

Blockchain Technology

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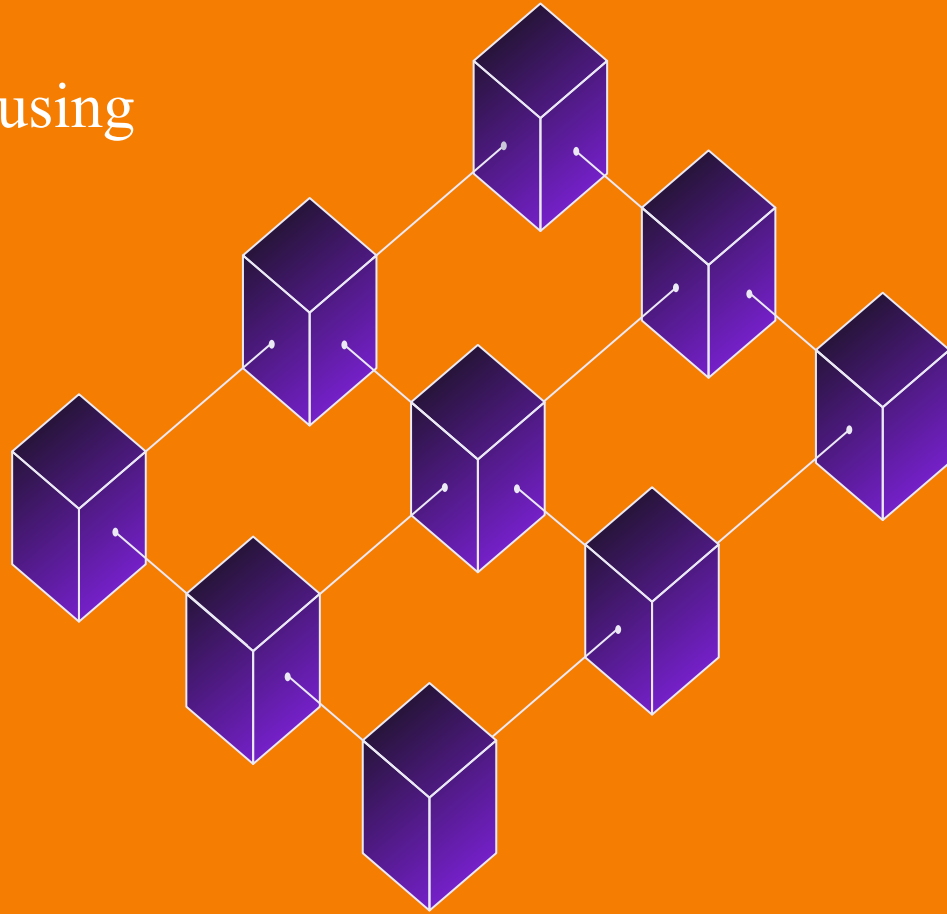
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Patient Electronic Health Records using Blockchain Security Framework

**Presented by
Prakash Mondal**



History of Blockchain

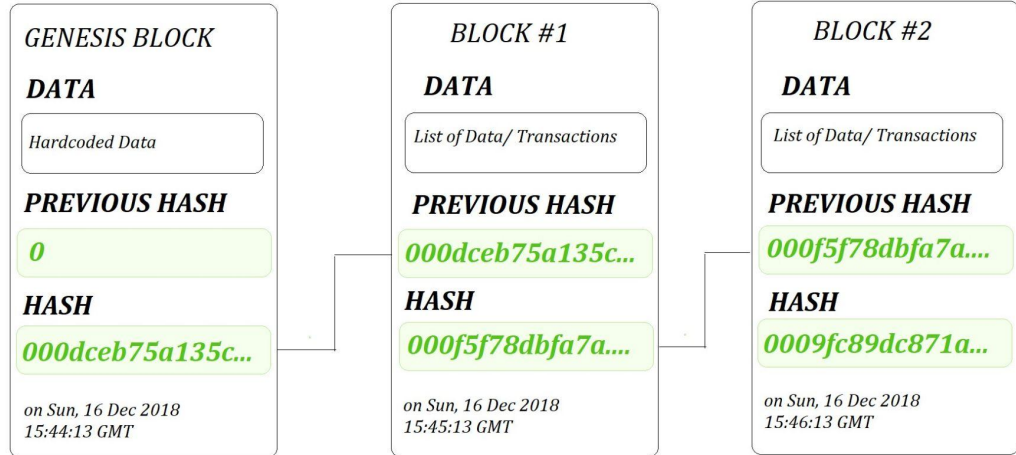
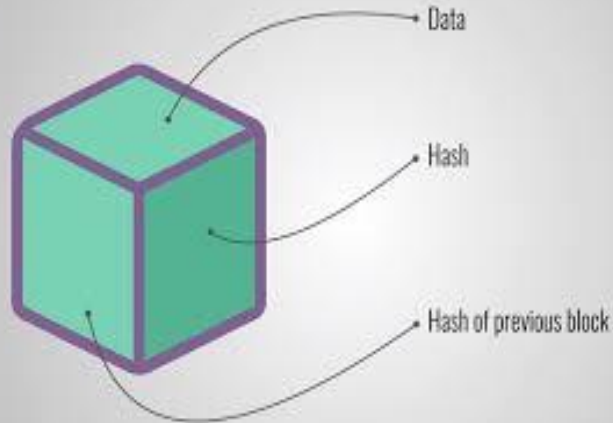
- In 1991, Researchers **Stuart Haber** and **W. Scott Stornetta** introduced the concept of blockchain technology.
- In 2000, Cryptographer **Stefan Knost** published his theory of **cryptographically secured chains**, it enables the future development in Blockchain.
- In 2004, **Hal Finney**, a cryptographic activist, introduced the concept of **“Reusable Proof of Work”**.
- In 2008, The mysterious **Satoshi Nakamoto** conceptualized the idea of a **“Distributed Blockchain”**.
- In 2009, Developer **Satoshi Nakamoto** released the concept of **Bitcoin White Paper**, officially introducing blockchain technology.

What is Blockchain?

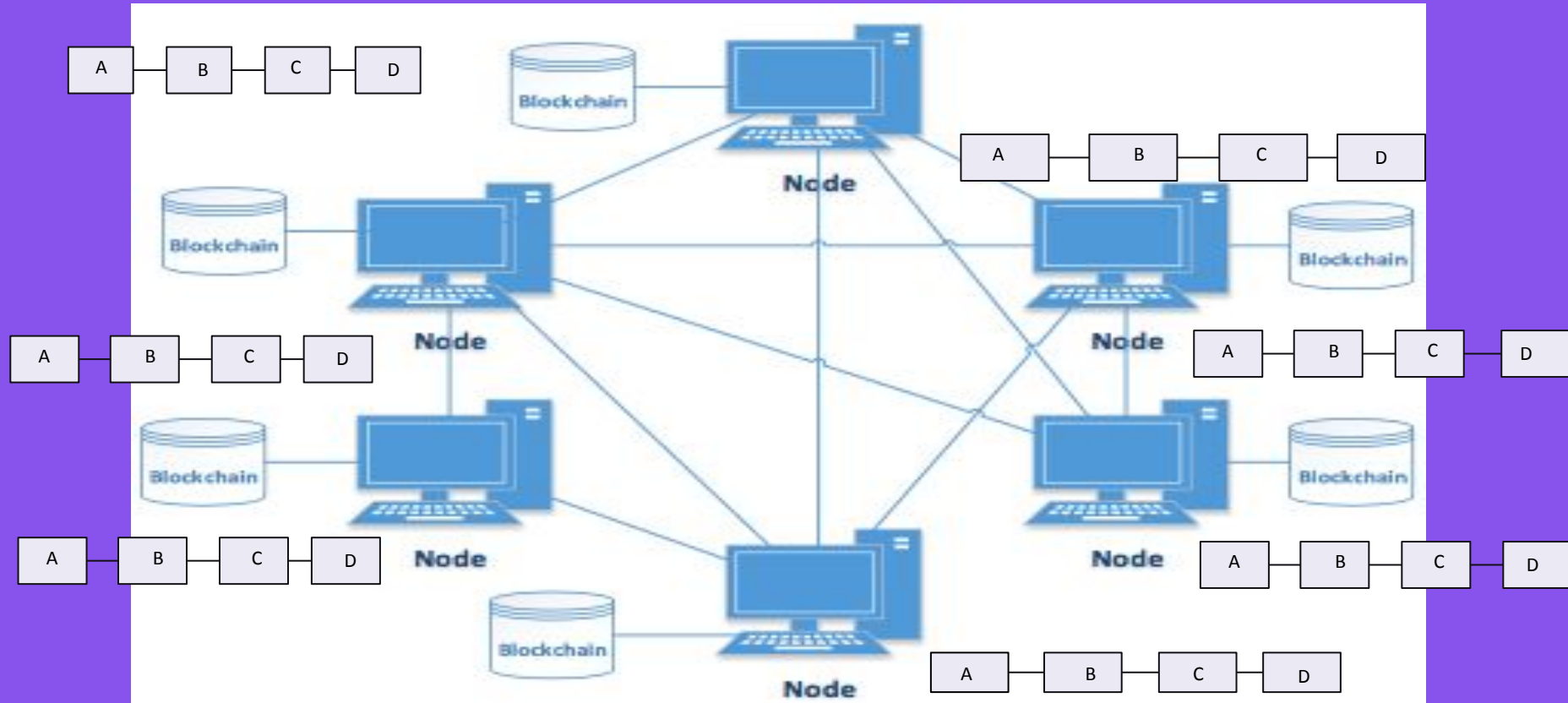
A **blockchain** is a **distributed immutable ledger or database** shared among a network of computers (nodes) that facilitates the process of recording transactions and tracking assets in a business network.

Blockchain is a P2P network that **acts as a decentralized ledger for one or more digital assets**, which refers to a decentralized peer-to-peer system where each computer keeps a complete copy of the ledger and verifies its authenticity with other nodes to guarantee the data is accurate.

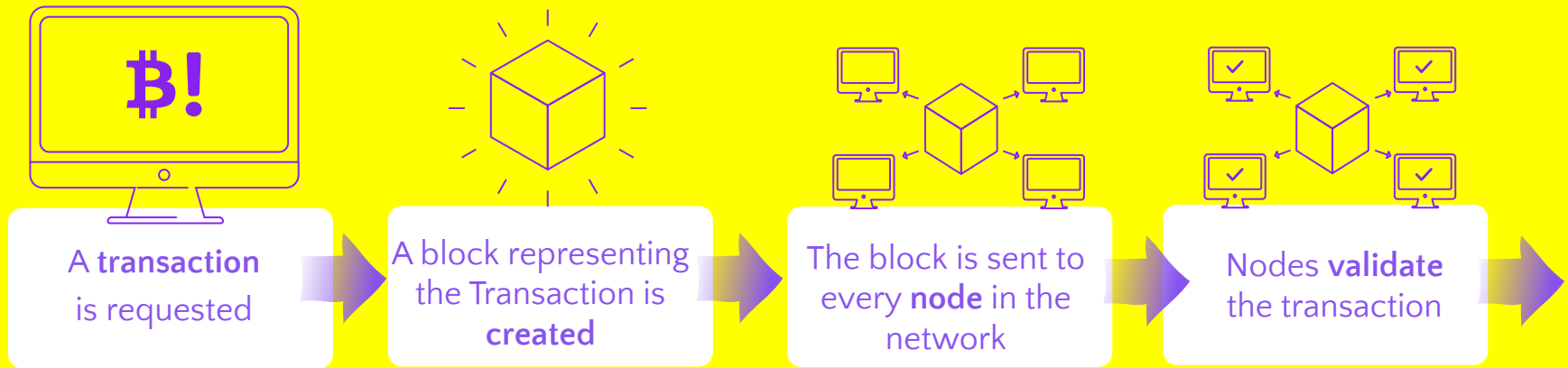
Structure of Blocks and How Blocks are connected?



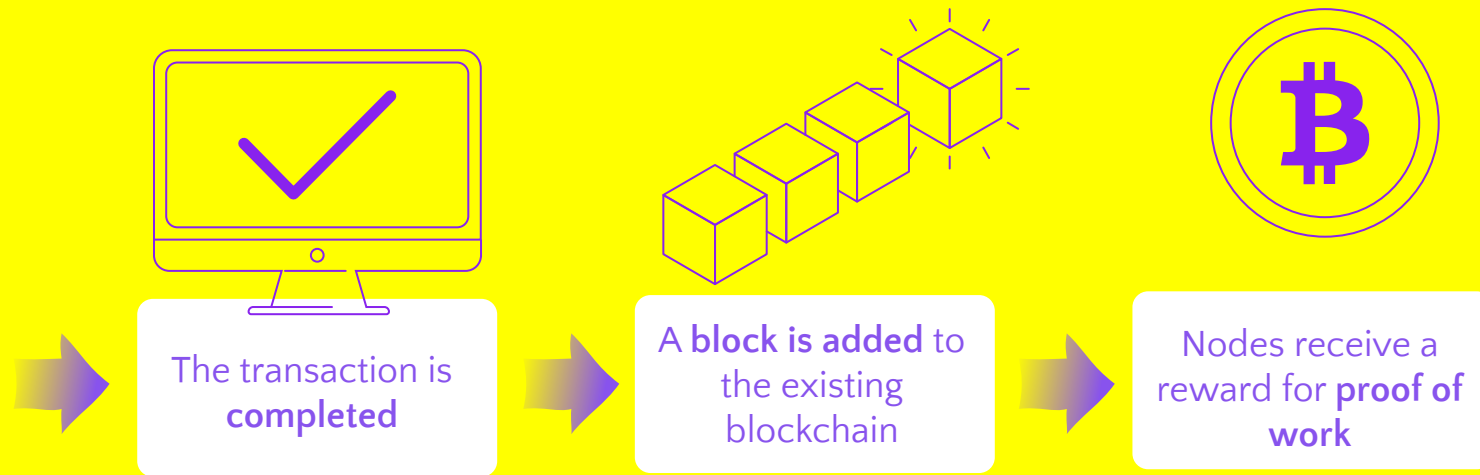
Blockchain P2P Network



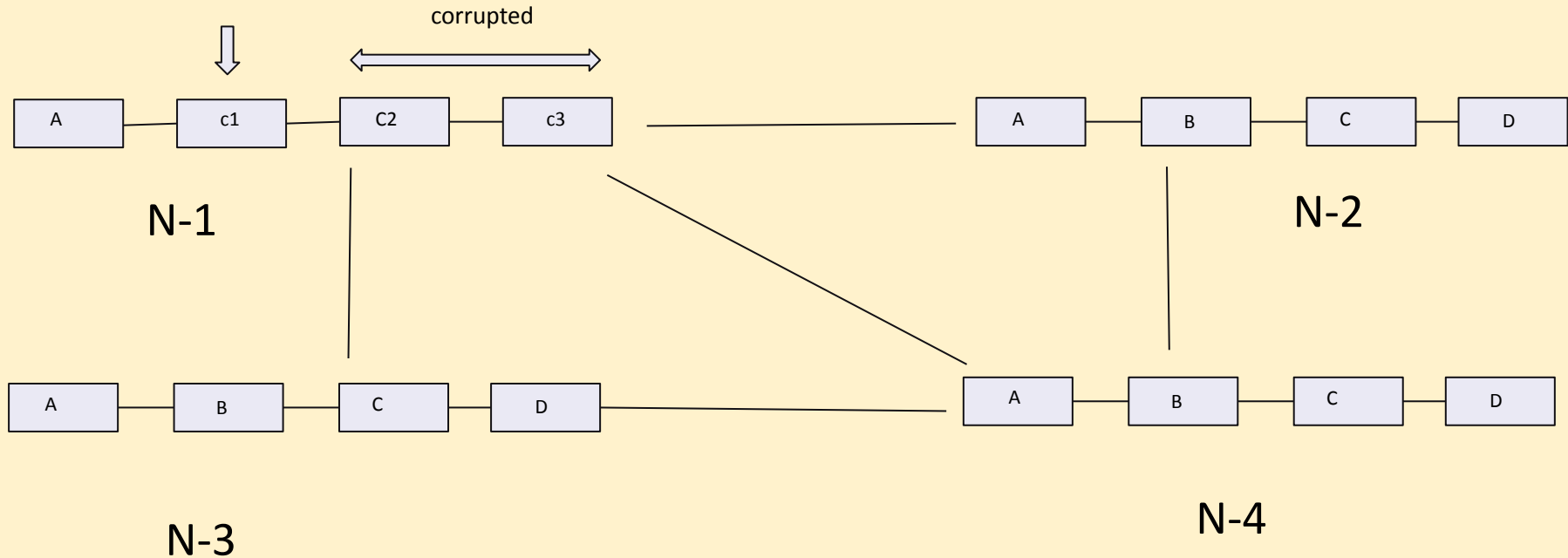
How a Blockchain works



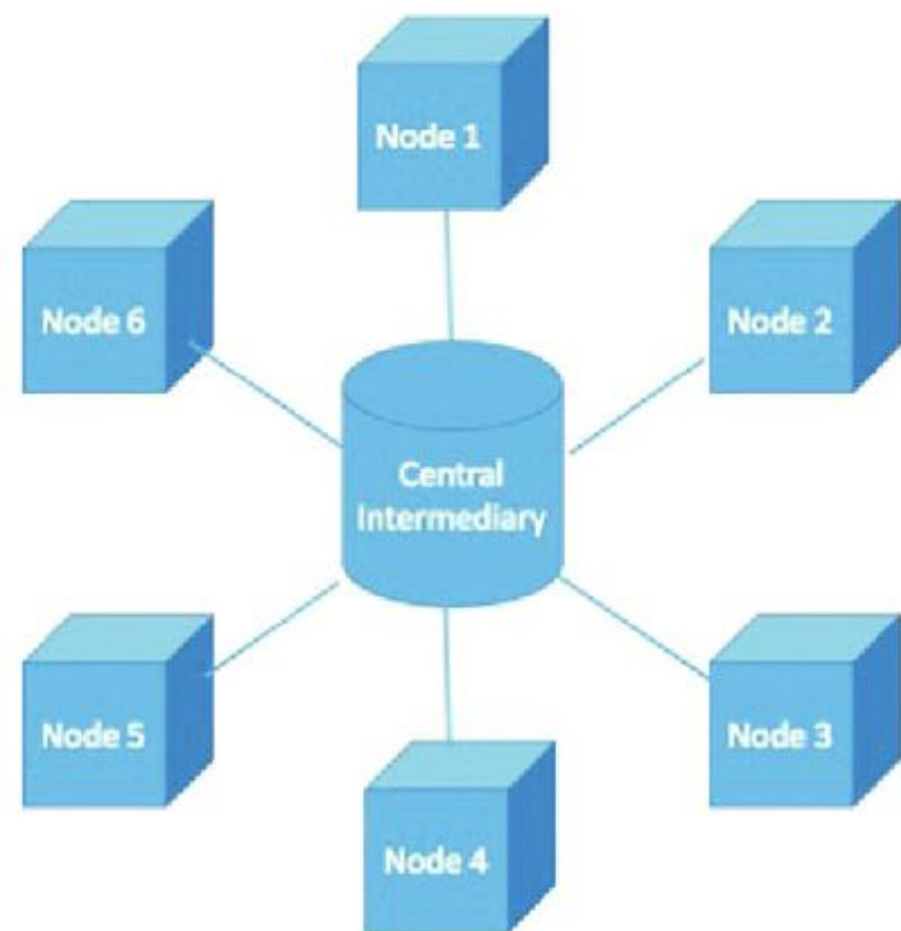
How a Blockchain works



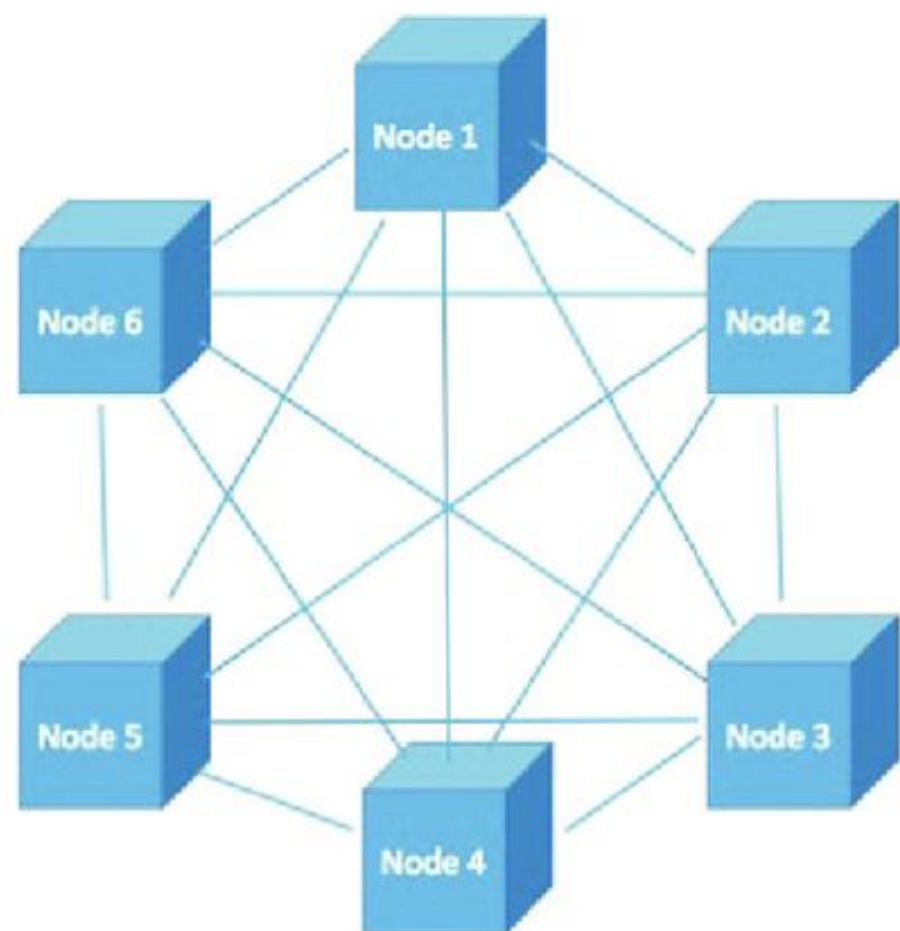
How to Recover data at any block ?



Centralized



Decentralized



Comparison: Centralization vs. Decentralization



Comparison Characteristics



Centralized



Decentralized

	Centralized	Decentralized
Data Flow	Data must flow through a central point (server)	Data flows through various points without any single specific point
Data Communication Flow	Data communication flow is vertical	Data flow is always open and free
Decision Making	The responsibility lies with the central point, which can be one server	Multiple points have decision-making capabilities
Adoption	Mass adoption	In the early phases of adoption
Data Security/Privacy	The privacy issue is standard as different agencies and governments can track the flow of information and data	It is known for data security as well as high levels of privacy
Failure	Subject to effects of single-point failure	Different types of access points or nodes through which data can pass averts the risks of single-point failure
Authority	Systematic reservation of authority in a network	In decentralized system, network involves systematic vesting of charge to access points

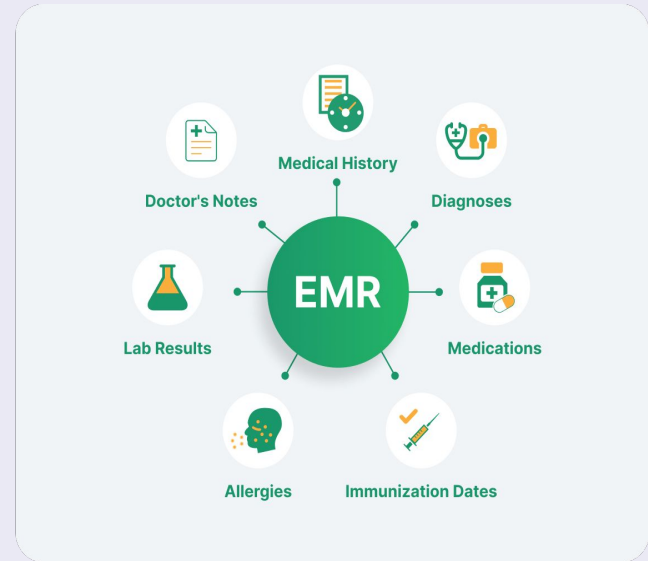
Application of Blockchain

1. **Cryptocurrencies:** The most well-known application of blockchain is in cryptocurrencies like Bitcoin and Ethereum, which use blockchain as a decentralized ledger to record transactions.
2. **Supply Chain Management:** Blockchain can be used to track the movement of goods in a supply chain, providing transparency and reducing fraud.
3. **Smart Contracts:** These are self-executing contracts with the terms of the agreement between buyer and seller being directly written into lines of code. They run on the blockchain, so they are stored on a public database and cannot be changed.
4. **Digital Identity:** Blockchain can be used to create secure digital identities, which can be used for authentication and verification purposes.
5. **Voting Systems:** Blockchain can be used to create secure and transparent voting systems, reducing the risk of fraud and ensuring the integrity of the voting process.
6. **Healthcare:** Blockchain can be used to securely store and share patient records to healthcare providers by ensuring privacy .

What is EHR and why it is important

Electronic Health Records are digital repositories of patient health information, facilitating better-informed medical decisions and coordinated care.

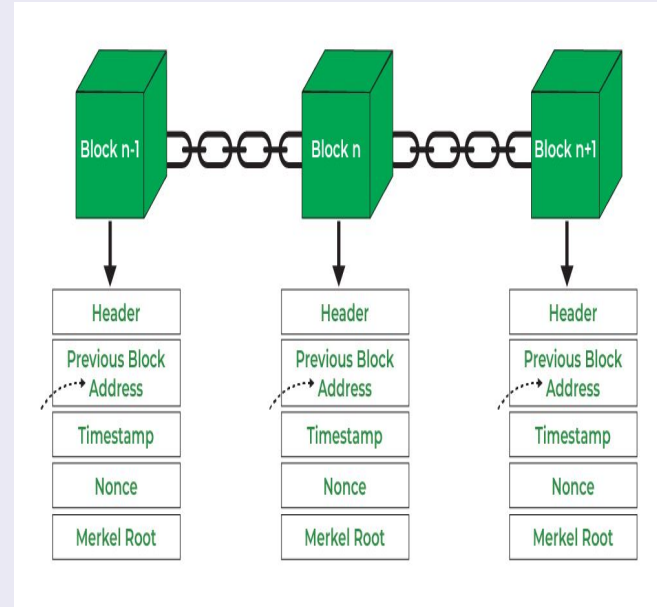
They enhance accessibility, empower patients, and promote data sharing among healthcare providers, leading to improved efficiency and cost savings in healthcare delivery.



Blockchain and How it will help

Blockchain is a distributed ledger technology that records transactions across a network of computers, ensuring transparency and security through cryptographic validation.

Unlike traditional databases, which are centralized and susceptible to tampering, Blockchain offers **decentralization**, removing the need for a central authority, transparency, providing a publicly accessible and **immutable** record of transactions, and immutability, ensuring that once data is recorded, it cannot be altered.



Advantages of using Blockchain

Ensuring Patient Privacy : Through cryptographic techniques and decentralized architecture, blockchain ensures patient data privacy, preventing unauthorized access and tampering, thus fostering trust between patients and healthcare providers.

Enhanced Accessibility: Operating offline ensures accessibility even in areas with limited or no internet connectivity, expanding the reach of the application to remote or underserved regions.

Data Security: Offline mode provides an added layer of security by minimizing the exposure of sensitive information to potential cyber threats associated with online operations. Rapid certificate validation further ensures the authenticity and integrity of data transactions.

Thank You

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