A
Seminar Report
On
Cryptocurrency And Crypto Mining (Bitcoin)

Submitted in partial fulfillment of requirement for the degree of
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in
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Certificate

Certified that seminar work entitled **"CRYPTOCURRENCY AND CRYPTO MINING (BITCOIN)"** is a bonafide work carried out in the VIII semester by **"GULSHAN KUMAR SHARMA"** in partial fulfillment for the award of Bachelor of Computer Science and Engineering from Krishna Engineering College Ghaziabad during the academic year 2020- 2021.

SIGNATURE

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Sincerely
Gulshan Kumar Sharma
(Roll no: 1716110074)

Date: **15/07/2021**

Place: **Ghaziabad**

Preface

I have made this report on the **"CRYPTOCURRENCY AND CRYPTO MINING (BITCOIN)"**. I have tried my best to elucidate all the relevant detail to the topic to be included in the report. While in the beginning I have tried to give a general view about this topic.

My efforts and whole-hearted corporation of each and everyone has ended on a successful note. I express my sincere gratitude to everyone who assisted me throughout the preparation of this topic. I thank them for providing me the reinforcement, confidence and most importantly the track for the topic whenever I needed it.

Abstract

Cryptocurrencies have emerged as important financial software systems. They rely on a secure distributed ledger data structure; mining is an integral part of such systems. Mining adds records of past transactions to the distributed ledger known as Blockchain, allowing users to reach secure, robust consensus for each transaction. Mining also introduces wealth in the form of new units of currency. Cryptocurrencies lack a central authority to mediate transactions because they were designed as peer-to-peer systems. They rely on miners to validate transactions. Cryptocurrencies require strong, secure mining algorithms. In this paper we survey and compare and contrast current mining techniques as used by major Cryptocurrencies. We evaluate the strengths, weaknesses, and possible threats to each mining strategy. Overall, a perspective on how Cryptocurrencies mine, where they have comparable performance and assurance, and where they have unique threats and strengths are outlined.

Contents

1. Introduction

Cryptocurrencies, or virtual currencies, are digital means of exchange that uses cryptography for security. The word ‘crypto’ comes from the ancient greek word, ‘kryptós’, which means hidden or private. A digital currency that is created and used by private individuals or groups has multiple benefits.

1.1 What Is a Cryptocurrency?

Cryptocurrencies challenge the orthodoxy of how a currency works in ways that excite some and worry others. So, what exactly is cryptocurrency and why is it different? Unlike other currencies, all cryptocurrencies are entirely digital. No cryptocurrency prints money or mints coins. Everything is done online. Conventional forms of currency are generated by government and then circulated in the economy, via banks.

1.2 Value of a Cryptocurrency

Cryptocurrencies do not rely on either of these institutions. Instead, cryptocurrency is decentralized. In other words, it is created, exchanged and regulated by its users. Cryptocurrencies are digitally mined. Mining precious metals has been used as a means of giving value to money. The question of how cryptocurrencies have value is complex, and reveals that any currency derives its worth from faith in its purchasing power. All currencies require a system that guards against misuse and fraud.

1.3 Blockchain

In banking, this is done with ledgers which track the flow of money through accounts. With cryptocurrency, the task is undertaken with blockchain using a form of maths called cryptology. Blockchain is a secure record of every single transaction made using a cryptocurrency. Verified transactions are added to the blockchain as part of the mining process. Mining is therefore not just about creating new money but also validating transactions. While it’s possible to buy cryptocurrency- all you need is a digital wallet as part of a free app or a cryptocurrency tax software — finding places that will accept it, the variable transaction charges and volatile exchange rates make buying and selling with it difficult.

1.4 Applications of Cryptocurrency

Cryptocurrency could transform the way we do transactions. The so-called distributed ledger technology behind blockchain can be integrated into all sorts of business processes that require trust among multiple parties. That’s because blockchains store information that are both secure and transparent. Pretty exciting, but how is that possible? For one thing, because of the blocks themselves. Now, rather than a long string of records, information in a blockchain is cut up into sealed blocks. Thanks to the use of cryptography, it is impossible to change or counterfeit the records in the block. But what’s inside these blocks?

Each block contains certain data, for example when selling an exclusive painting you want the block to have information on the name of the painting, the artist the previous owner, the new owner, the time of the sale and transaction. Next to the data, each block has an identifiable hash. This is a unique code, that functions like a fingerprint.

1.5 Advantages and Disadvantages of Cryptocurrency

1.5.1 Advantages

Cryptocurrencies hold the promise of making it easier to transfer funds directly between two parties, without the need for a trusted third party like a bank or credit card company. These transfers are instead secured by the use of public keys and private keys and different forms of incentive systems, like Proof of Work or Proof of Stake.

In modern cryptocurrency systems, a user's "wallet," or account address, has a public key, while the private key is known only to the owner and is used to sign transactions. Fund transfers are completed with minimal processing fees, allowing users to avoid the steep fees charged by banks and financial institutions for wire transfers.

1.5.2 Disadvantages

The semi-anonymous nature of cryptocurrency transactions makes them well-suited for a host of illegal activities, such as money laundering and tax evasion. However, cryptocurrency advocates often highly value their anonymity, citing benefits of privacy like protection for whistleblowers or activists living under repressive governments. Some cryptocurrencies are more private than others.

Bitcoin, for instance, is a relatively poor choice for conducting illegal business online, since the forensic analysis of the Bitcoin blockchain has helped authorities arrest and prosecute criminals. More privacy-oriented coins do exist, however, such as Dash, Monero, or ZCash, which are far more difficult to trace.

2. History

In 1983, the American cryptographer David Chaum conceived an anonymous cryptographic electronic money called ecash. Later, in 1995, he implemented it through Digicash, an early form of cryptographic electronic payments which required user software in order to withdraw notes from a bank and designate specific encrypted keys before it can be sent to a recipient. This allowed the digital currency to be untraceable by the issuing bank, the government, or any third party.

In 1996, the National Security Agency published a paper entitled How to Make a Mint: the Cryptography of Anonymous Electronic Cash, describing a Cryptocurrency system, first publishing it in an MIT mailing list and later in 1997, in The American Law Review (Vol. 46, Issue 4).

In 1998, Wei Dai published a description of "b-money", characterized as an anonymous, distributed electronic cash system. Shortly thereafter, Nick Szabo described bit gold. Like bitcoin and other cryptocurrencies that would follow it, bit gold (not to be confused with the later gold-based exchange, BitGold) was described as an electronic currency system which required users to complete a proof of work function with solutions being cryptographically put together and published.

In 2009, the first decentralized cryptocurrency, bitcoin, was created by presumably pseudonymous developer Satoshi Nakamoto. It used SHA-256, a cryptographic hash function, in its proof-of-work scheme. In April 2011, Namecoin was created as an attempt at forming a decentralized DNS, which would make internet censorship very difficult. Soon after, in October 2011, Litecoin was released. It used scrypt as its hash function instead of SHA-256. Another notable cryptocurrency, Peercoin used a proof-of-work/proof-of-stake hybrid.

On 6 August 2014, the UK announced its Treasury had been commissioned a study of cryptocurrencies, and what role, if any, they could play in the UK economy. The study was also to report on whether regulation should be considered.

In June 2021, El Salvador became the first country to accept Bitcoin as legal tender, after the Legislative Assembly had voted 62–22 to pass a bill submitted by President Nayib Bukele classifying the cryptocurrency as such.

3. Architecture

Decentralized cryptocurrency is produced by the entire cryptocurrency system collectively, at a rate which is defined when the system is created and which is publicly known. In centralized banking and economic systems such as the Federal Reserve System, corporate boards or governments control the supply of currency by printing units of fiat money or demanding additions to digital banking ledgers. In the case of decentralized cryptocurrency, companies or governments cannot produce new units, and have not so far provided backing for other firms, banks or corporate entities which hold asset value measured in it. The underlying technical system upon which decentralized cryptocurrencies are based was created by the group or individual known as Satoshi Nakamoto.

As of May 2018, over 1,800 cryptocurrency specifications existed. Within a cryptocurrency system, the safety, integrity and balance of ledgers is maintained by a community of mutually distrustful parties referred to as miners: who use their computers to help validate and timestamp transactions, adding them to the ledger in accordance with a particular timestamping scheme.

Most cryptocurrencies are designed to gradually decrease the production of that currency, placing a cap on the total amount of that currency that will ever be in circulation. Compared with ordinary currencies held by financial institutions or kept as cash on hand, cryptocurrencies can be more difficult for seizure by law enforcement.

3.1 Blockchain

The validity of each cryptocurrency's coins is provided by a blockchain. A blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography. Each block typically contains a hash pointer as a link to a previous block, a timestamp and transaction data. By design, blockchains are inherently resistant to modification of the data. It is ”an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way”. For use as a distributed ledger, a blockchain is typically managed by a peer-to-peer network collectively adhering to a protocol for validating new blocks. Once recorded, the data in any given block cannot be altered retroactively without the alteration of all subsequent blocks, which requires collusion of the network majority.

Blockchains are secure by design and are an example of a distributed computing system with high Byzantine fault tolerance. Decentralized consensus has therefore been achieved with a blockchain.

3.2 Nodes

In the world of Cryptocurrency, a node is a computer that connects to a cryptocurrency network. The node supports the relevant cryptocurrency's network through either; relaying transactions, validation or hosting a copy of the blockchain. In terms of relaying transactions each network computer (node) has a copy of the blockchain of the cryptocurrency it supports, when a transaction is made the node creating the transaction broadcasts details of the transaction using encryption to other nodes throughout the node network so that the transaction (and every other transaction) is known.

Node owners are either volunteers, those hosted by the organisation or body responsible for developing the cryptocurrency blockchain network technology or those that are enticed to host a node to receive rewards from hosting the node network.[40]

3.3 Timestamping

Cryptocurrencies use various timestamping schemes to ”prove” the validity of transactions added to the blockchain ledger without the need for a trusted third party.

The first timestamping scheme invented was the proof-of-work scheme. The most widely used proof-of-work schemes are based on SHA-256 and scrypt.

Some other hashing algorithms that are used for proof-of-work include CryptoNight, Blake, SHA-3, and X11.

The proof-of-stake is a method of securing a cryptocurrency network and achieving distributed consensus through requesting users to show ownership of a certain amount of currency. It is different from proof-of-work systems that run difficult hashing algorithms to validate electronic transactions. The scheme is largely dependent on the coin, and there's currently no standard form of it. Some cryptocurrencies use a combined proof-of-work and proof-of-stake scheme.

4. Crypto Mining

In cryptocurrency networks, mining is a validation of transactions. For this effort, successful miners obtain new cryptocurrency as a reward. The reward decreases transaction fees by creating a complementary incentive to contribute to the processing power of the network. The rate of generating hashes, which validate any transaction, has been increased by the use of specialized machines such as FPGAs and ASICs running complex hashing algorithms like SHA-256 and scrypt. This arms race for cheaper-yet-efficient machines has existed since the day the first cryptocurrency, bitcoin, was introduced in 2009. With more people venturing into the world of virtual currency, generating hashes for this validation has become far more complex over the years, with miners having to invest large sums of money on employing multiple high performance ASICs. Thus the value of the currency obtained for finding a hash often does not justify the amount of money spent on setting up the machines, the cooling facilities to overcome the heat they produce, and the electricity required to run them. Favorite regions for mining are those with cheap electricity or a cold climate. As of July 2019, bitcoin's electricity consumption is estimated to about 7 gigawatts, 0.2% of the global total, or equivalent to that of Switzerland.

Some miners pool resources, sharing their processing power over a network to split the reward equally, according to the amount of work they contributed to the probability of finding a block. A ”share” is awarded to members of the mining pool who present a valid partial proof-of-work.

As of February 2018, the Chinese Government halted trading of virtual currency, banned initial coin offerings and shut down mining. Some Chinese miners have since relocated to Canada. One company is operating data centers for mining operations at Canadian oil and gas field sites, due to low gas prices. In June 2018, Hydro Quebec proposed to the provincial government to allocate 500 MW to crypto companies for mining. According to a February 2018 report from Fortune, Iceland has become a haven for cryptocurrency miners in part because of its cheap electricity.

In March 2018, the city of Plattsburgh in upstate New York put an 18-month moratorium on all cryptocurrency mining in an effort to preserve natural resources and the ”character and direction” of the city.

4.1 GPU price rise

An increase in cryptocurrency mining increased the demand for graphics cards (GPU) in 2017. (The computing power of GPUs makes them well-suited to generating hashes.) Popular favorites of cryptocurrency miners such as Nvidia's GTX 1060 and GTX 1070 graphics cards, as well as AMD's RX 570 and RX 580 GPUs, doubled or tripled in price – or were out of stock.[50] A GTX 1070 Ti which was released at a price of $450 sold for as much as $1100. Another popular card GTX 1060's 6 GB model was released at an MSRP of $250, sold for almost $500. RX 570 and RX 580 cards from AMD were out of stock for almost a year. Miners regularly buy up the entire stock of new GPU's as soon as they are available.

Nvidia has asked retailers to do what they can when it comes to selling GPUs to gamers instead of miners. ”Gamers come first for Nvidia,” said Boris Böhles, PR manager for Nvidia in the German region.

4.2 Wallets

An example paper printable bitcoin wallet consisting of one bitcoin address for receiving and the corresponding private key for spending A cryptocurrency wallet stores the public and private ”keys” (address) or seed which can be used to receive or spend the cryptocurrency. With the private key, it is possible to write in the public ledger, effectively spending the associated cryptocurrency. With the public key, it is possible for others to send currency to the wallet.

There exist multiple methods of storing keys or seed in a wallet from using paper wallets which are traditional public, private or seed keys written on paper to using hardware wallets which are dedicated hardware to securely store your wallet information, using a digital wallet which is a computer with a software hosting your wallet information, hosting your wallet using an exchange where cryptocurrency is traded. or by storing your wallet information on a digital medium such as plaintext.

4.3 Anonymity

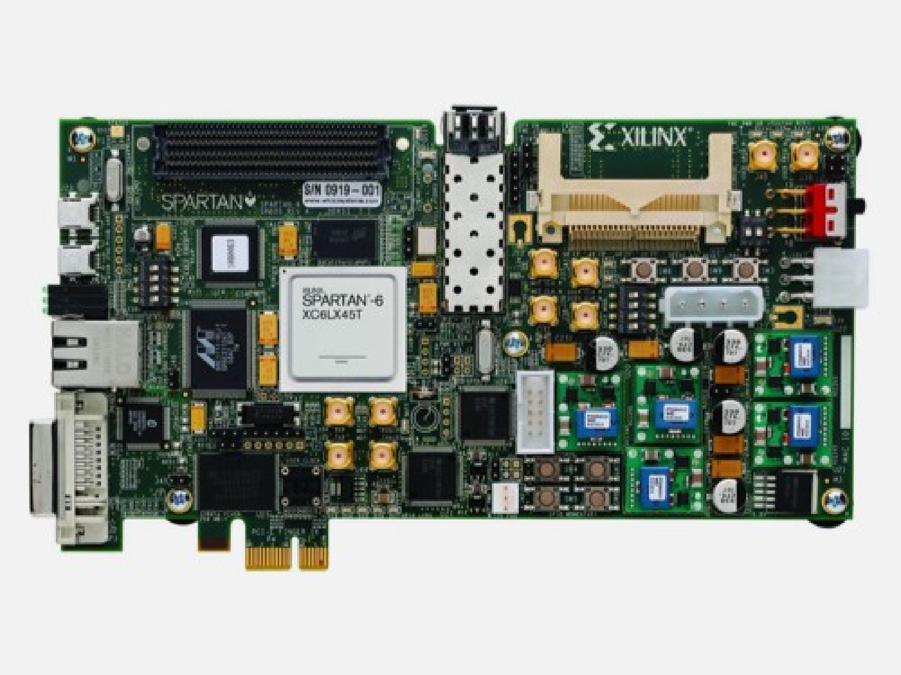
Bitcoin is pseudonymous rather than anonymous in that the cryptocurrency within a wallet is not tied to people, but rather to one or more specific keys (or ”addresses”). Thereby, bitcoin owners are not identifiable, but all transactions are publicly available in the blockchain. Still, cryptocurrency exchanges are often required by law to collect the personal information of their users.[citation needed]

Additions such as Monero, Zerocoin, Zerocash and CryptoNote have been suggested, which would allow for additional anonymity and fungibility.

5. Field-Programmable Gate Array

A field-programmable gate array (FPGA) is an integrated circuit designed to be configured by a customer or a designer after manufacturing – hence the term ”field-programmable”. The FPGA configuration is generally specified using a hardware description language (HDL), similar to that used for an application-specific integrated circuit (ASIC). Circuit diagrams were previously used to specify the configuration, but this is increasingly rare due to the advent of electronic design automation tools.

FPGAs contain an array of programmable logic blocks, and a hierarchy of ”reconfigurable interconnects” allowing blocks to be ”wired together”, like many logic gates that can be inter-wired in different configurations. Logic blocks can be configured to perform complex combinational functions, or merely simple logic gates like AND and XOR. In most FPGAs, logic blocks also include memory elements, which may be simple flip-flops or more complete blocks of memory. Many FPGAs can be reprogrammed to implement different logic functions, allowing flexible reconfigurable computing as performed in computer software. FPGAs have a remarkable role in embedded system development due to their capability to start system software (SW) development simultaneously with hardware (HW), enable system performance simulations at a very early phase of the development, and allow various system partitioning (SW and HW) trials and iterations before final freezing of the system architecture.



Field-Programmable Gate Array

5.1 History

The FPGA industry sprouted from programmable read-only memory (PROM) and programmable logic devices (PLDs). PROMs and PLDs both had the option of being programmed in batches in a factory or in the field (field-programmable). However, programmable logic was hard-wired between logic gates.

Altera was founded in 1983 and delivered the industry’s first reprogrammable logic device in 1984 – the EP300 – which featured a quartz window in the package that allowed users to shine an ultra-violet lamp on the die to erase the EPROM cells that held the device configuration.

Xilinx co-founders Ross Freeman and Bernard Vonderschmitt invented the first commercially viable field-programmable gate array in 1985 – the XC2064. The XC2064 had programmable gates and programmable interconnects between gates, the beginnings of a new technology and market. The XC2064 had 64 configurable logic blocks (CLBs), with two three-input lookup tables (LUTs). More than 20 years later, Freeman was entered into the National Inventors Hall of Fame for his invention.

In 1987, the Naval Surface Warfare Center funded an experiment proposed by Steve Casselman to develop a computer that would implement 600,000 reprogrammable gates. Casselman was successful and a patent related to the system was issued in 1992.

Altera and Xilinx continued unchallenged and quickly grew from 1985 to the mid-1990s when competitors sprouted up, eroding a significant portion of their market share. By 1993, Actel (now Microsemi) was serving about 18 percent of the market. By 2013, Altera (31 percent), Actel (10 percent) and Xilinx (36 percent) together represented approximately 77 percent of the FPGA market.

The 1990s were a period of rapid growth for FPGAs, both in circuit sophistication and the volume of production. In the early 1990s, FPGAs were primarily used in telecommunications and networking. By the end of the decade, FPGAs found their way into consumer, automotive, and industrial applications.

Companies like Microsoft have started to use FPGAs to accelerate high-performance, computationally intensive systems (like the data centers that operate their Bing search engine), due to the performance per watt advantage FPGAs deliver. Microsoft began using FPGAs to accelerate Bing in 2014, and in 2018 began deploying FPGAs across other data center workloads for their Azure cloud computing platform.

5.2 Applications

An FPGA can be used to solve any problem which is computable. This is trivially proven by the fact that FPGAs can be used to implement a soft microprocessor, such as the Xilinx MicroBlaze or Altera Nios II. Their advantage lies in that they are significantly faster for some applications because of their parallel nature and optimality in terms of the number of gates used for certain processes.

FPGAs originally began as competitors to CPLDs to implement glue logic for printed circuit boards. As their size, capabilities, and speed increased, FPGAs took over additional functions to the point where some are now marketed as full systems on chips (SoCs). Particularly with the introduction of dedicated multipliers into FPGA architectures in the late 1990s, applications which had traditionally been the sole reserve of digital signal processor hardware (DSPs) began to incorporate FPGAs instead.

Another trend in the use of FPGAs is hardware acceleration, where one can use the FPGA to accelerate certain parts of an algorithm and share part of the computation between the FPGA and a generic processor. The search engine Bing is noted for adopting FPGA acceleration for its search algorithm in 2014. As of 2018, FPGAs are seeing increased use as AI accelerators including Microsoft's so-termed "Project Catapult" and for accelerating artificial neural networks for machine learning applications.

Traditionally,[when?] FPGAs have been reserved for specific vertical applications where the volume of production is small. For these low-volume applications, the premium that companies pay in hardware cost per unit for a programmable chip is more affordable than the development resources spent on creating an ASIC. As of 2017, new cost and performance dynamics have broadened the range of viable applications.

The company Gigabyte created an i-RAM card which used a Xilinx FPGA although a custom made chip would be cheaper if made in large quantities. The FPGA was chosen to bring it quickly to market and the initial run was only to be 1000 units making an FPGA the best choice. This device allows people to use computer ram as a hard drive.

6. Application-Specific Integrated Circuit

An application-specific integrated circuit (ASIC) is an integrated circuit (IC) chip customized for a particular use, rather than intended for general-purpose use. For example, a chip designed to run in a digital voice recorder or a high-efficiency bitcoin miner is an ASIC. Application-specific standard product (ASSP) chips are intermediate between ASICs and industry standard integrated circuits like the 7400 series or the 4000 series. ASIC chips are typically fabricated using metal-oxide-semiconductor (MOS) technology, as MOS integrated circuit chips.

As feature sizes have shrunk and design tools improved over the years, the maximum complexity (and hence functionality) possible in an ASIC has grown from 5,000 logic gates to over 100 million. Modern ASICs often include entire microprocessors, memory blocks including ROM, RAM, EEPROM, flash memory and other large building blocks. Such an ASIC is often termed a SoC (system-on-chip). Designers of digital ASICs often use a hardware description language (HDL), such as Verilog or VHDL, to describe the functionality of ASICs.

Field-programmable gate arrays (FPGA) are the modern-day technology for building a breadboard or prototype from standard parts[vague]; programmable logic blocks and programmable interconnects allow the same FPGA to be used in many different applications. For smaller designs or lower production volumes, FPGAs may be more cost-effective than an ASIC design, even in production. The non-recurring engineering (NRE) cost of an ASIC can run into the millions of dollars. Therefore, device manufacturers typically prefer FPGAs for prototyping and devices with low production volume and ASICs for very large production volumes where NRE costs can be amortized across many devices.

Application-Specific Integrated Circuit

6.1 History

Early ASICs used gate array technology. By 1967, Ferranti and Interdesign were manufacturing early bipolar gate arrays. In 1967, Fairchild Semiconductor introduced the Micromatrix family of bipolar diode–transistor logic (DTL) and transistor–transistor logic (TTL) arrays.

Complementary metal-oxide-semiconductor (CMOS) technology opened the door to the broad commercialization of gate arrays. The first CMOS gate arrays were developed by Robert Lipp,[3][4] in 1974 for International Microcircuits, Inc. (IMI).

Metal-oxide-semiconductor (MOS) standard cell technology was introduced by Fairchild and Motorola, under the trade names Micromosaic and Polycell, in the 1970s. This technology was later successfully commercialized by VLSI Technology (founded 1979) and LSI Logic (1981).

A successful commercial application of gate array circuitry was found in the low-end 8-bit ZX81 and ZX Spectrum personal computers, introduced in 1981 and 1982. These were used by Sinclair Research (UK) essentially as a low-cost I/O solution aimed at handling the computer's graphics.

Customization occurred by varying a metal interconnect mask. Gate arrays had complexities of up to a few thousand gates; this is now called mid-scale integration. Later versions became more generalized, with different base dies customized by both metal and polysilicon layers. Some base dies also include random-access memory (RAM) elements.

7. GPU Mining

GPU mining involves the use of a gaming computer's graphics processing unit to solve complex math problems to verify electronic transactions on a blockchain.

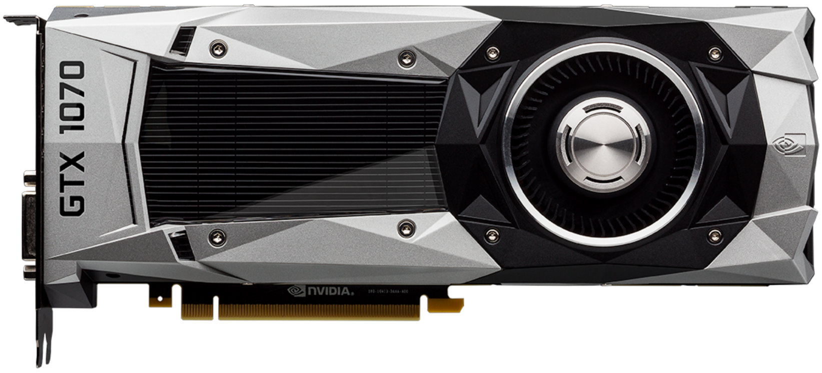
Normally, to mine a cryptocurrency, digital coins must be built on a blockchain architecture that supports proof-of-work (PoW) mining. Cryptocurrencies like Bitcoin (BTC), Ethereum (ETH), Monero (XMR), Litecoin (LTC) and Dogecoin (DOGE) are examples of coins that can be mined.

7.1 NVIDIA GeForce GTX 1070: The Most Popular Cryptocurrency Mining GPU

While there are a lot of different graphics cards in the markets, the cards used for crypto mining are those specially designed for gaming, not for video rendering. Shares in GPU manufacturing companies like NVIDIA and AMD have skyrocketed as miners look to earn cryptos with their computing powers. The NVIDIA GeForce GTX 1070 is one of the most popular mining rigs, when considering both its electricity usage, although there are other models out there if you do your own research into will can work for you.

While it used to be possible mine Bitcoin and other cryptocurrencies at home with your laptop, that's no longer an option for most cryptos due to the rising interest in mining, along with the Bitcoin reward halvings. Most mining operations, including the use of graphics cards and specialized mining rigs, are now conducted in shared pools, where participants combine their computing powers into a big group to generate results more quickly. Rewards are handed out to miners after a block of the currency has been mined.

All the participants in a shared pool get a share in the profits based on how much computing power they contributed. In this way, individual computers represent workers in a mine getting paid for searching for the treasure, the block reward.



Geforce GTX 1070

7.2 How Does GPU Mining Work?

GPU mining became a hot topic in 2017 after Bitcoin zapped past its previous highs to peak at just under $20,000 (a little less than half of what it would later reach in January 2021!). Since then, individuals from around the world have sought the best GPUs to get their share of crypto block rewards.

The complex maths functions solved by computers are usually SHA-256 hash functions. In mining, the computer takes the SHA-256 — an encrypted mathematical algorithm — and turn it into an output. The output is always a 256-bit number.

7.3 The Sha-256 Hash Function

Encrypted in the SHA-256 problems solved by computers are details of electronic payments and algorithms necessary to secure a blockchain network from attackers wishing to "double-spend." For partaking in the security of the blockchain network, miners are rewarded with crypto coins.

When the computational problem is solved by the mining card, the product is a seemingly-random 64 character output called a hash. On the Bitcoin network, miners have to find a hash that starts with approximately seventeen zeroes. To get this number, a computer has to try multiple times.

Once the hash is found, the block is closed, and the miner/pool of miners are rewarded with newly-created Bitcoin and transaction fees. On any blockchain, the hash rate is the speed at which a miner arrives and finds a hash. The hash rate is measured in giga hashes (GH/s).

8. GPU Mining Algorithms

Just as there are different cryptocurrencies built on different blockchains, there are different types of cryptocurrency mining algorithms available. The hash (the product of mining) differs on the different types of blockchain.

A hashing algorithm is a cryptographic hash function that maps data of any random size to a hash of a fixed size. These mathematical functions condense data to a fixed size. Because they are smaller, it is more convenient for a computer to compute hashes and solve the problems in the files or data string.

The hashing algorithms available that support GPU mining are the following.

8.1 SHA-256 Algorithm:

SHA-256, also known as cryptographic hash algorithm, is a cryptographic function. SHA-256 algorithms function on a 512-bit message block and a 256-bit intermediate hash value. The hash rate for the SHA-256 algorithm is measured in gigahashes (GH/s).

The product of mining a SHA-256 algorithm is a 32-byte (256-bit) signature for text strings. The block time varies between 6 to 10 minutes. Bitcoin (BTC), Bitcoin Cash (BCH), Terracoin (TRC) and Peercoin (PPC) are based on the SHA-256 algorithm.

8.2 Scrypt Algorithm:

The Scrypt hash function is used by Litecoin (LTC) as an alternative to the more power-hungry SHA-256 algorithm. Solving the Scrypt algorithm is a lot faster than the SHA-256 algorithm. The hash rate of the Scrypt algorithm is measured in kilohashes (KH/s).

Scrypt runs on password-based key functions, which were created for the Tarsnap online backup service by Colin Percival. This algorithm creates many pseudorandom numbers for storing in RAM locations, which makes it almost impossible for large-scale hardware attacks to be performed on a network.

Scrypt was first implemented in cryptocurrency by an anonymous programmer called ArtForz in Tenebrix, then Fairbrix and Litecoin shortly after.

The block generation time of the Scrypt function is 2.5 minutes for many cryptocurrencies. As a result, they can be performed on the GPUs of computers. Dogecoin (DOGE), Latium (LAT) and Bitmark (BTM) are some other cryptocurrencies based on the Scrypt algorithm.

8.3 X11 Algorithm:

This is the most energy-efficient mining algorithm for GPUs. With the X11 Algorithm, the GPUs can run on 30% less wattage. Proof-of-work blockchains that implement this algorithm run on a sequence of eleven hashing algorithms.

This algorithm was implemented in the Darkcoin protocol (later renamed to Dash) in 2014, specifically made by Evan Duffield to be resistant to ASIC mining.

The hash rate of the X11 Algorithm is measured in megahashes (MH/s). Some of the cryptocurrencies that use the X11 algorithm are Dash (DASH), StartCoin (START), CannabisCoin (CANN) and XCurrency (XC).

8.4 Ethash Algorithm:

The most well-known cryptocurrency to implement the Ethash Algorithm is Ethereum (ETH), the crypto for which this algorithm was initially created. DaggerHashimoto was the name of the first version of the Ethash algorithm, designed by Vitalik Buterin and the Ethereum team to be ASIC-resistant.

DaggerHashimoto is a combination of two other algorithms. The first, the Dagger algorithm, was built as an alternative for memory-intensive algorithms like Scrypt. However, Dagger is susceptible to pressure in shared memory hardware acceleration. The Hashimoto algorithm was designed to attain ASIC resistance by being IO-bound.

The hash rate for the DaggerHashimoto algorithm is measured in megahashes (MH/s). The popular cryptocurrencies that are based on it include Ethereum, Ethereum Classic and Expanse.

8.5 What to Mine With GPUs

Choosing a cryptocurrency to mine with GPUs is one of the major problems new miners face. In making the decision, one of the most frequently asked questions has been how much one can make from mining cryptocurrencies with GPUs.

To start, the project must be built on a blockchain architecture that supports proof-of-work (PoW) before it can be mined with GPUs. Also, different factors affect how much rewards one can make from GPU, including the block rewards.

The block reward is the amount of crypto given to a miner/pool of miners for completing a block of cryptographic equations on a blockchain.

For example, when Bitcoin launched in 2009, mining one block would earn you 50 BTC. However, in 2012, the block reward was halved to 25 BTC. By 2016, this was halved again to 12.5 BTC. Finally, in May 2020, the reward halved again to 6.25 BTC.

The best cryptos to mine are those that give rewards that can cover the electricity charges used in mining and the cost of the mining device/rigs.

9. Best Crypto to Mine With GPU

Some of the best cryptos to mine with GPU in 2021 are the following.

9.1 Grin (GRIN)

Grin is a relatively new cryptocurrency with high block rewards. Although the complexity of mining changes dynamically on the Grin network, mining is relatively easy and the project offers unlimited coins — a joy for miners. 60 GRIN is rewarded per block mined. A grin coin currently trades at $0.34 as of Feb. 1, 2021.

9.2 Bitcoin Gold (BTG)

This is one of the few cryptocurrencies created specifically for GPU mining. The architecture is perfectly optimized to support GPU mining. It is also one of the few non-stablecoin cryptos that have a relatively stable price.

Bitcoin Gold implements the Zhash hashing function and offers 12.5 BTG for a mined block. A BTG currently trades at $10.65 as of Feb. 1, 2021.

9.3 Litecoin (LTC)

Litecoin was one of the first users of the Scrypt protocol, meaning the network is best suited for GPU mining. Litecoin can be mined without an ASIC because it uses the SCRYPT protocol. The network also provides high-speed transactions with low fees.

Completing a block earns you a 12.5 LTC. Litecoin is currently valued at $132 as of Feb. 1, 2021.

10. Top Picks for the Best Mining GPUs

For those still interested, we've considered the options and come up with this list of the best mining GPUs for Ethereum right now — things can change rapidly based on pricing and availability, not to mention the valuation of Ethereum and Bitcoin.

10.1GeForce RTX 3060 Ti:

The second least expensive of the Ampere GPUs, it's just as fast as the RTX 3070 and generally costs less. After tuning, it's also the most efficient GPU for Ethereum right now, using under 120W while breaking 60MH/s. Make sure you get one of the non-LHR models, though, or mining profitability with Ethereum will be terrible.

RTX 3060 Ti

10.2 Radeon RX 5600 XT:

AMD's previous generation Navi GPUs are very good at mining, and the 5600 XT can hit about 40MH/s while using about 115W of power. The vanilla RX 5700 is another good choice, as it's as fast as the 5700 XT and costs less, but it's not as readily available.

10.3 GeForce RTX 2060 Super / RTX 2070:

Ethereum mining needs a lot of memory bandwidth, and all of the RTX 20-series GPUs with 8GB end up at around 44MH/s and 130W of power, meaning you should buy whichever is cheapest. That's usually the RTX 2060 Super or the older RTX 2070.

10.4 Radeon RX 580 8GB:

All the Polaris GPUs with 8GB of GDDR5 memory (including the RX 590, RX 580 8GB, RX 570 8GB, RX 480 8GB, and RX 470 8GB) end up with relatively similar performance, depending on how well your card's memory overclocks. The RX 590 is currently the cheapest (theoretically), but it's in limited supply, so look for any of the other Polaris 10/20 GPUs. Just don't get the 4GB models!

10.5 GeForce GTX 1060 6GB:

Mining performance is a bit lower than the RX 580 8GB (30MH/s), but power is well under 100W in our testing after tuning. Of course these could be five years old cards by this point, and buying a used graphics card presents some obvious risks!

10.6 Radeon RX Vega 56/64:

Overall performance is good, and some cards can perform much better — our reference models used for testing are more of a worst-case choice for most of the GPUs. After tuning, some Vega cards might even hit 45-50MH/s, which would put this at the top of the chart.

10.7 Radeon RX 6800:

Big Navi is potent when it comes to hashing, and all of the cards we've tested hit similar hash rates of around 65MH/s and 170W power use. The RX 6800 is generally cheaper than the others and used a bit less power, making it the clear winner. Plus, when you're not mining, it's a very capable gaming GPU.

Radeon RX 6800

10.8 GeForce RTX 3090:

This is the fastest graphics card right now, for mining and gaming purposes, and it's the only Nvidia Ampere GPU that won't be replaced by an LHR equivalent. The time to break even is pretty terrible right now, at more than a year, but if you do get into the black it will end up with the highest profitability from that point forward. But really, you shouldn't buy a $2,500 GPU for mining right now when it only makes about $6.50 per day.

GeForce RTX 3090

11. What Is Bitcoin Mining?

Bitcoin mining is the process by which new bitcoins are entered into circulation, but it is also a critical component of the maintenance and development of the blockchain ledger. It is performed using very sophisticated computers that solve extremely complex computational math problems.

Cryptocurrency mining is painstaking, costly, and only sporadically rewarding. Nonetheless, mining has a magnetic appeal for many investors interested in cryptocurrency because of the fact that miners are rewarded for their work with crypto tokens. This may be because entrepreneurial types see mining as pennies from heaven, like California gold prospectors in 1849. And if you are technologically inclined, why not do it?

However, before you invest the time and equipment, read this explainer to see whether mining is really for you. We will focus primarily on Bitcoin (throughout, we'll use "Bitcoin" when referring to the network or the cryptocurrency as a concept, and "bitcoin" when we're referring to a quantity of individual tokens).

Bitcoin Mining

11.1 How to Mine Bitcoins

Miners are getting paid for their work as auditors. They are doing the work of verifying the legitimacy of Bitcoin transactions. This convention is meant to keep Bitcoin users honest and was conceived by Bitcoin's founder, Satoshi Nakamoto. By verifying transactions, miners are helping to prevent the "double-spending problem."

Double spending is a scenario in which a Bitcoin owner illicitly spends the same bitcoin twice. With physical currency, this isn't an issue: once you hand someone a $20 bill to buy a bottle of vodka, you no longer have it, so there's no danger you could use that same $20 bill to buy lotto tickets next door. While there is the possibility of counterfeit cash being made, it is not exactly the same as literally spending the same dollar twice. With digital currency, however, as the Investopedia dictionary explains, "there is a risk that the holder could make a copy of the digital token and send it to a merchant or another party while retaining the original."

Let's say you had one legitimate $20 bill and one counterfeit of that same $20. If you were to try to spend both the real bill and the fake one, someone that took the trouble of looking at both of the bills' serial numbers would see that they were the same number, and thus one of them had to be false. What a Bitcoin miner does is analogous to that—they check transactions to make sure that users have not illegitimately tried to spend the same bitcoin twice. This isn't a perfect analogy—we'll explain in more detail below.

Once miners have verified 1 MB (megabyte) worth of Bitcoin transactions, known as a "block," those miners are eligible to be rewarded with a quantity of bitcoins (more about the bitcoin reward below as well). The 1 MB limit was set by Satoshi Nakamoto, and is a matter of controversy, as some miners believe the block size should be increased to accommodate more data, which would effectively mean that the bitcoin network could process and verify transactions more quickly.

Note that verifying 1 MB worth of transactions makes a coin miner eligible to earn bitcoin—not everyone who verifies transactions will get paid out.

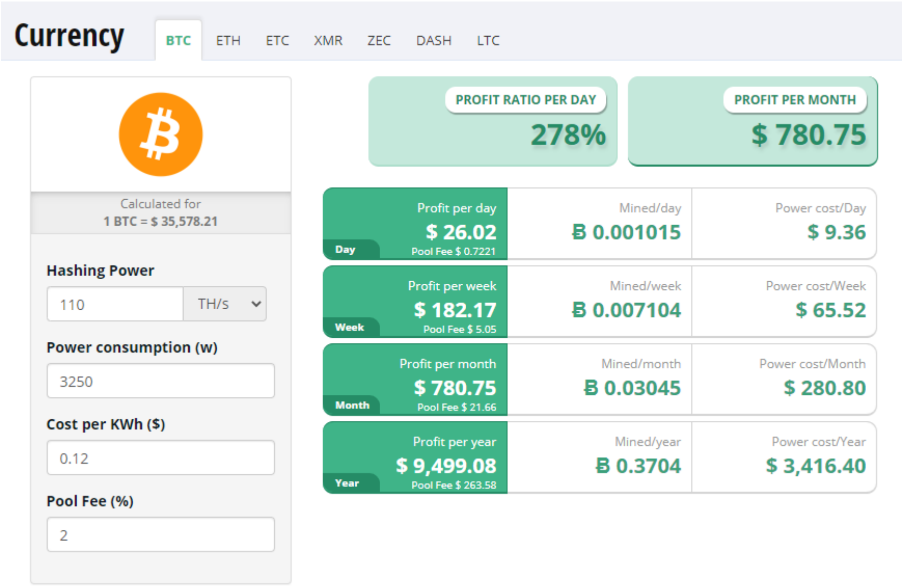
1MB of transactions can theoretically be as small as one transaction (though this is not at all common) or several thousand. It depends on how much data the transactions take up.

12. Mining Profitability

The mining profitability describes the profit margin of a miner that is based on his/her mining costs and the market price of the mined cryptocurrency. The relevant key parameters that make up the mining profitability are: market price of the cryptocurrency Or daily emission rate of the cryptocurrency.

Popular Mining Profitability Calculator

- NiceHash
- CryptoCompare
- WhatToMine, Etc.



Calculated for
1 BTC = $ 35,578.21

Hashing Power: 110 TH/s

Power consumption (w): 3250

Cost per KWh ($): 0.12

Pool Fee (%): 2

PROFIT RATIO PER DAY 278%

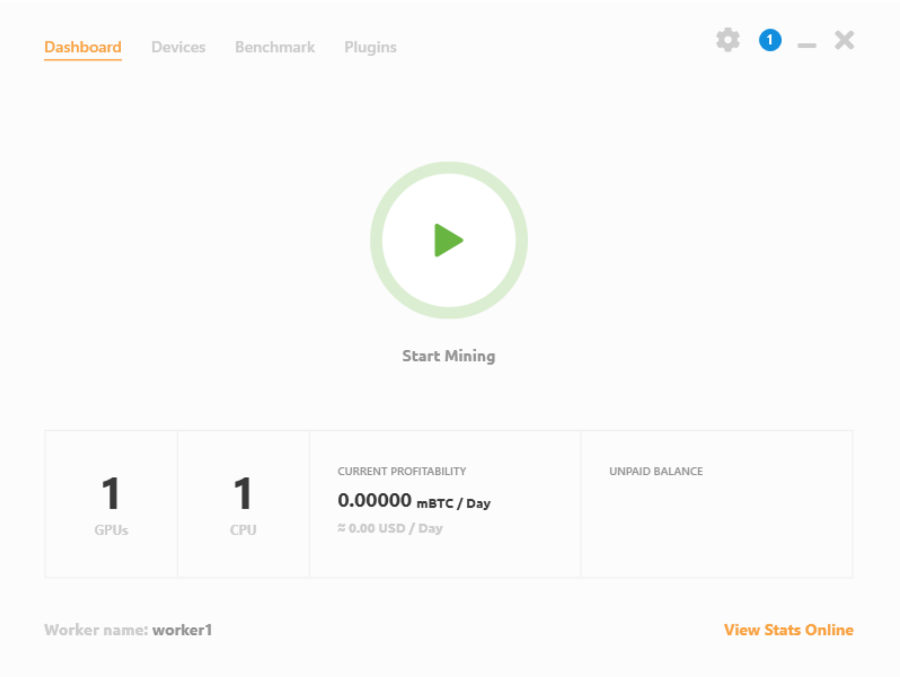
PROFIT PER MONTH $ 780.75

Day Profit per day $ 26.02 Pool Fee $ 0.7221	Mined/day Ƀ 0.001015	Power cost/Day $ 9.36
Week Profit per week $ 182.17 Pool Fee $ 5.05	Mined/week Ƀ 0.007104	Power cost/Week $ 65.52
Month Profit per month $ 780.75 Pool Fee $ 21.66	Mined/month Ƀ 0.03045	Power cost/Month $ 280.80
Year Profit per year $ 9,499.08 Pool Fee $ 263.58	Mined/year Ƀ 0.3704	Power cost/Year $ 3,416.40

Antminer s19 ASIC miner Bitcoin Profitability in india

13. How to Mine with NiceHash

The easiest way to get started at mining is with NiceHash. NiceHash launched in 2014, right around the time of the first major spike in cryptocoin mining (second if you want to include Bitcoin's initial surge to $32 per BTC in 2011). Prior to NiceHash, getting started with coin mining was quite a bit more complicated — as we'll detail below. NiceHash has greatly lowered the barrier to entry, and it gets rid of some of the worries about what coin(s) to mine. You effectively lease your PC's hashing power to other users, who get to choose what to mine, and you get paid in Bitcoin. NiceHash takes a small cut of the potential profits, and your PC can be up and mining in minutes.



1 GPUs

1 CPU

CURRENT PROFITABILITY 0.00000 mBTC / Day ≈ 0.00 USD / Day

UNPAID BALANCE

Worker name: worker1

Nicehash Miner

NiceHash has several options, ranging in degree of complexity. The easiest is to use the new QuickMiner, which is a web interface to a basic mining solution. You download the QuickMiner software, run that, and the webpage allows you to start and stop mining — you don't even need to put in your BTC address. It's dead simple, though the numbers can fluctuate quite a bit. For example, in a brief test QuickMiner suggested it was earning over $7 per day (on an RTX 3090), and noted we "could be making 16% more" by using NiceHashMiner (which we'll get to next). Except, after letting both versions run for a bit, QuickMiner seemed to stabilize at the same performance level as NiceHashMiner. YMMV.

Next up is NiceHashMiner, which is what most people will want to use. It's more complex in some ways than QuickMiner, but it has more options that can improve overall profitability. By default, it will ask you to log in using your NiceHash account details. Alternatively, you can use the NiceHash app on your phone to scan a QR code, or just input your BTC address manually.

Once launched, the first time it runs, NiceHashMiner will benchmark your hardware using various common mining (hashing) algorithms. Which algorithms and software get tested varies a bit by your GPU, and you can customize things quite a bit. Right now, DaggerHashimoto (aka, Ethash, what Ethereum uses — a modified variant of DaggerHashimoto) tends to be the most profitable, though sometimes Octopus or some other algorithm might sneak in some cycles.

The idea is that NiceHashMiner will choose whatever is currently the most profitable coin to mine, based on what people are willing to pay to lease your hardware. Sometimes a new coin will launch, or someone will want to dedicate a lot of mining power at a specific coin, and they'll pay more to do so. Instead of mining Ethereum 24/7, you might occasionally run some other algorithm, and it's all managed by the software, which usually (but not always) manages to do a good job.

The initial benchmarks on NiceHashMiner can be a bit prone to error, unfortunately. That's because the tests are only run for a minute each, and as your GPU heats up it may also slow down. That means the first algorithm benchmarked often ends up with an inflated result. You can get a better estimate of performance by using the Precise mode (on the benchmark tab), which takes twice as long to benchmark. You can also manually enter hash rates, so for example if you notice that after 30 minutes or more that NBminer stabilizes at 94MH/s instead of 98MH/s, you can fine tune the mining speed. You can also schedule an algorithm for retesting if you think the result is off, and by default (it can be turned off) NiceHashMiner will periodically download new versions of the miners and automatically retest.

13.1 What are the benefits?

NiceHash Miner is an advanced auto-miner that supports the latest algorithms and miners. No need to go through tons of configuration files, various mining software versions, configuration tuning or cryptocurrency coins market analysis. Auto-tuning for best performance and efficiency, automatic selection and runtime automatic switching to most profitable cryptocurrency algorithm are all integrated into NiceHash Miner and will enable you seamless, joyful and profitable mining experience.

13.2 Features

- Easy one-click CPU mining for CPUs that support at least AES (only works on Windows x64).
- Easy one-click GPU mining for NVIDIA GPUs using microarchitecture (compute capability) SM 3.0+.
- Easy one-click GPU mining for AMD GPUs using any AMD GPU devices that supports OpenCL.
- Integrated support for Simple Multi-Algorithm. Always mine most profitable algorithm.
- Integrated benchmarking tool. Run it only once before you start mining and after every hardware/driver/software upgrade.
- Watch-feature - automatically restart miner if crashed or hanged.
- Display current rate and your balance in real time.
- Auto update notifications.
- Much more...

13.3 Requirements

- Windows 10 or newer operating system 64-bit
- Windows 10 is recommended and will provide you a much better user experience
- For CPU mining a modern CPU with AES support
- For AMD mining any AMD GPU with OpenCL support
- For NVIDIA mining any NVIDIA GPU with Compute capability (SM) 3.0 or newer
- up-to-date patches for OS
- up-to-date drivers for all GPUs
- Reliable internet connectivity
- For GPU Mining, paging file size of 60% of your total GPU VRAM memory
- Personal Bitcoin wallet (you can create one by registering on NiceHash page)

13.4 How to get&run it?

All you have to do is download zip package or installer exe from the releases page. If you choose installer just run it and follow the instructions. In case of zip package extract it and run the miner. After that enter your Bitcoin wallet address where you want to get your coins sent at - and you are ready to start mining and maximizing your profit.

Note: Windows 10 with .NET Framework 4.8 or higher and Microsoft Visual C++ Redistributable 2015 are required. However, if you encounter any issues when starting application (application would fail to start or errors/warnings about missing DLL files are displayed) you should download and install Microsoft .NET Framework 4.8 and Microsoft Visual C++ Redistributable 2015 (vcredist_x64.exe) (after installation a reboot might be required).

Detailed instructions:

- Download binaries from here: https://github.com/nicehash/NiceHashMiner/releases
  - Installer
    - Run installer file (nhm_windows_3.x.y.z.exe)
    - Follow the instructions
  - Zip archive
    - Extract zip archive
    - Run NiceHashMiner.exe

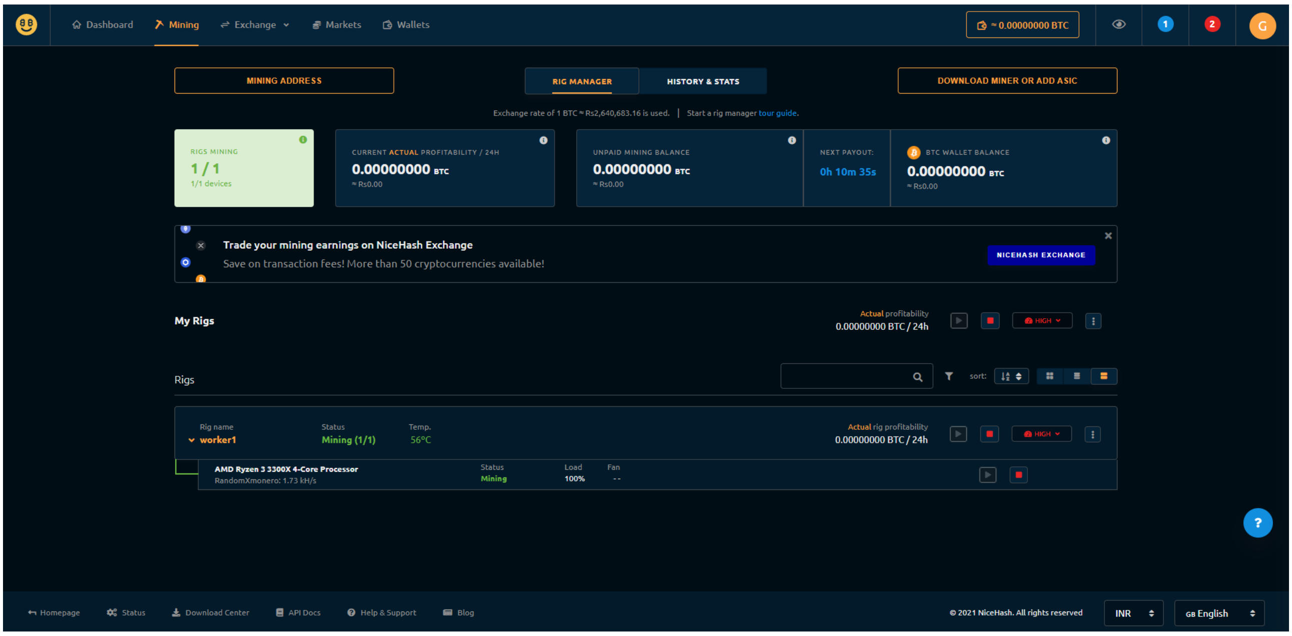
  Make sure you select your own personal Bitcoin wallet to receive payments, see Bitcoin wallet guidelines and instructions here:
  https://www.nicehash.com/support/general-help/wallet/how-to-use-nicehash-wallet. You will receive Bitcoin payments according to our payments schedule:
  https://www.nicehash.com/support/mining-help/earnings-and-payments/when-and-how-do-you-get-paid

The third and final NiceHash option is to use NiceHash OS. This is a custom Linux installation that would run in place of Windows, and it's recommended for larger scale mining farms that use NiceHash. As with all things Linux, getting it up and running may require a bit more knowledge and patience, but because it's an OS tuned specifically for mining, hash rates can be higher. (We didn't do any of our testing with NiceHash OS, due to time constraints.)

There are two big downsides to mining via NiceHash. One is that you're not actually getting Ethereum — not directly, at least. You'll get paid in Bitcoin, which you can then trade for Ethereum if you want. That's not necessarily a bad thing, considering BTC is the largest of cryptocoins, but if you want ETH you'll need to take some extra steps. The other downside is that NiceHash takes a cut of the amount paid, and the net result is generally lower payouts than mining Ethereum yourself. How big is the difference? Currently, direct Ethereum mining should pay about 7% more than NiceHash. That's a pretty big mining fee, though again the ease of use with NiceHash is hard to overstate.

13.5 Where is the profit coming from?

As a back-end NiceHash Miner relies on the NiceHash.com service. By running NiceHash Miner you're essentially selling the hashing power of your CPUs & GPUs to hashing power buyers. Those are using the hashing power to mine various cryptocurrency coins and support decentralized blockchain networks - similar to cloud computing - only that by running NiceHash Miner you're actually being a provider for the cryptocurrency mining hashing power. You are being part of a global compute power network, empowering decentralized digital currencies.



Exchange rate of 1 BTC ≈ Rs2,640,683.16 is used. | Start a rig manager tour guide.

RIGS MINING 1 / 1 1/1 devices

CURRENT ACTUAL PROFITABILITY / 24H 0.00000000 BTC ≈ Rs0.00

UNPAID MINING BALANCE 0.00000000 BTC ≈ Rs0.00

NEXT PAYOUT: 0h 10m 35s

BTC WALLET BALANCE 0.00000000 BTC ≈ Rs0.00

Trade your mining earnings on NiceHash Exchange
Save on transaction fees! More than 50 cryptocurrencies available!

My Rigs

Actual profitability 0.00000000 BTC / 24h

Rigs

Rig name	Status	Temp.	Actual rig profitability
worker1	Mining (1/1)	56°C	0.00000000 BTC / 24h

	Status	Load	Fan
AMD Ryzen 3 3300X 4-Core Processor RandomXmonero: 1.73 kH/s	Mining	100%	--

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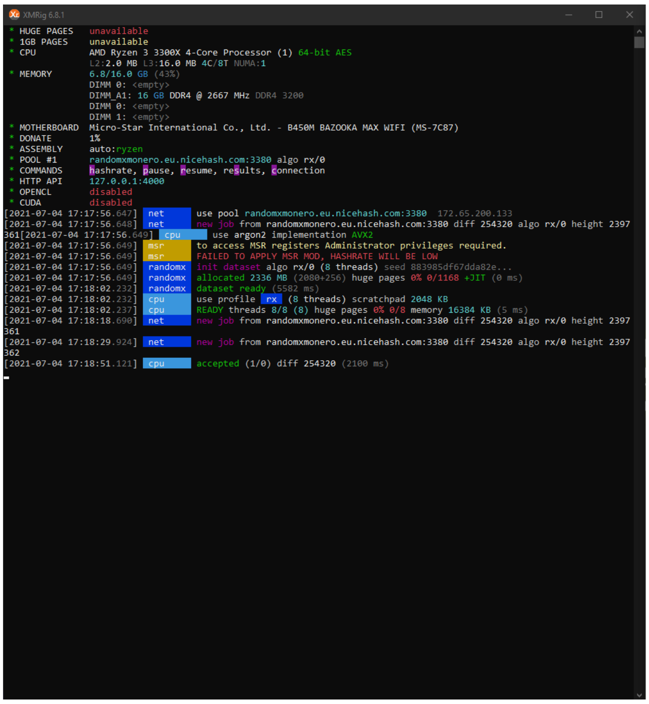
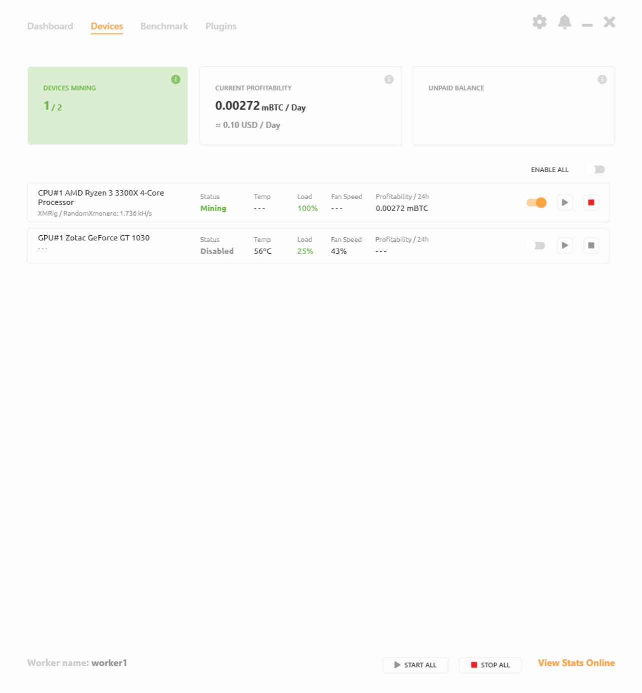
13.6 How to run NiceHash Miner only when profitability is high enough?

Profitability of mining can go up and down that may be unprofitable to mine especially places with high electricity cost. By using the ”MinimumProfit” settings, NiceHashMiner will stop mining if the current profits are below the minimum amount (in USD). This will help you mine during ”profitable” times only.



```
 * HUGE PAGES   unavailable
 * 1GB PAGES    unavailable
 * CPU          AMD Ryzen 3 3300X 4-Core Processor (1) 64-bit AES
                L2:2.0 MB L3:16.0 MB 4C/8T NUMA:1
 * MEMORY       6.8/16.0 GB (43%)
                DIMM 0: <empty>
                DIMM_A1: 16 GB DDR4 @ 2667 MHz DDR4 3200
                DIMM 0: <empty>
                DIMM 1: <empty>
 * MOTHERBOARD  Micro-Star International Co., Ltd. - B450M BAZOOKA MAX WIFI (MS-7C87)
 * DONATE       1%
 * ASSEMBLY     auto:ryzen
 * POOL #1      randomxmonero.eu.nicehash.com:3380 algo rx/0
 * COMMANDS     hashrate, pause, resume, results, connection
 * HTTP API     127.0.0.1:4000
 * OPENCL       disabled
 * CUDA         disabled
[2021-07-04 17:17:56.647]  net       use pool randomxmonero.eu.nicehash.com:3380  172.65.200.133
[2021-07-04 17:17:56.648]  net       new job from randomxmonero.eu.nicehash.com:3380 diff 254320 algo rx/0 height 2397
361[2021-07-04 17:17:56.649]  cpu       use argon2 implementation AVX2
[2021-07-04 17:17:56.649]  msr       to access MSR registers Administrator privileges required.
[2021-07-04 17:17:56.649]  msr       FAILED TO APPLY MSR MOD, HASHRATE WILL BE LOW
[2021-07-04 17:17:56.649]  randomx   init dataset algo rx/0 (8 threads) seed 883985df67dda82e...
[2021-07-04 17:17:56.649]  randomx   allocated 2336 MB (2080+256) huge pages 0% 0/1168 +JIT (0 ms)
[2021-07-04 17:18:02.232]  randomx   dataset ready (5582 ms)
[2021-07-04 17:18:02.232]  cpu       use profile  rx  (8 threads) scratchpad 2048 KB
[2021-07-04 17:18:02.237]  cpu       READY threads 8/8 (8) huge pages 0% 0/8 memory 16384 KB (5 ms)
[2021-07-04 17:18:18.690]  net       new job from randomxmonero.eu.nicehash.com:3380 diff 254320 algo rx/0 height 2397
361
[2021-07-04 17:18:29.924]  net       new job from randomxmonero.eu.nicehash.com:3380 diff 254320 algo rx/0 height 2397
362
[2021-07-04 17:18:51.121]  cpu       accepted (1/0) diff 254320 (2100 ms)
```



DEVICES MINING 1 / 2

CURRENT PROFITABILITY 0.00272 mBTC / Day ≈ 0.10 USD / Day

UNPAID BALANCE

Device	Status	Temp	Load	Fan Speed	Profitability / 24h
CPU#1 AMD Ryzen 3 3300X 4-Core Processor XMRig / RandomXmonero: 1.736 kH/s	Mining	---	100%	---	0.00272 mBTC
GPU#1 Zotac GeForce GT 1030 ---	Disabled	56°C	25%	43%	---

Worker name: worker1

Bibliography

- **Websites**
  - NiceHash
    https://www.nicehash.com/
  - tom'sHARDWARE
    https://www.tomshardware.com/
  - Github
    https://github.com/nicehash/NiceHashMiner#introduction
  - nVIDIA
    https://www.nvidia.com/en-us/
  - CoinMarketCap
    https://coinmarketcap.com/
  - Investopedia
    https://www.investopedia.com/
  - Google
    https://www.google.co.in/
  - Wikipedia
    https://www.wikipedia.org/
- **Softwares Used**
  - MiKTeX Console 4.2
    Download Link - https://miktex.org/howto/download-miktex
  - TeXstudio 3.1.2
    Download Link - https://www.texstudio.org/
  - Microsoft Paint
    Steps To Open
    - Click on start → Go to search → Search Paint → Open it.
    - Click on start → Scroll down to ”Windows Accessories” (In case of Windows older than Windows 10 first click on ”All Programs” then scroll to ”Accesssories”) → Click on Paint.
  - Adobe Photoshop
    Link To Buy Or Use Free Trial - https://www.adobe.ly/3hETFt7