



Orbs Universe: Our Proof-of-Stake Ecosystem

The Orbs Proof-of-Stake (PoS) ecosystem is the backbone of the Orbs network and the Universe that is being created. This ecosystem serves as the foundation for the security and operation of the network, enabling an optimal platform for decentralized applications.

This document is provided for discussion purposes and presents the PoS architecture and model in its Year Zero genesis, implemented in V1. There is a high likelihood that this architecture and model will be adjusted over time in order to strengthen the long term viability of the network. The primary source of these changes will come from the direct interaction with the initial ecosystem participants to collaborate on the ideal path forward. This document relates to the incentive and security layer of the network, i.e., describing the roles in the ecosystem, their nomination process and the rewards that will be received for the participation.

The foundation of the model described in this document is the ORBS token. The main purpose of ORBS token is to enable users to pay infrastructure operators (Validators) for running the consensus layer, for execution of smart contracts and for consensus-based storage — as these are the three primary services provided by the platform. The tariffs for these operations are laid out in a pricing list (<https://www.orbs.com/pricing>), that sets the price of the computing resources for each type of service at a certain number of ORBS tokens. These tariffs will be hard-coded in the protocol. This establishes the present and future stable value that the ORBS tokens have for participants in the Orbs ecosystem. This provides service cost stability for participants and enables them to, among other things, use the ORBS tokens for security deposits, incentivise services on the network and reward improvements of the protocol.

For the authoritative and up-to-date PoS architecture, model and specifications, refer to: <https://github.com/orbs-network/orbs-spec/tree/master/pos-architecture>.



The Orbs Proof of Stake Model Rationale

The Orbs Proof-of-Stake ecosystem and incentive model addresses two core functions. The first function is network operation, which includes block creation and validation, maintaining the network state and providing interfaces for the network's users. It requires technical skills, providing security, availability, and quality of service. The second function is enforcement of the protocol and adaptation of the protocol. It should be done by stakeholders and key players in the network who are committed to its long term success. While some players fit both functions, we recognize that this is not always the case. Moreover, separating these functions provides a better balance of power and enables them to evolve in different directions.

When considering the network operation, there is an inherent trade-off between the short term and long term goals. Initially, as the network grows, there is a need for higher flexibility and shorter improvement and development cycles. For example, in the long term we recognize the value in a large number of validators increasing the network's decentralization. The right time for the network to grow to hundreds of validators should be aligned with the growth in usage. As the network grows, the Orbs Randomized-Proof-of-Stake enables to maintain the network high performance. For the network initial rollout, a smaller number of validators and a gradual rollout are preferred to ensure the long term strength of the network. The Orbs community and stakeholders will play a significant part in the shaping and evolution of the PoS model. The stakeholder participation, alongside the lessons from the Year Zero model, will enable to steer the network towards a model that provides the ideal long term effectiveness.

While we want participants in the network to be compensated for their efforts, we are focused on avoiding a situation in which potential excess profits of elected parties encourage them to buy votes, leading stakeholders to vote for whoever pays the most instead of the party most beneficial for the network. The Orbs PoS model reduces the economic factor in the Delegators and Guardians decisions by separating the reward of the Delegators, Guardians and Validators.



Roles in Orbs Universe

The Orbs Universe is centered around three core roles - Validators, Guardians and Delegators.

Validators - Validators operate the Orbs network. They participate in the block creation and validation and maintain the state and block history. Validators are skilled professionals, capable of maintaining their node security, availability and connectivity and providing the required quality of service.

Guardians - Guardians are expected to be key players and stakeholders within the Universe who enforce the security of the network, align with the long term Orbs vision and play a role in making this vision a reality. A core role of the Guardians is to review the validators, monitor their operations and approve the ones that follow the protocol correctly, ensuring the network operation and security.

Delegators - Delegators are token holders who wish to promote the network security and operation, and do so by assigning responsibility for their voting weight (stake) to Guardians. Delegators empower Guardians to align the network with the best interests of the ecosystem.

Applications and virtual chains - The Orbs platform is designed to optimize usability. Applications using the Orbs platform as infrastructure deploy a virtual chain providing them the required performance and isolation. A virtual chain deployment requires paying a monthly fee, that will be distributed among the validators.

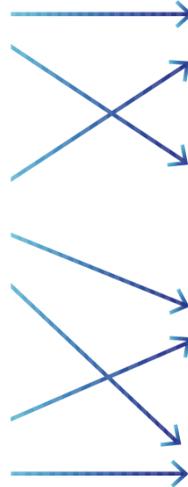


ORBS

Delegators



Guardians



Validators



Orbs Election Process

Orbs election processes is comprised of two phases: delegation to Guardians and election of Validators. Token holder can delegate their voting weight (stake) to a Guardian to vote on their behalf. Guardians, in turn, use their (direct and delegated) voting weight to approve Validators.

Orbs elections occur periodically every 20,000 Ethereum blocks (approximately 3 days). The results are calculated based on the participants' ORBS stake at the block at which the election event took place and the delegations and votes that were registered prior to it.

Delegation and voting are performed in Ethereum smart contracts, allowing any individual to calculate and verify the results. The use of Ethereum, a blockchain



external to the network, enables to avoid conflict of interest, where the ones protecting the election's probity are the ones being elected.

Guardians Voting

Anyone who wishes to participate and contribute to the network's security and proper operation may register to be a Guardian. Once registered, a Guardian can participate in the Validators approval. Guardians are expected to monitor the network and cast their votes accordingly. A Guardian that identifies Validators that do not follow the protocol can and should vote them out. In each vote, a Guardian can vote out up to 3 Validators. If Guardians reckon all Validators are operating correctly, they may approve all Validators by voting out an empty list. A Guardian may cast a vote at any time, that vote will remain valid up to a week or until replaced by a newer vote. Guardians are considered active in an election term if their vote is valid at the time of the election event. When voting out multiple Validators, the voting weight for each Validator equals to the Guardian's total voting weight.

The voting power of each Guardian is proportional to the number of ORBS tokens that are delegated to that Guardian, including the Guardian's own tokens, at the time of the election event. Tokens can be delegated to Guardians either directly by their owner, or indirectly through a series of delegations.

Guardians are expected to actively monitor the Orbs network and the operation of the Validators, and cast their votes to support and promote the best interests of the network. Guardians are encouraged to build a community of Delegators who empower them with their voting weight, thereby increasing their voting impact.

Guardians Registration

In order to participate in the network, Guardians are required to register. Registration is done in a smart contract on Ethereum, and enables Guardians to provide identification details, such as name and website, enabling Delegators and other stakeholders to put their trust in them. In addition, in order to register, Guardians are required to place a security deposit. Guardians may choose to unregister and receive their deposit back, subject to a minimum participation period of two weeks from registration after which a Guardian can unregister. Registered guardians implicitly



delegate their ORBS tokens to themselves, taking precedence over any explicit delegation.

Token Holders Delegation

Acting as a Guardian requires continuous monitoring and participation in the Orbs network. Token holders may choose to participate as Guardians or delegate their stake to a Guardian they trust. Delegating the voting weight to an active Guardian increases the network's security by enabling the weight of the honest, silent majority to impact the network. The voting weight of each Delegator is equal to the balance of their ORBS tokens at the time of each election. In order to participate as a Delegator, a token holder must have at least 10,000 ORBS tokens in its balance at the time of the election event.

It is important for a Delegator to select an active Guardian, as the participation of the Guardian is required in order for the Delegator to participate and receive rewards. Moreover, Delegators are encouraged to delegate only to identified and reputable Guardians. A Delegator may trust another Delegator with the selection of the Guardian, allowing the Guardian to receive the voting weight of the hierarchy of all Delegators behind it. A delegation may be modified at any time and persists unless modified.

Orbs Validators

Validators run the Orbs network, maintaining its security, availability and performance. Validators operate the virtual chains for all active applications. They maintain the state and block history and participate in block creation and validation. Validators expose public interfaces that allow developers and clients to interact with the network.

Validators are skilled professionals, capable of maintaining their node availability and ensuring correct operation. In order to become a Validator, a company has to register with a smart contract on Ethereum, providing its details. During the launch period of the network and its initial set-up, Validators undergo a due diligence process in order to evaluate their technical abilities and enabling gradual rollout. This is to ensure the healthy functioning of the network in this critical period and to avoid the network interference by problematic actors during its launch.



In upcoming versions of the protocol, new mechanisms may be introduced that lock the Validators' stake as a security collateral for their proper operation.

Election Results Calculation

The voting weight of each Guardian is calculated based on the balances and delegations state at the time of the election. Next, the out-votes for each Validator are counted, based on the Guardians' vote at the time of the election. A Validator that received 70% or more of the total voting weight of the election is disqualified and can't participate in the election. The remaining Validators are implicitly approved. If more than 22 Validators are approved by the Guardians, a minimum stake for Validator is set to accommodate 22 Validators. A Validator that is consistently voted out by the Guardians in 3 consecutive elections will be removed from the candidates list and required to re-register in order to be elected.

Year Zero Rewards and Voting Economy

The Orbs Universe applies an economic incentive layer to encourage its members to maintain the network live and secure. Orbs Universe rewards are calculated per election term, proportionally to the election term duration, and are distributed every 3 months.

Operation Reward (Validators)

Validators are rewarded for running the network protocol and the actual steps they take to keep the network active and secure. The Validators reward is proportional to their stake.

In the network's early stages, a limited number of Validators that join the network and are elected are awarded with an additional fixed reward as part of Validator Introduction Program. The fixed reward is also used to cover the Validators' infrastructure costs during the network's early growth. Over time, usage volumes should increase to the point where the application usage fees are sufficient to cover the infrastructure costs.

Validator candidates are rewarded for every term they are elected as active validators. In addition to the operation reward, Validators, like any other token holder, may delegate their own stake to a Guardian and receive the participation reward (see



below). In addition to the rewards, the fees paid by applications for usage of the network are divided among the validators.

Elected validators reward and fees components:

- 4% annual rate of the Validator own stake. Awarded for the duration the Validator was elected
- Fees paid by the applications, divided equally between the active Validators.
- Validator Introduction Program - a 1M ORBS tokens per Validator, on an annualized basis. Awarded in proportion to the duration the Validator was elected, for the duration of the Validator Introduction Program.

Participation Reward (Delegators and Guardians)

Token holders that delegate their voting weight to an active Guardian directly or indirectly, are awarded proportionally to their stake. In order to receive the delegation reward for an election term, Delegators must have delegated to a Guardian that participated in the election.

An annual aggregate sum of 60m ORBS tokens is allocated to reward participation (of Delegators or Guardians). The reward allocation per election term is determined as a fraction of the annual allocation proportional to the duration of the election term.

Participants are rewarded in proportion to the stake they own and delegate at the time of each election event. The rewards are calculated at the end of each election term. In case the rewards for a term exceed an 8% annual rate on the total delegated stake, the reward for that term will be limited to an annual rate of 8%.

Guardians Excellence Reward Program

Guardians keep the network secure and play the significant role of maintaining the vision of the network. Guardians are rewarded for their own stake as part of the participation reward. In order to encourage Guardian activities and community building, top-ranking Guardians are rewarded with the Guardians Excellence Program.



An annual aggregate sum of 40m Orbs is allocated to reward top-ranking Guardians for their work. The reward allocation per election term is determined as a fraction of the annual allocation proportional to the duration of the election term.

In each election term, rewards will be allotted to the 10 leading Guardians that actively participated in the elections, ranked by the amount of stake delegated to them (including their own stake) in that election. Each Guardian is awarded in proportion to the stake delegated to her. The rewards are calculated at the end of each election term. In case the rewards for one term exceed a 10% annual rate on the amount delegated to the Guardians, the reward for that term will be limited to an annual rate of 10%.

Rewards Examples

Example 1

A Guardian holding 30m ORBS with additional 70m ORBS delegated to her.

Total participating stake: 1b ORBS.

Total stake in the Guardians Excellence Program: 800m

The Guardian total stake is within the top 10 (Guardians Excellence Program)

- Annual participation reward: $30m / 1b \times 60m = 1.8m$ ORBS
- Annual Guardians Excellence Program reward: $100m / 800m \times 40m = 5m$ ORBS
- Total annual reward — 6.8m ORBS

Example 2

An elected Validator holding 10m ORBS that are delegated to an active Guardian

Total participating stake: 1b ORBS

- Annual participation reward: $10m / 1b \times 60m = 0.6m$ ORBS
- Annual validator reward: $4\% \times 10m = 0.4m$ ORBS



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- Annual Validator Introduction Program reward: 1m ORBS
- Total annual reward — 2m ORBS



ORBS

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Forward-Looking Statements

This document contains forward-looking statements or information (collectively “forward-looking statements”) that relate to our current expectations regarding the Orbs platform’s proposed operating model. In some cases, these forward-looking statements can be identified by words or phrases such as “may”, “will”, “expect”, “anticipate”, “aim”, “estimate”, “intend”, “plan”, “seek”, “believe”, “potential”, “continue”, “is/are likely to” or the negative of these terms, or other similar expressions intended to identify forward-looking statements. The model described herein speaks to our objectives only, and is not a forecast, projection or prediction of future results of operations. This model is subject to further development, and may be changed from time to time during the launch period. The future operation of the Orbs network is reliant on the formation of the Orbs Universe. We are unable to guarantee that sufficient members will join the Orbs Universe to support and realize the intended design in its entirety. Forward-looking statements are based on certain assumptions, analysis and current plans made by the Orbs project team in light of its experience and perception of historical trends, current conditions and expected future developments and other factors we believe are appropriate, and are subject to risks, uncertainties and changes. Although the forward-looking statements contained in this document are based upon what we believe are reasonable assumptions, there are risks, uncertainties, assumptions, and other factors which could cause the actual results, performances, achievements and/or experiences to differ materially from the



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