HASHPRICE

SHA256#

₿ITCOIN MINING GLOSSARY

BRAIINS

TH/S.

The 256 essential terms

ASICBOOST

BRAINS Insights

BITCOIN MINING GLOSSARY

Braiins propaganda

BRAIINS Insights

BRAIINS Insights

Bitcoin Mining Glossary

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Printed in the Czech Republic

978-80-908709-1-8

BRAIINS

Braiins, established in 2011 and based in Prague, Czech Republic, is a global leader in the field of bitcoin mining.

The company specializes in the **development of software and hardware tools for bitcoin miners**, including the world's longest-running bitcoin mining pool and the first custom operating system for bitcoin mining computers. Braiins' tools are used on hundreds of thousands of devices around the world.

You can learn more about the company and our offerings at braiins.com

BRAIINS POOL

Formerly **Slush Pool**

BRAIINS MANAGER

BRAIINS OS

BRAIINS Toolbox

BRAIINS Insights

FARM PROXY

CONTENT

ENGLISH IS THE LANGUAGE OF MINING - A SHORT FOREWORD

Bitcoin is one of the few things in the world that just makes sense – there will only ever be 21 million, nobody controls it, and anyone can use it. **Bitcoin mining, and the words we use to talk about it, however, are often complex and confusing**.

Growing up in the Czech Republic, my first language was Czech. Like many Europeans, I learned to speak English as a second language throughout my education. English is the language of mining, and a simple, decentralized technology often seems way more difficult than it should be – thanks to the weird words we use to talk about it. Still, it could be worse, Czech could be the language of mining!

Don't get me wrong, I'm proud to be Czech, and we're extremely grateful that **Braiins was born in Prague - the heart of Europe. Prague is forever wired in bitcoin's DNA.** So many bitcoiners and bitcoin companies call this

place home. Our fun but hard-wor-ing Czech mentality has helped us grow and defined us over the years. Bitcoin is about building a better world, but why not throw in some fun memes along the way? **Gigawatts worth of electricity mine with Braiins**. Still, we haven't let all that power get to our heads – and we won't anytime soon.

We're still dedicated to building a better world through bitcoin and mining. Since we can't do that without you, we figured we could make things a bit easier for everyone by attempting to define some of these confusing terms we spew amongst each other. If you're a bitcoin beginner or a non-native English speaker, we want to give you a jumpstart in the bitcoin mining industry.

That's what Braiins is about – making bitcoin miners' lives easier.

Cheers,
Kristian Csepcsar, chief of propaganda
Prague – Czech republic (EU)
5/16/2024 - block height 843714
P.S. Print books, not money 🧡

PROLOGUE

Concerning Education

Congratulations! You have taken an even deeper dive down the endless bitcoin rabbit hole. It truly never ends – and that's a good thing. Why be passionate about something that refuses to get better? The bigger the improvements bitcoin makes, the deeper the rabbit hole gets. Don't fall behind and stay informed.

There are so many useful resources for bitcoin education. Regrettably, this pocket-sized book will not be the only source of information on the subject, but it should help you. The following list has great options for learning more:

- Braiins Insights https//insights.braiins.com/en
- Braiins Books (you are currently reading one – great job! Check the back cover for the others)
- Braiins Blog https//braiins.com/blog
- Digital Mining Solutions https//digitalminingso-

lutions.tech
- River https//river.com/learn/
- mempool.space
- Clark Moody Dashboard https//bitcoin.clark-moody.com/dashboard/

These are not the only sources of bitcoin education. Find more. Maybe even create one. You can never learn enough about bitcoin.

Concerning Communities

Bitcoin is a peer-to-peer network, so we owe it to ourselves to learn from each other. Bitcoiners love bitcoin. They love talking about it too. Join the online conversation at any of these places:

- X (Twitter) – join the open discussion
- Braiins News – https//t.me/Braiins
- Home Mining Wizards – https//t.me/HomeMiningWizards
- Miners Peak – https//t.me/minerspeak

- Miner Hosting & Power Purchase – https//t.me/volumehosting
- Hardware Market – https//t.me/HardwareMarket
- Reddit – r/BitcoinMining
- nostr.com – a decentralized protocol where you control your own data
- BitcoinTalk.org – the OG bitcoin forum

Share what you know, and be open to knowing more. The bitcoin journey never ends.

Concerning Conferences

Bitcoin conferences are fun – especially the mining conferences. They're a great place to strengthen your own bitcoin network. Whether you want to work in the industry or mine some personal non-KYC sats, conferences and meetups are a phenomenal way to get started in anything bitcoin. Below are some of the most popular mining conferences:

- Nashville Energy & Mining Summit

- Mining Disrupt
- Empower
- Energising Bitcoin
- Bitcoin Ski Summit
- Texas Blockchain Council Summit
- World Digital Mining Summit
- Bitcoin Policy Summit

For those not able to travel to these big events, you are almost guaranteed to have a regular bitcoin meetup near you. Go to meetup.com, type in "bitcoin" and your zip code, and find one. Here are some examples of local meetups:

- Bitcoin Park – Nashville
- PubKey – NYC
- Bitcoin Jawn – Philadelphia
- BitDevs – All over (NYC, Atlanta, Tampa Bay, Denver)
- Bitcoin Bay – Tampa and St. Petersburg

Take the time to attend a local bitcoin meetup. It will be worth it.

Below are 256 terms that will help you on your bitcoin mining journey. Hopefully they make things less confusing. Take your time and enjoy the ride.

ELECTRICITY

Bitcoin mining is often referred to as digital energy. Through proof-of-work hardware and software, bitcoin converts energy to currency – unlike anything ever created. There are multiple forms of electricity, and multiple ways to harness it.

Bitcoin does not care what energy is behind it. It just needs to be powered.

behind-the-meter

A type of electricity that can go directly to a mining facility without interacting with the electric grid

coal

Electricity plants often burn coal to generate electricity; this can also be a viable source to power bitcoin mining operations depending on a variety of factors

curtailment

The shutting down of part of or an entire mining facility to conserve electricity; this is done as part of an energy contract or in response to outages in the surrounding area

Curtailment Service Provider (CSP)

A company that connects bitcoin miners with energy grids with the goal of providing demand response contracts; they provide other curtailment-related

services, but in bitcoin mining, their main goal is helping miners with demand response setups

demand response

The act of curtailing miners to accommodate higher electricity needs, often in residential areas during outages caused by severe weather

electric grid

The interconnected network of power stations, transformers, and transmission lines that deliver electricity from producers to consumers

flare gas mining

Utilizing excess gas – that is typically flared during oil extraction – to mine bitcoin; removes methane from the atmosphere while generating cash flow for an energy provider; typically occurs in remote areas where it is too costly to connect excess energy to the grid

generator

Typically some type of power plant that produces electricity to be transported to the grid (and eventually users); often are good partners for bitcoin miners (e.g. a wind generator can partner with a bitcoin miner to consistently buy power from them, then if the wind generator doesn't produce enough power, the miner can buy electricity from the grid instead)

geothermal power

Electricity generated by extracting thermal (heat) energy from the Earth's crust; a renewable source of energy that has been used for heat for thousands of years

grid balancing

Maintaining the supply and demand of electricity on the electric grid; bitcoin mining can assist in meeting demand due to its decentralized nature

heat exchanger

A device that transfers heat from one place to another; these are commonly used in bitcoin mining heat reuse systems

hydropower

Electricity generated by using the natural flow of moving water to generate electricity, typically via dams; it is the largest and one of the oldest sources of renewable energy; often produced in remote areas, making it an excellent energy source for bitcoin mining

intermittent power

Electricity that is not available 24/7 for various reasons, such as wind energy or solar energy; this power relies on external factors to be created, so when those factors don't take place, no energy is produced

kilowatt

1,000 watts of electrical power; abbreviated as kW;

the standard unit that most energy companies charge per hour; also the standard reporting number for ASIC power consumption

kilowatt hour

1,000 watts of electrical power used for one hour; abbreviated as kWh; this is the main unit of measurement for all bitcoin miners' electrical costs

measure at the wall

Measuring an ASIC's power consumption at the physical site, not based on what software or anything can report; "the wall" is more accurate, as it has direct contact with the electrical setup

megawatt

1,000,000 watts of electrical power; abbreviated as MW

megawatt hour

1,000,000 watts of electrical power used for one hour; abbreviated as MWh

natural gas

An energy source, primarily made up of methane; formed by the remains of plants and animals, built up over millions of years; often, excess energy produced but not used is flared into the atmosphere, releasing high amounts of methane

nuclear power

Electricity generated via nuclear reactions, typically nuclear fission, nuclear decay, and nuclear fusion; it typically produces abundant, cheap energy, making it an excellent energy source for bitcoin mining

off-grid

Electricity powered by an independent source that generally relies on battery storage to retain excess

power; being independently sourced, this can often have cost advantages for bitcoin mining

on-grid

Electricity powered from a local utility company's grid; most residential homes have this style of power, and certain bitcoin mines with PPAs use this electricity if the power rate is low enough;

power consumption

The amount of energy used by one ASIC, typically labeled on the machine; this can change based on various user decisions, such as overclocking, underclocking, or Dynamic Performance Scaling

solar power

Electricity generated via solar panels that capture heat produced by the sun and transform it into energy

stranded energy

Electricity that is either too remote or too expensive to connect to the electric grid and is therefore unused; in a bitcoin mining sense, this can produce free mining rewards

substation

Structures where power is transformed from high levels of voltage to lower levels of voltage (or vice versa)

thermal cycling

The process of cycling through two temperature extremes at high rates of change; this environmental stress test helps determine how durable and reliable some products are (e.g. bitcoin miners)

transformer

An energy system that either steps up voltage or steps down voltage for transmission across long distances and eventually to power users (bitcoin miners)

transmission

The bulk transfer of electrical energy from generating power plants to electrical substations

voltage

The “pressure” that pushes electricity from one point to another

watt

The amount of energy (in Joules) a machine uses per second, measured as 1 Joule per second (1 W = 1 J/s)

wind power

Electricity generated by wind turbines that produce energy as they move; it is an intermittent source of energy, so for bitcoin mining, it often needs a batter- to accompany the machines for optimal uptime

MINING INFRASTRUCTURE

Bitcoin mining is complex. Therefore, it needs intricate setups with thousands of moving pieces, where anything can go wrong at the drop of a hat. Like any growing industry, new improvements are constantly being made to improve the ease of mining setups. What was groundbreaking at one point became normal, then obsolete.

air cooling

The traditional way of cooling ASICs; the built-in fans on the miner cool the machine as it runs

airflow management

The efficient organization and design of an air-cooled mining facility to effectively remove all heat; often involves properly setting up intake and exhaust systems to direct the hot air out of the facility

as-generated PPA

A type of power-purchasing-agreement where the user pays for the energy as it gets created by the facility

CFM

Cubic feet per minute; a metric that describes how much airflow is created by a fan; this is a necessary item to know when building out an air-cooled mining facility

cold aisle

An isle in a mining facility where inputs are facing outward, keeping the temperature cool, as heat comes out the other side

(mining) container

Containers that hold racked ASICs in an efficient manner to maximize available space; can vary depending on the ASICs and cooling systems used

cooling towers

Structures that remove excess heat from the bitcoin mining process while holding and running multiple ASICs at once

data center

Facility where hundreds, if not thousands of ASICs are deployed, typically with low electricity costs backed by PPAs; also referred to as a “mining facility”

ERCOT

Electric Reliability Council of Texas; frequently participates in demand response to stabilize their electric grid

ethernet cables

Cords that connect an ASIC directly to an internet source; these are the preferred connection method as it is much more reliable than wireless

fixed volume PPA

A type of power-purchasing-agreement where the facility owes a user a certain volume of megawatt hours per month; also referred to as “baseload PPA”

hot aisle

An isle in a mining facility where outputs are facing outward, exhausting heat into it, often resulting in temperatures exceeding 100 degrees Fahrenheit

HVAC

Heating, Ventilation, and Air Conditioning; where various systems and technologies are used to control the temperature in a house or data center; some pleb miners customize their HVAC setups to allow for an ASIC to heat their homes

hydro cooling

A cooling method that uses water to dissipate heat generated by the hardware; typically involves circulating water through a cooling loop to transfer heat away from the mining hardware, maintaining optimal operating temperatures

immersion cooling

A cooling method where the hardware is submerged in a non-conductive liquid coolant; offers heat dissipation by directly contacting the hardware components; potentially improves mining performance as fans are removed, lowering power consumption; in-

creases miner longevity compared to air-cooling as the machine is constantly clean

immersion fluid

Synthetic oil used to submerge ASICs in tanks; often can increase ASIC efficiency due to not needing to run fans and prolong ASIC lifespan due to improved cleanliness for the miners inside the oil; often a key component of miner heat reuse projects

immersion tank

A tank designed to hold ASICs and run them submerged in fluid; are often designed for various quantities of miners, depending on the user's preference

miner fleet

The total number of ASICs running in a mining facility; these are optimally run and controlled by mining management software

PDU

Power Distribution Unit; these devices have multiple outlets and are used to supply power to multiple ASICs in a mining facility

power cables

Specific cords used to connect ASIC hardware to electrical outlets; often, these are custom-made to fit specific requirements at mining facilities

PPA

Power-purchase-agreement; allows larger-scale miners to buy electricity at a long-term, fixed rate, typically for less than residential energy costs

rack

The shelves ASICs go on in a mining facility; these are often stacked as high as possible to provide maximum room to support and run miners

rackspace

Availability for ASICs to run in a mining facility, either as hosted miners or for the facility owners' own purchased machines

MINING HARDWARE

With massive amounts of power and strong infrastructure to harness that electricity, we now take a look at hardware. An individual, sole proprietorship, LLC, or incorporation all need the same thing to mine bitcoin hardware. There's more than one way to cook an egg. The same can be said about running an ASIC.

The three biggest hardware companies on the market are Bitmain, MicroBT, and Canaan. All three have their

own product lines, with new models released regularly. Bitmain has their Antminer series, MicroBt has their Whatsminer series, and Canaan has their Avalon series. Each series has different miners and different strongpoints. Look into them. These companies are as important to know as anything in bitcoin mining.

As for procuring hardware, there are countless options on the market, so research the various companies, their offerings, and see what's best for you. You might even find some ASICs on ebay – but buyer beware. Make sure you're buying from credible sellers. You can't mine without hardware.

aftermarket PSUs

Power supply units built by other vendors, typically designed for a specific miner variant, delivering more power and increasing efficiency, among other benefits

ASIC

Application Specific Integration Chip; the most com-

mon type of bitcoin miner on the market; first introduced in 2013; despite being the chip name, miners generally talk about an entire hardware model with this term; also commonly referred to as “machine”, “miner”, “rig”, or “unit”

ASIC lifespan

The projected time an ASIC can effectively run for; can be improved through a variety of options, such as immersion cooling or custom firmware

certified repair center

A business, certified by an ASIC manufacturer, that will identify the problem with and fix broken machines

chips

Small, silicone-based devices that are deployed together on hashboards and control boards that work together to make an ASIC mine

control board

A panel inside an ASIC that contains equipment meant to regulate the miner; an inside part of a miner that connects with other important hardware features

CPUs

Central Processing Unit; the original method of mining bitcoin, typically in garages on old computers

DOA

Dead On Arrival; an unfortunate status of ASICs that arrive to a facility and cannot mine because of some manufacturing issue; typically, these machines get replaced by the supplier free of charge

fans

Components built into an ASIC, meant to cool the machine as it hashes and produces excess heat; they help keep a miner mining during air-cooling

FPGAs

Field Programmable Gate Array; type of hardware used to mine, bridging the gap between CPUs/GPUs and ASICs

GPUs

Graphics Processing Unit; proceeded CPUs as the primary mode of mining bitcoin

hashboard

A circuit board inside a miner that holds ASIC chips, which allow a machine to mine

heat dissipation

The removal of heat from an ASIC into the surrounding environment to prevent overheating and keep the miner running

IP report button

A button on an ASIC, when pressed, provides the miner's IP address to the computer screen it is connected to

nodes

Computers that validate and relay transactions and maintain a copy of the bitcoin ledger, which is vital for network integrity and decentralization

nonce

A number used only once in a cryptographic communication, often adjusted by miners to find a valid block hash.

PSU

Power Supply Unit; the part of an ASIC that sends energy to the hashboard and control board; initially, they were sold separately from ASICs, but now are included in a purchase

(miner) reboot

The process of restarting an ASIC; this may be necessary for troubleshooting, to address errors for either hardware or software

temperature sensor

Features added to hashboards or chips to alert the user when an ASIC begins to overheat

(miner) warranty

A guarantee, typically lasting one year from purchase, that the manufacturer of an ASIC will repair a machine for free if it gets damaged; typically only applies to new ASICs, though some used machines are sold with remaining warranty

MINING SOFTWARE

Hardware is nothing without proper software. Every day, new updates are being built and new software is being made, making an incredibly difficult industry just a bit easier. The right software paired with top-of-the-line hardware makes magic internet money.

aggregation proxy

A mining tool that allows users to reduce data loads, configure parallel usage of multiple pools, set back-up pools, meant to optimize large-scale mining operations

ASIC efficiency

The amount of energy (in Joules) a miner uses to reach a certain hashrate (in terahash); typically measured in J/THs

ASICBoost

An optimization technique that increases the efficiency of mining hardware by exploiting certain properties of the SHA-256 hashing algorithm, leading to lower energy consumption and potentially higher profits

Autotuning

Feature of Braiins OS that identifies each specific chip to determine their quality, then makes higher

quality chips perform at higher frequencies, producing more hashrate; makes lower quality chips perform at lower frequencies, increasing efficiency; lets miners get the full potential of their hardware at any power level; also referred to as “tuning” or “(per) chip tuning”

BOSminer

An open-source software replacement for CGminer, written from scratch in Rust; the core of Braiins OS; provides miners with a regularly updated, open-source software option

BetterHash

A mining protocol proposed by Matt Corallo in 2018, giving miners the ability to accept work from miners who constructed their own block templates, increasing decentralization; a mining protocol that let individuals have a greater say in how blocks were constructed

block template

The structure of unfound blocks chosen by miners attempting to find them

CGminer

Originally a fully open-source mining software, compatible with a variety of hardware types; formerly was available under a General Public License, but has since been discontinued

custom firmware

Third-party software added to ASICs to increase efficiency at any power rate

device monitoring

A feature that allows users to see when devices experience downtime, which allows them to react faster and minimize the financial impact of an outage

developer fee

The fee charged by a mining software provider, paid by the miners using whatever software, generally custom firmware or mining management software; typically, these fees are roughly 2-3%

Dynamic Performance Scaling

Feature of Braiins OS that adjusts ASIC power consumption based on chip temperature and workload, optimizing efficiency; prevents downtime and hardware failures that occur more frequently in hot summer months

GUI

Graphical User Interface; the dashboard setup that lets miners view performance metrics on each machine in a simple manner

low power mode

Decreasing power consumption, generally due to higher electric costs

mining management software

Software that allows the user, usually a data center operator, to track all relevant mining data to maximize uptime and productivity

overclocking

Increasing the power consumed by an ASIC to increase that machine's hashrate; does not always increase efficiency

(mining) pool

A collection of miners who combine their hashrate to make finding blocks easier; rewards from blocks found are then split amongst users according to effective hashrate

(mining) pools 1.0

The “first wave” of mining pools; where individual miners took their “apes together strong” mentality and joined forces; eventually, more pools got their start as they saw the benefits of pooled mining

(mining) pools 2.0

The “second wave” of mining pools, where pools began offering additional services to its users as the increased competition began shrinking margins

(mining) pools 3.0

The “third wave” of mining pools, where pools are expected to effectively trade their hashrate as a means to provide users with consistent revenue combined with the additional services offered in “mining pools 2.0”; pools will provide platforms for anyone to buy and sell hashrate as they see fit

pool URL

The link, provided by a mining pool, used during miner configuration to connect the ASIC to a mining pool; also referred to as “mining URL” or “Stratum URL”

stock firmware

Default software that enables an ASIC to hash and mine bitcoin; generally is less effective than custom third-party firmwares

translation proxy

A mining tool that assists communication between different protocols and softwares

underclocking

Decreasing the power consumed by an ASIC to make it run more efficiently; usually results in lower hashrate; also referred to as “downclocking”

THE BITCOIN NETWORK

Now we arrive at the omniscient bitcoin network. It knows all. It shows all. A protocol is nothing without the actual network. Backed by millions of separately-owned computers working together in competition, the bitcoin network is the most secure thing in the world.

0-hop address

A wallet address that is generally controlled by a mining pool

1-hop address

A wallet address that receives bitcoin from a mining pool, so typically a miner

APIs

Application programming interface; a set of rules or protocols that allows software apps to communicate with each other

base layer

The combination of the distributed ledger, nodes, Proof-of-Work consensus mechanism, and all on-chain activity; this is the core of the bitcoin network

block explorer

An online tool that lets a user look up any relevant information on the blockchain (i.e. public key, transactions, block hash)

block hash

Serves as a unique “block ID” for each block, determined by the contents of the block

blockchain

The distributed ledger displaying all blocks securely linked together, labeled by block hash; allows any individual to look up any on-chain bitcoin transaction

blocksize

Each block has a limit of 1 MB (megabyte), which can store over 2,000 transactions; was replaced by SegWit

difficulty

The measure of how hard it is to find a hash below a given target; changes every 2016 blocks to ensure even distribution of new bitcoin

difficulty adjustment

Occurs every 2016 blocks (approximately 10 days); generally moves in accordance with total network hashrate to stabilize distribution

genesis block

The very first bitcoin block, mined by Satoshi Nakamoto on January 3, 2009

mempool

Stands for “memory pool”; it is a theoretical waiting room for bitcoin transactions that have not been included in a block by a miner; each node adds a signed bitcoin transaction to its own mempool upon validation, then removes the transaction when it is added to a block

Merkle root

The hash of all transaction hashes included in a block; these enhance the security and efficiency of bitcoin, allowing verification without needing to download the entire blockchain

Merkle Tree

A cryptographic tree, where each leaf node is labeled with the hash of each block, and each non-leaf node is labeled with the hash of its child nodes' labels; allows for secure, efficient verification of the contents in a large data structure; also referred to as a "hash tree"; created and patented by Ralph Merkle

mining algorithm

A set of rules and processes used by miners to validate transactions and create new blocks, such as SHA-256 in bitcoin. Every coin has its own algorithm.

network hashrate

The total hashrate of every miner on the entire bitcoin network

orphan block

A valid block that is not included in the main blockchain due to being mined at nearly the same time as another block.

previous block hash

The unique hash (block ID) of the previous block header, which ensures that all previous blocks remain unchanged; connects the newest block to all previous blocks

SegWit

Segregated Witness, a protocol upgrade that separates transaction signatures from transaction data, increasing block capacity.

SHA-256

The hash function and mining algorithm of the bitcoin protocol; moderates the management and creation of wallet addresses; “Secure Hash Algorithm 256”

Stratum V1

A protocol designed by Marek “Slush” Palatinus in 2010 for communication between miners and pools; this protocol is vulnerable to “man-in-the-middle attacks” such as hashrate hijacking; Stratum V2 was created to address weaknesses in the protocol and further decentralize and protect mining

Stratum V2

An updated version of the Stratum protocol and evolution of BetterHash, improving efficiency, security, and decentralization

target

The defined number that a hash must be smaller than in order for that hash to be considered valid

timestamp

A record of the exact time when a block is mined, included in the block header and used to maintain chronological order in the blockchain.

UTXO

Unspent Transaction Output; a specific amount of bitcoin that is authorized by the sender and available to be spent by the receiver

GENERAL MINING TERMINOLOGY

In a completely new technology, it makes sense to have completely new terminology. Being a new technology though, some of these terms can be very confusing — that's what we're here for. It pays to study bitcoin — all aspects of it.

BIP

Bitcoin Improvement Proposal; a formal proposal to change bitcoin that will only go into effect with consensus approval

bitcoin protocol

The set of rules that govern bitcoin as a whole, initially set forth by Satoshi Nakamoto in the Bitcoin Whitepaper; can be changed through Bitcoin Improvement Proposals (BIPs)

block

A set of transactions compiled by miners and verified by nodes; are produced every ten minutes on average

block header

The metadata associated with each block, including information such as the previous block hash and timestamp

block height

The number of blocks preceding a particular block in the blockchain, used to measure the blockchain's length and chronological order

block reward

The total amount of bitcoin given to the miner who finds the most recent block; block subsidy plus transaction fees

block subsidy

The new bitcoin given to the miner finds the most recent block, gets cut in half every 210,000 blocks

BRC-20

A protocol that gives users ability to create "tokens" on the bitcoin network through ordinal inscriptions, generally accompanied by large transaction fees – a bigger payday for miners

closed-source

Mining software that is not available for the public to see; this type of software is typically made to retain competitive edges by companies, though it occasionally can raise questions regarding security

coinbase transaction

The first transaction in a block, rewarding the miner with the block reward and any transaction fees collected

confirmation

The process by which a transaction is included in a block and added to the blockchain, considered confirmed once it is buried under several subsequent blocks; in order for a block reward to be spendable, it must be included in the next 100 blocks

consensus mechanism

The process by which participants in the bitcoin network agree on the validity of transactions and the

state of the ledger, ensuring that all nodes reach a common understanding, without the need for a central authority

cryptography

A method of protecting information and communications using code, allowing only those who are intended to see something to see it; in bitcoin, elliptic curve cryptography and SHA-256 are used to generate public keys from individuals' private keys

decentralization

The idea that no specific person or group holds control over something; this is central to bitcoin – nobody controls it, therefore everybody controls it

double-spending

A hypothetical issue that one user can send the same bitcoin (or any online money) to two or more recipients; this problem is solved by miners and nodes

who verify all transactions; banks (trusted third-parties) verify that a person does not send money to two recipients at once, however banks have made some mistakes in the past. This is one of the reasons bitcoin was created - to prevent this kind of theft

downtime

The opposite of uptime; the duration that hardware is not operational or unavailable for use, making it impossible to earn rewards via mining

duplicated rejects

When a share is submitted more than once, indicating a bug in a user's mining software

epoch

A time period with a specific block reward; new ones are every 210,000 blocks (each halving); generally a 4-year period

fiat

Money issued by government decree; comes from the Latin fiat, meaning “let it be”; most frequently used to refer to paper money not backed by precious metals; commonly referred to as “worthless”

halving

The event where the block subsidy is cut in half to reduce new supply issued and promote scarcity; occurs every 210,000 blocks (~4 years); the final one expected in 2140; also referred to as “halvening” or “HalFinning”

hard fork

A change to the bitcoin protocol that is not backward-compatible, every node not updated to this upgrade will be not compatible with network consensus

hash function

A mathematical function that takes an input and pro-

duces a fixed-size string of characters, which uniquely identifies data and produces a digital signature; used to secure transactions and create new blocks

hashrate

Number of hashes per second a miner produces per second; see table below for various numbers to measure hashrate – some are in use regularly, some are obsolete, and some have not been reached yet

KiloHash

One thousand (1,000) hashes per second (kH/s); first reached by the network on January 9, 2009

MegaHash

One million (1,000,000) hashes per second (MH/s); first reached by the network on January 11, 2009

GigaHash

One billion (1,000,000,000) hashes per second (GH/s); first reached by the network on July 13, 2010 – OBSOLETE

TeraHash – the standard measure of hashrate

One trillion (1,000,000,000,000) hashes per second (TH/s); first reached by the network on May 1, 2011

PetaHash

One quadrillion (1,000,000,000,000,000) hashes per second (PH/s); first reached by the network on September 19, 2013

ExaHash

One quintillion (1,000,000,000,000,000,000) hashes per second (EH/s); first reached by the network on January 18, 2016

ZettaHash

One sextillion (1,000,000,000,000,000,000,000) hashes per second (ZH/s); this metric has not been reached by the network at the time of publication

hosting provider

Someone (or a company) that offers ASIC activation, management, supervision, and protection in exchange for a fee; they can have a variety of client sizes, with some taking a minimum of 1 machine and others taking minimums of several hundred

inscriptions

Inscribing individual bitcoin satoshis with data; doing this often requires a high transaction fee; Satoshi Nakamoto inscribed the January 3, 2009 headline from The Times on the very first bitcoin block

IP address

A unique string of numbers that identifies every device connected to the internet; “Internet Protocol address”

lightning network (LN)

A layer 2 payment protocol built on bitcoin using nodes, where users “pass on” bitcoin stored on it for instant, nearly free transactions; this network seeks to solve scalability issues on the main bitcoin layer with its seamless transacting method

lottery mining

Form of mining where one miner runs a machine by himself to try and win an entire block; through this, bitcoin has given the world a new way to play the lottery

open-source

Software where the source code is freely available to anyone who wishes to see it; bitcoin’s source code is visible to anyone, which adds trust and stability to the protocol

ordinals

A protocol that allows every satoshi to be assigned a unique identifier, allowing users to add additional data to each one

output

The destination address used in a bitcoin transaction, aka “receiver”

Peer-to-Peer (P2P)

A network where participants interact directly with each other without a central authority or trusted third-party, letting users send and receive transactions directly amongst each other

private key

An identifying address comprised of a long sequence of numbers that decrypts the data in a bitcoin wallet; commonly compared to the “password” that a user

can enter to access his or her wallet; cannot be recovered by the public key

Proof of Work (PoW)

A consensus mechanism where miners compete to find blocks, using computing power to secure the network, making it costly to attack

public key

An identifying address comprised of a long sequence of numbers that encrypts the data in a bitcoin wallet; commonly compared to an “account number” that a user can identify with his or her wallet; can be recovered by the corresponding private key

public mining company (PubCo)

Corporations that issue shares of stock and take on debt to fund bitcoin mining projects; these companies have to meet certain self-reporting obligations in order to be traded on stock exchanges; colloquial-

ly referred to as PubCos for short; generally, some of the biggest bitcoin miners are PubCos

Runes

An expansion of the ordinals protocol launched during the fourth bitcoin halving (block height 840,000); allows users to mint “tokens” on bitcoin; generally are accompanied with large transaction fees; unlike ERC-20 tokens, these are compatible with the lightning network and are not inscribed on satoshis

Shares

A potential block solution delivered to a mining pool, under the difficulty target; combined to calculate rewards for each miner

soft fork

A change to the bitcoin protocol that is backward-compatible, meaning nodes that haven’t upgraded can still validate new blocks

solo mining

Mining independently without joining a mining pool, relying solely on one's own computational power

stale rate

The number of shares submitted after the previous block has already been found and the pool has moved onto the next block; ideally, it is a very low number

stale rejects

Jobs that are submitted too late, indicating an issue with latency; often can be due to low internet speed or needing an extranonce subscription

taproot

A November 2021 upgrade that incorporated BIPs 340, 341, and 342; enhanced privacy and efficiency of transactions; added smart contracts such as ordinals to bitcoin

target rejects

Means a user's mining software that needs to be inspected or configured correctly, possibly due to the mining software not being compatible with the pool

transaction censorship

When a mining pool refuses to add specific wallets' transactions into a block for whatever reason; this act goes strongly against everything bitcoin stands for and therefore is a hot topic in the mining space

trusted third-party

In financial transactions, there is generally some type of "middle man" that verifies the sender has the money being sent to the receiver; through bitcoin, there is no need for a trusted third-party in electronic payments

uptime

The duration that hardware is actively mining and contributing hashrate to the network

UTXO consolidation

The process of combining multiple, small UTXOs into larger ones; reduces the size and complexity of transactions and therefore fees

whitepaper

Titled “Bitcoin A Peer-to-Peer Electronic Cash System” and released by Satoshi Nakamoto on October 31, 2008; outlines the reasoning and methodology behind the bitcoin network; now, when new additions are made to bitcoin, they often have a whitepaper accompanying it (e.g. Lightning Network)

MINING ECONOMICS

Bitcoin mining is a growing industry for a reason when all the above are mixed beautifully, it leads to tremendous economic opportunity. Unfortunately sometimes the exact opposite is true, as countless factors in mining have led to countless miners getting rekt. Study ASIC price trends.

ASIC-backed debt

Type of debt taken on by miners where ASICs are used as collateral to fund new ASIC purchases; a very easy way to go underwater due to the volatility of both bitcoin and ASIC prices

average block value

The average block reward value (block subsidy + transaction fees) for the past 5 days of blocks found by each pool

average fees per block

The average amount of transaction fees per block mined over a given number of blocks

average mining fee

Calculated in FPPS based on transaction fees, shares delivered to the pool, and difficulty of the network; the stat calculated by FPPS pools to give users their transaction fees

bitcoin-backed debt

Type of debt taken on by miners where bitcoin reserves are used as collateral to fund new ASIC purchases

break-even electricity price

Metric that tracks the shut-off price for a specific hardware model at its stock efficiency level; the cost per kilowatt hour where a specific ASIC will be profitable

capital expenditure

Up-front expenses, generally made on mining equipment, infrastructure, and ASICs

corporate debt

Loans taken on by corporations to fund business operations; in bitcoin mining, there are often various forms of collateral to allow companies to take on these loans

daily bitcoin mined

The total amount of bitcoin mined each day, calculated by multiplying the number of blocks found by the block reward

deployed hashrate

The collective amount of hashrate in a mining fleet

effective hashrate

The actual hashrate, calculated based on hashes submitted by an ASIC to a pool; this is typically somewhat lower than nominal hashrate, due to hashing variance, internet quality, and the fact that all machines are slightly different

estimated hashrate

A pool's hashrate calculated based on the amount of blocks each pool has found in the past 5 days, updated for every pool with each block found, regardless of which miner found the block

FPPS

Full Pay Per Share; mining pools that pay workers out in a more consistent basis, based on 24-hour hashrate, rather than only paying out when blocks are found

future ASIC order

Purchasing an ASIC months in advance, either due to limited supply or no availability to activate the machine; these orders move slower, but generally cost less due to the delay in machine arrival

hashprice

Revenue metric measuring dollars per terahash per second per day ($/TH/s/day)

Hashrate as a commodity

The idea that hashrate is a digital commodity – it is the only way to create the hardest money ever – so it can thus be traded like other commodities on a marketplace

hashrate derivatives

A contract between two parties where the value of the contract derives from the price of hashrate; these contracts will fluctuate as hashrate does; with hashrate becoming commoditized and financialized, we expect to see these become a common option for investors

hashrate forwards

A custom, private, over the counter contract between two parties to buy or sell hashrate on a future date at an agreed upon price; with hashrate becoming commoditized and financialized, we expect to see these become a common option for investors

hashrate futures

A standardized, publicly available contract, traded on an exchange, to buy or sell hashrate on a future date at an agreed upon price; with hashrate becoming commoditized and financialized, we expect to see these become a common option for investors

hashrate marketplace

The marketplace where mining pools can smartly trade some of their hashrate to increase profits for them and their users; perpetually coming soon

hashrate variance

The expected (upwards or downwards) change in ASIC hashrate, assumed due to factory variance in all "standard" models

hashvalue

BTC-denominated hashprice (BTC/TH/s/day)

HODL Ratio

The percentage of bitcoin a miner retains from their proceeds

infrastructure-backed debt

Type of debt taken on by miners where a data cen-

ter or mining facility serves as collateral to fund new ASIC purchases

lightning payouts

Payouts from a mining pool to a user on the Lightning Network; allows for no minimums or transaction fees, instantly

marginal cost to mine 1 BTC

Monthly OpEx (all-in electricity costs) by monthly BTC mined after fees; this stat tells miners the discount (or premium) they are getting via mining

market share

The percentage of total network hashrate that each miner or mining pool controls, according to the amount of blocks mined in the past 5 days

miner capitulation

The shutting off of miners due to a lack of profitability; rather than paying to run ASICs at a loss, miners deactivate their machines; this often happens after a halving or serious drop in bitcoin price

negative energy pricing

This occurs when electricity production is high and demand is low, forcing some grid system operators to pay someone to use the energy this is extremely beneficial for bitcoin miners, as they will use any energy available to them given optimal economics

nominal hashrate

The “sticker hashrate” that an ASIC is capable of reaching; factors such as environment, heating, firmware, and power usage may change this, either increasing or decreasing it

on-chain payouts

Payouts from a mining pool to a user on the bitcoin blockchain; typically requires a minimum amount of bitcoin to send and is often dependent on overall network fees; these are troublesome for small miners, as it can take months to receive their bitcoin

operating expenses

Expenses that are directly related to revenue; for bitcoin miners, the biggest OpEx is monthly electric costs; often referred to as “hashcost”

OTC sales

“Over-the-counter” sales of bitcoin from a miner directly to a buyer, removing an exchange from the equation; sometimes, buyers pay a premium for virgin bitcoin produced by a miner to increase privacy

payout address

A bitcoin wallet set to receive proceeds from a min-

ing pool account; often are changed for each payout to maximize individual privacy

payout fees

The fees charged by mining pools for processing payouts; typically are just the transaction fee required to send users their rewards

payout rule

The requirement for a bitcoin payout to occur; on-chain payouts typically require a minimum amount of bitcoin; can be set based on time or amount of bitcoin mined, depending on a user's preference

payout threshold

The limit, either in time or bitcoin, that triggers a payout when reached

pool fees

The fee paid by miners for using a mining pool; often can vary depending on several factors, such as total hashrate or firmware use (e.g. some pools offer zero pool fees for using their firmware)

pool luck

The expected number of shares to find a block divided by the actual number of shares it took for the pool to find a block; cannot adjust until the pool finds a block, as it's unknown how many shares it will take until the block find actually occurs

PPLNS (Pay-Per-Last-N-Shares)

A payment method used in mining pools where miners are paid based on the number of shares they contributed to the pool's effort to find a block over a specific period, typically the last N shares.

PPS (Pay-Per-Share)

A payment method used in mining pools where miners are paid a fixed reward for each share they contribute, regardless of whether the pool finds a block.

profit share

An added term in a hosting contract where the hostee agrees to share a percentage of profits with the hoster; this incentivizes the hoster to maintain uptime and secure hardware

reported hashrate

The hashrate reported by pools via APIs or on their websites, usually updated every 10 minutes to 1 hour, depending on the pool; should more accurately reflect pool's actual hashrate as it won't be impacted by the typical short-term variance in block finds (i.e. pool "luck")

revenue share

An added term in a hosting contract where the hostee agrees to share a percentage of revenue with the hoster; this incentivizes the hoster to maintain uptime and secure hardware

rewards

The payment (in bitcoin) that miners receive for their contributions to a pool; consists of coinbase reward cut and transaction fees cut in a FPPS system

rig-to-hashprice

Rigprice divided by hashprice

rig-to-hashvalue

Rigprice divided by hashvalue

rigprice

The dollar per terahash cost of mining hardware ($/Th)

sats/vbyte

Satoshis per byte; used to measure the fee rate in bitcoin transactions in a specific block

secondary hardware market

Used miner sales; often, as hosting contracts expire or as new generation ASICs come out, used miners get sold for various reasons; often, those with low power costs benefit from buying less expensive used machines on this marketplace

spot ASIC order

Purchasing an ASIC with immediate shipping and fulfillment; these orders move much quicker, but often cost more; when miners are in stock and readily available, these types of orders are frequently seen

sticker efficiency

The reported efficiency for a given ASIC based on the

manufacturer's rating; often can be improved with custom firmware

total cost to mine 1 BTC

Marginal cost including the depreciation of assets, factoring CapEx

total mining revenue

The total value (in millions of US Dollars) earned by miners in the past day; USD value of all the block rewards for blocks mined in the past 24 hours; ($/mil/Day)

transaction fee

Additional cost to add a transaction to a block

MINING SLANG, HISTORICAL EVENTS, AND MINING LEGENDS

Slang is as central to bitcoin as decentralization. These terms are found all over Twitter, Reddit, Telegram – anywhere bitcoin is being discussed, there are passionate bitcoiners speaking in code about their favorite orange coin. Famous events have shaped the bitcoin we see today, and the shaping

was done by some of the biggest legends in bitcoin history — before, during, and after bitcoin's founding.

Not every famous historical event made it on the final cut, but we have you covered. Check out our bitcoin calendars. Scan this QR code:

QR code of https//linktr.ee/braiins

51% attack

An attack on the bitcoin network where a single entity controls more than 50% of the total hashrate, allowing them to manipulate transactions; this is a commonly used FUD, though the practice of actually acquiring, deploying, and maintaining 51% of the total network hashrate is basically impossible

Adam Back

A famous British cryptographer and cypherpunk; he invented Hashcash, which was the first ever example of proof of work in use

BIP148

A user-activated soft fork (UASF) that activated segregated witness deployment (colloquially referred to as “SegWit”)

Bitcoin Pizza Day

The first example of bitcoin being used as a medium of exchange, where Laszlo Hanyecz paid 10,000 bitcoins for two pizzas; occurred on block 57,043, or May 22, 2010

brrr

The sound that both ASICs and central bank money printers make

BTFD

Buy the fucking dip; sentiment among bitcoiners when price dips, encouraging them to stack more sats

chain split

A divergence in the blockchain due to a change in consensus rules, resulting in two separate chains with different histories

China ban

The country banned bitcoin mining in March of 2021, halting growth and requiring miners to physically relocate hashrate; one of several “black swan” events bitcoin has endured and overcome

DCA

Dollar Cost Averaging; the strategy of regular purchases of bitcoin regardless of the current price; miners automatically DCA by leaving ASICs running

FUD

Fear, Uncertainty, Doubt; generally misinformation spread in attempt to make bitcoin and bitcoin mining look bad

getting rekt

The result of taking on ASIC-backed debt during the height of a bull market

Hal Finney

Receiver of the first ever bitcoin transaction and the second person to successfully mine a block; Hal Finney was one of the early pioneers of bitcoin and bitcoin mining; he died of ALS on August 28, 2014, and the “Running Bitcoin Challenge” takes place annually from January 3rd to January 10th, in honor of his famous “Running bitcoin” tweet and to fundraise for ALS research

hashrate hijacking

When a malicious third party is able to steal a miner's proof of work before it reaches their target pool, thereby taking credit for the work and earning the payout for themselves again; one flaw in Stratum V1 that is answered in Stratum V2; generally, theft of roughly 2% would occur – enough to make a difference, but not enough for a miner to fully investigate what's going on

hodl

A slang term for holding bitcoin for the long term; it came about through an accidental typo, misspelling the word "hold" in a now legendary comment on the BitcoinTalk forum

hodler

Someone who holds onto their bitcoin over the long-term

KYC

"Know Your Customer"; a requirement by most ex-

changes for users to verify their information, typically via a government ID/passport; this links bitcoin wallet addresses to individuals

NgU

Number go Up; a key metric when determining your bitcoin mining strategy

non-KYC

non-“Know Your Customer“; fully anonymous bitcoin; all bitcoin from mining is anonymous, as it is freshly created and sent directly to a user; those who value privacy often mine bitcoin to acquire non-KYC coins

pleb miners

Individual bitcoiners who mine bitcoin, typically in creative ways indifferent of profit/loss; they mine for the pride of securing the network or non-KYC coins; they would keep the network going if it ever got “banned” worldwide

pool heating

Utilizing excess heat produced through bitcoin mining to heat a swimming pool; typically requires an immersion tank and a heat exchanger to trap the heat then send it to the proper area

satoshis (sats for short)

The smallest bitcoin unit – named after the creator of bitcoin, Satoshi Nakamoto; 1 bitcoin is 100,000,000 satoshis, and 1 satoshi is 0.00000001 bitcoin

Satoshi Nakamoto

The pseudonymous creator(s) of bitcoin; he mined the Genesis Block and inscribed that date's (January 3, 2009) headline from The Times; technically is the largest holder of bitcoin, though nobody has seen or heard from him since December 12, 2010; estimated to have mined over 22,000 blocks, meaning he owns over 1 million bitcoin

Slush a.k.a. Marek Palantinus

Founded the original bitcoin mining pool, “Bitcoin.cz Mining Pool” – then renamed Slush Pool, now named Braiins Pool; also founded Stratum V1 and co-invented the world’s first hardware wallet (Trezor Model One) with Pavol “Stick” Rusnák

SPA-256

A hot tub heated by excess heat produced through bitcoin mining; combines the SHA-256 algorithm with “spa” in a clever fashion

stacking sats

The slang synonym buying bitcoin; in contrast to DCA, stacking need not be regular (stacking is good during price drops – see BTFD); may not even involve actual purchases – hodlers can work for sats

tainted bitcoin

Refers to bitcoin associated with illicit activities;

given the extreme traceability of bitcoin, money acquired by some type of crime, sent via the network is considered dangerous to hold, as it links the holder to the crime

user-activated soft fork

It represents a mechanism in which the activation time of a blockchain soft fork, enforced by the nodes; famously, the first happened during an attempt to activate SegWit, which was meant to make bitcoin more scalable; soft forks generally are meant to implement slight improvements to bitcoin

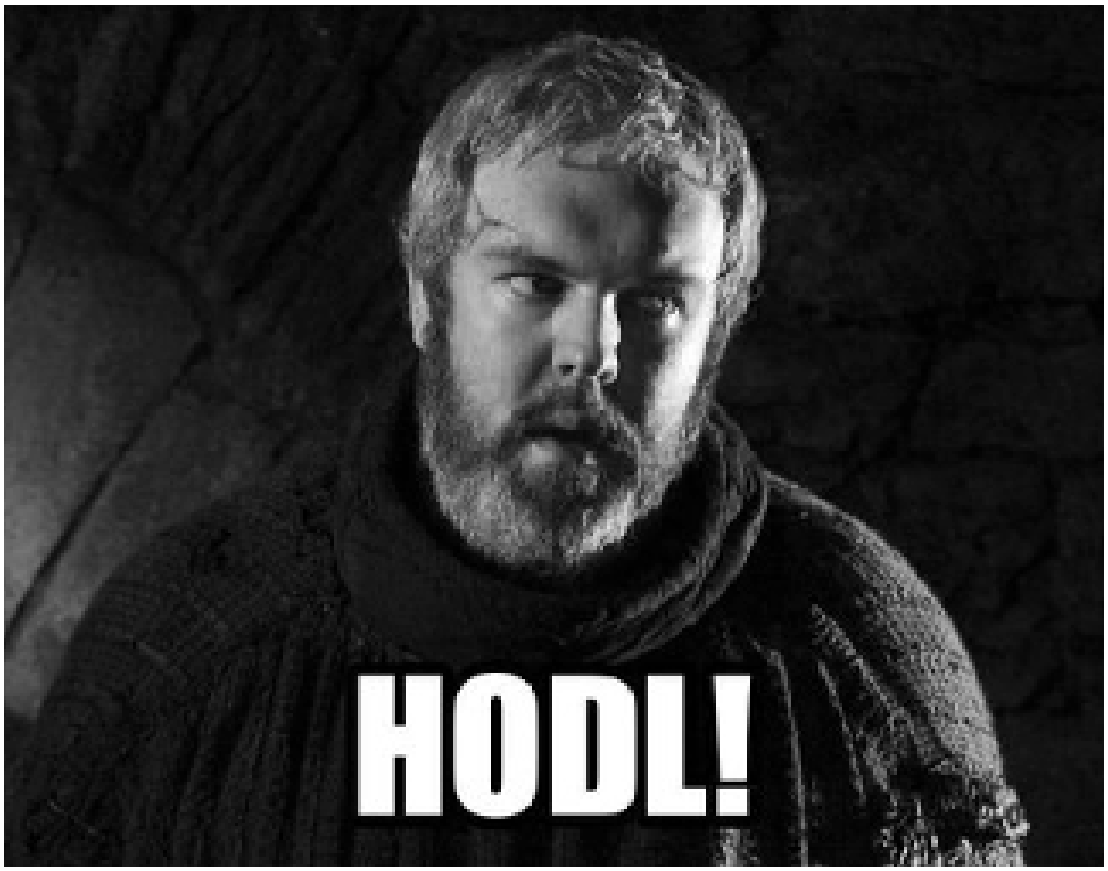
virgin bitcoin

Refers to bitcoin that has no transaction history whatsoever; newly created by miners; often can be sold at a premium over-the-counter; also referred to as “clear coins”

MEMES

It’s not a real Braiins book without memes. Memes are as vital to the bitcoin ecosystem as the 21 million hard cap. They help us celebrate the good times and cope with the bad times. While the price of bitcoin may endure volatile swings, the memes are a constant. Please enjoy some important mining memes and share them with friends when it’s relevant.

With a major revenue driver changing every 10 days, all miners struggle to adjust

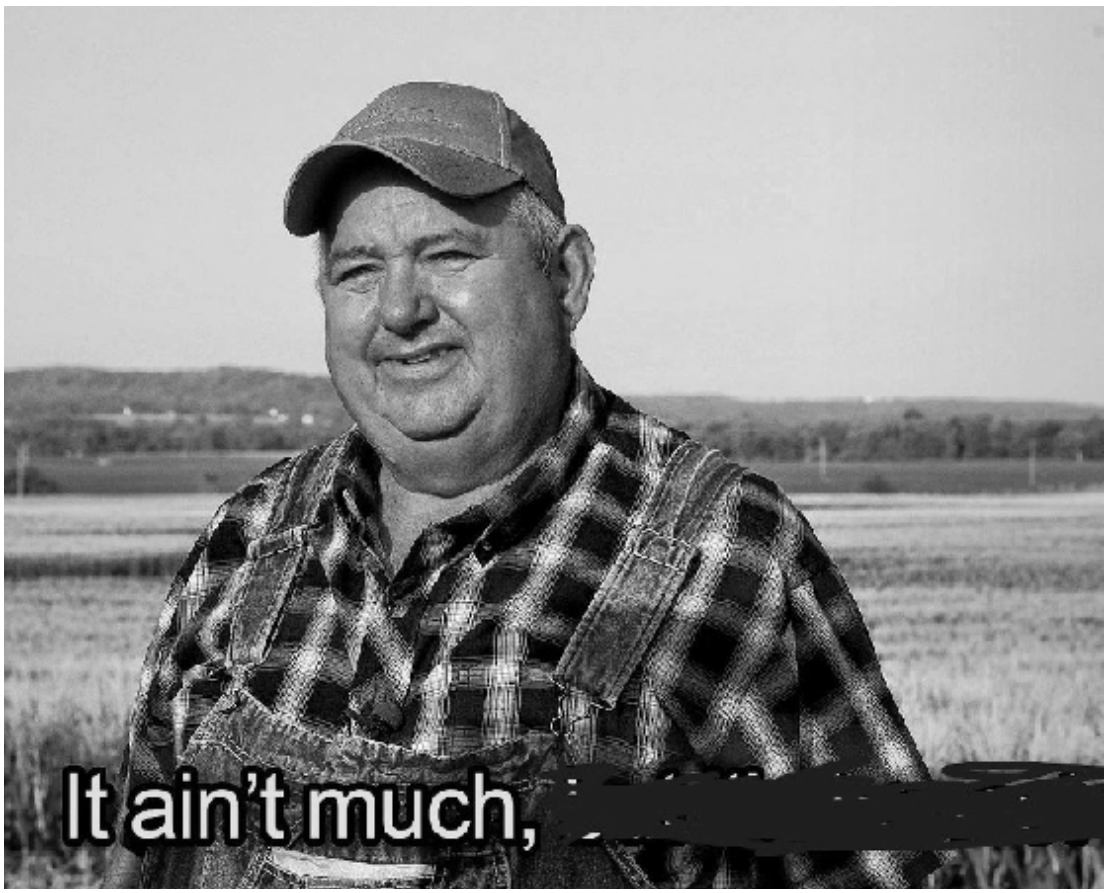


During the worst bear markets, sometimes hodl is the only word we can say

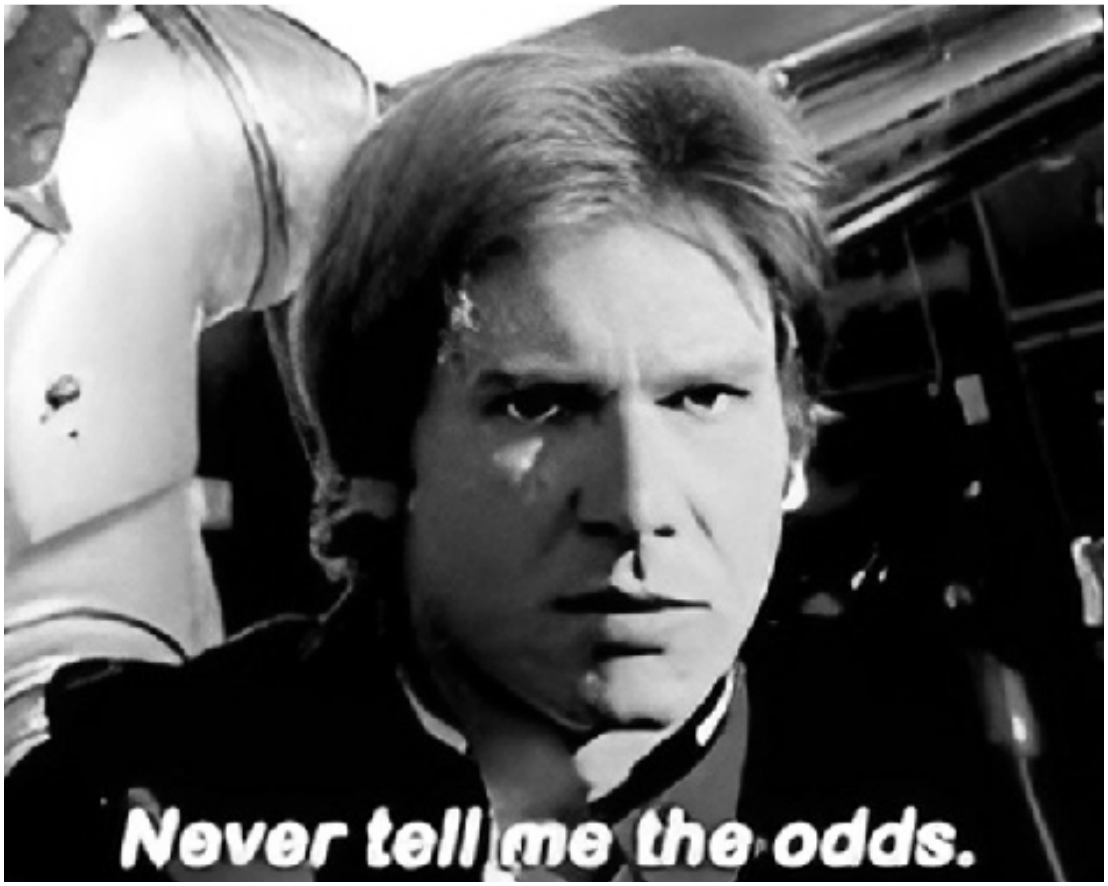
Hal Finney's famous "Running bitcoin" tweet – he used a lowercase "b" back then, too

Sound economic policy

Hashprice is an incredibly important metric – check in on your friends who mine when it drops



When a bitcoiner is asked what fiat currency is worth



Han Solo after purchasing his Braiins Mini Miner

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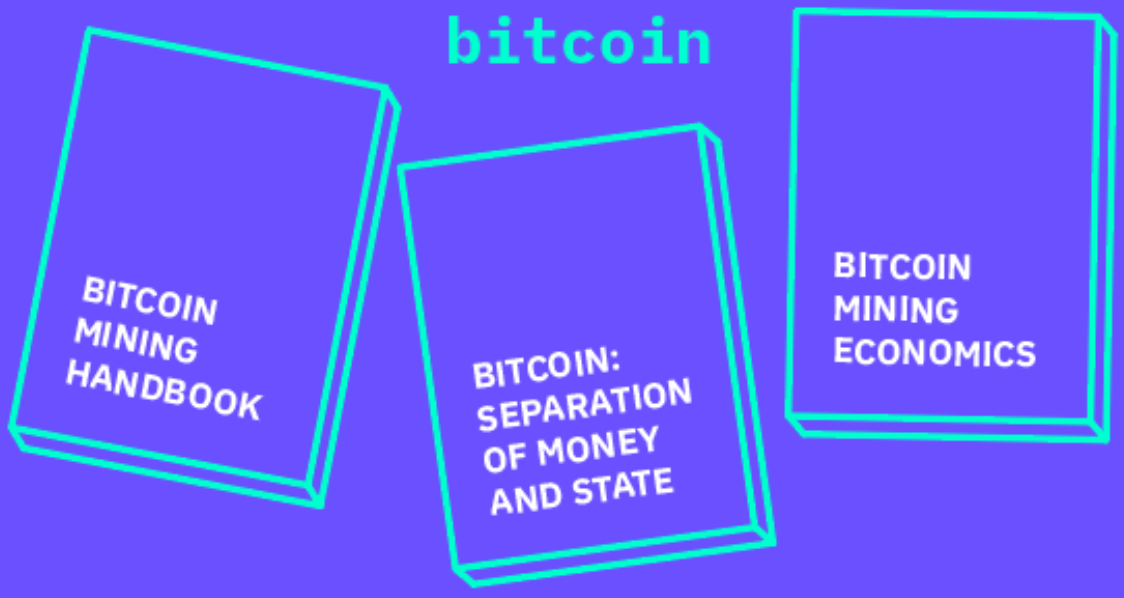

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