



The Orbs Network launched in March of 2019. The successful mainnet launch has enabled the growth of the Orbs ecosystem across all vectors.

During Year 0 of the mainnet, development efforts were focused on building and maintaining a secure, stable and inclusive network. Now that this goal has been achieved and as the Network grows and scales, the Orbs team feels it is the right time to introduce Orbs V2 - a new architecture for the Orbs Universe.

Orbs V2 will emphasize usage and performance while empowering the Orbs Universe Guardians. Orbs V2 will enable the Orbs Universe Guardians to take an active role in building and maintaining a secure, scalable network, which will be the first choice for blockchain adoption, and to better manage and serve the network and its participants.

After running Orbs V2 in open beta mode, testing the proposed protocol changes and getting valuable feedback from participating Guardians, further optimization was implemented. Orbs V2.5 introduced additional improvements, mainly in the staking rewards assignment and distribution architecture, leading to an improved distribution mechanism and significant reduction in Guardians operating costs.

With the launch of Orbs V2.5 planned for November 2020, the Orbs development team is working on several updates to the Orbs Network, all with the purpose of strengthening network security and scalability through the Orbs PoS Universe and enabling the on-boarding of clients with different use-cases.

In this document, we will walk through some of the main planned updates to the network, which include:

1. Operating the Network validator nodes by Guardians
2. Guardians' Ownership Over Reward Distributions
3. Proof of Stake on Ethereum
4. Election Committees
5. Rewards, Fees & Bootstrap Fund
6. Validator Nodes Streamlining
7. Minimum Self Delegation
8. Revamped Delegation Mechanism
9. Summary: V2 Benefits over V1
10. V2 Timeline and Transition Promotion

The Orbs Network is a community-based project and cannot succeed without the collective effort of all participants, including the Orbs development team, Guardians, users and token holders. We encourage everyone to review this material carefully and get in touch with us through one of our community channels with questions and feedback.



## **OPERATING THE NETWORK VALIDATOR NODES BY GUARDIANS**

In Year 0 of the project, the separation of Validators and Guardians provided applications with the ability to run their business applications on the network prior to full stabilization of the network ecosystem. Direct communication with the Validators, along with a mandatory minimal technical due-diligence process, enabled a stable network for applications, while the permissionless Guardian role allowed the PoS ecosystem to flourish.

Orbs Guardians represent the Orbs community; they maintain the security of the network and they invest time and efforts in the network success. As the most significant stakeholders in the network, they are most suitable to provide enterprise business applications the required security and availability.

The Orbs Universe provides community members that are not constantly active an opportunity to contribute to the network by delegating their stake to Guardians. Therefore, when a Guardian operates a validator node and signs a block, it is backed not just by the Guardian's own stake, but also by the stake delegated to him. The delegated stake significantly increases the amount of stake that backs the network security and therefore increases applications' trust in its operation. Moreover, the delegated stake plays an important role in preventing network attacks. An attacker that wishes to gain control of the network for a short period of

time and act maliciously will need to possess more stake than the current network Guardians and their community in order to be elected.



## A NEW REWARDS ASSIGNMENT AND DISTRIBUTION ARCHITECTURE

The Guardians are the key players responsible for network security and operation. Guardians are expected to build a community of Delegators that trust them to truthfully represent their and the network's interests. Providing the Guardians with the ability to set the level of rewards that will be distributed to their respective Delegators tightens their relationships with their communities.

With V2, staking rewards are set by the Guardians, who determine how to split the rewards amongst their Delegators, while a minimum rate of compensation to Guardians is imposed by the protocol.

Guardians play an important role in the reward distribution process. A new automated mechanism to set the level of rewards that will be distributed to their Delegators will be enabled at the protocol level and featured as part of the updated Guardian interface. The mechanism calculates the amount of rewards that each of the Guardian's Delegators is entitled to, based on the Delegators' stake over time and the allocated ratio. A maximum annual reward equal to 12% of total delegated stake is awarded, addressing the tradeoff between an appealing award and sustainable inflation (see Rewards chapter).  $\frac{1}{3}$  of the rewards are guaranteed to the Guardians (i.e., up to 4% annual reward maximum), while the default values for the distribution application grant the remaining  $\frac{2}{3}$  to Delegators (i.e., up to 8% annual

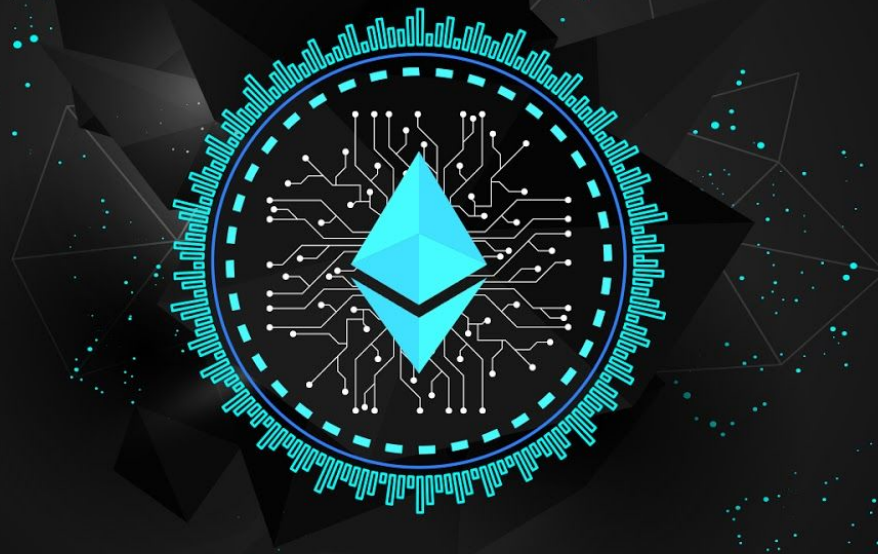
reward maximum). The new automated tool allows the Guardians to modify the Delegators rewards split.

Orbs V2.5 introduced an optimized reward distribution architecture that provides a scalable and gas-efficient reward distribution that occurs through the protocol itself.

Under the new system, once the level of distributions is set by the Guardians, the respective rewards are distributed by the protocol directly to both the Guardians and the Delegators, on a continuous basis. Delegators and Guardians can then decide when they wish to claim their reward tokens.

This has several important benefits such as added flexibility to the Guardians and Delegators, who may claim the staking rewards at any point in time, significant reduction in costs for Guardians, and more.

To learn more of the new V2.5 distribution mechanism, read the [Orbs V2.5 Update documentation](#).



## POS ON ETHEREUM

As a hybrid Blockchain, Orbs has always been able to utilize the benefits of both the Orbs Proof-of-Stake architecture along with the benefits of Ethereum - an external objective blockchain for the PoS logic.

**V2 architecture takes Orbs' Proof-of-Stake over Proof-of-Work architecture to the next level.**

ORBS token, staking, delegation and voting already operate over Ethereum contracts, utilizing Ethereum's value as an objective auditor. V2 architecture moves the core of the election logic to Ethereum. In the V2 architecture, the entire election logic, reward calculation and distribution are done on Ethereum contracts providing multiple advantages.

First, it provides a high level of transparency, in particular to light clients. Orbs clients rely on the elected validators set as the foundation on which applications' data correctness is based on. The ability of any application running on top of Orbs to validate the elected validators set by a simple light client, with no need to constantly audit the election process and PoS logic, is of high value to business applications.

Second, as the token, the subscription payments and the staking are performed on Ethereum, a valid state of the elected validator nodes set on Ethereum is required for full automation of Orbs fees and rewards distribution.

Third, the Proof-of-Stake over Proof-of-Work architecture provides additional security to the network. The use of two networks allows the Orbs Network to enjoy the aggregate protection of the combined networks, as any attacker would be required to incur the costs of attacking them both. Specifically, using Ethereum, which has a robust ecosystem whose participants are, in large part, indifferent to what happens on the Orbs Network, makes it difficult for an attacker to exploit Ethereum to launch an attack on Orbs. The security advantages of this architecture manifest in a variety of ways. For example, it provides a measure against long-range attacks, in which the attacker creates an alternative chain starting with the same genesis block that is indistinguishable from the valid chain, and then misleading users to use the malicious chain. Proof-of-Stake architectures are susceptible to long-range attacks because there is no extra cost to creating long chains, unlike in Proof-of-Work chains, where creating a long malicious chain would involve intensive computational resources. Thus, Proof-of-Stake typically requires applications to audit all the network traffic in order to validate the current Proof-of-Stake state. Orbs' architecture avoids this problem by taking advantage of the security provided by Ethereum's robust Proof-of-Work.

Finally, the use of this hybrid architecture ensures the integrity of elections on Orbs, since the Orbs Guardians are not entrusted to process their own election. Processing the elections on the Ethereum network provides an external guarantee that the Orbs Guardians cannot manipulate the election process.





# ELECTION COMMITTEES

The V2 architecture replaces the previous approach of having all Validators serving in one committee with a hybrid model of two committees: General and Certified.

This innovative two-committee approach is introduced to address enterprise developer needs and reduce their barrier of entry, while maintaining an open and permissionless Proof-of-Stake ecosystem.

The first and main committee is the General committee. The General committee comprises the top 22 Guardians with the most delegated stake, whether they have been certified or not. The General committee represents the vast majority of ORBS stake and therefore provides a high quality operation suitable for most applications.

In contrast, the Certified committee includes only Guardians who meet certain requirements and have undergone a certification process that includes providing certain identification documents. The Certified committee provides a suitable solution for enterprises with regulatory restrictions that are interested in running applications on a blockchain. Enterprises may also choose initially to use the Certified committee to reduce friction and transition to the General committee over time.



## **REWARDS, FEES & BOOTSTRAP FUND**

The Orbs V2 incentive layer is built to incentivize a maximum overlap between the two committees. A high overlap implies a higher stake backing each committee. Guardians are incentivized to meet the requirements and earn additional rewards associated with participation in the certified committee. Certified Guardians are incentivized to accumulate a high stake to enjoy the rewards of the General committee.

The fees and rewards in the Orbs Proof-of-Stake architecture serve two important purposes. The first is compensation for operating a validator node. The second is a reward for contributing to network security by staking. The V2 rewards model is targeted to award the ones who deserve it - participants that contribute to the network operation and security.

Operating a validator node has a cost that includes both computational resources cost and operations cost. Two forms of compensation are designed to cover these costs. First, Virtual Chain fees are paid in the form of Orbs Tokens by the network users who launch a virtual chain. The fees paid for each Virtual Chain are expected to represent the cost with a profit margin. As the network matures and runs more Virtual Chains, the cost per Virtual Chain is expected to be almost constant, representing the cost of the computational resources allocated to the Virtual Chain.

This will provide a scalable solution, as the Guardians profit increases as the usage increases.

In order to incentivize Guardians to participate in the Certified committee by covering their costs, V2 includes an additional bootstrap fund for Guardians who join the Certified committee. The bootstrap fund is distributed in DAI, stable to USD, popular in many Defi applications. Having a fund stable to the dollar, provides profitability even if the token value fluctuates. The fund is designed to cover the cost of operating a validator node while running a small number of Virtual Chains during the network early stages. This is important as it provides enterprises with the ease of mind that the network will continue to operate even under unexpected price fluctuations.

A Guardian that operates a validator node and goes through the certification process to participate in the Certified committee will be entitled to receive the annual total of 3000 DAI. This fund provides an incentive for Guardians to participate in the Certified committee, thus increasing the participating stake in this committee and making the network more attractive to enterprise users, while covering the reduced cost of operation as further described in the next episode.

Virtual Chain fees and the bootstrap fund are awarded for the validator nodes operation. Therefore, unlike staking rewards, the fees and the bootstrap fund are distributed directly to the Guardians operating the validator nodes. The fees and the bootstrap fund are not staked or shared with the Delegators, allowing the Guardians to utilize them to cover their costs. The fees and the bootstrap fund are awarded for the time period that a Guardian participates in the applicable committee. The rewards can be claimed by the Guardian at any time.

Staking rewards are awarded for the stake that elected Guardians and their Delegators allocate to contribute to the network security. It is important to note that **Only the top 22 elected Guardians are eligible for the rewards, fees and bootstrap funds.**

A maximum annual reward equal to 12% of total delegated stake is awarded, addressing the tradeoff between an appealing award and sustainable inflation.  $\frac{1}{3}$  of the rewards are guaranteed to the Guardians (i.e., up to 4% annual reward maximum), while the default values for the distribution application grant the remaining  $\frac{2}{3}$  to Delegators (i.e., up to 8% annual reward maximum).

The staking reward is capped at 80M ORBS annually. If a larger percentage of ORBS token holders participates, the reward will be allocated pro-rata according to the Guardians' effective delegated stake. Rewards are calculated continuously based on the effective delegated stake in each time period.



## VALIDATOR NODES STREAMLINING

Orbs PoS V2 significantly reduces the cost of operating and maintaining a validator node on the Orbs Network. This, combined with the development of new automation tools for Guardians, will decrease the operation costs of existing Guardians, as well as lower the barrier to entry of new Guardians into the Orbs Universe, thereby improving the level of the Orbs network's decentralization.

Here is a list of the the major points of improvement in terms of efficiency and cost reduction:

- V2 node operation cost is significantly reduced as compared to V1 node.
- For AWS-deployed nodes: a base infrastructure monthly cost reduction, with options to reduce the cost further by reserving resources in advance.
- An elastic architecture that leverages cloud architectures and enables compute and storage resources allocation as needed for the network use.
- Transition to EFS/NFS-based block storage architecture, significantly reducing the storage cost and providing more flexible resource sharing among Virtual Chains, while maintaining the Virtual Chains isolation.

- Utilizing light Ethereum client architecture to reduce the cost of the Ethereum service operation.
- Automatic and simple node setup, with enhanced logging and monitoring tools for reduced operations overhead.



## MINIMUM SELF DELEGATION

Guardians are responsible for operating the validator nodes, maintaining the security of the network and upholding its long term vision. As such, Guardians are required to gain the trust of both the Delegators and the enterprises that rely on the network with their business applications.

In order to ensure a secure, available and performant network, Guardians are required to have a commitment to an honest and secure operation of the network. Guardians are also expected to be committed to their communities and their Delegators staked tokens. Therefore, Guardians are required to own a personal stake of at least 8% of their total delegated stake.

The requirement to stake their own tokens provides a higher level of commitment. A high commitment of the ones operating the validator nodes is important for applications adoption and is required by enterprises applications.

Delegators are expected to select a Guardian that will act on their behalf, maintain the network and distribute their rewards in an honest and timely manner. Delegators are expected to conduct due-diligence regarding their Guardian and select a trustworthy one. Having a minimum self- stake requirement, provides an additional layer of trust, knowing that the Guardian has a “high stake in the game”.

A minimum self- stake also contributes to the Guardians' dynamics and mitigates some potential abuse scenarios. For example, a player with no long-term consideration may try to solicit Delegators by offering an excessive percent of the reward. Such a short-term player may make a profit or gain political power without regard to the potential negative impact on the ecosystem. An attacker may further abuse the delegation by distributing all the rewards and even provide additional funds as a bribe to overcome the network. Minimum self-delegation mitigates such attacks, as a Guardian that abuses the ecosystem is likely to lose the value of his own staked tokens.





## REVAMPED DELEGATION MECHANISM

Delegators are ORBS token holders who assign their voting weight (stake) to Guardians, thereby empowering them to maintain security of the Network and uphold the long term vision of the ecosystem. Therefore, it is the role of the Orbs delegators to actively contribute to the network's success by staking their ORBS tokens.

Earlier this year, we introduced the new [Locking Mechanism](#), which enhanced the stability and security of the Orbs Network. In addition, the Orbs team developed [TETRA](#), a dedicated staking wallet, from which any ORBS holder can easily stake tokens with a Guardian of their choice. Both of these improvements were widely accepted by the Orbs community in a successful transition period.

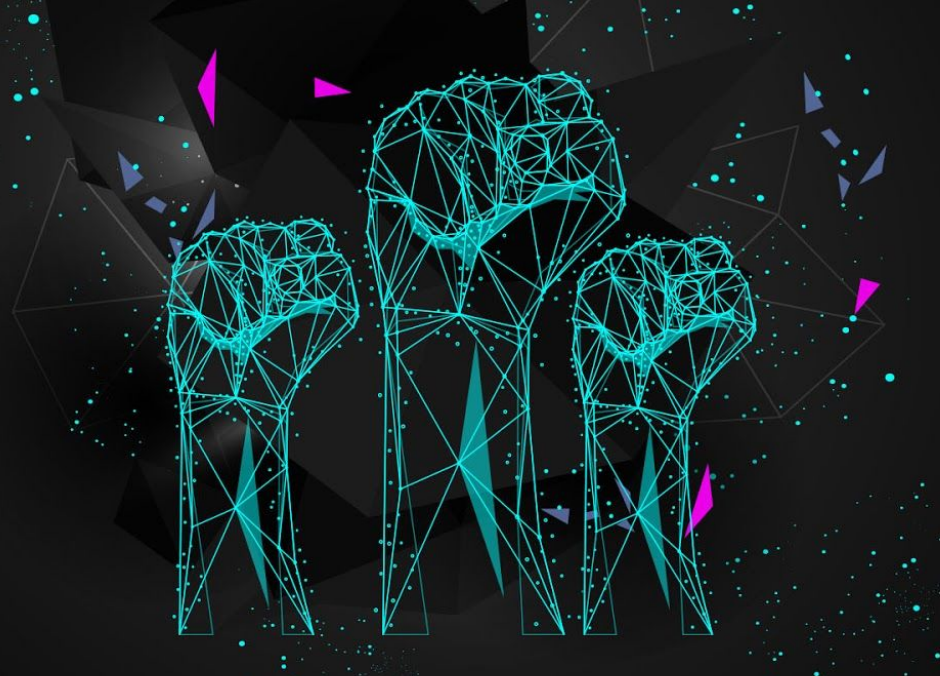
Orbs PoS V2 further assists in reducing friction for Delegators by allowing for an easy transition of delegation between Guardians through the new staking contract. Delegators can now easily modify their stake between the various Guardians using the new Tetra Wallet, without the need to unstake first.

Token holders that delegate to an active Guardian are rewarded in proportion to their stake. Only delegation to an active Guardian that operates a validator node receives rewards. A Guardian that does not fulfill his responsibilities can harm the

network and will cause his Delegators to lose their rewards. Therefore, it is imperative for Delegators to monitor their Guardians and make sure that they are fulfilling their responsibilities. The new features described above enable Delegators to efficiently stake to their chosen Guardian, or switch Guardians if necessary, thus helping them fulfill their important role in making the network safe and efficient.

Orbs V2.5 new rewards assignment and distribution architecture provides Orbs Delegators with an additional level of confidence and predictability for their rewards allocation. Under the V2.5 architecture, staking rewards are distributed directly to the Orbs Delegators on a continuous basis. This continuous reward assignment allows both Guardians and Delegators to control the rate at which they claim their rewards. Under the new architecture, a Participant can claim their rewards by sending a claim transaction to the contract. This may be done using the Tetra staking interface. As the claim transaction has a gas cost, Delegators may initiate these transactions based on their need and the current gas price, which fluctuates heavily.

For more information, read the [Orbs V2.5 Update documentation](#).



## V2 BENEFITS OVER V1

Here is a summary of the major benefit points of Orbs PoS V2 as compared to PoS V1:

1. **Simplicity**

Combining the Guardians and Validators roles simplifies the network architecture and brings it closer to industry standards. This, we believe, will help participants better understand how the Orbs network works.

2. **Reduced Operation Costs**

The new automated mechanism for rewards distribution will reduce the Guardians' operating costs. This improvement in efficiency and cost reduction is expected to lower the barrier for new Guardians to join the Orbs Universe.

3. **Improved Transparency and Security**

The improved hybrid mechanism with Ethereum will provide a higher level of transparency and additional security to the network.

4. **"Skin in the Game"**

The Guardians' minimum self-delegation requirement will incentivize Guardians to properly perform their duty, as well as enhance the Guardians' commitment to their communities and their Delegators.

## 5. **Stakeholders Empowerment**

Orbs PoS V2 empowers both the Guardians and Delegators in the Orbs Universe:

- Providing the Guardians with ownership of the reward distribution split and frequency tightens the relationships with their Delegators.
- Delegators will now have clear differentiators between Guardians and will be able to choose a Guardian they trust to perform according to the best interests of the Network.

## 6. **V2.5 UPDATE - Combating the Gas Storms**

Orbs V2.5 introduces several essential improvements and Optimizations:

- Significant reduction of Ethereum gas consumption across the Orbs Universe.
- Simplification of the system by requiring less service in the nodes.
- Reduction of node operation requirements by Guardians.
- Added flexibility to the Guardians and Delegators, who may claim the staking rewards at any point in time.
- Significant reduction in costs for Guardians.
- Increased predictability and confidence for Delegators.

For more information, read the Orbs V2.5 Update documentation.



## V2 TIMELINE

### November 2020 - Launch of Orbs PoS V2: Age of Guardians

July - August

**Complete Beta Development and launch of the V2 beta program**

August -October

**Beta Program**

- Combine single role Guardian-Validator
- Transition to a V2 node
- Rewards calculated and distributed in accordance with V1 mechanism
- Beta Promotion Reward is applied for participating Guardians

October-November

**Beta program analysis and feedback**

- Testing and analysis of the V2 protocol changes during the beta program
- Feedback from participating Guardians
- Development and implementation of any additional improvements and optimization, as required.

November

**End of Beta Program - V2 Launch!**

- Only Guardians who participate in V2 are eligible to receive rewards
- Open registration of new Guardians
- Rewards calculation and distribution under the V2 new reward mechanism

Note:

Guardians who would like to participate in the V2 Beta Program **will be required to run a V2 node**. Instructions will be provided by the Technology Engagement team. This requires a higher level of engagement, providing the Orbs Team with ongoing feedback and upgrading the node software when needed.

## Beta Promotion Reward

To facilitate the transition to a V2 node, the Orbs team is offering an Orbs PoS V2: Age of Guardians **promotion reward**. Guardians who onboard to a V2 node and maintain their node in operation up until the V2 launch (currently anticipated for 1st of October), will be eligible for the following promotion rewards:

**1) V2 Node Maintenance Benefit:**

A monthly benefit of 250 DAI to each Guardian operating a V2 Beta node during the Beta period.

**2) Special Beta Success Bonus:**

A total benefit of 0.7 ETH to each Guardian operation a V2 Beta node during the Beta period.

**3) Special Beta Success Bonus:**

A **total pool of 800,000 ORBS** to be distributed to all Guardians who successfully complete the Beta Program terms, pro rated to the time during which they operate a V2 validator node.

**4) V2 Beta Achievement Guardian Honor:**

The Orbs team applauds Guardians who are early adopters and are positioning themselves at the bleeding edge of Orbs' PoS technology. These Guardians show exceptional motivation and long-term belief in Orbs and its vision.

The Guardian Honor includes:

- A trusted Guardian marker, to appear on the Orbs official website, identifying the Guardian as trustworthy to Orbs Delegators\*
- A Guardian Overview blog-post/video to be shared on all Orbs official channels
- A customised Guardian Shield Emblem, designed by the Orbs team and shared on public channels.



Note:

During the Beta Period, Guardians will be expected to cooperate with the Orbs team to perform such actions as needed (such as QA tests, troubleshooting, etc.) in order to ensure the proper operation of a V2 node. A Guardian whose node goes offline for prolonged periods or isn't responsive during the Beta Program period will not be eligible for compensation, bonus or honor.

In addition, during the Beta Period, the PoS smart contracts may distribute nominal amounts of Orbs and/or DAI to Guardians and/or Delgators. Please note that these are intentional tests of the Beta system conducted by the Orbs team.

\*The Orbs team reserves the right to remove this badge at any time if it judges the Guardian to be no longer worthy.

**Detailed explanation of the V2 onboarding process and node setup will be provided separately.**

## Closing Remarks

Thank you for taking the time to read this paper. We encourage you to join the conversation in one of our community channels with your feedback and thoughts. The Orbs development team strongly believes that through community collaboration and open dialogue involving all participants, the Orbs Network can succeed in fulfilling its mission to become the first choice platform for enterprise use-case adoption.

We look forward to hearing from you!

*If you have any further questions or would like to learn more about Orbs V2: The Age of Guardians, reach out to us on the [Orbs Official Telegram](#) group. Also for important updates be sure to follow Orbs on [Twitter](#).*



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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..

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 expectations expressed, implied, or perceived in forward-looking statements. Given such risks, you should not place undue reliance on these forward-looking statements.