Soarchain Protocol Economics

Soarchain Team
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Soarchain is an evolving platform, and aspects of its protocol, as described in this document, are under development and subject to change. The contents herein may not fully reflect the current status of the Soarchain protocol at any given time. The documentation and content are preliminary and subject to modification.

By engaging with Soarchain or acquiring SOAR tokens, you acknowledge and agree that you fully understand the nature of the project, the inherent risks involved, and the regulatory landscape governing blockchain technologies and token sales.

SOAR Token Flow

Soarchain's token economy is based on using SOAR tokens as a means of exchange and as a reward for participating in the network. This innovative approach enables the platform to power the secure execution of smart contracts and dApps while providing data and transaction fees to its nodes.

The primary purpose of SOAR tokens is as an exchange currency throughout the Soarchain network. They can be used to pay for services and dApps or to pay data and transaction fees to nodes. In addition to being used as an exchange currency, SOAR coins are rewards for participating in the Soarchain network by making vehicles' connectivity and computational resources available to the network.

Each epoch is dynamically calculated and portions of tokens are minted based on the network activity and then distributed amongst participants who prove their availability within the network through Proof of Availability (PoAv). This ensures that users who actively contribute to the security and stability of the platform are rewarded accordingly.

Soarchain's unique token model provides users with a secure way to exchange value within the platform and receive rewards for participating in its network. Having both uses for its tokens creates an incentive structure that encourages active engagement from those involved for them to reap maximum benefits from their interaction with the Soarchain network. This balance between usage and reward makes Soarchain stand out.

The value generation and capture of the token can be analyzed from multiple perspectives:

a. Utility and Demand: The SOAR token serves as the primary means of access to the rich ecosystem of mobility-related applications and services, creating consistent demand for the token. As more users, developers, OEMs, and other stakeholders participate in the ecosystem, the demand for the token will naturally grow. Additionally, token usage in services such as insurance, vehicle maintenance, energy road safety, and more will further drive demand. The diverse range of users, including non-crypto individuals, will further contribute to the growing demand for the token. These users will engage with Soarchain not simply for the rewards, but for access to a myriad of applications. We are creating an app store for cars where the main transactions are handled by SOAR tokens.

b. Network Effects: The value of the SOAR token is directly correlated to the growth of the ecosystem. As more participants join and contribute data to the network, the overall value of the network increases, following Metcalfe's Law. This creates a positive feedback loop combined with a growing application base, where increased value attracts more participants, leading to further growth and value capture for the token.

c. Token Economics: The gas-based token economy ensures that the token is used for transactions and interactions within the ecosystem, creating a continuous circulation of tokens. This helps maintain a healthy token economy and supports the growth of token value over time.

d. Data Monetization: The data collected and shared by vehicle owners through the Soarchain ecosystem represents a valuable resource for various industries, including insurance, automotive, and transportation. By monetizing this data, the Soarchain platform can generate additional revenue streams that can be used to support the token's value and further develop the ecosystem.

e. Scarcity: The limited supply of SOAR tokens, combined with staking mechanisms for applications and services, creates a scarcity that can lead to an appreciation of the token's value as the ecosystem expands.

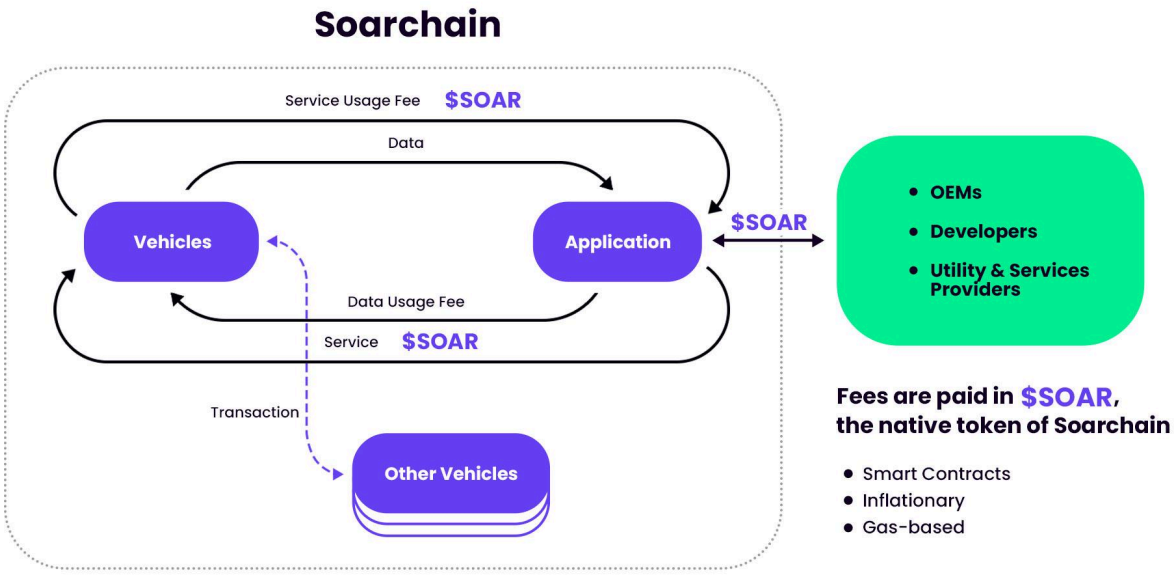


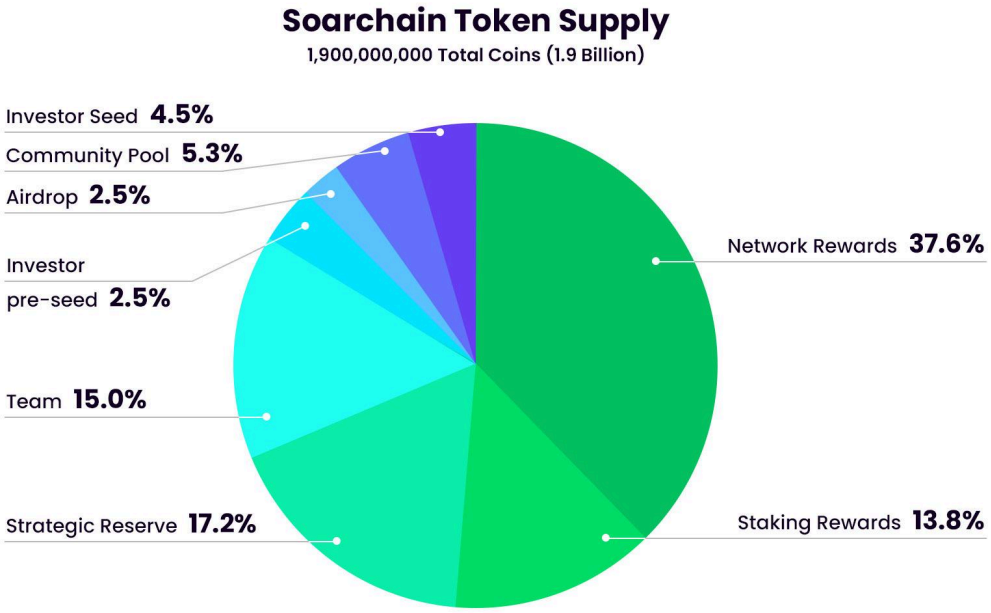
Figure 1: Soarchain data flow diagram.

- SOAR is the native token of the Soarchain Network.
- It is gas-based and inflationary.
- It is used as the service or usage fee for Soarchain smart contracts and PoAv rewards.

More info at Soarchain Documentation.

Token Distribution

Our tokenomic model consists of **1.9 billion** SOAR tokens. Transaction fees are burned, and the genesis supply is **48.6%**. In comparison, **51.4%** will be distributed as a reward for network participants - providing long-term sustainability into our economics model development that encourages continued engagement within these parameters over time. These 51.4% are mainly attributed to three groups: i) V2N rewards **22.6%**, ii) V2V rewards **15%** and iii) Staking rewards **13.8%**.



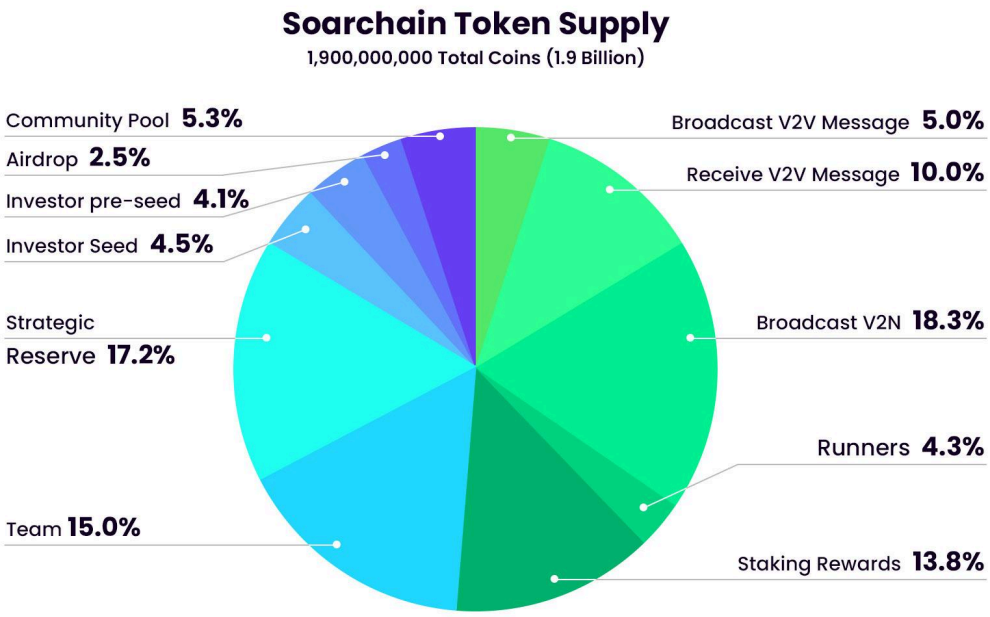


Figure: Total token supply with network reward details.

Strategic Reserve (327,275,000 Tokens - 17.225 of Total Supply)

The Strategic Reserve is designed to support the future development and expansion of Soarchain. This pool can be utilized for various purposes like forming new partnerships, getting additional investment, funding strategic initiatives, marketing, and other activities that will enhance the reach and capabilities of the Soarchain network. It acts as a buffer to ensure the long-term sustainability and scalability of the ecosystem.

Pre-seed Investor Allocation (74,250,000 Tokens - 4.075% of Total Supply)

These tokens are allocated to early investors who provided the capital necessary for the initial development phases of Soarchain. Their investment was crucial in kick-starting the project, and this allocation is a means of acknowledging their support and trust in Soarchain's vision. It also aligns their interests with the long-term success of the network.

Seed Investor Allocation (85,500,000 Tokens - 4.5% of Total Supply)

These tokens are designated for seed round investors, whose funding was vital for Soarchain's early stage growth. Their support helped propel the project forward, and this allocation recognizes their commitment and aligns their interests with the network's long-term success.

Community Pool (100,700,000 Tokens - 5.3% of Total Supply)

The Community Pool is dedicated to ongoing community engagements and initiatives. This includes but is not limited to, funding community-driven projects, governance proposals, rewards for active community members, and various programs that encourage participation and contribution from the broader Soarchain community. This pool is vital for nurturing a vibrant, collaborative, and growing ecosystem.

Testnet & Airdrop (47,500,000 Tokens - 2.5% of Total Supply)

This allocation is for users who participated in the incentivized testnet phase of Soarchain and for airdrop campaigns. The testnet participants played a vital role in testing, providing feedback, and helping to improve the network before its official launch. The airdrop serves to reward early adopters and spread awareness, thereby fostering a robust and engaged community around Soarchain.

Team (285,000,000 Tokens - 15% of Total Supply)

The Team tokens are allocated to reward and incentivize the core team members, developers, and founders of Soarchain. This allocation is crucial for maintaining a dedicated and skilled team for the continuous development, innovation, and management of the Soarchain ecosystem.

The Network Rewards

51.4% of the total supply will be distributed as a reward for network participants under three main categories.

Type	Token Amount	Percentage (%)
V2N rewards	429,400,000	22.6
V2V rewards	285,000,000	15
Staking rewards	262,200,000	13.8

V2N Rewards

Under the Network Rewards distribution of the token economics, we introduce a system known as Vehicle-to-Network (V2N) rewards. These rewards serve as network incentives disbursed to participants engaged in V2N challenges. These participants can be classified into two main categories: V2N Broadcasters, and Runners.

1. V2N Broadcasters

V2N Broadcasters are essentially vehicles or devices equipped with the necessary technology (like the Soarchain devices) to gather and transmit data from the vehicle to the network. They play a critical role in the Soarchain ecosystem by serving as the primary source of data collection and transmission.

Function:

- Data Collection: These devices collect various types of data from vehicles. This data can include vehicle generated data, location data, sensory data, environmental conditions, and more.
- Data Transmission: After collecting the data, V2N Broadcasters transmit this information to the Soarchain network via the Runners. This transmission typically occurs real-time or near-real-time data flow.
- Token Rewards: For their role in data collection and broadcasting, these devices are rewarded with tokens. The rewarding mechanism is explained in the section below.

2. Runners

Runners are specialized nodes in the Soarchain network that receive, process, and sometimes store the data transmitted by V2N Broadcasters. They act as intermediaries between the V2N Broadcasters and the Soarchain blockchain.

Function:

- Data Reception: Runners are responsible for receiving data from multiple V2N Broadcasters. They need to be capable of handling large volumes of incoming data efficiently.
- Data Processing and Validation: Upon receiving the data, Runners process and validate it. This process can involve checking the data for completeness, accuracy, and integrity without compromising the anonymity. They might also be involved in formatting the data for blockchain compatibility.
- Data Storage (Temporary): Some Runners may temporarily store data as part of the processing or validation process.

- Token Rewards: Just like V2N Broadcasters, Runners also earn tokens for their role in the network. Their rewards are typically based on the volume of data they process and the efficiency and accuracy of their operations.

The emission schedule of the V2N Rewards is determined by an algorithm, which is closely linked to both the network activity and the total count of participants. This approach ensures that the distribution of rewards is fair and directly reflective of each participant's contributions.

As the number of challenges undertaken increases, the amount of tokens minted per challenge decreases. This indicates a progressive diminishing return of V2N rewards per contributed challenge for V2N challenge participants. It's a designed mechanism to maintain a sustainable reward system as the network grows.

The V2N token minting mechanism is designed with an innovative decay system. Initially, tokens are minted per challenge at a constant rate. However, after every 192 epochs (equating to one day), the rate experiences a decay. Essentially, one day is composed of 192 epochs.

Importantly, the token minting rate for each challenge on a given day is influenced by the total number of challenges that occurred the previous day. This dynamic approach ensures a direct and responsive relationship between network activity and reward issuance.

Moreover, the daily decay rate of V2N tokens minted per challenge is determined by the number of daily challenges that took place that day. The quantity of daily challenges correlates directly with the number of active V2N participants in the network, signifying a vibrant and engaged ecosystem. This decay system is reflective of the network's active engagement, ensuring a balance between incentivization and sustainable growth.

The $v2nMintedperChallange$ is calculated using the following equations.

*Let **A, B and C** be v2n Reward Coefficient parameters.*
(*The **A,B, and C** coefficients will be determined at the beginning of the Mainnet event.)

*Let **d** represent **today** and **d-1** represent **yesterday** (192 epoch before the current epoch)*

*Let the **Initial Token Minted per Challenge** for v2n be*
(*The number of initial **Token Minted per Challenge** will be determined at the beginning of the Mainnet event.)

$$v2nMintedperChallange(d = 0) = 9$$

*Let the **Initial Minted Tokens** for v2n be*

$$v2nMintedTokens(d = 0) = 0$$

*Let the **Initial Remaining Tokens** be*

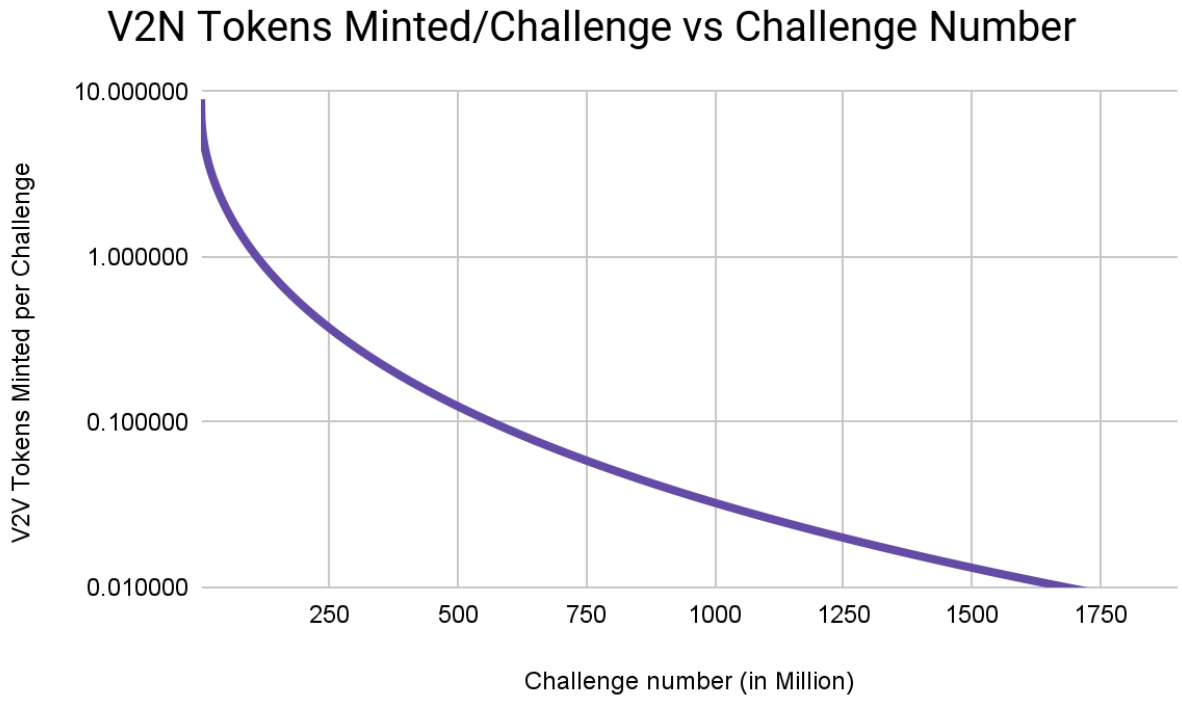
$$v2nRemainingTokens(d = 0) = 429,400,000$$

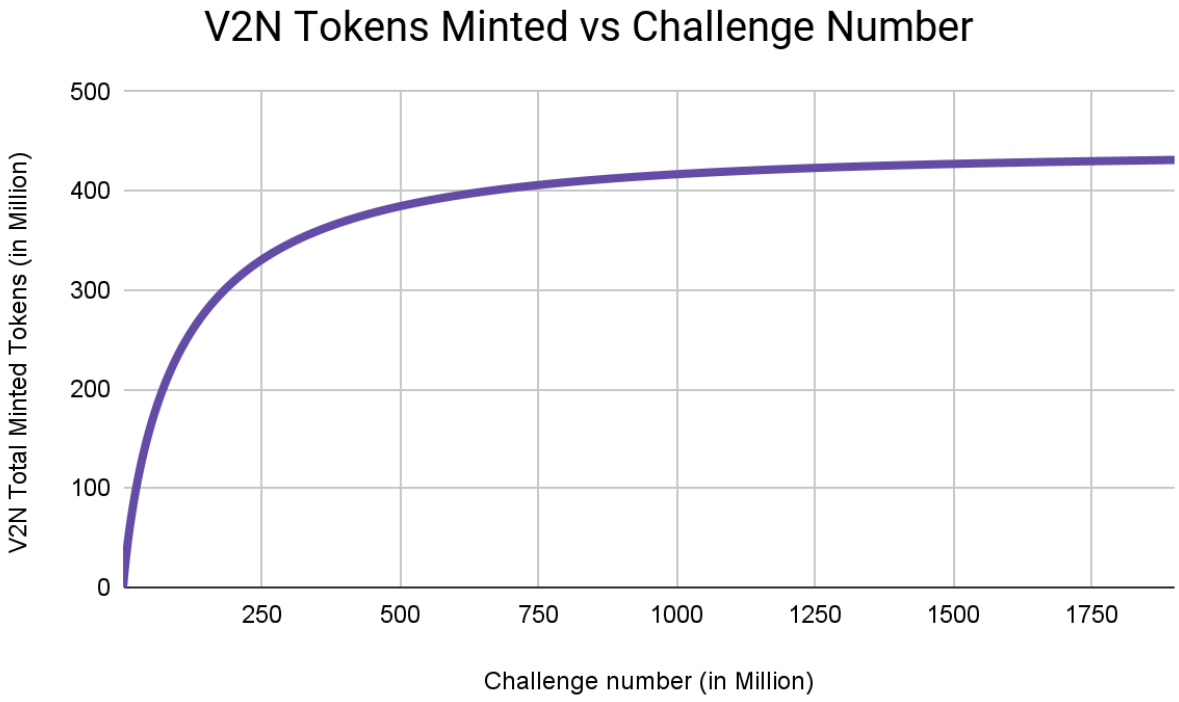
*Then **Tokens Minted per challenge** for v2n become;*

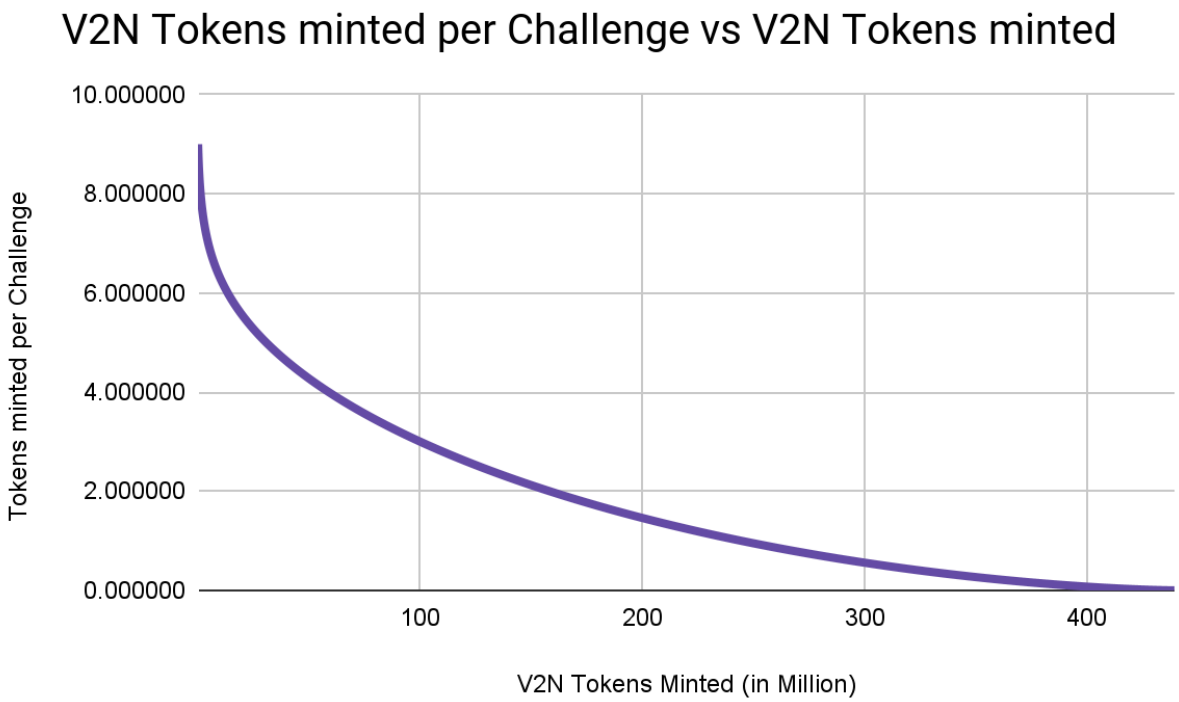
$$v2nMintedperChallange_{d} = v2nMintedperChallange_{d-1} \times (1 - (B \times (\frac{v2nMintedTokens_{d-1}}{v2nRemainingTokens_{d-1}})^{A} + C)$$

The distribution of V2N Network Rewards follows a specific allocation plan outlined in the following table.

Type	Token Amount	Percentage
Broadcast V2N	347,700,000	18.3
Runners	81,700,000	4.3
V2N Rewards TOTAL	429,400,000	22.6




V2N Tokens Minted vs Challenge Number
V2N Total Minted Tokens (in Million)
500
400
300
200
100
0
250
500
750
1000
1250
1500
1750
Challenge number (in Million)


V2N Tokens minted per Challenge vs V2N Tokens minted
Tokens minted per Challenge
10.000000
8.000000
6.000000
4.000000
2.000000
0.000000
100
200
300
400
V2N Tokens Minted (in Million)

V2V Rewards

In our tokenomics framework, we have integrated a distinctive reward mechanism known as Vehicle-to-Vehicle (V2V) rewards. These are incentives distributed to participants who engage in V2V challenges. The participants are divided into two main categories: Broadcast V2V Messages, Receive V2V Messages.

The issuance schedule for V2V rewards is derived from a meticulous algorithm, taking into account both the activity within the network and the total number of participants. This ensures that the rewards are distributed equitably, reflecting each participant's contribution to the network's growth and functionality.

It is important to note that the number of tokens minted per challenge gradually decreases as the total count of completed challenges since inception increases. This relationship demonstrates an inversely proportional dynamic, ensuring a balanced and sustainable reward system as the network matures.

The exact breakdown for the distribution of V2V Network Rewards is detailed in the table provided below. We uphold the principle of fairness and incentive compatibility in our reward distribution, aiming to foster robust network participation and sustainable growth.

Type	Token Amount	Percentage
Broadcast V2V	95,000,000	5
Receive V2V message	190,000,000	10
V2V Rewards TOTAL	285,000,000	15

The $v2vMintedperChallange$ is calculated using the following equations.

*Let **A, B and C** be v2v Reward Coefficient parameters.*
(*The **A,B, and C** coefficients will be determined at the beginning of the Mainnet event.)

*Let **d** represent **today** and **d-1** represent **yesterday** (192 epoch before the current epoch)*

*Let the **Initial Token Minted per Challeng**e for v2v be;*
(*The number of initial **Token Minted per Challenge** will be determined at the beginning of the Mainnet event.)

$$v2vMintedperChallange(d = 0) = 5.49$$

*Let the **Initial Minted Tokens** for v2v be;*

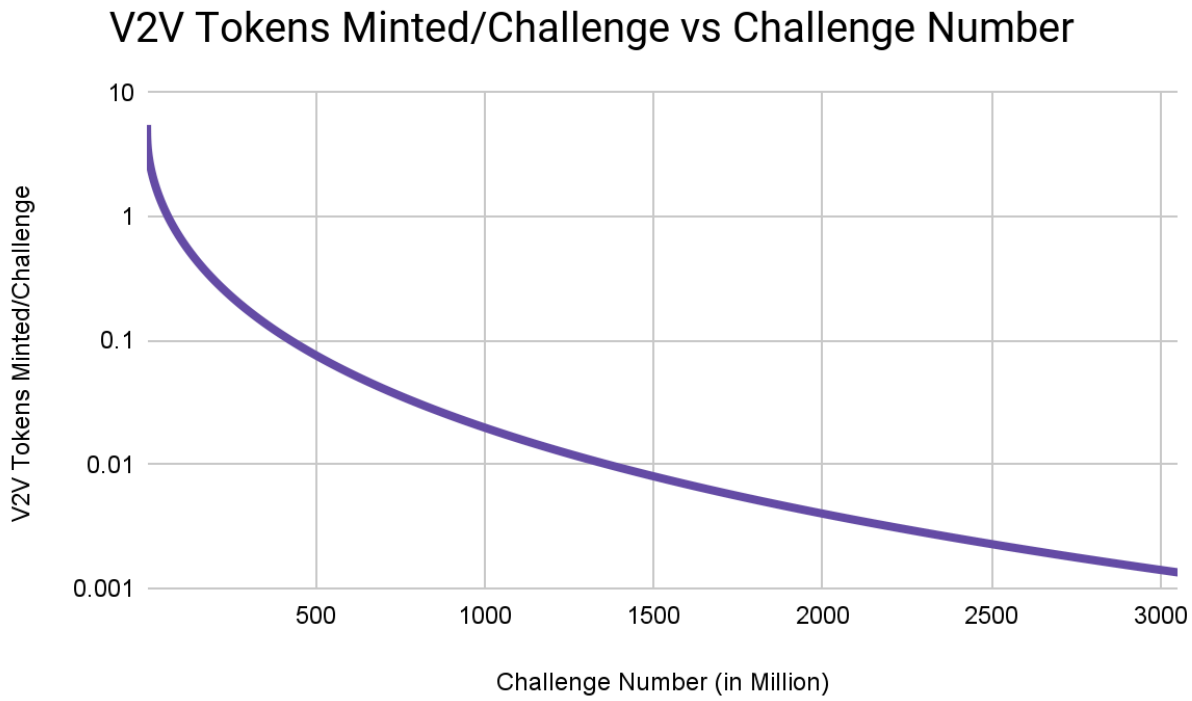
$$v2vMintedTokens(d = 0) = 0$$

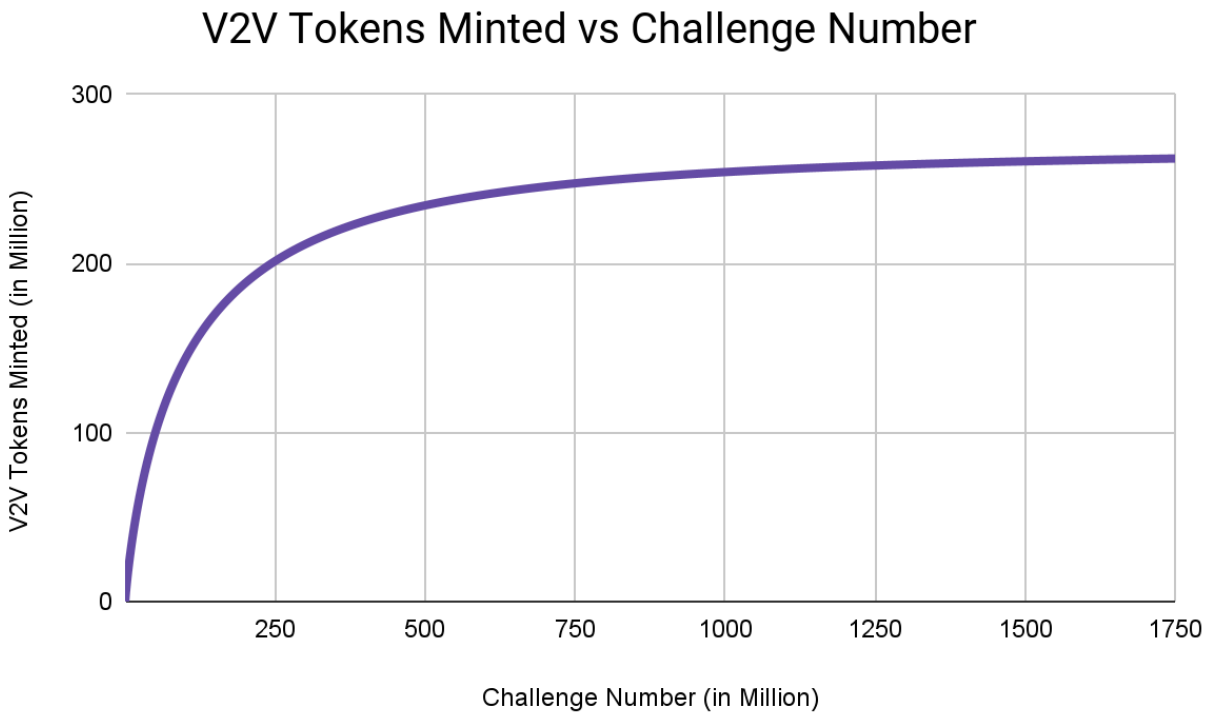
*Let the **Initial Remaining Tokens** to be;*

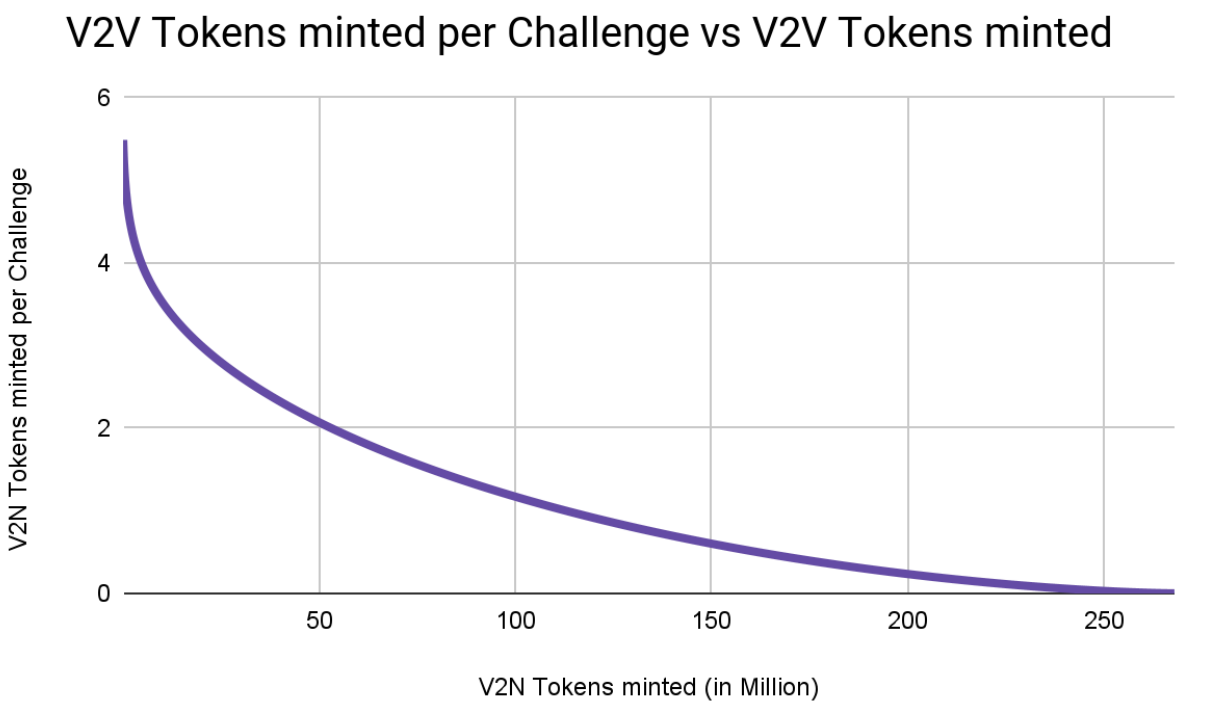
$$v2vRemainingTokens(d = 0) = 285000000$$

*Then **Tokens Minted per challenge** for v2v become;*

$$v2vMintedperChallange_{d} = v2vMintedperChallange_{d-1} \times (1 - (B \times (\frac{v2vMintedTokens_{d-1}}{v2vRemainingTokens_{d-1}})^{A} + C)$$




V2V Tokens Minted vs Challenge Number
300
200
100
0
V2V Tokens Minted (in Million)
250
500
750
1000
1250
1500
1750
Challenge Number (in Million)


V2V Tokens minted per Challenge vs V2V Tokens minted
6
4
2
0
V2N Tokens minted per Challenge
50
100
150
200
250
V2N Tokens minted (in Million)

Staking Rewards

In our refined token economy framework, the Staking Rewards mechanism is carefully constructed to ensure network sustainability and scalability. Here's how it functions:

A total of ***262,200,000 tokens*** (13.8% of total supply) are allocated for the network Staking Rewards. An essential component in our framework is the "$Base\ Staking\ Reward$", which denotes the base quantity of tokens minted for staking rewards each day (192 epochs). The $Base\ Staking\ Reward$" will be determined at the beginning of the mainnet event. Additionally, our model incorporates a dynamic component, the "$Daily\ Staking\ Reward$". This is recalculated at the start of each month, reflecting the network usage during the previous period.

The "$Challenge\ Variation\ Rate$" is another key variable, representing the rate of change in the cumulative count of V2N and V2V challenges for the current month compared to the previous one. This rate is updated monthly. If the "$Challenge\ Variation\ Rate$" yields a positive number, reflecting an increase in the network activity, the "$Monthly\ Staking\ Reward$" inflates by the same percentage as the "$Challenge\ Variation\ Rate$".

$$Challenge\ Variation\ Rate_{M} = \frac{(Total\ Challenge\ Number_{M-1} - Total\ Challenge\ Number_{M-2})}{Total\ Challenge\ Number_{M-2}}$$

If $Challenge\ Variation\ Rate \geq 0$ **then** $Daily\ Staking\ Reward_{M}$ for the new month is,

$$Daily\ Staking\ Reward_{M} = Base\ Staking\ Reward \times (1 + Challenge\ Variation\ Rate)$$

Conversely, if the "$Challenge\ Variation\ Rate$" is negative, indicating a decrease in the network activity, the "$Base\ Staking\ Reward$" for the month will decrease by the square root of the absolute value of the "$Challenge\ Variation\ Rate$". This ensures that reductions in network activity are responded to in a measured and balanced way, assuring network validators and their delegators while maintaining network stability.

If $Challenge\ Variation\ Rate < 0$ **then** $Daily\ Staking\ Reward_{M}$ for the new month is,

$$Daily\ Staking\ Reward_{M} = Base\ Staking\ Reward \times (1 - Challenge\ Variation\ Rate^{2})$$

The adjustments to the "$Daily\ Staking\ Reward$" persist until 80% of the total tokens set aside for staking rewards have been minted, around 210,000,000 tokens. After reaching this threshold, the "$Base\ Staking\ Reward$" undergoes a halving. This halving process continues in perpetuity, each time occurring when half of the remaining staking rewards pool has been minted.

This evolving and resilient Staking Rewards mechanism encourages network participation, ensures equitable reward distribution, and safeguards the long-term viability of the token economy.

Conclusion

This document outlines a strategic and comprehensive plan for Soarchain Protocol Economics. However, the nature of blockchain protocols is such that they require constant evolution, critical assessment, and innovative thought. The Soarchain community, therefore, must remain vigilant, open to new information, and flexible in its strategies to adapt to the changing landscape.

Regular assessments of key economic indicators like cost structures, revenue models, and protocol expenditure are crucial. For Soarchain to effectively and efficiently scale in a decentralized model, it requires the diverse skills and active participation of its community members.

Soarchain stands as a potential game-changer in the field of sustainable decentralized physical infrastructure networks. The economic model presented in this document is designed to be adaptable and resilient, capable of thriving in favorable conditions and withstanding challenges during more difficult periods. The foundation for long-term success of Soarchain lies in the collaborative spirit of its community and the continued growth and improvement of the protocol.

Future Work

Data Provisioning Request Economics: Detailed examination and development of the economic model for Data Provisioning Requests (DPRs), including analyzing the cost-benefit aspects for all involved parties and establishing fair compensation models.

Data Marketplace Economics: Exploration and structuring of the economics surrounding the Data Marketplace within Soarchain, focusing on the valuation of data, market dynamics, and the interplay of supply and demand.

Data Contracts and Flow: Further refinement of the data contract system, including the flow of data within Soarchain. This will involve a deep dive into the mechanics of data contracts, understanding the roles and commissions of involved parties, and ensuring a seamless and efficient data exchange process.

By focusing on these future directions, Soarchain aims to solidify its position as a robust and dynamic platform, leading the way in decentralized mobility and data exchange solutions.