Volume Network (VOL)

White Paper

—A HardDisk-based Basic Currency
Exploring the Evolutionary Monetary Path

Version 1.2

1. Foreword

1.1 Vigorous development of cryptocurrency

In 2008, Satoshi Nakamoto published a paper describing Bitcoin's electronic cash system in the Cryptography Mailing List of Metzdowd. The Genesis block of Bitcoin was created on January 3, 2009, and the first 50 Bitcoins were created simultaneously. Bitcoin was free from the constraints of "trusted third party" with distributed ledgers, and which was called "blockchain" by Satoshi Nakamoto.

As a kind of cryptocurrency, Bitcoin has great advantages over traditional currencies:
Decentralization: Bitcoin is the first type of distributed virtual currency, with the whole network composed of user nodes, and no central bank. Algorithms serve as the guarantee for Bitcoin security.

Global circulation: Bitcoin can be managed from any computer connected to the Internet. There is no complicated formality or line of limit for its transaction. You can make payment if you know the Bitcoin address of the other party.

Convenient to use: compared with cash and various precious metal currencies, Bitcoins cost almost nothing to carry and keep, and there is no wear and tear.

Cryptocurrency ecosystem might seem like a slow start, but its evolvement became faster and faster in the last two years. It is a sign that the tech giants like Microsoft, Dell and Dish, etc. are embracing cryptocurrencies as a mode of payment. This is a revolutionary solution, and cryptocurrencies have benefited numerous businesses and industries, while the financial and technology industries have become the vortex of cryptocurrency and blockchain storm:

- Financial industry

Financial institutions are probing into how to use their advantages effectively: Banks are adapting to blockchain technology and carrying out transactions of derivatives or even cotton with it. A consortium of multiple banks is supporting IBM to create a blockchain technology that can be used for cross-border transaction. Australian Stock Market is the world's first stock trading platform based on blockchain.

- Banking industry

More than 2 billion people in the world have no personal bank account. Cryptocurrency accounts enable them to transfer money and receive payments. The countries with unstable or non-problematic banking systems, for instance, Venezuela, have turned to cryptocurrency, such as Bitcoin and etc.

- E-commernce

Many large online retailers have begun accepting the payment with token coins, such as Bitcoin or Ether, etc. Overstock.com, Expedia, Shopify and other large companies have accepted cryptocurrency as a mode of payment. Merchants and users can complete transactions more safely and faster, and avoid credit card fraud; meanwhile, they need not to worry about payment service providers freezing funds for all kinds of reasons any more.

We've seen how cryptocurrency can change the world in more ways than people can imagine.

1.2 Current problems for Bitcoin and its competitors

Bitcoin has emerged as a kind of peer-to-peer electronic cash system since Satoshi Nakamoto published the White Paper, which is just the design goal of Bitcion. As people gradually explore the application possibility of Bitcion in terms of store of value, world monetary base, global settlement network, derivative financial system and global notarization system, etc, Bitcoin has been given more and more important significance; nevertheless, all these purposes are not likely to be achieved simultaneously; as a result, an increasing number of divergences have appeared among the development teams, miner manufacturers and miners in the Bitcoin eco-system due to the different economic and political prospects in the future. In particular, the centralization problem of research and development teams in the expansion and HashRate war has raised serious worries about the future political risks of Bitcoin.

Bifurcation always exists in Bitcoin (BTC). In the previous bifurcation, the status of BTC was never challenged in the field of cryptocurrency, but the market share of BTC fell sharply to about 34% from above 90% early due to the network congestion resulted from too small blocks in the cryptocurrency bull market in 2017. Although it returned to more than 50%, BTC congestion still existed in the next rising cycle, so it is difficult to predict it in the future. In most people's opinions, the expansion of block was originally a consensus, which was a simple thing, but the dispute was about how to make expansion. Nevertheless, the debate, contradiction and even war caused by the seemingly simple issue has cast a shadow on the development of BTC, and all kinds of problems

resulted from the minor issue of expansion have made the future of BTC and many forked coins based on HashRate POW gradually unclear. In addition, the twists and turns confronted by the giant company of miners in listing, and the dull of sale of Asic miners have blocked the channel for many potential users of digital currency to access digital currency market through mining, thereby making the channel for funds to enter digital currency market become the purchase of USDT; we believe it will harm the future development of digital currency market. Meanwhile, it is always difficult for many digital currencies based on GPU and FPGA mining, such as ETH and GRIN, etc., to become the mainstream choice due to the high price of GPU, and POS digital currency cannot undertake the heavy task of anchoring real-world assets; therefore, it is also difficult to introduce more funds into the digital currency field.

Hence, we created the Volume Network, and we hope the miners and new entrants could obtain digital currency through hard disk mining, with the aim of enabling new users to acquire digital currency through lower-barrier mining, thus entering the digital currency market.

1.2.1 Division of consensus in BTC ecosystem

BTC has been divided out into BCH and BSV in the past two years, and we will not make more detailed description of its complicated and eccentric process here. The source of BCH was a bifurcation initiated by ABC team and Bitmain when the Core team of BTC refused the Elastic Volume solution but chose SegWit and Lightning Network for capacity expansion, which might cause the decline of BTC competitiveness in the future. This bifurcation gave birth to BCH. After this bifurcation, BTC would gradually develop into the global settlement network and value reserve currency rather than the world base currency. In addition, Lightning Network will become the main transaction channel for micropayment uses, while the main chain of BTC will become a settlement network; as a result, the transactions through the main chain of BTC will decrease. However, the miners' earnings will gradually decrease as the number of small transactions decreases, and the safety level of BTC may be reduced. The future prospect of BTC depends on the Core team, and the Core team's insistence on crypto punk culture, as well as small block and utopianism hidden in the crowd will make it possible for BTC to keep away from the needs of mainstream. Therefore, the centralization of development teams has brought great political risks to the prospect of BTC, and restricted the progress of ecosystem.

Supported by the capacity expansion supporters, the ABC development team of Bitcoin developed a Bitcoin client with a volume of 8M blocks around July, 2017, which was launched and operated

independently from BTC network on August 1, 2017, namely, the BCH now. In the following year, although Bitcoin Unlimited, Bitprim, nChain, Bitcrust, ElectrumX, Parity, VOLT and other teams were involved in BCK development, ABC team still undertook the main development work and mastered the dominant right.

BCH is a kind of digital currency adhering to the path of exploration and renewal, in which the technologies including block-by-block difficulty rule DAA, Two-level intelligent contract wormhole, and etc. have been introduced. Nevertheless, the development of BCH has brought unpredictable risks due to the division of BSV. After ABC launched 0.18 version upgrade on Bitcoincash.org (the official website of BCH), CSW strongly criticized it and released BSV version, proposing to cancel 0.18 version upgrade of ABC and adopt BSV version in the whole network. Due to the support of CSW, and the introduction of a similarly religious development mode, as well as the personality cult and rationalism, BSV has greatly split the BCH community consensus, but BSV has also weakened the originally great development potential of BCH regardless of the future development of BSV, thereby resulting in the difficult implementation of the huge global economic vision of global monetary base and electronic cash.

BTC, BCH and BSV have coexisted since the beginning of expansion war, which has brought difficulty for people newly entering the digital currency market to make choice. The consensus split in Bitcoin community has also led to the deviation from the great goal of e-cash. We hope to provide a new additional solution for the new crowd to understand and acquire digital currencies with a very low entry barrier, just as BTC before.

1.2.2 Development team centralization and development team motivation

The formation and development of Bitcoin ecosystem heavily relied on the innovation interest and idealism enthusiasm of early participants, of which the developers and Geek groups played the most important role; however, as time goes on and the currency prices rise, the miners and mining machine manufacturers gain huge benefits, but the developers groups obtain no immediate interest in the development of currencies. Therefore, as the core developers of Bitcoin constituted BlockStream and developed the Lightning Network system, and the problem of centralized code review authority has become increasingly urgent.

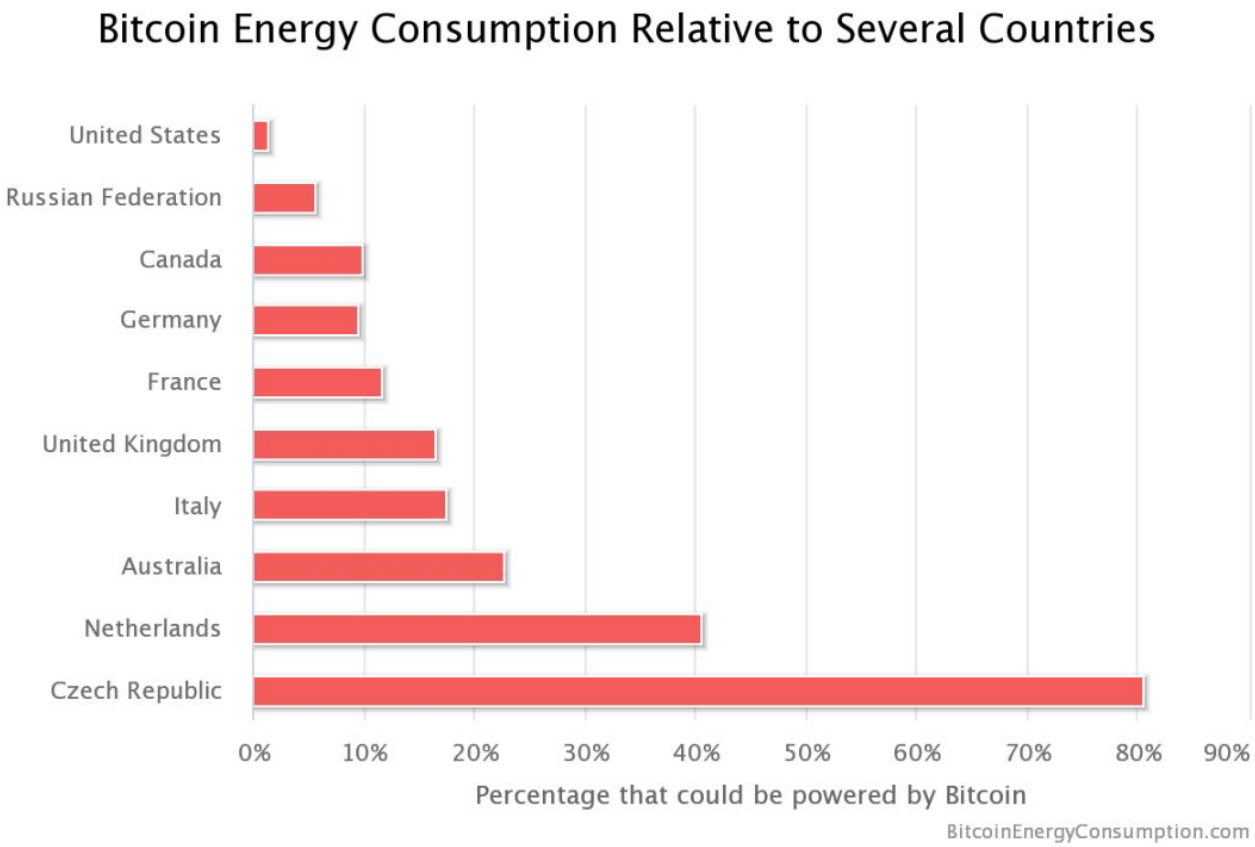
Essentially, the Core team spared no effort to fulfill the vision of Lightning Network and global settlement network, which also embodied the fact that developers needed economic incentives.

However, under the current system, neither Core team nor ABC team can directly benefit from the development of digital currency, which will cause great problems.

1.2.3 Public relations problems caused by the waste of power resources

Cryptocurrency miners are tight-lipped about the exact amount of electricity they use in mining, but everyone declares that the electricity consumption is huge when asked.

According to the cryptocurrency energy consumption index issued by digiconomist.net, a cryptocurrency news agency, the annual energy consumption for Bitcoin mining is about 42.15~54.11 TWh (1 TWh-100 million KWH), which accounts for about 1.2% of the annual electricity consumption in the United States, 5.1% of that in Russia, 10.4% of that in French, 15.7% of that in the UK, 14.7% of that in Italy, 20.4% of that in Australia, 36.4% of that in the Netherlands, and 72.2% of that in the Czech Republic. This number will increase year by year as new miners join the network and mining becomes more difficult. It is even predicted that, according to the current growth rate, virtual currency mining will account for all of the world's electricity generation by 2024.



It is terrible. It means that Bitcoin will emit the equivalent of 2,000 tons of carbon dioxide a year, which is a blatant defiance of the Earth's climate, and anyone who enjoys the coastal, forest, and unthreatened death from mosquito bites. From another metaphorical perspective, Bitcoin P2P network is basically a distributed super-AI that is turning all energy (i.e. matter) in the universe into Bitcoin.

So, will we really use up electricity due to Bitcoin mining?

At present, governments around the world have noticed the resource depletion trend caused by Bitcoin, and the NDRC has introduce policies to eliminate Bitcoin mining for its backward production capacity; on April 8, 2019, the NDRC announced on its web site, a file named *Catalogue of Guidance for Industrial Structure Adjustment (Exposure Draft 2019)*, aiming to encourage, limit or eliminate all kinds of industries, and optimize the industrial structure. In the *Catalogue of Guidance for Industrial Structure Adjustment*, the catalogues of various industries that need to be encouraged or eliminated were listed, in which the presentation of virtual currency "mining" activity appeared in the catalogue of industries to be eliminated. It was also specially explained in the document that, it was the production process of Bitcoin and other virtual currencies.

In the document classification, the mining activity belongs to “backward production equipment”, and the time limit for elimination is immediate elimination. It is worth mentioning that mining activity is classified together with some toxic and polluting technologies/processes. The period for soliciting public opinions for the *Catalogue of Guidance for Industrial Structure Adjustment (Exposure Draft 2019)* is April 8, 2019-May 7, 2019; in other words, if no one puts forward opinion on the elimination of mining industry before May 7, mining activities will undoubtedly be eliminated by the state.

In this context, PoST, with hard disk capacity as the cryptographic consensus algorithm basis, can be used as a basic consensus algorithm to generate new digital currencies.

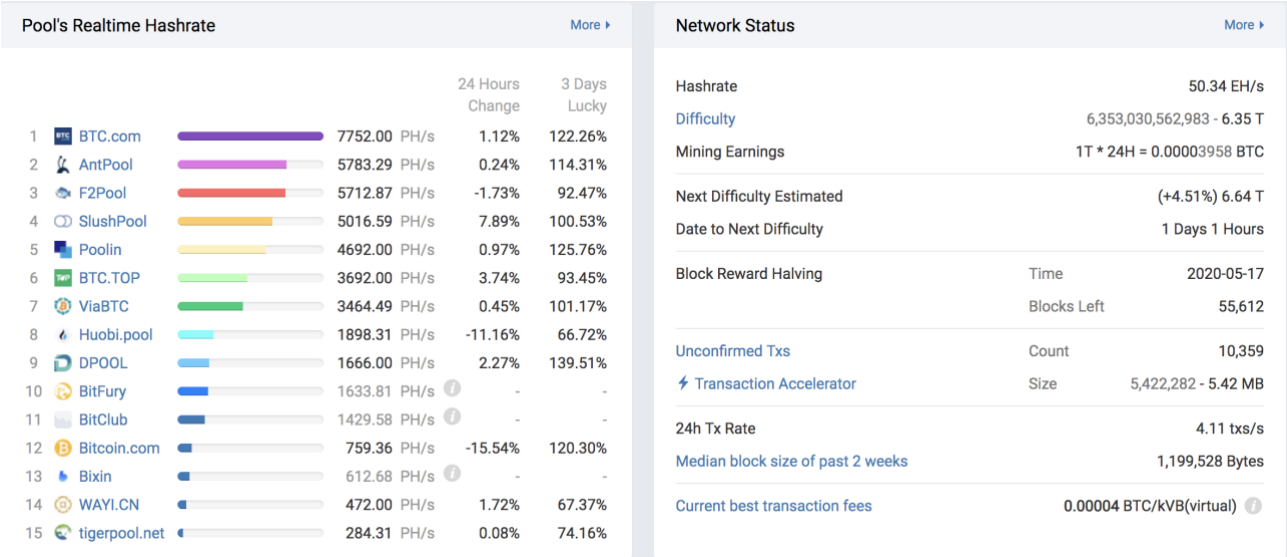
1.2.4 Entry barrier resulted from the centralization of HashRate

There's no trick for Bitcoin's POW consensus mechanism. SHA-256 algorithm has no alternative to Brute Force. This means that the computer should be constantly running, with a fan operating constantly to cool the overheated and overloaded processor.

And this is where the egalitarianism collapses, and mining pools with centralized HashRate begin to emerge.

At the beginning, cryptocurrency geeks could operate mining software on their home computers with standard CPUs. Afterwards, people began to be aware of that GPUs were better suited for hashing than older CPUs. After a few years, people began to customize FPGA chips, purchase kits and then customize them for mining. And then, people preferred ASICs (application-specific integrated circuits), which were customized according to Bitcoin algorithm, and deployed to the specific data center.

According to the statistics of block mining in the past year, the top five mining pools in the world have accounted for 62.6% of the HashRate of the whole network, and the top ten mining pools have accounted for 86.3% of the HashRate of the whole network. It is almost impossible for an individual to get the block reward.



Pool's Realtime Hashrate — More

			24 Hours Change	3 Days Lucky
1	BTC.com	7752.00 PH/s	1.12%	122.26%
2	AntPool	5783.29 PH/s	0.24%	114.31%
3	F2Pool	5712.87 PH/s	-1.73%	92.47%
4	SlushPool	5016.59 PH/s	7.89%	100.53%
5	Poolin	4692.00 PH/s	0.97%	125.76%
6	BTC.TOP	3692.00 PH/s	3.74%	93.45%
7	ViaBTC	3464.49 PH/s	0.45%	101.17%
8	Huobi.pool	1898.31 PH/s	-11.16%	66.72%
9	DPOOL	1666.00 PH/s	2.27%	139.51%
10	BitFury	1633.81 PH/s	-	-
11	BitClub	1429.58 PH/s	-	-
12	Bitcoin.com	759.36 PH/s	-15.54%	120.30%
13	Bixin	612.68 PH/s	-	-
14	WAYI.CN	472.00 PH/s	1.72%	67.37%
15	tigerpool.net	284.31 PH/s	0.08%	74.16%

Network Status — More

Hashrate		50.34 EH/s
Difficulty		6,353,030,562,983 - 6.35 T
Mining Earnings		1T * 24H = 0.00003958 BTC
Next Difficulty Estimated		(+4.51%) 6.64 T
Date to Next Difficulty		1 Days 1 Hours
Block Reward Halving	Time	2020-05-17
	Blocks Left	55,612
Unconfirmed Txs	Count	10,359
Transaction Accelerator	Size	5,422,282 - 5.42 MB
24h Tx Rate		4.11 txs/s
Median block size of past 2 weeks		1,199,528 Bytes
Current best transaction fees		0.00004 BTC/kVB(virtual)

Currently, only a small proportion of the global population own digital currencies, and more and more people are gradually accepting and understanding digital currencies. However, the high entry threshold of Bitcoin will keep these people out of digital currencies. We hope that the emergence of Volume Network will solve this problem.

1.2.5 Network centralization

In the Bitcoin blockchain, a decentralized network, HashRate is power.

In November, 2018, the bifurcated Bitcoin cash bifurcated again due to the disagreement of community opinions. According to the statistical data of Forl. Lol, BCH's overall hash value rose from 9.54% to 15.43% from November 10, 2018 to November 17, 2018; simultaneously, BTC's hash value dropped by 7% in those days, from 90.46% to 84.57%. The final result was that BitcoinABC, represented by Bitmain, won the victory. BitcoinABC held more than 51% of the HashRate of the whole network with the HashRate of 4000P of Bitcoin.com mining pool at the critical moment.

The HashRate war has shown that it will take just enough centralized HashRate and a little greed to manipulate the Bitcoin network. This is exactly the opposite of Nakamoto's original intention of peer-to-peer decentralization.

In the design of Volume Network, the consensus based on HDD capability will make the whole cryptogram consensus process more dispersed. Moreover, the HashRate of the whole system will be distributed in the hands of each miner more evenly in the absence of Asic.

1.3 What is Volume Network, and what are its advantages?

Volume Network is dedicated to building a large-scale cryptocurrency that can be applied in the real commercial society. We firmly believe that the real large scale is that everyone can participate in mining, and the total cost of network maintenance can be reduced as much as possible.

Therefore, we propose a more energy-saving and environmental friendly, safe and anti-Hacking cryptocurrency -- Volume Network with a low entry barrier, which can be truly applied in the commercial society on a large scale.

1.3.1 Ultra-low entry barrier

Unlike PoW mining, which requires expensive and dedicated ASIC rig or GPU, Volume Network mining can be achieved with an extra laptop and a USB- HDD. As long as you have one extra PC and terabytes of disk space to access the mining game, you can basically mine several VOL every day. Due to the very common redundancy in storage space, as well as the cheap hardware and less intense competition, more people can participate in PoST mining, which means the network is more dispersive and decentralized.

We believe that hard disk mining can really lower the entry barrier for mining, and fulfill the vision that every family has mining machine and everyone can participate in mining.

At present, the price of an ordinary hard disk with a capacity of 3T is about RMB 500 Yuan, and you can participate in the mining of Volume Network based on cryptogram consensus process with an ordinary PC, which is a very low barrier for people to understand and enter the field of digital currency for the first time.

1.3.2 Energy-saving and environmentally friendly

Hard disk is provided with many advantages, such as low power consumption, no heat generation, no heat dissipation, low noise, low purchasing threshold, and no incorporation into ASIC. Dozens of hard disks placed at the corner are enough, and you do not need to worry about the huge cost of electricity:

In the Volume Network, the average power consumption of mining with 5T hard disk is less than 7W. Bitcoin ASIC miner consumes about 1,350- 2,000W, while Volume Network requires only 70-90W, which is only 1/20 of the power consumption of bitcoin ASIC miner. An ASIC miner will consume about 17,520 KWH every year, while a hard disk miner will only consume about 700 KWH. The hard disk miner not only consumes very little electricity, but also produces very little noise and almost no heat compared with Bitcoin ASIC miner.

The hard risks with larger capacity will be required for the mining earnings in the future, and the used hard disks can be used to store movies and data, or used as the arrays of independent drives. Therefore, the residual value and preservation rate of hard disk is very high.

1.3.3 Safe and anti-Hacking

Proof of Time is an auxiliary mechanism of spatial “cultivation”. To be precise, Proof of Time is a Verifiable Delay Algorithm, which is a special Proof of Work. During the verification process, a certain period of time and a specific number of iterations is required. Each iteration can be accelerated, but parallel computation cannot be carried out across iterations. Meanwhile, it also is required to ensure that the operation results are verifiable and authoritative: if any two different nodes are verified, the computation results are consistent, and other nodes in the network can verify the results. In this mechanism, Volume Network can even set the computation result of Proof of Time in one block as the starting computation point of Proof of Space in the next block.

By virtue of the Proof of Time and Proof of Space, the generation of each block will take the Proof of Space as a starting point, and the Proof of Time as the ending point, and ensure a block is indeed a block (that is what we call the finalized), and the weight of each block are equal, then the attacker won't be able to rewrite the whole chain from a solitary block.

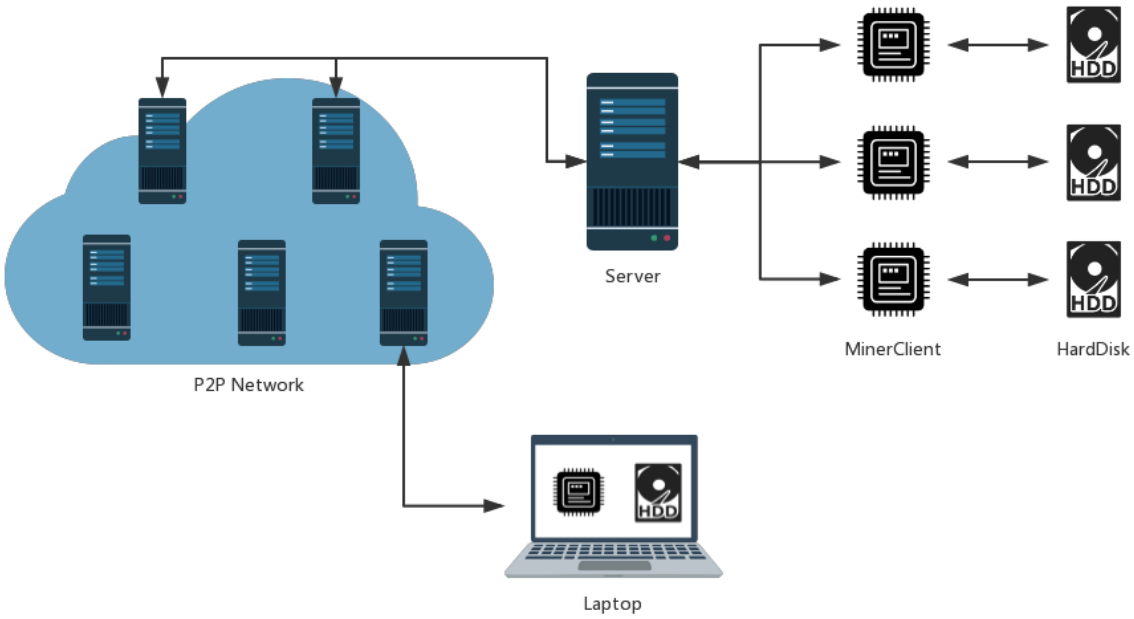
2. Technology solutions of Volume Network

PoST (Proof of Space and Time) is taken as the basis of consensus algorithm in the Volume Network.

2.1 Architecture of Volume Network

Before probing into the details of mining, it is necessary to understand the architecture of Volume Network first.

A PC or a mining pool is a mining node. Mining nodes need to be connected to at least one node in the Volume Network. Mining node needs to store the mining private keys. The miner client can be



started locally or connected to several other miner clients, and then connected to the hard disk through the client.

2.2 Consensus algorithm - Proof of Space and Time (PoST)

PoST (Proof of Space and Time) is to introduce the time-domain operator based on the original PoC(Proof of Capacity) algorithms, and compulsively require the miners to make arithmetical operation with certain time intensity after obtaining the candidate block data based on the characteristics of Verifiable Delay Functions, and make block selection by combining the rapid

verification results and candidate block data, so as to alleviate the vulnerabilities in similarly selfish mining, rewriting attack and other security aspects in POC (Proof of Capacity) algorithm.

PoST consensus algorithm can be divided into two parts: plot-based hard disk mapping algorithm and VDF-based proof of time.

According to the size of different hard drives, it will take days or even weeks to complete mapping. We use a very slow hash algorithm called Shabal for mapping. Because it is very slow to complete the computational process of Shabal hash algorithms, we must precompute and store them in hard disks, which is called hard disk mapping.

A large number of pre-computed Nonces created during the mapping process will occupy the hard-disk space. The larger the hard disk space allocated to mapping, the more Nonces you can store. The more Nonces you can store, the larger probability for you to successfully mine.

When a Plot file is generated, it is essential to provide a Volume Network account. Because each account is different, even if the numbers of Nonce are the same, each miner's Plot file is different.

Meanwhile, we also designed a VDF-based Proof of Time algorithm, in which the probability of the network choosing a miner to create a new block is in direct proportion to the relationship between the current miner's storage capacity (S) and the whole network capacity (A). We designed the algorithm, so that the miners had to provide storage and computation to prove that a consensus could be reached after the data was stored.

2.3 Key technologies

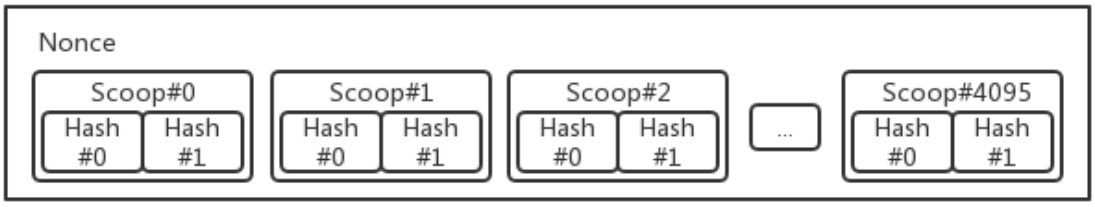
1. Plot-based hard disk mapping algorithm
The miner will firstly generate a Plot file based on their public keys and Shabal algorithm, which is known as a P drive mapping. The larger the hard disk capacity is, the more the Hash values will be filled in the Plot file, and the higher the probability of mining block will be.

2. VDF-based Proof of Time algorithm
After informed of the transactions received by the wallet, the miner will form a block, and look for the best-matched Nonce in the hard drive based on the hash value of this block, and convert the

Nonce to Deadline. The miner is required to perform mathematical operation with certain time intensity on the Nonce, so as to obtain the VDF proof, and broadcast the block and VDF proof.

Below we introduce the technical details of hard disk mapping algorithm, and VDF Proof of Time algorithm.

2.3.1 Plot-based hard disk mapping algorithm



The pre-computed Hash data stored in the hard disk is called Plot file. P drive mapping is the process of generating Plot file in the hard drive. The 256-bit Shabal algorithm is adopted in Volume Network, which is a time-consuming Hash function, and an algorithm to resist ASIC. This algorithm is more suitable for PoST consensus.

Plot file consists of a large number of Nonce files. The size of each Nonce is 256K. Each Nonce has a unique number, from 0 to 18446744073709551615. Each Nonce is divided into 4,096 segments, and each segment is called a Scoop. Each Scoop includes 64 bytes and two Hash values.

In order to create nonce, we first create the first seed, which contains Plotter ID and nonce number, and then generate the first hash value by using the shabal256 function as Scoop#4095Hash#1.

Then, Scoop#4095Hash#1 is attached to the start seed as the seed for the next round of shabal256 computation.

Then attach Scoop#4095Hash#0 and Scoop#4095Hash#1 to the starting seed as the seeds for the next round of shabal256 computation. In turn, FinalHash value will be generated:

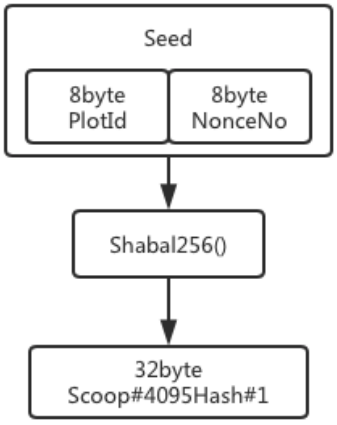
Use FinalHash or any other Hash and store in the Plot file.

2.3.2 VDF-based Proof of Time algorithm

Base target is calculated from the nearest 24 blocks. Base target is used to adjust the difficulty in mining. The lower the Base target, the harder to mine. Because of the adjustment of difficulty, Volume Network can guarantee to generate a block every four minutes or so.

If you mine in a mining pool, the awarding is involved, which, in fact, is to tell the Volume Network: 1) all your earnings are distributed to the pool. 2) The pool can use the Deadline found in your Plot file, and generate the block signature.

Before mining, the miner is required to staking a certain number of coins to get mining qualification. The miner should send the transaction of staking coins to the whole network, and the whole



network nodes will record the staking information in the local block after receiving the transaction of staking coins.

The first thing of mining is that the miner asks the wallet about the mining information: block packaging signature, base target, and height of the next block. The wallet is responsible for the

block packaging signature and the height of the next block, which can be used by the miner to generate Generation Hash based on Shabal256 algorithm.

Then, Scoop numerical value can be obtained through modular arithmetic (4096).

All Scoop numbered with the above results are read from the Plot file. For each Scoop, the upper block signature is merged and then processed by Shabal256 to obtain Target. Target is divided by the Base Target to get an 8-byte Deadline. The miner shall check whether the Deadline is low enough, which can be used as the alternate block data if low enough.

Input the Deadline into the Verifiable Delay Function (VDF) and perform VDF calculation with a certain percentage of time from the current time to the Deadline, so as to obtain at least L evidence chains and the final calculation result R, where (T, L, R) are publicly verifiable.

The miner can calculate whether it meets the block requirements according to (T, L, R). If it meets the formula requirements, and no one else has mined the block before you after the Deadline for the mining of the last block, you can mine the block and get an award.

The miner shall submit information to the wallet: account ID and Nonce numerical value. If you are an independent miner, you also need to provide the key. If it is a pool, the pool key should be used. After receiving the Deadline information submitted by the miner, the wallet will create the corresponding Nonce to verify the VDF and Deadline. If VDF verification is successful, the wallet will check whether the current system time meets the Deadline, and continue to wait if the current system time is before the Deadline. If another wallet generates a valid block that meets the Deadline when the miner is waiting, it is necessary to discard the block (since the block is no longer valid). If two or more miners submit the Deadline, the wallet will choose the earliest Deadline. When the Deadline is met, the wallet will start generating and broadcasting the block.

The wallet will check each transaction packaged into a block, for example, whether the transaction signature is correct, whether the time is correct, and so on. The wallet will calculate all the amounts and fees for the block. The block will only record the transaction ID and Sha256 information of all transaction information.

After receiving the block, the wallets of other nodes will verify the block transactions one by one and reward the miners. When calculating the reward, the wallet will first retrieve the staking

information in the local block, and gets the full reward if the miner's staking coins meet the staking conditions defined in the economic model.

3. Token-economy model

Block chain platform is essentially a fair value circulation market, so the cost basis of all economic behaviors lies in the transaction cost, VOL coin is the carrier of transaction cost, which will be used for the following incentive purposes from this perspective:

1. Rewards for bookkeeping (mining);
2. In the consensus, the token holding of VOL will affect the weight of individual cases (i.e. node block selection);
3. The participants of Volume Network ecosystem will promote the rewards of ecological progress in underlying code development, peripheral tool/service supply, propaganda of ecological influence, and implementation of application scene and other aspects.

3.1 Token distribution

Volume Network(VOL) Token model:

1. Total supply: 10 billion VOL
2. Block reward: 4000 VOL per block
3. Premine: 3%VOL will be premined to IEO and the rest 97%VOL will be mined normally
4. Miners: 9.1 billion VOL of block reward is rewarded to miners, which is 3752.5 VOL/block
5. VOL Ecosystem: 600 million VOL of block reward (247.5 VOL/block) will be rewarded to VOL Ecosystem, including core code upgrade contributor, mining pool service provider, mining machine service provider, promotion team and following participants

3.2 Calculation of miner’s earning

According to the PoST consensus mechanism, the HashRate of each miner is determined by the available hard disk storage space, and the earning is determined by the success rate of block mining and the current block earning:

Assuming that miner A has A 10T hard disk, and that there are 10P in the whole network at this time, and that the CPU of miner A is at the average level, the probability of miner A successfully mining block is 0.1%.

At the current stage, the block award is 4,000VOL, with one block mined every 4 minutes, and 360 blocks per day.

The average earning of miner A is 3600*4000*0.1%=1440 VOL/day

3.3 Increase in mining for staking

Staking bonus will be added to PoST consensus mechanism. Additional mining rate will be given according to miners' staked VOL token. The total amount of staked VOL will extremely approach to 100% amount of VOL total supply. With the increasing of miner staking, the bonus of per unit will decrease. The calculation formula is as below:

$$f(x) = \begin{cases} x & x \in [0, 1) \\ \frac{199}{999} * x + \frac{800}{999} & x \in [1, 1000) \\ \frac{1}{60} * x + \frac{550}{3} & x \in [1000, 10000) \\ \frac{1}{853800} * x + \frac{1494100}{4260} & x \in [10000, +\infty) \end{cases}$$

4. Roadmap

March, 2019: the establishment of core contributor team, as well as the technical route and economic model survey of Volume Network project has been completed.

April, 2019: The project is officially launched, and the white paper is completed.

Q2 of 2019: the Testnet of Volume Network will be launched, so that the miners can access the main network in advance to prepare for mining.

Q3 of 2019: the Genesis block of Volume Network will be mined, thus kicking off an innovative mining journey.

Q4 of 2019:
1. Staking function is added in PoST consensus mechanism.

2. The mining pool is added with anti-cheating detection function.

Q1 of 2020: the open source of GitHub code is achieved, and VDF algorithm is introduced in PoST consensus mechanism.

Q2-Q3 of 2020: the users will be supported to make dynamic switch between Lambda Network and Volume Network, and store files and mine in Volume Network simultaneously.

V. Core team

Lucien Chen:

Founder of Volume Network. As the former CTO and first employee of TRON, Lucien Chen successfully led the realization of TRON Public Chain and the implementation of applied ecology. Lucien Chen successively worked for the first-tier Internet enterprises, such as Netease Youdao, Tencent, Qihoo 360, Alibaba and etc. He has accumulated a wealth of experience in AI (artificial intelligence), Recommended System, Distributed System and etc., as well as High-concurrency system framework design; moreover, he is provided with the development capability in Billion-level system architecture, and extensive practical experience in team management, strategic planning, overall business planning and so on; meanwhile, Lucien Chen was also one of the early supporters and investors of Bitcoin except for his profound attainments in cryptography.

Adolph Sun:

Product designer of Volume Network, former senior product manager of TRON, and the first product manager of OneCloud. Adolph Sun successively took charge of Wallet, Tronscan, App Store, Developer Tools and other projects in TRON. When working for Xunlei, he deeply participated in the approval and initiation of OneCloud project, assisted in the combination of distributed storage network and blockchain, and participated in the mechanism design of WKC (later renamed as LinkToken). He has well known the mainstream public chain mechanism and technical protocols, and owned rich experience and profound understanding of system design, such as system model and economic model, etc.

Jc:

Project manager of Volume Network, director of DApp, TRXMarket of former TRON. Jc was responsible for the overall planning of DApp ecology of TRON, and successfully built the first DApp with a transaction volume of ten million for TRON. He led and completed the closed R&D of

TRXMarket from 0 to 1, which was the first decentralized exchange of TRON. He is provided with strong coordination ability, communication ability and resource integration ability. In addition, he was also deeply involved in the solution design of multiple blockchain projects, as well as the implementation of miner projects.

Sasaxie
Blockchain engineer of Volume Network, the second employee and former core developer of TRON. Sasaxie entirely participated in the development of TRON code open source, test network and major network in TRON, thus accumulating rich experience in the development of block chain architecture, block chain monitoring and block chain stress test, etc. As a server-side development engineer of LETV, Sasa xie also built the video live broadcast business platform architecture. In addition, he also has the ability to develop back-end system architecture of ten-million-level user software, and rich experience in high concurrency and micro services, etc.

Lambda core development team:
As the initial code contribution team of Volume Network, and core development team of Lambda, they led the development and ecological implementation of Lambda project. Lambda is a safe, reliable, and infinitely extendible decentralized storage network, which is a benchmarking project for Filecoin. The core R&D team members of Lambda were all from OneAPM. At the peak period, OneAPM SaaS system was required to process over 100 billion pieces of data every day. In order to meet such business demand, Lambda team members began to create distributed and highly available database software based on open source community. Along the way, the Apache foundation, the Akka community, the Druid community, and the ClickHouse team helped shape the current Lambda project.

VI. References

[1]https://people.xiph.org/~greg/confidential_values.txt
[2]https://bitcointalk.org/index.php?topic=279249.0
[3] https://cryptonote.org/whitepaper.pdf
[4]https://eprint.iacr.org/2015/1098.pdf
[5]https://download.wpsoftware.net/bitcoin/wizardry/horasyuanmouton-owas.pdf
[6]http://blockstream.com/sidechains.pdf
[7]http://fr.harrypotter.wikia.com/wiki/Sortilège_de_Langue_de_Plomb

[8]https://bitcointalk.org/index.php?topic=281848.0

[9]https://download.wpsoftware.net/bitcoin/wizardry/mimblewimble.txt

[10] SpaceMint: A Cryptocurrency Based on Proofs of Space
Sunoo Park, Albert Kwon, Joel Alwen, Georg Fuchsbauer, Peter Gazi, Krzysztof Pietrzak

[11] Proofs of Space

Stefan Dziembowski, Sebastian Faust, Vladimir Kolmogorov, and Krzysztof Pietrzak

[12] Synchronous Byzantine Agreement with Expected O(1) Rounds, Expected

O(n2)Communication, and Optimal Resilience

[13] HOP: Hardware makes Obfuscation Practical

[14] Proof of Space from Stacked Expanders

Ling Ren, Srinivas Devadas