

The Rising SVM Sector

The Next Breakthrough in the
Solana Ecosystem



Abstract

- **The development of the SVM sector can be divided into three phases:** The technological foundation phase (before 2023), the ecosystem emerging phase (2023-2024), and the explosive growth phase (from 2025 onward). The year 2025 is considered the breakout year for the SVM sector, marked by surging market enthusiasm, accelerated technological iterations, and rapid ecosystem expansion.
- **SVM sector explodes on social media:** In early 2025, mentions and social media reach showed a significant upward trend, with peak reach hitting 2.5 million per day (data source: Brand24).
- **Still a small market cap, indicating early development stages:** As of February 17, 2025, the independently tracked market cap of the SVM sector stood at approximately \$444 million, accounting for only 0.013% of the total crypto industry market cap.
- **Capital racing to invest, ecosystem poised for growth:** Investments in the SVM ecosystem show three key trends: heavy focus on infrastructure, bets on innovation, and aggressive positioning within the sector.
- **There are three key reasons for Solana's introduction of SVM:** the inevitable result of its performance bottleneck, unlocking diverse possibilities within the Solana ecosystem, and a strategic move to counter competition.
- **New forces emerging in the SVM ecosystem:** Sonic SVM is creating a new Web3 gaming entry point through deep collaboration with TikTok; Eclipse is the first Ethereum Layer 2 solution powered by the Solana Virtual Machine, integrating multi-chain advantages; Solayer focuses on hardware-accelerated SVM to break through Solana network performance bottlenecks.
- **Multiple challenges ahead:** On the technical front, balancing performance and scalability, optimizing parallel processing algorithms, and improving developer tool maturity are key challenges. Addressing cross-chain competition, overcoming cold-start issues, and tackling MEV problems remain critical on the ecosystem front. Designing a sustainable token economy to avoid liquidity fragmentation and cross-chain friction is essential on the economic model front. On the regulatory front, managing conflicts between KYC require-

ments and anonymity and mitigating the risk of token securities classification are major concerns.

Keywords:

Gate Research, Solana, Sonic SVM, Eclipse, Solayer, SVM

Gate Research: The Rising SVM Sector

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1 Introduction

At the beginning of 2025, the SVM (Solana Virtual Machine) sector within the Solana ecosystem quickly became the focus of market attention. With the Sonic SVM airdrop sparking widespread discussion on social media and the announcement of projects like Solayer going live, the SVM sector not only ignited market enthusiasm but also rekindled visions of blockchain-driven wealth creation. Following the impressive performance of sectors like Meme coins and DePIN on Solana, the SVM sector is now emerging as another promising and fast-growing field within the Solana ecosystem.

In recent years, as blockchain application scenarios have continued to expand, the demand for high performance and scalability has grown increasingly urgent. With its exceptional performance advantages, SVM has gradually become a key driving force in advancing the decentralized ecosystem. Currently, numerous innovative projects based on SVM are emerging, such as Sonic SVM, Eclipse, SOON, and Solayer. These projects have not only extended Solana's technical boundaries but also injected new energy into the broader blockchain industry through innovative application scenarios and efficient development tools. It can be said that the rise of the SVM sector is a crucial engine driving the continuous expansion of the Solana ecosystem.

This report will explore how the SVM sector enhances the vitality of the Solana ecosystem and analyze how innovative projects based on SVM are expanding Solana's ecosystem boundaries, providing readers with comprehensive insights.

2 Market Overview

The SVM (Solana Virtual Machine) sector refers to the blockchain ecosystem, along with its associated projects and applications, that are built using Solana Virtual Machine (SVM) technology. SVM is one of the core components of the Solana blockchain, and it is responsible for executing smart contracts and processing on-chain transactions. The SVM sector not only includes applications native to the Solana chain but also extends to cross-chain solutions powered by SVM technology, Layer 2 networks, modular blockchains, and other high-performance application chains.

2.1 What is SVM?

Before exploring the SVM sector, it's essential to understand the concept of Solana Virtual Machine (SVM). SVM is the core execution engine of the Solana blockchain. Simply put, it functions as the "computer" within the Solana network, responsible for processing all transactions and smart contracts. SVM leverages parallel processing technology, enabling Solana to handle massive transactions at exceptionally high speeds. When you perform a transaction or interact with a smart contract on Solana, your instructions are sent to multiple validator nodes across the network. The SVM on each of these nodes verifies and executes your instructions simultaneously. This parallel processing approach significantly enhances transaction throughput.

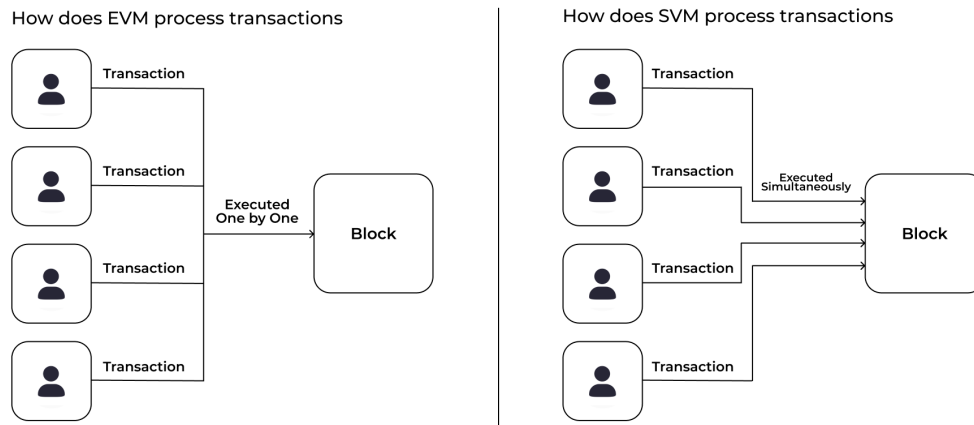
Key Features of SVM:

- **Parallel Processing (Sealevel):** SVM utilizes the Sealevel engine to enable parallel transaction processing, allowing multiple smart contracts to run simultaneously and dramatically increasing throughput.
 - Sealevel optimizes performance by predefining the data that transactions will read from or write to, minimizing conflicts and supporting the concurrent execution of thousands of transactions.
 - Compared to the Ethereum Virtual Machine (EVM), which relies on serial processing, SVM's parallel execution model suits it better for high-frequency use cases like DeFi and blockchain gaming.
- **High Performance and Low Cost:** SVM inherits Solana's high throughput capabilities (with a theoretical TPS of up to 65,000 and a real-world TPS of around 2,500-3,000) and low latency (400ms block time), while simultaneously reducing transaction costs.

The key difference between the Solana Virtual Machine (SVM) and the Ethereum Virtual Machine (EVM) lies in their execution models. EVM employs a serial processing method, executing transactions one by one, which limits the network's throughput and performance. In contrast, SVM leverages a parallel processing model capable of handling tens of thousands of transactions concurrently, significantly boosting network efficiency. Furthermore, SVM supports multiple programming languages such as Rust, C, and C++, whereas EVM primarily relies on Solidity. This flexibility, combined with SVM's high performance, makes it an ideal choice for high-frequency transaction scenarios such as DeFi and NFTs.

Figure 1: SVM vs. EVM Transaction Processing Models

The EVM is designed to execute transactions sequentially, while the SVM can execute multiple transactions in parallel.



Gate Research, Data from: squads.so

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In summary, SVM is the core driving force behind the Solana network. Through its parallel processing model and innovative Sealevel design, SVM delivers a high-performance, low-cost blockchain solution. As the "engine" of Solana, SVM provides developers with an efficient and flexible execution environment, supporting complex smart contracts and high-frequency transactions, positioning itself as a vital infrastructure in the era of Blockchain 3.0.

2.2 The Evolution of the SVM Sector: From Solana's Engine to the Foundation of Web3

Since the introduction of the Solana Virtual Machine (SVM) concept, its development journey can be summarized into three phases: **Technological Foundation**, **Ecosystem Emergence**, and **Explosive Growth**.

2.2.1 Technological Foundation Phase (Before 2023)

Solana initially gained recognition for its high throughput (theoretical 65,000 TPS) and low latency (400ms block time). However, in its early days, most ecosystem applications were focused on the native chain. With the introduction of SVM as a standardized virtual machine framework, developers gained the ability to customize dedicated application chains while still benefiting from the security of Solana's mainnet. The Pyth Network was among the first to launch a ne-

network application chain based on Solana's code (with SVM as the underlying virtual machine) called Pythnet. As a Proof of Authority (PoA) fork of the Solana mainnet, Pythnet served as a computational base layer dedicated to processing and aggregating on-chain data provided by the Pyth data publisher network.

2.2.2 Ecosystem Emergence Phase (2023-2024)

As developer tools improved, numerous projects began building on SVM, laying a solid foundation for multi-chain ecosystem expansion. For example, Eclipse pioneered a modular Layer 2 solution powered by SVM, combining Ethereum's asset ecosystem with Solana's performance advantages; Sonic SVM introduced a modular SVM chain (Hypergrid), offering an ideal development environment for high-performance applications such as gaming; NitroVM enabled seamless migration of Ethereum smart contracts to Solana, leveraging SVM's high-performance capabilities. Additionally, projects like Zeus Network and Molecule shifted their focus to Bitcoin, aiming to enhance Bitcoin's scalability through SVM integration. During this period, the SVM ecosystem began to reveal two core values: cross-chain interoperability and high-frequency scenario adaptability.

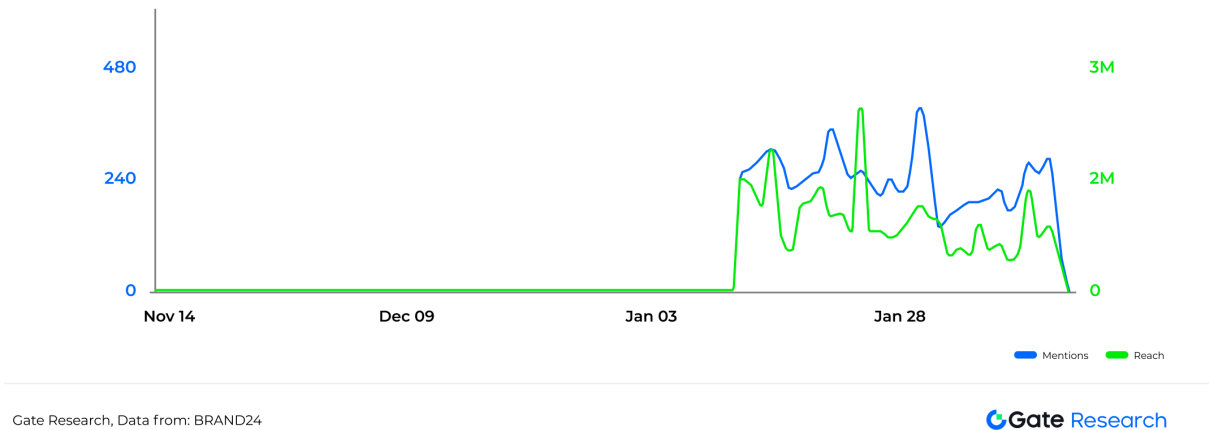
2.2.3 Explosive Growth Phase (2025 Onward)

The year 2025 is expected to mark the breakout year for the SVM sector:

Market Hype: Sonic SVM's airdrop campaign sparked a market frenzy, with its token price surging by nearly 1,200% after being listed on major exchanges. This ignited community excitement, while the successful NFT sales by SOON raised \$22 million. Additionally, the token distribution campaigns for Solayer and its subsequent listings on major exchanges further fueled market expectations, reinforcing the narrative that "SVM = Wealth Effect".

According to social media monitoring data from Brand24, SVM mentions and audience reach on social media showed a noticeable upward trend at the start of 2025. Interest remained relatively low throughout 2024, but following Sonic SVM's exchange listings in January 2025, social media reach for "SVM" surged dramatically, peaking at 2.5 million daily impressions, indicating that SVM had successfully gained traction and captured audience attention.

Figure 2: Mentions and Reach of "SVM" on Social Media



Technical Iteration: SVM underwent compatibility upgrades that supported more complex smart contract logic, accelerating the large-scale migration of high-frequency DeFi protocols (such as the Jupiter V2 DEX aggregator), blockchain games (such as the Star Atlas SVM version), and social applications.

Ecosystem Expansion: Solana established the "SVM Alliance", collaborating with developer platforms like NEON and Teleport to build multi-chain interoperability standards. This effort gradually shaped an ecosystem centered on SVM-powered high-performance application chains. According to data from SuperteamDAO, the SVM ecosystem now spans various sectors, including infrastructure, cross-chain bridges, DEXs, data aggregation platforms, and gaming, demonstrating SVM's potential for diverse application scenarios.

Figure 3: SVM Ecosystem Map



SVM has evolved from a standalone on-chain virtual machine into a high-performance application chain infrastructure. This transformation not only reinforces Solana's technological leadership in the Layer 1 sector but also introduces modular designs that expand Web3 application scenarios. By addressing the demand for high-frequency transactions and diverse blockchain use cases, SVM has effectively achieved a balance between performance and compatibility, positioning itself as a standout technical solution in early 2025.

2.3 Market Size of the SVM Sector: Emerging Growth with Strong Potential

Based on the current classification logic of the SVM ecosystem, APPChains (application chains) built on SVM are generally considered extensions of Solana's mainnet applications, with their valuation and traffic still attributed to the Solana ecosystem. Meanwhile, SVM Rollups (such as Layer 2 scaling solutions) and cross-chain protocols integrated with other ecosystems (e.g., Wormhole bridging multi-chain assets) are categorized independently as part of the SVM sector to reflect their technical independence and cross-chain scalability potential.

2.3.1 The SVM Ecosystem's Market Cap Remains Modest, Indicating Early Development Stage

According to Cryptorank data (as of February 17, 2025), the independently calculated market cap of the SVM sector is approximately \$444 million, accounting for just 0.013% of the total crypto industry market cap, with daily trading volumes around \$100 million. As shown in the chart below, most SVM ecosystem projects have relatively small market caps and have yet to issue tokens or get listed on major exchanges. This trend suggests that the SVM ecosystem is still in its early development stage, with its full technological potential yet to be fully realized. Among the projects already launched, notable examples such as Zeus Network (a Bitcoin-Solana cross-chain protocol), Solayer (a hardware-accelerated SVM), and Sonic SVM (an Ethereum-compatible SVM Layer 2) have achieved stable market caps in the \$100 million range. Their sustained value is primarily driven by clear positioning and differentiated technological approaches.

Figure 4: Cryptorank "SVM Ecosystem" Market Cap Data

Name	Price	Chg(24H)	Chg(30D)	Market Cap	Volume(24H)	Circ. Supply	Price Graph(7D)
 Zeus Network ZEUS	\$ 0.397	-6.50%	-46.5%	\$ 169.18M	\$ 2.80M	ZEUS 426.00M	
 Solayer LAYER	\$ 0.733	-2.18%	N/A	\$ 161.38M	\$ 79.03M	LAYER 220.00M	
 Sonic SVM SONIC	\$ 0.319	+6.79%	-54.9%	\$ 114.75M	\$ 28.93M	SONIC 360.00M	
 Eclipse	N/A	N/A	N/A	N/A	N/A	N/A	
 Mantis M	\$ 0.0868	-19%	N/A	N/A	\$ 6.54K	N/A	
 Yona Network	N/A	N/A	N/A	N/A	N/A	N/A	
 SOON	N/A	N/A	N/A	N/A	N/A	N/A	
 bullet bullet	N/A	N/A	N/A	N/A	N/A	N/A	
 Lumio	N/A	N/A	N/A	N/A	N/A	N/A	
 Fogo	N/A	N/A	N/A	N/A	N/A	N/A	
 Atlas	N/A	N/A	N/A	N/A	N/A	N/A	

Gate Research, Data from: DefiLlama

 Gate Research

Current market classifications by Cryptorank and others may underestimate the potential value of the SVM ecosystem. If APPChains (such as the Helium DeFiN project migrating to SVM) and Solana-native protocols (such as Jito) are included in the analysis, the total associated market cap could exceed \$5 billion. However, the independent categorization of the SVM sector emphasizes technical differentiation (e.g., Rollup architecture) rather than simple dependence on the underlying blockchain. In the future, attention should focus on the explosive potential of cross-chain SVM solutions (such as integration with the Bitcoin ecosystem), which may drive a redefinition of the sector.

2.3.2 Investors Racing to Position Themselves as the SVM Ecosystem Gears Up for Growth

Based on SVM sector funding data from Cryptorank (as of February 2025), early investors have shown three prominent trends in their SVM ecosystem investments: focus on infrastructure, bets on innovation, and aggressive sector positioning, reflecting long-term confidence in SVM's technological potential.

Infrastructure development remains the core focus of capital investment, with leading projects

demonstrating strong fundraising capabilities. Modular scaling solutions (such as Eclipse and SOON) and high-performance infrastructure (such as Solayer) have been major funding targets. For example, Eclipse (an Ethereum Layer 2 powered by SVM) set a record in the sector with cumulative funding of \$65 million, backed by top investors like Polychain and Hack VC, underscoring the market's strong belief in SVM's cross-chain expansion potential; Solayer (a hardware-accelerated SVM) raised \$12 million in its seed round, led by Polychain, reflecting investors' keen interest in solutions that push Solana's performance boundaries.

Cross-chain interoperability and vertical innovation have also drawn substantial investor attention. Zeus Network (a Solana-BTC cross-chain protocol) raised over \$8 million, with backers like Mechanism Capital and Spartan Group, who are betting on the convergence of the Bitcoin ecosystem + SVM narrative. SOON (SVM + OP Stack) secured over \$22 million in funding, with support from Hypersphere and others, reflecting investor optimism about its modular stack's cross-chain scalability. Vertical scenario differentiation has also gained traction. For example, Sonic SVM attracted investment from gaming-focused VCs like Bitkraft and Galaxy Interactive, raising over \$16 million in total; Mantis (an intent-based trading Rollup) secured funding from CertiK Ventures, reflecting investor confidence in SVM's potential to improve transaction execution efficiency.

Figure 5: Cryptorank "SVM Ecosystem" Project Funding Data

Project	Description	Funding Amount	Funding Round	Investors	Date
SOON	Modular Rollup stack, combining SVM with OP Stack	\$ 22.00M	Undisclosed	Hack VC, Hypersphere Ventures, etc.	2025-01-22
		-	Undisclosed	Anatoly Yakovenko and other angel investors	2024-08-27
Mantis	Solana's first intent trading Rollup	-	Undisclosed	CertiK Ventures	2025-01-17
Solayer	Hardware-accelerated SVM, building infinSVM to scale Solana	\$ 12.00M	Seed	Polychain Capital, Hack VC, etc.	2024-08-27
		-	Undisclosed	YZi Labs (Prev. Binance Labs)	2024-08-07
		-	Undisclosed	Sandeep Nailwal and other angel investors	2024-07-01
Sonic SVM	Building modular SVM chain for gaming scenarios	\$ 12.00M	Series A	Bitkraft Ventures, OKX Venture, etc.	2024-06-18
		-	Pre-Series A	Alchemy	2023-04-13
		-	Undisclosed	MH Ventures	2022-07-07
		\$ 4.00M	Seed	Republic, OKX Venture, Galaxy Interactive, etc.	2022-03-11
Zeus Network	SVM cross-chain application infrastructure, focusing on Solana-BTC connection	\$ 8.00M	Undisclosed	Mechanism Capital, The Spartan Group, etc.	2024-04-03
		-	Angel	Anatoly Yakovenko, Muneeb Ali, Andrew Kang and other angel investors	2024-02-09
Eclipse	SVM-based Ethereum Layer 2	\$ 50.00M	Series A	Hack VC, Polychain Capital, Delphi Ventures, Placeholder Ventures, etc.	2024-03-11
		\$ 6.00M	Pre-Seed	Polychain Capital, Tribe Capital, Accel, etc.	2022-09-27
		\$ 9.00M	Seed	Tribe Capital, IVC, etc.	2022-09-27

Gate Research, Data from: Cryptorank



It is worth noting that prominent investment firms such as Polychain Capital and Hack VC have invested in multiple SVM-related projects like Eclipse, Solayer, and SOON. By diversifying their investments across several projects, these firms aim to mitigate risk while strengthening their influence within the ecosystem. Additionally, individual investors such as Anatoly Yakovenko (co-founder of Solana) and Sandeep Nailwal (co-founder of Polygon) have personally participated in angel rounds, providing valuable technical expertise and community support to these projects. Leading institutions have adopted a "multi-round coverage" strategy, aggressively positioning themselves within the SVM sector and betting on the ecosystem's explosive growth.

Overall, the investment landscape surrounding the SVM ecosystem can be described as one of "cautious optimism with aggressive positioning." On one hand, investors are heavily bac-

king infrastructure projects to secure returns from core technology advancements. On the other hand, they are strategically investing in cross-chain solutions and vertical application scenarios to capture breakout opportunities in niche markets. As SVM continues to integrate with the Bitcoin and Ethereum ecosystems, 2025 may mark a pivotal turning point where the SVM sector transitions from a "technical narrative" to "large-scale adoption."

3 Why Does Solana, a High-Performance Blockchain, Still Need SVM?

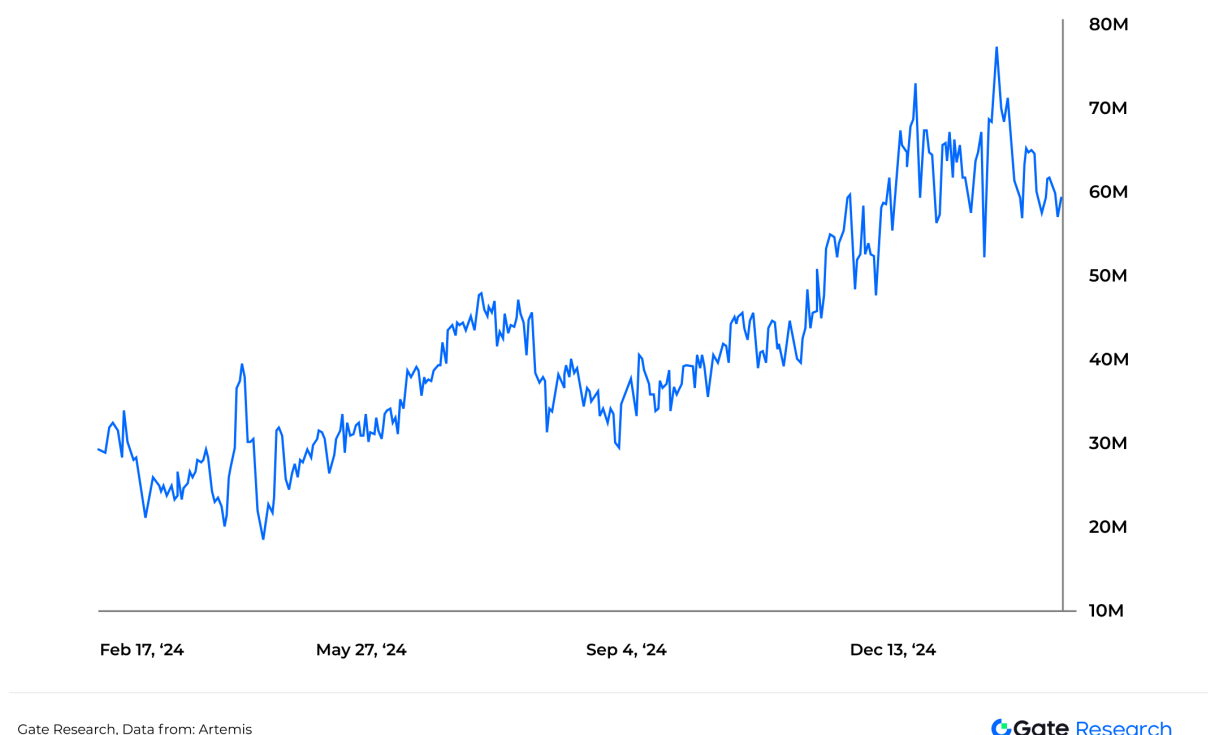
Solana is renowned for its high throughput and low latency, but why does it still need SVM? This question once raised doubts in the market about the necessity of the SVM sector. In reality, the development of SVM is intended to further expand Solana's ecosystem and meet the growing demand for complex applications. With the rise of high-frequency applications such as DeFi and NFTs, the performance requirements for blockchains have become increasingly stringent. Although Solana's native performance is already impressive, SVM enhances this by leveraging parallel processing and efficient state management. This not only strengthens Solana's leadership in high-performance blockchain solutions but also provides broader opportunities for application expansion. The necessity of SVM can be explained across three dimensions: technological performance breakthroughs, ecosystem expansion, and market competition.

3.1 SVM: The Inevitable Solution to Solana's Performance Bottleneck

3.1.1 Solana's High-Frequency Transactions Trigger a Congestion Crisis

Between 2024 and early 2025, a series of high-profile events (such as the JUP airdrop, the rise of the Pump.fun ecosystem, and the ORE mining boom) led to a surge in user activity on the Solana network. Data shows that Solana's daily active addresses skyrocketed from 600,000 - 700,000 in 2024 to approximately 6 million, reflecting a nearly 10x increase. Meanwhile, daily transaction counts surged from 20 million to roughly 60 million, with total transaction volume nearing 2 billion.

Figure 6: Solana Daily Transaction Count

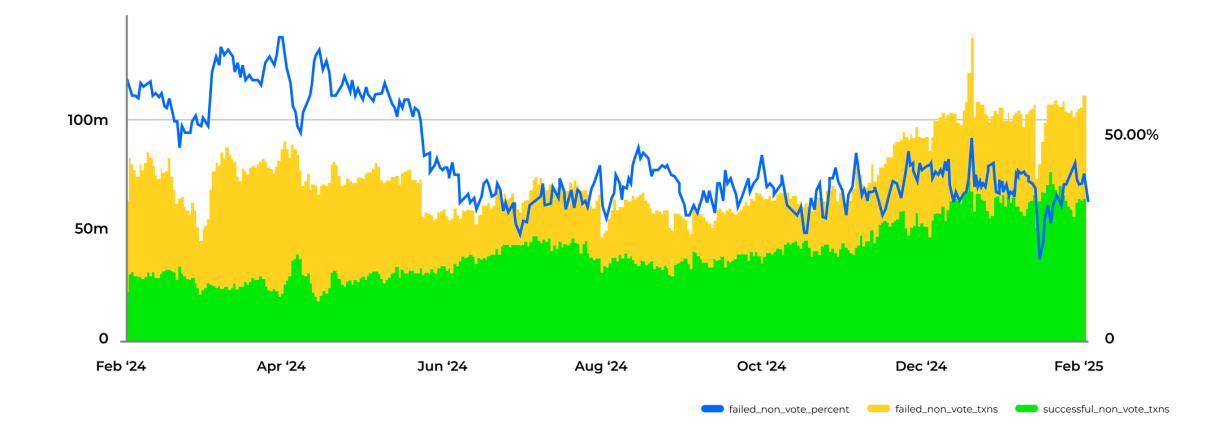


However, Solana has experienced multiple congestion issues over the past few months due to the transaction surge. High-frequency trading activity consumed many network resources, leading to increased latency and rising transaction fees. As user numbers continued to grow, Solana's network load intensified, significantly impacting user experience. For example, on February 6, 2024, Solana suffered a four-hour outage caused by a BPF (Berkeley Packet Filter) loader malfunction. Additionally, Solana faced several outages and congestion incidents in 2023 and 2022, raising concerns about the network's reliability despite its reputation for high performance.

3.1.2 Frequent Transaction Failures and Rising Costs on Solana

On February 15, 2025, Twitter user Dave (@ItsDave_ADA) reported that Solana's Meteora platform experienced a 95.27% transaction failure rate over the previous seven days. Out of approximately 139 million transactions, 131 million failed, with only about 8 million successful. This was a significant blow to users relying on Solana for DeFi activities. Many users have experienced issues where transactions fail without immediate notice, only to discover the failure later — resulting in a frustrating user experience. Statistics indicate that since November 2024, roughly 50% of submitted transactions failed, requiring multiple retries. During periods of heightened network volatility, failure rates spiked to as high as 75%.

Figure 7: Solana Failed Non-Vote Transaction Rate



Gate Research, Data from: WormholeDune, @scarn_eth

Gate Research

Notably, on February 17, Coinbase executive Conor Grogan shared data revealing that average transaction costs on Ethereum mainnet and Solana reached their closest point in history. At 7:00 AM on February 15, 2025, the difference between the two was just \$0.28 (see Figure 8). During the Otherside mint peak in 2022, Ethereum's transaction costs were \$3,500 higher than Solana's on an hourly basis. Throughout most of 2022, Ethereum's average transaction fees exceeded Solana's by \$20 - \$70 per transaction. Grogan also noted that during the Libra crash, Solana's transaction costs surpassed those on Ethereum L1 in several instances.

Figure 8: Solana Average Transaction Cost vs Ethereum Average Transaction Cost

hour	avg_fee_sol	sol_price	avg_fee_sol_usd	avg_fee_eth	eth_price	avg_fee_eth_usd	fee_diff_usd
2025-02-15 07:00	0.00006858675014055836	196.25666666666666	0.013460606960085511	0.00010895530946504315	2707.24	0.2949681779961434	-0.28150756503
2024-09-02 01:00	0.00005158810300652584	130.00083333333336	0.0067064963809342	0.000137594672732908	2442.543333333334	0.321828208391928	-0.31512171201
2025-02-15 08:00	0.00006785734927372168	196.49916666666667	0.01333912584495256	0.00013897432974352785	2707.0833333333331	0.3762150918098749	-0.36288117922
2024-08-31 08:00	0.000036929002405477833	137.43916666666667	0.005075491316440204	0.00015640068545670825	2523.3383333333326	0.39465145397080736	-0.38957596265
2024-08-31 03:00	0.00005754117991351922	138.34416666666665	0.007960486584152549	0.0001612235531087614	2525.8633333333337	0.4072286612671398	-0.39926817468
2025-02-15 05:00	0.00008513150435898407	197.54583333333326	0.016817373971515802	0.00015411654675415352	2723.7633333333347	0.4197769991089159	-0.40295962513
2025-02-16 17:00	0.00009572624560515518	190.65750000000001	0.018250926671464884	0.00015703688140146724	2698.4525000000012	0.423756565209993	-0.40550563853

Gate Research, Data from: Dune, @cgrogan

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3.1.3 SVM Helps Solana Overcome Its Performance Bottleneck

According to Nansen data, as of January 1, 2024, Solana's total active address count had reached 13.9 million. As shown in Figure 6, Solana's daily active addresses increased nearly 10x in 2024, and daily transactions tripled to approximately 60 million, with total transactions nearing 2 billion. Given the current growth trajectory, Solana's total wallet count is projected to exceed 50 million, with transaction volumes surpassing 4 billion. This scale far exceeds Solana's current capacity limits. While the Firedancer upgrade is expected to provide performance improvements, its rollout timeline remains uncertain, making it an unlikely solution to address short-term scaling needs. Additionally, Solana's monolithic architecture and software testing process limit its ability to expand rapidly. As transaction volume continues to rise, network load pressure will intensify.

To address this challenge, Solana is exploring more flexible scaling solutions:

1. **Vertical Scaling:** Performance optimization efforts led by Anza (a Solana Labs spin-off)—such as validator client improvements—may provide short-term relief from congestion but are unlikely to overcome the inherent limitations of Solana's monolithic architecture.
2. **Horizontal Scaling:** SVM's modular design has emerged as the key breakthrough. By decoupling SVM from validators, developers can independently run customized SVM instances (e.g., integrating Agave or Firedancer components), enabling a “plug-and-play” architecture. The transaction pipeline separation proposal by Anza engineer Joe C offers further cost reduction potential, paving the way for diverse ecosystem expansion.

SVM's parallel processing capability and low latency make it an ideal environment for building next-generation applications. SVM can process multiple off-chain transactions and consolidate them into a single on-chain settlement, representing a major efficiency boost for the network. Developers can build complex, high-frequency applications (such as DeFi protocols, games, and social platforms) without worrying about speed limitations or excessive costs. As a result, public blockchains built on SVM excel in the following areas:

1. **Value Capture:** Developers can design custom fee models via Rollups, directly embedding their business models.
2. **Scenario Customization:** SVM supports privacy enhancements, cross-chain integration, and other customized requirements that surpass L1's functional limitations.
3. **Performance Optimization:** By offloading frequent transactions to Rollups, SVM effectively reduces mainnet congestion, improving overall network performance.

4. **Cost Efficiency:** Transaction fees remain stable and low —typically below \$0.01 —regardless of L1 network load fluctuations.

In conclusion, SVM is an inevitable outcome of Solana's evolution. As the SVM ecosystem continues to expand, Solana is expected to overcome its current bottlenecks, achieve faster and more flexible scaling, and maintain its competitive edge in the rapidly evolving blockchain landscape.

3.2 SVM: Unlocking Diverse Possibilities for the Solana Ecosystem

3.2.1 The Hidden Concern Behind Solana's Growth: The Contradiction Between High Transaction Volume and Low Value Retention

According to Defillama's blockchain data as of February 18, 2025, Solana leads Ethereum in both transaction volume and active addresses:

1. **24-Hour Transaction Volume:** Solana recorded \$2.952 billion, significantly exceeding Ethereum Mainnet's \$2.285 billion, with Base (\$790 million) and Arbitrum (\$700 million) following behind.
2. **Active Addresses:** Solana reported 3.94 million active addresses, far surpassing Ethereum Mainnet's 470,000.
3. **Total Value Locked (TVL):** Ethereum dominates with \$57.4 billion, while Solana's TVL stands at just \$8.3 billion, with Base (\$3.2 billion) and Arbitrum (\$2.8 billion) ranking lower.

Figure 9: Daily Transaction Volume, Active Addresses, and TVL Across Different Blockchains

Name	Active Addresses	TVL	Bridged TVL	Stables	24h Volume
1  Ethereum	476,793	\$57.442b	\$175.492b	\$122.43b	\$2.285b
2  Solana	3.94m	\$8.34b	\$29.66b	\$11.593b	\$2.952b
3  Bitcoin	722,465	\$6.505b			\$330,854
4  BSC	1.13m	\$5.47b	\$13.665b	\$6.956b	\$2.162b
5  Tron	2.29m	\$5.117b	\$67.09b	\$62.58b	\$109.64m
6  Base	870,058	\$3.214b	\$14.87b	\$3.978b	\$790.76m
7  Berachain		\$2.998b		\$799.14m	\$57.09m
8  Arbitrum	254,697	\$2.833b	\$11.655b	\$2.92b	\$702.93m
9  Sui		\$1.376b	\$1.146b	\$467.1m	\$161.06m
10  Avalanche	47,773	\$1.242b	\$5.164b	\$2.159b	\$192.78m

Gate Research, Data from: DefiLlama, 2025.02.18

 Gate Research

Despite Solana's strong performance in active addresses and transaction volume, its TVL is only one-tenth that of Ethereum's, revealing a key contradiction: high transaction volume but low value retention. The root of this issue lies in the differing technical approaches between the two blockchains:

1. **Ethereum:** Prioritizes security over efficiency, with a redundant consensus mechanism that ensures reliability under extreme conditions, attracting long-term capital retention.
2. **Solana:** Prioritizes performance and efficiency, optimizing for ideal conditions with high throughput, but capital is more inclined toward short-term transactions rather than long-term staking.

This disparity has resulted in Solana's ecosystem being heavily driven by PVP (player versus player) dynamics —where users chase high-frequency trading trends (e.g., meme coins and mining) but lack sustainable value capture mechanisms. To break this cycle, Solana must enhance cross-chain compatibility and adopt modular architecture to attract external capital into its ecosystem while extending Solana's native assets into multi-chain networks, ultimately establishing a healthier liquidity flow.

3.2.2 SVM: The Value Engine of the Solana Ecosystem, Driving Cross-Chain Compatibility and Ecosystem Expansion

The emergence of SVM addresses Solana's core contradiction of high transaction volume but low value retention. First, SVM reduces migration barriers, attracting projects and resources

from other ecosystems like Ethereum. For instance, compatibility layers such as Neon EVM allow Ethereum developers to seamlessly migrate DApps to Solana, enabling them to retain familiar EVM development practices while benefiting from Solana's superior performance. This combination of high performance + compatibility has drawn numerous Ethereum-based projects to deploy on Solana.

Second, SVM's modular design significantly extends Solana's performance boundaries, offering developers enhanced customization capabilities. The decoupling framework proposed by Anza allows developers to build dedicated custom chains. For example, Sonic SVM customized consensus rules for gaming applications, dramatically improving transaction efficiency. Eclipse and SOON leverage SVM as their execution layer, inheriting Ethereum's security features while achieving high throughput on Ethereum. Solayer enhances virtual machine performance using FPGA/ASIC optimizations, further overcoming hardware limitations.

Moreover, SVM ecosystem projects have achieved standardized virtual machine instruction sets, facilitating asset and data interoperability between Solana, Bitcoin, Ethereum, and other blockchains. For example: Zeus Network enables BTC to participate directly in Solana DeFi; Wormhole leverages SVM state proofs to connect Solana with Ethereum, Avalanche, and other chains, ensuring seamless asset transfers; Grass utilizes an SVM compatibility layer to merge Ethereum and Solana's node computing power pools, expanding the scale of AI DePIN resource supply. These cross-chain innovations not only attract capital inflows from the Bitcoin and Ethereum ecosystems but also enhance Solana DeFi's liquidity growth.

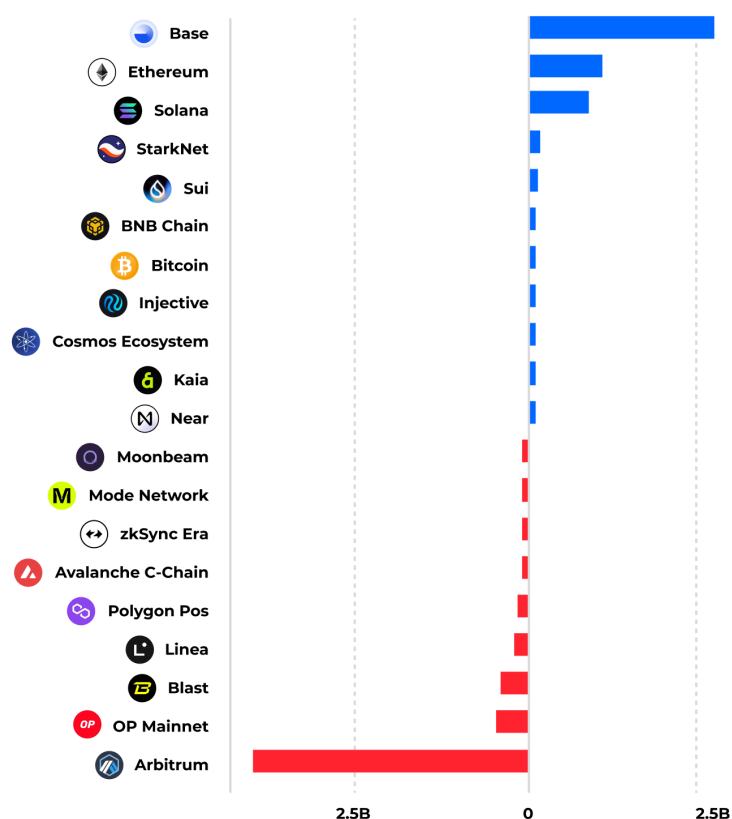
In short, SVM's efficiency and flexibility empower developers to easily build complex decentralized applications, unlocking greater potential in DeFi, on-chain gaming, and Web3. In the short term, SVM's compatibility has already attracted Ethereum developers and Bitcoin liquidity, potentially boosting Solana's TVL to \$20 billion. The medium-term goal is to establish a cross-chain execution layer centered around SVM, positioning itself as a strong competitor to Cosmos IBC and Polkadot XCM. In the long term, if the Firedancer upgrade is successfully implemented, SVM may evolve into the standard for next-generation blockchain virtual machines, accelerating the adoption of the "Solana OS" concept.

3.3 SVM: Solana's Strategic Move to Stay Competitive

In 2024, the Solana ecosystem experienced rapid growth across multiple sectors, including DeFi, infrastructure, GameFi, NFTs, DePIN, AI, and consumer applications. However, Solana faces increasingly intense competition, particularly from emerging blockchains like Base. Supported by Coinbase, Base has achieved explosive growth in key metrics such as on-chain active

addresses, daily transaction volume, and total value locked (TVL). For instance, Base’s daily transaction count surged from 338,000 to 11.1 million, marking an astonishing 3000% increase. Meanwhile, its daily active addresses grew from 61,200 to 811,200, reflecting a remarkable 1200% annual growth rate. Additionally, Base’s TVL skyrocketed from \$830 million to \$14.2 billion, representing a staggering 1600% increase. Notably, as of February 19, 2025, Solana’s net capital inflow over the previous three months amounted to just \$900 million, significantly trailing behind Base’s \$2.7 billion inflow.

Figure 10: Net Capital Inflows by Blockchain Over the Past 3 Months (as of February 19, 2025)



Gate Research, Data from: Artemis

Gate Research

Despite being surpassed by Base in some metrics, Solana is carving out a differentiated competitive path by leveraging its SVM (Solana Virtual Machine) for technical depth and ecosystem expansion. SVM itself amplifies Solana’s influence —the stronger the SVM ecosystem, the greater Solana’s impact.

3.3.1 Using SVM to Overcome Base's EVM Limitations

Base's rapid rise has largely been driven by liquidity migration from the EVM ecosystem and Coinbase's user base. However, Base's 15 TPS performance ceiling exposes its limitations in high-frequency use cases such as gaming, social apps, and high-frequency trading. In contrast, Solana's SVM, with its Sealevel parallel engine and modular architecture, offers several key advantages:

Vertical Customization for Specific Use Cases: Sonic SVM optimized its consensus rules specifically for gaming applications, achieving sub-second transaction finality. Meanwhile, Base's EVM architecture struggles to deliver comparable performance for on-chain games due to latency issues.

Superior Cross-Chain Performance: Unlike EVM, SVM's major advantage lies in its parallel transaction execution capability. Transactions that do not modify the same state can be processed simultaneously, significantly boosting throughput and efficiency.

Lower Infrastructure Costs: Sonic's standardized SDK has reduced Solana L2 development timelines from several months to just weeks, cutting development costs by 70%. In contrast, deploying Rollups on Base still requires complex audits and customized development.

Cross-Chain Asset Integration: Zeus Network leverages SVM to enable atomic swaps between BTC and Solana DeFi. Meanwhile, Wormhole synchronizes SVM state proofs across 30+ chains, creating a cross-chain liquidity hub. By comparison, Base's asset flow remains largely confined within the EVM ecosystem.

3.3.2 Leveraging SVM to Outperform Base in Consumer Applications

Although Base gained rapid traction with social applications like Friend.tech, its EVM architecture struggles to support large-scale consumer apps with millions of daily active users. In contrast, Solana leverages SVM to unlock superior performance in the following ways:

Native Mobile Integration: Solana Mobile comes with a built-in lightweight SVM node, enabling seamless on-chain interactions for apps like Stepn. In contrast, Base's EVM apps still require cumbersome signing steps.

Web2 Developer-Friendly Environment: Neon EVM enables Ethereum developers to migrate

DApps to SVM with zero code modifications. For instance, Uniswap V3 achieved a 10x increase in transaction speed after migrating to SVM. Conversely, Base's OP Stack requires contract logic to be rewritten.

Hardware-Driven Performance Enhancement: Solayer leverages FPGA acceleration to enhance SVM instruction set performance, improving smart contract execution efficiency by 5x. This breakthrough is particularly advantageous for computationally intensive scenarios like AI, DePIN, and data processing. In contrast, Base's reliance on EVM's serial processing model limits its ability to achieve similar performance gains.

In the short term, Base may continue its growth momentum due to its capital advantage and EVM compatibility. However, in the long run, Solana is reshaping the competitive landscape through the technological advantages of SVM, such as its 400ms block time, and its open ecosystem that supports multi-chain asset interoperability. Unlike Base, which relies on a single-layer EVM architecture, Solana leverages SVM to establish a three-layer ecosystem consisting of the "mainnet, application chains, and Rollups" by 2025. This structure will enable Solana to break free from architectural constraints and position itself as a leader in the era of large-scale Web3 applications.

4 Core Projects in the SVM Ecosystem

In 2025, emerging projects based on SVM, such as Sonic SVM, Eclipse, and Solayer, are quietly rising to prominence. These projects are driving continuous innovation in technology, applications, and ecosystem development, injecting powerful momentum into Solana's growth.

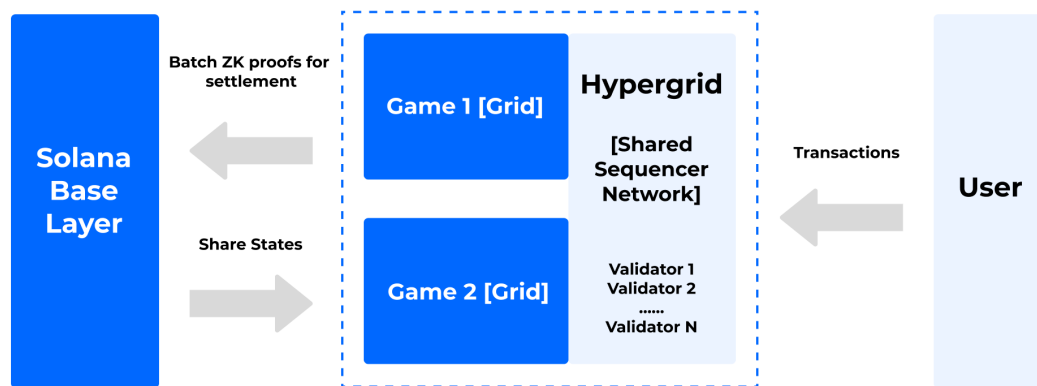
4.1 Sonic SVM: The SVM Gaming Infrastructure Integrated with TikTok

Sonic SVM is the first project in the SVM sector to conduct a Token Generation Event (TGE) and is now listed on major global exchanges, including Gate.io, OKX, BYBIT, and Upbit. After the official launch of the \$SONIC token, its price surged rapidly, reaching a peak increase of over 50x, making it a market sensation in early 2025.

4.1.1 Introduction to Sonic SVM

Sonic SVM is the first Layer 2 expansion project built on SVM, designed to provide a high-performance, low-cost blockchain environment specifically for gaming and high-frequency interaction applications. Its core objective is to expand Solana's infrastructure through its HyperGrid architecture, addressing the needs of Web3 game developers for high concurrency and low latency.

Figure 11: Sonic SVM's HyperGrid Architecture



Gate Research, Data from: Sonic SVM

Gate Research

Sonic SVM was created by Mirror World Labs, whose team includes CEO Chris Zhu, COO Alan Zhu, and CTO Jonathan Bakebwa. Notably, founder Chris Zhu previously worked at ByteDance and is recognized as a Web3 CEO with a deep understanding of TikTok. The project has completed a total of \$16 million in funding, backed by investors such as BITKRAFT, Galaxy Interactive, Big Brain Holdings, and Sky9 Capital.

Sonic SVM offers several key advantages designed to deliver an exceptional blockchain solution for gaming and high-frequency interaction applications:

- **High-Frequency Transactions:** Leveraging SVM technology, developers can set custom gas fees, avoiding the high L2-L1 data availability costs while delivering a faster, stronger, and more responsive on-chain gaming experience.
- **Interoperability:** Sonic SVM's underlying technical framework utilizes Solana as its settlement layer while pioneering the first scalability architecture known as HyperGrid. This

allows developers to leverage Solana's foundational services and liquidity without re-deploying Solana programs and accounts.

- **EVM Compatibility:** Through the HyperGrid interpreter, developers can seamlessly deploy EVM-based dApps onto Solana, minimizing migration costs.
- **Custom Features and Independent Governance:** Sonic SVM is tailored for gaming scenarios with customized data structures, independent resource allocation, and governance mechanisms. Game developers can flexibly design on-chain rules according to their unique needs, enabling distinctive and customized game logic.
- **Integrated Infrastructure:** Sonic provides comprehensive infrastructure solutions for gaming growth, traffic, payment, and settlement. Additionally, Sonic offers a full suite of on-chain game development components, lowering the development barrier for Web3 game developers.

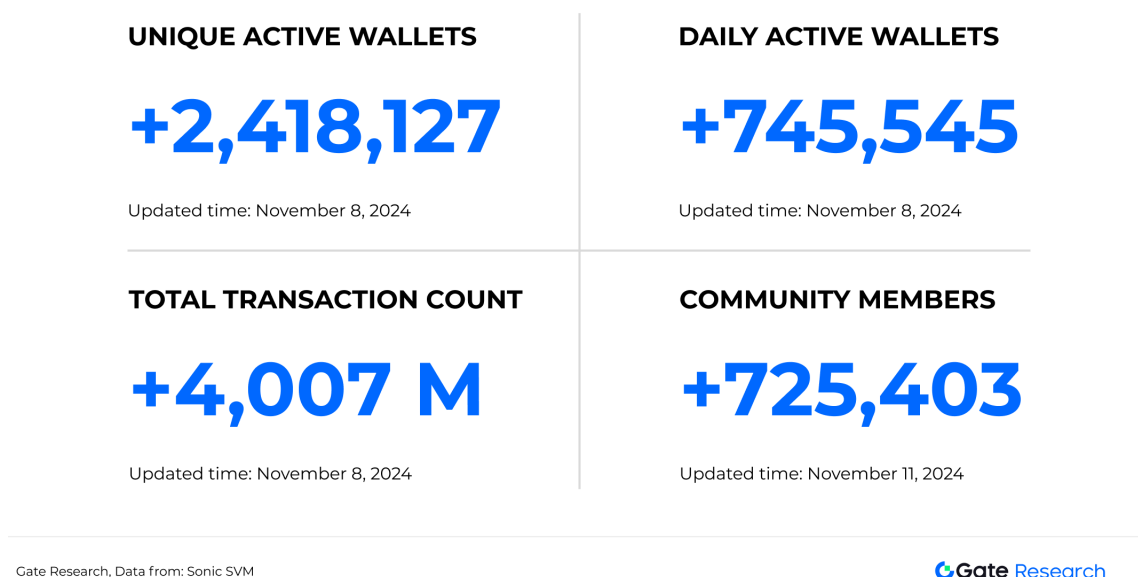
4.1.2 Sonic SVM Project Highlights: Partnering with TikTok to Create a New Web3 Gaming Gateway

Sonic SVM has successfully built a bridge between the Web2 and Web3 worlds through its deep partnership with TikTok, opening a new growth path for blockchain gaming. By embedding mini-games directly into TikTok, users can enter the gaming ecosystem without configuring a crypto wallet, significantly lowering the entry barrier and creating an accessible gateway for real users to rapidly join the platform. As one of the world's leading short video platforms with 1.6 billion global users, TikTok's young demographic, which is generally more open to Web3 and cryptocurrencies, provides Sonic SVM with a valuable user acquisition channel.

One standout application is SonicX, a blockchain-based "tap-to-earn" gaming platform built on Solana's Sonic SVM that is deeply integrated with TikTok. SonicX allows users to log in using their TikTok accounts, eliminating the need for crypto wallet setup or private key management. This design removes the technical barriers typical of blockchain games, making it especially appealing to users with no prior crypto experience.

SonicX encourages user engagement through daily challenges, friend invitations, and leaderboard competitions, rewarding participants with NFTs and cryptocurrencies that have real-world value. Leveraging airdrop campaigns and embedded mini-games, SonicX quickly attracted a large TikTok user base, reaching over 2 million activated addresses, more than 700,000 daily active users, and recording over 4 billion transactions.

Figure 12: Core Data of the Sonic SVM Ecosystem



Currently, over 20 games have joined the Sonic ecosystem, with six games —JogoJogoGame, RageEffect, FoMoney, Lumiterra, KeplerHomes, and SnakeLite —officially announced. During the Sonic Testnet Odyssey phase, JogoJogo and FoMoney launched closed beta tests, allowing users to participate in testnet activities and earn \$SONIC rewards.

As the first public showcase of the Sonic and HyperGrid infrastructure, the Testnet Odyssey campaign achieved remarkable success, attracting 300,000 unique wallets and completing 52 million transactions within just two weeks.

Figure 13: Sonic Testnet Odyssey Activity Data



Overall, Sonic SVM resembles TON in its strategy of building an application chain ecosystem powered by a major social media platform. However, TikTok's significantly larger user base, higher commercial value, and superior reach position Sonic SVM for even greater growth potential. According to Business of Apps, TikTok generated \$23 billion in revenue in 2024, with 1.6 billion active users, whose demographic is younger, broader in distribution, and has notably higher spending power than Telegram's user base. In terms of viral reach, TikTok's short video content drives 2.2 times higher conversion rates than Telegram's text-based content. Additionally, TikTok's user base is concentrated in regions with higher spending power, such as North America, Europe, and Asia-Pacific, while Telegram's user base is more prominent in developing markets like Eastern Europe, Southeast Asia, and Africa.

Telegram founder Pavel Durov announced on his personal channel that Telegram's total revenue in 2024 exceeded \$1 billion, with approximately 950 million active users. As a result, TikTok's ARPU (average revenue per user) stands at \$14.37 (calculated as \$23 billion / 1.6 billion users), which is more than ten times higher than Telegram's ARPU of \$1.05 (calculated as \$1 billion / 950 million users), demonstrating TikTok's significantly greater commercial value. TON previously leveraged Telegram's traffic and viral mini-game success to drive substantial growth in TVL and token prices. If Sonic SVM can successfully establish itself on TikTok, its commercial potential is expected to be even greater.

Sonic SVM also employs TikTok as an innovative traffic channel while seamlessly integrating into Solana's established ecosystem, benefiting from its robust technical support. Consequently, Sonic SVM holds a significant advantage in user conversion and payment potential, making it well-positioned to attract substantial capital and fuel the growth of its DeFi, GameFi, and broader ecosystem. In the future, Sonic SVM is expected to leverage TikTok's high-conversion user base and capital retention mechanisms to further enhance the Solana ecosystem's growth, ultimately becoming a central hub connecting Web2 and Web3.

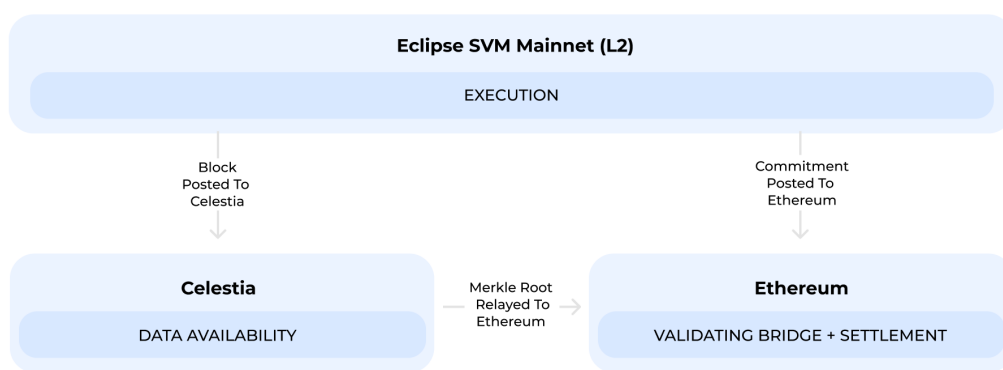
4.2 Eclipse: Ethereum's SVM Layer 2 Integrating Multi-Chain Advantages

As one of the earliest SVM-based projects to launch, Eclipse has already deployed its mainnet but has yet to issue a token. On March 11, 2024, Eclipse secured a Series A funding round led by Placeholder and Hack VC, reaching a valuation of \$1 billion. As a project with both high fundraising and high valuation but no token issuance yet, Eclipse has naturally attracted significant market attention.

4.2.1 Introduction to Eclipse

Eclipse is the first Ethereum Layer 2 solution powered by the Solana Virtual Machine (SVM). By combining Ethereum's security and deep liquidity with Solana's speed and efficiency, Eclipse offers a unique hybrid solution designed to address scalability challenges faced by decentralized applications. Eclipse adopts a modular architecture that effectively leverages the strengths of other blockchains. It utilizes Solana's SVM as the execution layer, Ethereum for authentication and consensus, Celestia for data availability, and RISC Zero to create ZK Proofs for verification.

Figure 14: Eclipse Technical Architecture



Gate Research, Data from: Eclipse labs

Gate Research

Eclipse was founded in 2022 by Neel Somani, a former quantitative researcher at Citadel and software engineer at Airbnb, and Sam Thapaliya, the founder of the Zebec protocol. In the same year, Eclipse raised \$15 million across two funding rounds backed by prominent investors such as Polychain and Tribe Capital. Additionally, Eclipse joined Celestia's Modular Fellows program and received a development grant from the Solana Foundation. In March 2024, Eclipse completed a \$50 million Series A round led by Placeholder and Hack VC, bringing its total funding to \$65 million.

4.2.2 Key Features of Eclipse: Integrating Multiple Advantages to Build a High-Performance Layer 2 Solution

As the first Layer 2 expansion project based on the Solana Virtual Machine, Eclipse has experienced rapid ecosystem growth since its launch in May 2024, attracting numerous projects. While its TVL still trails behind more mature blockchains, Eclipse has demonstrated strong growth

momentum, particularly in the DeFi and consumer application sectors.

4.2.2.1 Rapid Ecosystem Growth and Significant TVL Expansion

As of now, the Eclipse ecosystem has officially disclosed 79 projects across various sectors, including DeFi, NFTs, gaming, and social applications. Its TVL has surged from \$14 million at the beginning of 2025 to \$45 million currently, marking a more than 3x increase, signaling strong growth momentum.

Figure 15: Eclipse TVL Growth



Gate Research, Data from: DefiLlama, 2025.02.20

Gate Research

In the DeFi ecosystem, Eclipse's largest DEX is Orca, with a TVL of \$14 million. Following Orca are the lending protocols Save and Astrol, with TVLs of \$11 million and \$10 million, respectively. The second-largest DEX, Invariant, currently holds a TVL of \$7 million. Each of these projects has experienced significant growth over the past two months. On the consumer application front, diverse projects such as the After School Club NFT series, the SEND Arcade gaming platform, and the Dscvr.one social protocol have attracted user attention, contributing to Eclipse's growing user base.

Figure 16: TVL of Eclipse Ecosystem Protocols

Name	Category	TVL	1m Change	Spot Volume 24h	Cumulative Volume
1  Orca 2 chains	Dexs	\$14.58m	+27.22%	\$3.44m	\$390.68m
2  Save 2 chains	Lending	\$11.98m	+277%		
3  Astrol 1 chain	Lending	\$10.77m	+87.69%		
4  Invariant 2 chains	Dexs	\$7.26m	+38.15%	\$3.96m	\$235.87m
5  Lifinity V2 2 chains	Dexs	\$609,738	+63.57%		

Gate Research, Data from: DefiLlama, 2025.02.20

Gate Research

4.2.2.2 Unique Technical Architecture Integrating Multiple Strengths

Eclipse adopts a modular architecture that combines the strengths of multiple blockchains, including Solana, Ethereum, Cosmos, and Celestia:

- **Solana’s Parallel EVM:** Ensures high performance and low gas fees, improving the overall user experience.
- **Ethereum’s Security:** As an Ethereum Layer 2, Eclipse inherits Ethereum’s mainnet security, ensuring asset safety.
- **Cosmos’s IBC:** Enables seamless cross-chain communication, facilitating connections with other blockchain ecosystems.
- **Celestia’s Data Storage:** Reduces data storage costs while improving data transmission efficiency.
- **Zero-Knowledge Proofs:** Enhances privacy protection to meet users’ security and anonymity needs.

By combining these advantages, Eclipse has created a high-performance, secure, scalable, and privacy-protecting Layer 2 platform.

4.2.2.3 Innovative tETH Design to Enhance User Returns

One of the key differentiators of Eclipse compared to other projects is that it has not issued its own native token; instead, it uses Ethereum as the gas token for its Layer 2 network, effectively aligning itself closely with Ethereum’s ecosystem. In addition, Eclipse introduced Turbo ETH (tETH), an innovative solution designed to simplify yield management and reduce liquidity fragmentation risks. By aggregating yields from multiple protocols, tETH provides users with a streamlined liquidity management tool.

- **Unified Restaking Token:** tETH consolidates rewards from major Ethereum protocols, enabling users to earn restaking rewards without navigating complex processes.
- **Innovative Yield Generation Mechanism:** By integrating yield from multiple protocols, tETH provides users with a convenient way to maximize earnings.
- **Support for Multiple LRT Minting:** Users can mint tETH using various liquid restaking tokens (LRTs) such as WETH and weETH, helping to diversify risk while maximizing rewards.
- **Exchange Rate Yield Mechanism:** Similar to Compound's cTokens and Lido's wstETH, tETH's ETH-based yield increases its exchange rate value over time.

The design of tETH not only simplifies user participation in the Ethereum ecosystem but also introduces a unified rewards structure and exchange rate yield mechanism, offering a new and efficient liquidity management tool for users.

4.2.2.4 Low Migration Difficulty for Easy Deployment

For projects that have already developed smart contracts on Solana, deployment on Eclipse can be done almost instantly. For projects that have only developed EVM contracts, they can convert their EVM contracts into SVM-compatible contracts using Neon before deploying them on Eclipse. Building an independent SVM-based Layer 1 blockchain would present significant migration challenges for members of Ethereum's core community; however, transitioning to an Ethereum Layer 2 solution like Eclipse significantly reduces the migration difficulty for both developers and users. Eclipse's modular design and plug-and-play features further minimize development costs and reduce the time required for deployment.

Additionally, Eclipse adopts a sequencer revenue model as its primary monetization strategy, drawing from the proven commercial model of established Layer 2 solutions such as Arbitrum. As Eclipse's ecosystem continues to expand, its revenue potential is expected to grow substantially.

Overall, Eclipse is emerging as an important part of the Solana ecosystem, distinguished by its unique technical architecture, innovative product design, and promising growth prospects. Its modular structure, innovative tETH design, and low migration costs position Eclipse as a standout among Layer 2 projects. While Eclipse's current TVL and user base are still relatively small, its continued ecosystem expansion and development are likely to elevate it as a leading Layer 2 platform in the future.

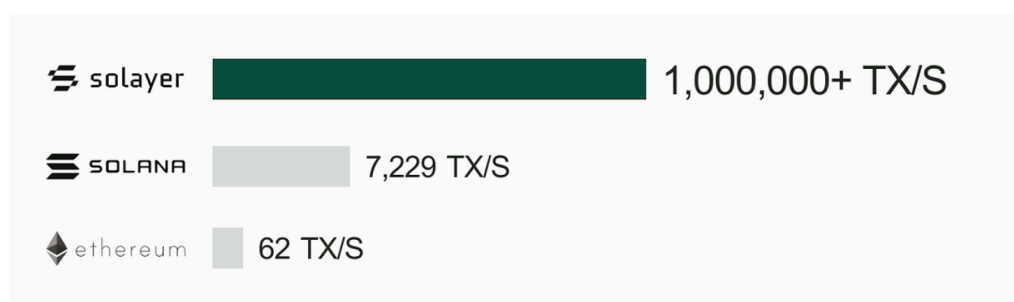
4.3 Solayer: Hardware-Accelerated SVM

Over the past year, Solayer has undergone multiple narrative transformations. From its origins as a restaking protocol to the launch of an RWA stablecoin, and now evolving into a hardware-accelerated SVM solution, Solayer has consistently remained at the forefront of technological innovation. Through the acquisition of FuzzLand and the introduction of Solayer InfiniSVM, the project is committed to becoming the first blockchain to achieve a hardware-accelerated scaling solution—a goal that undoubtedly injects new momentum into the Solana ecosystem.

4.3.1 Introduction to Solayer InfiniSVM

Solayer is a restaking protocol within the Solana ecosystem, with its core objective being to enhance the capital efficiency of SOL and its derivative assets (such as mSOL and JitoSOL) while improving Solana's security and liquidity. Solayer InfiniSVM is a key component of Solayer's 2025 roadmap, introducing Infiniband RDMA technology designed to boost Solana's network performance and scalability through hardware acceleration. InfiniSVM leverages programmable chips to offload blockchain components, enabling over 1 million TPS and network bandwidth exceeding 100 Gbps, achieving near-zero latency for demanding application scenarios. The project employs SDN and RDMA technology to scale a single execution machine into multiple execution machines based on application requirements. By integrating hardware acceleration with an infinitely scalable architecture, InfiniSVM aims to overcome Solana's performance bottlenecks and unlock new capabilities for the network.

Figure 17: Solayer InfiniSVM TPS Performance



Gate Research, Data from: Solayer

Gate Research

Solayer is led by Rachel Chu, Jason Li, and Ryan Clark, who bring extensive experience in product development, engineering, and strategic growth. Rachel Chu was previously a core

contributor at SushiSwap. Solayer has successfully completed two funding rounds, raising over \$12 million. Notable investors include Polychain Capital, Binance Labs, and strategic backers such as Anatoly Yakovenko (Co-founder of Solana), Sandeep Nailwal (Co-founder of Polygon), and Alan Curtis (COO of EigenLayer). The raised funds are primarily allocated for InfiniSVM development, ecosystem incentives, and governance token issuance preparations.

4.3.2 Solayer InfiniSVM Project Highlights: Hardware Acceleration for Extreme Traffic Scenarios

As a restaking protocol within the Solana ecosystem, Solayer InfiniSVM leverages hardware acceleration and an endogenous AVS mechanism to address blockchain performance bottlenecks, injecting new vitality into the Solana ecosystem.

4.3.2.1 Technological Innovation: Hardware Acceleration and Infinite Scalability

InfiniSVM Architecture: InfiniSVM introduces a new blockchain architecture that integrates SDN (Software-Defined Networking) and RDMA (Remote Direct Memory Access) technology to achieve 100 Gbps network bandwidth and 1ms transaction confirmation latency, pushing blockchain performance to hardware limits.

Dynamic Sharding and Hardware Offloading: InfiniSVM can dynamically partition a single execution machine into an infinitely scalable hardware cluster based on demand, enabling near-zero latency processing. Critical processes such as transaction ordering, scheduling, and storage are offloaded directly to hardware circuits to improve efficiency.

Hybrid Consensus Mechanism: InfiniSVM incorporates a hybrid PoA + PoS consensus mechanism, where the main node handles millions of TPS while coordinating with validator nodes to achieve efficient consensus.

4.3.2.2 Enhanced Staking Infrastructure

Solayer has established a robust staking infrastructure on Solana, initiating native SOL staking, with a total value locked (TVL) of \$190 million. In addition, Solayer has launched sUSD, a yield-bearing stablecoin backed by T-bill returns, providing users with a secure and profitable asset option.

By offering native assets such as sSOL and sUSD, Solayer bridges the gap between on-chain

finance and real-world assets, delivering diversified financial services to users. Solayer has also partnered with DeFi protocols such as Orca, Raydium, and Jupiter to collectively expand the Solana ecosystem.

Figure 18: Solayer TVL



Gate Research, Data from: DefiLlama, 2025.02.20

Gate Research

4.3.2.3 Endogenous AVS Enhancing User Experience; InfiniSVM for Extreme Traffic Scenarios

Solayer has introduced an endogenous AVS system within Solana, allowing DApps to directly compete for block space and transaction execution priority via the AVS mechanism. This enhances both user experience and project profitability. The intensified competition over computing power, sequencing rights, and capital allocation has made AVS resources a new variable influencing capital distribution across the Solana ecosystem.

Moreover, InfiniSVM is designed to handle extreme traffic scenarios, such as transaction surges during NFT blind box sales, with robust backup solutions to ensure system stability under high loads. By leveraging hardware acceleration and dynamic sharding technology, InfiniSVM effectively mitigates the congestion issues commonly seen in traditional blockchains during periods of peak traffic.

In summary, Solayer InfiniSVM has achieved significant progress in hardware acceleration, performance enhancement, and DeFi ecosystem development through its innovative technology and strategic ecosystem layout. Its core technology, InfiniSVM, holds the potential to break through blockchain performance bottlenecks and unlock new possibilities for the Solana ecosystem. As blockchain technology continues to evolve, Solayer InfiniSVM is well-positioned to secure

an influential role in the market.

5 Risks and Challenges Facing SVM

5.1 Technical Challenges: Balancing Performance and Scalability

Complexity of Parallel Processing: SVM relies on Solana's parallel execution architecture known as Sealevel, which requires precise prediction of transaction state access conflicts. While this design theoretically supports high throughput, transaction failure rates may still spike in high-load scenarios. If SVM fails to optimize its conflict detection algorithm, it risks repeating the congestion issues experienced by Solana's mainnet.

Compatibility Risks of Modular Architecture: Projects like Eclipse utilize modular designs that integrate multiple blockchain technologies (such as Celestia DA and Cosmos IBC). However, cross-protocol coordination introduces potential risks. If one module, such as the data availability layer, experiences downtime, it could compromise the entire chain's functionality. Additionally, maintaining compatibility during independent module upgrades raises technical coordination costs. For example, Eclipse's reliance on Celestia for data storage means network delays on Celestia could impact the real-time performance of the SVM chain.

Trade-Off Between Modular and Monolithic Architecture: The SVM ecosystem faces a strategic dilemma between pursuing extreme performance by maintaining a monolithic architecture and embracing flexible scalability through modularization. Excessive modularization may increase system complexity and reduce mainnet reliability. Furthermore, if application chains (such as gaming-focused chains) compete aggressively with the main chain for resources, it could undermine network consistency.

Maturity of Developer Tooling: Compared to Ethereum's mature developer ecosystem, SVM's developer tools are still in the early stages. The requirement to use Rust and BPF (Berkeley Packet Filter) bytecode compilation presents a higher barrier to entry for traditional Web3 developers. Moreover, the ecosystem for smart contract testing and auditing tools is not yet mature, increasing development risks.

5.2 Ecosystem Challenges: Competing for Users and Developers

Cross-Chain Ecosystem Competition: Ethereum Layer 2 solutions like Base and OP have attracted significant developer and capital inflows due to their EVM compatibility and mature ecosystems. While SVM supports EVM contract conversion, potential issues such as cross-chain asset losses and fragmented user experiences during migration may hinder adoption.

Cold Start Problem: Emerging SVM chains such as Sonic SVM face the challenge of independently acquiring users outside Solana's mainnet ecosystem. While Sonic SVM leverages TikTok's traffic for growth, platform policy changes (e.g., restrictions on Web3 content) could sever this user acquisition channel. Additionally, if SVM chains fail to rapidly establish DeFi protocols and liquidity pools, on-chain assets may become stuck in a "farm-and-withdraw" loop, limiting long-term ecosystem engagement.

MEV (Maximal Extractable Value) and Fairness: SVM's high throughput may exacerbate MEV issues. In high-frequency trading environments, bots with lower latency could exploit opportunities to gain priority profits, potentially harming retail users. Although the Solana community has explored solutions like fee auctions to mitigate MEV risks, no clear consensus has been reached, posing a risk of unfair resource distribution within the network.

5.3 Economic Model Risks: Sustainability and Speculative Bubbles

Tokenomics Design Flaws: Projects such as Sonic SVM and Eclipse have relied heavily on airdrops to attract users. However, if these tokens lack utility functions (e.g., governance, gas fee reduction), they risk becoming purely speculative assets, which could lead to price crashes followed by ecosystem decline. Additionally, Eclipse's revenue model depends on sequencer fees; if transaction volumes fail to meet expectations (especially amid increasing Layer 2 competition), cash flow may struggle to sustain operational costs.

Liquidity Fragmentation and Cross-Chain Frictions: SVM application chains must interact with both the Solana mainnet and other blockchains. However, cross-chain bridge security and efficiency remain ongoing concerns. Given that cross-chain bridge exploits have historically resulted in substantial losses, the SVM ecosystem could become a target if adequate security measures are not implemented. Additionally, fragmented liquidity pools may dilute overall liq-

idity, increasing slippage for users.

5.4 Regulatory and Compliance Risks

KYC vs. Anonymity Conflict: Projects like Sonic SVM, which integrate TikTok for user acquisition, may require mandatory KYC verification. While this helps reduce fraud risks, it conflicts with the Web3 ethos of anonymity and could face resistance from the community. Moreover, regional regulatory differences (e.g., EU MiCA regulations or U.S. SEC policies) could limit the global expansion of SVM projects.

Token Classification as Securities: If regulators classify SVM ecosystem tokens as securities—as seen with the SEC’s potential investigation into SOL—this could result in tokens being delisted from centralized exchanges, ultimately drying up liquidity. Additionally, compliance with disclosure and audit requirements would impose additional operational burdens on projects.

In essence, the challenges facing the SVM sector center on balancing the impossible triangle of “performance-decentralization-compatibility.” To break through, it needs to optimize parallel conflict detection algorithms and establish fair MEV distribution mechanisms; build a token economic model with strong utility and reduce developer migration costs; focus on vertical scenarios (such as high-frequency social gaming and real-time DeFi) while avoiding direct competition with EVM chains. Only by finding a dynamic balance point between technology, ecosystem, and regulation can SVM evolve from being a “Solana auxiliary ecosystem” to become a core pillar of next-generation blockchain infrastructure.

6 Conclusion: SVM Driving Solana’s Future

At the beginning of 2025, the SVM sector within the Solana ecosystem emerged as a rising force, with new projects such as Sonic SVM, Eclipse, and Solayer quietly gaining momentum. Like pioneers expanding uncharted territories, these projects are pushing the boundaries of Solana’s ecosystem. Through exceptional technological innovation, unique application scenarios, and promising market potential, they have not only injected new vitality into Solana but have also introduced new possibilities for the broader blockchain industry.

Sonic SVM, in partnership with TikTok, has created a new entry point for Web3 gaming, offering a fresh approach to bringing blockchain games to the mainstream. Eclipse, positioned as an Ethereum-based SVM Layer 2 solution, combines multi-chain advantages to set a new standard

for high-performance Layer 2 scalability. Meanwhile, Solayer leverages hardware-accelerated SVM technology to break through blockchain performance bottlenecks, providing robust support for high-performance applications. The success of these projects is closely tied to the prosperity of the Solana ecosystem and the increasing maturity of SVM technology.

However, the development of the SVM sector has not been without its challenges. Technical hurdles, ecosystem competition, tokenomics design, and regulatory concerns are all critical obstacles that the SVM ecosystem must confront. Balancing performance and scalability, attracting developers and users, designing a sustainable token economy, and navigating global regulatory pressures are key issues that will shape the future of the SVM landscape.

Despite these challenges, the potential of the SVM sector remains undeniable. With innovations such as hardware acceleration, dynamic sharding, and hybrid consensus mechanisms, SVM is breaking through traditional blockchain performance bottlenecks and delivering novel solutions for high-frequency transactions, cross-chain interoperability, and customized vertical applications. As more projects are launched and the ecosystem expands, SVM is poised to become a major driving force not only within the Solana ecosystem but across the entire blockchain industry.

Looking ahead, the growth of the SVM sector will rely not only on technological breakthroughs but also on ecosystem collaboration and community-driven development. As the Solana ecosystem continues to expand, SVM is expected to play a greater role in high-frequency application scenarios such as DeFi, blockchain gaming, and social platforms, ultimately bridging the gap between Web2 and Web3. Whether you are a developer, investor, or everyday user, the SVM sector is undoubtedly worth following closely, as it could represent a crucial step toward the large-scale adoption of blockchain technology.

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