WHITE PAPER

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Executive Summary

The cryptocurrency market is going though one of its most difficult stages so far. Ethereum and Bitcoin prices keep falling, transaction processing times remain low, mining rewards are falling, and suggested solutions for the issues of scaling and energy inefficiency are still far from implementation.

These developments go against the established expectation that the economy is about to undergo a fundamental shift, becoming more decentralized. Blockchain enthusiasts have long hoped to see – and help build – a world where cross-border transactions are instantaneous and free, where individuals can conduct their business without the interference of banks and other authorities, and where deals will not depend on trust between parties. All this should be possible with blockchain – but can these advantages be realized in the light of current problems?

Ethereum Classic Vision is a new cryptocurrency that intends to bridge this divide of expectations and reality. A hard fork of Ethereum, it will leverage most advanced solutions proposed for the world's second-largest digital currency, at the same time preserving the ideal of decentralization. The project will combine such technologies as sharding, P2P asset exchange, dApp development tools, and decentralized file storage using IPFS. Starting out as a PoW-based system, it will later offer stable rewards to transaction validators thanks to the implementation of Proof-of-Stake, at the same time creating an optimal environment for deploying new assets.

The present White Paper provides a description of both the challenges facing Ethereum and the technical features of Ethereum Classic Vision that will help the project meet these challenges. Further, the document outlines the upcoming hard fork, including a snapshot of the Ethereum network that will allow all ETH holders to claim free ETCV coins.

1. Ethereum: current challenges and potential solutions

1.1. Ongoing crisis of the Ethereum network

Ethereum Classic Vision is an upcoming hard fork of Ethereum – a new cryptocurrency that proposes bold and efficient answers to the crisis in the blockchain industry. Ethereum – the world's leading platform for development and deployment of blockchain applications – currently finds itself in a deep crisis. Numerous solutions are proposed, yet none of them have been implemented so far – and the present course of Ethereum leadership does not instil much optimism for the future. Fixing existing problems will take years, and the solutions themselves can lead to even bigger issues down the line. The following list describes only some of the major difficulties that have to be resolved if the Ethereum community is to move forward:

1) Scaling. Ethereum currently processes only 15 transactions per second, and long backlogs of transactions often form in the network. Since the Ethereum blockchain can only process one payment at a time, its total capacity is only as large as that of each computer in the network. Increasing the number of nodes cannot solve the issue, and as the number of transactions increases, processing times will increase and gas fees will rise. The solution is to switch from the Proof-of-Work consensus algorithm to Proof-of-Stake (see below), but the transition is constantly being delayed, and there is no indication of when it will happen.

2) Difficulty bomb. A special piece of code has been introduced into Ethereum, making it progressively more difficult and less efficient to produce new blocks. Eventually it will become so inefficient and unprofitable that miners will abandon Ethereum and switch to other cryptocurrencies. At this point all operations within the Ethereum network will cease (this is known as the Ethereum ice age). The purpose of the difficulty bomb is to stimulate the transition to PoS; however, seeing as developers cannot reach an agreement on when and how to execute the switch, the "ice age" is becoming an ever more probable scenario.

3) Declining rewards. Miners' rewards have been in decline for the past year due to rising complexity, a slump in cryptocurrency prices, and excessive control acquired by large mining pools. The leadership team of Ethereum has made the situation even worse: in an

attempt to make the network more efficient and win some time for the transition to PoS, they made the decision to decrease block rewards to 2 ETH, provoking the anger of most miners.

4) Centralization. It is now clear that Ethereum has failed its purpose as a truly decentralized network. The control exercised by the Ethereum Foundation and its disregard for the opinion of the community, as well as – perhaps most disturbingly – the growing concentration of mining resources in the hands of ASIC producers (up to 70% of the hashrate is controlled by just four or five pools) – testify to the fact that centralization in the Ethereum network is growing.

5) Rental storage fees. Vitalik Buterin recently stated that Ethereum will introduce fees for hosting smart contracts on Ethereum. At present, there is only a one-time deployment fee; however, in the near future developers will have to keep paying for their dApps to stay online.

1.2. Proof-of-Stake consensus algorithm: advantages

Proof-of-Work remains the main consensus protocol utilized in the cryptocurrency space, mainly due to the fact that it is used by the two largest blockchains – Bitcoin and Ethereum. Yet, PoW is highly inefficient and lies at the root of many problems faced by these distributed networks. At the same time, switching from PoW to Proof-of-Stake is a complex undertaking that requires significant resources and careful balancing.

Ethereum Classic Vision is built as an advanced, fast, easy-to-scale, and highly decentralized system, and Proof-of-Stake clearly does not correspond to these objectives. Thus, after an initial period when the platform will use PoW, a switch to PoS will be carried out. Unlike Ethereum, which will most probably go through a lengthy partial testing stage (with one block out of 100 validated using PoS), Ethereum Classic Vision will execute a more decisive and confident transition. We firmly believe that introducing a revolutionary upgrade in a highly limited form can only destabilize the network, prolong discussions, create discord and ultimately make a full switch impossible.

The Proof-of-Stake concept is based on users staking a significant number of coins ("freezing" them, as it were, so that they cannot be spent) in order to be chosen as block

validators, for which they get a reward. This consensus algorithm has a number of important advantages over Proof-of-Work:

1. Energy efficiency. PoW-based blockchains are notoriously inefficient when it comes to electricity. Bitcoin mining alone consumes 0.33% of the global energy usage - more than the whole country of Denmark (or any of other 150 countries, including most states of Africa). Electricity spent on just one BTC transaction could power an average household for a whole month. This inefficiency is caused by the fact that all validators (miners) in a PoW network work on solving each block simultaneously, looking for a solution to a cryptographic puzzle that changes every few seconds. By contrast, running a PoS node does not require much energy: it can be done using any computer or even mobile device.

2. Fair distribution of rewards. Proof-of-Stake networks do not have block rewards – they offer only transaction fees to validators. While these are naturally lower than the standard block reward in ETH or BTC, the resulting long-term profits are comparable to those obtained with PoW, since operational costs are so low. As a result, even a user with a basic $40 Raspberry Pi computer can become a validator, as long as he or she stakes enough coins (which will come out much cheaper than buying a mining rig). All users are put in equal conditions when earning rewards with a PoS system like Ethereum Classic Vision.

3. Decentralization. Even if Bitcoin and Ethereum claim to be decentralized, they are not. The creation of new coins in itself is ever more concentrated in the hands of large mining pools (according to some data, 51% of the Bitcoin hashrate is already controlled by pools, with over 40% owned by Bitmain alone)[1]. Independent miners without access to economy of scale have all but lost hope to compete with large rights. Naturally, this is very far from the ideal of decentralization and equality. PoS systems are just the opposite: there are no mining farms, no economy of scale, and even staking more coins than anyone else will never allow one validator to take over.

4. Security. It is often stated that PoW is safer than PoW, since it would require a successful attack on 51% of all nodes to hack a blockchain, which seems impossible (or at least economically unjustified). However, one needs to keep in mind that for small

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[1]

https://www.ccn.com/bitmains-mining-pools-now-control-nearly-51-percent-of-the-bitcoin-hashrate/

projects that have only just launched 51% of all nodes can be a small number. In fact, it can cost less than a thousand dollars to hack a smaller blockchain network (which was amply demonstrated by the 51% attack on Bitcoin Gold, when $18 million was stolen)[2]. In this context, PoS offers equal security to projects of all sizes, since block validators lose their deposits if they break the rules or act maliciously.

5. Stability

The price of PoS-based cryptocurrencies, including Ethereum Classic Vision, will remain more stable in the long run and exhibit a steady growth rather than uncontrolled volatility that can be seen with Bitcoin. Indeed, validators have no motivation to sell their ETCV coins, since they would lose their stake and the right to validate transactions. By holding coins one earns more than by speculating with them on an exchange.

PoS does have its challenges - for example, staked coins have to be stored in a secure offline location, which can lead to the emergence of powerful centralized cold storage "vaults" that can become points of failure. Moreover, miner rewards with PoS may not be as high as they were in the best periods of PoW mining. However, the benefits of PoS for the crypto community and for the environment easily outweigh these issues.

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[2] http://fortune.com/2018/05/29/bitcoin-gold-hack/

2. Technical features of the project

Ethereum Classic Vision aims to resolve the major issues facing Ethereum, including scaling, mining inefficiency, and high costs of data storage. The transition to Proof-of-Stake, described in Chapter 1, constitutes the key element of this plan, but a number of additional modules and features will also play an important role. This section introduces the solutions proposed by Ethereum Classic Vision, their advantages, and implementation plan.

2.1. VisionDEX – a decentralized exchange

Ethereum Classic Vision follows the principles of true decentralization and independence promoted by Ethereum Classic and lost in Ethereum as we know it today. Therefore, one of the founding team's priorities is to provide Ethereum Classic Vision users with a way to conduct market operations without relying on centralized exchanges. Integrating a decentralized P2P cryptocurrency exchange – named VisionDEX – will ensure that Ethereum Classic Vision holders will retain full control over their assets and will not lose them to hackers as it happened at such exchanges as Coincheck ($500 million stolen), Coinrail ($40 million) and even the supposedly decentralized (and actually hybrid) Bancor ($23 million). A P2P exchange like VisionDEX also protects its users from closure by the authorities (as happened to numerous centralized exchanges in China and Korea), bankruptcy, and malicious or incompetent actions of the organizers.

At VisonDEX, all major functions – asset exchange, order matching and handling order books – will be carried out using smart contracts. In particular, a smart contract will function as a trustless multisig escrow, holding the currency sent by the buyer until the matching amount in the other currency is received from the seller.

The exchange will be built on the principle of currency neutrality: it will allow users to store not only ETCV, but also also ETH, ETC, ERC20 tokens, BTC, BCH, XLM, and others. All digital assets created using the Ethereum Classic Vision dApp platform (see blow) can also be listed on the exchange and made available to buyers even prior to a project's launch. This means that VisionDEX can be used as a fundraising platform for blockchain startups and to conduct initial token offerings. Anonymous trading will be available. Since VisionDEX will be hosted by multiple nodes across the Ethereum

Classic Vision network, its downtime can be expected to be close to zero. Liquidity will be provided by a combination of private and public reserves.

Absence of a third-party authenticator will allow to keep transaction fees on VisionDEX at a very low level. However, it will also mean that the underlying smart contract will need to be heavily audited prior to launch to exclude the risks of redundancy attacks, overflows, underflows, and other vulnerabilities. The audit will be conducted by one of the leading specialized companies and is scheduled for April-May 2019.

In the second implementation stage, we plan to introduce a range of market tools that are presently absent from most existing decentralized exchanges, including margin trading, stop-loss limits, limit order, and trades in derivatives, such as cryptocurrency futures. Latency times will be decreased to provide opportunities for high-frequency trading. This second stage is preliminarily planned for Q2 2020.

2.2. Platform for decentralized application development

While a vast majority of new dApps are developed within the Ethereum framework, it is far from the most efficient solution due to the problems described in section 1. A constantly growing number of dApps (most of which fail to achieve adoption and remain in the system as dead weight) creates congestion, and the whole system is subject to unpredictable changes imposed by the centralized leadership of Ethereum.

To provide an alternative environment for blockchain startups, Ethereum Classic Vision will introduce its own subplatform for developing new decentralized applications, with a range of tools, including a sidechain development kit and a vast database of pre-made smart contracts, plug-and-play applications, and modules created by the Ethereum Classic Vision community and provided both for free and for a fee in ETCV. The Ethereum Classic Vision dApp platform will feature both back-end and front-end development tools, allowing users to build a complete application with an attractive UI and added native apps for Android and iOS without recurring to third-party services. There will be no smart contract storage rental fee, only a one-time deployment fee. However, the Ethereum Classic Vision community will hold regular votes to place unused smart contracts in the sleep mode to free up resources. An app can be "woken up" from such sleep by a one-time payment of an additional fee. This will address an issue plaguing

Ethereum: a large number of applications are eventually abandoned due to lack of interest or funding but are never removed from the network.

The platform will support Ethereum Virtual Machine and Solidity; however, it is important to note that developers working in the Ethereum Classic Vision environment can also use other established languages, such as JavaScript, and new languages, including Vyper and Red. It will be possible to migrate existing dApps from Ethereum and Ethereum Classic to Ethereum Classic Vision with relative ease. Both fungible and non-fungible coins and tokens can be created on the Ethereum Classic Vision dApp platform, and each new asset can be immediately added to the VisionDex P2P exchange (see below).

In the second implementation stage, we plan to introduce a comprehensive set of features aimed at users will limited or no programming skills in accordance with the principles of the zero-code movement. Even non-tech startup founders will be able to compose their own prototype or MVP with a functioning blockchain using drag-and-drop elements. The second stage will also introduce sidechains for hosting individual dApps, which will ensure that potential vulnerabilities of new applications will not cause stability issues for Ethereum Classic Vision. Support for mobile smart contracts will also be introduced. Finally, we plan to add the option of migrating dApps from virtual machines other than EVM, including EOS, NEO, and Lisk.

2.3. Sharding

Scaling is perhaps the most urgent challenge faced by blockchains. With all their advantages – decentralization, immutability of records, low fees, etc. - the inability of networks like Ethereum to scale threatens their entire future development. Indeed, while Visa processes 24 thousand transactions per second, Ethereum can currently process only 25. This creates a long backlog of transactions awaiting confirmation and can at times stall the whole system, as it happened in December 2017 at the height of the Cryptokitties craze. The scaling problem is not an unexpected development – it is a logical consequence of the very structure of the network.

An ideal blockchain system should have three properties: security, scaling, and decentralization. In reality, networks normally have only two of these: for instance, Ethereum Classic is properly decentralized and secure, but it doesn't scale. By contrast,

Cardano is both fast (that is, it scales well) and secure, but it is centralized. As explained above, slow speeds on Ethereum are caused by the consensus algorithm, which requires the majority of nodes in the network to approve each transaction. This has to be done in sequence – one operation after another, meaning that transactions cannot be parallelized. While switching to PoS will already put Ethereum Classic Vision in a good position to solve the scaling problem, additional measures will need to be take to make the network as fast as necessary to satisfy the needs of future growth.

The best solution proposed so far – and the one that Ethereum Classic Vision will implement – is sharding. The concept is already widely used in databases and is expected to become the new standard for cryptocurrency network in the next two years. In this model, the entire network state is divided into a number of fragments, or shards, each of which has a decentralized structure. Since each node only processes information related to its shard and does need to occupy itself with the transactions happening on other shards (except for cross-shard operations – see below), processing of payments is effectively parallelized, with the capacity increased manifold. Each shard also has its own set of validators, all of whom have to stake enough coins to be included in the validator pool (see section 2.1. - PoS).

To implement sharding, Ethereum Classic Vision will introduce a special beacon sidechain that will function as a source of pseudorandomness when selecting validators for each shard. A sharded system is more vulnerable to attacks, since it potentially takes only 1/n of the hashrate (where n is the number of shards in the system) to compromise a whole shard. The key to protecting the Ethereum Classic Vision network against such attacks is to ensure that validators are selected pseudorandomly (that is, the selection process for all shards has a common source of randomness) and that they cannot know in advance which shard they will be assigned to. The beacon chain will also contain information about the current state of each shard, acting as a connecting link between them, though the sidechain by itself forms a separate Merkle tree and does not act as a part of the Ethereum Classic Vision blockchain.

When an ETCV payment is sent by a user on one shard to somebody on another shard, a system of Vision Receipts will be used to process them. An initial transaction sent to Shard 1 reduces the Ethereum Classic Vision balance of User A (sender) and creates a receipt, which is stored separately from the main state; a second transaction, which

includes the receipt, is sent to Shard 2, where the receipt is checked; finally, the balance of User B (recipient) is increased accordingly.

We expect that the introduction of sharding will allow to increase the capacity of Ethereum Classic Vision to 10 000 tps in the first implementation stage with 100 shards in the system. We expect to launch the beacon chain and begin sharding in the testnet by August-September 2019. In the second phase (scheduled for early 2020), we expect to introduce a dynamic growth of the number of shards.

2.4. IPFS data storage integration

For all dApps and blockchain platforms that must store large volumes of data, the file storage challenge becomes just as important as the scaling challenge. Indeed, projects in fields as varied as medical care, insurance, design, coding, and social networking rely on heavily on files created by users – mages, code repositories, videos, technical manuals, etc. However, blockchains themselves cannot be used to store such items – they simply were not designed for the purpose. Standard blockchain transactions are cheap because the amount of data transmitted is limited to several bytes. Any attempt to store larger files on a blockchain would push transaction fees beyond a reasonable limit – for instance, it would cost thousands of dollars to cost 1 GB of data.

For this reason, any blockchain project that requires data storage presently has to use centralized servers to store files, which goes against the concept of decentralization and creates single points of failure for the whole system. Luckily, new, far more decentralized solutions already exist and will be implemented by Ethereum Classic Vision as part of its plan to become a major platform for dApp development.

Decentralized data storage implies renting out one's unused hard drive space. All kinds of users can be included in such a network – from owners of average laptops and home computers to mining farms seeking to compensate for falling profits. The leading solution in the market is IPFS, or Interplanetary File System, which is fully decentralized, operational, and already connects many thousands of users.

IPFS has a lot in common with the more advanced blockchains, though it uses a very different technology. Each large file stored in the system is sharded, with each shard

receiving its unique cryptographic hash (just like a transaction on a blockchain). All hashes are stored in a table, which is updated automatically whenever a new file enters the system. Each shard of each file is stored in numerous copies by multiple users, making sure that it remains available even when some users are offline. For storage of proprietary and confidential data, standard cryptographic mechanisms can be used (both symmetric, such as SHA-256 hashes, and asymmetric – taking into account possible threats presented by the advance of quantum computers to asymmetric cryptography as a whole).

It is important to note that IPFS itself is not a project or platform – it is an underlying protocol that can be easily integrated with any other system, including Ethereum Classic Vision. Our implementation of a decentralized data storage module will introduce monetary rewards for storing files (paid in ETCV coins). Prices for storage will be low compared to traditional cloud storage solutions like Amazon and Azure (and below the pricing levels of other decentralized storage platforms like Storj), while download speeds will be high enough even for such resource-hungry applications as design and rendering platforms.

Storage fees will contribute the necessary revenue to promote further development of the Ethereum Classic Vision network in its more advanced stages, including research into superquadratic sharding, second-layer payment protocols, and hardware-driven consensus protocols.

According to the Ethereum Classic Vision implementation plan, the introduction of our Vision Storage module will closely follow the launch of the dApp platform and is scheduled for July-August 2019. Full integration of the storage module and rewards system is expected in late 2019.

3. Project implementation

The section describes the major steps in the process of implementing Ethereum Classic Vision and its modules, starting from the snapshot of the Ethereum network. A detailed roadmap is provided, listing both development stages and a promotional campaign.

3.1. ETH network snapshot and distribution

The initial distribution of free Ethereum Classic Vision coins will take place after a snapshot of the ETH network, which is scheduled for January 11, 2019 (20:00 GMT). Taking a network snapshot constitutes a standard practice for cryptocurrency hard forks and produces a list of all blockchain addresses containing a certain coin or token.

Any user who is found to hold Ethereum coins in their private wallet at the moment of the snapshot will receive free Ethereum Classic Vision coins at a 3:1 ratio. For example, a user who holds 100 ETH in a private wallet (such as Coinomi, Jaxx, or Ledger Nano) will be able to claim 300 ETCV for free. It is crucial to stress that only ETH stored in personal wallets (desktop, mobile, or cold storage) are eligible for free ETCV after the hard fork. Users who hold their ETH in exchange wallets cannot claim the reward.

Once the snapshot is completed, ETH holders will be able to dispose of their coins as they wish, including transferring them to an exchange, selling them, or exchanging them. The amount of free ETCV airdropped to ETH holders depends only on how many coins they own at the moment of the snapshot – not before or after it.

3.2. Project Roadmap

Q3-4 2018 ETH hard fork ideation & development; formation of the team; negotiation with and signing up first advisors

Jan 11, 2019 Snapshot of the ETH network & distribution of Ethereum Classic Vision coins

Q1 2019 Introduction of the dApps platform (initially with new dApps residing on the mainchain and support for migration from Ethereum and Ethereum Classic virtual machines); establishment of key technological partnerships; listing Ethereum Classic Vision at a number of major digital exchanges; testing the P2P exchange module

VisionDEX; security audit of VisionDEX smart contracts; expanding the team and adding more developers; launch of a large-scale marketing campaign.

Q2 2019 Implementation of the P2P decentralized exchange module; onboarding of an advisory board specializing in sharding and decentralized storage technology; work on the sharding protocol; development of the decentralized storage system based on IPFS; testing the PoS consensus protocol; roadshow covering major coding events and hackathons in Europe and Asia.

Q3 2019 Switch to the PoS consensus protocol; integration of the dApp platform with VisionDEX; Sharding implementation; testing of the file storage module and the associated rewards system; attracting advisors from the field of the zero-code movement.

Q4 2019 IPFS integration with rewards for storage space providers, launch of a marketing campaign for the storage system; establishing partnerships with blockchain foundations in North America and East Asia; expanding the number of digital exchanges where Ethereum Classic Vision is listed.

Q1 Beta testing of additional features for VisionDEX (margin lending, limit orders, etc.)

Q2 2020 Integration of new exchange features: stop-loss, limit orders, margin trading; implementation of a Sidechain Development Kit for the dApp platform

Q3 2020 Implementation of cryptocurrency derivatives trading; introduction of a migration tool for dApps developed outside of EVM (NEO, EOS, Lisk, Stratis)

Q4 2020 Integration of a zero-code, drag-and-drop dApp development module

3.3. Concluding comments

The main objective of Ethereum Classic Vision is to create a truly decentralized, trustless economy that can serve as a base for a wider adoption of cryptocurrency payments and real-life applications of blockchain. To make this a reality, we will combine the integrity and commitment to decentralization that is characteristic of Ethereum Classic with the power and variety of technological solutions developed for Ethereum. With its decentralized exchange, platform for dApps, and upcoming decentralized file storage and sharding features, Ethereum Classic Vision will be a fast, secure, cheap, and user-friendly environment. The implementation of a Proof-of-Stake consensus protocol will ensure

energy efficiency, equal level of security for projects of all sizes and at all stages of development, and fair distribution of mining rewards.

ETCV coins will be distributed for free among ETH holders after a network snapshot on January 11, 2019. In the following several months, ETCV will be listed at a number of large cryptocurrency exchanges (the project team is currently conducting negotiations with several of them) and launch its dApp development framework, where blockchain startups will be able to create and deploy new services, adding their assets to a specially build P2P exchange – Vision DEX.

The team of Ethereum Classic Vision firmly believes that the current problems of Ethereum cannot be resolved in the short term. Recent protracted discussions on the switch to PoS and implementation of sharding and second-layer payment protocols (like Plasma and Raiden), which are not accompanied by any concrete actions, demonstrate that the expected evolution of Ethereum will take years. As the ETH network becomes slower and more congested and consumption of electricity by the mining industry keeps growing rapidly, faster and more decisive measures need to be taken to produce real change. Ethereum Classic Vision presents a model of such change – a versatile environment that looks decisively forward and looks to efficiently balance decentralization, scaling, and security.