

Bitwise®

The Investment Case for Solana (SOL)

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Table of Contents

I	Executive Summary	5
<hr/>		
II	Understanding Solana (SOL)	6
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	Our Thesis: OPOS (Only Possible on Solana)	6
	Solana Explained	8
	Solana's Tech Stack	14
III	Valuing Solana (SOL)	29
<hr/>		
	Sacrificing Security for Speed and Yield	29
	Understanding SOL Tokenomics	30
	Staking Solana	31
IV	Investing in Solana (SOL)	36
<hr/>		
	SOL Price Forecast	42
V	Conclusion	46
<hr/>		
VI	Investment Opportunity: Bitwise Solana Staking ETP (BSOL)	47

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About Bitwise

Bitwise is one of the world's leading crypto specialist asset managers. Thousands of financial advisors, family offices, and institutional investors across the globe have partnered with Bitwise to understand and access the opportunities in crypto.

Since 2017, Bitwise has established a track record of excellence managing a broad suite of index and active solutions across ETPs, separately managed accounts, private funds, and hedge fund strategies, spanning both the U.S. and Europe.

In Europe, Bitwise (previously ETC Group) has developed an extensive and innovative suite of crypto ETPs, including Europe's largest and most liquid Bitcoin ETP. This family of crypto ETPs is domiciled in Germany and issued under a prospectus approved by BaFin, with 100% of the assets backing Bitwise's products securely stored offline (in cold storage) through regulated custodians. Bitwise products are designed to seamlessly integrate into any professional portfolio, providing comprehensive exposure to crypto as an asset class.

Access is straightforward via major European stock exchanges, with primary listings on Xetra, the most liquid exchange for ETF trading in Europe. Retail investors benefit from easy access through numerous DIY/online brokers, coupled with Bitwise's robust and secure physical ETP structure, which includes a redemption feature.

I Executive Summary

Solana is a high-performance blockchain poised to lead the next phase of decentralized application adoption, driven by sustainable economics, developer innovation, and execution excellence.

- **Economic Strength:** Solana's staking model balances inflationary rewards with deflationary mechanisms, incentivizing network security while enhancing token value.
- **Developer Leadership:** Its 100x improvement in speed and cost over Ethereum has attracted a vibrant developer ecosystem, with increasing migration from competing platforms.
- **Technological Innovation:** Solana's monolithic architecture ensures scalability, low fees, and a superior user experience, avoiding the complexities of modular Layer-2 solutions.
- **Ecosystem Growth:** Spanning DeFi, NFTs, and Decentralized Physical Infrastructure Networks (DePIN), Solana supports diverse, high-value applications, including partnerships with Shopify and Circle.
- **Institutional Appeal:** Favoured by institutions as a high-beta play on Bitcoin and Ethereum, Solana's resilience under stress positions it for mass adoption.

With proven scalability, low costs, and a thriving ecosystem, Solana is a leading contender for institutional and retail adoption, delivering transformative opportunities for investors.

II Understanding Solana (SOL)

Our Thesis: OPOS (Only Possible on Solana)

Solana's projected evolution into 2025 presents a compelling investment thesis built on three foundational pillars: sustainable economics, developer magnetism, and execution.

First, the platform's economic model has proven remarkably robust, with Solana's real economic value reaching unprecedented heights: November alone generated \$409 million¹ in revenue through genuine economic activity. It is particularly noteworthy that Solana's staking mechanism creates a sophisticated wealth transfer dynamic from non-stakers to stakers. While critics focus on headline inflation numbers, this design actively rewards network security participants, creating a powerful economic feedback loop. This is not mere dilution—it's an elegantly designed system wherein active participants gain an increasing share of ownership over time, much like how traditional financial markets reward active capital deployment.

Second, the developer ecosystem story is equally compelling. Solana's improvement over Ethereum in terms of speed and cost was revolutionary—a 100x enhancement that fundamentally changed what was possible on-chain. In contrast, newer competitors to Solana face a much steeper challenge: They must demonstrate meaningful advantages over an already optimized infrastructure. Just as Ethereum's developer network effects proved insurmountable for previous "Ethereum killers," Solana's growing developer mindshare, evidenced by growing hackathon participation rates and significant migration from EVM chains, suggests we're witnessing the emergence of a new blue-chip blockchain.

Lastly, execution velocity has emerged as Solana's defining moat. While competitors focus on theoretical improvements, Solana's engineering-first culture consistently delivers practical solutions. For example, the Firedancer implementation, which promises 1 million transactions per second (TPS) on commodity hardware—and which is now live on the Solana Testnet—exemplifies this approach, focusing on tangible improvements rather than theoretical perfection. This execution-focused strategy has already enabled Solana to maintain sub-second finality and negligible transaction costs while scaling network activity.

(1) Solana Analytics | Blockworks Research

Looking ahead to 2025, Solana's recent performance during the memecoin surge has demonstrated remarkable resilience. The network not only maintained stability under unprecedented load but showed how its localized fee markets can help isolate high-value transactions from retail activity. This real-world stress test validates Solana's infrastructure design and suggests why new use cases consistently emerge on Solana first. The platform simply enables applications that are not feasible elsewhere. As we've seen with Aptos and other newer chains adopting elements of Solana's blueprint, we believe we will continue to see innovation originate on Solana before being adapted by competitors.

We believe we are approaching a pivotal moment in the Layer-1 segment as we move toward 2025. The industry is transitioning from theoretical discussions about blockchain adoption to practical implementation of use cases and rigorous infrastructure stress-testing as institutions enter the space. The fundamental question regarding institutional blockchain adoption has shifted from "if" to "when and who." While Ethereum has garnered significant institutional interest, Solana's recent performance—particularly its resilience during unprecedented network activity and its ability to maintain stability through various stress tests—presents a compelling case for institutional adoption.

Despite historical challenges with outages, Solana's remarkable recent performance sets a new standard for blockchain infrastructure reliability. Looking toward 2025, we expect this momentum to create a powerful positive feedback loop: More successful use cases will drive greater product-market fit, which in turn will attract more developers and institutions.

The question is no longer whether Solana will succeed, but rather how transformative its impact will be.

Solana Explained

Solana, a high-performance blockchain platform, is revolutionizing the way we perceive and interact with decentralized applications (dapps). By leveraging cutting-edge technologies and innovative design principles, Solana aims to address the limitations that have plagued other blockchain networks, such as scalability issues, high transaction costs, and slow confirmation times.

At its core, Solana is designed to facilitate the rapid, cost-effective, and scalable execution of dApps across a wide range of industries. The platform's architecture is capable of processing a theoretical maximum of 65,000 TPS without the need for additional scaling solutions, making it an ideal choice for a variety of use cases such as on-chain gaming and financial services.

What sets Solana apart from its competitors is its unique approach to achieving scalability. While many blockchains rely on complex, multi-layered architectures to improve performance (a **modular** approach), Solana has adopted a streamlined, single-layer integrated design (a **monolithic** approach). This design choice, in our opinion, was a revolutionary one within the space at the time, and as a result has set the new gold standard for the new generation of Layer-1 blockchains (such as Aptos).

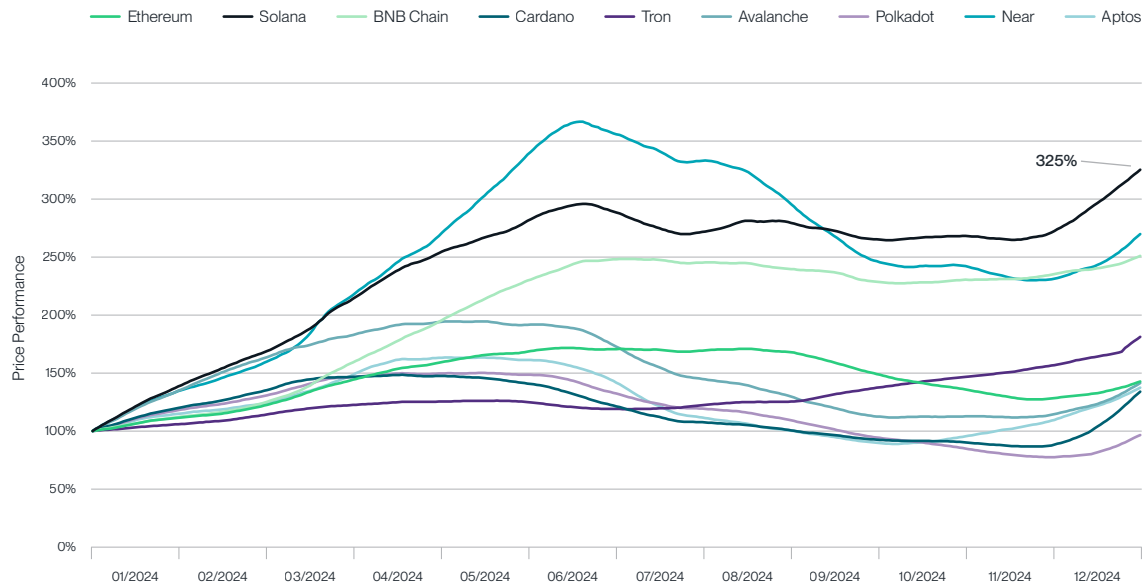
Solana's native token, SOL, serves as the lifeblood of the ecosystem, facilitating value transfer and securing the network through a staking mechanism. The platform's growing popularity and impressive technical capabilities have propelled SOL into the ranks of the top 10 crypto assets by market capitalization.

We believe that Solana has:

- Shown incredible innovation in terms of blockchain infrastructure.
- Been battle-tested and found product-market fit in multiple areas in crypto.
- Built incredible, product-driven developer mindshare that has been instrumental to its fast start and success.
- Created significant moats that protect itself from upcoming competition.

Solana Outperformed All Competitors in 2024

Price Performance of the Top Smart Contract Platforms (Indexed to 100)



Source: Bitwise Europe, Artemis

Lessons from the Mobile Revolution

To fully appreciate the potential impact of Solana on the blockchain landscape, it is helpful to draw parallels with the transformative effects of the smartphone revolution on the mobile industry. Prior to the introduction of the iPhone in 2007, the mobile market was dominated by devices like the BlackBerry and Nokia N95, which primarily catered to business users and tech enthusiasts. These early smartphones, while innovative for their time, had limitations in terms of user experience, app ecosystems, and overall accessibility.

The launch of the iPhone marked a significant shift in the mobile industry, introducing a device that offered a more intuitive, user-friendly experience and a robust app ecosystem. This breakthrough in user experience and functionality appealed to a much broader consumer market, driving widespread adoption and fundamentally changing the way people interacted with mobile technology.

In the context of the blockchain industry, Ethereum can be seen as analogous to the pre-iPhone era of mobile devices. As a pioneer in smart contracts and decentralized applications, Ethereum has been instrumental in advancing blockchain technology and laying the groundwork for the decentralized economy. However, like the early smartphones, Ethereum has begun to face challenges related to scalability, high transaction costs, and slow confirmation times, which have the potential to limit its adoption and growth.

While Ethereum remains the leading smart-contract platform, prioritizing decentralization and security, it has struggled to keep pace with the increasing demand for low-cost, high-volume applications in areas such as payments, gaming, social media, and DePIN.

Although the development of Layer-2 scaling solutions on Ethereum shows promise, alternative platforms like Solana, which offer compelling solutions for specific use cases, may be better suited to meet the needs of certain dApps and user bases.

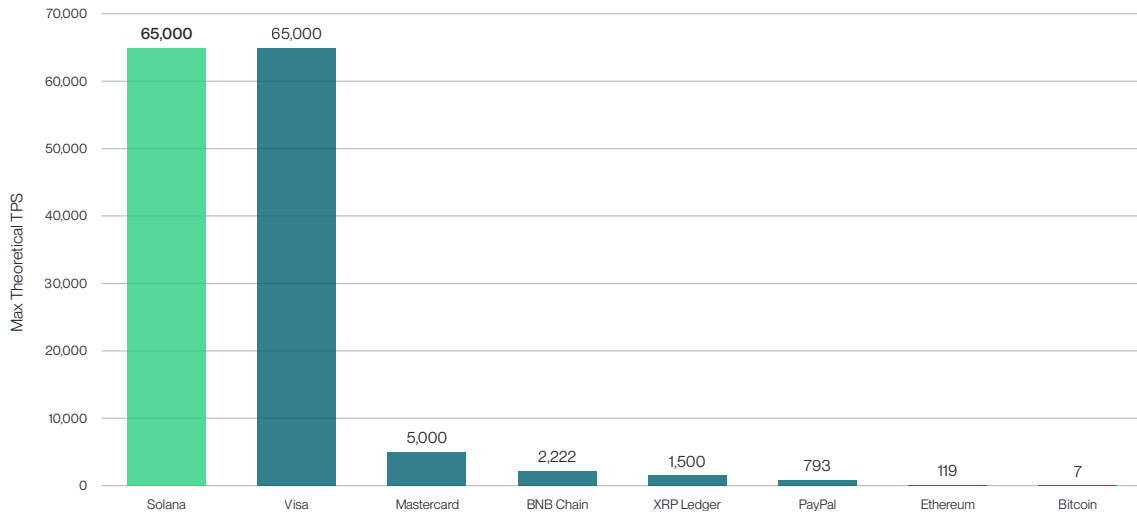
Solana: The iPhone Moment for Blockchain

With a max theoretical throughput capacity of 65,000 TPS, Solana surpasses the combined performance of most Ethereum Layer-2 solutions, making it an ideal platform for building high-volume, low-latency applications such as decentralized exchanges and real-time trading platforms. Moreover, Solana's ultra-low transaction costs, currently averaging just \$0.08 per transaction, open new possibilities for micro-transactions and high-frequency trading, enabling use cases that were previously impractical or cost-prohibitive on other blockchain networks.

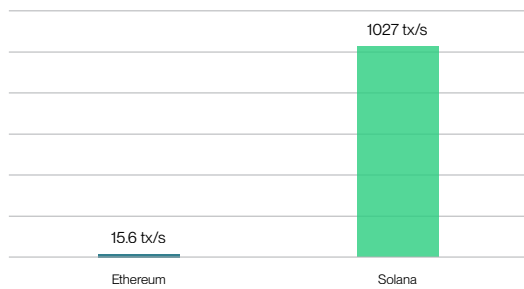
The combination of high throughput, low latency, and minimal transaction costs enables developers to create decentralized applications that push the boundaries of what is possible on blockchain technology. From real-time market data and high-frequency trading to large-scale gaming and social media platforms, Solana's technology stack empowers builders to create applications that can compete with, and even outperform, centralized systems in terms of speed, efficiency, and user experience.

Maximum Transactions Per Second (TPS) Comparison

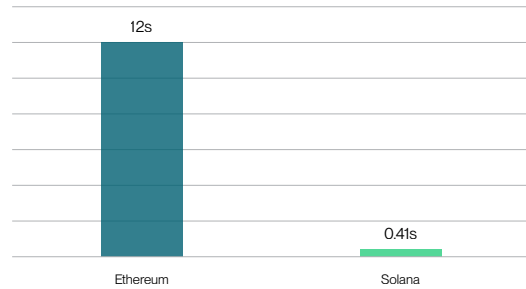
Solana vs. Major Blockchain Networks and Traditional Payment Processors



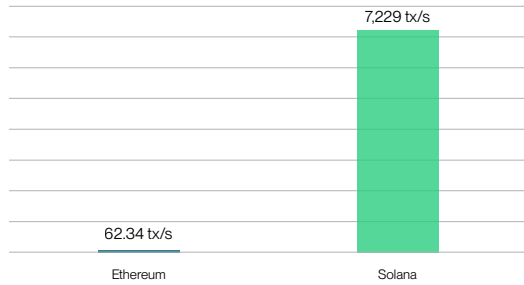
Real Time TPS



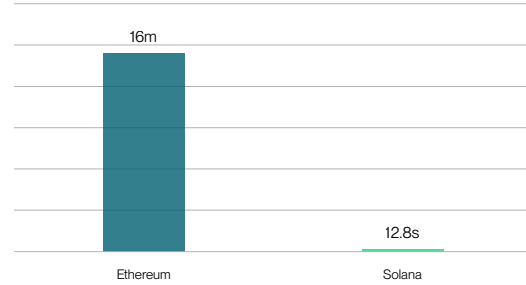
Block Time



Max Recorded TPS



Finality

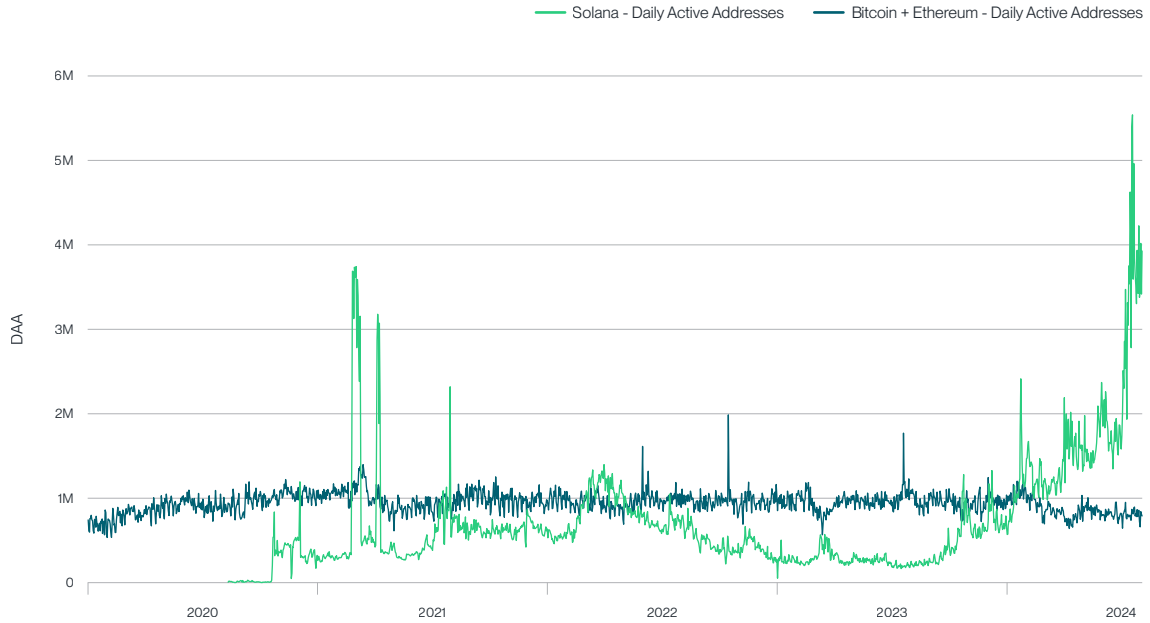


Source: Bitwise Europe, Chainspect.app

Beyond its technical prowess, Solana has focused on fostering a vibrant ecosystem of developers, projects, and users. The Solana ecosystem has seen remarkable growth.

Solana's Daily Active Addresses

#1 in Terms of DAAs; More DAAs Than BTC and ETH Combined

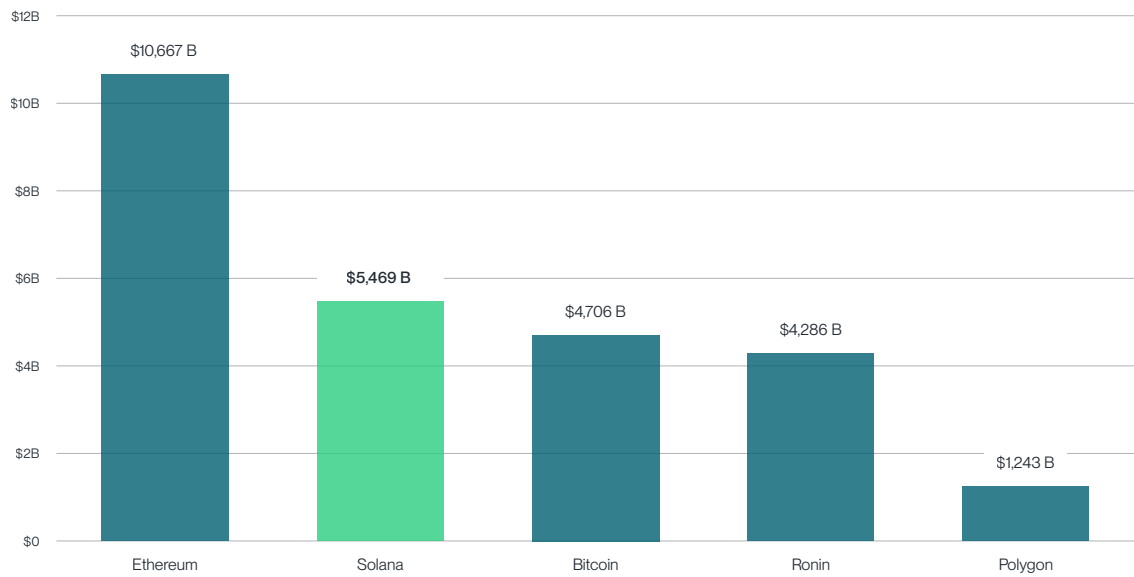


Source: Bitwise Europe, Artemis

Solana's ecosystem spans various sectors, including decentralized finance (DeFi), non-fungible tokens (NFTs), gaming, and decentralized infrastructure. Projects like Serum (decentralized exchange), Raydium (automated market maker), and Hivemapper (decentralized AI-powered dashcam network for real-time map data) showcase the diversity and potential of the Solana ecosystem. The Solana Foundation has actively supported the growth of the ecosystem through initiatives like the Solana Accelerator Program, hackathons, and strategic partnerships. These efforts have attracted top talent and fostered a strong product-oriented developer community.

Solana NFT Sales

Solana Ranks 2nd After Ethereum in Terms of Real Sales Volume (Total Sales—Wash sales)



Source: Bitwise Europe, cryptoslam.io

Solana's technological innovation is a fundamental driver of SOL's potential as a viable asset, even more so than other factors such as narrative, sentiment, and liquidity. To better understand this, let's take a deep dive into how Solana works and what sets its technology stack apart from those of its competitors.

Solana's Tech Stack

Monolithic vs. Modular

Central to Solana's design philosophy is the use of a single-layer, integrated (i. e., monolithic) architecture. This approach avoids the complexities and potential inefficiencies associated with multi-layered, modular solutions. By maintaining all core functions—transaction execution, settlement, and data storage—on a single layer, Solana can deliver high throughput and low latency, making it an ideal platform for supporting decentralized applications (dApps).

Solana's streamlined single-layer architecture offers significant advantages over Ethereum's multi-layered "L2" scaling approach. By avoiding the complexities of coordinating multiple layers, Solana achieves high transaction throughput and low fees without complexity.

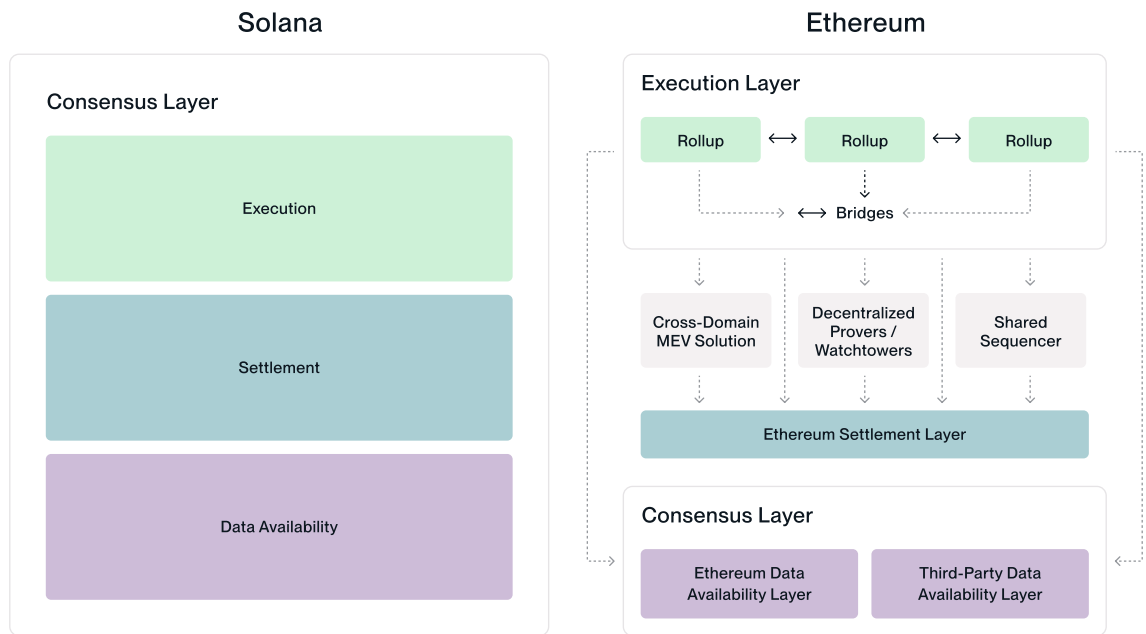
In contrast, modular blockchains using L2 solutions introduce challenges such as:

- Fragmented liquidity due to the need to bridge assets between layers, reducing market depth and increasing slippage.
- Constant compatibility checks and dependency management between layers, increasing system complexity.
- Difficulty in swiftly identifying and resolving issues that arise due to the intricacies of the layered architecture.
- Higher communication costs from transferring data between layers.
- A more complicated user experience navigating the multi-layered ecosystem.

Solana's monolithic design sidesteps these issues, enabling more efficient transaction processing at a lower cost compared to Ethereum's L2 approach. This architectural simplicity positions Solana as a compelling alternative for users and developers seeking a high-performance blockchain platform.

Integrated vs. Modular Stacks

While modularity increases developer flexibility and promotes greater security, associated costs from such a multi-chain economy may only become more burdensome as the number of actors in the modular stack expands.



Source: Bitwise Europe, adapted from Synchrony. Note: Illustrative

-----> Fee Flows

Solana's decision to stick with a monolithic architecture is rooted in its early challenges with fundraising. During its initial coin offering (ICO) in March 2020, Solana raised just \$1.76 million, a modest sum compared to some of its peers. For example, Algorand had raised \$60 million in a similar auction just six months prior. These constraints forced Solana to be judicious with its resources and design choices, ultimately leading to the efficient, cost-effective single-layer architecture it employs today.

To better illustrate the difference between Solana's monolithic approach and the modular architecture used by blockchains like Ethereum, let's draw a parallel to traditional finance. Consider the example of a full-service bank that provides a wide range of financial services, such as checking and savings accounts, loans, credit cards, and investment products, all under one roof.

When you visit a full-service bank, you can access all these services through a single point of contact, whether it's a teller, a personal banker, or an online banking platform. This integrated approach allows for a seamless and efficient experience, as you don't need to visit multiple institutions or navigate complex systems to manage your financial needs.

In this analogy, the full-service bank represents Solana's monolithic architecture, where all the core functions of the blockchain are handled on a single layer. Just as the bank provides a comprehensive suite of services, Solana's single-layer design enables it to process transactions, execute smart contracts, and manage the entire ecosystem without relying on additional layers or third-party solutions.

This monolithic approach offers several advantages. First, it simplifies the user experience, as individuals and businesses can interact with the blockchain directly, without the need for intermediaries. Second, it reduces complexity, as all the components of the system are tightly integrated and optimized to work together seamlessly. Third, it enables fast and cheap transactions, as there is no need to coordinate between multiple layers or pay fees to intermediaries.

In contrast, blockchains with modular architectures, like Ethereum, can be compared to a network of specialized financial institutions. In this model, you might have separate entities for checking accounts, loans, credit cards, and investments, each with its own systems and processes. While this approach allows for specialization and innovation within each domain, it also introduces challenges such as fragmented user experiences, increased complexity, and higher costs due to the need for coordination between different entities.

Solana's monolithic architecture, much like a full-service bank, streamlines the blockchain experience by providing a comprehensive and integrated platform. This architectural choice is a key factor in Solana's ability to offer high performance, low costs, and a developer-friendly environment, making it an attractive option for users and builders alike.

Congestion and Localized Fee Markets

Solana's innovative approach to transaction processing, including Proof of History (PoH) and localized fee markets, tackles the critical issues of network congestion and high transaction fees that have plagued other blockchains, causing significant concerns for end-users.

To understand PoH, imagine a traditional stock exchange where traders must constantly communicate to agree on the order of trades. This communication can slow down the process, like how validators in traditional blockchains must reach consensus on transaction order. In contrast, PoH functions like a synchronized, tamper-proof clock that all traders can independently reference, eliminating the need for constant communication.

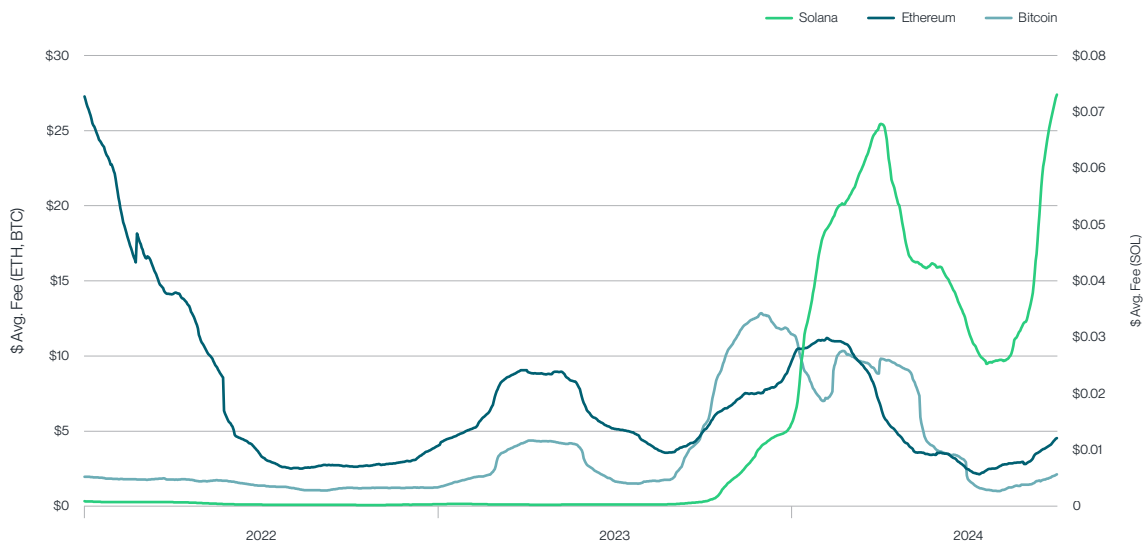
Anatoly Yakovenko, the creator of Solana, recognized that the scalability limitations in existing blockchains were largely due to the lack of a trustless, universal clock for timestamping transactions. His solution was to create a global clock that each validator could independently verify, simplifying network synchronization. This allows transactions to be processed almost immediately upon arrival, like how stock trades are executed in real time.

This concept, known as Proof of History, aligns with Solana's belief that if software does not hinder hardware, network performance can increase linearly with hardware advancements. This is analogous to how stock exchanges adopt cutting-edge technology to process trades more efficiently.

By minimizing the need for nodes to communicate and agree on transaction order, Solana can process transactions much more efficiently than traditional Proof of Stake (PoS) blockchains like Ethereum. Ethereum's sequential processing and the requirement for nodes to agree on transaction order can lead to significant congestion during high network activity, like how a stock exchange might experience delays during peak trading hours.

Solana's Competitive Fees Showcases the Effectiveness of a Monolithic Architecture

Despite High Network Traffic, Average Transaction Fees Have Never Exceeded \$0.10

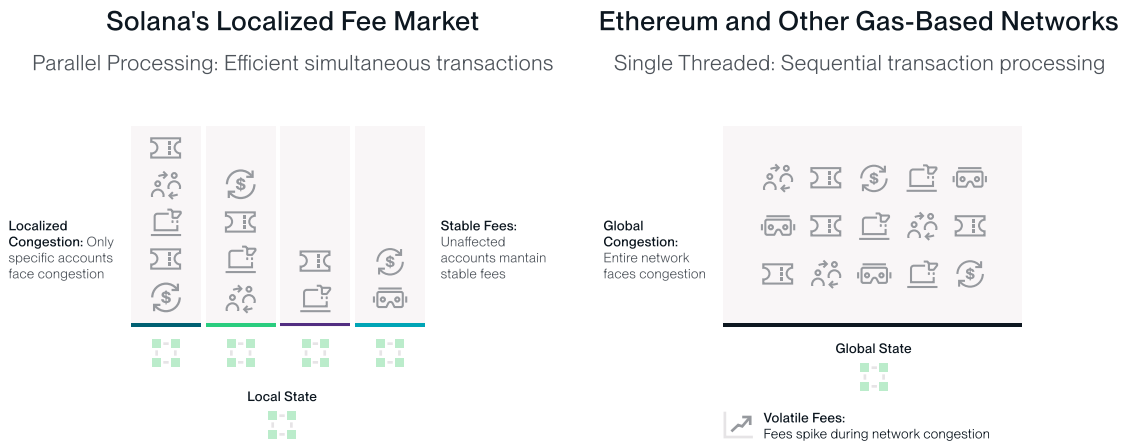


Source: Bitwise Europe, Artemis

In addition to PoH, Solana also implements a unique localized fee market that further helps to mitigate the impact of network congestion on transaction fees. In Solana's localized fee market, transactions that don't overlap with each other are executed on separate threads, much like vehicles traveling on separate roads.

For example, if one account becomes busy due to high demand for a specific asset, such as an NFT, only the fees on that account will increase. The fees on other accounts, unaffected by this congestion, remain stable. This leads to a fee market that responds to demand based on the use case. When there's a spike in demand for a specific asset, the transaction cost for that asset rises temporarily, while the costs for other transactions on the chain remain unaffected.

Comparing Fee Markets: Solana vs. Ethereum and Other Gas-Based Network



Solana's localized fee market offers predictability and efficiency by isolating congestion. In contrast, for Ethereum and other gas-based networks, global congestion leads to volatile fees.

Source: Visa

Scalability Galore: Solana's Consensus Mechanism

Solana's consensus mechanism is a unique combination of Delegated Proof of Stake (DPoS) and Proof of History (PoH). In DPoS, token holders delegate their tokens to elected validators, whereas in traditional PoS, each validator stakes on its own. While PoS is the same technology currently used by Ethereum to secure transactions, PoH is an innovative timestamping system that helps achieve consensus more efficiently.

Here is a step-by-step explanation of how Solana reaches consensus:

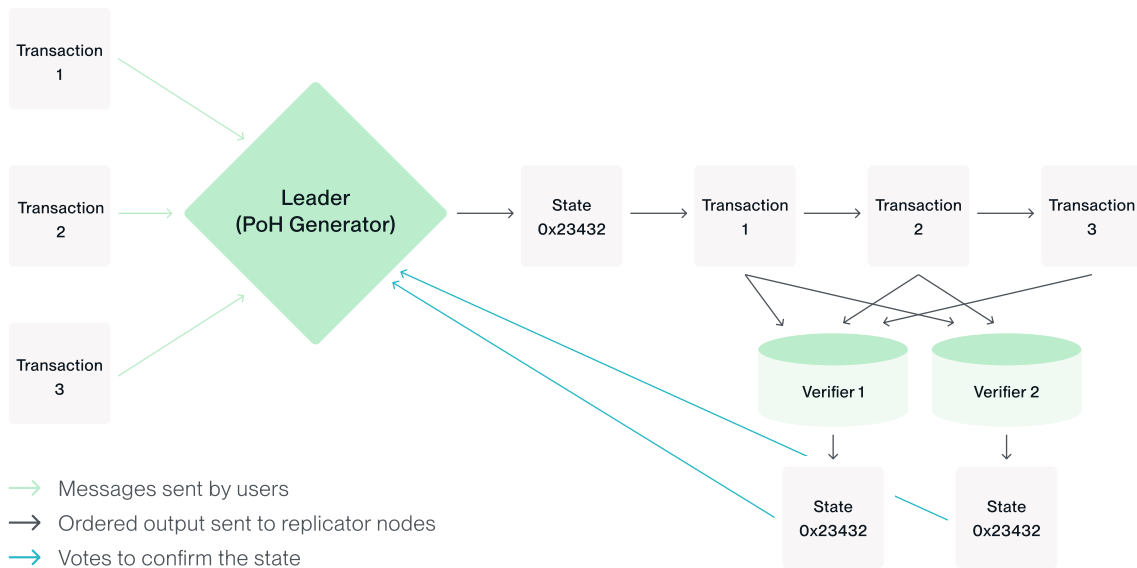
1. **Transaction Signing and Broadcasting:** A user signs a transaction using their wallet (a digital app that stores and manages crypto assets) and sends it to a Remote Procedure Call (RPC) node. An RPC node is a computer connected to the Solana network that helps relay information between users and the blockchain.
2. Solana's consensus mechanism is a unique combination of Delegated Proof of Stake (DPoS) and Proof of History (PoH). In DPoS, a smaller, elected set of validators handle block production, which often results in faster block times and higher throughput than traditional PoS systems. While PoS is a similar concept used by Ethereum to secure transactions, DPoS in combination with PoH is an innovative timestamping system that helps achieve consensus more efficiently.
3. **Timestamping and Banking:** The leader node receives transactions and assigns them to different threads (like lanes on a highway) for processing. Some transactions are processed one after another (sequentially), while others can be processed at the same time (in parallel). The leader node uses PoH, a cryptographic timestamp, to give each transaction a unique place in the order of events.

4. **Block Creation:** Once transactions are timestamped and processed, the leader node creates a new block containing these transactions and their PoH sequence.
5. **Block Propagation:** The newly created block is sent to other validators in the network, called replicator nodes, which maintain copies of the blockchain.
6. **Validation:** Replicator nodes verify the transaction order using the PoH sequence and ensure that all transactions comply with the network's rules. Since the transaction order is determined by the PoH timestamps, validators don't need to communicate with each other to agree on the order, streamlining the verification process.
7. **Block Finalization:** Once transactions are verified, the block is added to the blockchain, which is like a public ledger that contains all the transaction records. The process then starts again with the selection of the next leader node.

At the core of Solana's consensus mechanism is PoH, a cryptographic clock that allows each validator to keep track of time independently. PoH works by creating a chain of hashes, where each hash is derived from the previous one. This creates a verifiable sequence of events, proving the passage of time without the need for validators to communicate with each other.

In addition to PoH, Solana integrates Tower BFT, a tailored implementation of Byzantine Fault Tolerance (BFT). BFT is a consensus mechanism that ensures the network remains operational and secure even if some validators fail or behave maliciously. In practical terms, it allows the system to achieve consensus despite potential disruptions. Tower BFT enhances this by leveraging PoH as a time and order reference, enabling validators to efficiently vote on the state of the ledger. As more validators confirm a specific sequence of events, it becomes increasingly difficult to alter or reverse transactions, providing both security and finality to the network. This design strengthens Solana's ability to deliver reliable high-speed performance in a decentralized environment.

The combination of DPoS, PoH, and Tower BFT allows Solana to process thousands of transactions per second, making it one of the fastest blockchain networks in the industry. Its high throughput and low latency make Solana an attractive platform for applications that require fast and inexpensive transactions, such as DeFi protocols, gaming, and DePIN protocols.



Source: Solana Whitepaper

In addition to PoH and Tower BFT, Solana has implemented several other innovations that further enhance its performance and scalability:

- Turbine:** Turbine is a block propagation protocol that breaks data down into smaller packets, enabling faster and more efficient data transmission across the network. This innovation helps to optimize bandwidth usage and reduces the time required for block confirmation.
- Gulf Stream:** Gulf Stream is a transaction-forwarding protocol that allows validators to execute transactions ahead of time, reducing confirmation times and improving overall network throughput.
- Sealevel:** Sealevel is a core technology that enables multi-threaded parallel processing in Solana. This is the reason why the localized fee market implementation, a solution to address network congestion, is possible.
- Pipeline:** Pipeline is a transaction processing unit that streamlines the process of transaction validation and execution. By optimizing the transaction flow (by using different parts of the hardware), it helps maximize the efficiency and utilization of hardware. This helps to minimize the latency and improve the overall efficiency of the network.
- Archivers:** Archivers are a distributed ledger storage solution that allows the network to store large amounts of data off-chain, reducing the storage burden on individual nodes. This innovation helps to ensure that the network remains accessible to a wider range of participants, regardless of their individual storage capacities.

One of the most recent and significant innovations in the Solana ecosystem is the introduction of SuperToken, a new token standard that is set to replace the current SPL (Solana Program Library) standard.

This innovation brings a range of new features and capabilities that were previously unattainable on Solana. SuperToken offers several key advantages, including immutable ownership, which prevents unauthorized token transfers and ensures secure transactions; confidential transfers, enabling private transactions through zero-knowledge proofs; interest-bearing tokens, allowing for the accumulation of interest over time; transfer fees, facilitating sustainable community funding; transfer hooks, opening up new possibilities for custom program triggers during token transfers; and non-transferable tokens, which are useful for applications such as event ticketing.

The overarching trend here is constant innovation that pushes the boundaries of what is possible in a blockchain. Solana has been a leader in this field for years, and that leadership position is strengthening over time.

Solana’s “Network Extension” Narrative

As Solana reaches a pivotal moment in its development, the platform faces a critical decision: whether to maintain its commitment to the current monolithic architecture or adopt a more modular approach to scaling. This choice has significant implications for Solana’s future performance and user experience, and it is essential for investors to understand the potential consequences of each path.

While Solana has already made significant strides in solving throughput and scalability issues with its innovative consensus mechanism and parallel transaction processing, the platform continues to explore new ways to enhance its capabilities. One such approach is the concept of “Network Extensions,” a term coined by Austin Federa,² which aims to improve scalability and introduce specialized execution environments without compromising the platform’s core advantages or requiring users to navigate the complexities of moving assets between different layers.

The term “Network Extensions” has sparked a debate within the crypto community about the similarities and differences between Solana’s approach to scaling and Ethereum’s Layer 2 (“L2”) solutions. While some argue that Network Extensions are essentially the same as Ethereum’s L2s, there are key differences between the two concepts. Ethereum’s L2s are defined by specific technical architectures and involve moving execution and data off the main chain, whereas Network Extensions are categorized based on their purpose and the functionality they bring to the Solana ecosystem.

Examples of Network Extensions in the Solana ecosystem include protocols like Neon EVM, which allows EVM developers to deploy Solidity contracts on Solana, and Sonic, an L2 SVM rollup focused on gaming.

(2) See Federa’s post on X from September 2, 2024.

Another notable example is MagicBlock, an L1-native execution engine for high-performance apps with a focus on gaming. Unlike traditional L2 architectures, MagicBlock enables developers to deploy ephemeral rollups, which are fully customized execution layers for specific parts of an application. This approach allows developers to choose which parts of the app logic run on the rollup while keeping the rest, including liquidity, on the Solana L1. This abstraction eliminates the need for users to bridge assets between layers, maintaining the platform's monolithic structure while still benefiting from the scalability enhancements of a modular system.

The debate surrounding Network Extensions highlights the ongoing competition between Solana and Ethereum, with both platforms seeking to offer the most efficient and user-friendly scaling solutions. Some Solana supporters argue that Ethereum's L2s are "parasitic" to the base layer, taking away revenue and users. However, Ethereum proponents counter that L2s are symbiotic and complementary to the base layer, and that the term "parasitic" is simply a pejorative term used to imply that Ethereum's L2 model is inferior.

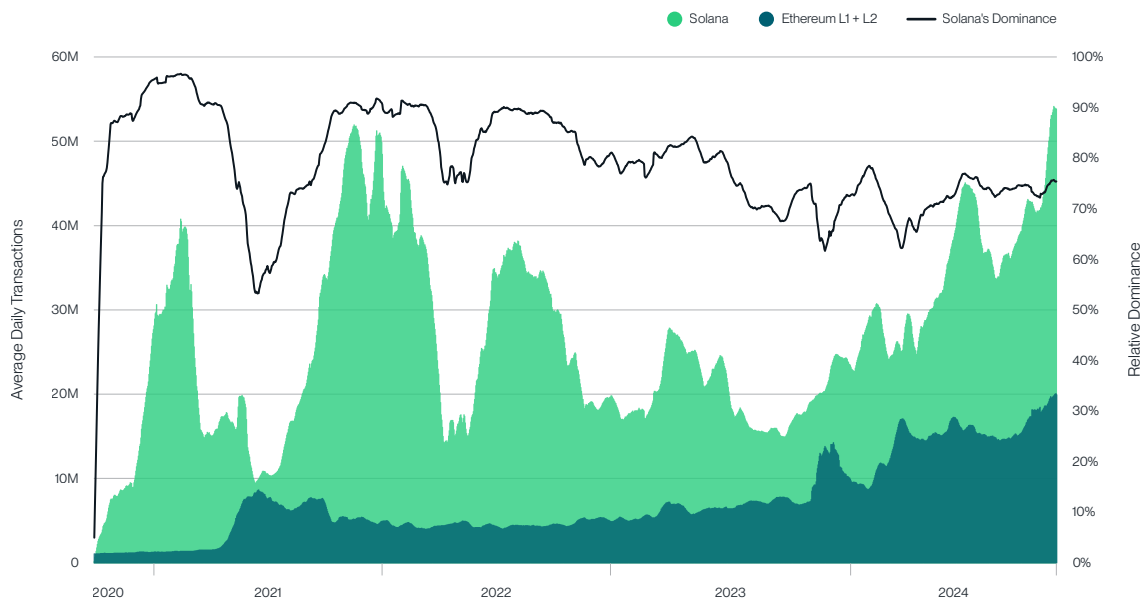
While the debate surrounding the similarities and differences between Network Extensions and Ethereum's L2 solutions continues, it is clear that Solana is committed to finding innovative ways to enhance its capabilities without compromising its core strengths. As the platform navigates this critical juncture, the success of its Network Extension strategy will depend on its ability to enable new use cases, improve performance, and maintain a seamless user experience.

Finding Product-Market Fit

Solana's ecosystem has experienced remarkable growth across various metrics, demonstrating the platform's increasing popularity and potential. The total value locked (TVL) in Solana's DeFi protocols has surged to over \$9.5 billion, while the numbers of active wallets and daily transactions continue to climb, showcasing Solana's strong product-market fit.

Solana's Dominance in Daily Transactions

Solana Consistently Outperforms ETH and Its L2s in Daily Transactions, Sustaining an Average of 75% Dominance



Source: Bitwise Europe, Artemis

While Solana's DeFi market share is substantially less than Ethereum's, with Solana at roughly 11% the size of Ethereum in terms of TVL, Solana's target market extends beyond DeFi, primarily focusing on high-frequency operations and retail trading activity such as payments, trading, gaming, artificial intelligence (AI), and decentralized physical infrastructure networks (DePIN).

The platform's potential is not merely theoretical; Solana is already seeing significant real-world adoption across various industries and use cases. For example, Solana has recently partnered with Shopify, allowing millions of businesses to accept payments via Solana Pay, a decentralized, peer-to-peer payments protocol built on the Solana blockchain. This partnership highlights Solana's ability to integrate with established platforms and provide valuable solutions for real-world applications.

Furthermore, Solana's low fees and fast transaction times have attracted the attention of DeFi protocols and stablecoin issuers. In a notable development, Circle, the company behind the popular USDC stablecoin, has integrated USDC on Solana. This integration not only validates Solana's potential for large-scale, real-world applications but also brings increased liquidity and stability to the Solana ecosystem.

Solana's DePIN Revolution

Solana's ecosystem is at the forefront of the DePIN revolution, with a wide range of use cases that showcase the platform's versatility and potential. From decentralized energy solutions and GPU networks to data collection for training large language models, Solana is enabling a new generation of decentralized infrastructure projects.

A prime example of Solana's DePIN capabilities is the Helium network, a decentralized wireless network that incentivizes users to provide coverage by rewarding them with HNT tokens. Helium's migration to the Solana blockchain has opened up new possibilities for scalability and interoperability, demonstrating Solana's ability to support large-scale, real-world infrastructure projects.

Similarly, Hivemapper, a decentralized mapping network built on Solana, leverages the power of crowdsourcing to create highly accurate, up-to-date maps. By incentivizing users to contribute mapping data through a token rewards system, Hivemapper is building a decentralized alternative to traditional mapping services, with the potential to disrupt industries ranging from transportation to urban planning.

As more DePIN projects recognize the benefits of building on Solana, the platform is poised to become the go-to blockchain for decentralized infrastructure initiatives. The success of projects like Helium and Hivemapper highlights Solana's ability to support complex, real-world use cases that require high throughput, low latency, and cost-effective transactions.

Solana's DePIN ecosystem is not limited to these two projects; numerous other initiatives are leveraging the platform's capabilities to build decentralized infrastructure solutions. For example, projects like Akash Network, a decentralized cloud computing platform, are utilizing Solana's blockchain to create innovative, decentralized solutions for their respective industries.

The growth of Solana's DePIN ecosystem can be attributed to several factors, including the platform's high-performance architecture, low transaction costs, and vibrant developer community. As more projects recognize the benefits of building on Solana, the network effects created by this growing ecosystem will likely attract even more developers, users, and investors, further solidifying Solana's position as a leader in the DePIN space.

Institutional Applications

One of the most significant developments in Solana's ecosystem is the Firedancer project, spearheaded by Jump Trading, a leading high-frequency trading and market-making firm. Firedancer is a new validator client designed to push the boundaries of Solana's performance, with a theoretical throughput of up to 1 million TPS on commodity hardware. The significance of Jump Trading's involvement cannot be overstated. As a vertically integrated firm with extensive expertise in distributed systems and in-house hardware engineering capabilities, Jump brings unparalleled technical prowess to the Solana ecosystem. Their decision to invest heavily in building the fastest validator client for Solana is a strong vote of confidence in the platform's long-term potential, particularly in the context of tokenized trading markets.

Jump's strategy with Firedancer is likely aimed at capturing advantages in market-making by narrowing spreads and improving trade execution times. By running the fastest validator client on Solana, potentially even utilizing custom hardware to further optimize performance, Jump has positioned itself to be a leader in this space, outperforming competitors in terms of speed and efficiency.

The Firedancer project is not only a game-changer in terms of performance but also a critical step in enhancing Solana's robustness. By diversifying the network's validator clients, Firedancer, along with other clients like Anza's Agave, reduces the risk of a single point of failure. This increased resilience, combined with the scalability improvements brought by Firedancer, makes Solana an even more attractive platform for the future of tokenized trading and decentralized finance.

The advent of blockchain technology has also introduced a new paradigm for high-frequency trading (HFT), presenting both challenges and opportunities for traders and quants. Unlike traditional HFT, which focuses on minimizing latency by colocating with exchanges, trading on blockchains like Solana involves a distributed systems problem, where latency depends on the physical location of the validator processing a transaction.

Solana's architecture, with its emphasis on high throughput and low latency, is uniquely positioned to address these challenges. The Firedancer project, in particular, promises to revolutionize blockchain-based HFT by enabling theoretical throughputs of up to 1 million transactions per second on commodity hardware. This scalability, combined with Solana's fast block times and low transaction costs, makes it an ideal platform for HFT strategies.

Moreover, Solana's growing ecosystem of decentralized exchanges, such as Serum and Raydium, provides a fertile ground for HFT firms to deploy their strategies. These exchanges, built on Solana's high-performance blockchain, offer traders access to deep liquidity and advanced trading features, creating new opportunities for arbitrage and market-making. As tokenized markets expand and mature, Solana's ability to handle high-frequency trading at scale will become increasingly crucial. The combination of Firedancer's performance improvements and the platform's inherent advantages in terms of speed and cost-effectiveness position Solana to be a leading blockchain for the next generation of financial markets.

Firedancer is crucial because it changes how Solana scales. It moves the limitations from software to hardware, aligning with the idea that as technology gets better, Solana can handle more transactions. While reaching 1 million TPS might take a bit of time, Firedancer sets the stage for big improvements in scalability, making Solana an even more compelling option for institutional investors and high-frequency traders.

Solana’s Memecoin Dominance: A Testament to Its Product-Market Fit

Solana has found a unique product-market fit by becoming the preferred blockchain for memecoins and speculative assets. This is mainly due to its fast and cheap performance, combined with the perfect environment to foster “Degen” culture—a high-risk, high-reward mentality that aligns well with the volatile nature of memecoins.

The network’s low transaction fees make it economically viable for users to engage in frequent trades and transactions of even small amounts—a crucial factor for the often low-value, high-volume nature of memecoin trading. This technical foundation has allowed for the development of an ecosystem tailor-made for retail engagement, with user-friendly tools like Telegram bots, decentralized exchanges, and wallets simplifying the experience for newcomers.

The rise of memecoins on Solana, despite their speculative and often volatile nature, reflects deep-seated behavioral and economic principles. Memecoins tap into the human brain’s dopaminergic system, which governs reward anticipation. The rapid price swings offer both the thrill of potential reward and the communal engagement of participating in a shared narrative. This phenomenon is not new; speculative investments fueled the early days of the internet and the dot-com bubble, catalyzing the digital transformation of the global economy.

At the same time, memecoins convene a network of like-minded individuals to participate in a community. Therefore, even though most memecoins do not possess intrinsic value like Bitcoin, they possess social value for their users. Different expressions for memecoins could be “community coins” or “social coins.”

Solana, often described as the “retail blockchain,” has benefited massively from the memecoin phenomenon. The influx of memecoin activity drives network effects, increasing transaction volume, fostering liquidity, and incentivizing the development of better tooling and infrastructure. As mentioned earlier in our thesis, we believe this is another example of how Solana is being stress-tested as a Layer-1 blockchain and continues to build irrefutable evidence that it has the infrastructure to inevitably embrace mass adoption.

A prime example of how this ecosystem functions can be seen in the story of BONK, a “culture coin” that has evolved to launch multiple products, including an NFT collection, a play-to-earn gaming platform, and various DeFi integrations. Memecoins like BONK represent a form of “attention tokens,” capturing and financializing attention by allowing people to speculate on cultural phenomena.

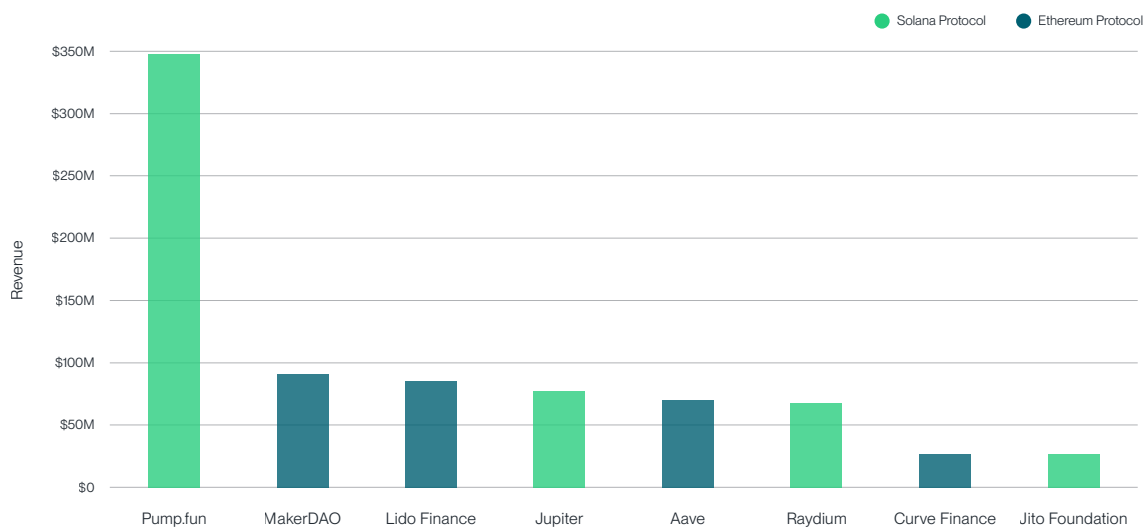
Solana's financial sector has been the primary driver of the memecoin frenzy, with users creating and trading these speculative assets en masse. Several factors have contributed to this trend, including a backlash against overpriced venture-backed tokens, a lack of interest in richly valued application tokens, and the fact that speculation has always been a core part of the crypto economy. While these experiments may seem frivolous, they play a crucial role in stress-testing the infrastructure and preparing for the eventual shift of the global financial system onto blockchains.

The meteoric rise of Pump.fun, the defining protocol of Solana's growth over the past year, exemplifies the potential of this ecosystem. Pump became the fastest-growing application in the history of the crypto economy, generating \$100 million in revenue in just 217 days. Today, it stands as the industry's top revenue-generating application, with a run rate of \$348 million per year. Although memecoin trading may ultimately be viewed as a form of blockchain-native gambling, Pump's success sends a powerful signal to builders on Solana about the possibilities that await them.

The most compelling argument for the value of memecoins to Solana is their potential to serve as a gateway to broader adoption. Many users who are initially drawn to Solana through memecoins will eventually graduate to more sophisticated use cases, driving innovation and growth across the ecosystem. The revenues and attention captured by memecoins can be reinvested into the ecosystem, providing support and resources for projects that might otherwise struggle to gain visibility or funding.

Solana Applications Are Becoming Competitive

Despite Sentiments About Memecoins, Pump.fun is the Top App by Revenue, Beating Out Apps on Ethereum



Source: Bitwise Europe, Synchrony. Data as of October 2024

Solana's memecoin dominance is not a passing fad or frivolous distraction, but a crucial driver of mass adoption, stress-testing, and innovation. By providing a low-cost, user-friendly environment for speculative assets, Solana has created a gateway for users to explore the full potential of blockchain technology.

The Infinite Monkey Theorem provides a useful framework for understanding the value of this market segment: Just as more monkeys typing on keyboards increases the likelihood of producing Shakespeare, and testing more compounds in drug discovery increases the chances of finding a cure, the proliferation of memecoin projects on Solana accelerates innovation and the emergence of transformative applications. As the ecosystem matures, the resources and attention attracted by memecoins can be channeled into more advanced use cases, positioning Solana as a leader in the next phase of blockchain adoption.

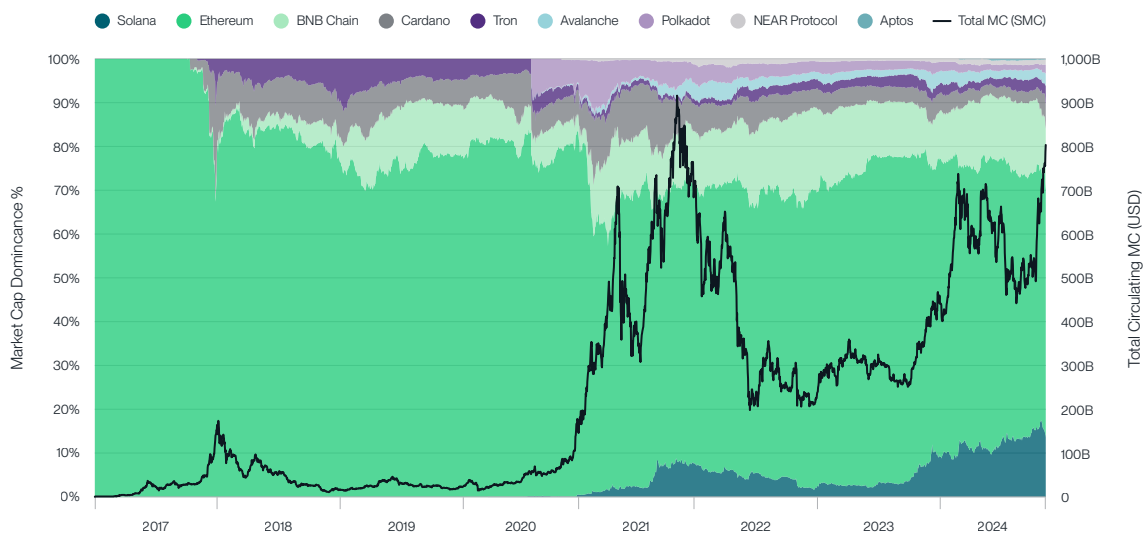
III Valuing Solana (SOL)

Sacrificing Security for Speed and Yield

During the previous bull market cycle (2020/21), the Layer 1 (L1) trade gained significant traction as market participants demonstrated a willingness to sacrifice security for user experience and higher yield opportunities in decentralized finance (DeFi) applications. Platforms like Solana, Avalanche, Polkadot, and Cardano capitalized on this trend, offering lower fees and faster transaction speeds compared to Ethereum's mainnet.

Smart Contract Dominance

Solana Ranks as the 3rd Most Dominant SMC Platform After ETH and BNB



Source: Bitwise Europe, Artemis

This phenomenon underscores the importance of low fees and seamless user experience for the majority of market participants. The willingness to move up the risk curve in pursuit of higher risk-to-reward plays was a defining characteristic of the L1 trade narrative.

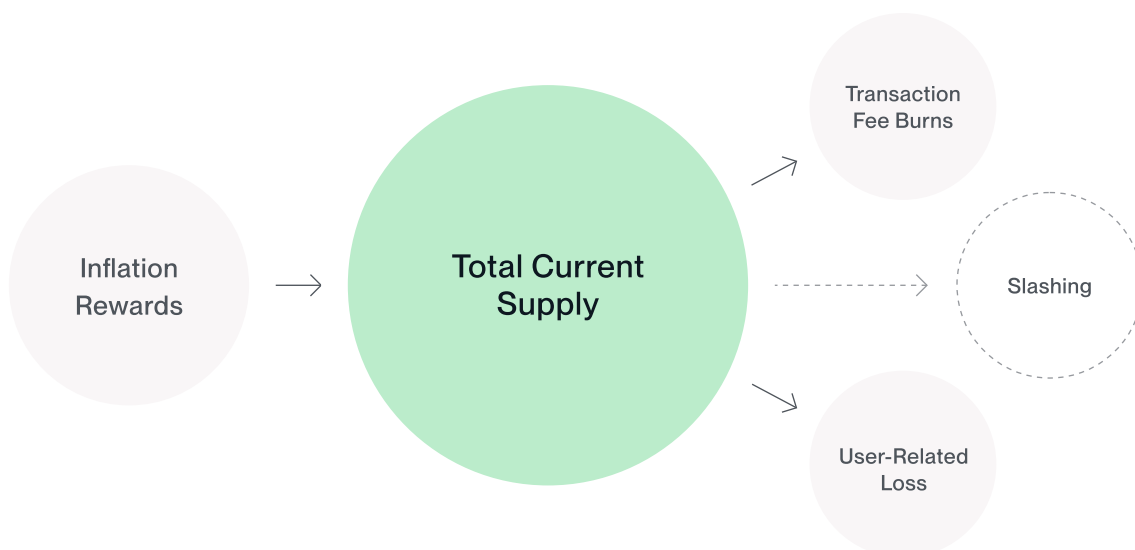
Solana's innovative architecture and economic model present a compelling case for investors seeking exposure to this asset class. To fully appreciate Solana's value proposition, it is essential to understand the distribution of the network's Total Economic Value (TEV) among its key stakeholders and the factors that drive demand for the native SOL token.

Understanding SOL Tokenomics

All SOL tokens originate from one of two sources: the genesis block or protocol inflation, also known as staking rewards. Conversely, transaction fee burn is the only protocol mechanism by which SOL tokens can be removed from the supply. This means that SOL has both inflationary and deflationary mechanisms built into its tokenomics.

SOL token issuance is described by the inflation schedule's three key parameters: the Initial Inflation Rate (8%), the Disinflation Rate (-15%), and the Long-Term Inflation Rate (1.5%). Currently, SOL's inflation rate is 4.9%. Delegated Proof of Stake (DPoS) consensus is natively built into Solana, allowing token holders to easily stake their SOL to a validator of their choice and unstake at every epoch boundary (which lasts approximately two days).

Solana Inflationary and Disinflationary Forces



Source: Bitwise Europe, Adapted from Helius. Circles not to scale

80.7%

19.3%

476,117,505

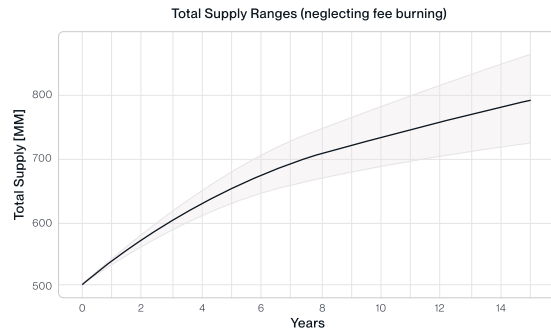
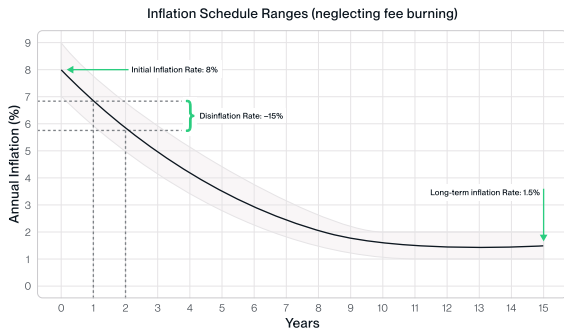
Circulating Supply

“Locked SOL in stake accounts”: SOL that is typically staked, often resulting from investments or grants by the Solana Foundation.

“Unlocked SOL owned by Solana Labs/ Foundation”: SOL held by Solana Labs or the Solana Foundation, kept in stake accounts but not locked.

113,726,622

Non-Circulating Supply



Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Inflation Rate	8.00%	6.80%	5.78%	4.91%	4.18%	3.55%	3.17%	2.57%	2.18%	1.85%	1.58%

Source: Bitwise Europe, Solanacompass.com, Solana Whitepaper

Staking Solana

In traditional markets, investors are often faced with a choice between holding an asset for potential price appreciation or seeking yield through various instruments such as bonds, dividends, or interest-bearing accounts. However, the emergence of protocols like Solana has introduced a new paradigm that allows investors to both hold the native token and earn rewards for supporting the network through staking.

Solana’s innovative PoS mechanism is designed to incentivize token holders to actively participate in securing the network by staking their SOL tokens. By doing so, stakers not only contribute to the network’s overall health and stability but also have the opportunity to earn attractive rewards in the form of newly minted SOL tokens.

The beauty of Solana’s staking model lies in its ability to create a positive feedback loop that benefits both stakers and the network. As more token holders choose to stake their SOL, the network becomes increasingly secure and resilient, which in turn drives greater adoption and demand for the token. This virtuous cycle has the potential to create a sustainable and rewarding ecosystem for all participants.

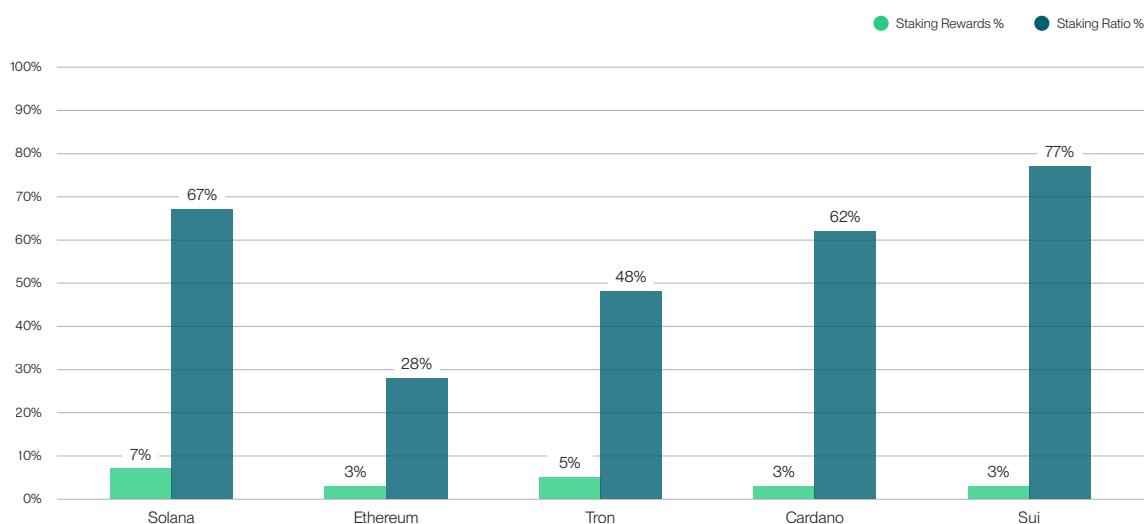
Token Holders: Benefiting From Deflationary Pressure. Token holders, the owners of SOL, have a vested interest in the deflationary pressure exerted on the token supply through the burning mechanism. This process of burning SOL can be likened to a stock buyback program in traditional finance. Just as a company buying back its own shares reduces the total number of outstanding shares, thereby increasing the value of each remaining share, the burning of SOL effectively reduces the token supply, potentially leading to an appreciation in the value of the remaining tokens. This dynamic creates an incentive for token holders to support the network's growth and success.

Stakers: Earning Rewards for Network Security. Stakers, a subset of token holders who actively contribute to the network's security by delegating their tokens to validators, enjoy additional benefits beyond the potential appreciation of their holdings. They are rewarded with a portion of the newly minted SOL through inflation and a share of the transaction fees collected by the validators to which they delegate. This reward mechanism can be compared to a dividend payment in the traditional stock market, whereby shareholders receive a portion of the company's profits as a return on their investment.

Validators: The Backbone of the Solana Network. Validators, the backbone of the Solana network, are responsible for processing transactions, maintaining the ledger, and ensuring the overall security and integrity of the blockchain.

Solana Achieves One of the Highest Staking Ratios and Staking Rewards in Top 50 PoS Protocols

Staking Ratio and Rewards Comparison Across Leading Networks



Source: Bitwise Europe, CoinGecko

To illustrate the potential benefits of staking SOL, let's consider a hypothetical scenario:

- Total SOL supply: 500 million
- Price per SOL: \$20
- Initial market capitalization: \$10 billion
- Annual inflation rate: 6%
- Staking participation rate: 70% (350 million SOL staked)

In this example, let's assume an investor holds 10,000 SOL, which is 0.002% of the total supply. At the current price of \$20, their holdings are worth \$200,000.

If the investor chooses to stake all their tokens and earns the full 6% annual reward, they receive 600 new SOL over the course of a year. Because we assume the price remains at \$20—implying the total market cap grows proportionally to accommodate the new supply—the staker's balance of 10,600 SOL is now worth \$212,000, reflecting a 6% gain. In contrast, a non-staker who held an identical 10,000 SOL has not accrued any additional tokens and remains at \$200,000 in absolute value. Furthermore, their share of the network supply has effectively shrunk, since it remains at 10,000 SOL out of an expanded 530 million.

This simplified example demonstrates the power of Solana's staking model in rewarding active participants and creating a more equitable distribution of network ownership over time. However, it is worth noting that aggressive issuance without sufficient token burns or market demand could exert downward pressure on the market capitalization, further impacting the price of SOL. This scenario assumes stable pricing for simplicity, but real-world dynamics may vary.

Active Stake
389.8M / 585.4M
Current Staking Rate = 66.5%

Annual staking reward (%) per epoch is determined by:

- Current global inflation rate, based on the disinflationary issuance schedule.
- Fraction of staked SOL relative to the total circulating supply.
- Commission charged by the validation service.
- Validator's up-time/participation in the previous epoch.

Note: Locked tokens can be staked, allowing active stake to exceed the circulating supply.

Solana Fees
12,325 SOL

Fees (24h)	
User Priority Fees	9,542.78
— Total Base Fees	1,523.53
— User Base Fees	371.77
Vote Base Fees	1,151.76
Failed Tx Fees	1,712.32

Solana Burn
6,162 SOL

SOL Burnt (24h)	
From User Priority Fees	4,771.39
From All Base Fees	761.76
From Vote Fees	575.88

50% of all fees on Solana (base fees, vote fees, or priority fees) is burned. The remaining 50% is sent to the leading validator who proposed the block.

Source: Bitwise Europe, Solanacompass.com, Solana Whitepaper

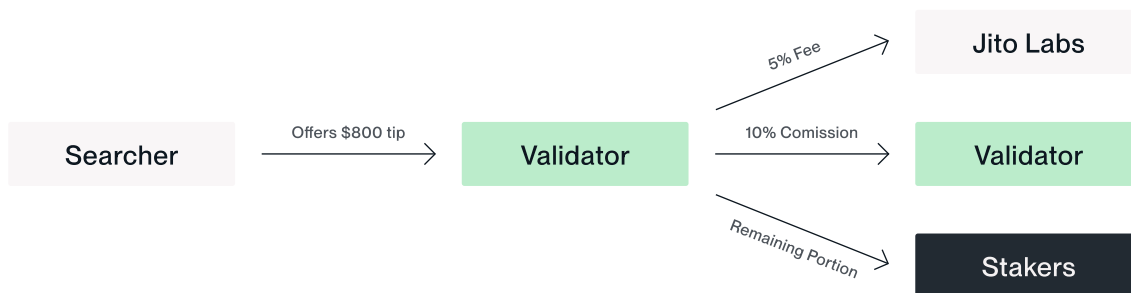
The distribution of Solana's Total Economic Value (TEV) among its key stakeholders—token holders, stakers, and validators—is a crucial aspect of the network's economic model. This distribution mechanism plays a vital role in aligning the interests of various participants and ensuring the long-term sustainability of the ecosystem.

Validators earn rewards as a payment for maintaining the network. Those participating in consensus are incentivized with SOL rewards, which are distributed through inflation. This process increases the total token supply by minting new tokens and distributing them to validators.

These rewards are issued at the end of each Solana epoch and are based on the annual inflation rate, calculated using the following formula:

$$Nominal\ staking\ reward\ (NSR) = Inflation\ Rate \times Validator\ Uptime \times (1 - Validator\ Commission) \times \left(\frac{1}{\% \text{ of SOL Staked}}\right)$$

One of the key sources of revenue for validators is the Maximum Extractable Value (MEV), which refers to the profits that can be earned by strategically including, excluding, or reordering transactions within a block. MEV can be conceptualized as a form of arbitrage in traditional financial markets, where traders seek to exploit price discrepancies across different exchanges or assets. In the Solana ecosystem, specialized traders known as "searchers" identify MEV opportunities and offer higher transaction fees (tips) to validators in exchange for prioritizing their transactions.



Economic Value Transferred to Token Holder

Category	Q4 2024 F	Q4 2024 A	Q3 2024	Q2 2024	Q1 2024	Q4 2023
Total Economic Value						
REV	\$ 851.20	\$ 638.40	\$ 195.80	\$ 263.50	\$ 127.60	\$ 17.50
SOL Issuance	\$ 1,214.10	\$ 910.60	\$ 1,004.40	\$ 1,035.30	\$ 896.70	\$ 391.40
Total Economic Value	\$ 2,065.30	\$ 1,549.00	\$ 1,200.20	\$ 1,298.80	\$ 1,024.30	\$ 408.90
Real Economic Value (REV)						
Vote Fees	\$ 20.50	\$ 15.40	\$ 14.70	\$ 10.20	\$ 8.60	\$ 6.50
Base Fees	\$ 7.50	\$ 5.60	\$ 4.80	\$ 5.00	\$ 3.70	\$ 1.20
Priority Fees	\$ 384.00	\$ 288.00	\$ 90.10	\$ 131.20	\$ 73.20	\$ 6.50
Jito Tips	\$ 439.20	\$ 329.40	\$ 86.20	\$ 117.00	\$ 42.00	\$ 3.40
Real Economic Value	\$ 851.20	\$ 638.40	\$ 195.80	\$ 263.50	\$ 127.60	\$ 17.50
Operator Payments						
Validator Commission on Transaction Fees	\$ (206.00)	\$ (154.50)	\$ (54.80)	\$ (73.30)	\$ (42.80)	\$ (7.10)
Validator Commission on Jito Tips	\$ (49.20)	\$ (36.90)	\$ (14.90)	\$ (23.50)	\$ (6.60)	\$ (0.30)
Jito Labs Take Rate on Jito Tips	\$ (22.00)	\$ (16.50)	\$ (4.30)	\$ (5.80)	\$ (2.10)	\$ (0.20)
Validator Commission on SOL Issuance	\$ (40.90)	\$ (30.70)	\$ (33.50)	\$ (37.20)	\$ (39.10)	\$ (20.70)
LST Management Fee on Staking Rewards	\$ (3.40)	\$ (2.60)	\$ (2.20)	\$ (2.30)	\$ (1.70)	\$ (0.60)
Total Operator Payments	\$ (321.50)	\$ (241.10)	\$ (109.70)	\$ (142.00)	\$ (92.30)	\$ (28.90)
Token Holder Net Income	\$ 529.70	\$ 397.30	\$ 86.10	\$ 121.50	\$ 35.30	\$ (11.40)

Source: Bitwise Europe, Blockworks Research

In this scenario, if a searcher identifies an MEV opportunity worth \$1,000, they may offer a tip of \$800 (80% of the MEV) to the validator. Jito Labs, a prominent MEV solution provider that connects all parties, captures a 5% fee on this tip, while the validator retains their commission (assumed to be 10% in this example). The remaining portion of the tip is distributed among the stakers delegated to that validator. The redistribution of MEV tips among validators and stakers highlights the interconnected incentives that underpin Solana's ecosystem. This mechanism ensures that all participants—searchers, validators, and stakers—benefit from network activity, fostering a cooperative and mutually rewarding environment.

In conclusion, Solana's Proof of Stake inflation is designed in a way that does not necessarily dilute the value of SOL but rather decreases the network share of non-stakers relative to stakers, a dilution that effectively transfers wealth from non-stakers to stakers. This is a fairly standard approach among PoS blockchains. While the issuance of new tokens through staking rewards does lead to inflation, which can potentially dilute the value of SOL if the inflation rate outpaces the rate at which SOL is burned (or taken out of circulation), this positive flywheel incentive mechanism is key to encouraging investors to actively participate in the network. By staking their SOL, investors can earn rewards that help offset the impact of inflation on their holdings while simultaneously contributing to the long-term stability and success of the Solana ecosystem.

IV Investing in Solana (SOL)

Solana is one of the best-performing investments in recent years, outpacing not only traditional financial assets but also major crypto assets like Bitcoin and Ethereum.

The chart below shows Solana's (SOL) performance vis-à-vis both Bitcoin (BTC) and Ethereum (ETH).

Since its inception, Solana has managed to outperform Ethereum by a factor of 10 and Bitcoin by a factor of 17.

Solana Has Outperformed Both Bitcoin and Ethereum by a Very Wide Margin

Solana Relative Performance (Indexed to 100)



Source: Glassnode, Bitwise Europe

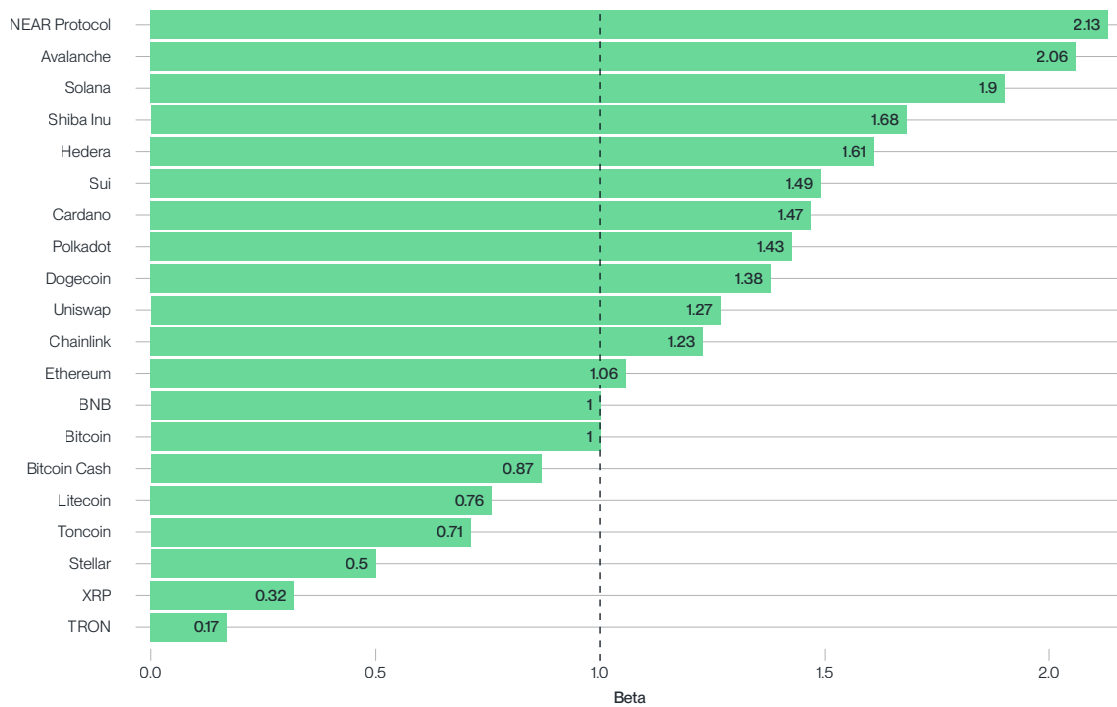
One of the major reasons is the sheer outstanding growth in Solana's network activity (as described in the previous section), which can be attributed to Solana's innovative technology, growing ecosystem, and increasing adoption by developers, users, and institutions.

Recent institutional investor surveys also revealed that Solana has become the third-most favored crypto asset by institutions after Bitcoin and Ethereum.

Solana is considered a "high-beta play" on both Bitcoin and Ethereum, and is often used by investors as a way to take on more risk in an attempt to outperform the market.

Beta (Sensitivity)

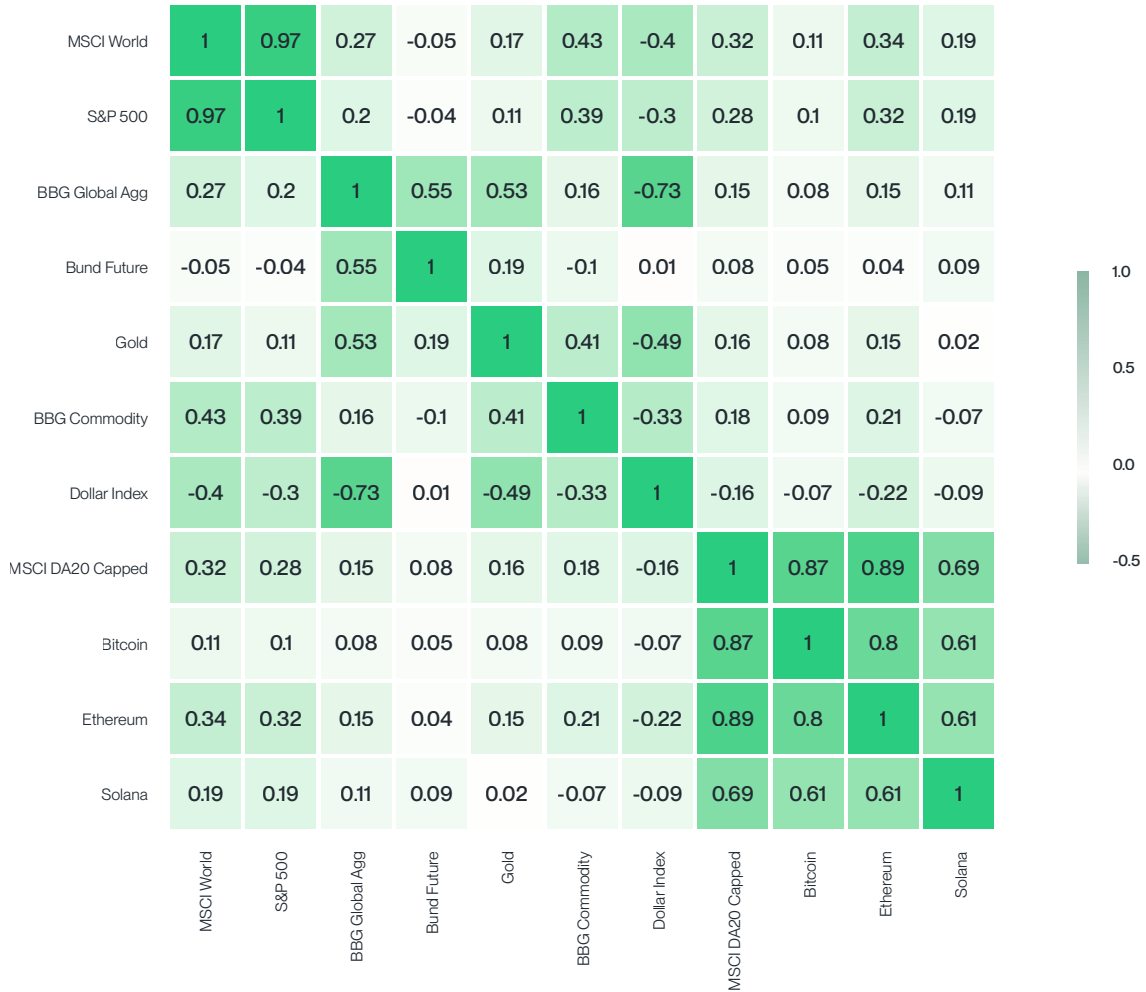
Relative to Bitcoin



Source: CoinMarketCap, Bitwise Europe. Differing sample sizes. Results based on linear regression, Beta = sensitivity to BTC

Solana has also exhibited a relatively low correlation of only 0.69 to the top 20 major crypto assets and only 0.61 to both Bitcoin and Ethereum, implying that adding it to a diversified portfolio of crypto assets may boost risk-adjusted returns.

Cross Asset Correlation Matrix



Correlations of weekly returns. Source: Bloomberg, Bitwise Europe. Earliest data start: 2011-01-03, data as of 2024-12-02

Solana has emerged as an attractive standalone beta play for investors looking to gain exposure to the growth potential of the crypto markets. Here's why:

Diversification Potential

With a correlation coefficient of only 0.61, Solana and Bitcoin/Ethereum are moderately correlated. This suggests that Solana is partially influenced by major crypto assets but still moves independently enough to justify holding both in a diversified portfolio.

Potential for Outperformance

A beta of 1.90 to Bitcoin indicates that Solana can be seen as a higher-risk, higher-reward alternative to both Bitcoin and Ethereum. When Bitcoin moves, Solana tends to move in the same direction but with a larger magnitude. Therefore, Solana may offer amplified returns in bullish markets while introducing some degree of volatility.

For investors looking for outperformance in bullish markets, adding Solana alongside major crypto assets like Ethereum can provide enhanced returns without fully replicating Ethereum's movements.

Risk-Return Balance

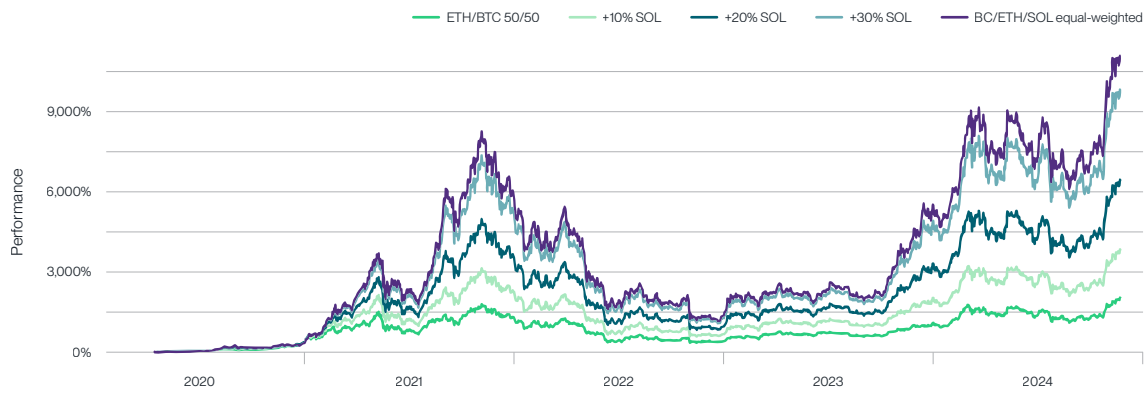
Holding both Ethereum and Solana can allow investors to maintain a balance between high-beta (Solana) and low-beta (Ethereum) exposures. Ethereum's lower responsiveness to market volatility complements Solana's higher sensitivity, helping manage portfolio risk while potentially increasing returns during favorable market conditions.

As discussed earlier in the report, Solana's unique architecture, scalability, and thriving ecosystem position it as a strong competitor to Ethereum. By investing in Solana alongside Ethereum, investors can gain exposure to the growth potential of both platforms while benefiting from diversification and the potential for amplified returns.

Adding Solana (SOL) to an existing portfolio of major crypto assets like Bitcoin and Ethereum can offer significant and potentially surprising enhancements to risk-adjusted returns, according to historical data.

The analysis below examines how adding different amounts of Solana to a portfolio of Bitcoin and Ethereum has impacted historical returns. The starting point is an equally weighted portfolio consisting of both Bitcoin and Ethereum (50% each), rebalanced on a monthly basis. Solana is added in 10% increments while the weights of both Bitcoin and Ethereum are reduced proportionally.

Adding Solana (SOL) to a Crypto Portfolio

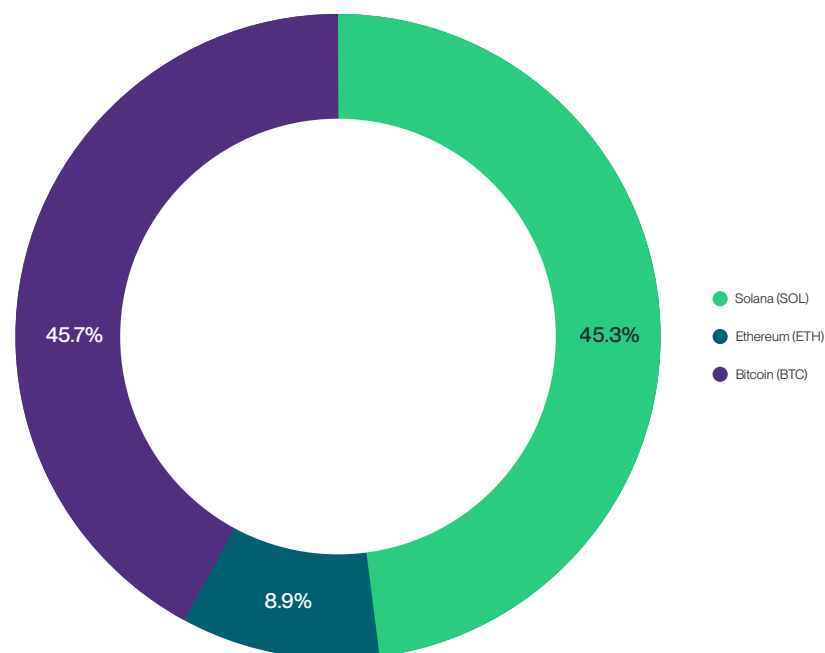


	ETH/BTC 50/50	ETH/BTC + 10% SOL	ETH/BTC + 20% SOL	ETH/BTC + 30% SOL	ETH/BTC/SOL Equal-Weighted
Cumulative Return (%)	2124.4	3933.7	6555.7	9977	11267.2
Annual Return (% p.a.)	92.7	120	145.5	168.7	175.8
Volatility (% p.a.)	66.9	68.6	72.1	77	78.9
Sharpe Ratio	1.32	1.5	1.61	1.67	1.68
Sortino Ratio	1.82	2.07	2.25	2.38	2.41
Max Drawdown (%)	76.2	79	81.6	84.2	85

Source: Glassnode, Bitwise Europe. Monthly rebalancing. Sharpe and Sortino Ratios were calculated with 3M USD Cash Index as assumed risk-free rate. SOL allocation is equally taken out of BTC and ETH allocation. Past performance not indicative of future returns.

Although incremental increases in the allocation to Solana lead to higher overall portfolio volatility and higher maximum drawdowns, investors are more than compensated for this added risk through additional returns. In other words, higher allocations to Solana push investors out along the Efficient Frontier, as highlighted by the higher Sharpe and Sortino ratios in the portfolios with higher allocations to SOL. In fact, the portfolio that generates the maximum Sharpe Ratio in our historical analysis is nearly 50% invested in SOL and holds SOL as its largest single position. This dramatic result is driven by Solana’s unique combination of high returns and low correlations to other assets.

Optimal Solana (SOL) Allocation in a Major Crypto Asset Portfolio



Source: Glassnode, Bitwise Europe. Percentages may not total 100 due to rounding. Optimized weights based on maximized Sharpe Ratio. Sample: April 2020—2024/12/02. Values may not add to 100% due to rounding.

It bears reminding that the above analysis is based on limited historical data. The pure quant case is just one approach, and investors might well consider other approaches. A rational investor might not follow this approach exactly and might instead take an approach that relies more on market capitalization.

SOL Price Forecast

Our valuation methodology leverages Metcalfe's Law to quantify Solana's network value.

Metcalfe's Law assumes the utility of the network to increase to the square of the number of users. For the sake of simplicity, we assume the Daily Active Addresses (DAA) to be the number of users and the market capitalization to represent the utility of the network represented in monetary terms.

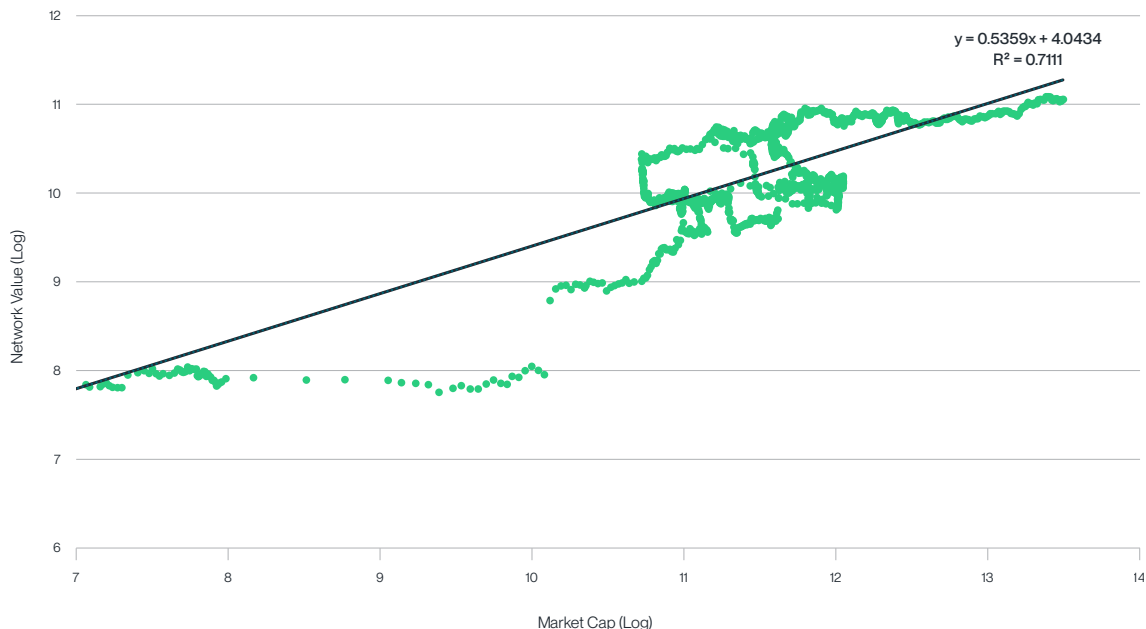
The regression analysis of the logarithm of DAA^2 against the logarithm of the market cap yields an R^2 of 0.7111 and a positive correlation ($y = 0.5359x + 4.0434$), supporting our approach of using network effects to project future valuations.

This relationship between DAA^2 and market cap is particularly relevant for Solana given its unique positioning as the most scalable chain. Its monolithic design, combined with its innovative consensus mechanism, value accrual to stakers, and battle-tested performance are designed to drive mass user adoption through superior scalability.

The positive correlation, while moderate at 0.71, suggests that as Solana achieves its goal of becoming "the most scalable and secure blockchain platform for global adoption," network value should grow proportionally with the square of its user base.

Estimating Solana Network Valuation Through Metcalfe's Law

Scatter Plot of Log (Network Value) Against Log (Market Cap) for Solana Valuation Projections



Source: Bitwise Europe, Artemis

Our analysis begins with Solana's current position: 7 million daily active addresses and a market share of approximately 2.84% (\$108B out of crypto's total \$3.8T market cap). We use Solana's share of crypto market capitalization as a proxy to project its potential share of future network adoption.

We project a total of 1 billion daily active addresses across all blockchains by 2030, which we note is a conservative estimate; the actual number could be higher since users typically maintain multiple addresses. However, we maintain this 1 billion figure as our baseline to achieve a more conservative valuation.

The growth scenarios build upon Solana's current 2.84% market share. This methodology assumes that Solana's share of total crypto market capitalization provides a reasonable proxy for its potential share of future network adoption, particularly given its positioning as a high-performance, retail-focused chain.

The bear case assumes Solana captures 4.26% (1.5x its current share) of the projected 1 billion daily active addresses in 2030, amounting to approximately 42.6 million DAA. The projected growth from 7 million to 42.6 million DAA over six years results in a 35.1% CAGR. This projection reflects organic growth sustained by Solana's established ecosystem advantages, including its proven high throughput and low transaction costs. This conservative estimate accounts for potential market headwinds while acknowledging Solana's strong foundation in retail applications and growing institutional integrations. Based on our network value analysis, this scenario yields a 2030 price target of \$2,318.90.

The base case projects Solana capturing 7.1% (2.5x its current share) of total addresses in 2030, or about 71 million DAA. This represents growth from 7 million to 71 million DAA over six years, which translates to a 47.2% CAGR. This growth trajectory assumes that Solana builds on its current momentum, supported by its expanding developer ecosystem and breakthrough partnerships with mainstream platforms like Stripe and Shopify. This scenario results in a 2030 price target of \$4,025.73.

The bull case envisions Solana capturing 11.36% (4x its current share) of addresses, reaching approximately 113.6 million DAA and a 59.1% CAGR. This scenario reflects Solana's potential to leverage its execution moat—particularly its theoretical capacity of 65,000 TPS—to capture a larger share of expected mainstream adoption. This growth trajectory is supported by Solana's robust DeFi ecosystem, growing institutional acceptance, and better regulatory clarity that could accelerate adoption. Under this scenario, our analysis indicates a 2030 price target of \$6,636.88.

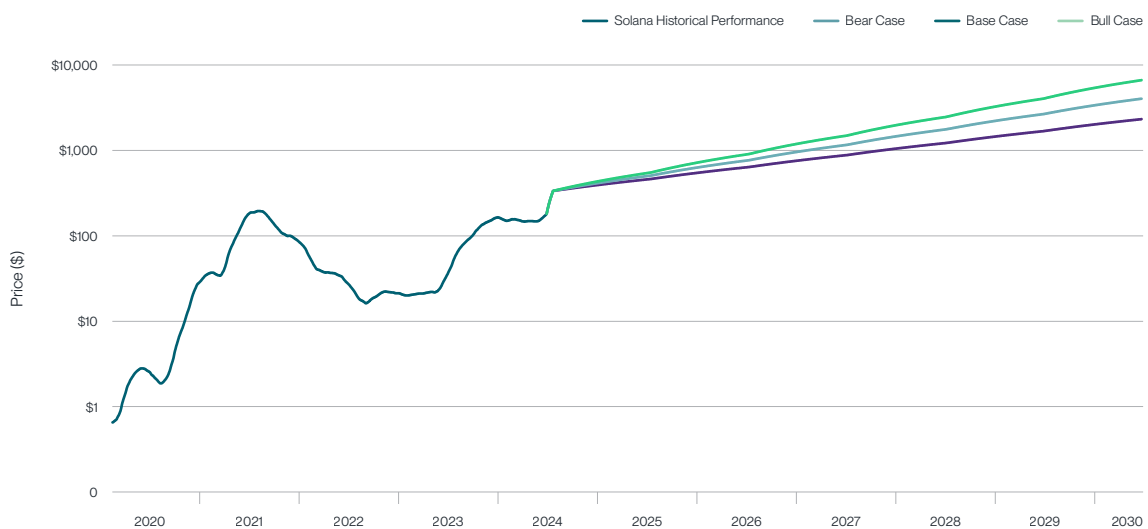
These projections deliberately maintain conservative assumptions despite Solana's recent performance. While Solana achieved 239% DAA growth in 2023 despite challenging market conditions and demonstrated explosive 2,800% growth in early 2024, our forecasts intentionally moderate these rates to reflect the natural deceleration that occurs as networks mature and achieve significant scale.

We use the total supply of 716 million SOL tokens for our calculations, which aligns with projections from Helius based on current inflation parameters (4.9% inflation rate, 8% initial rate, -15% disinflation rate, and 1.5% long-term rate). This approach provides realistic price targets accounting for future supply dynamics.

It is important to note that our growth assumptions are deliberately conservative compared to historical patterns. While our recent analysis of Aptos³ used much higher growth rates (2,792% base case, which maps to the average growth of established Layer-1 platforms excluding market leaders, and 17,000% bull case based on Ethereum and Solana’s historical growth patterns), such assumptions would be unrealistic for Solana given its maturity and existing market share. As an established blockchain that has already captured significant network effects, Solana’s growth trajectory naturally differs from emerging platforms like Aptos that start from a much smaller base.

Solana Valuation Projections: Bear, Base, and Bull Scenarios

Projected \$SOL Forecasts Based on 716 Million Tokens Unlocked per Helius Base-Case Assumption



Year	Bear Case	Base Case	Bull Case
2024	\$ 335.01	\$ 335.01	\$ 335.01
2025	\$ 462.49	\$ 507.02	\$ 551.08
2026	\$ 638.46	\$ 767.34	\$ 906.49
2027	\$ 881.40	\$ 1,161.33	\$ 1,491.12
2028	\$ 1,216.77	\$ 1,757.59	\$ 2,452.81
2029	\$ 1,679.75	\$ 2,660.00	\$ 4,034.72
2030	\$ 2,318.90	\$ 4,025.73	\$ 6,636.88

Source: Bitwise Europe, Artemis, Helius

(3) "The Investment Case for Aptos," by Bitwise Europe. November 2024.

To further validate our price targets, we analyzed Solana's transaction fee mechanics to determine the maximum sustainable price levels that would maintain its unique selling proposition (USP) as a low-cost blockchain.

Our methodology examined average transaction fees (90-day simple moving average) across leading Layer 2 Ethereum solutions, next-generation chains like Aptos and Sui, and established value-transfer networks like Tron. We calculated fee quartiles to represent varying user sensitivity:

- Bear Case (25th percentile): \$0.0005—Highly cost-sensitive users prioritizing minimal fees
- Base Case (50th percentile): \$0.0420—Average user preferences under normal conditions
- Bull Case (75th percentile): \$0.1407—Reduced fee sensitivity as utility takes precedence

Given Solana's fixed transaction fee mechanism (5,000 lamports per transaction, where 1 SOL = 1 billion lamports), its fee-to-price ratio remains constant at 0.0005%. This yields the following price ceilings where Solana would remain competitive:

- Bear Case: \$97.98
- Base Case: \$8,550.87
- Bull Case: \$28,401.23

The bull case transaction fee threshold of \$0.1407 is notably conservative given broader industry trends, where fees approaching \$0.30 per transaction could still be considered negligible in many contexts. Moreover, as the ecosystem matures, small fee differentials below certain psychological thresholds become less decisive in guiding user behavior, particularly for higher-value transactions.

This analysis provides strong support for our network value-derived price targets. Even our bull case target of \$6,636.88 falls well below the \$28,401.23 price ceiling where transaction fees would become prohibitive. The results indicate that Solana can achieve significant price appreciation while maintaining its core value proposition as a cost-effective blockchain.

From a competitive standpoint, while low fees remain an important differentiator for emerging blockchains, Solana's structural advantages ensure it can maintain this edge even with substantial price appreciation. This provides additional confidence in our price targets and growth trajectory.

V Conclusion

Solana stands out as a high-performance blockchain with a compelling investment thesis built on sustainable economics, developer innovation, and technological excellence. Its monolithic architecture enables unmatched scalability, low fees, and superior user experience, while its staking model rewards active participants, creating a positive feedback loop for network security and token value.

With a thriving ecosystem spanning DeFi, NFTs, gaming, and Decentralized Physical Infrastructure Networks (DePIN), Solana has demonstrated product-market fit and resilience under stress. Institutional adoption is accelerating, bolstered by innovations like Firedancer and partnerships with major platforms like Shopify and Circle.

As Solana continues to redefine blockchain performance, it is uniquely positioned to lead the next wave of mass adoption, offering transformative opportunities for developers, institutions, and investors alike.

V Investment Opportunity

Bitwise Solana Staking ETP (BSOL)

Investment Objective

The Bitwise Solana Staking ETP (BSOL) offers investors exposure to the performance of SOL, while capturing additional staking rewards that are accumulated in the ETP. BSOL is an institutional-grade, low-cost, and liquid ETP that is fully backed with Solana (SOL) held in cold storage custody. The ETP is benchmarked to the Compass Solana Total Return Monthly Index, after fees and expenses.

Revolutionizing Performance and Transparency

BSOL is designed to deliver the best possible outcomes for investors looking to earn rewards from SOL staking. The ETP aims to provide the highest staking returns, the lowest total cost of ownership, and superior performance compared to other Solana staking products. With a competitive Total Expense Ratio (TER) of 0.85% and a transparent staking fee structure, BSOL maximizes investor returns. Its innovative staking mechanism ensures higher rewards, while its status as the only Solana staking ETP benchmarked against a total return index provides a clear and reliable measure of performance.

Key Product Details

ETP Name	Bitwise Solana Staking ETP
Primary Ticker	BSOL
ISIN	DE000A4A59D2
Domicile	Germany
Reference Benchmark	Compass Solana Total Return Monthly Index
TER	0.85% p.a.

Why invest in BSOL

Seamless investment access to Solana with institutional-grade custody: Trade BSOL like any stock or ETF through your existing brokerage account—no new accounts or wallets needed. Assets backing the ETP are securely held in cold storage custody.

A leading high-performance blockchain: Solana is a high-performance blockchain poised to lead the next phase of decentralized application adoption, driven by sustainable economics, developer innovation, and execution excellence.

Staking: BSOL is fully backed and stakes the underlying SOL tokens to generate rewards from the blockchain that will be accumulated in the ETP. The Compass Solana Total Return Monthly Index allows for clear assessment of performance against the current Solana staking rewards market rate.

The Risks

- Investors' capital is at risk. Investors may not get back the amount originally invested and should obtain independent advice before making a decision regarding investment.
- Any decision to invest should be based on the information contained in the relevant prospectus.
- ETP securities are structured as debt securities, not as equity.
- ETPs trade on exchanges like securities. They are bought/sold at market price which may be different from the net asset value of the ETC.

Please note, this is not an exhaustive list and other risks may apply. Please consult the KIID and Prospectus for more details

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