Jax.Network Light Paper

Introduction

Bitcoin has spurred the blockchain boom observed in recent years. However, it is recognized that the industry is rife with two major problems: the lack of stability of the blockchain's native tokens, and the reduced throughput these systems can offer. Because of these two problems, we see cryptos such as Bitcoin and Ether being treated as speculative assets rather than global currencies that can facilitate day-to-day transactions.

We believe that if these two problems are addressed, then blockchain-based cryptocurrencies can become a real contender against the world's leading payment systems.

Our Solution

Jax.Network is a blockchain project that begun in 2018. We have developed a blockchain protocol that is secure, scalable, decentralized, and houses its very own stablecoin, realizing Satoshi's vision in creating electronic cash. This project aims to create a truly global cryptocurrency that is suitable for mass adoption and day-to-day use.

Furthermore, we have elected to anchor our blockchain to the Bitcoin blockchain, bringing much-needed stability and scalability to its ecosystem. This is not only beneficial for the users of Bitcoin but also for the miners who secure the network as well.

Through our merge-mining innovations, Bitcoin miners will be able to merge-mine our blockchain as well as the Bitcoin blockchain at a nominal cost. This is a long-term solution to a big problem many miners of the Bitcoin network face: the volatility of Bitcoin's pricing affecting miners' revenues.

Features of our Blockchain

Two Coins

The Jax.Network blockchain houses two native digital tokens.

JAXNET coin - Are coins that are mined on the beacon chain of the Jax.Network blockchain. The beacon chain is responsible for adding new parallel chains, or shards, to the network in a timely and coordinated fashion. The beacon chain operates very similarly to Bitcoin because blocks on this chain are mined approximately every 10 minutes and offer a reward of 20 JAXNET coins (after the first 5 years). JAXNET coins reflect the entire value of the network and are therefore speculative and can be used as a reliable store of value.

The utility of JAXNET coins in our network are as follows:

- To pay for the security of Jax.Network by incentivizing Bitcoin miners to merge-mine Jax.Network

- To be used as gas fees for exchange agent listing transactions and other critical transactions
- To incentivize miners to defend the beacon chain that holds the shard registry
- Serve as a secondary savings account for the Bitcoin network
- To incentivize miners to defend the Bitcoin network when the BTC reward drops to 0
- To reflect the value of the global transactional payments ecosystem of Jax.Network

JAX coin - Are coins that are mined on the shard chains of the Jax.Network blockchain. Sharding is the mechanism that allows the Jax.Network blockchain to scale and support a virtually limitless number of transactions at any given time. JAX coins will be mainly used for day-to-day transactions and can handle mass adoption due to the network's ability to scale.

JAX coins can only be created by burning the Bitcoin and JAXNET coin base block rewards. This will control the issuance rate of JAX coins so that they can be issued if and only if there is transactional demand for them.

Additionally, we argue that JAX coins will be stable in value over time due to our reward mechanism which incentivizes miners to mint and distribute coins following the law of supply and demand.

JAX Coin Reward Function

Jax.Network has developed our very own reward function that compensates miners in proportion to the hash power they contribute to the network. For simplicity let's use a hypothetical example, 100 units of hash power will yield 100 Jax coins and 150 units will yield 150 coins, and so on.

This reward function will only exist on the shard chains of the Jax.Network blockchain and is the main factor that maintains JAX coin's stable value.

A reward of JAX coins is only issued when the deflationary (Bitcoin and JAXNET) coins are foregone or 'burnt' (more on this can be read in the 'Anchoring to Bitcoin' section). This controls issuance and ultimately puts a stop on inflation. The advantage is that we don't resort to complicated schemes to remove coins out of circulation.

Since miners are profit-oriented, they will follow the law of supply and demand to maximize profits. This means that when the price of JAX coins is high, miners will increase their hash rate, minting more coins and distribute them accordingly and vice versa.

As previously stated, we are arguing that this will result in a coin that is, in a steady-state, stable in value over time. However, here the value is measured in units of hash power and not in fiat. This novel way of measuring value allows us to peg the transactional coin to data that is intrinsic to decentralized networks, more specifically the cost of computing power allocated to mine one Bitcoin block. Moreover, through this reward function, we can ensure that the value of JAX coins on one shard is in proportion to the coins of another shard.

This makes our stablecoin superior to existing stablecoins because it preserves its decentralization and does not need to peg to assets or fiat currencies to maintain its stable value.

Merge-Mining

A common criticism of sharding within blockchains is that as you split the network to create more shards, it becomes increasingly difficult to maintain an acceptable level of security on the individual shards.

This is why virtually all blockchains that employ a sharding mechanism to increase scalability and throughput use a Proof-of-Stake, Delegated-Proof-of-Stake, or Proof-of-Authority based consensus algorithm to add new blocks to the shard chains.

Jax.Network employs merge-mining as our solution to maintain security on our shard chains.

Merge-mining often refers to the process of mining two or more cryptocurrencies at the same time. People are familiar with this term thanks to altcoins such as Namecoin, which is merge-mined with Bitcoin, and Dogecoin, which is merge-mined with Litecoin.

We can secure all shards from takeover attacks through our merge-mining innovations and the creation of our very own proprietary merge-mining tree.

A common criticism of merge-mining is that it creates centralization. To circumvent this issue, we have designed a unique Merkle tree to optimize the efficiency of encoding the data structure in our blockchain, and thus retrieving the hash from past block headers. This ensures that even small nodes can verify the state of transactions. Moreover, the reward function on Jax.Network shards allow any miner to participate in mining, regardless of their computing power.

Additionally, small mining pools have an advantage at mining JAX coins since they will receive the reward on shards, even though they have a smaller probability of finding the next Bitcoin block. Therefore it is less costly for them to forgo their Bitcoin and JAXNET coinbase rewards and print JAX instead. These three components will help to tame mining centralization on shards.

More detail about our merge mining solution can be read here: https://bit.ly/3xqUPhD

Proof-of-Work

Unlike other blockchain projects that have high scalability, we have chosen a Proof-of-Work based consensus protocol to secure our network. The primary reason for this is because we believe that Proof-of-Stake is a sacrifice on decentralization for higher scalability.

Proof-of-Stake centralizes power and is therefore wide open to third party or government intervention. Furthermore, we believe that if the power to add blocks within a blockchain network is centralized, it becomes a single point of failure.

Anchoring to Bitcoin

To improve security, reduce the risks of inflation on shards, and promote early adoption, the Jax.Network blockchain will be anchored to the Bitcoin blockchain.

Miners of our network will be merge-mining at least 3 chains: the Jax.Network beacon chain (JAXNET coins), the Jax.Network shard chains (JAX coins) and Bitcoin (BTC).

Anchoring to Bitcoin provides the much-needed security for Jax.Network and the security model works as long as 51% of the Bitcoin miners mine Jax.Network honestly.

When Jax.Network is merge-mined with the Bitcoin network, miners get JAXNET coins almost for free, except for some slightly increased cost of electricity bill as merged-mining has slight additional costs.

Since Jax.Network brings scalability and stability to the Bitcoin ecosystem, it should improve Bitcoin's value and also earn Bitcoin miners additional transaction fees and additional coinbase rewards in the form of JAXNET coins. These asset coins would eventually represent the value of the global transactional payment ecosystem and bring great value for Bitcoin miners.

When a miner mines Jax.Network, they are rewarded JAX coin transaction fees, JAXNET coin transaction fees, Bitcoin transaction fees, and one of the following two combinations:

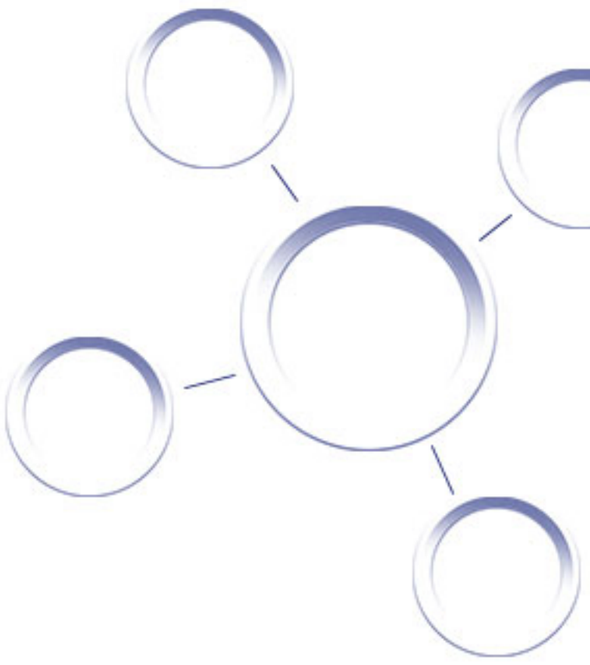
1) BTC + JAXNET block creation reward

(or)

2) JAX coins block creation reward

Miners have to burn Bitcoins and JAXNET coins to mint new JAX coins. By destroying the asset coins (BTC+JAXNET) to mine stable/relatively inflationary coins (JAX coins), the supply of stablecoins will strictly follow the demand for the same. It increases the opportunity cost of printing new transactional JAX coins. This mechanism is a check on inflation caused by Moore's law that may be inflicted upon JAX coins, which over time devalues the coin and destroys its transactional utility.

Proof-of-Work Sharding



It's a known fact that single-chain blockchain networks such as Bitcoin and Ethereum suffer from scalability issues. They can't increase transaction throughput without sacrificing a fraction of their security and decentralization. Limited throughput causes high transaction fees and limited adoption.

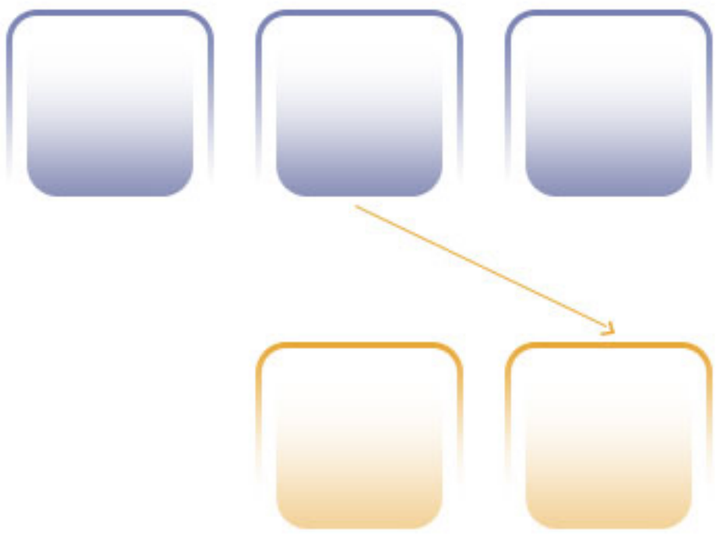
In order to overcome the aforementioned issue, the Jax.Network team has developed a novel sharding approach that utilizes hundreds of independent chains which work in parallel based on Proof-of-Work consensus. In order to verify the transactions on one shard for double spends, there is no need to store data, download, or process network traffic from other shards. This feature makes Jax.Network trustless for casual users without extra security assumptions common in competitive proposals.

A major advantage of our solution is the ability to preserve a high level of decentralization despite the high throughput. Decentralization in Jax.Network is not limited by either high variance of rewards or block propagation delays which are known to be major obstacles to scaling single-chain blockchains.

In contrast to competitive sharding proposals, profitable independent mining in Jax.Network doesn't require huge investments in hardware. Miners are able to mine the subset of shards of their choice. They are not forced to go through expensive committee reorganization events common in proposals based on Proof-of-Stake consensus.

Thus the miner's network traffic is always proportional to the number of shards that he has chosen to mine.

Cross-shard exchange protocol



Independence of shard chains in Jax.Network is a useful feature that helps to preserve decentralization. However, one disadvantage of this approach is the absence of direct cross-shard transactions. In order to mitigate this inconvenience, the architecture of Jax.Network supports an efficient SPV-client called FlyClient. It provides casual users an efficient and reliable tool to verify transactions without downloading the complete history shard chain.

Also, Jax.Network has an ecosystem of exchange agents. Anyone with proper hardware and a stock of JAX coins can become an exchange agent and perform cross-chain exchanges for casual users for a fee.

Liquidity Providers/Exchange Agents

BecauseJax.Network scales through pure state sharding, we have an additional economic actor in Jax.Network

who is responisble for providing the necessary liquidity for cross shard swaps.

Users who stake JAX coins to provide liquidity are called Exchange Agents and can make commissions by facilitating cross shard transactions.

Benefits of our Blockchain

Now that you are familiar with some of the unique features of the Jax.Network protocol you are better equipped to understand what potential benefits it brings to the existing payments and blockchain systems.

Firstly, by anchoring our blockchain to Bitcoin, we can bring much-needed stability and scalability to the Bitcoin ecosystem.

Many miners on the Bitcoin blockchain have been looking for a solution that will bring them a less volatile revenue stream as well as something that will improve the practicality of the Bitcoin ecosystem. Improving the Bitcoin ecosystem will ensure an increase in steady revenues for miners in the years to come.

Secondly, offering people a decentralized currency that is stable in value, which also has the scaling capacity to handle a large number of transactions at any given time, the way Visa and Mastercard do, is exactly what is needed for cryptocurrencies to go fully mainstream. We believe that people will want to transact with our JAX coins because of the nominal network fees, fast settlements, privacy, and lack of third-party interference that plagues centralized payment systems and even some ‘so-called’ cryptocurrencies.