



electric cash

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Table of Contents

1. Introduction	4
1.1. Problem statement and solution approach	4
2. Electric Cash infrastructure	5
2.1. Fast transactions layer	5
2.2. Free transactions	6
2.3. Block reduction and rewards strategy	7
2.4. Development Treasury	8
3. Electric Cash ecosystem	9
3.1. Staking	10
3.1.1. Staking process	10
3.1.2. Staking and Spending Wallet	10
3.1.3. Staking Rewards Pool	10
3.2. Governance system	11
3.2.1. Importance of governance	11
3.2.2. Governance Power (GP)	11
3.3. Merged mining	14
Electric Cash roadmap	15
Summary	15
Definitions	16
Sources	16
References	17

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Electric Cash Whitepaper

Eyal Avramovich
Whitepaper v1.0

Abstract. In 2009 the first cryptocurrency, Bitcoin (1) was released. Today, 11 years later, despite breaking price records, Bitcoin, or any other cryptocurrency, still has not seen mass adoption. Most cryptocurrencies, although secure, are not designed to function like cash. Transactions are not efficient, tend to be expensive and the user experience is still a secondary issue for many projects. However, new technological solutions allow us to design a better cryptocurrency that is as secure as most blockchains, but also fast and cheap (or even free) to use. In this paper, we introduce a new decentralized fast payment protocol – Electric Cash (ELCASH) – a SHA-256 based coin, designed to be a cash-like, for everyday use. Its fast and cheap (or even free) transactions make it a perfect means of exchange and great tool for daily payments. In addition, the governance mechanism of Electric Cash protocol gives its coin holders the power to decide on the future of the ecosystem development. We believe this project fills an existent gap in the market as it promises to be for everyone.

1. Introduction

1.1. Problem statement and solution approach

Blockchain fees

The first cryptocurrency, Bitcoin, implemented a simple, yet quite reliable mechanism of transaction fees designed to protect the network from spam. Transaction fees can vary, and depend on several factors including network congestion, transaction confirmation times and transaction size. When the load is low, all transactions are processed quickly for minimal fees. The fees are low enough so that there is little-to-no cost for an individual to request a transaction. As the load increases and approaches pre-defined limits, the demand for transaction confirmation increases to the point that the miner can increase the fees charged (2). Many projects copied this design without solving the problem of fees increasing with the network growth.

Today, as many cryptocurrencies gained popularity, they are burdened with high transaction fees. In some cases, they amount to several dollars per transaction. Such a cost makes it unprofitable for everyday use, discouraging both new and existing network participants from using it. In the case of Proof-of-Work cryptocurrencies, fees are used to protect networks from malicious overflowing and for prioritizing transactions added to the blockchain. The same applies to the ELCASH protocol. However, the ELCASH solution rewards users who actively participate in the network enabling cheap or even free transactions. Users who stake ELCASH get the transaction fee returned to their wallets as one of the rewards for participating in the network.

Blockchain performance

Although blockchain gained popularity in the financial world, its actual usefulness as a distributed trusted technology is hindered by its lack of scalability (3). The majority of Proof-of-Work blockchains have a limited transaction processing capacity. As the popularity and use of the network increases and more transactions are placed on the blockchain, the network's ability to process those transactions in a timely manner diminishes. Hence, most of the PoW consensus cryptocurrencies that are considered to be most secure, are rarely used on a daily basis, but rather as a substitute of gold. Other cryptocurrencies, like Ethereum (4), realized this problem and made a shift from Proof-of-Work to Proof-of-Stake consensus.

Many solutions have been proposed. In this project we implement the most promising one: the so-called "fast layer" system to improve the blockchain throughput. We combine the best of two worlds – blocks are mined in Proof-of-Work, which makes the blockchain secure, but transactions can be processed on a second layer (L2) of blockchain, what makes them almost instant (5).

Community influence

For a project to grow, new features should be implemented, and the existing ones modified. Usually, projects in the crypto environment are governed by the blockchain team or core developers, so they are centrally governed. Decisions regarding any further development and network changes are controlled and taken by a relatively small number of individuals. Many mainstream users either don't have a say or enough influence in decision making due to a lack of technical knowledge or financial power.

Electric Cash is changing that by establishing a Development Fund Treasury. It is taken from Proof-of-Work mining rewards and stored in such a "Treasury". Additionally, the Electric Cash community members receive Governance Power. This allows the network to be fully decentralized where the decisions on future project developments and the use of funds from the Development Fund Treasury are driven by the project community. That network democracy is achieved thanks to the blockchain's built-in voting mechanism (6).

2. Electric Cash infrastructure

Electric Cash is a payment protocol designed to be accessible and lightweight, with a focus on reducing transaction fees and make daily use almost seamless. Fast and cheap (or even free) transactions on a secure and decentralized network make ELCASH ideal for everyday payments.

2.1. Fast transactions layer

In order to implement fast transactions, the blockchain requires enough block capacity to include all the transactions which are waiting for confirmation, and to inform the network about the transactions as quickly as possible. In the traditional Proof-of-Work blockchains, instant transactions are hard to achieve due to security reasons.

In this project a fast transaction layer (Layer 2) is created on top of the network to improve the transaction speed.

Layer 2

Enables fast transactions.

Layer 1

Consensus Layer (PoW) ensures the integrity of the blockchain executing the consensus algorithm across participants.

Layer 0

Blockchain layer is of utmost importance to the scalability, security, and privacy of the network.

Hardware Layer

Enables efficient execution of protocol at other layers.

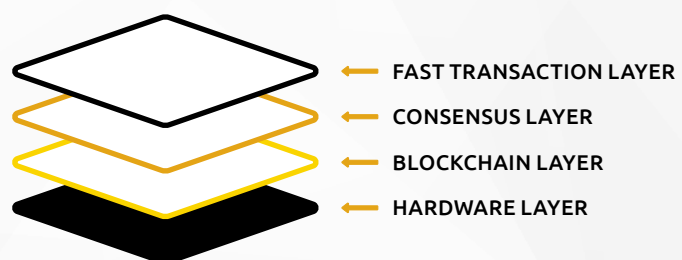


Figure 1. Architecture of the Electric Cash blockchain ecosystem (7).

This fast-layer solution enables fast transactions and assures a high level of network security. The transactions are propagated to the main blockchain using Layer 2 where transactions are confirmed off the chain before being approved by the PoW miners.

2.2. Free transactions

Free transactions are achieved thanks to the blockchain architecture: during the staking process, stakers generate the “free transaction limit” to spend. The fee is applied to all transactions which will make malicious network attacks more difficult to enforce. The transaction cost, however, will be returned to users depending on their limit. For us, this is an important factor of mass adoption of cryptocurrencies. In this field, we compete not only with other blockchain projects, but also with traditional financial institutions. Cryptocurrencies, however secure, are often expensive to use, especially when the project gains popularity and the network use increases. This causes a situation where the more popular the project, the more expensive its use becomes. Fewer new users are willing to participate, thus hindering the project’s growth. To achieve global adoption, projects need to reach a critical mass, i.e. a certain the number of users that make the network appealing to join. Projects like cryptocurrencies or social media platforms become more useful with every new user because it is possible to connect to more people. In effect, if the project limits itself with rising transaction fees while more users are in the network, it makes the global adoption hard – or even impossible – to achieve (8).

Free ELCASH transactions limit

In the ELCASH project, blockchain fees are charged in advance and later returned to users if they were eligible for free transactions. Every user who stakes ELCASH is eligible. The free transaction limit is calculated every day and depends on the user’s staking parameters. After a transaction is made, the fee is returned to the user’s spending wallet.

This design helps keep the network secured against malicious overflooding, making attacks expensive, while genuine users are able to make free transactions.

Miners are not burdened with additional work without a reward. If a free transaction is to be made, mining difficulty is automatically lowered proportionally to the free transactions value included in the block. As a result, the miners’ total and final block rewards will not be affected in any sense by the free transactions and the miners’ additional work will be rewarded accordingly.

2.3. Block reduction and rewards strategy

Electric Cash mining is launched from a fresh genesis block. The strategy presented in Table 1 aims to meet the expected market demand for the coin, while preventing oversupply during the early years.

Pre-mining is planned to continue until 10 percent of the supply is mined and allocated to activities including, but not limited to project development, marketing, promotional efforts and more.

We strive to prevent any undesired activities that may arise at the very beginning of the coin's existence when the coin and its ecosystem are not yet mature. The plan to secure the previously mentioned 10 percent of the total supply of ELCASH also includes the added benefit of discouraging market manipulation by potential holders of substantial volumes of ELCASH.

Table 1. Block reduction and rewards strategy.

Period	Date	Blocks	Block Reward	Coins
1	December 2020	4,200	500	2,100,000
2	January 2021	52,500	75	3,937,500
3	January 2022	52,500	70	3,675,000
4	January 2023	52,500	65	3,412,500
5	January 2024	52,500	55	2,887,500
6	January 2025	52,500	40	2,100,000
7	January 2026	52,500	25	1,312,500
8	January 2027	52,500	15	787,500
9	January 2028	52,500	7.5	393,750
10	January 2029	52,500	3.75	196,875
...

The pre-mined coins will be used in various activities that have one main goal: attracting attention and users to the ELCASH ecosystem. It is a common and widely accepted solution for projects to allocate a designated number of coins to marketing and development activities. We believe this solution will provide a healthy way of funding the project's development and create a brighter future for the blockchain ecosystem.

Examples of use-cases for the pre-mined 10 percent of the total supply of Electric Cash:

- Promotional airdrops
- Business development
- Additional rewards for stakers
- Marketing efforts
- Social media advertisements
- Software budget

During the first year, the block reward will amount to 75 coins. Each subsequent period will gradually decrease it. After seven years, the network will switch to rewards strategy called “halving” where the block reward is decreased by 50 percent each year from that time.

The total supply of Electric Cash is currently capped at 21,000,000 coins, identical to the total supply of Bitcoin. A fixed supply helps minimize potential inflation and dilution. However, if the project gains popularity in the future and the demand for the coin grows, the most active network users will be able to increase the supply through democratic voting thanks to the governance system tools, bearing in mind that if this may result in small inflation.

It is important to note that Electric Cash assumes a community governance system, and it will be possible to change all parameters as required. This will allow the community to decide on the coin’s economy. What’s more, the governance will not only make the project healthier and more transparent, but will help the coin adapt faster to market conditions and users’ needs and remain among the best projects in the crypto world.

2.4. Development Treasury

The ELCASH project implements a dedicated Development Treasury Fund constituting of one percent of the mining rewards collected in a special wallet managed by the Electric Cash governance system. The funds are kept safely until the community votes to spend it. It can cover the costs of the protocol improvements and changes like developing new features in the Electric Cash ecosystem. To keep the whole process transparent, the balance of the collected funds is presented on the Governance Explorer.

3. Electric Cash ecosystem

Electric Cash is designed to be a cash-like cryptocurrency for everyday use with an additional staking feature. The Electric Cash protocol is governed by its coin holders who are eligible to manage the future development of the ecosystem. All these aspects are integrated under one ecosystem, allowing Electric Cash to cover a wider variety of market and user needs.



STAKING



GOVERNANCE



MERGED MINING

To incorporate incentives dedicated not only to miners, but also to other network users, Electric Cash block rewards are divided into three parts. The first and the biggest one goes to Proof-of-Work miners. Miners are crucial to ensure that the network functions properly and that it is safe. But miners are not the only stakeholders. People who use the network on a daily basis and expand the ELCASH ecosystem are essential for the project go grow.

ELCASH coin as an integral part of ecosystem

In this project, the key aspect of the ELCASH coin is its long-term offer to every active user. Therefore, a comprehensive ecosystem where staking coins unlocks rewards and additional possibilities was designed. Thanks to the governance system, internal resources can be spent on network improvements.

To achieve it, a unique distribution model was implemented into the network, where every user can be rewarded for his contribution, i.e.:

- After the initial pre-mining to accumulate allocated coins according to the coin distribution plan is over, the largest part of the total coin supply is allocated to miners.
- Part of the total supply is used for staking rewards.
- Part of the total supply is allocated to the Development Treasury Fund. It can only be used for future developments (protocol improvements) and only the network community members (users who stake and gain GP) have the right to manage it (i.e. by voting).

We believe that this approach will attract the miners on launch. As a result, by the end of the bootstrap phase, there should be enough coins in circulation and a significant amount of hash power securing the network so that other network functionalities can be used and facilitate mass adoption in daily use.

3.1. Staking

3.1.1. Staking process

Staking is a form of storing funds. By staking, every user can actively contribute to the network growth in the long run and help prevent the oversupply problem that could affect the overall inflation issue over the years. This in turn increases the network stability.

The Electric Cash network participants can stake ELCASH to govern the network and earn rewards from the staked amount. Staking will also reward users with additional benefits like free transactions and Governance Power (GP). Every Electric Cash holder can stake any number of his coins.

3.1.2. Staking and Spending Wallet

One of the key elements of the Electric Cash ecosystem is a user-friendly and intuitive wallet. The ELCASH Wallet application includes a Spending and a Staking Wallet. The Staking Wallet will allow users to stake their coins to receive the Governance Power, free transactions and staking rewards. Users are in constant control of the funds and private key related to both the Staking and Spending Wallet, therefore security is as strong as the user's personal standards.

3.1.3. Staking Rewards Pool

A part of the total supply is reserved for staking initiative and locked in the Staking Rewards Pool. Rewards are distributed periodically among the participants depending on their stake amount and duration. The rewards can be transferred out to the stakers only after the locking (staking) period ends. Early withdrawal of funds results in penalties such as loss of the rewards earned to date. No reward is accrued before the completion of a predefined staking period. The rewards that are not accrued stay in the pool and are subsequently distributed among other stakers holding their position.

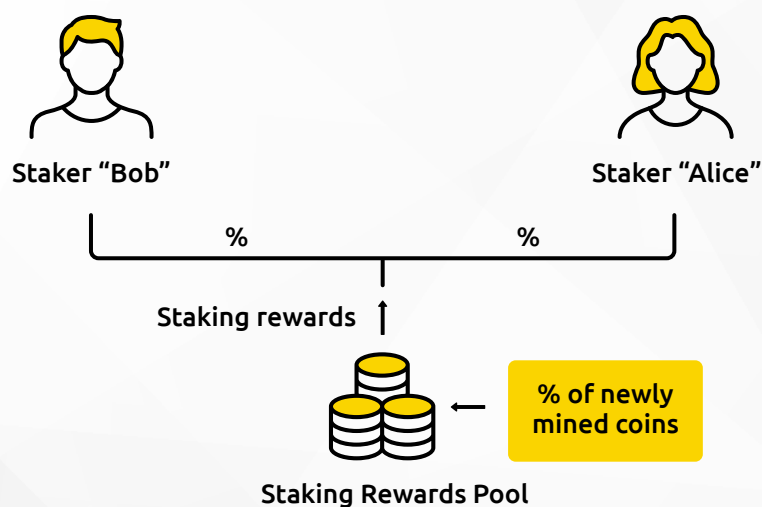


Figure 2. Staking Rewards distribution flow.

After the agreed staking period is over, users decide what to do with additional received funds. They can re-stake ELCASH or just withdraw rewards to the Spending Wallet and use them as they want. However, closing the staking results in the loss of benefits that come with the cumulative staking duration.

3.2. Governance system

In order to achieve direct democracy Electric Cash implements a governance system. In the governance process, new changes can be proposed, designed, agreed upon and implemented. Changes are not limited to the blockchain source code technical details, but also may cover other important network and community issues. Thanks to the blockchain's built-in voting mechanism, users can vote on proposals made both by the community members and/or core management team of Electric Cash.

3.2.1. Importance of governance

The blockchain governance is not just a symbolic gesture towards the community. It is also an important element of the blockchain ecosystem. It makes projects more transparent and easier to manage. Introducing the governance system in Electric Cash makes the project more competitive as decisions can be made faster and better address the market and user needs.

The existing coins are often built on an open-source code and are easy to copy. The difference between them are the people supporting the project. Communities are the most important and unique part of every blockchain ecosystem. There is no success on crypto market without engaged stakeholders.

3.2.2. Governance Power (GP)

During the staking process network participants (stakers) obtain Governance Power (GP). Governance Power is directly conditioned by the staking parameters: the higher the value of the stake and the longer the staking period, the more voting (governance) rights stakers have over the ecosystem. Governance Power is untradable and untransferable (from wallet to wallet) creating an ecosystem of credible users with "skin in the game" who stake more and for a longer time. We want to make every effort to ensure that greater GP is available only to the most active and dedicated members of the ELCASH community. Therefore, Governance Power gained by a user will change over time if he ceases to be active in the network.

Electric Cash governance system has the goal to create the project that is:

- **Decentralized:** Every network user can participate in the governance. Every user can make a proposal and vote.
- **Transparent:** All vote results, together with their implementation stage, are visible on the Governance Explorer site.
- **Immutable:** Decisions made by voting are binding and can be changed only by voting again.

- **Secure and private:** All users can vote anonymously. However, if a user wants his name to be visible, the vote he cast can be verified.

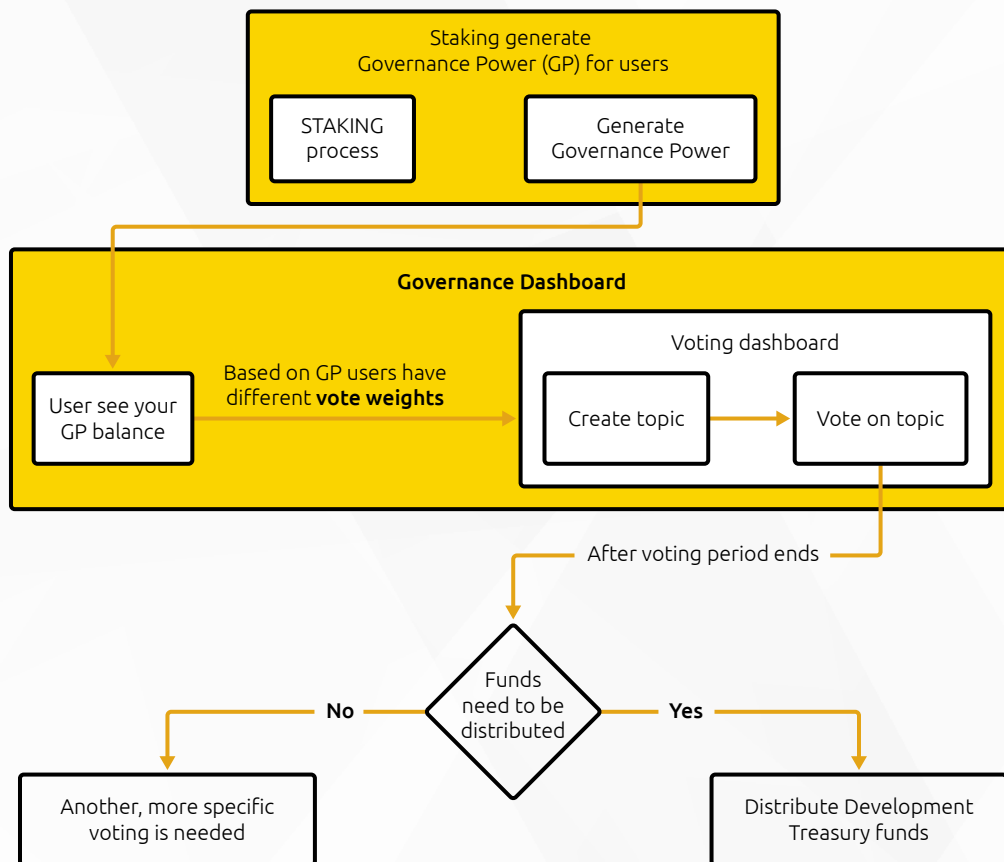


Figure 3. Electric Cash governance mechanism.

Calculating the Governance Power

Governance Power is calculated to reward the most valuable and the most active network participants. Every user staking Electric Cash will gain Governance Power (GP). The Governance Power factor depends on the following parameters:

- **Staked amount** – the more ELCASH staked, the more Governance Power a user gets during the staking period.
- **Staking time** – as long-term staking is more beneficial to the network, users who stake for longer get more benefits, i.e. users staking once for a longer unbroken period of time get more GP than those who re-stake their funds repeatedly, even if the cumulative staking period is the same.
- **Network activity** – the more active users are and the more they contribute to the network, the more GP they can obtain. As the ELCASH ecosystem include staking, governance, mining, etc., participation in all of these activities is rewarded accordingly with GP.
- **Active participation** in the voting and governance process.

GP is not a separate coin. It is a non-monetary right connected to the user's ELCASH address and it is untradable and untransferable (from wallet to wallet).

Creating proposals

Every user can create a new proposal for the network to vote on. In order to create a new proposal, user must pay with his GP. This is to prevent overflowing community with too many proposals.

The ELCASH community decides on the economy and ecosystem of the coin. Members can vote not only on additional features, but also on the Electric Cash mining parameters, like the coin's maximum supply. This will help ELCASH to be competitive and up-to-date in the future.

Voting

Every user can vote on the proposals presented in the governance dashboard. A user's vote is proportional to the amount of Governance Power earned. For the voting to be valid, quorum must be attained based on the total GP in the network. After the voting ends, every user can check the results on the Governance Explorer.

3.3. Merged mining

During the early stages of development, ELCASH will operate using a merged mining process. It will allow ELCASH to leverage the hashing power of larger SHA-256 (Bitcoin-like) based chains ensuring the overall security of the new network.

Merged mining is implemented with Bitcoin, since both cryptocurrencies use the same SHA-256 hash function. In this case, BTC is the parent chain and ELCASH is the auxiliary chain. As a result, Bitcoin's (parent) Proof-of-Work solutions can be used to validate ELCASH (auxiliary chain) as an auxiliary Proof-of-Work (AuxPoW) consensus mechanism (9).

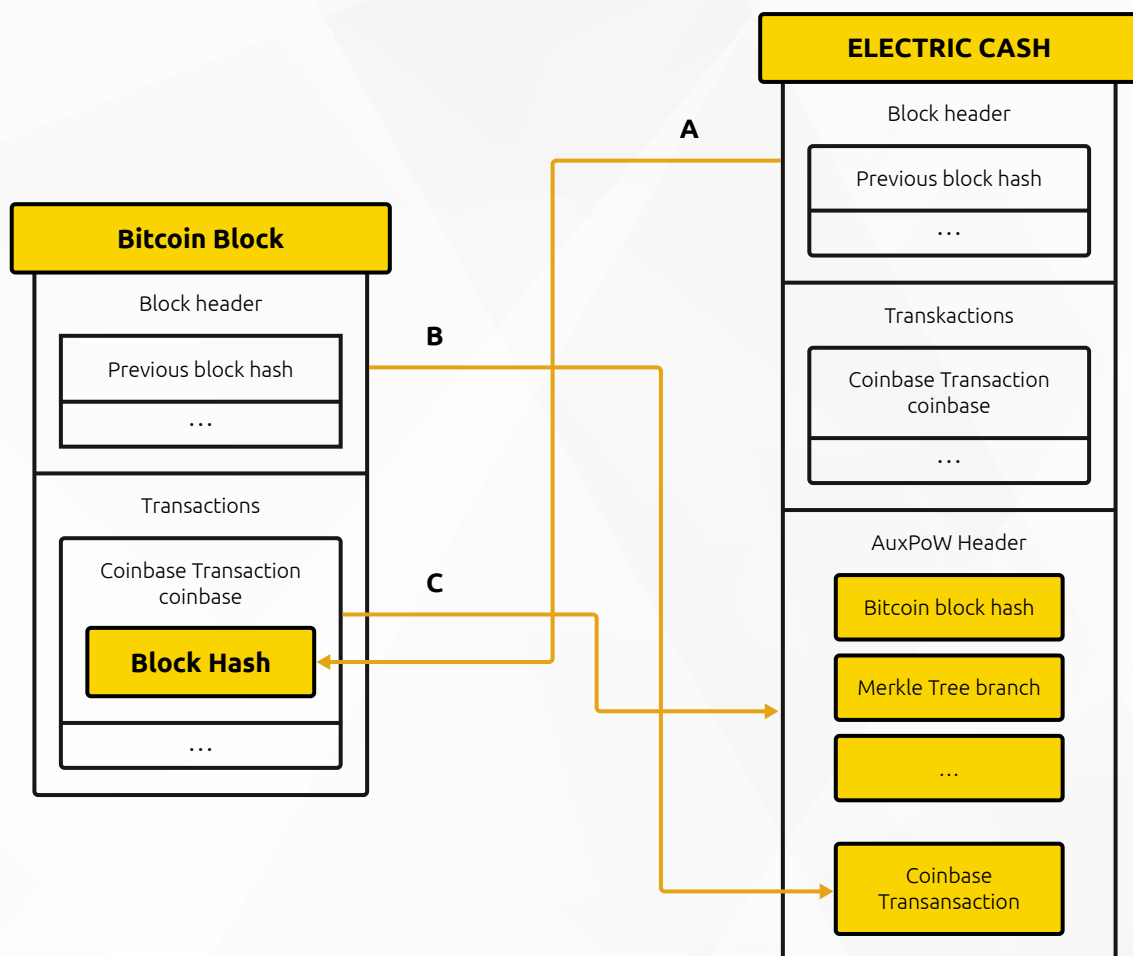
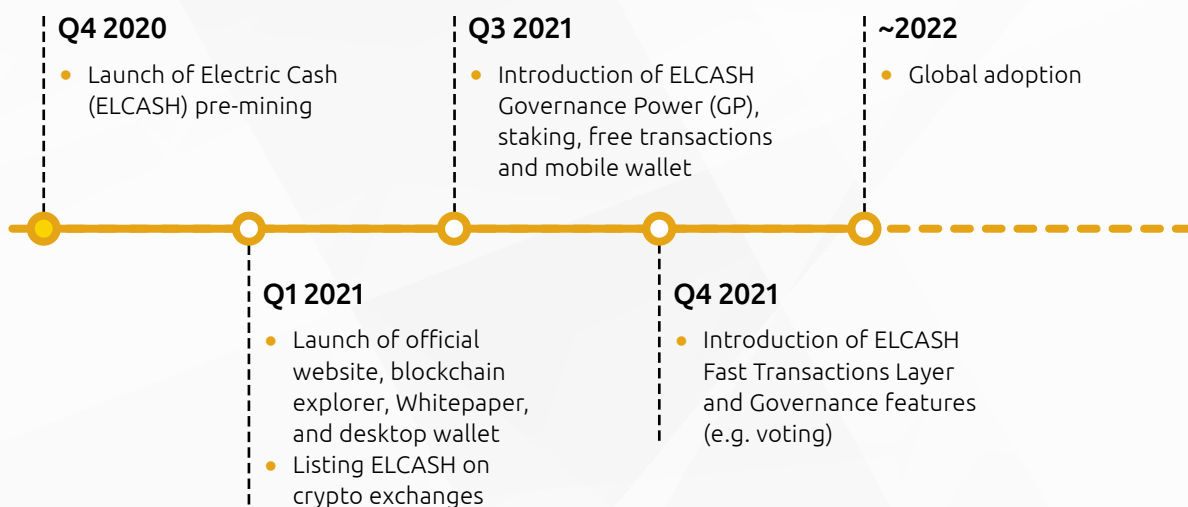


Figure 4. Structure of merged mined blocks in Electric Cash.

Merge mining is a good method for new blockchains such as ELCASH, to increase security and reduce vulnerability to 51% attacks. Implementation of that integrated mining architecture to the ecosystem gives us confidence that ELCASH meets current industry safety standards.

Electric Cash roadmap



Summary

In this paper, we introduced Electric Cash (ELCASH). The project's goal is to provide a comprehensive ecosystem and solve several major problems in the cryptocurrency industry.

ELCASH facilitates everyday payments. By implementing an additional Layer 2 to the blockchain, it can perform fast transactions while still ensuring the network security.

The ELCASH protocol, designed to be accessible and lightweight, also focuses on reducing transaction fees. Staking is also rewarded with free transactions, which are granted based on the size and longevity of the staking total. The ecosystem not only introduces reduced fees, but also additional benefits like Governance Power. By actively participating in the network, each coin holder earns Governance Power (GP) and can have a direct impact on the protocol changes. GP is distributed depending on the user's stake parameters and network activity. It gives the right to participate in the governance process and to vote on available proposals.

We believe that this decentralized and community-focused ecosystem will ensure a healthy growth and a global long-term project perspective.

Definitions

Development Treasury Fund – a special wallet of funds collected from mining rewards. That fund is governed by the network stakeholders and intended to cover the costs of the protocol improvements and changes e.g. developing new features in the Electric Cash protocol.

Governance – the process by which network changes are proposed, designed, agreed upon and implemented. Changes are not limited to technical details of the blockchain source code, but also cover other important issues such as marketing and education.

Governance Power (GP) – the right by which stakeholders (those who are affected by and can affect the network) exercise power over the network.

Halving – an event where the block reward for mining a new coin is halved, meaning that coin miners will receive 50 percent less reward for every transaction they verify.

Staking – the act of locking cryptocurrencies to receive Governance Power and other network benefits.

Staking Rewards Pool – a part of the total supply reserved for the staking process rewards. Rewards from the pool are periodically distributed among participants depending on their stake amount and duration.

Sources

To find out more about the project, please visit:

Website: electriccash.global

Twitter: twitter.com/elcash_official

Telegram: t.me/elcash_official

Facebook: facebook.com/electriccash.official

Instagram: instagram.com/elcash_official

GitHub: github.com/electric-cash

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