

Hash rate and difficulty: how Bitcoin keeps blocks near 10 minutes

Difficulty is a number the Bitcoin protocol resets every 2,016 blocks, and hash rate is an estimate worked back from it over windows that differ by provider.

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1. How to read it / Where it misleads

Difficulty measures how hard it is to find a valid Bitcoin block. The protocol sets it, and Bitcoin Core reports it as "the proof-of-work difficulty as a multiple of the minimum difficulty" (source 4). Hash rate measures how many attempts per second all miners together make at finding that block. The protocol adjusts difficulty so that, whatever the hash rate, blocks keep arriving about every 10 minutes.

The two are not equally solid. Difficulty is written into the chain and read exactly. Hash rate is never observed: providers estimate it from difficulty and how fast blocks arrived. Blockchain.com says Bitcoin's "exact hashing power is unknown" (source 6).

Estimates also swing with luck. Blocks arrive at random, so a day with a few extra blocks looks like a jump in hash rate even if nothing changed. The window a provider chooses, from 120 blocks to 30 days, shapes the number it reports.

This explains how a metric is calculated. It is not a signal, forecast or recommendation, and past readings do not predict prices. Le Coin does not publish live readings of this metric.

2. The formula

Bitcoin Core sets a target spacing of 10 minutes per block and a target timespan of two weeks (source 3). The retarget interval is the timespan divided by the spacing (source 3), which in Le Coin's arithmetic is 2,016 blocks.

At the end of each interval, Bitcoin Core multiplies the old target by the actual time the interval took and divides by the two-week target (source 2). A lower target is harder to hit, so a fast interval raises difficulty and a slow one lowers it. The code limits each step: the measured time cannot count as less than a quarter of two weeks or more than four times it (source 2).

Le Coin's restatement:

New target = Old target × Actual time ÷ Two weeks, with Actual time held between 3.5 and 56 days

Difficulty = Minimum-difficulty target ÷ Current target

For hash rate, Bitcoin Core's `getnetworkhashps` "Returns the estimated network hashes per second based on the last n blocks," with a default of 120 blocks, or "-1 for blocks since last difficulty change" (source 4). The code divides the chain work added across those blocks by the time they took (source 4).

3. Example data

The figures below are invented to show the arithmetic. They describe no real period.

Case	Example data	Result
Fast period	2,016 blocks took 12 days	Target × 12/14; difficulty up about 16.7%
Slow period	2,016 blocks took 70 days	Counted as 56 days; difficulty falls to one quarter, the largest drop allowed
Hash rate estimate	Difficulty 1,000,000; 144 blocks in a day	$1,000,000 \times 2^{32} \div 600 \approx 7.16$ trillion hashes per second

The hash-rate line follows Coin Metrics' published formula for Bitcoin with one day's worth of blocks at the target pace (source 5). If 160 blocks had arrived that day instead of 144, the same formula would report about 11% more hash rate, with no change in actual mining.

4. Who publishes it and how definitions differ

Bitcoin Core estimates hash rate over the last 120 blocks by default, using chain work and block timestamps (source 4).

Coin Metrics publishes a daily figure, "the mean rate at which miners are solving hashes that day," and a 30-day version (source 5). For Bitcoin its formula is $(\text{BlkCnt} / 144) \times \text{DiffMean} \times ((2^{32} / 10^{12}) / 600)$, in terahashes per second (source 5). It says hash rate "is derived from difficulty (DiffMean), the rate at which block came in (BlkIntMean)" and other data, and "gives an estimate" (source 5).

Blockchain.com describes its chart as "the estimated number of terahashes per second the bitcoin network is performing in the last 24 hours," estimated "from the number of blocks being mined and the current block difficulty" (source 6). It adds that its analysts found a 7-day average "is a better representation of the underlying power" (source 6).

In Le Coin's view, the three agree on the idea and differ on the window: 120 blocks, one day or 30 days, and 24 hours with a suggested 7-day average. Two charts can disagree on the same day for that reason alone.

5. Where the terms come from

Satoshi Nakamoto's 2008 white paper introduced difficulty targeting: "the proof-of-work difficulty is determined by a moving average targeting an average number of blocks per hour" (source 1). Bitcoin Core's code retargets once per 2,016-block interval rather than continuously (source 2). No originator of the term "hash rate" is credited.

6. What it means

In Le Coin's view, difficulty is the protocol's record and hash rate is an estimate built on it. Check the window before reading meaning into a short-term move.

Sources

- 1 Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System," <https://bitcoin.org/bitcoin.pdf>, accessed 2026-10-16, 11:00 p.m. ET.
- 2 Bitcoin Core src/pow.cpp, commit 924f4c4, <https://github.com/bitcoin/bitcoin/blob/924f4c4ac78b0cd3b917c694f42c0651a6f3003a/src/pow.cpp>, accessed 2026-10-16, 11:00 p.m. ET.
- 3 Bitcoin Core src/kernel/chainparams.cpp and src/consensus/params.h, commit 924f4c4, <https://github.com/bitcoin/bitcoin/blob/924f4c4ac78b0cd3b917c694f42c0651a6f3003a/src/kernel/chainparams.cpp>, accessed 2026-10-16, 11:00 p.m. ET.
- 4 Bitcoin Core src/rpc/mining.cpp and src/rpc/blockchain.cpp, commit 924f4c4, <https://github.com/bitcoin/bitcoin/blob/924f4c4ac78b0cd3b917c694f42c0651a6f3003a/src/rpc/mining.cpp>, accessed 2026-10-16, 11:00 p.m. ET.
- 5 Coin Metrics, "Hash rate," <https://docs.coinmetrics.io/asset-metrics/mining/hashrate>, accessed 2026-10-16, 11:00 p.m. ET.
- 6 Blockchain.com, "Total Hash Rate," <https://www.blockchain.com/explorer/charts/hash-rate>, accessed 2026-10-16, 11:00 p.m. ET.

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