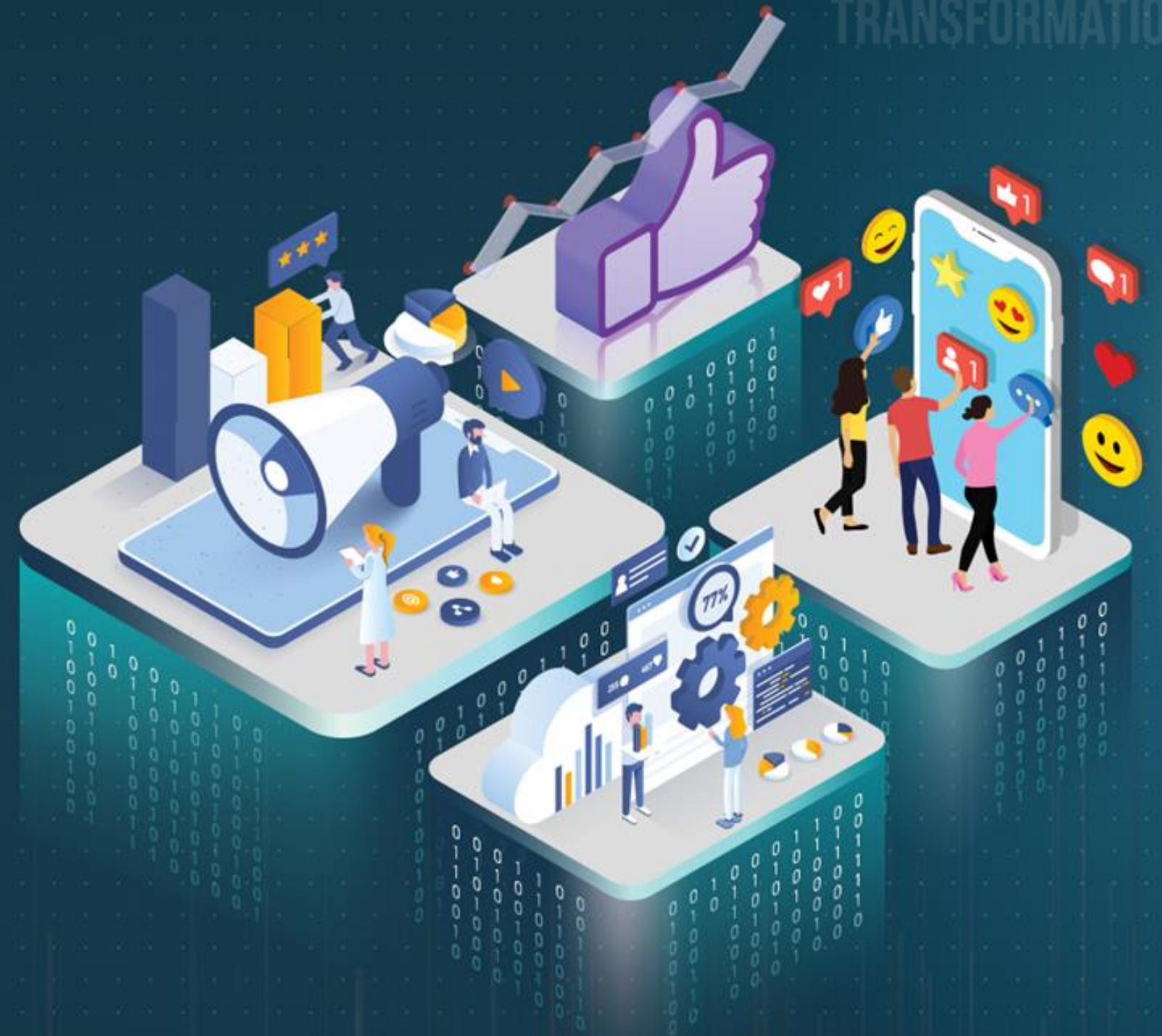


Digital Transformation for Leaders



Blockchain and IoT



Learning Objectives

By the end of this lesson, you will be able to:

- 🕒 Explain blockchain and its advantages
- 🕒 Discuss how industries are using blockchain technology
- 🕒 Define IoT and its advantages
- 🕒 Describe how industries are using IoT technology



Blockchain: Overview

Bitcoin: Case Study

Bitcoin is one of the most popular digital currencies available on the market today due to its current increase in marketability.



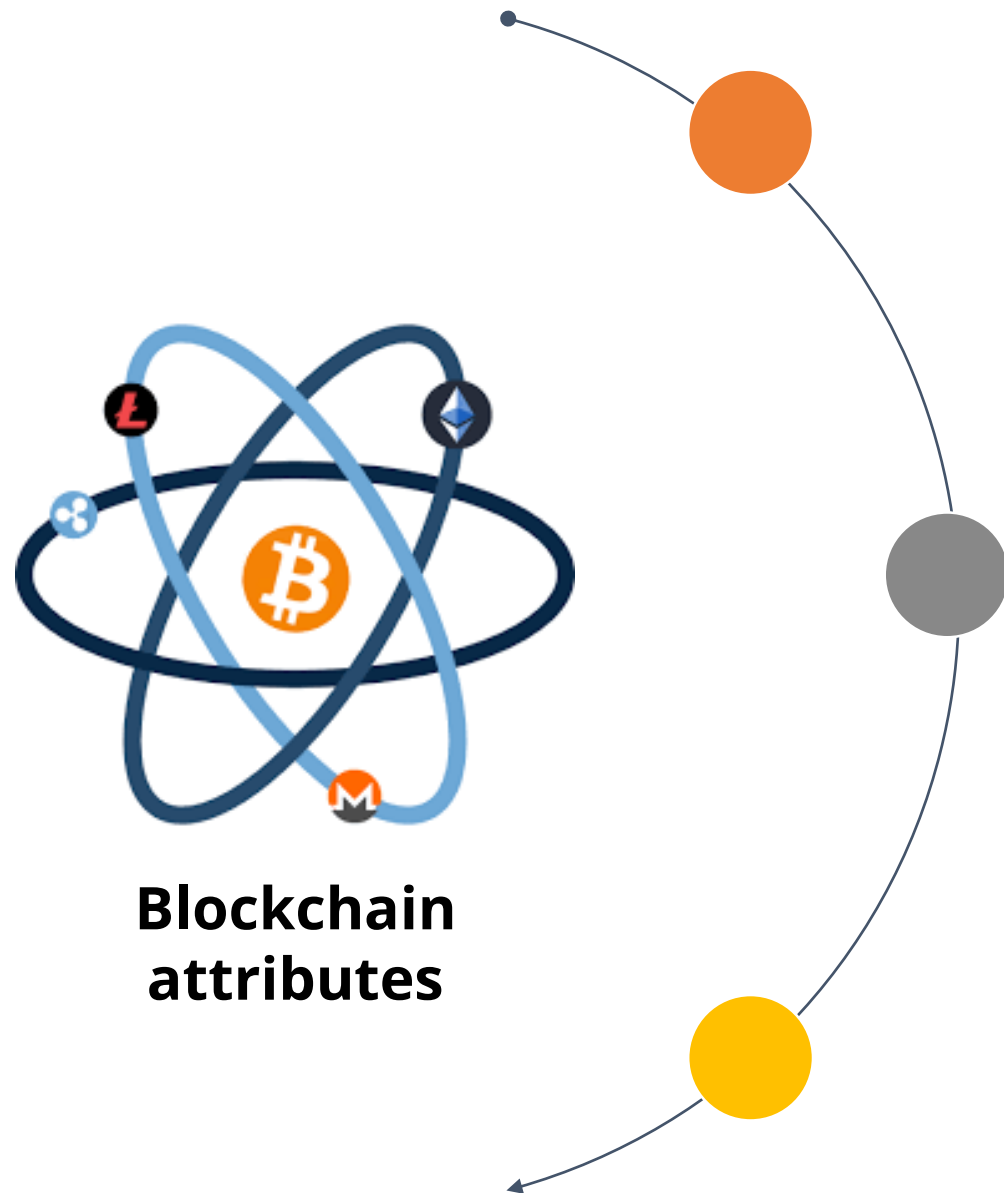
Bitcoin transactions are recorded and transferred by employing a distributed ledger on a peer-to-peer network that's open, public, and anonymous.

Blockchain: Definition



- Blockchain is a distributed, secure, and transparent system of record containing a log of transactions shared across a digital network.
- Each node on the network contains a complete replica of the blockchain data.
- Blockchain is the underpinning technology that maintains the Bitcoin transaction ledger.

Blockchain: Attributes



Distributed Ledger

It is the digital version of ledger to track and monitor data.

Peer-to-peer transactions

These are transactions where trading takes place directly between two parties.

Cryptography

In this process, the information embedded in block is validated by the network nodes using cryptographic techniques.

Components of Distributed Ledger

Distributed Ledger: Components

Distributed ledger is the most used blockchain attribute. The five components of a distributed ledger are:

**Network of
Nodes**

Tokens

Structure

**Consensus
Mechanism**

Rules

Distributed Ledger: Components

Network of Nodes

It is composed of the members and computers of the network. Nodes are responsible for the maintenance of the ledger and the verification of transactions.

Tokens

Structure

Consensus Mechanism

Rules



Distributed Ledger: Components

Network of
Nodes

Tokens

Structure

Consensus
Mechanism

Rules

Tokens are used as a unit of exchange or account in distributed ledger transactions. They are mostly referred to as cryptocurrency or digital currency.



Distributed Ledger: Components

Network of
Nodes

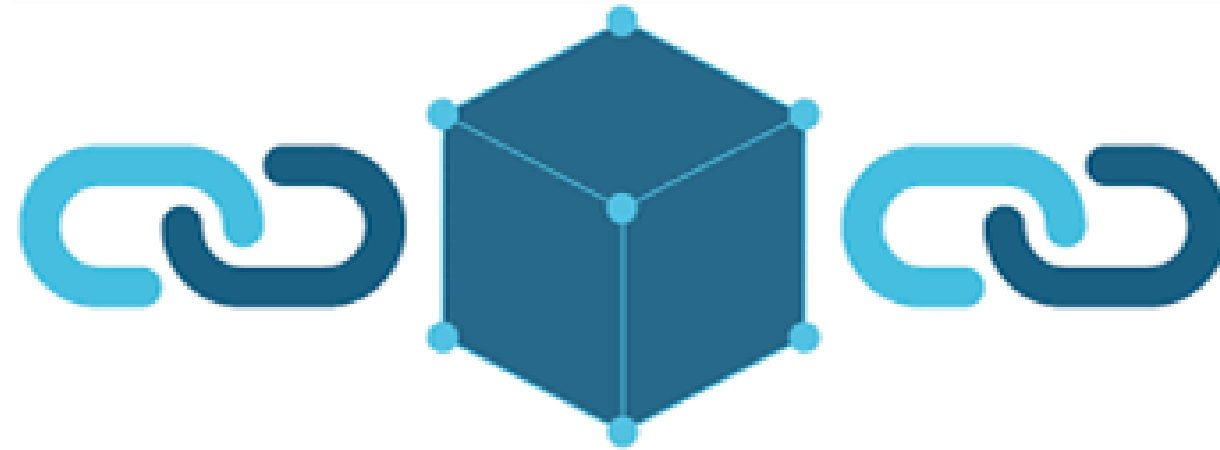
Tokens

Structure

Consensus
Mechanism

Rules

It defines how transactions are stored in the ledger, most prominent being blockchain. A blockchain consists of electronically chained blocks that contain the transaction records of a given period of time.



Distributed Ledger: Components

Network of
Nodes

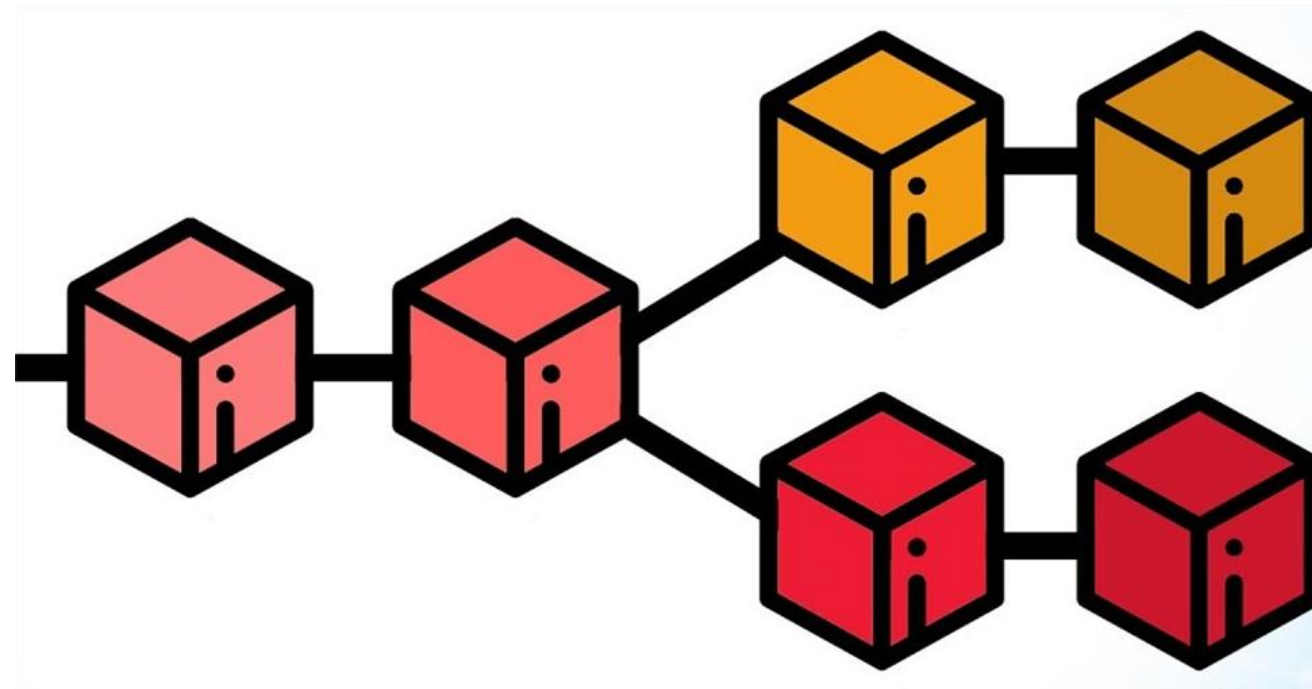
Tokens

Structure

Consensus
Mechanism

Rules

It prevents double spending and determines the correct version of the ledger. Double spending occurs if tokens are spent twice.



Distributed Ledger: Components

Network of
Nodes

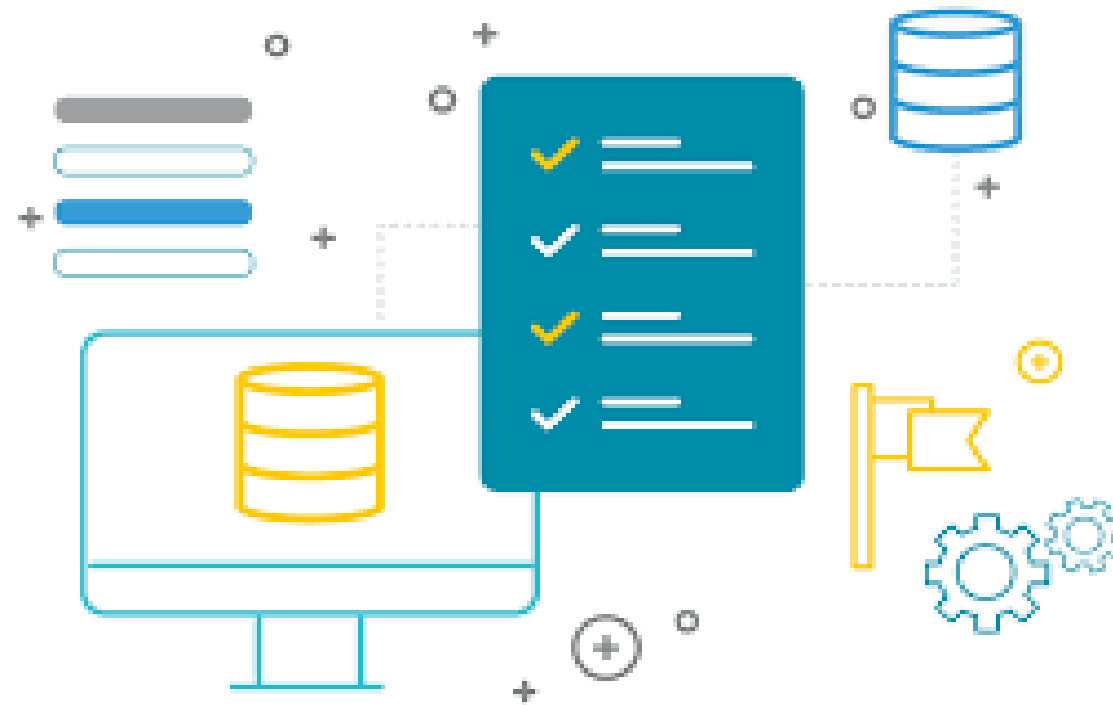
Tokens

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Consensus
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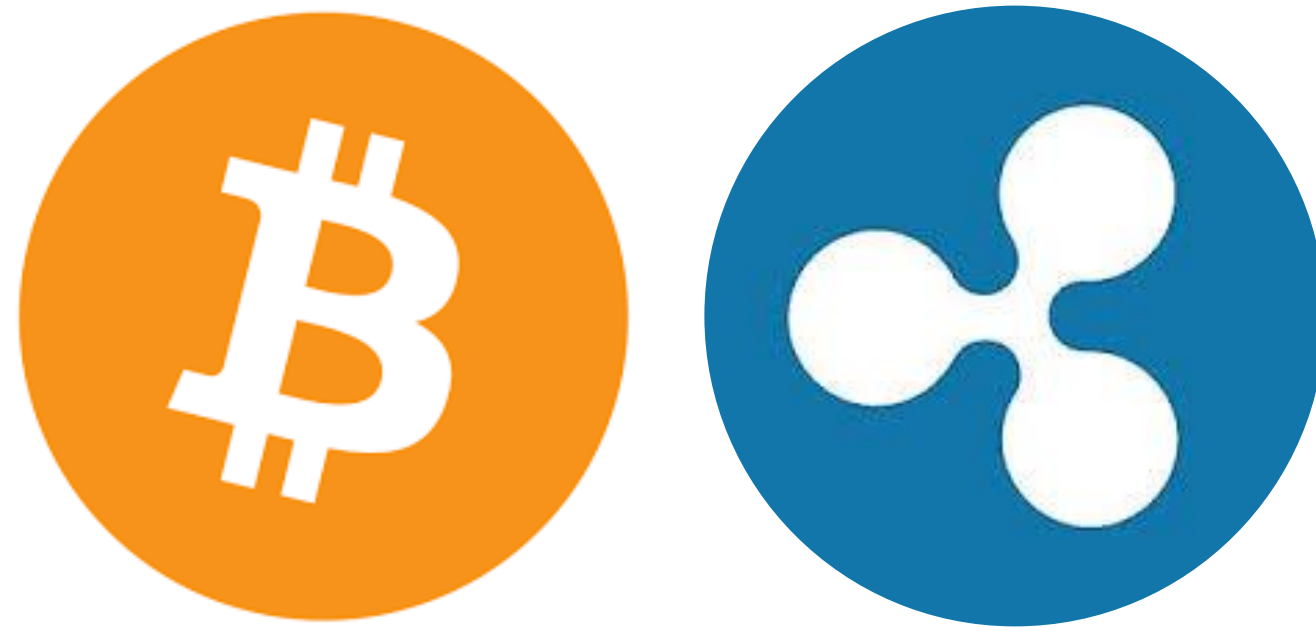
Rules

They set out a protocol for interactions between participants. Two of the most influential protocols are seen on the Bitcoin and Ripple networks.



Distributed Ledger: Example

Bitcoin is a cryptocurrency with a built-in payment system, whereas Ripple is a payment system for arbitrary assets.



The two protocols differ in their consensus mechanism, transaction fee policy, creation of new tokens, and other aspects.

Advantages of Blockchain

Advantages of Blockchain



- A peer-to-peer network, combined with a distributed timestamping server, allows blockchain databases to be managed autonomously to exchange information between disparate parties.
- Blockchain networks can be used for smart contracts or scripts that automatically execute when certain conditions are met.

Advantages of Blockchain

The advantages of blockchain technology are leveraged in two categories:

A blue circle containing the text "Public Blockchain".

Public Blockchain

It allows anyone who is part of the consensus process to view or send transactions.

A blue circle containing the text "Private Blockchain".

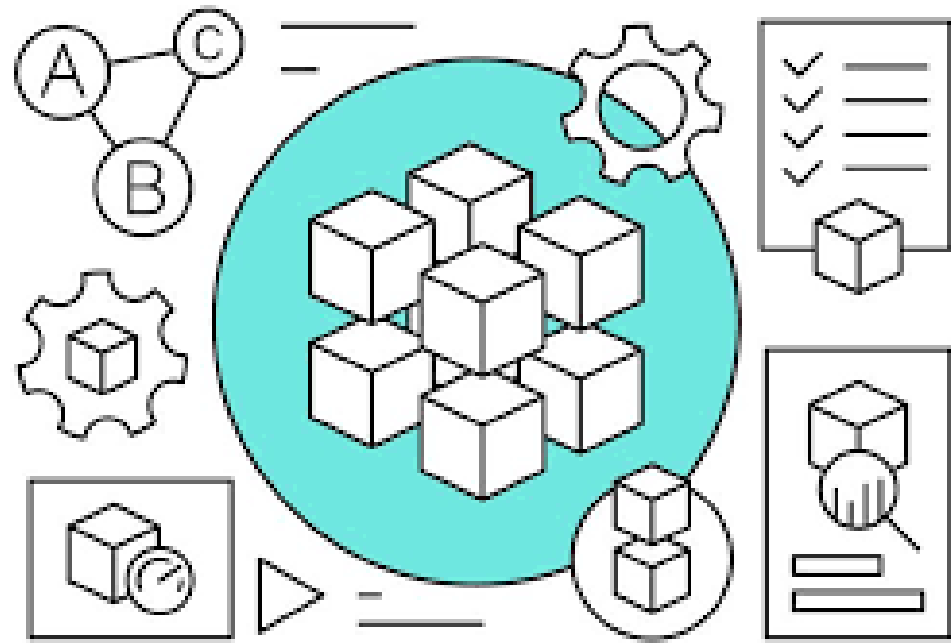
Private Blockchain

It restricts the ability to write to a distributed ledger to one organisation.



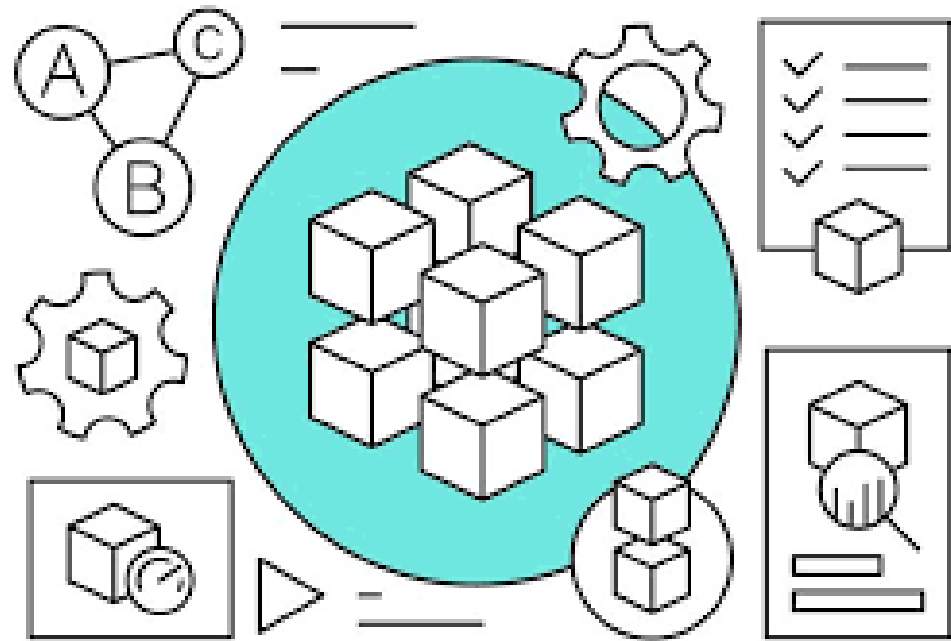
Blockchain: Functionality

Blockchain: Functionality



1. Blockchain leverages a decentralized network of computers that conduct intermediary tasks over the internet.
1. All transactions are recorded in a digital ledger, which is publicly available and fully distributed to all members of the network.
1. The distributed ledger approach eliminates the need for a trusted third party.

Blockchain: Functionality

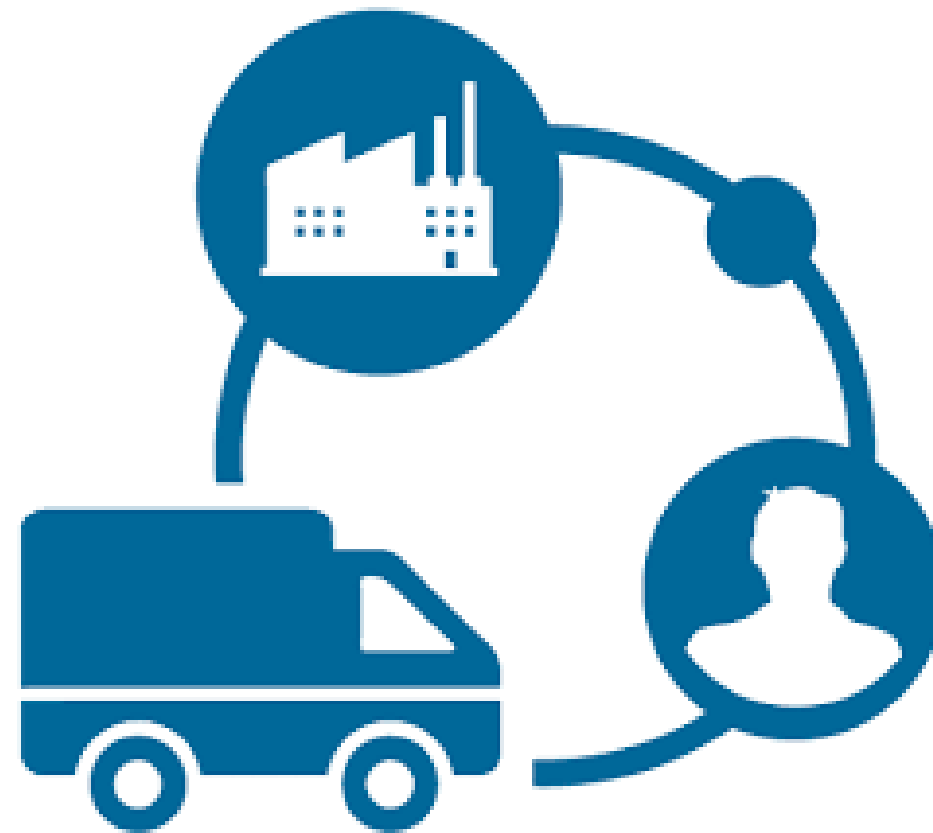


- 4. Each network member who holds a valid copy of the ledger, can certify asset ownership and clear transactions.
- 4. Transactions are visible to all network participants and are immutable once recorded.
- 4. The distributed ledger approach increases the transaction speed and decreases the costs as operations are performed peer-to-peer between the corresponding parties.

Blockchain: Applications

Logistics Management and Supply Chain Auditing

Blockchains can play a very important role in enhancing the security and efficiency of the storage or transfer of products.



Every activity of the process can be recorded on the distributed ledger and all concerned parties on the network will be notified about the activities.

Logistics Management and Supply Chain Auditing

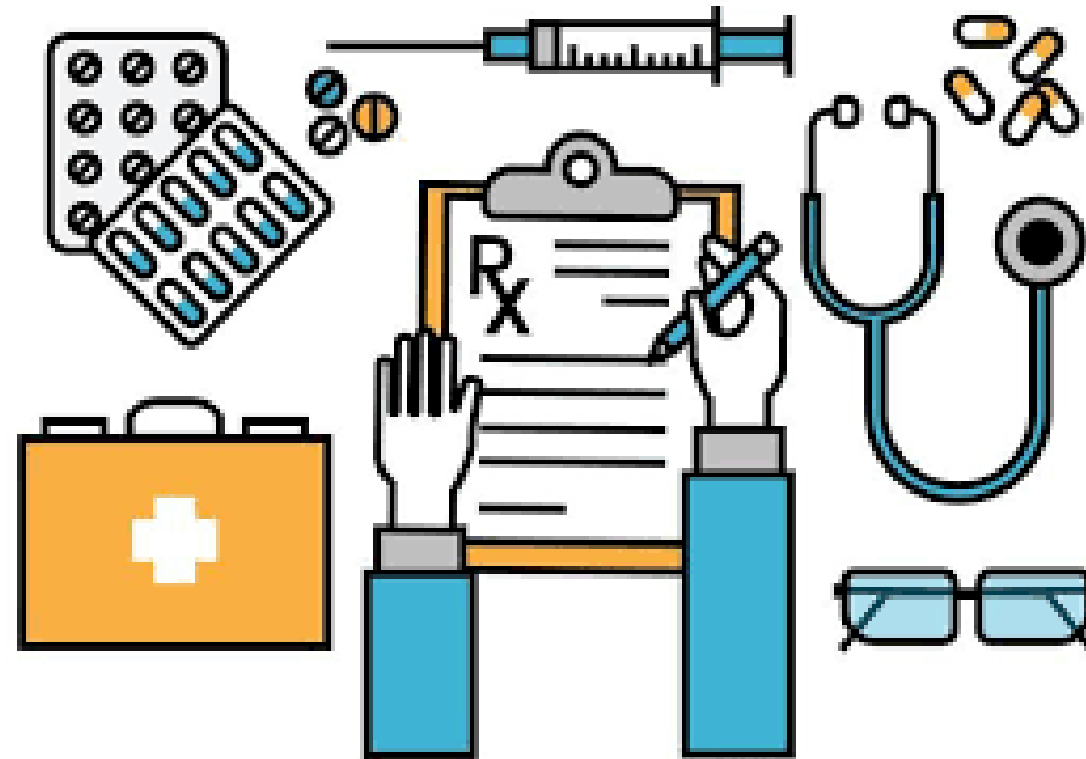
With blockchain's audit and authentication of each step in the logistics system, it has become easier and smarter.



Example: Belgium-based Port of Antwerp is running a pilot blockchain project focused on logistics automation.

Healthcare

Blockchain helps in handling medical records accurately and securely and enables the creation of smarter health information exchange models.



Example: Simply Vital Health is using blockchain technology in its new products, connecting care and health Nexus, to streamline data and records to save time and money.

Utilities



Blockchain has helped in:

- Empowering and encouraging prosumers by building a trustworthy energy market and transaction settlement system on blockchain
- Improving asset tracking management by building the underlying network of IoT devices on aetherium block chains
- Enabling metering technology for immutable and transparent metering and auto linkage of meters with consumer's digital wallets
- EV charging and sharing using a wallet for on-the-go transactions

Utilities



- Better power distribution and supply and demand balancing by blockchain enabled connected grids and real time information flow
- Efficient consumption driven blockchain based trading platform, where consumers can sell additional units of energy thereby reducing excessive consumption.
- Automated payment settlements in crypto tokens using smart contracts, based on actual usage measured on blockchain enabled meters.

Internet of Things

IoT: Definition

Internet of Things is the network of interrelated computing devices, sensors, or other objects that have unique identifiers and can communicate with other devices on the network.



IoT: Overview

The integration of IoT technology helps businesses in:

- Making more informed decisions aided by the torrent of interactional and transactional data at their disposal
- Improving performance through IoT analytics and IoT security to deliver better results
- Providing a platform for devices to represent themselves digitally and to control them from anywhere
- Facilitating connectivity by capturing more data to increase efficiency and improve safety and security



Applications of IoT

Insurance



- Erie uses IoT enabled drones for inspecting property in the event of a damage claim.
- Drones speed up the claim process, look at the damages without endangering employees, and get a clearer picture of potentially fraudulent cases.

Insurance



- Connected homes adoption helps customers in product bundling through inclusion of home sensors.
- For insurers, processing the claims becomes simple as a loss notification is routed automatically through sensors.

Insurance



Usage-based insurance

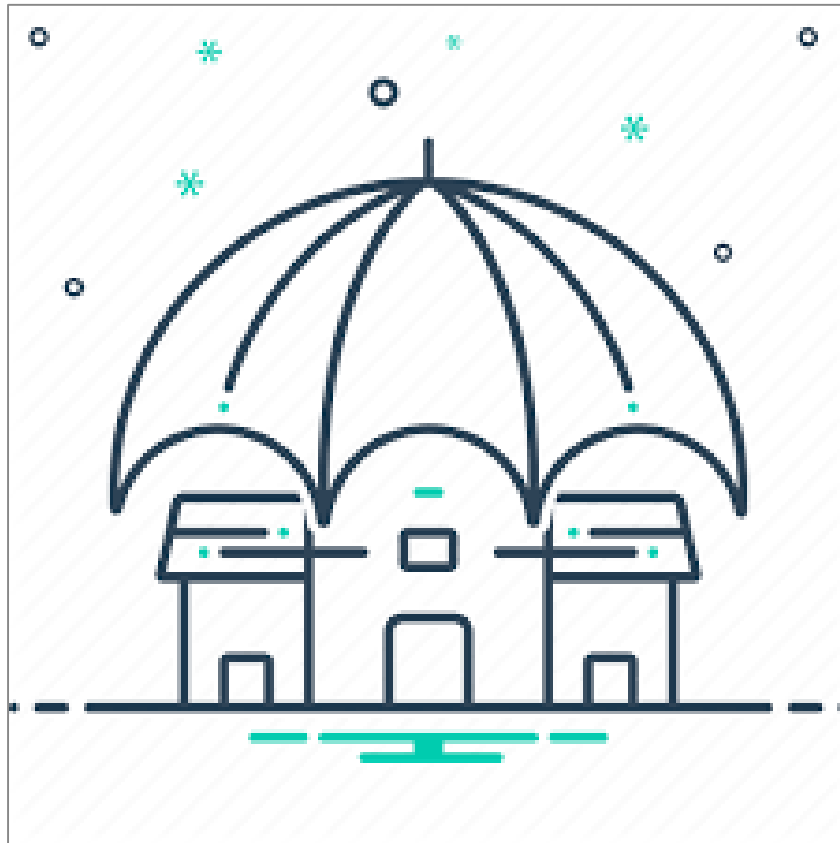
- Auto insurance segments enables personalization, including being able to provide value-added services to customers.
- This is achieved through tracking vehicle data on driving patterns with the help of telematics devices fitted to the insurance vehicle.
- As a result, the insured needs to pay a premium only for the actual distance travelled and allows insurers to retrofit their overall pricing and improve relevant loss adjustment expenses.

Insurance



- Commercial insurers are experiencing the power of industrially connected devices capable of transmitting and communicating information in real time.
- These devices help insurers adopt a dynamic rating model that enables risk-based pricing for customers.
- This approach accumulates new data points at frequent intervals by integrating property and location specific attributes with traditional risk data.
- It enables better risk evaluation, leading to effective risk management and loss minimization practices for insurers.

Insurance



- Commercial property insurers, using location enabled GIS devices, can now access advanced data to accurately assess risk exposure and use it to baseline their pricing in advance.
- Technology like drones can enable timely underwriting and risk inspections, including providing proactive loss notification or mitigation alerts during catastrophic events.

Insurance



Wearables that transmit the insured's fitness data on a regular basis help them avail pricing discounts in terms of health, disability, and accident insurance.

Banking

Royal Bank of Scotland has an integrated RBS Assist chatbot for banking FAQ's to DBS.



Using Kasisto's Kai AI platform, the chatbot allows customers to conduct transactions, like paying their bills.

Travel and Hospitality

Starwood and Hilton introduced IoT based mobile keys to reduce the waiting time for guests.



With a mobile app integration, guests are notified when their room is ready. Once at the room guests simply wave their phone in front of the lock to open the door.

Healthcare

Augmedix and Obaa are using connected objects to improve the delivery of healthcare in hospitals and clinics and track treatments.



This is done using smart glass wearables like Google Glass that is used for health care charting.

Underwriting

The convergence of different data types leads directly to increased precision in assessing risk and pricing policies.



Constant monitoring allows underwriters to recommend real pricing and policy term modifications.

They can also model the impact of new health and well-being services to manage mortality and morbidity risk over time.

Key Takeaways

- 👁 A blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography
- 👁 As a peer-to-peer network combined with a distributed timestamping server, blockchain databases can be managed autonomously
- 👁 Blockchain networks can be used for smart contracts that automatically execute when certain conditions are met
- 👁 Internet of Things is an ecosystem of connected physical objects that are accessible through the internet

