L01: Introduction to Blockchain

BSc Blockchain Course

Digital Finance

Outline

Learning Objectives

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

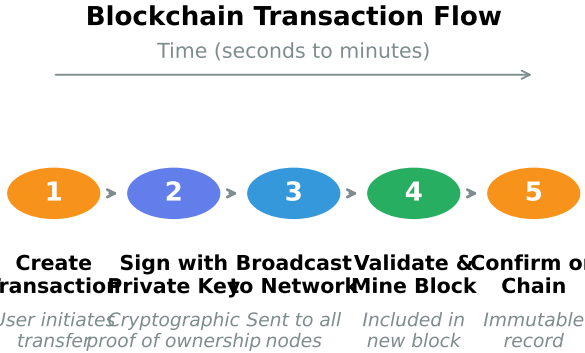
1. Define blockchain and explain its core properties
2. Distinguish between centralized, distributed, and decentralized systems
3. Identify key milestones in blockchain history
4. Explain why blockchain matters for various industries
5. Compare blockchain with traditional database systems

This lesson provides the foundation for understanding all subsequent topics.

What is Blockchain?

Definition

- A distributed ledger technology (DLT)
- Immutable, append-only data structure
- Secured by cryptography and consensus

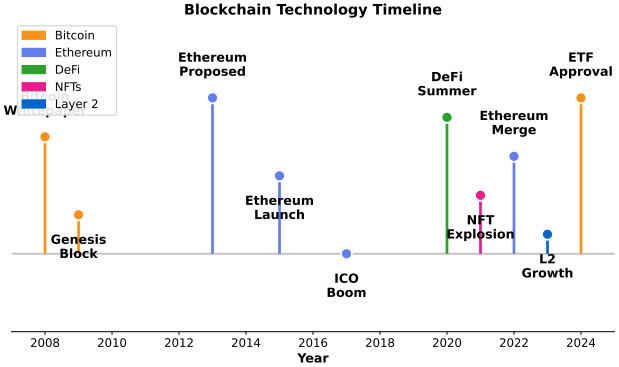


Blockchain = chain of cryptographically linked blocks containing transaction data.

Brief History

Key Milestones

- 2008: Satoshi Nakamoto publishes Bitcoin whitepaper
- 2015: Ethereum enables smart contracts
- 2020-2024: DeFi, NFTs, and institutional adoption



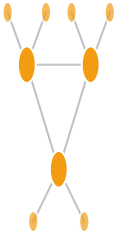
From cypherpunk experiment to trillion-dollar asset class in 15 years.

Network Topology Comparison

Centralized

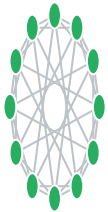
Single point of failure

Distributed



Multiple hubs

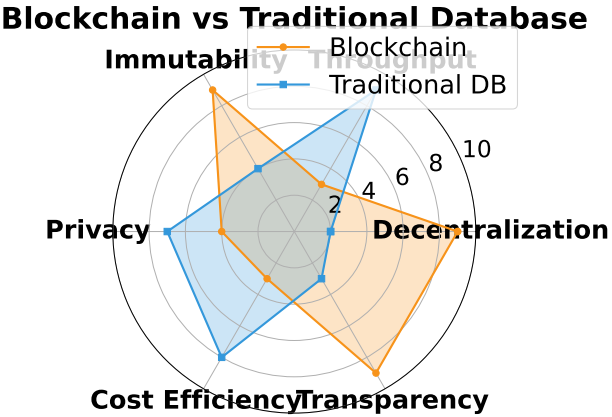
Decentralized (P2P)



No central authority

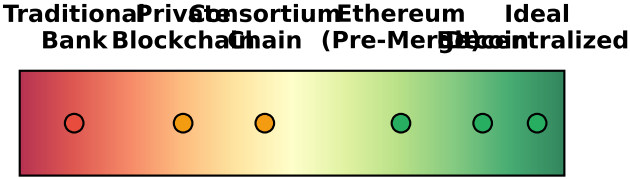
Blockchain uses peer-to-peer decentralized topology – no single point of failure.

Blockchain vs Traditional Database



Blockchain trades throughput for decentralization, immutability, and transparency.

Decentralization Spectrum



Centralized

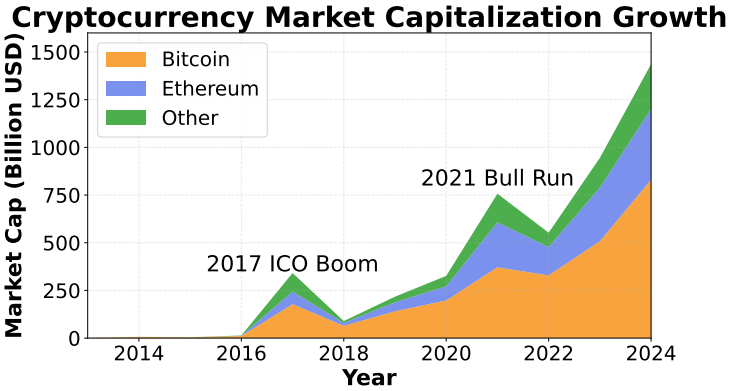
- Single authority
- High throughput
- Easy to update

Decentralized

- No single authority
- Censorship resistant
- Immutable

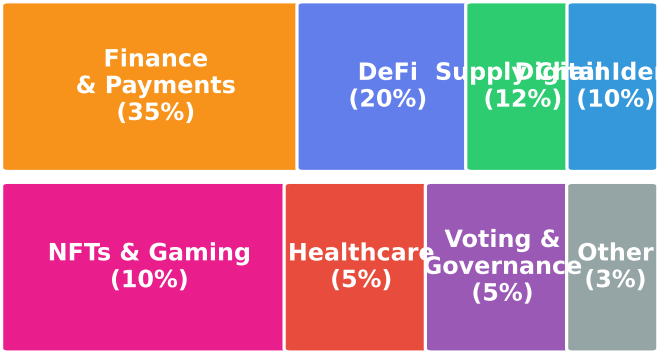
Not all blockchains are equally decentralized – design choices matter.

Market Growth



Cryptocurrency market cap has grown from $0 to over $3T in 17 years.

Blockchain Use Cases by Market Share



Finance dominates, but supply chain, identity, and gaming are growing rapidly.

Key Takeaways

Remember These Points

1. Blockchain is a distributed, immutable ledger secured by cryptography
2. Decentralization eliminates single points of failure and control
3. Trade-offs exist: throughput vs decentralization vs security
4. Adoption is accelerating across multiple industries
5. Bitcoin and Ethereum are the two dominant platforms

Next Lesson: Cryptographic Foundations – the math that makes blockchain secure.