

The Odyssey Chain

“Powering the Crypto Revolution with Green Energy”

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2. Overview

The crypto industry has experienced a significant trend shift in the last few years, where institutional adoption has grown exponentially. However, the overall industry faces several limitations that the Odyssey Chain aims to address:

- a. **A hybrid L1 blockchain:** Most of the blockchains are either fully permissionless (e.g. Ethereum) or fully permissioned (e.g. Hyperledger Fabric). This is a major hurdle in institutional adoption since several institutions process personal data, are under heavy regulations, and are required to follow compliance and access control procedures.

Odyssey Chain offers a blockchain that all types of developers and enterprises can use to launch their dApps according to specific business cases.

- b. **Lower carbon footprint:** An increase in adoption has led to higher energy consumption as well, even before the networks could be upgraded to facilitate such high demands.

Now that the demand for green energy is increasing and there is an outcry to decarbonize the tech sector, it is important to have a blockchain network that consumes significantly less energy than its competitors, has multiple product lines being worked on to reduce "carbon clutter" (e.g. Nebra and Orion), while maintaining a higher degree of scalability, and interoperability.

- c. **Throughput Speed:** 4,500+ TPS (average) which can be increased further in the coming years.
- d. **Scalability:** Odyssey Chain utilizes a horizontal scaling approach to create an infinite number of networks (aka Infi-Nets) that can be fully customized as per the business needs.

This is a typical example of a layer 2 solution baked within an L1 blockchain.

- e. **Interoperability:** It refers to the ability of assets on one chain or ecosystem to seamlessly move, share data, or interact with other chains or ecosystems without much friction or complex development.

At the time of this writing, the top 50+ chains in the world are either EVM forks or at least, fully compatible with EVM. This is yet another reason why Odyssey Chain has chosen to incorporate EVM as well.

Therefore, if a dApp is currently running on an EVM-compatible blockchain, its developers will find it quite seamless to deploy on Odyssey Chain.

- f. **Decentralization:** Achieving a higher degree of decentralization is one of our core objectives, therefore, Odyssey Chain utilizes a DPoS model, which increases adoption from retail users as well.

DIONE coin holders govern the network and we have kept very lean eligibility criteria for validators to have more inclusion.

Moreover, since every Infi-Net can have its own set of validators on Odyssey Chain and all of those validators must be a part of the Parent Network (explained in detail in the Whitepaper), it enables Odyssey Chain's mainnet to have a higher degree of decentralization without compromising scalability.

3. Introduction

The core of the Odyssey Chain's mainnet lies in the 3 blockchains (explained in the "Infi-Nets" section). Each one serves a unique aspect of the ecosystem, such as creating and trading assets, creating smart contracts, and the logic for Infi-Nets and validators.

Odyssey Chain is a heterogeneous network of blockchains, which allows separate chains and networks to be created for different purposes.

The Parent Network is a special Infi-Net that contains all validators (including validators of any Infi-Net). A node can become a validator for the Parent Network by staking Dione coins and meeting the minimum requirements, as explained in the "Validators & Delegators" section.

Odyssey Chain allows developers to implement their dApps in the programming language of their choice using the Virtual Machine (VM). VMs define the core application-level logic of the blockchain.

Developers have fine control over the behavior, logic and rules of their Infi-Net and every Infi-Net is independent - it can also be considered as a standalone network.

4. Infi-Nets

Infi-Nets are an extension of our core architecture and play a pivotal role in handling increased network usage and customized requirements that vary from one business to another. They also facilitate a more modularized architecture and hence, provide a greater degree of scalability.

The Parent Network of the Odyssey Chain is an Infi-Net that consists of the following blockchains - the "DAO":

- a. Delta Chain (D)
- b. Alpha Chain (A)
- c. Omega Chain (O)

4.1. Delta Chain (D)

The Delta Chain (D) runs the EVM and all the contracts written in Solidity run on this chain. It is also meant to improve developer onboarding by enabling developers to launch EVM-compatible dApps on this network.

4.2. Alpha Chain (A)

The Alpha Chain (A) is responsible for the issuance and exchange of Dione coins and other digital assets. This network supports the creation of new tokens, NFTs, stablecoins, and more.

4.3. Omega Chain (O)

The Omega Chain (O) serves as a platform for launching and customizing Infi-Nets, and blockchains and enables developers to create their own unique rules and logic.

Key Takeaways:

- a. Every Infi-Net can contain “N” number of blockchains
- b. Every Infi-Net has an instance of VM running and can be implied as a standalone network which enables developers to have:
 - i. Customized VM
 - ii. Customized tokenomics
 - iii. Customized validator requirements
 - iv. Customized security configurations
- c. Every Infi-Net contains a group of validators that must abide by its rules and are responsible for validating its transactions
- d. The performance of Infi-Nets can vary from one another based on their load and configurations. Therefore, if an Infi-Net is lagging, it cannot affect any other Infi-Net’s performance
- e. One validator can be a member of multiple Infi-Nets and can validate transactions from multiple blockchains, given that it satisfies the respective rules
- f. One blockchain can ONLY be validated by one Infi-Net to allow developers to define customized business rules and ensure compliance with the rules
- g. Every validator must validate the transactions of the Parent Network

This approach has numerous advantages. For instance:

- a. **Private networks can be established:** Developers can decide the rules for adding validators. For instance, they can decide whether the consensus participants on an Infi-Net only have to be trusted entities, follow geo-restriction, follow certain hardware requirements, etc.
- b. **Low traffic:** The transaction delays can be prevented by avoiding "clutter" since validators only need to join the Infi-Nets that they want to validate.

Note: For better visualization, consider The Odyssey Chain mainnet as the container of the Parent Network (containing Delta Chain (D), Alpha Chain (A), and Omega Chain (O)) **AND** all Infi-Nets.

5. Virtual Machines

Most dApps that are used by retail users do not require any modification to the already popular VMs, such as EVM - the underlying functionality is quite similar in most cases.

However, due to its highly generic nature, Odyssey Chain enables developers to launch their VM, should they require a highly customized implementation of the use cases and prefer to interact directly with the “machine”.

6. Consensus

At its core, the Odyssey Chain follows the Proof of Stake principles, however, to bring more optimization, we have introduced a few modifications, as explained in this section, which allows us to enhance scalability, quick finality, ability to reach high throughput, and decentralization.

There are multiple stages for reaching the consensus (in real-time, the entire process happens (almost) immediately).

6.1. Why Proof of Stake?

After in-depth research and comparative analysis of what Odyssey Chain aims to accomplish, PoS emerges as the clear winner. The reasons are explained below.

6.1.1. Energy Efficiency

Computations for problem-solving do not require a lot of energy in contrast to other consensus algorithms, especially PoW. Since Odyssey Chain aims to reduce the carbon footprint, this happens to be one of our core concerns.

6.1.2. Higher Decentralization

PoS leads to more nodes active on a network which promotes a far reduced risk of centralization. Since Odyssey Chain facilitates delegation as well, more retail adoption can occur.

6.1.3. Better Security

Security for a PoS network is insulated and tried and true. The well-known 51% attack on a network becomes much more complex and costly to carry out which deters many attackers from attempting and succeeding because of the higher decentralization of nodes.

6.1.4. Lower Cost

Since PoS is less energy intensive, it reduces the cost of computational power required to solve complex math equations and therefore, incentivizes more participation from the community, prospective projects, and partners.

6.2. The Consensus Process

It is important to note that:

- a. Our consensus mechanism is leaderless by nature. It implies that every validator has a "vote"
- b. Every node on the network is initially neutral (i.e. it does not carry any opinion)

6.2.1. Step 1

Every validator is configured to be at one of the following 3 states at any given time:

- a. True
- b. False
- c. Neutral

As mentioned in the beginning, by default, the validators are set to be "neutral". Another way to put it is that validators are initially "opinion-less" and only start to form an opinion on a transaction when they are tasked to validate it.

As soon as the initial node (e.g. "Node A") forms its opinion (i.e. "True" or "False") on any transaction, it will broadcast its result to other nodes on the network and will query more nodes.

At this stage, it is important to notice that since the entire process is being carried out to reach a consensus, this querying will have ONE of the following outcomes:

- a. If the queried nodes have not yet formed an opinion on the transaction, they will inherit Node A's opinion
- b. If the queried nodes have already established their opinions, Node A will inherit the majority's opinion

This repeated sampling will occur across the network randomly until the entire network forms the same opinion on a transaction.

The network is configured in a way that all validators select a constant size of the sample to query. For instance, given that $k = X$, all nodes would always query X number of nodes to get their opinion as "sample data".

6.2.2. Step 2

This step ensures memory optimization for every validator.

When the querying node receives a response that matches its own opinion on a transaction, it increases its counter by "1" and it resets to "0" when the node has to change its opinion to that of the majority.

After multiple attempts of random sampling, nodes will stop flipping their counters.

This step marks an end to Step 1 - otherwise, if there is no upper cap on the counter, it will continue to count, and Step 1 will never end, thus a transaction will never be finalized.

6.2.3. Step 3

This is an extension of Step 2.

Step 3 enables each node to possess and update its "confidence" counter. This specific counter does not change its opinion based on the opinion of other nodes only, instead, it weighs in their trust level as well.

This counter is only changed based on how accurate the queried node's response was in previous attempts.

Note: Every validator on an Infi-Net executes Steps 2 and 3 until the consensus is achieved.

6.2.4. Step 4

This step marks the end of the consensus and the confirmed transactions are appended into the blockchain.

At the beginning of sampling, the network may seem to have a 50:50 split in favor of "True" or "False". However, after extensive pseudo-sampling and querying several random nodes, the network will ultimately reach a consensus distinctively.

7. Validators & Delegators

Validators are the block producers of the system and are responsible for validating the computational outputs submitted to the network. There is no upper limit on the number of Validators participating in Odyssey Chain, only a minimum self-stake requirement.

Block rewards and transaction fees in the form of Dione coins are given to Validators in exchange for their ongoing efforts. The Validators can increase their stake and the chance to be elected to validate blocks, by attracting more Delegators. Apart from an excellent reputation, this can also be done via incentives, where Validators pledge a percentage of block rewards to Delegators if they back them. As a result, a Validator with a smaller stake might spur competition by paying Delegators a pro-rata percentage of block rewards in exchange for their support.

The system allows for Validators to pledge 0% to Delegators, however, they can easily be left with no Delegator support.

A validator must meet the following minimum eligibility:

- **Hardware Requirements**
 - CPU: Equivalent of 8 AWS vCPU
 - RAM: 16 GiB
 - Storage: 1 TiB SSD
 - OS: Ubuntu 20.04 or MacOS >= 12

- **Staking Requirements**

- The minimum amount that a validator must stake is 500 000 DIONE
- The minimum amount that a delegator must delegate is 500 DIONE
- The minimum amount of time one can stake funds for validation is 1 year
- The maximum amount of time one can stake funds for validation is 6 year
- The minimum amount of time one can stake funds for delegation is 1 month
- The maximum amount of time one can stake funds for delegation is 6 years
- The maximum weight of a validator (their own stake + stake delegated to them) is the minimum of 60M Dione or 5 times the amount the validator staked (whichever is minimum). For example, if a Validator stakes 2M Dione to become a Validator, only 8M Dione can be delegated to their node total (not per Delegator)

Note: A validator will receive a staking reward if they are online and respond for more than 80% of their validation period, as measured by a majority of validators, weighted by stake.

All Validators should aim to be online and responsive 100% of the time.

The validators will receive two types of rewards:

- a. **Block rewards** (see Block Rewards section)
- b. **Transaction fees** (see Transaction Fees section)

Transaction fees depend on the network congestion and type of operations requested by the users. More details on the fee structure and their distribution are available in the Transaction Fees section. Block rewards are issued as each new block is added to the network and can voluntarily be shared with Delegators backing the Validator who adds the block. Validators configure the share rate for their node and it is visible on monitoring dashboards and Validator profiles, so Delegators make an informed choice of who to back.

8. Transaction Fees

The platform will collect 2 types of transaction fees: a base fee and a priority fee. The base fee is mandatory, however, the priority fee is optional and will put a user's transaction in front of others. The value of transaction fees depends on the network congestion and type of operations requested by the users.

8.1. Transaction Fee

Delta Chain (D)

Transaction Type	Base Fee (DIONE)
Simple Send	50

Alpha Chain (A)

Transaction Type	Base Fee (DIONE)
Send	50
Create Asset	100
Mint Asset	50
Import Odyssey	50
Export Odyssey	50

Omega Chain (O)

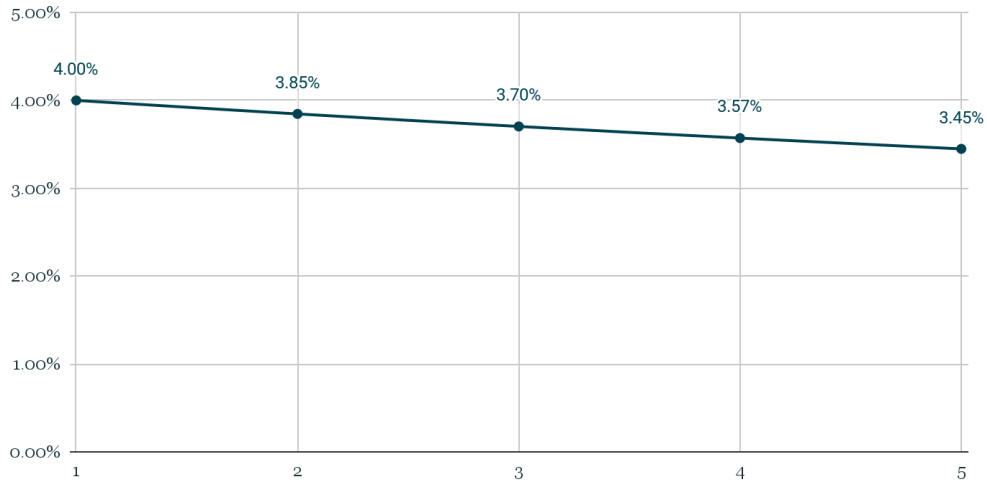
Transaction Type	Base Fee (DIONE)
Create Infi-Net	3000
Create Blockchain	3000
Add Validator	0
Import Odyssey	50
Export Odyssey	50

8.2. Transaction Fee Distribution

Base Fee (Fixed)	Priority Fee (Dynamic)
<ul style="list-style-type: none"> ● Validators: 25% of Base Fee is equally distributed amongst all nodes ● LP: 25% of Base Fee allocated to LP ● Governance Treasury: 50% is dedicated to the Treasury. This 50% is reduced by 5% for each Orion validator that contributed to the validation of the transaction up to a cap of 25%. The deducted amount is equally split between all Orion validators who contributed 	<ul style="list-style-type: none"> ● 100% of the Priority Fee is equally distributed amongst all nodes randomly chosen to validate the transaction. ● If 1 or more nodes are Orion validators then an additional 5% of the Priority Fee is allocated to all validators (i.e. equally distributed among all) who operate an Orion that contributed to the validation of the transaction.

9. Block Rewards

Odyssey Chain will fund the validator reward with an annual inflation of 500M coins.



10. Tokenomics

The Dione coin is a fee settlement coin for the Odyssey Chain. The coin facilitates the blockchain's consensus mechanism functions serving as block rewards and a stake on behalf of Validators. List of coin functions:

- Settlement of blockchain transactions
- Securing the network via PoS consensus
- Participate in system governance
- Payments

The Dione coin is somewhat inflationary at launch. See the Block Rewards section for more details.

10.1. Dione Coin Generation Event

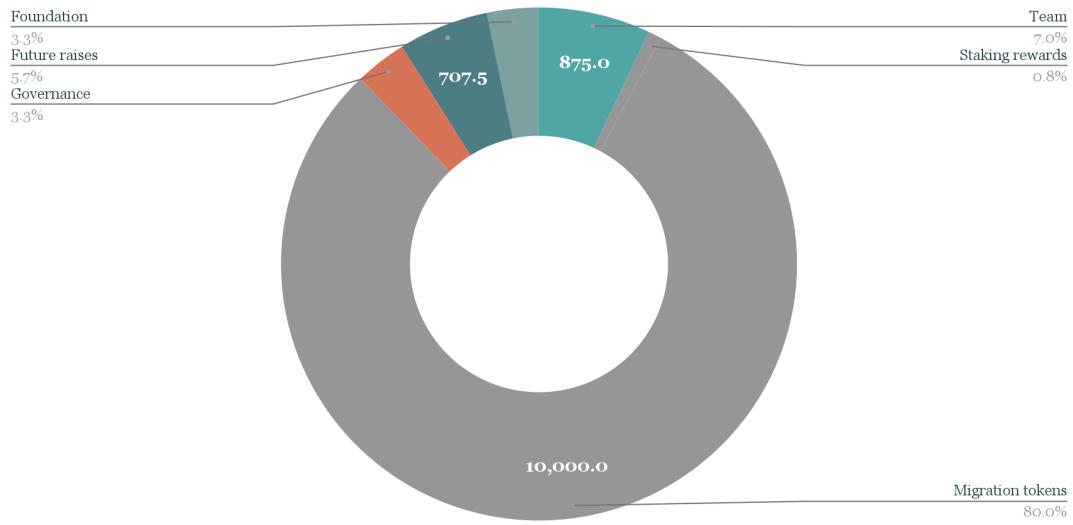
Note: The following tokenomics have been approved by the community:

<https://snapshot.org/#/dioneprotocol.eth/proposal/0x7d498435ddaf67eb4f2274d1ebe5c679a755823d62ad0ae26babc9a20b969115>

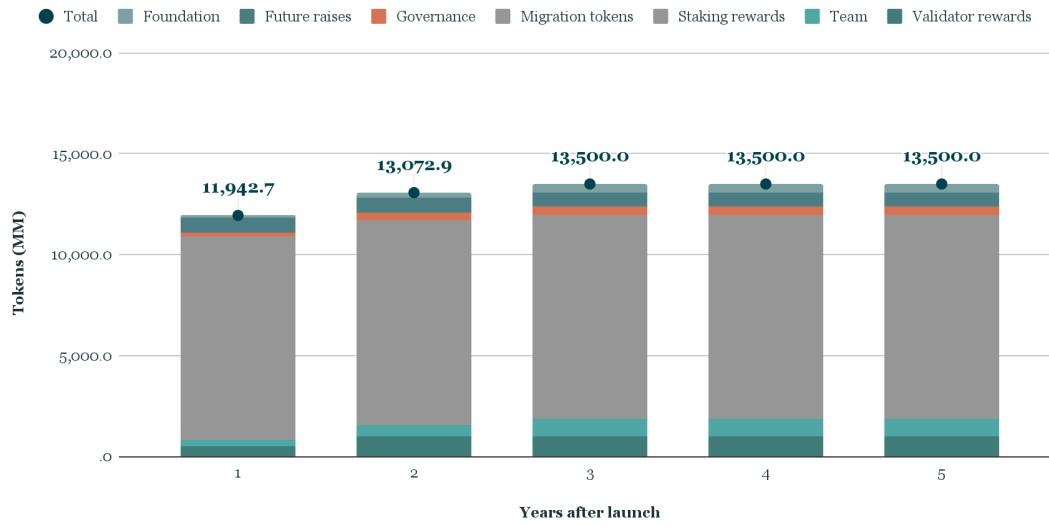
DIONE Coin Generation Event Summary	
└ Total Supply:	12,500.0 M DIONE
└ Migration Coins:	10,000.0 M DIONE*
└ Migration allocation:	80.00%

Vesting schedule, per token allocation						
Stage	Allocation	Tokens (M)	Listing release	Cliff	Vesting	Monthly release
└ Migration tokens	80.000%	10,000	100.0%			
└ Team	7.000%	875	0.0%		36	2.78%
└ Governance	3.250%	406	0.0%		24	4.17%
└ Foundation	3.250%	406	0.0%		36	2.78%
└ Staking rewards	0.840%	105	100.0%			
└ Future raises	5.660%	708	100.0%			
Totals	100.000%	12,500	86.5%			

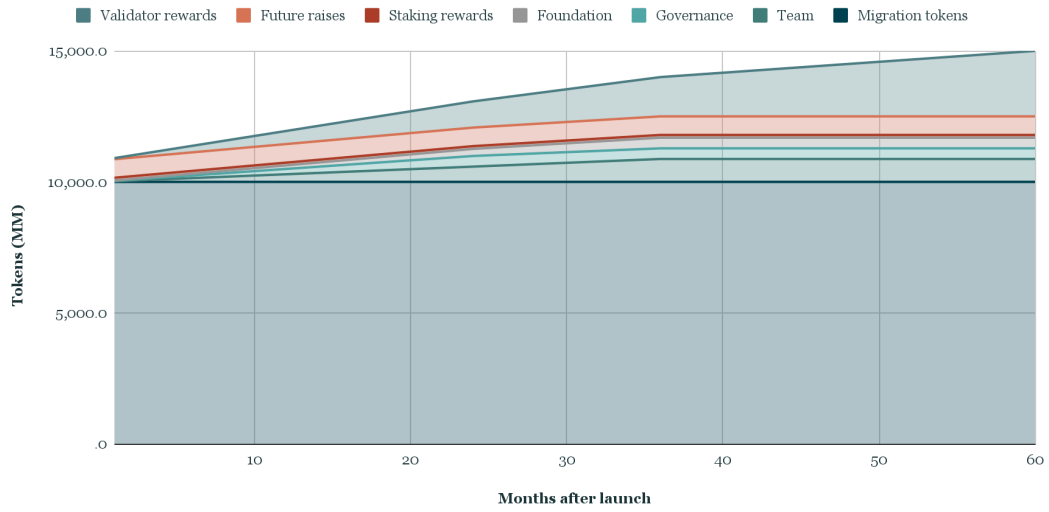
The “Future raises” allocation is a discretionary allocation for the Dione team, in order to be able to secure funding for several years of runway.



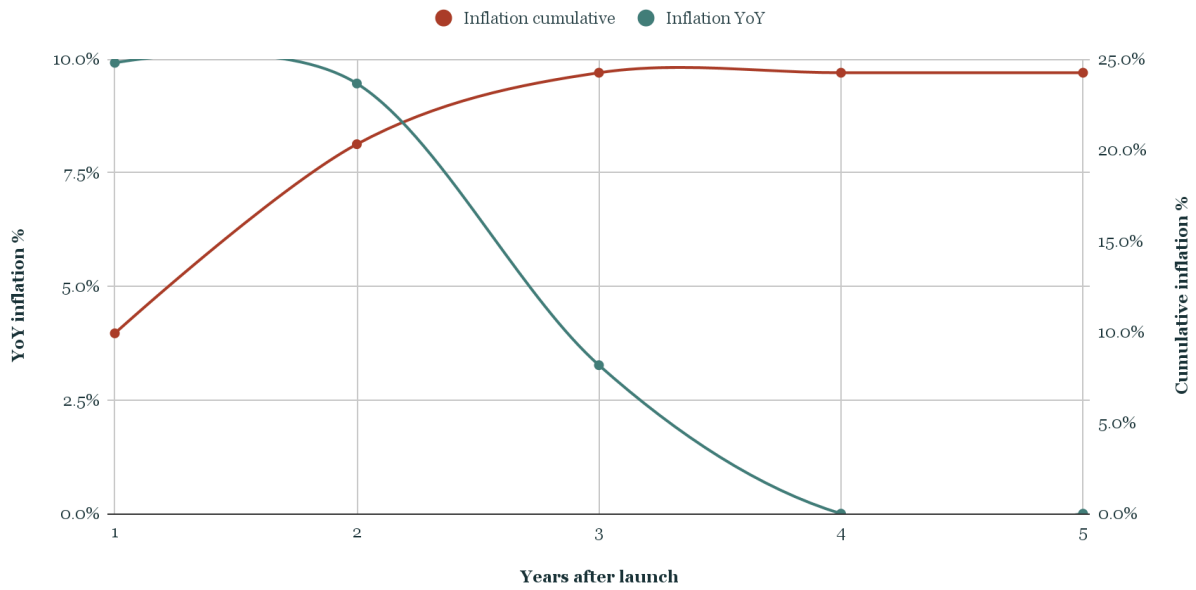
Total coin allocation



A breakdown of the coin release schedule, by year and by allocation. The numbers on top are the total tokens released



Monthly Dione coin vesting schedule (detailed, non-aggregated)



Dione coin inflation YoY and cumulative

11. Governance

Odyssey Chain, as an L1 blockchain, is a decentralized ecosystem by nature. Like PoW chains are in the hands of miners, PoS networks, like Odyssey Chain, are ultimately controlled by token holders. While this gives PoS token holders complete control over the network, regardless of process, we have still detailed a comprehensive, structured approach to Odyssey Chain's governance. At the center of the DAO, run by its DAO members, is the DIONE coin used to derive "voting power" to vote on the future of the network.

Voting on ecosystem changes will be done via **vote escrowed (ve) tokens**¹. VE tokens were first pioneered by Curve² and later adopted by multiple large protocols such as yEarn and Balancer³ to great success.

In a nutshell, ve tokens are locked for a very long duration, granting a huge increase in voting power to the person locking the coins. The interesting thing about the system is that the locked coins do not necessarily need to be the project coins themselves. Instead, they can be a derivative of the project coin.

We will use a similar system, where derivate tokens based on the user contributions (C_x) defined as the tokens staked in the consensus mechanism as a Validator⁴.

Additionally, to avoid voting power consolidation and collusion, the voting will be done via quadratic voting⁵. This means that the final voting power that a user has grows slower and slower the more coins they have. More formally:

$$VP = \sqrt{C_x \times M}$$

Where:

- VP is voting power
- C_x is the user contribution
- M is a duration-based multiplier

We can then define M based on the table below with prefixed lock durations. The maximum multiplier is capped at 295.

¹ <https://bowtiedisland.com/vote-escrowed-tokens-vetoken-the-good-the-bad-the-ugly/>

² <https://curve.readthedocs.io/dao-vecrv.html>

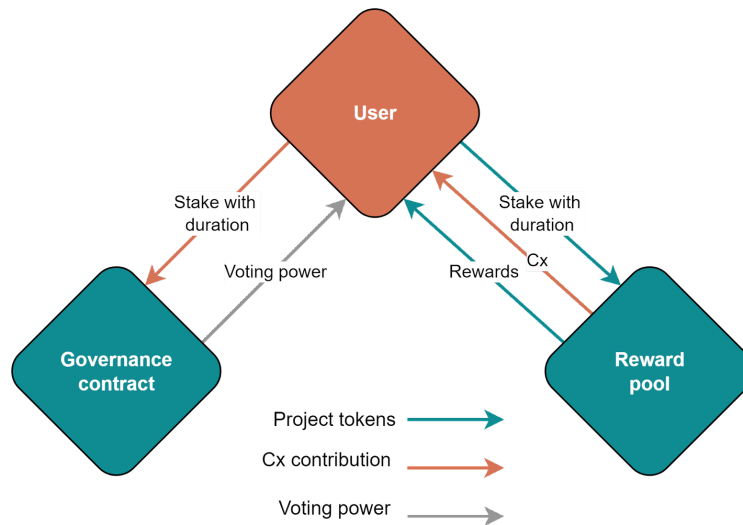
³ <https://cryptobriefing.com/balancer-jumps-following-vote-escrow-system-launch/>

⁴ The weight of all values needs to be adjusted post implementation, since there are implementation details which can affect the number of tokens generated for each category.

⁵ <https://towardsdatascience.com/what-is-quadratic-voting-4f81805d5a06>

Here is a depiction of the whole process:

Level	Stake duration	Vote multiplier (M)
1	1 month	1
2	6 months	5
3	1 year	10
4	2 years	35
5	3 years	75
6	4 years	135
7	5 years	205.0
8	6 years	295.0



IMPORTANT: As a blockchain protocol, Odyssey Chain will be decentralized from its inception, with the above process being the final goal of its mature governance. However, in the early stages, until all contracts are developed, a more simplified approach may be adopted in the interim.

The project's financial guidelines and development schedule will be under the control of the DAO. The Governance fund will be the main source of funding for the protocol's technological upgrades and all other business operations, such as expansions. The DAO has the right to award grants and use Governance fund money in accordance with the decisions made by an impartial governance vote for any contests, community-building projects, technological advancements, etc.

The DAO will be in full control of the ecosystem development, coin expenditures, reward policies, and future growth of the network and partnerships.