



# Introduction to Blockchain

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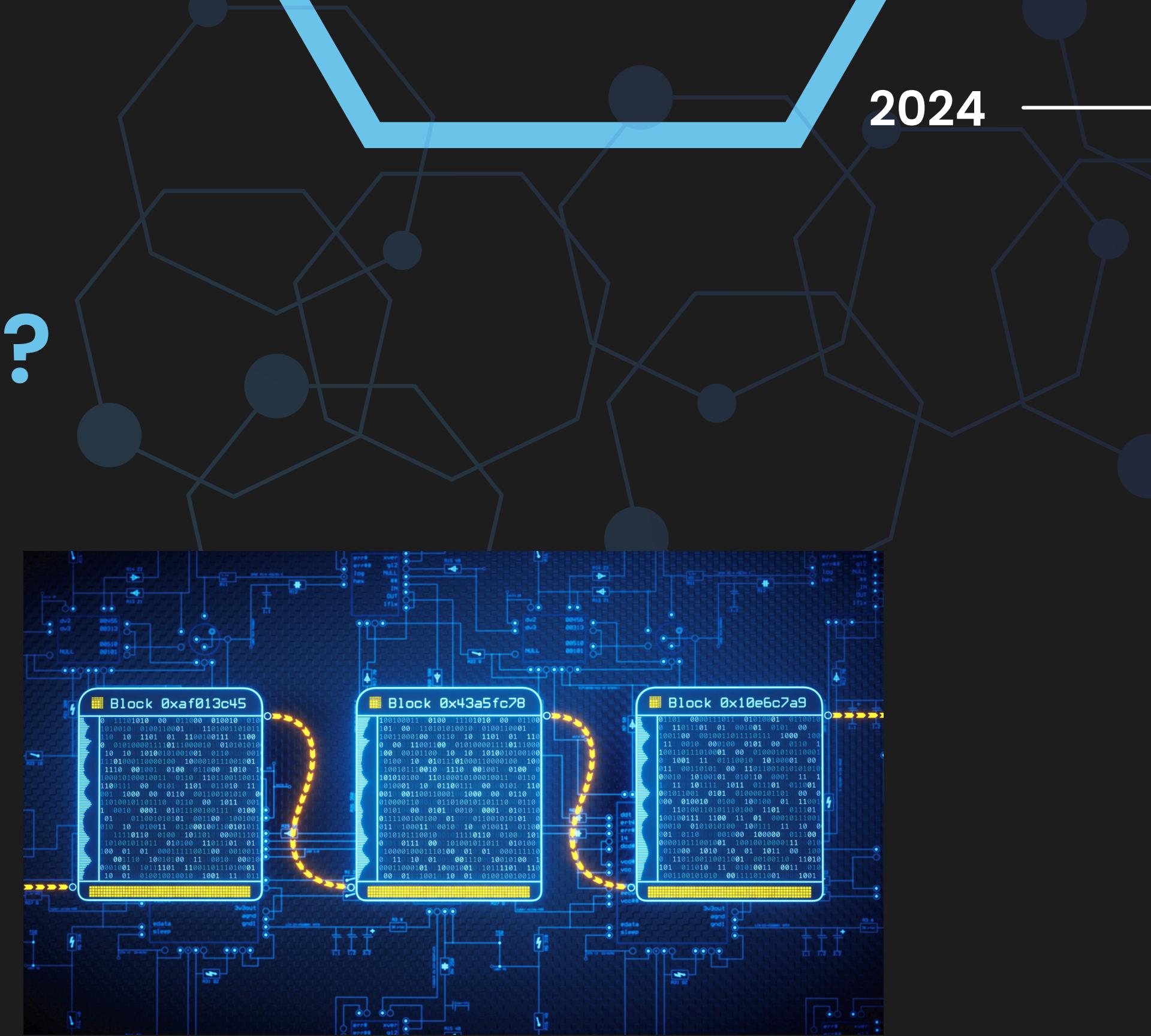
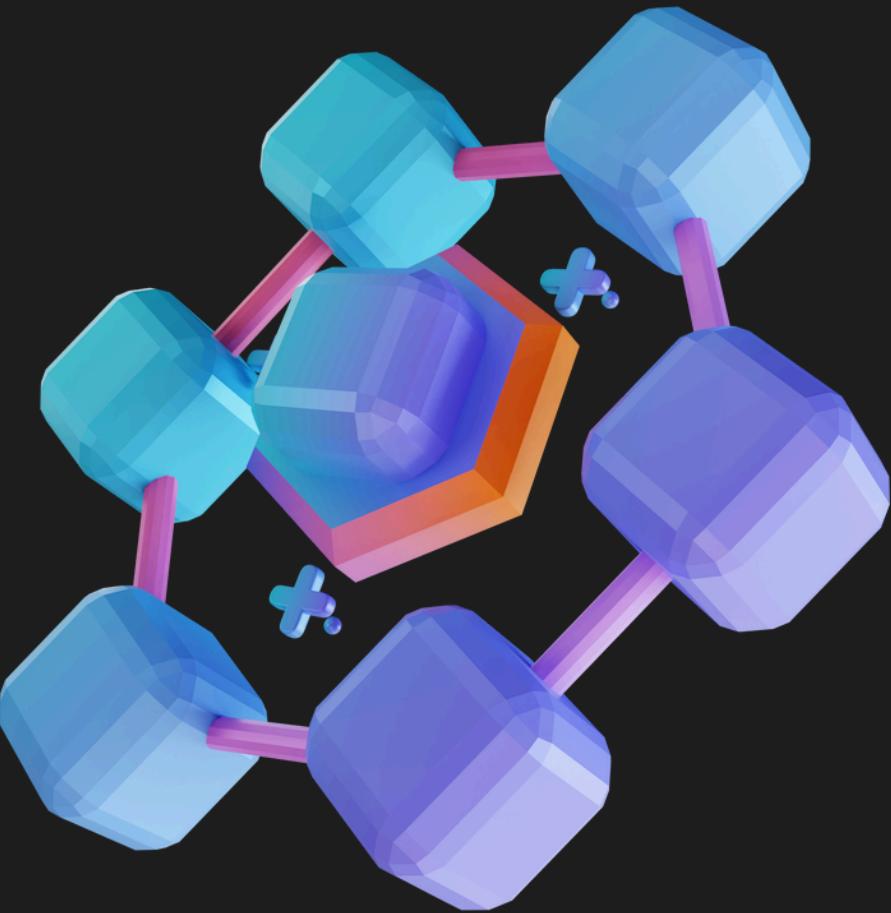
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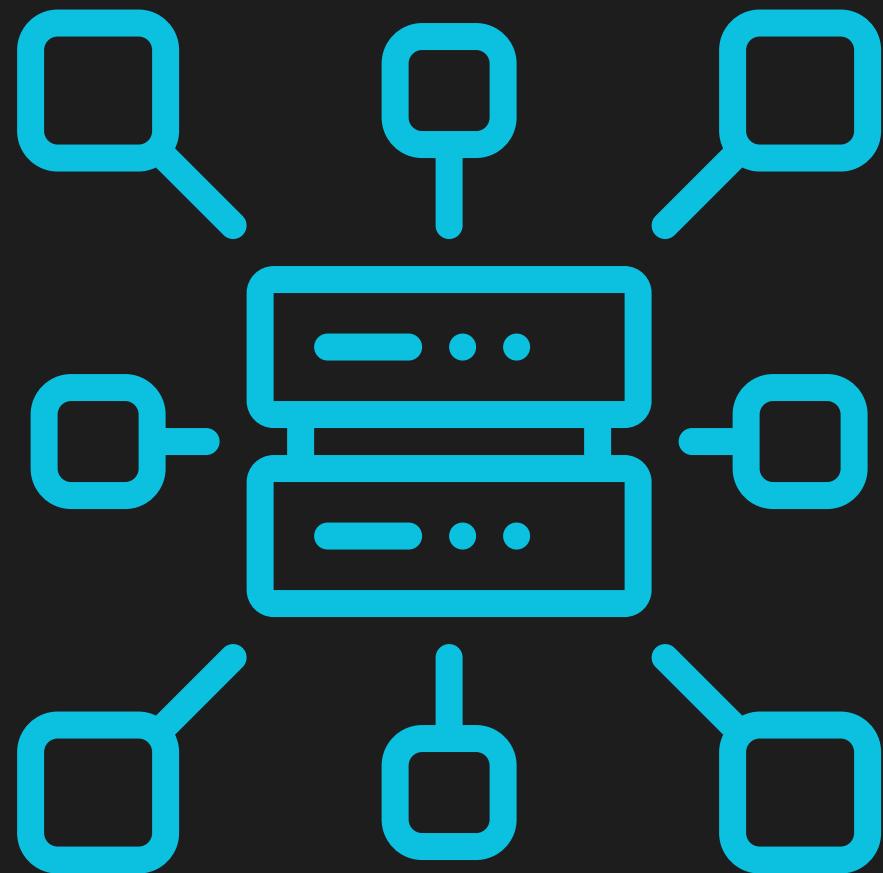
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# What is Blockchain?





# Centralization



**Centralization refers to a system where control and decision-making are concentrated in a single point, often with a central authority or organization.**





# Centralized System



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# Centralized System

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# Centralized System

# ISSUE

- Single Point of Failure
- Trust Issues
- Limited Transparency
- Inefficiency and Slow Decision-Making
- Censorship and Control

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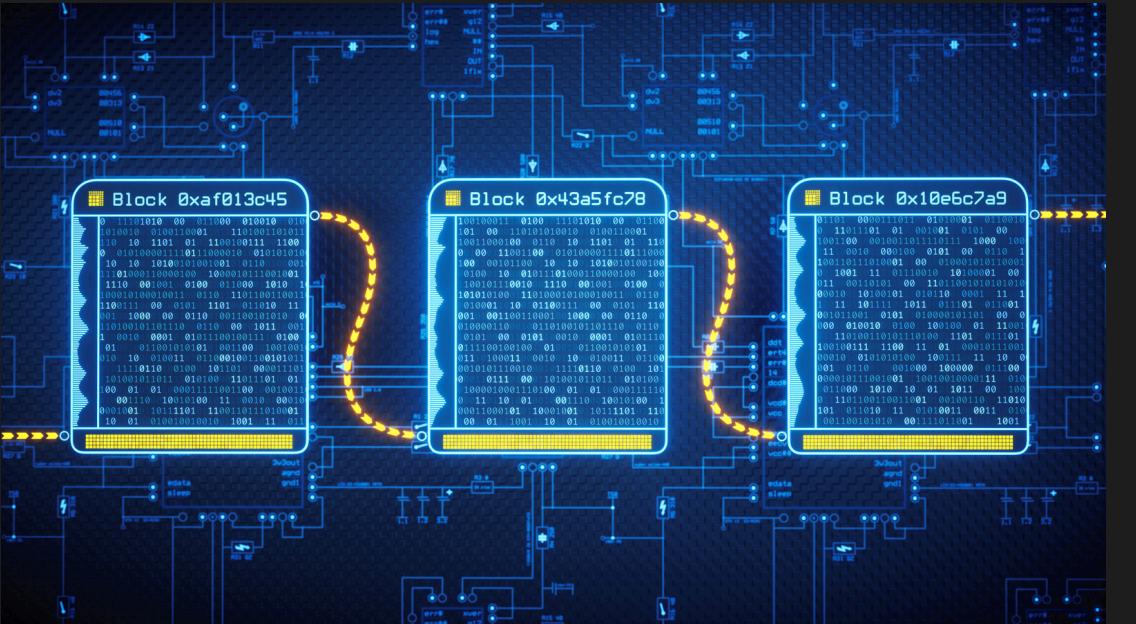
# Transition to Blockchain

CHANGE

- Control is distributed across multiple participants
- Transparency is guaranteed, and decision are visible to all
- Systems are more secure, efficient and censorship-resistant



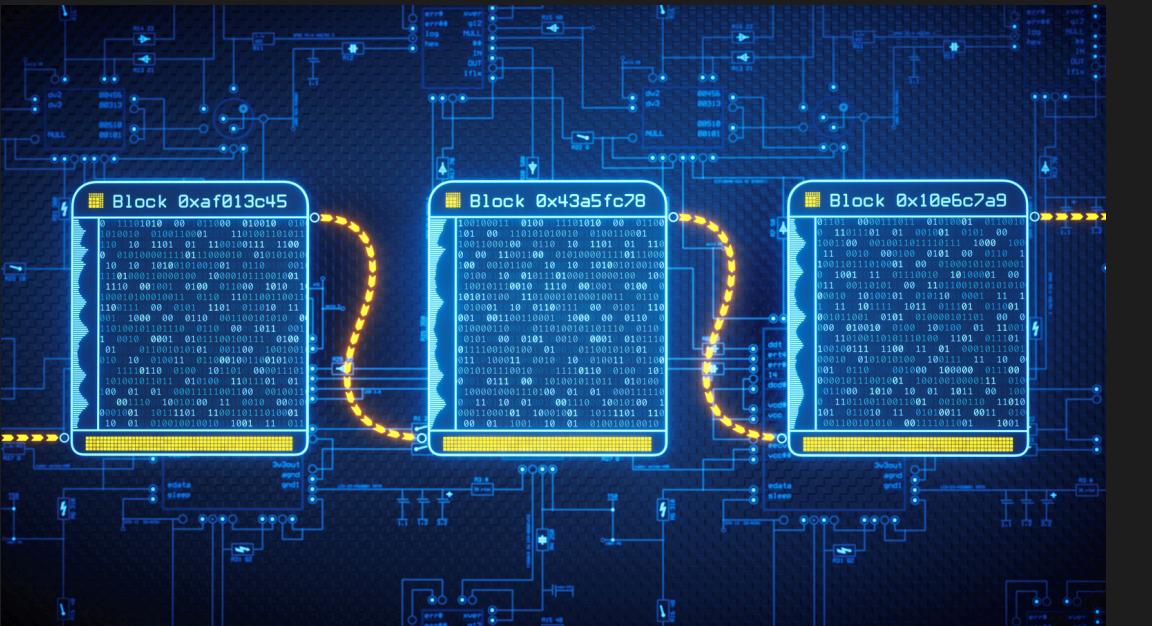
# What is Blockchain?



A distributed ledger technology that allows secure, transparent, and tamper-proof recording of transactions across multiple computers.

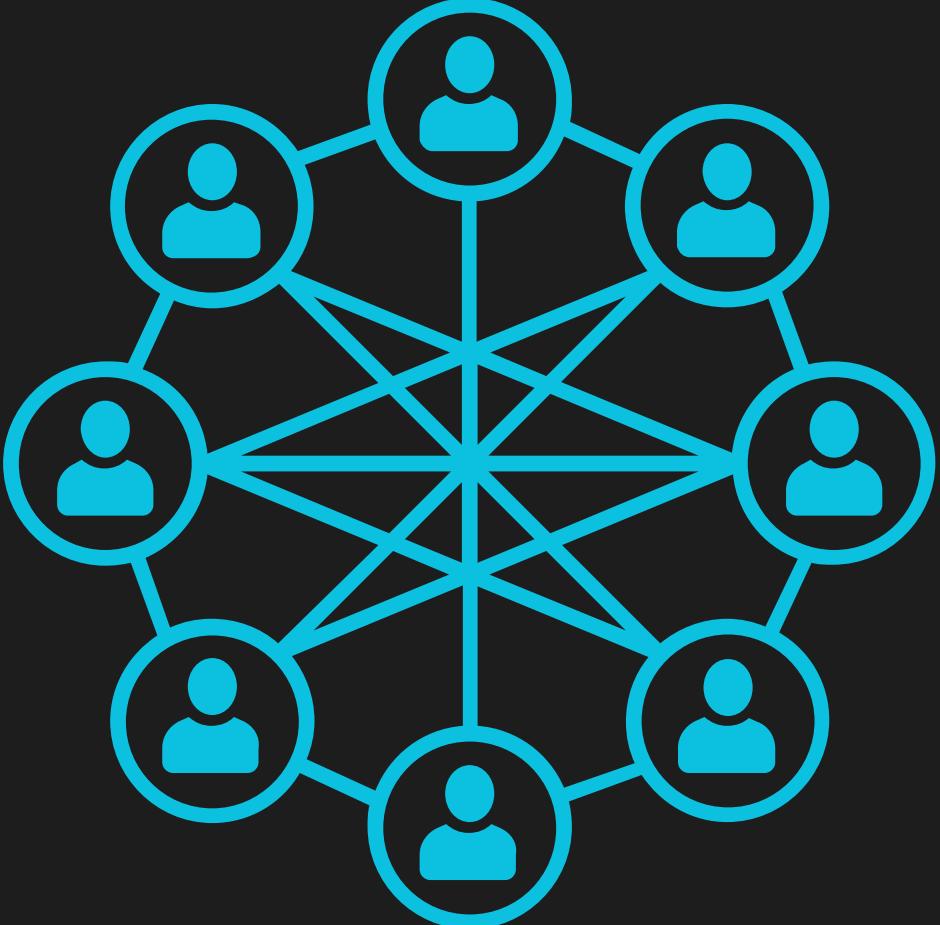


# Core Principles of Blockchain



- Decentralization
- Immutability
- Transparency

# What is Decentralization?



**Decentralization in blockchain refers to the distribution of control and decision-making across a network rather than being confined to a central authority or single point of control.**

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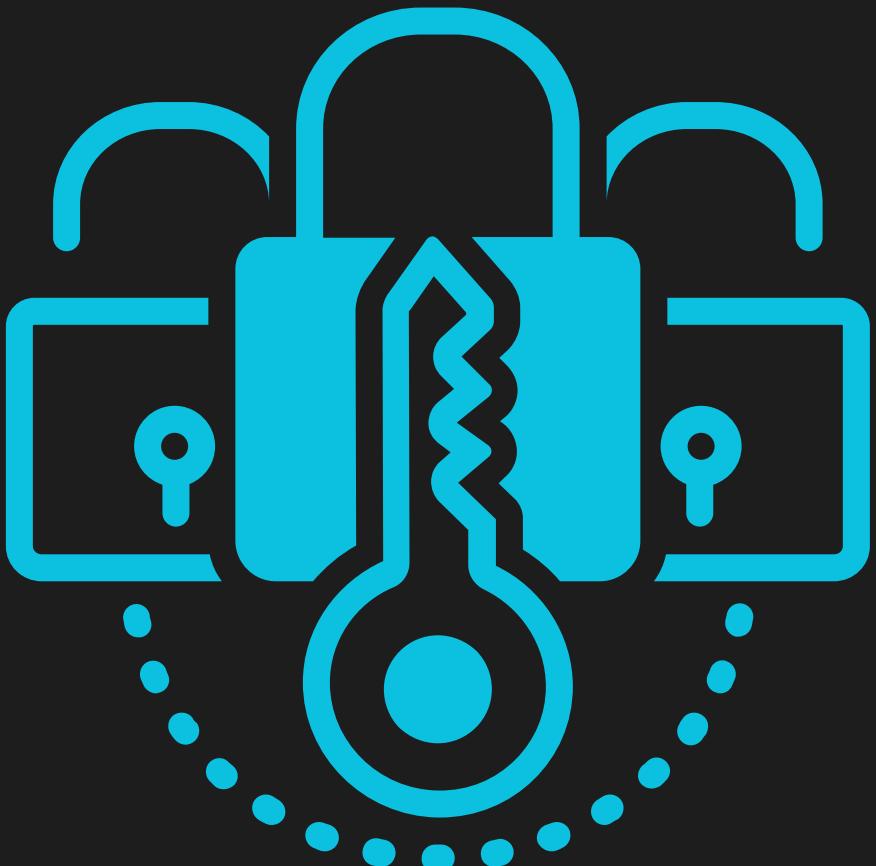


# Decentralization

- **How it works:** In decentralized systems, no one person, organization, or government controls the entire network. Instead, power is shared among all participants (nodes). Each node has a copy of the blockchain and helps validate transactions.
- **Benefits:** This leads to greater security because there's no single point of failure. It also promotes openness, as no single entity can alter the system unilaterally.
- **Example:** Bitcoin is a decentralized digital currency, where the participants (miners) validate transactions and update the ledger without needing a central bank.



# What is Immutability?



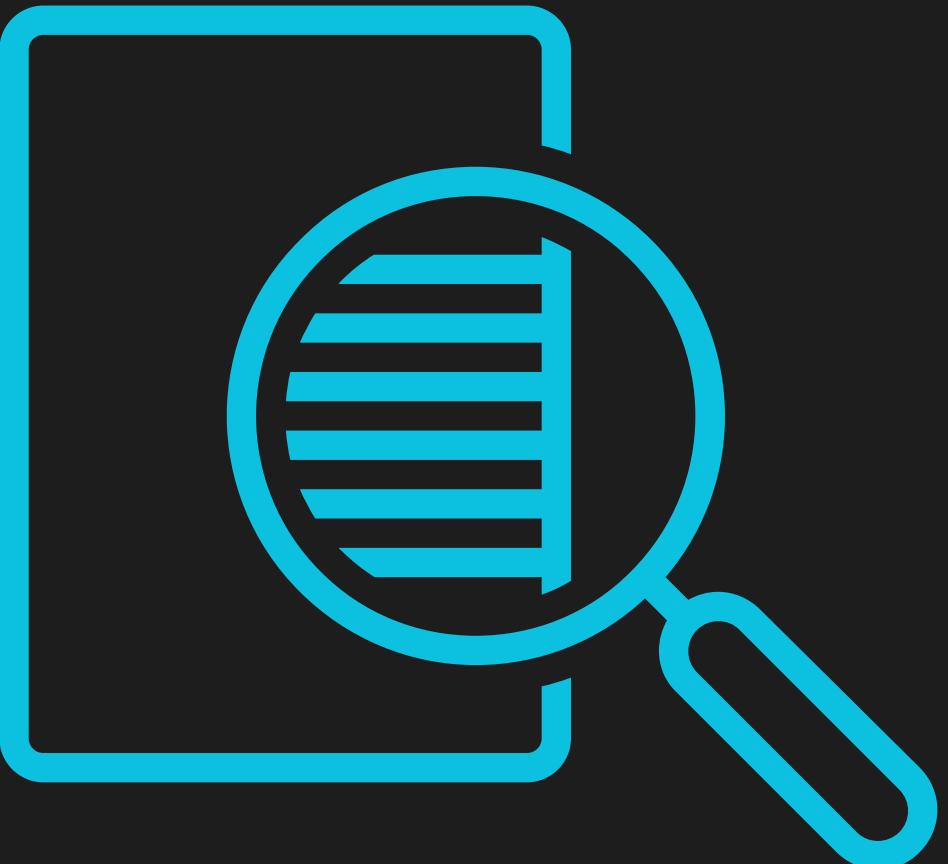
Immutability refers to the characteristic of blockchain that makes it nearly impossible to alter or delete data once it has been recorded.



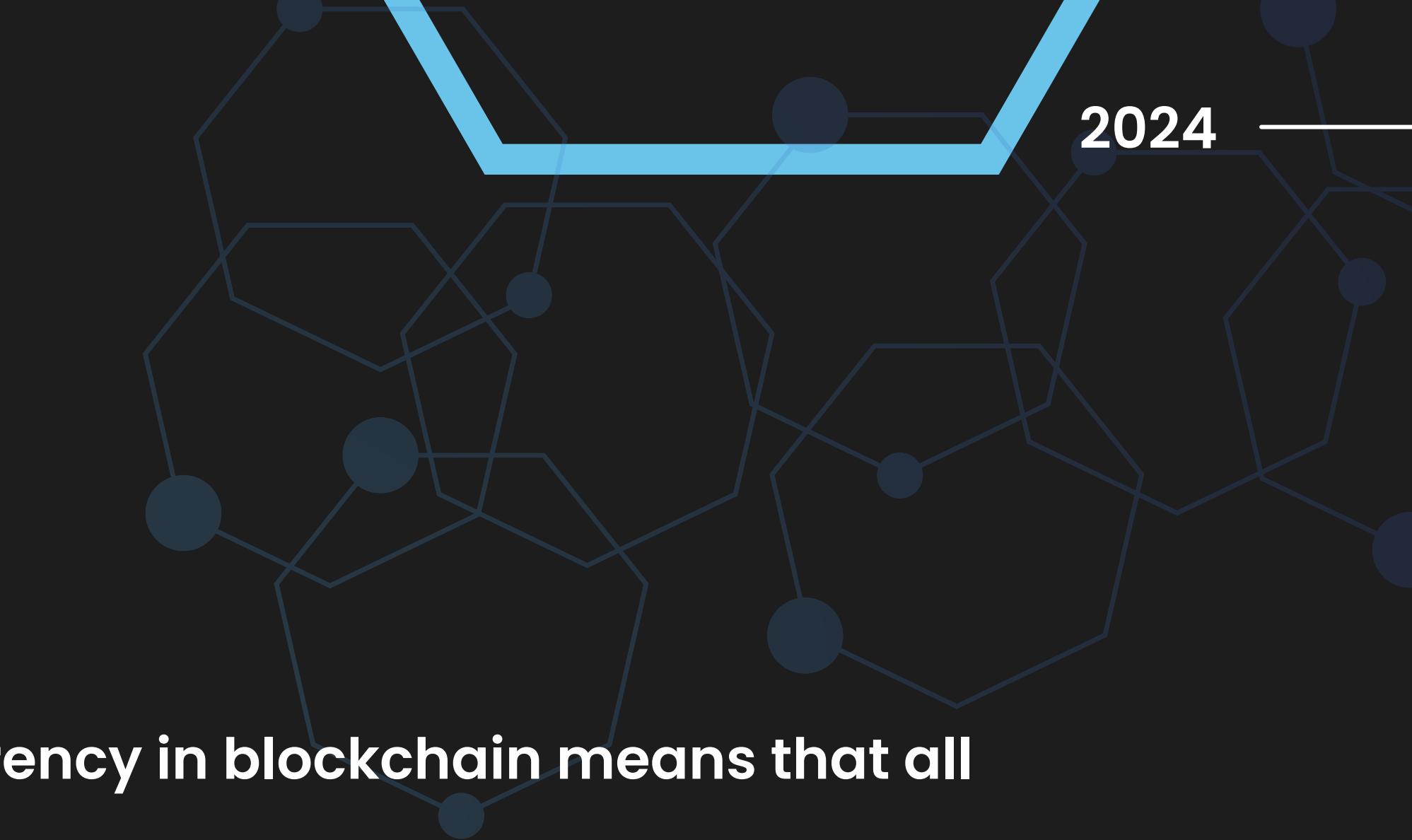
# Immutability

- **How it works:** In a blockchain, transactions are grouped in blocks and added to a chain of previous blocks. Once a block is validated and added to the blockchain, its contents are permanent and cannot be changed without altering all subsequent blocks.
- **Benefits:** This ensures trust and reliability because users know that once information is added to the blockchain, it cannot be tampered with or manipulated. It guarantees data integrity.
- **Example:** In Bitcoin, once a transaction is added to the blockchain, it cannot be undone, ensuring that the record of the transaction remains intact forever.

# Transparency



**Transparency in blockchain means that all transactions or data stored on the network are visible and verifiable by all participants**





# Immutability

- **How it works:** Since every participant has access to the blockchain, they can view the entire history of transactions or records stored in the blockchain. While the data is visible, the identities of participants are protected through cryptography, ensuring privacy while maintaining transparency
- **Benefits:** This open access to data ensures accountability and reduces the likelihood of fraud or corruption, as all participants can independently verify transactions..
- **Example:** In Ethereum, smart contract executions are transparent, meaning anyone can see the terms of the contract and its outcome, enhancing trust and fairness



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# MCQ

**What is decentralization in the context of blockchain technology?**

- A) A system where all power is held by a central authority
- B) A system where control is distributed across multiple nodes
- C) A system where only one node validates all transactions
- D) A system where power is shared between two main authorities



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# MCQ

**Which of the following is a benefit of decentralization in blockchain?**

- A) Increased control by central authorities
- B) Higher efficiency due to a single point of failure
- C) Greater security due to the lack of a single point of failure
- D) More private information stored in centralized databases



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# MCQ

In a decentralized blockchain, who validates and verifies transactions?

- A) A central bank
- B) A government entity
- C) All participants (nodes) in the network
- D) Only the original sender of the transaction





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# MCQ

**What problem does decentralization help to solve in blockchain networks?**

- A) The problem of data redundancy
- B) The problem of data privacy
- C) The problem of trusting a single centralized authority
- D) The problem of excessive computing power



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# MCQ

**What does immutability mean in the context of blockchain?**

- A) Transactions can be modified by anyone in the network
- B) Transactions, once added to the blockchain, cannot be altered or deleted
- C) The blockchain ledger can be updated by a central authority
- D) The data in the blockchain can be easily replaced

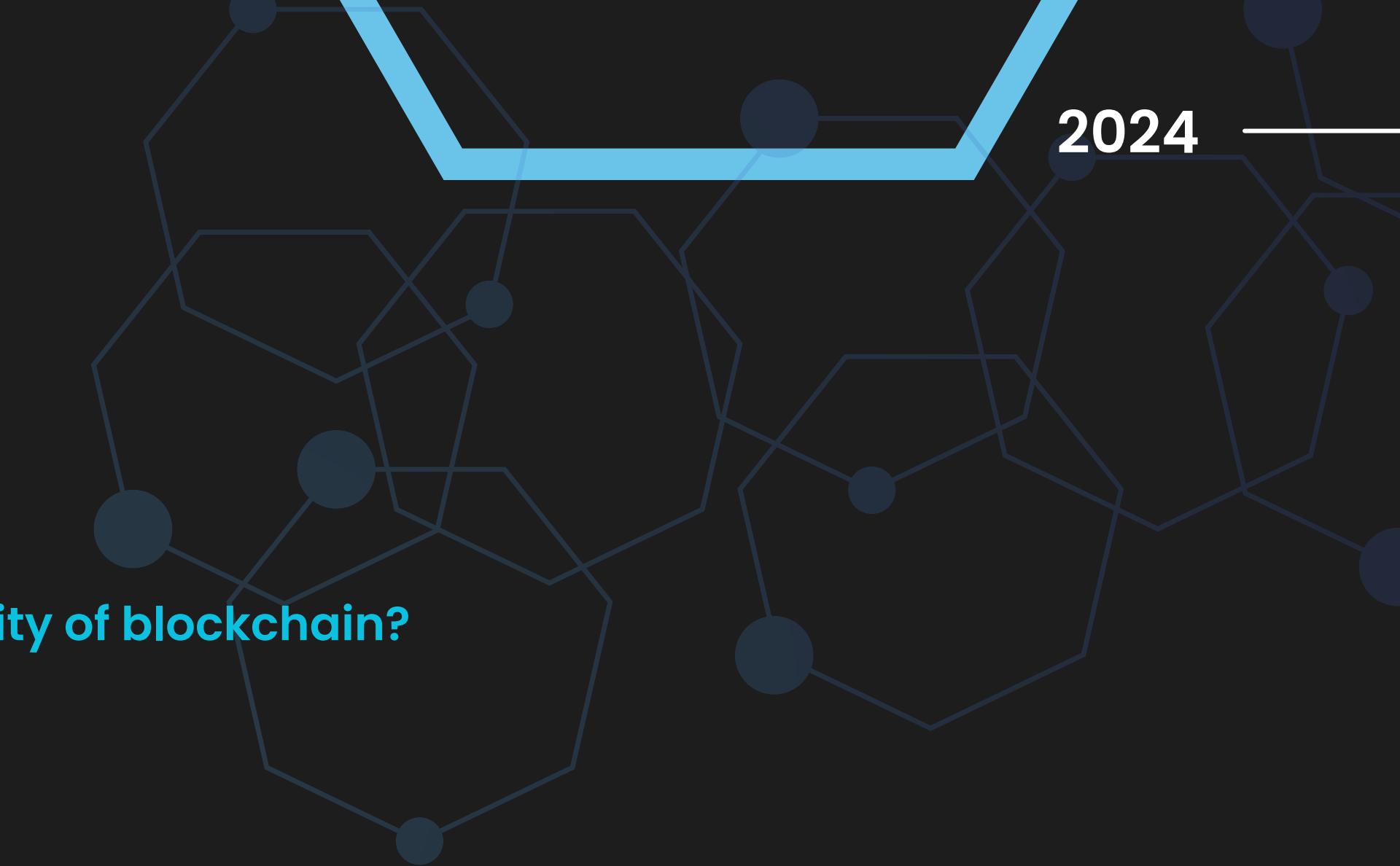


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# MCQ

**Which of the following is a result of the immutability of blockchain?**

- A) Data integrity and trust in the records stored
- B) The ability to modify transactions at any time
- C) Increased central control over the data
- D) Enhanced flexibility for changing records





# MCQ

**Why is it difficult to alter a transaction once it is added to the blockchain?**

- A) Transactions are stored in a central server that locks data
- B) Altering a transaction would require changing all subsequent blocks, which is computationally expensive
- C) Transactions are hidden from the public, making changes impossible
- D) Blockchain networks do not store historical data



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# MCQ

**Immutability in blockchain ensures that:**

- A) Only a few nodes can modify the data
- B) The data can be deleted by the administrator
- C) The data remains unaltered and permanent once added to the blockchain
- D) The data is stored in a centralized database





# MCQ

**What is transparency in blockchain technology?**

- A) Only the central authority can view the transactions
- B) All participants in the network can view and verify transactions
- C) Participants cannot see any data related to transactions
- D) Transactions are hidden from all nodes except the central server



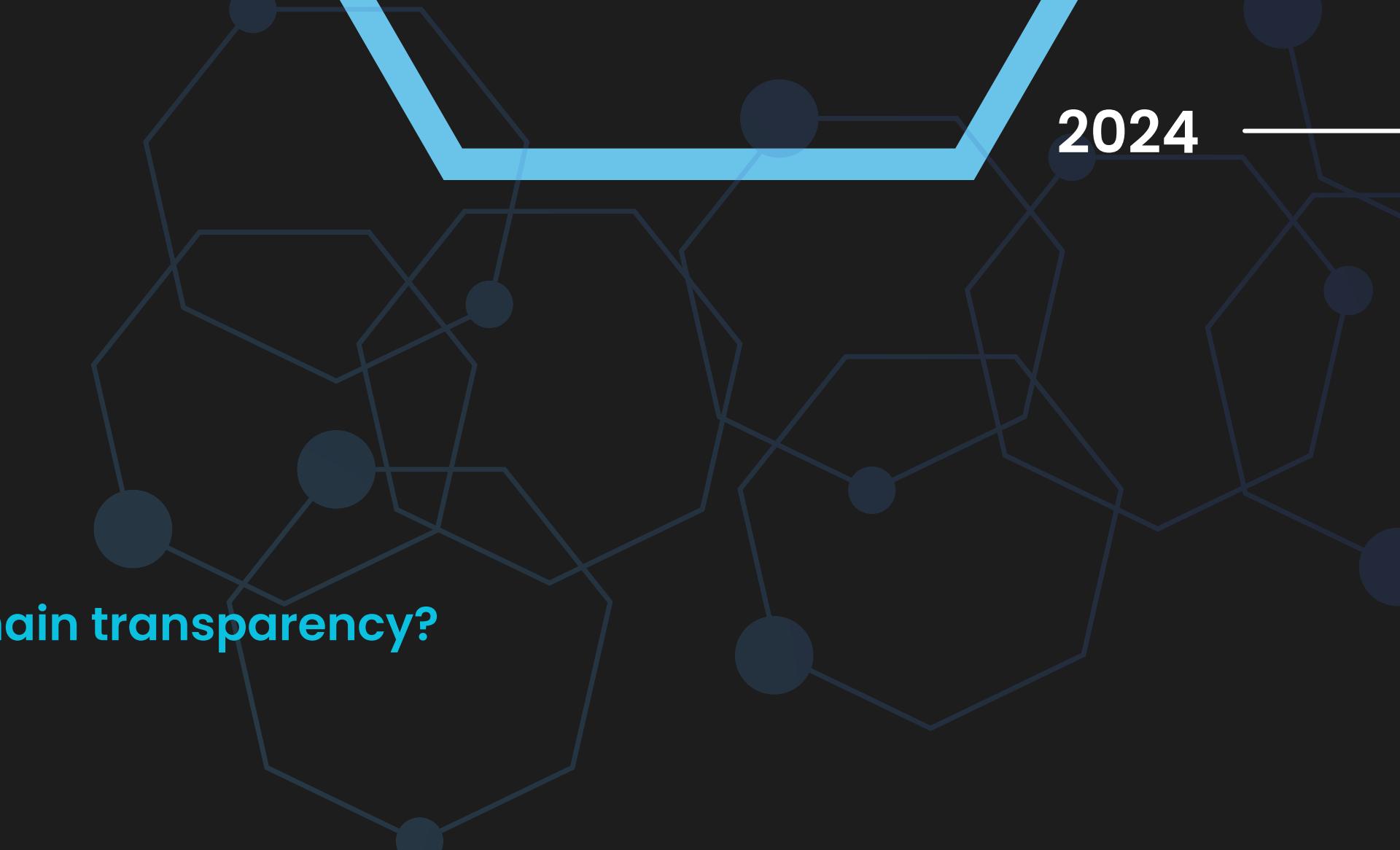


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# MCQ

**Which of the following is an advantage of blockchain transparency?**

- A) Reduced trust between participants
- B) Increased accountability and reduced risk of fraud
- c) Only selected nodes can access the ledger
- D) More control by central authorities





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# Use Case 1: Banking System

A national bank handles all financial transactions within the country. Every transaction—whether it's personal banking, loans, or transfers—must go through the central bank, which holds customer data and controls the system.

**Question: Should this banking system be centralized or decentralized? Why?**



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## Use Case 2: Voting System in National Elections

The government is responsible for organizing and managing national elections. All votes are counted and verified through a central election authority. There have been concerns about vote tampering in past elections.

**Question: Should the voting system remain centralized, or would a decentralized system provide more trust and transparency? Why?**



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## Use Case 3: Supply Chain Management

A large multinational company manages the production and shipment of goods. The company wants to ensure transparency and traceability of goods from the raw materials stage to the final product delivery. In the current system, each part of the supply chain reports to a central system.

**Question: Should the supply chain management system remain centralized, or could decentralization improve transparency and efficiency? Why?**



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## Use Case 4: Social Media Platform

A social media platform is owned and managed by a single corporation. The platform's policies, user data, and content control are fully governed by the company. Recently, users have raised concerns over censorship and data privacy.

**Question: Would a centralized or decentralized platform be more appropriate to address these concerns? Why?**



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## Use Case 5: Medical Records System

A hospital stores all patient data, including medical history and treatments, in a centralized database. Only hospital staff have access to this information, and patients rely on the hospital to maintain and secure their records.

**Question: Should this medical records system be centralized for better control, or decentralized to give patients more ownership over their own data? Why?**



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## Use Case 6: Global Cryptocurrency Network

A global digital currency needs to be transferred and verified across countries. Users prefer quick, secure, and transparent transactions without relying on intermediaries, such as banks or payment processors.

**Question: Should this digital currency be centralized or decentralized to meet the needs of its global users? Why?**



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## Use Case 7: Cloud Storage for Enterprises

An enterprise uses a cloud storage service to store sensitive company data. This storage service is managed by a single cloud provider, which has full control over security, access, and backups.

**Question: Should this digital currency be centralized or decentralized to meet the needs of its global users? Why?**



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## Use Case 8: Digital Identity Verification

An online service requires users to verify their identity (such as KYC – Know Your Customer) through a centralized service before they can access features. The centralized service collects, verifies, and stores user identity data.

**Question: Is it better for identity verification to be centralized with a trusted service provider, or should it be decentralized, allowing users to control their own identity data? Why?**



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## Use Case 9: Online Music Streaming Platform

An online music platform allows users to stream music but takes a percentage of the earnings before distributing the rest to artists. All decisions about content, royalties, and distribution are managed by the platform's central authority.

**Question: Would decentralizing the music streaming platform benefit artists and users, or should it remain under centralized control? Why?**



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## Use Case 10: Disaster Relief Donation Platform

After a natural disaster, a platform is set up to collect donations from around the world. A central authority manages all the funds and decides how and when to distribute them to affected areas.

**Question: Would a centralized or decentralized system be better for managing disaster relief funds to ensure transparency and fairness? Why?**