



# Nebulas NAX White Paper

NextDAO Lab

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# 1 The Nebulas Vision

Blockchain technology itself is not a brand-new technological innovation but rather a combination of a several of technologies (including cryptography, distributed systems, game theory, etc...) resulting in a novel innovation. Bitcoin [1] created the perfect design for “a decentralized electronic cash system” opening the door to the blockchain world. Next, Ethereum further proposed a smart contract blockchain framework with Turing complete code thus creating the ERC20 token paradigm which made it easier to finance new ideas via blockchain.

Blockchain technology has thus achieved unprecedented prosperity and development. The Nebulas White Paper [2] also presented its own blockchain concept and is committed to the vision of “to allow everyone to benefit fairly from decentralized collaboration.” It also presented novel technologies such as Nebulas Rank (NR), Developer Incentive Protocol (DIP), Nebulas Force (NF) and Nebulas’ unique approach to on-chain consensus entitled Proof of Devotion (PoD).

Over the past two years, Nebulas have learned from their strengths within the blockchain world. We understand that there will be further exploration and experimentation within blockchain collaboration. Our direction is not limited to the contents of the white paper and will include new attempts such as NextDAO.

## 2 NextDAO

### 2.1 Blockchain Collaboration

With the emergence of the Ethereum ERC20 token that is based on the blockchain smart contract technology has become a new, fast and low-cost financing method. However, with all its benefits, the post-financing collaboration and management issues have not been well resolved which has always been one of the important development directions of blockchain and at the same time, it has shown many issues.

The DAO (Decentralized Autonomous Organization) [3] is an organization embodied in open and transparent computer code that is controlled by shareholders and is not affected by centralized organizations. After the release of The DAO, it was quickly hacked and millions of dollars of Ethereum was stolen which eventually led to a hard fork of the Ethereum network. Although The DAO project had defects, it has shown us many lessons to learn from and to incorporate into follow-up work.

The Nebulas blockchain is committed to the development of blockchain collaboration and on this basis, proposes a framework based on on-chain financial collaboration entitled NextDAO. Specifically NextDAO includes: public chain collaboration, governance, decentralized finance (DeFi), etc... and is shown in detail in 1. NextDAO attempts to address several issues in the current blockchain collaboration model such as:

- (a) Incentives are still based on block rewards
- (b) Missing fair and positive ecosystem
- (c) Single collaboration model

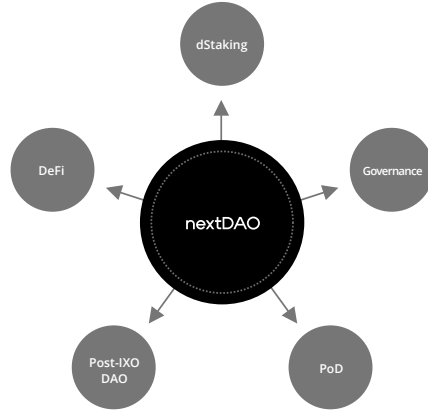


Figure 1: Blockchain collaboration paradigm: NextDAO

## 2.2 Public-Chain Token Economics

The Token Economy is embodied in an economic model that includes the generation, circulation, repurchase and incentives of issued tokens. The general token economy exists in all corners of the blockchain world such as public chain ecosystem, decentralized applications (DApp) and so on. The typical use-case of a public chain token economy is the Ethereum ERC20 token which greatly facilitated the speed of financing and distribution leading to a stimulated economic prosperity on Ethereum as well as driving the development of the entire blockchain industry.

Therefore, the value and innovation of the public chain is not only due to the innovation of this technology itself but also the model and commercial innovation brought

by technology. The problem to be considered in the public chain token economy is the human-to-human game, and it is necessary to avoid the tragedy of the commons [4] which promotes the prosperity and development of the public chain economy through positive incentives.

Most public chain projects fail in comparison when trying to compare the power of the Ethereum community. With this in mind, it's critical to design a token economy that suits its ecosystem. A designed token economy must align with the expansion of consensus, the development of the community and a model that presents a positive ecosystem to all which will bring long-term benefits to the system. The positive development of user incentive is needed in order to promote the development of blockchain technology and its commercial expansion. The following section explores Nebulas' own vision and characteristics and presents a common on-chain based token economy paradigm based on the NextDAO framework: NAX.

## 3 The Design of the NAX

### 3.1 Design Goal

In addition to forming a positive economic game and increasing ecosystem activity, the goals of the public chain token economics should also conform to certain principles such as fair benefits, positive incentives, logical simplicity while being capable of utilization in diverse scenarios. The public token economy requires fair access to scenarios and diverse consumption scenarios while retaining a high holding value thereby promoting the development and growth of the public chain making the entire ecosystem more dynamic. To sum up, the design goals of NAX include:

- (a) fair benefits
- (b) positive incentives
- (c) simple and effective
- (d) retains high utility

### 3.2 Core Mechanism

#### 3.2.1 Asset Fairness

The effectiveness of a public chain's token economy comes from the fairness and legitimacy of asset acquisition. The requirements for acquiring assets should be simple,

transparent and an identical process for the vast majority of people. In the Nebulas economy, NAS assets owned by users are relatively fair and legitimate and due to this, the primary way to obtain equity of a token is via Pledging (staking) NAS. Equity obtainment must not be due to unclear requirements or loopholes existing which lead to the phenomenon of poor asset allocation. The overall result of obtainment must be conducive to improved ecosystem development on the public chain.

### 3.2.2 Decentralized Staking/pledge - dStaking

The traditional centralized pledge method requires users to transfer assets into smart contracts for temporary custody. Asset security issues are maintained in a smart contract and unfortunately, smart contract asset security issues are common in the history of blockchain where hackers exploit contract loopholes and as a result the investors suffer large economic loss.

Due to this, pledging also puts great pressure on public chain project parties since a large number of assets are kept in a smart contract which makes them targets. Due to this, the management and security of smart contracts is a large development bottleneck. All assets on the blockchain are genuine and pledging simply locks in the liquidity of that asset - it does not validate the ownership of the asset (although it can be retrieved by calling the contract method) once transferred to the contract.

We propose a new mechanism of pledging: dStaking (decentralized Staking) as shown in the figure 2. This new method ensures the assets are still owned by the user; the user enters into a pledge “contract” where the smart contract records the value of the pledge. The purpose of a pledge contract is simply to randomly verify whether the user is still fulfilling their contractual duties (e.g. pledging a minimum amount of NAS). When the balance of the pledging address is greater than or equal to the amount specified within the contract, it is considered a valid pledge, otherwise it will be considered a canceled pledge. The user is also able to add assets to their pledge and the system recalculates an average age based on the new pledge value which is discussed in the appendix.

The advantages of dStaking include:

- (a) Protects user identification of assets
- (b) Improve pledge participation due to eliminated security risk
- (c) Improve overall asset security

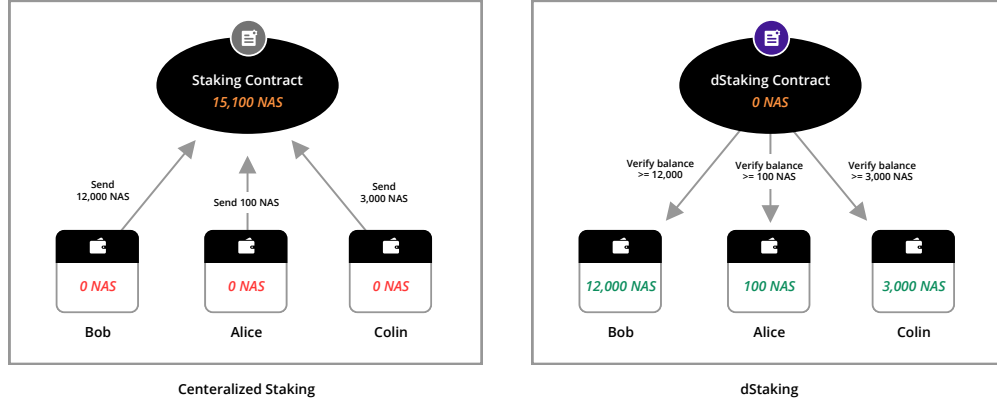


Figure 2: Centralized pledge vs decentralized pledge

### 3.2.3 NAX Distribution Model - NDM

As mentioned above, on the basis of safeguarding the equity and legitimacy of assets, and ensuring the inviolable ownership of pledged assets, the user contributes the liquidity of their assets and in return, they obtain corresponding ecological rights and interests. We call this new mode of token issuance “NDM” (Nebulas Devotional Mining).

The maximum amount of NAX tokens that will be released is 10 billion( $10^{10}$ ) with an issuance cycle of every 6,000 blocks (approximately once per day tokens will be distributed). The number of tokens issued per cycle decreases with an attenuation coefficient of  $\mu = 0.999$  (reduction of 0.001% every cycle) which leads to distribution completion in about 12 years. The number of pre-release NAX increases with the number of cycles, as shown in 3 and the cumulative number of pre-release NAXs is shown in 4.

### 3.2.4 Dynamic Distribution Model

The dynamic distribution model refers to fact that the system will determine the actual number of NAX to be distributed according to specific variables with the intention to promote a positive economic game. At the beginning of NAX, we will introduce the pledge rate impact factor and dynamically adjusted the actual distribution ratio based on the increase or decrease of the pledge rate. In the future, we will introduce more factors as needed. As shown in the figure 5, the system pre-distributes  $C_i$  NAX to the users pledging in the current period within the period  $i$ . In the actual distribution

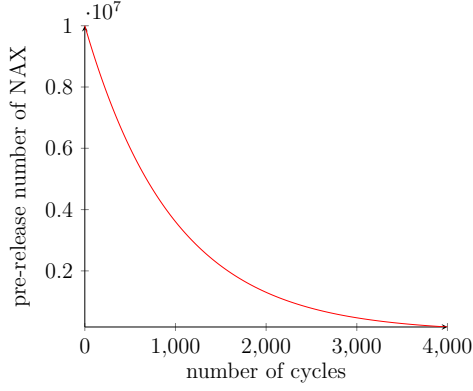


Figure 3: Pre-release number and period relationship

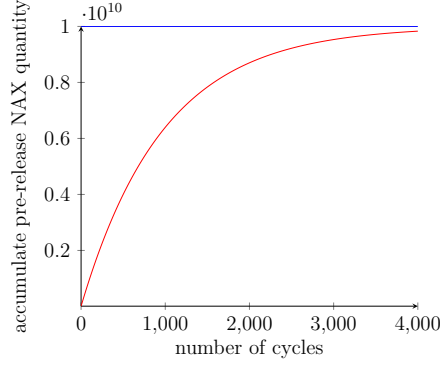


Figure 4: cumulative pre-release quantity and period relationship

process, according to the current pledge rate level  $\lambda$  (total amount of pledge NAS/total NAS circulation,  $0 < \lambda < 1$ ), the actual distribution of NAX is:  $C_0 \mu^i \lambda$ .

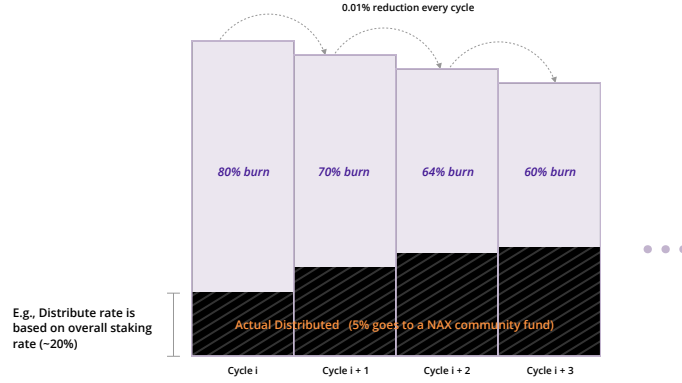


Figure 5: Dynamic distribution strategy diagram

### 3.2.5 Distribution cycle

During a distribution cycle, different number of pledge cycles will result in different distribution weights. The system determines the final NAX distribution amount based on the pledge quantity of each pledged user  $V_{i,j}$  and the pledge weight  $f(T_{i,j})$ . If the  $N$  address is being validly pledged during the  $i$  period, the  $j$  address pledge is  $V_{i,j}$ , and the effective pledge period is  $T_{i,j}$ . Therefore, the number of NAXs that the address can



be distributed to is  $K_{i,j}$  as shown in the following formula.

$$K_{i,j} = \frac{V_{i,j}f(T_{i,j})}{\sum_j V_{i,j}f(T_{i,j})} \lambda_i C_i \quad (1)$$

Where  $f(T_{i,j})$  is the effective weight function for the pledge of the  $i$  user  $j$ . The relationship between the pledge weight and the number of pledge cycles is as follows (the function relationship is shown in figure 6).

$$f(T) = 1 - \frac{\sqrt{(aT + b)^2 + c^2} - (aT + b)}{2} \quad (2)$$

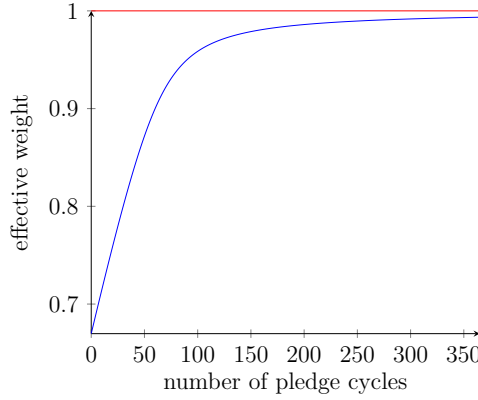


Figure 6: Relationship between the effective weight and the number of cycles

The parameters  $a$ ,  $b$ ,  $c$ , etc... in the formula are discussed in the appendix. In general, within the same cycle, the system allocates the total amount of additional issuance tokens according to the number of pledges and the corresponding length of the pledge. In order to achieve a fair result, the more pledges and the longer the pledge, the higher the issuance number will be. At the same time, this method makes new pledge users more motivated while motivating existing pledges since the existing addresses weight will be retained at a considerable level. The design will meet the following scenarios:

- (a) Early users involved in pledge have a greater probability of receiving more issuance.
- (b) As the pledge rate increases, the number of system issuance will increase accordingly to encourage more people to join the pledge.

### 3.2.6 NAX Ecosystem Fund Pool

In order to facilitate economically better opportunities for investment, incubation, support and other activities, a NAX eco-fund pool will be established. During the actual distribution process, the system will distribute it to pledge users and deduct 5% of the pool of funds which is subject to community supervision. The specific content of the event will be disclosed after the publication of the white paper.

### 3.3 Contract Framework

NAX is an extensible NRC20 contract consisting of a set of contracts, data management and parameters of the entire contract with multi-sign contracts, as shown in detail in 7.

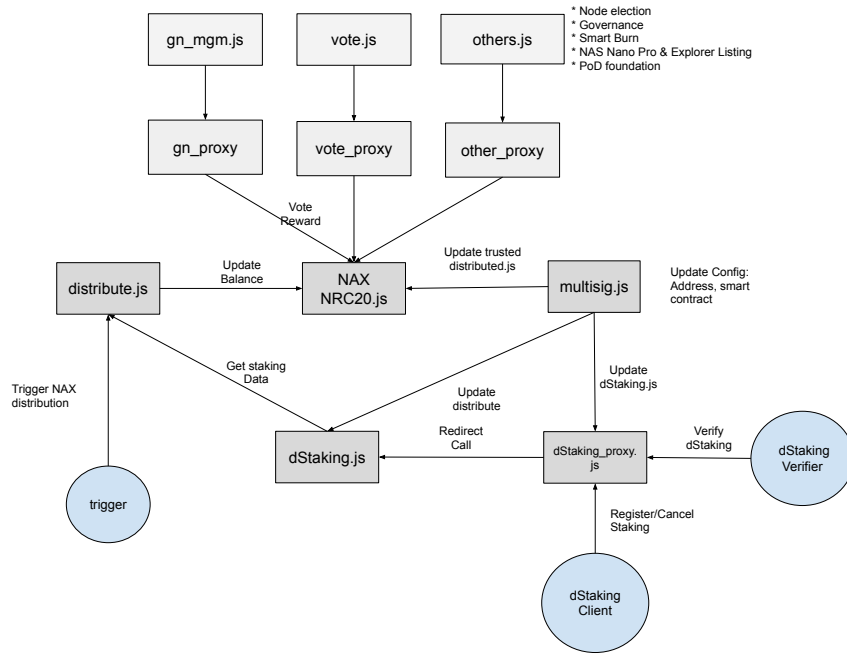


Figure 7: NAX contract component schematic

## 4 Application Scenarios

In order to respect the fairness, legitimacy and power of assets, we have made the design of the distribution model concise, clear and effective. Combined with the ecological characteristics of Nebulas, more incentives and economic game scenarios are handed over to application scenarios. With this principle, incentive and consumption scenarios

within the application scenario can be more varied and diverse. In this chapter, we will explore some prospects for existing and future application scenarios in Nebulas. As shown in Figure 8, we can clearly outline the positive incentives of NAX in the Nebulas ecosystem.

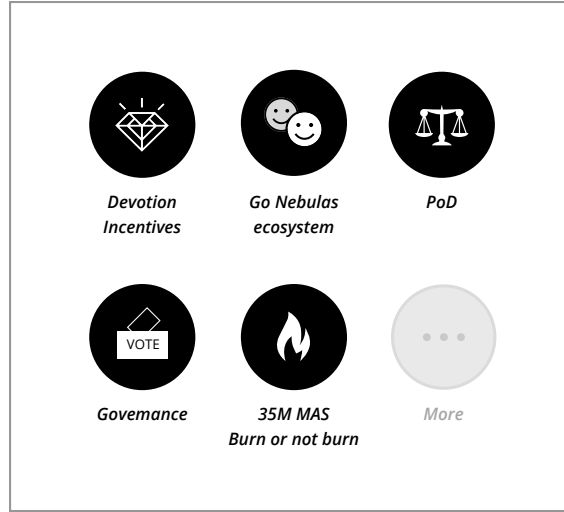


Figure 8: NAX usage scenarios in the nebula ecosystem

## 4.1 Economic Contribution Incentive

In the Nebulas white paper, the contribution-proof consensus algorithm Proof of Devotion (PoD) and the vision of Nebulas was shared: “Fair value for all via decentralized collaboration” and combined with the launch of the Go Nebulas platform in early 2019, Nebulas has constantly explored ecosystem contribution. These have all been important steps for Nebulas to move further towards the creation of the Autonomous Metanet. To this end, we put forward a unique pledge investment fund as a proof of equity incentive which can be applied to different scenarios.

### 4.1.1 Go Nebulas Incentive

The Nebula Foundation will invest no less than 3 million in NAS to fund projects on the Go Nebulas platform, and if needed, the Foundation will provide additional funding. This fund will be invested in pledging and the resulting equity will be used to Incentivize the large and small contributions of users that are made on the Go Nebulas platform. For example, in addition to receiving NAS funds as a reward, Go

Nebulas contributors will also receive NAX incentives under the rules established by the Go Nebulas platform as an equity right contribution to the Nebulas ecosystem. The corresponding rights and governance can be exercised in the Nebulas ecosystem. Detailed incentives will be developed by Go Nebulas' operations team managers and community participants.

Incentives can be divided into the following categories:

- (a) core infrastructure
- (b) market expansion
- (c) promotion
- (d) creating proposals and participation

In addition to being an important means of investing within community building and receiving NAX incentives, the Go Nebulas platform is an important use-case scenario for NAX. Utility scenarios include (but not limited to) the following categories:

- (a) create and initiating a proposal
- (b) passing and rejecting proposals
- (c) pledge towards the progress of the project

#### 4.1.2 Foundation Core Member Incentive

Members of the Nebulas Foundation core team which includes part-time and full-time staff will receive NAX benefits from the Foundation's pledge as additional contribution which is in addition to receiving their appropriate salary.

## 4.2 PoD Consensus Exploration

With the advancement of Nebulas and the development of PoD, decentralization is the only way for Nebulas chain. NAX will play an important role in PoD by effectively combining PoD technology being developed to become the basis and direction of the new consensus algorithm. The previous section discussed the incentive scenarios for NAX in the ecosystem, and with the NAX single pledge distribution method, the ways to obtained NAX include:

- (i) contributing to the liquidity of assets
- (ii) investing in the continued construction of Nebulas

- (iii) participate in community governance

From another perspective, it is not difficult to conclude that NAX can be seen as a contribution to the Nebulas ecosystem. As the name suggests, PoD is a proof of devotion and contribution. PoS (Proof of Stake) is the essence of the Nebulas blockchain which is more in line with blockchain collaboration. With different roles in ecosystem contribution as the basis for the block reward, we must not solely rely on the amount of processing power an entity controls such as PoW (Proof of Work).

When choosing a consensus committee members, users will be able to introduce the equity of NAX to influence the probability of the block generation. The election of consensus committee members, either through on-chain or off-chain method. Now let's take the off-chain node election as an example to explain the possible ways of describing the case. The final form will be based on the to-be published PoD technical documentation:

- (a) node committee members are voted for via NAX
- (b) members must burn a specified amount of NAX as well as pledging NAS
- (c) nodes will be divided into multiple segments to enrich diversity
- (d) the main network PoD consensus algorithm will introduce NAX as a parameter to influence the distribution of block equity

### 4.3 On-chain Governance Scenario

Within the Nebulas ecosystem, there will be a variety of community selection and election activities. In order to increase participation in the community ecosystem, each activity will use NAX as a proof of equity and will be needed to play an important role in voting and incentive strategies.

For example a vote that will soon be proposed on how to handle the 35 million NAS community reserve fund. The Nebulas Foundation has proposed to burn this fund and we will ask the community to contribute options on the destruction (partially or fully). One possible solution is to launch a vote using NAX every month to burn the community's total reserved NAS  $\lambda$  % ,  $\lambda$  % It is the current share of NAS pledge rate in total circulation. We also encourage communities to provide more effective and proactive solutions to jointly determine the use of this part of assets.

## 4.4 Ecosystem Advancement

Developed by the Nebulas Foundation, the ecosystem products are an important element for the ecosystem use of the Nebulas blockchain. These products include the current and future Nebulas products incubated by the Foundation, such as NAS nano Pro [5], Web Explorer Citeexplorer and the Nebulas DEX. As NextDAO advances and community governance progresses, there will be many more NRC20 tokens and governance projects within the community. These new assets have a strong demand these ecosystem tools. With limited resources, we will require NRC20 project owner to contribute funds in NAX to the platform. These funds can also be used for activities and incentives for ecosystem projects. Funding is used to invest in the construction of the platform.

## 5 Conclusion

In order to better realize the concept, vision and align with the characteristics of Nebulas' own ecosystem, Nebulas proposes a economy that adapts to its own philosophy and development. Throughout this document, we analyzed the fairness, legitimacy, power, and motivation of NAX throughout Nebulas' philosophy, ecology, development, collaboration, and governance. This is a demonstration and a beginning of NextDAO's direction. During the process, more unique and valuable ideas will emerge and as such, we expect the community to join in enriching the content and utilization of NextDAO.

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## Appendix A NAX Analysis

### A.1 Circulation Analysis

We set a total circulation limit of 10 billion ( $10^{10}$ ) for NAX, so we can deduce the scale of the 0th pre-release as follows:

$$\sum_{i,j} K_{i,j} = \sum_i C_0 \mu^i = \frac{C_0}{1 - \mu} \quad (3)$$

Let this upper bound be 10 billion ( $10^{10}$ ), and solve for  $C_0 = 10^{10}(1 - \mu) = 1.0 \times 10^7$ .

### A.2 The Relationship Between Pledge Weight and Age

In order to encourage early users to participate in pledging and at the same time encouraging new users to join the pledge, the age weight of the pledge is calculated dynamically.

As the number of active pledge cycles increase and when the pledge period exceeds 90, the weight will level off to a peak of 1, while the starting weight for new users will start at 0.67. According to the above details and the weight formula in the white paper, the corresponding coefficients can be calculated, where  $a = 0.005$ ,  $b = -0.3$ ,  $c = 0.2$ , the effect of the function is shown in the figure Refweight is shown.

### A.3 Additional pledge affects the age of the coin

In order to facilitate the increase of pledge amount from the original address, the user only needs to make another contract transaction via the pledge contract. The system will recalculate the average currency age based on the number of past pledge and new pledge value. For example, if a user currently pledges 100NAS for 10 cycles, the user pledges an additional 100 NAS via the smart contract, the new pledge amount is 200 NAS. The currency age will be averaged from the two pledges of 5 cycles.

## Appendix B Change Log

- 0.0.1 Release.