# *The Orderbook DEX*

## What is *The Orderbook DEX*?

*The Orderbook DEX* project's main objective is to develop **viable** and **fully decentralized** exchanges with **orderbook functionality** that work on the **EVM** (Ethereum Virtual Machine).

- By **viable** we mean not only its **practical viability** but also its **economic viability**.

  > The gas cost of using it should be **predictable** and **reasonable**.

- By **fully decentralized** we mean in particular that it should **not depend** on a third party or organization (either centralized or decentralized) to operate.

- By **orderbook functionality** we mean that it should work as similar as possible as a **traditional orderbook** exchange.

  > **Liquidity** should be provided **organically** by the market, and orders are filled **honoring the order** in which they were placed.

## How will it be implemented?

- **Several versions** of *The Orderbook DEX* are to be developed, where each major version is not necessarily an extension, improvement, or upgrade of the previous one, but an **entirely new approach** to the same problem.

- The **objective** is not to provide direct replacements of the previous version but **alternatives**, each with their own **balancing of features** and aimed at different market players and use cases.

- **Exchanges** running different versions can either indirectly affect each other through **arbitrage** or be made to work together as one exchange through an **integration interface**.

## Where can I learn more about...

- ...*The Orderbook DEX* **V1**?
- ...*The Orderbook DEX* **V2**?
- ...*The Orderbook DEX* **V3**?
- ...*The Orderbook DEX* **Client**?
- ...the utility token?
- ...the **Roadmap**?
- ...*The Orderbook DEX* **Team**?
- ...how to stay **in the loop**?

# *The Orderbook DEX* **V1**

## Features

- It allows **Limit Orders**.
- It requires **no additional fee** to function (other than gas fees).
- Orders **at market** are executed **immediately** when possible, working similarly to a **swap**.
- Almost all functions are **O(1) complexity**.

  > This means that the **gas needed** for these functions is always equal or below a predetermined **constant** value.

- Order ownership can be **transferred**.

  > This also means that an order can be wrapped as an **NFT**.

## Trade-offs

- It **only** allows Limit Orders.
- Order placers must **lock** the funds to be traded.
- **Canceling** an order is **O(n) complexity**.

  > Where **n** is relative to the amount of **orders after yours**.
  >
  > Which means the more orders after yours, the **more gas** will be needed to cancel it.

## Considerations

- Keep in mind that the funds you are locking in for trading might remain locked **for a long time**.
- It might take some time for people to start canceling orders from a price point that has **moved away from market**, which would give you a chance to cancel for a **viable gas cost**.
- Since order ownership can be transferred, you might be able to exit a position by **trading your order**, either directly or by wrapping the **order as an NFT**.
- *The Orderbook DEX* **V2** might be a better option if you are interested in **short-term trading**.

## More about V1

- How does V1 work?
- Why is V1 designed the way it is?
- What is planned for V1?

# How does **V1** work?

## The basics, explained in under 5 minutes

- *The Orderbook* keeps a record of `total contracts placed` on a price point.
- It also keeps a record of `total contracts filled`.
- Each order keeps a record of the amount of `contracts placed before the order`.
- If the `total contracts filled > contracts placed before the order`
    - The order has been **filled**.
    - The difference between the values indicates **how much** of it has been filled.

## Regarding canceling orders

- For an order to be canceled, orders placed after it **must** also be updated to keep the system **consistent**.
- Each order keeps track of the `previous order` and the `next order`.

    > This is what is commonly referred to as a `doubly linked list`.

- When an order is canceled, it can be **deleted** and the `previous order` and the `next order` updated accordingly.

    > Search `doubly linked list deletion` for details on how this work.
    >
    > Deletion in a `doubly linked list` is **O(1)** and doesn't change the order of items.

- This way other orders that wish to be canceled don't have to go through **all orders** after it, only the **remaining ones**.

    > Transversing a `doubly linked list` is still **O(n)**, but this way **n** can shrink.
    >
    > If orders start being canceled from the tail of the queue upwards, everyone eventually gets a chance to cancel at a reasonable gas cost.

# Why is **V1** designed the way it is?

## Design Philosophy

- The first release of **V1** was designed with **readability** as a top priority.

  > The key here is to prioritize the ease of understanding of *The Orderbook's* logic.

- **V1** was designed expecting that its core functions will be called **a lot**.

  - Therefore, optimizations favor reduction of gas for these functions.

    > This is why **V1** does not use **proxies** or **libraries** to reduce the cost of deploying a new orderbook.

- Some optimizations were disregarded in an attempt to avoid **premature optimization**.

  > We had no way of knowing how **V1** would be used effectively, so there was no way of knowing what optimizations would actually be required.

- For both **efficiency** and **security** reasons, V1 only has and will ever have the **minimal required** features.

  - If something can be solved **externally**, without adding extra code, it will be solved that way exclusively.

    > This is why **V1** only works and will ever work with **strictly standard** ERC20 tokens.
    >
    > Tokens that don't fit the requirement (e.g. fee-on-transfer or rebase tokens) have to be wrapped to work.

    > This is also why **V1** does not and will not provide orders as NFTs directly. It can be done by using a wrapper.

- **Observer** (view) functions provide only the **internal** state, and do **no validity checks**, neither on input nor output data.

  - Consumers of the smart contract are expected to do both the high level interpretation of the data and the validity checking.

  - This way the consumer can be more efficient by avoiding redundant validity checks and storage access.

    > For other smart contracts we provide a library with all the high level functions that interpret the internal data of *The Orderbook*.

# What is planned for **V1**?

## Feedback Phase

- We will monitor how **V1** is being used, with a focus on the **UX** quality.
- We will collect **feedback** from its users.
- From all of this we will try to determine where **optimizations** are actually required, or if **extra functionality** is needed.

## Revision and Optimization Phase

- We will implement any optimization or functionality alteration deemed necessary by the **Feedback Phase**.
- We will at this stage introduce changes that will reduce the code's **readability** in favor of **performance**.

## Integration Phase

- After **V2** is released we will work on mechanisms for making **V1** and **V2** work together.
- This integration might be **external**, a **common gateway** for interacting with a **V1** and **V2** orderbook as if they were one.
- Alternatively, an integration might be a modification of **V1** which allows for a deeper connection with a **V2** orderbook.

# *The Orderbook DEX* **V2**

> *The Orderbook DEX* **V2** is **under development**, and more details will be shared when it is ready for **testing**.

## Features

- It allows to place orders with an **expiration time**.
- It has **Similar features** to *The Orderbook DEX* **V1**
- The **utility token** will be required to operate.

  > Most interactions with the orderbook will **require** users to pay **a fee** in the utility token.
  >
  > Some will **occasionally** give back the collected fees as a **reward** for having to do extra work.

- ...more to be disclosed when **V2** is **ready for testing**.

# *The Orderbook DEX* **V3**

> *The Orderbook DEX* **V3** is in the **early stages of design**, so details aren't available and features might change.

## Features

- **More types** of orders.
- The **utility token** will have a more **important role**, and will be used not only for **rewards**, but also for **staking**.
- ...more details to come as **system design** progresses.

# Client App

## Features

- Initially developed as a **web app**, it will be later on provided as a **desktop app**.
- It only uses **on-chain** data.

  > This means that it does not rely on any **centralized** data provider. While this does not compromise the **decentralized** nature of the system, it also means that it takes more time to boot up the market data.

- It's **distributed** both through decentralized and centralized means.

  > The app will be hosted on a **traditional web domain**, but the recommended way to access the app is through **decentralized distribution**, which will be eventually the sole way to access the app.

- For **UX reasons**, the app interacts with orderbooks through an ***Operator*** smart contract owned by the user.

  > Check this page for details.

- The app has one **centralization issue** to keep in mind regarding the **upgradability** of the ***Operator*** smart contracts.

  > It was decided to do it this way because it was deemed preferable than pushing on **every user** the cost of upgrading the smart contract on **each version release**.
  >
  > Please read more about this on this page.

## More info

- The *Operator* smart contract
- The *Operator Logic* upgrade scheme

# The *Operator* smart contract

## Why is it used?

- The ***Orderbook*** smart contracts are not designed with **end user experience** in mind, as they are meant to also be used by **other smart contracts**.
- Particularly a transaction to place a limit order **close to market** might fail because the market moved.
- There is also the issue of **handling token approvals**.

  > We **rather not** make the user give **full access** of their funds to the orderbook smart contract, as this is considered a **poor practice** regarding security.

- Finally it helps give **proper feedback** of the result of an operation to the user.

  > EVM based chains are particularly **unreliable** when trying to obtain the **reason** why a transaction **failed**.
  >
  > The **Operator** helps exposing this info to the user.

## What does it do?

- The *Operator* acts as a **wallet** for the funds to be traded in *The Orderbook DEX* ecosystem.

  > Keep in mind that the Operator is a smart contract owned **solely** by the user.

- The *Operator* handles the required **token approvals** for each operation.

  > So there is no need to give any **permissions** to spend tokens.

- An operation to place a **limit order** will be filled through a **market order** if the market **moved**.

## Further considerations

- Keep in mind the ***Operator*** smart contract is esentially a **proxy**, and a malicious ***Operator Logic*** will be able to do **anything** with the funds held by the *Operator*.

  > Therefore, **do not use** a newly released version of an *Orderbook* until you have **checked** that it's **safe to use**.

- **Please read** about the ***Operator Logic*** upgrade scheme here.

# The *Operator Logic* upgrade scheme

## How does an *Operator* upgrade?

- On the release of a **new version**, a smart contract for the ***Operator Logic*** of that version is deployed.
- This ***Operator Logic*** smart contract is afterwards registered in the ***Operator Logic Registry***.
- When an ***Operator*** is then asked to do an operation on an ***Orderbook***, it first checks **the version** of that *Orderbook*.
- Then the ***Operator*** checks the ***Operator Logic Registry*** for the ***Operator Logic*** assigned to that version.
- Finally, the ***Operator*** forwards the operation to the ***Operator Logic***.

## Why is it done this way?

- The alternative would be to ask **every user** to upgrade their ***Operator*** on each new version.
- This would mean that **total gas cost** of upgrading the *Operators* would be **directly proportional** to the amount of users.

  > Instead, we decided that it would be preferable if there was **no extra gas cost** for the users on a new version.

- Steps can be taken to **mitigate** the centralization issues of using this upgrade scheme.

## What measures are taken against centralization?

- The ***Operator Logic Registry*** does not allow the ***Operator Logic*** of a version to change once it's set.

  > This means that once you checked that it's safe to use an ***Operator Logic*** for a specific ***Orderbook*** **version**, you don't have to worry about it being **changed** for a malicious one.

- The ***Operator Logic Registry*** is owned by a multi-sig smart contract.

# The Utility Token

## What is its purpose?

- To **finance** *The Orderbook DEX* project.

  > *The Orderbook DEX Team* will be able to finance the project through **vested token reserves**.

- To **compensate** the users who end up having to do **extra work** to keep the DEX working.

  > When the DEX requires some of its users to **ocasionally** do extra work, they'll be **rewarded** tokens collected from other users as **fees**.

- To allow users to **participate** in the running of a DEX through **staking**.

  > When the DEX requires its users to run **maintenance** functions to keep it running, the users will have to **stake tokens** to be able to do so and get **fees** as a reward.
  >
  > Staked tokens would also act as **collateral** to keep the participants honest.

## What is it not?

- It is **not** a **governance** token.

  > Though we are open to it **in the future**.

## Regarding Chains & Bridges

- We are **not** going to use **bridges**.

  > We don't want the DEX to be **dependent** on a bridge. Not until we are sure this won't **compromise** the DEX's **decentralization**. We are open to revise this in the future.
  >
  > Meanwhile, we would rather explore **alternative solutions** to cross-chain interactions. Check The Roadmap to learn more about it.

- Total supply of tokens will **not increase**.

  > New tokens might be created for the purpose of **upgrading** or **deploying to new chains**, but the total supply will remain the same when doing so.

- When deploying *The Orderbook DEX* on a **new chain**, token holders will be given a chance to **transfer tokens** to the new chain by **burning them** in another.

  > Keep in mind this is a **one-way** transfer.

- *The Orderbook DEX Team* will also have a chance to transfer **vested tokens** to the new chain while keeping the same **vesting rules**.

  > This is to make sure that a chain might not end up **undersupplied** with tokens. Vested tokens will **remain locked** the time they are expected to.

## More about the token

- Tokenomics

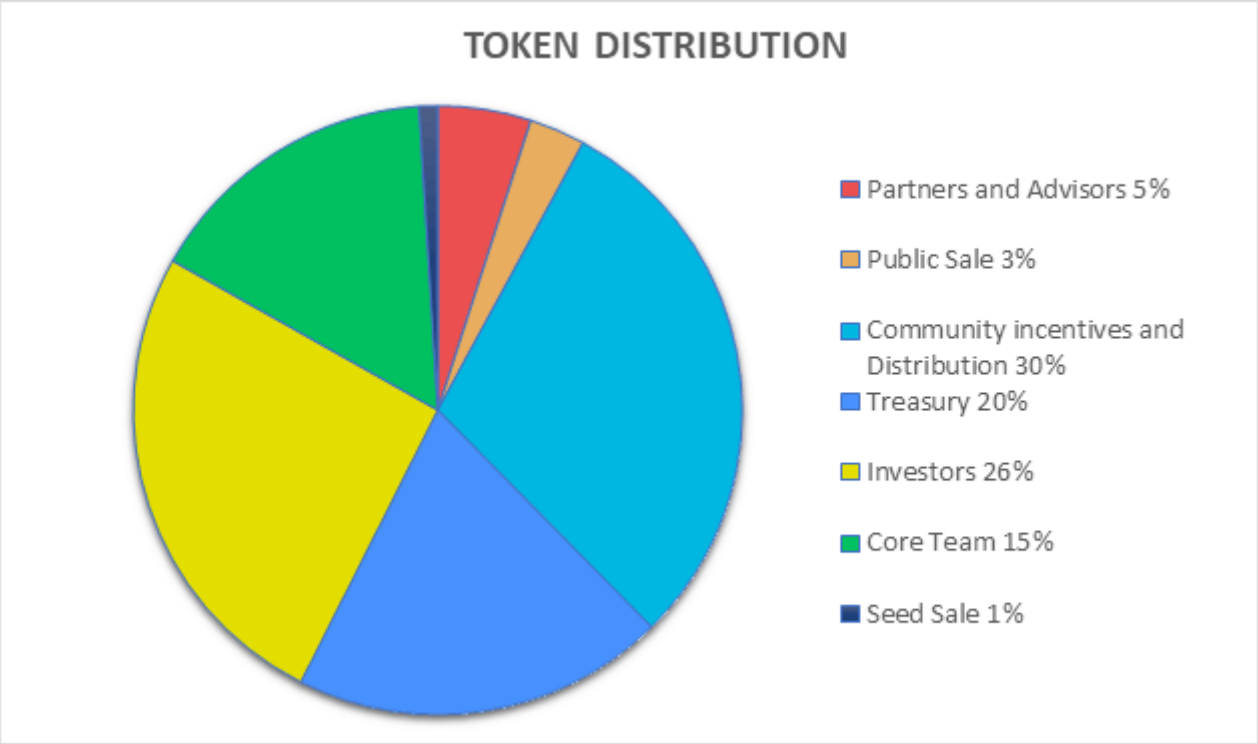
# Tokenomics

## Token Supply

- The token total supply is 1,500,000,000

## Token Distribution

- Partners and Advisors: 5% (75,000,000)
- Public Sale: 3% (45,000,000)
- Community incentives and Distribution: 30% (450,000,000)
- Treasury: 20% (300,000,000)
- Investors: 26% (390,000,000)
- Seed Sale: 1% (15,000,000)
- Core Team: 15% (225,000,000)



# Token Allocation

| Stage | Vesting Period |
| --- | --- |
| Investors | 20% to be released on TGE. After a two month cliff, 80% will be released over 6 months on a monthly basis at a monthly linear rate. |
| Public Sale | 100% to be released on TGE. |
| Treasury | After a 6 month Cliff, 100% will be released over 42 months on a monthly basis at a monthly linear rate. |
| Community incentives and Distribution | After a 6 month Cliff, 100% will be released over 42 months on a monthly basis at a monthly linear rate. |
| Partners and Advisors | After a 3 month cliff, 100% will be released over 36 months on a monthly basis at a monthly linear rate. |
| Core Team | After a 12 months Cliff, 20% will be released, while the remaining 80% will be released over 42 months on a quarterly basis at a quarterly linear rate. |
| Seed Sale | 20% to be released on TGE. After a two month Cliff, 80% will be realeased over 6 months on a monthly basis at a monthly linear rate. |

# Roadmap

> Keep in mind that dates **might change** depending on **funding** available and **feasibility**. Join our socials to stay in the loop.

## Q3 2022

- Deploy **V1** on **testnet**
- Release **temporary** Web App

## Q4 2022

- Deploy **V1** on **mainnet**
- Redesign and release **alpha version** of Web App

> We had to do this to make sure the Web App's code is **open source compatible** and can be disclosed and distributed without problems.

## Q1 2023

- Deploy **V2** on **testnet**
- Improve **analysis tools** of Web App
- Revise and optimize **V1**

## Q2 2023

- Deploy **V2** on **mainnet**
- **First** iteration of **automation** tools of Web App

## Q3 2023

- Revise and optimize **V2**
- V1 and V2 **integration**

## Q4 2023

- Deploy **V3** on **testnet**
- **Second** iteration of **automation** tools of Web App

## Q1 2024

- Deploy **V3** on **mainnet**
- **Alpha** version of **Desktop App**

## TBD

> Please consider most of the following to be **tentative** and kind of a *"wishlist"* of problems we want to tackle, but we are not sure at this stage if they are entirely feasible.

- Deploy on **more** EVM compatible chains
- Expand **beyond EVM** chains
- **Conditional** orders
- **Short** Trading
- **Options** Trading
- **Cross-chain** DEX / bridge alternative solution
- DEX with **no fund locking** requirement
- **NFT** Orderbook

# Team

- **DM**

  > Lifelong alternative assets investor. Market analyzer and trader.

- **JIDC**

  > Bachelor's Degree in Human Resources, Investment, Financial Advisor and trader.

- **MA** (aka *Frugal Wizard*)

  > All-round software developer, obsessed with making code beautiful.

- **PC**

  > Bachelor's Degree in Economics, Investment and Financial Advisor.

- **RC**

  > 35 years economist, trader, businessman and ice cream enjoyer.

- **RI**

  > Builder and entrepreneur by day. NFT degen and cardboard collector by night.

- **TA**

  > Bachelor's Degree in Economics. Market analyzer and trader.

# Our Socials

- Twitter
- Discord
- Reddit
- Medium
- GitHub