

Bitcoin, explained: the rules in its code and who can change them

A plain guide to how Bitcoin works, what fixes its supply, how its rules change, and how US investors reach it through exchange-traded products.

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AT A GLANCE

- 1** Bitcoin is the peer-to-peer electronic cash system described in a white paper by the pseudonymous Satoshi Nakamoto ^[1].
- 2** Its code halves the new-coin reward every 210,000 blocks and caps any valid amount at 21 million bitcoin ^{[2][3]}.
- 3** Blocks are targeted every 10 minutes, and mining difficulty resets every 2,016 blocks, about two weeks ^{[2][4]}.
- 4** Rules change by soft fork; under BIP 9, activation needed 1,916 of 2,016 blocks to signal support ^[4].
- 5** The SEC approved US-listed spot bitcoin exchange-traded products on Jan. 10, 2024 ^[14].

1. What it is

A cash system without a middleman

Bitcoin began as a proposal for "a purely peer-to-peer version of electronic cash" that "would allow online payments to be sent directly from one party to another without going through a financial institution" ^[1]. The paper, titled "Bitcoin: A Peer-to-Peer Electronic Cash System," is signed Satoshi Nakamoto, a pseudonym ^[1].

“a purely peer-to-peer version of electronic cash”

Satoshi Nakamoto, Bitcoin white paper ^[1]

The double-spending problem

Digital money is easy to copy, so the hard part is stopping someone from spending the same coin twice. The paper says digital signatures solve part of this, "but the main benefits are lost if a trusted third party is still required to prevent double-spending" [1]. Bitcoin's answer is a shared public record that every participant can check.

Analogy, not the mechanism itself: it works like a ledger copied in thousands of offices at once, where a page can only be added after a costly puzzle is solved, so rewriting old pages is impractical.

A chain of proof-of-work

The network "timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work" [1]. Proof-of-work means computers compete to find a number that makes a block's fingerprint, or hash, begin with a required number of zero bits [1]. The paper names SHA-256 as the hash function [1].

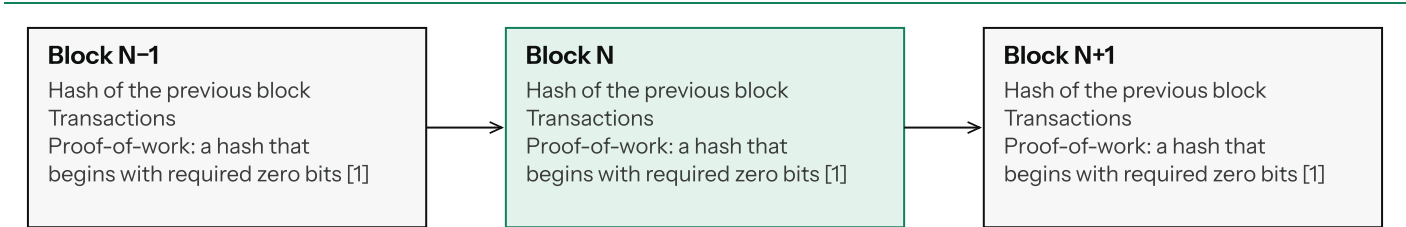
The security bet

The design rests on one assumption. "As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers," the paper says [1]. CPU power here means the computing work spent on mining, now usually called hash power.

Units: bitcoin and satoshis

One bitcoin is divided into 100,000,000 smaller units called satoshis, the unit Bitcoin's software counts in [3].

2. How it works



Changing an old block means redoing its proof-of-work and every block after it [1]

Target time between blocks	10 minutes [2]
Difficulty resets every	2,016 blocks, about two weeks [2] [4]
Block subsidy halves every	210,000 blocks [2]
Largest valid amount (MAX_MONEY)	21,000,000 BTC, a sanity check [3]

Blocks every 10 minutes

New transactions are grouped into blocks. Bitcoin Core, the node software whose code this page cites, sets the target gap between blocks at 10 minutes [2]. That is a target, not a guarantee.

Difficulty resets every two weeks

To hold that pace, the network adjusts how hard the mining puzzle is. The code sets the adjustment window at two weeks ^[2]. At one block per 10 minutes, that window is 2,016 blocks, the period BIP 9 also uses ^[4].

Analogy, not the mechanism itself: it is like a thermostat that checks the room every two weeks and turns the heat up or down to keep the same temperature.

The halving

Miners who add a block are paid in newly created bitcoin, called the block subsidy. Bitcoin Core's code halves that subsidy every 210,000 blocks ^[2]. At about 10 minutes a block, that works out to roughly four years, an approximation rather than a fixed date.

The 21 million limit

The code also sets a ceiling, MAX_MONEY, at 21,000,000 bitcoin ^[3]. The file that defines it is careful about what it means. It says the number "is *not* the total money supply, which in Bitcoin currently happens to be less than 21,000,000 BTC for various reasons, but rather a sanity check" ^[3]. Because consensus code uses that check, the file adds, its exact value is consensus critical ^[3].

The rules in one table

The table below lists the core rules as they appear in the code. Every value comes from the cited source line, not from estimates.

Rule	Value	Source
Target time between blocks	10 minutes	chainparams.cpp ^[2]
Difficulty window	2 weeks (2,016 blocks)	chainparams.cpp ^[2] ; BIP 9 ^[4]
Subsidy halving interval	210,000 blocks	chainparams.cpp ^[2]
Largest valid amount	21,000,000 BTC	amount.h ^[3]
Satoshis per bitcoin	100,000,000	amount.h ^[3]
BIP 9 activation threshold	1,916 of 2,016 blocks (95%)	BIP 9 ^[4]

Read together, these rules fix how fast new bitcoin appears and how firmly the network resists change.

Nodes and software

A node is a computer that keeps a copy of the record and checks every rule itself. Bitcoin Core is the software whose code this page cites. As of Oct. 16, 2026, its releases page lists Bitcoin Core 31.1 as the newest entry, followed by 31.0 ^[16].

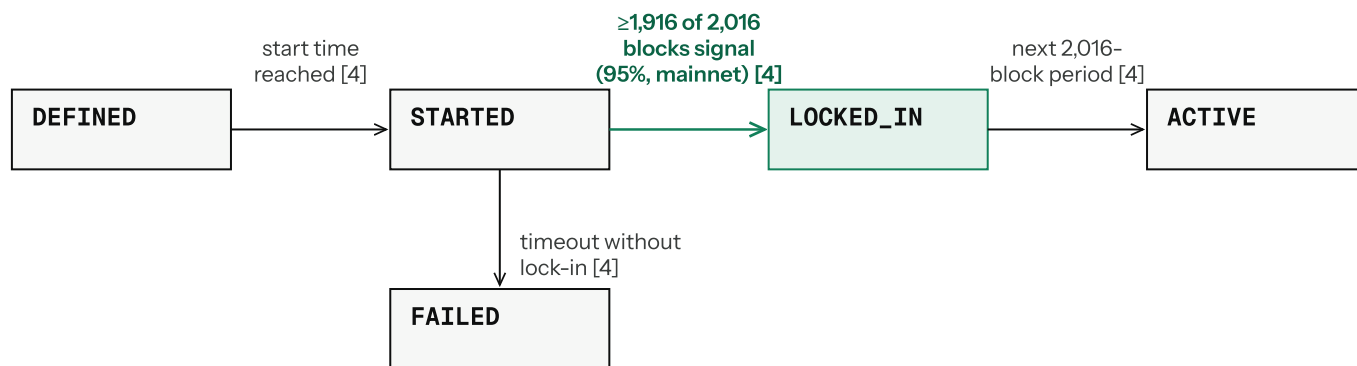
3. What changed

How changes are proposed

Bitcoin has no company or token vote that sets its rules. Changes are written up as Bitcoin Improvement Proposals, or BIPs, and take effect only when node operators run software that enforces them ^{[4][5]}. BIP 8 calls backward-compatible rule changes "soft forks" ^[5].

BIP 9 signaling

BIP 9, titled "Version bits with timeout and delay," lets miners signal readiness for a soft fork inside each block ^[4]. On the main network, a change locks in once at least 1,916 blocks in a 2,016-block period signal for it, which is 95% ^[4]. On the test network, the threshold is 1,512 blocks, or 75% ^[4].



One 2,016-block period on mainnet ^[4]



Testnet threshold: 1,512 of 2,016 blocks (75%) ^[4]

Bar shows the count needed, not which blocks; the 2,016 cells are drawn as one proportional bar

BIP 8, the alternative

BIP 8, "Version bits with lock-in by height," describes itself as an alternative to BIP 9 "that corrects for a number of perceived mistakes" ^[5]. It uses block heights instead of timestamps and adds a setting, `lockintimeout`, that can force activation ^[5]. BIP 8 recommends that setting for a soft fork "expected or found to have political opposition from a non-negligible percent of miners" ^[5].

Analogy, not the mechanism itself: BIP 9 is like a motion that dies if not enough people raise their hands in time; BIP 8 can be set so the motion passes at the deadline regardless.

SegWit (block 481,824)

Segregated Witness, or SegWit, is defined in BIP 141 ^[6]. It moved signature data out of the part of a transaction used to identify it ^[6]. Bitcoin Core records its main-network activation at block height 481,824 ^[2].

Why it mattered: BIP 141 says SegWit "fixes the problem of transaction malleability fundamentally, which enables the building of unconfirmed transaction dependency chains in a trust-free manner" ^[6]. Malleability meant a transaction's ID could be changed before confirmation, which made chained, off-chain payments hard to build safely.

Taproot and Schnorr signatures

Taproot is defined in BIP 341, "Taproot: SegWit version 1 spending rules" ^[8]. It works with BIP 340, which specifies Schnorr signatures for secp256k1, the elliptic curve named in its title ^[7]. A third, BIP 342, "Validation of Taproot Scripts," "specifies the semantics of the initial scripting system under BIP341" ^[17]. Bitcoin Core implemented the Taproot rules in version 0.21.0, with main-network activation as of version 0.21.1 ^[9]. BIP 341 records that Taproot activated on the main network at block 709,632 ^[8].

Why it mattered: one design choice in BIP 341 is that "the public key is directly included in the output," which its authors describe as more space efficient overall when the simple key-based spending path is used ^[8].

Lightning, built on top

The Lightning Network is a system of payment channels that settle on Bitcoin. It was set out in a Jan. 14, 2016 draft paper by Joseph Poon and Thaddeus Dryja, "The Bitcoin Lightning Network: Scalable Off-Chain Instant Payments" ^[12]. Its technical specifications, called BOLTs, are maintained in a public repository ^[13]. SegWit's malleability fix is what BIP 141 cites as enabling such constructions ^[6].

Spot bitcoin ETPs (Jan. 10, 2024)

On Jan. 10, 2024, the SEC approved, "on an accelerated basis," rule changes to list and trade spot bitcoin exchange-traded products (Release No. 34-99306) ^[14]. The exchanges were NYSE Arca, Nasdaq and Cboe BZX ^[14]. The order names 11 products: Grayscale Bitcoin Trust, Bitwise Bitcoin ETF, Hashdex Bitcoin ETF, iShares Bitcoin Trust, Valkyrie Bitcoin Fund, ARK 21Shares Bitcoin ETF, Invesco Galaxy Bitcoin ETF, VanEck Bitcoin Trust, WisdomTree Bitcoin Fund, Fidelity Wise Origin Bitcoin Fund and Franklin Bitcoin ETF ^[14].

Why it mattered, in Le Coin's view: investors can hold exposure to bitcoin through a brokerage account, with a trust holding the coins through a custodian ^[14], instead of managing keys themselves.

Each fund's prospectus sets its fee and custodians. The iShares Bitcoin Trust's July 31, 2025 prospectus says its sponsor's fee "is accrued daily at an annualized rate equal to 0.25% of the net asset value of the Trust" ^[18]. Its bitcoin custodian is Coinbase Custody Trust Company, LLC, with Anchorage Digital Bank N.A. as an additional bitcoin custodian and The Bank of New York Mellon holding cash ^[18]. The Fidelity Wise Origin Bitcoin Fund's April 29, 2026 prospectus sets "an annual unified fee of 0.25% of the Trust's Bitcoin Holdings" ^[19]. Its custodian is Fidelity Digital Assets, N.A., with BitGo Bank & Trust, N.A. as additional custodian and State Street Bank and Trust Company as cash custodian ^[19]. The two fees are measured on different bases: net asset value for one, bitcoin holdings for the other.

4. What is open

The majority-hash-power assumption

Bitcoin's security still rests on the white paper's assumption that honest participants control most of the mining power ^[1]. If that ever fails, the paper's guarantee that honest nodes "outpace attackers" no longer holds ^[1].

Coordinating soft forks

Activation rules themselves are contested. BIP 8 exists because some developers saw "perceived mistakes" in BIP 9 ^[5]. Any future change has to pick a method, and that choice is part of the debate.

Holding your own keys

People who hold bitcoin directly hold private keys. BIP 32 describes "hierarchical deterministic wallets," which derive a whole tree of keys "from a single seed" ^[10]. BIP 39 describes turning that seed into "a group of easy to remember words," often called a seed phrase ^[11]. Whoever holds those words can rebuild the wallet, so they are both the backup and the risk.

Quantum computing

BIP 341 addresses a common belief about quantum resistance. It says that hiding public keys behind hashes is often said to protect against quantum computers, but "this protection is very weak at best," because transactions are not protected while being confirmed ^[8].

Tax treatment

In the US, the IRS says it issued Notice 2014-21 in 2014, "explaining that virtual currency is treated as property for federal income tax purposes" ^[15]. The IRS also says those FAQs "generally apply to transactions involving digital assets completed before Jan. 1, 2025" ^[15]. Rules for later years are outside this page.

What this page leaves out

By Learning Hub policy, this dive carries no price, market value, supply or network-usage figures. Those go stale, and News covers them. Fees and custodians appear only for the two funds whose prospectuses Le Coin has read; the other nine are not covered.

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Not financial advice.