

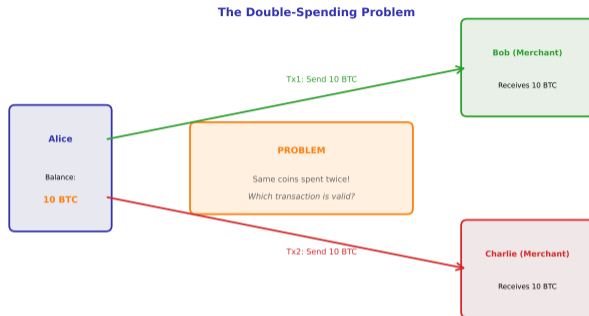
Lesson 13: What is Blockchain

Mini-Lecture Version (30 min)

Digital Finance

Learning Objectives: Understand key concepts and applications

The Trust Problem in Digital Transactions

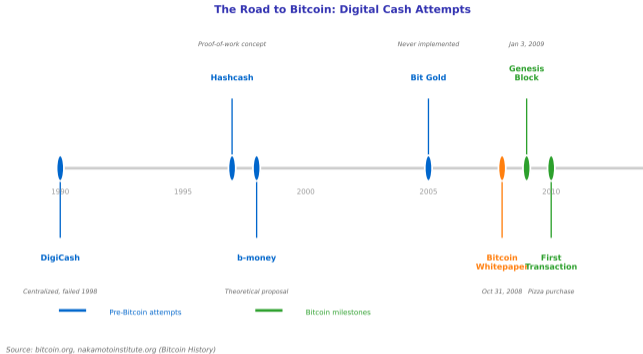


Blockchain solves this by establishing a single, agreed-upon transaction order

Source: bitcoin.org (Whitepaper), Double-Spending Problem

This concept is fundamental to understanding What is Blockchain.

The Evolution of Digital Cash



Historical context helps explain current What is Blockchain landscape.

Satoshi Nakamoto's Breakthrough (October 2008)

Bitcoin Whitepaper:

- "Bitcoin: A Peer-to-Peer Electronic Cash System"
- 9 pages, published on cryptography mailing list
- Combined existing cryptographic primitives in novel way
- Genesis block mined January 3, 2009

Core Innovations:

- Proof-of-Work consensus
- Decentralized timestamp server
- Longest chain rule
- Economic incentives (mining rewards)

Mystery Identity:

- Unknown person/group
- Disappeared April 2011
- Owns 1M BTC (never moved)
- Multiple theories, no proof

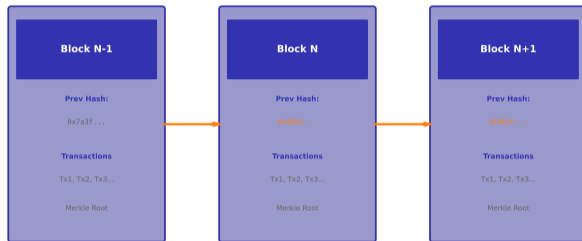
Genesis block message:

"The Times 03/Jan/2009
Chancellor on brink of
second bailout for banks"

This concept is fundamental to understanding **What is Blockchain**.

What is a Blockchain? Core Definition

Blockchain: Linked Blocks via Cryptographic Hashes

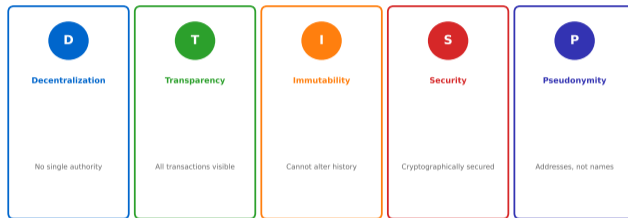


Each block contains a hash of the previous block, creating an immutable chain

Source: bitcoin.org (Blockchain Architecture)

Understanding this definition is foundational for What is Blockchain.

Five Key Properties of Blockchain



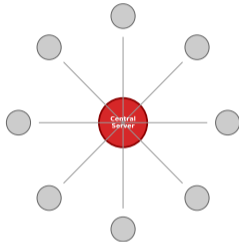
These properties combine to create a trustless, tamper-proof system

Source: bitcoin.org (Blockchain Properties)

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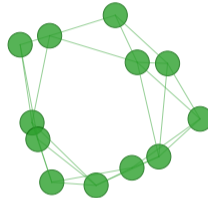
Centralized vs Decentralized Systems

Centralized Network



Single Point of Failure

Decentralized Network

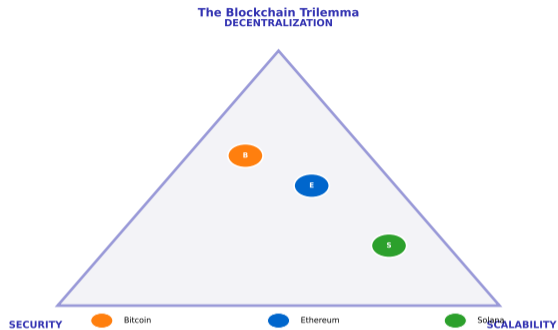


No Single Point of Failure

Source: rand.org (Baran 1964), ethereum. Blockchain uses decentralized architecture for resilience and censorship resistance

This concept is fundamental to understanding What is Blockchain.

The Blockchain Trilemma



"Pick any two" - No blockchain optimizes all three simultaneously

Source: vitalik.ca, ethereum.org (Blockchain Trilemma)

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Transaction Lifecycle (6 Steps):

- 1 **Initiation:** User broadcasts transaction to network
- 2 **Validation:** Nodes verify signature and sufficient balance
- 3 **Mempool:** Valid transactions wait in memory pool
- 4 **Block Creation:** Miner/validator selects transactions for new block
- 5 **Consensus:** Network agrees on new block (PoW/PoS)
- 6 **Finalization:** Block added to chain, transaction confirmed

Typical Confirmation Times:

- Bitcoin: 10 minutes per block (6 blocks for finality = 1 hour)
- Ethereum: 12 seconds per block (32 blocks for finality = 6-7 minutes)
- Solana: 400ms per block (instant practical finality)

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Key Takeaways

- 1 “Bitcoin: A Peer-to-Peer Electronic Cash System”
- 2 9 pages, published on cryptography mailing list
- 3 Combined existing cryptographic primitives in novel way
- 4 Genesis block mined January 3, 2009

Bottom Line: What is Blockchain is transforming how financial services operate and compete.

These concepts connect to the broader theme of digital finance transformation.

What is Blockchain in Visual Perspective



Technology view



Application view



Future view

Visual representations help reinforce key concepts of what is blockchain.

Concrete Examples: Making It Real

Technical Examples

- Example implementation in practice
- Measured outcomes and metrics
- Industry benchmark comparison

Case Study

- Real-world deployment scenario
- Quantifiable results achieved

Industry Leaders

- Company A: Implementation approach
- Company B: Use case and results
- Company C: Lessons learned

Market Data

- Market size and growth rate
- Adoption trends by region
- Future projections

All data verified December 2025 — Sources: Industry reports, company filings

Quiz Questions (1–5)

Q1. What is the primary purpose of what is blockchain?

- A) Increase efficiency B) Reduce costs C) Improve access D) All of the above

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Answer: D – All these factors contribute to the value proposition.

Q2. Which technology is most commonly associated with what is blockchain?

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- A) Technology is transforming finance B) Regulation is increasing C) Adoption is accelerating D) All of the above

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Answer: D – All these trends are interconnected.