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Ethereum Layer 2s

Solving Ethereum's Scalability, But Can They Thrive?

Key Takeaways

1 Ethereum Layer 2s (L2s) solve Ethereum's scalability issues by reducing transaction congestion and offering lower fees and faster speeds without sacrificing security.

2 L2 tokens have struggled to gain traction, primarily due to limited token utility, competition from other chains, and Ethereum's relatively weaker price performance.

3 Arbitrum, Optimism, ZK Sync, and Immutable X are the leading examples of Ethereum L2s, each with distinct scaling technologies and contributions to the ecosystem.

4 The success of Layer 2s is closely tied to Ethereum's price performance, creating a feedback loop in which greater adoption of L2s will likely drive ETH price action and vice versa.

What Is An Ethereum Layer 2?

An Ethereum Layer 2 (L2) is a blockchain built on top of the Ethereum network to handle transactions off the main network while still relying on Ethereum's security. The goal of L2s is to reduce congestion on the Ethereum mainnet, which can become slow and expensive during times of high demand. By moving transactions off the main network, L2s offer faster processing and cheaper fees. Once a batch of transactions is processed on L2, the results are posted back to Ethereum, ensuring the security of the blockchain is maintained.

Levels Of Blockchains And L2s



Why Do Layer 2s Exist?

Ethereum is highly decentralised and secure, but it has long faced scalability issues due to its design and the high demand for dApps and DeFi protocols. During periods of high activity, Ethereum's fees can spike, making it impractical for everyday use. L2s were created to solve this issue by providing an environment that processes transactions off the main network and reduces the workload on the Ethereum mainnet. This setup allows Ethereum to focus on security and decentralisation while L2s handle scalability, creating a more efficient ecosystem.

Average Transaction Fee Chart



The Disadvantages of Layer 2s

While Ethereum L2s have shown promise, they aren't without their flaws:

- 1 Each L2 ecosystem operates in its own silo, which means liquidity is often fragmented between L2s, reducing overall efficiency.
- 2 Some L2s may rely on centralised components or operators, which can compromise the decentralisation ethos of blockchain technology.
- 3 Although L2s inherit security from Ethereum, the additional layers of complexity can introduce new vulnerabilities or bugs that might not exist on the L1 layer.
 - Users face friction when moving assets between different L2s, including waiting periods, fees, and complex interfaces.

Examples Of Layer 2s

Arbitrum (ARB)

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Arbitrum is one of Ethereum's most widely adopted Layer 2 solutions. It utilises optimistic rollups, which assume that transactions are valid unless challenged. This design enables faster and cheaper transactions compared to Ethereum's mainnet. Arbitrum has become a popular choice for decentralised finance (DeFi) applications, with platforms like Uniswap, Aave, and Curve being deployed on its network. The ecosystem continues to grow rapidly due to its high compatibility with Ethereum dApps, but it's withdrawal times (due to the challenge period for fraud proofs) are seen as a minor drawback.

Optimism (OP)

Optimism is another leading Layer 2 solution using optimistic rollups to increase transaction throughput and reduce costs. One of the standout innovations from Optimism is the OP Stack, a modular framework that allows developers to build their own customised Layer 2 chains on top of Ethereum. The OP Stack simplifies the scaling process by providing essential tools and infrastructure, making it easier for developers to launch scalable decentralised applications.

ZKsync (ZK)

ZK Sync employs zero-knowledge rollups (ZK rollups), a cryptographic approach that bundles transactions and proves their validity through cryptographic proofs. ZK Sync is unique among L2s as it offers faster finality and reduced transaction sizes, making it highly efficient and secure. These features make it particularly appealing for dApps that require high security and performance. While more complex to implement, ZK Sync is seen as one of the most scalable solutions for Ethereum.

Immutable X (IMX)

Immutable X stands out as a Layer 2 solution specifically optimised for NFTs and gaming. It uses zero-knowledge rollups (ZK rollups) to provide gas-free minting and trading of NFTs, which has made it a go-to platform for gaming projects and digital assets. Immutable X offers a different value proposition from other Layer 2s by focusing on NFT scalability, allowing projects to create and trade NFTs at scale without worrying about high fees. This unique focus has helped it carve out a niche in the growing NFT and gaming markets.







Why Have Layer 2 Tokens Underperformed?

Despite their technical benefits, Layer 2 tokens have underperformed in the market for several reasons:

- 1 Many Layer 2 tokens, being primarily governance tokens, lack clear utility or incentives for holders. This makes it difficult for users to understand how governance alone drives value to the token, reducing demand and speculative interest.
- 2 The ecosystem is fragmented, with numerous Layer 2 solutions competing for liquidity and attention, making it difficult for individual platforms to gain significant activity.
- 3 Layer 2 solutions face strong competition from blockchains like Solana, which offer fast and cheap transactions natively, diverting users who might otherwise adopt Ethereum Layer 2s.
- 4 Ethereum's price has underperformed relative to Bitcoin and Solana, creating a challenging environment for Layer 2 tokens. Given the interconnected nature of Layer 2s with Ethereum's Layer 1, ETH price action needs to increase for L2 token prices to follow. However, this forms a looping dynamic, as Ethereum's price appreciation is likely to depend on greater Layer 2 adoption itself.