Ethereum Scaling Solutions

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This article explores the relationship between tokenization and Ethereum and how various scaling solutions can take the ecosystem to new heights.

By 2022, the total number of decentralized applications (DApps) on the Ethereum blockchain reached 3,000. Currently, this ecosystem is the preferred choice for those creating DApps, NFTs, and other trending tokens. But are the developers, and, most importantly, the community, happy with that?

Due to its increased popularity, Ethereum is facing various issues with performance, such as high gas fees, slow contract execution and others. The mainnet deployment, set to fix those problems, is finally coming in August. And while we're holding our breath and hoping that it is not postponed again, let's explore how tokenization affects Ethereum and how various scaling solutions can send the ecosystem to new heights.

Ethereum and Its Existing Drawbacks

Ethereum blockchain is so far limited to only 30 transactions per second, while competitors like Solana are able to process over 30,000. The average transaction cost for the blockchain hovers around $1.5, and though it's a significant drop from the previous year, it's still higher than the desired gas fee.

Another thing is that Ethereum is responsible for providing security and regulating data across its blockchain. Data layering, transaction approval, security maintenance… All this multitasking means that the blockchain has to face limitations in certain performance aspects.

With Ethereum being an extremely popular choice in the decentralized world, the main problem with many developers choosing it is overcrowding, which inevitably leads to higher transaction fees for customers who use it as a currency and/or investment.
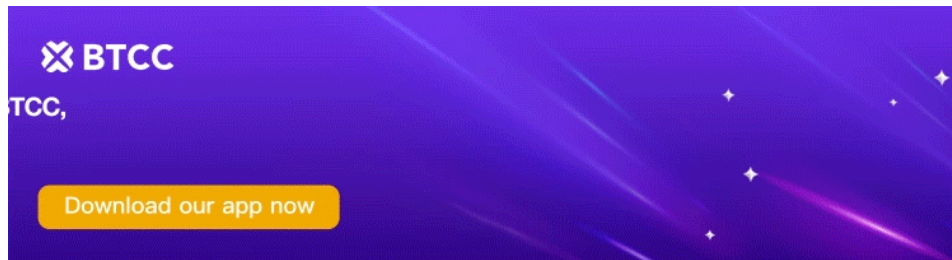
Scaling Issues and Solutions

Execution and transaction shortcomings are commonly referred to as scaling problems. Researchers have already offered many solutions to those, some of them being included in the much-awaited August update.

The scaling solutions should enable the blockchain to reach better efficiency and lower the transaction fees while making sure that the performance is not harmed. The first-layer solutions normally include sidechains and off-chain layers, that are built on top of the main chain and designed to increase transaction throughput. Second-layer ones involve state channels, rollups, blockchain interoperability, sharding, and alternative cryptographic functions.

In August, if tThe Merge is not delayed again, the Ethereum blockchain is set to be united with its beacon chain and integrated with sharded chains. Thus, the process will divide the Ethereum network into multiple chains, which is expected to significantly improve throughput and transaction speed.

As a result of The Merge, the Ethereum mainnet is set to become:

- Transactions could be finalized as quickly as nanoseconds.
- A higher number of transactions per second increases the overall rate of transactions occurring on the blockchain.
- More decentralized. Decentralization and heavy security are two traits that Ethereum is best known for, and thus will remain after the update.

Tokenized vs Tokenless Scaling Solutions

Before we proceed to various tokenized and tokenless scaling solutions, let's briefly recall what tokenization means. Normally we use this term when we speak of something valuable being converted into a digital token used on the blockchain. Everything you can imagine is able to become a token: from real estate to digital art.

When we speak of Ethereum's second-layer solutions, tokenless would mean that the network still uses ETH as its main coin, while tokenized ones have their own tokens. Arbitrum, optimistic rollups, and other zero-knowledge (ZK) rollups opted for sticking to ether as the native asset. Polygon, Metis, and Boba are the most popular among the ones that created new tokens.

While keeping ether as a native asset on its own blockchain is perfectly understandable, Polygon's history of success demonstrates that the launch of a token economy goes together with hype and a loyal community. If a token or an incentive program is launched, it inevitably draws attention and motivates the users to take part in the process both financially and physically, for instance, by voting for network decisions or investing in its future development.

Let's take a closer look at some tokenized and tokenless scaling solutions to understand how they can improve the Ethereum network.

Two Main Types of Rollups

The main idea behind rollups is to execute the transactions on the second layer which allows to speed up the mainnet and increase efficiency. There are two main types of rollups: optimistic and zero-knowledge. The optimistic ones are named like this because basically, any validator is able to post a rollup block and confirm the validity of other blocks. If a particular validator finds something suspicious, an inspection can be run to check the state of the block.

Let's see how it works with Arbitrum. As of May 2022, this rollup held $1.35 bn in total value locked

(TVL), being the most popular tokenless scalable solution in the Ethereum network.

In Arbitrum, full nodes that submit transactions to the layer 1 chain earn rewards in ETH. The rest of the user transaction fees are distributed to other network participants — such as validators. In case the block added by the Arbitrum user is proven to be incorrect or a challenge is proven unjustified, the responsible validator will have their stake confiscated, ensuring the participants always play fair or risk the consequences.

As for zero-knowledge rollups, or zk-rollups, these Layer 2 scalability solutions allow blockchains to validate transactions faster while also ensuring that gas fees remain minimal. The transaction speed is reached with the help of Merkle Trees: one stores all accounts, while the other all balances. This off-chain storage of data saves huge amounts of processing power and time for the blockchain.

Ether is used as a base coin by both Arbitrum and other rollups to cover the gas. The protocols are required to pay transaction fees and additional costs in order to bring the rollup out onto the mainnet. That should be mentioned as the main setback of tokenless scaling.
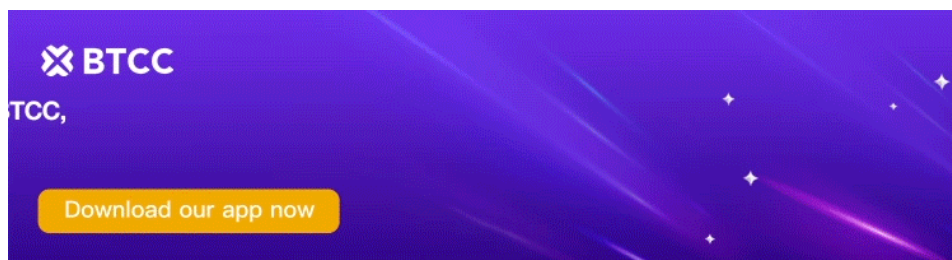
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Tokenized Ethereum Scalability Solutions

As we mentioned above, tokenized scalability solutions use their own tokens to maintain the ecosystem built on top of Ethereum. Polygon, a multi-chain ecosystem of Ethereum-compatible blockchains, is the most known among them, and we already had a deep dive on it, so today let's focus on another example: Metis.

The Metis Layer2 is a scaling solution offering scalability combined with the security of the Ethereum blockchain and the ability to create Ethereum dApps. It uses its own token to pay transaction fees, with 30% of those being returned to protocols that work on the network. Unlike Arbitrum, Metis allows third parties to run sequencers by staking Metis to prove their honesty.

In addition to that, Metis offers an NFT bridge between its Andromeda network and Ethereum, NFT storage, along with the functionality of creating decentralized autonomous organizations ([DAO](#)) and decentralized autonomous companies (DACs). Its TVL is $53.1 at the time of writing, which is almost three times less than the Arbutrum's. However, with all its NFT and DAO features the project can demonstrate further growth – with its loyal community of 130K users in Twitter only.

Is Tokenization Really a Necessity for Ethereum?

The examples we discussed above show that both tokenization and tokenless solutions help achieve the main goal of scaling the ethereum blockchain. While the first ones like Arbitrum are focused on speeding up transactions, Polygon, Metis and others are also building a community and a broad range of decentralized services.

As a result, tokenization is not required. However, it is very beneficial in reducing the cost of gas, as fees are usually paid in native tokens and the audience is interested in participating in developing new networks.