

Validators DAO: Building a Sustainable Solana Ecosystem

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Abstract. As of October 2025, the Solana network faces structural challenges such as stake centralization, a decline in validator count, and imbalances in bandwidth prioritization. These issues influence one another and undermine Solana’s core principles of being high-speed, decentralized, and fair.

The reduction in validators and the concentration of stake diminish decentralization and threaten the overall reliability of the network. At the same time, the mechanism known as SWQoS (Stake-weighted Quality of Service) — introduced by Solana as an anti-spam measure — determines transaction priority based on stake weight.

This mechanism is more than a simple spam countermeasure; it represents a fundamental concept for maintaining a decentralized network over the long term. In a decentralized system without central evaluation, treating all transactions equally allows spam to proliferate, destabilizing the network. Just as in economic systems, a structure that prioritizes trustworthy transactions and nodes is essential for network sustainability. SWQoS expresses this “trust” through stake weight, giving higher priority to transactions from reliable RPCs and validators, thereby maintaining the integrity of the Solana network.

However, practical implementation of SWQoS is not simple. Configuration and operational understanding are complex, and there are limited tools to verify whether settings are properly applied. When validators and RPCs are managed by separate organizations, coordination between them is required — a process that adds both technical and operational overhead. This integration task is costly in both time and resources, and there is still no sufficient means to verify whether the connection has been properly established.

As a result, only a limited number of nodes have correctly implemented SWQoS, leaving large portions of bandwidth underutilized even though many projects require it.

Even developers operating dedicated RPCs often struggle to apply SWQoS bandwidth. Validators, on the other hand, must restart their nodes for every configuration update, which lowers validator scores and rewards, causing many to avoid doing so.

Although “no-downtime migration” can mitigate this, it requires running multiple nodes concurrently — an approach that is costly in time, capital, and operational resources, making it impractical for small incentives.



Consequently, only validators with substantial stake allocations can afford to adopt SWQoS, leaving small-scale validators excluded and deepening bandwidth concentration. Thus, Solana has fallen into an inefficient structure where bandwidth exists but remains unused.

Validators DAO addresses these problems from both technical and economic perspectives. Through the SWQoS Market Software, it provides an environment where bandwidth can be safely and transparently traded and where fair incentives can be distributed based on stake and usage.

SLV (Solana Validator Toolkit) is an open-source tool that drastically reduces the learning and operational costs associated with validator and RPC setup and maintenance. Validator operations in Solana require advanced knowledge and continuous maintenance, often leading small operators to exit. SLV solves this by automating node setup, monitoring, updates, and recovery, allowing validators to run more efficiently. This gives validators and developers the time and freedom to focus on network improvement and product development instead of daily maintenance tasks.

SLV will also include features to support Solana application development in the future. With this functionality, developers will be able to build high-quality Solana environments quickly and use SLV to develop Web3 applications or staking strategies more effectively.

Furthermore, SLV provides seamless connectivity to the SWQoS Market, allowing participants to easily engage with its economic incentive structure. This framework supports the ongoing operation of validators and provides the foundation for maintaining Solana's decentralization in a practical way.

Maintaining Solana's decentralization and efficiency requires technology, a transparent and fair market economy, and incentives.

Validators DAO integrates these three through SLV for operational support, SWQoS Market Software for economic infrastructure, and elSOL for enhanced incentives — together forming a sustainable model for decentralized operation.

Each component plays a central role, complementing one another to align stake, bandwidth, rewards, and infrastructure — realizing a balanced, sustainable Solana ecosystem.

1. Background

1.1 Validator Reduction and Centralization

Operating a validator on the Solana network requires extensive technical expertise and continuous maintenance. Daily tasks such as node updates, troubleshooting, performance optimization, and network monitoring demand both skill and time.

These technical and temporal burdens make it difficult for small-scale validators to enter and remain in the ecosystem.

Operational costs also present a barrier.

Without sufficient stake or financial resources, teams struggle to maintain profitability and are often forced to shut down. While the Solana Foundation provides a staking support program to assist smaller validators, many participants fail to achieve profitability after the support period ends and eventually cease operation.

As a result, stake has concentrated among a limited number of large operators, weakening decentralization across the network. This ongoing validator reduction and stake concentration represent a structural issue that threatens Solana's foundational principles of speed, fairness, and decentralization.

1.2 Bandwidth Prioritization and SWQoS Inefficiency

In Solana, SWQoS (Stake-weighted Quality of Service) determines communication priority based on stake allocation.

This design was introduced to prevent spam and disordered transactions, ensuring that trusted nodes are prioritized to maintain network performance.

In practice, however, SWQoS has not been fully utilized.

Its configuration is complex, verification tools are limited, and coordination between independently managed validators and RPC operators increases operational difficulty.

Furthermore, updating SWQoS settings typically requires restarting validator nodes, which carries the risk of score and reward loss.

Although SLV provides a no-downtime migration feature, it requires running redundant infrastructure, keeping operational costs high.

As a result, small stake allocations are rarely applied, and SWQoS bandwidth remains underused and concentrated among a few validators.

1.3 Structural Inefficiencies and Challenges

Technical, temporal, and economic constraints have combined to reduce validator participation and accelerate stake concentration within the Solana network.

Operating a validator requires not only technical proficiency but also the ability to attract stake through community engagement and information sharing.

However, information within the validator community is fragmented, and building trust to gather sufficient stake demands both time and effort.

This reality has led many operators to withdraw, leaving fewer than 1,000 active validators as of October 2025.

At the same time, SWQoS — intended to improve reliability — remains difficult to configure and sustain.

Although bandwidth capacity exists, only a small number of validators can utilize it effectively, resulting in underused resources and diminished efficiency across the network.

Validator centralization and SWQoS underutilization stem from the same structural cause: the absence of software and economic systems that simplify management and provide appropriate incentives.

Validators DAO resolves this by addressing these missing components through technology.

By reducing learning, operational, and economic barriers, it enables Solana to restore both decentralization and operational efficiency in a practical manner.

2. Solution

Validators DAO aims to resolve the structural issues facing the Solana network — the reduction and centralization of validators, inefficiencies in SWQoS, and the stagnation of bandwidth utilization — through software-based systems.

The DAO's framework consists of three core components:

- SLV (Solana Validator Toolkit) — reduces technical and operational burdens.
- SWQoS Market Software — establishes a fair and transparent economic structure.
- elSOL — optimizes incentives and promotes bandwidth utilization.

These systems operate independently yet complement each other, forming the foundation that sustains Solana's decentralization and efficiency over the long term.



2.1 SLV (Solana Validator Toolkit)

SLV is an open-source tool designed to simplify the setup, operation, and maintenance of validators and RPC nodes. Running a validator in Solana requires extensive technical expertise and constant attention to maintenance, updates, and issue resolution.

This has long served as a significant barrier to entry and continuity, especially for smaller validators.

SLV addresses this issue by automating node setup, monitoring, updates, and recovery.

Through standardized processes, it drastically reduces the learning curve and operational burden associated with validator management.

This allows operators to focus on network improvements and product development rather than repetitive operational tasks.

In the future, SLV will also implement features to support Solana application development.

Developers will be able to deploy high-quality Solana environments in a short period of time, making SLV a platform that provides both operational and developmental support.

This approach creates time and resource efficiency for both validators and developers, allowing them to focus on building products and more strategic staking operations.

SLV is distributed as open-source software, enabling anyone to utilize and improve it freely.

By sharing operational knowledge and reducing technical disparity, SLV serves as the foundation that supports technical decentralization within the Solana network.

2.2 SWQoS Market Software

The SWQoS Market Software provides an open and transparent environment for trading network bandwidth on Solana.

Previously, bandwidth was managed through private contracts between validators and RPC operators, with little transparency or standardized pricing.

Within this market, bandwidth is represented as SSP (SOL Staking Power), and its value is expressed through VLD (Validators DAO Token).

Supply-side participants list SSP at their desired rates, while demand-side participants purchase SSP using VLD. Prices are autonomously formed based on demand and supply, accurately reflecting the actual cost of bandwidth within the Solana network.



For unsold SSP, rewards are still distributed based on the utilization of shared SWQoS endpoints. The unutilized portion of SSP receives a proportional allocation of VLD, ensuring that providers are compensated even when direct sales do not occur.

For RPC operators and developers, this system eliminates the need for direct contracts or complex configuration with validators.

They can simply obtain the required bandwidth through the market, resulting in standardized, efficient, and transparent communication resource allocation across Solana.

The SWQoS Market Software replaces the previously closed contract model with a transparent and fair transaction layer, becoming a core component of Solana's communication economy.

2.3 eSOL

eSOL is a liquid staking token (LST) designed to operate in conjunction with the SWQoS market. While other LSTs or validator stakes do not necessarily contribute to SWQoS bandwidth, eSOL is utilized entirely — 100% — as SWQoS-enabled bandwidth.

All eSOL validators operate with zero commission fees and are MEV-enabled. They contribute 20% of their block rewards back to the eSOL pool every epoch. As a result, eSOL consistently delivers higher yields to stakers than conventional staking pools, providing a clear incentive for participation.

eSOL directly connects Solana's staking structure with SWQoS bandwidth. This ensures that staked assets actively function as network bandwidth, aligning communication quality and economic value within a unified framework.

By offering a high-yield structure while promoting SWQoS utilization, eSOL activates bandwidth use across the Solana network. Consequently, Solana operates with aligned incentives among stake, bandwidth, and rewards, achieving a balanced and sustainable ecosystem built on decentralization and efficiency.

3. Economic Model

The Validators DAO economic model connects bandwidth trading and staking rewards within the Solana network through clear, rule-based mechanisms, establishing a transparent and sustainable market structure.

At its center lies VLD (Validators DAO Token), which functions as the primary unit of exchange and accounting for bandwidth trading and reward distribution in the SWQoS Market.

3.1 Token Design

VLD is the token used for trading bandwidth, represented as SSP (SOL Staking Power), within the SWQoS Market.

The total supply of VLD is capped at 10M (10,000,000) VLD.

Of this, 15% is distributed through an airdrop, and the remaining 85% is allocated for DAO minting.

DAO minting operates at a fixed rate of 1 VLD = 0.1 USDC.

When the market price exceeds this baseline, DAO minting is prioritized to prevent excessive price inflation.

The USDC generated from minting is added to the VLD–USDC liquidity pool, supporting both liquidity and price stability in the market.

VLD serves as the base currency for bandwidth trading across Solana.

The price of SSP and the market value of VLD reflect real-time network conditions—specifically, the balance between bandwidth demand and supply.

3.2 Airdrop

The initial airdrop will be distributed to the DAO community, the OSS ecosystem, and existing contributors.

The recipients are as follows:

- Open-source contributors to SLV (formerly solv)
- elSOL holders
- EPCT token holders (excluding the core team, DAO wallets, and locked tokens)
- Buidlers Collective (BDLC) NFT holders
- Epics Beta Tester Ticket NFT holders
- Buidlers Guild Card Pack NFT holders
- Participants of periodic snapshot events announced via Discord
- SWQoS Market Beta Testers (Both Bandwidth Users and Validators)



This airdrop serves as a token of appreciation and acknowledgment for those who have supported Solana-related and open-source development projects.

The concept of Validators DAO was born during the development of Epics DAO, an open-source initiative created to address the lack of stable, high-speed Solana development environments.

To solve this challenge, we developed ERPC and SLV, which now serve as the technical foundation of Validators DAO.

The inclusion of Epics DAO supporters as preferred recipients reflects their long-standing contributions to Solana's open-source ecosystem and their continued involvement in advancing global open-source development.

Without their early support, this DAO could not have been realized.

Part of the initial allocation is therefore returned to these contributors in recognition of their efforts and ongoing commitment.

3.3 Market Stability and Price Formation

The market value of VLD is determined through trading activity within the SWQoS Market.

When demand for bandwidth increases, the price of VLD rises, resulting in higher rewards for bandwidth providers. Conversely, when demand decreases, prices naturally adjust downward, maintaining equilibrium across the market.

The DAO minting rate of 0.1 USDC per VLD acts as a stabilizing mechanism against excessive volatility.

If the market overheats, additional VLD is minted to temper price surges; if trading slows, airdrops and shared rewards help sustain circulation.

Through this design, VLD's supply and demand are synchronized with actual network activity, enabling organic price formation without centralized intervention.

Trading volume and price movements of VLD become key indicators of Solana's bandwidth utilization and market health.

The market itself serves as a transparent price discovery mechanism within the Solana ecosystem.

3.4 Reward Structure and Market Alignment

elSOL is designed to provide high yield to stakers. Validators participating in elSOL set their commission to zero and return 20% of their block rewards to the elSOL pool each epoch.

This mechanism allows stakers to receive additional rewards on top of standard staking yields, creating consistently higher returns compared to traditional staking pools.

Attractive yields encourage continued staking, which in turn supports validator operations and network stability.



In the SWQoS Market, SSP (SOL Staking Power) is traded using VLD.

Providers who sell SSP receive VLD, while buyers obtain priority bandwidth.

For unsold SSP, rewards are distributed based on the proportion of unutilized SSP within shared SWQoS endpoints, ensuring that providers have consistent earning opportunities regardless of direct sales outcomes.

The price of VLD fluctuates according to trading activity and bandwidth demand.

The DAO mint baseline of 0.1 USDC per VLD, along with the total supply limit, functions as a safeguard against market overheating or liquidity shortages.

USDC obtained from minting is added to the VLD–USDC liquidity pool, further reinforcing market reliability and transactional stability.

Through this model, bandwidth provisioning, VLD trading, and eSOL’s reward mechanisms are aligned.

The result is a transparent, sustainable economic structure that operates according to market principles within the Solana network.

4. Operation

The operation of Validators DAO is composed of three core systems: the SWQoS Market Software, the eSOL Pool, and the Monitoring and Streaming System.

These systems work together to efficiently and securely manage Solana’s network bandwidth, ensuring that both bandwidth providers and users receive rewards reliably.

4.1 SSP Sales and Reward Distribution

Within the SWQoS Market, validators and stakers sell SSP (SOL Staking Power), which users purchase using VLD.

When a sale is completed, the VLD paid by the buyer is automatically transferred to the seller.

For unsold SSP, a portion of the VLD used within shared SWQoS endpoints is distributed based on the holder’s proportion of unutilized SSP.

This structure ensures that providers earn rewards even when their listings are not directly sold.

All reward data is recorded on-chain, and distribution is fully automated.

Reward calculations occur on an epoch basis, accurately aggregating both sold and unsold portions for each provider.



4.2 Real-Time Streaming Payments

Once SSP is purchased, VLD transfers occur in real time.

During the service period, payments are automatically streamed at regular intervals.

Traditional one-time payments carried risks such as non-payment by the buyer or non-delivery by the provider.

By using real-time streaming payments, rewards are distributed proportionally to actual usage, enabling fair and secure transactions for both parties.

Payment flows are managed per transaction.

Transfers continue only while the buyer actively uses the allocated bandwidth, and automatically stop when the usage period ends or when an abnormal condition occurs in the contract or system.

4.3 Monitoring and Automated Control

To ensure operational reliability, Validators DAO operates a dedicated monitoring system.

This software continuously monitors bandwidth application, payment status, and staking balances.

If an anomaly is detected, payments are automatically suspended and notifications are sent to the relevant parties.

When configuration inconsistencies or unstable connections are detected, the system prompts for reconfiguration or confirmation to prevent extended downtime.

The monitoring software integrates payment control, reward distribution, and staking application management, ensuring that all SWQoS transactions on the Solana network are executed accurately and stably.

4.4 Automation and Audit

All operational workflows within the DAO are automated through software.

Reward calculations, payment processing, and configuration updates are performed automatically each epoch, eliminating the need for manual intervention and reducing the risk of human error.

The entire process is planned for third-party auditing, including verification of reward calculation logic and payment control mechanisms.

This external audit ensures both security and transparency across the DAO's operational systems, strengthening trust among all participants.



5. Conclusion and Future Development

Validators DAO has established a software-based framework that supplements the technological, economic, and incentive-related elements required to maintain decentralization within the Solana network in a practical manner. SLV, SWQoS Market Software, and elSOL each function independently while operating in coordination, forming the foundation that allows Solana to achieve both decentralization and efficiency.

The preparation for the SWQoS Market is scheduled to begin with beta testing in the first half of 2026, followed by a public release in the second half of the same year.

During the beta phase, key functions such as bandwidth trading, reward distribution, and real-time streaming payments will be tested in an active network environment to ensure operational stability and security.

The insights and data obtained from this testing phase will be used to finalize configurations and confirm system reliability prior to the official launch.

The Token Generation Event (TGE) will coincide with the public release of the market.

Through the TGE, VLD tokens will be officially issued, liquidity will be provided, and initial allocations will be completed via DAO minting and airdrop distribution.

This marks the start of formal trading within the SWQoS Market, alongside the activation of reward distribution and elSOL integration.

Following the TGE, the DAO will continue to monitor market activity and refine its software systems to enhance stability.

Metrics such as network bandwidth utilization, VLD market performance, and staking distribution will be continuously reviewed, and improvements will be implemented to further balance decentralization and economic sustainability across the network.

Validators DAO aims to serve as a lasting foundation for both technical and economic decentralization within Solana, enabling developers, validators, and stakers to contribute on equal terms and share in the collective outcomes of an open and sustainable ecosystem.



Links

elSOL: <https://elsol.app/>

SLV (Solana Validators/RPC tool) : <https://slv.dev/>

Validators DAO: <https://dao.validators.solutions/>

ERPC (Solana Enhanced RPC) : <https://erpc.global/>

Validators DAO Discord: <https://discord.gg/C7ZQsrCkYR>

Solana Foundation Validator Health Report: March 2023:

<https://solana.com/news/validator-health-report-march-2023>

Validator Health Report: October 2023: <https://solana.com/news/validator-health-report-october-2023>

A Guide to Stake-weighted Quality of Service on Solana:

<https://solana.com/ja/developers/guides/advanced/stake-weighted-qos>

Solana Stake Pool Program: <https://spl.solana.com/stake-pool>

Epics DAO: <https://epics.dev/>

Epics DAO Discord: <https://discord.gg/GmHYfyRamx>

Buidlers Collective (BDLC) NFT - MagicEden: <https://magiceden.io/marketplace/buidlersc>

Epics Beta Tester Ticket NFT - MagicEden: <https://magiceden.io/marketplace/ebtpp>

USDC - EPCT exchange - Orca:

<https://www.orca.so/?tokenIn=EPjFWdd5AufqSSqeM2qN1xzybapC8G4wEGGkZwyTDt1v&tokenOut=CvB1ztJvpYQPvdPBePtRzjL4aQidjydtUz61NWgcgQtP>

