Tyche Protocol

V 1.1.0

https://www.tyche.zone/

In Greek mythology, Tyche (sometimes spelled Tychi or Tykhe) is the goddess of fortune, luck, and prosperity. She is often depicted holding a cornucopia, which symbolizes abundance and prosperity, and a rudder, which represents the idea that luck can change like the winds.

Introduction: TYCHE protocol is a WEB3 project that is designed to launch multiple decentralized applications (dApps) on different networks. The project is focused on providing a platform that is both secure and reliable, with a particular emphasis on developing innovative features that can benefit users in multiple ways. The project will start by launching an automated market maker (AMM) on Evmos EVM, and it plans to expand its offerings with other dApps in the future, on different networks.

One of the most innovative features of the TYCHE protocol is its NFT lending platform. This platform is designed to allow users to borrow instantly by using their NFTs as collateral. This is an entirely new concept that is poised to transform the lending industry, providing new opportunities for individuals to access funding when they need it the most.

The TYCHE protocol team has been working tirelessly to ensure that the platform is not only easy to use but also offers a high level of security. With a user-friendly interface and advanced security features, the TYCHE protocol platform aims to provide a safe and secure environment for users to conduct transactions. With its focus on developing innovative features that can benefit users in multiple ways, the project is well-positioned to make a significant impact on the blockchain industry.

TYCHE Automated Market Maker (AMM)

AMMs implement a peer-to-pool method, where liquidity providers (LPs) contribute assets to liquidity pools while individual users exchange assets with a pool containing the swap assets. It benefits both LPs and swap users with accessible liquidity provision and swap. Users obtain immediate liquidity without having to find an exchange counterparty, whereas LPs profit from swap fees from users.

As AMM, Tyche uses **liquidity pools (LP)** of different assets valued relative to each other. The liquidity pool will be used as a single counterparty for each transaction, pricing assets algorithmically with a conservation function unlike traditional order-book-based exchanges, where the price of an asset is determined by the last matched buy and sell orders.

Tyche DEX will share the same conservation function, slippage, and divergence loss functions as Uniswap. As such, the system is structurally similar, but the main difference may lie in parameters and/or mechanism adaptation

Key Features of the Tyche AMM

- **Decentralized:** The Tyche Protocol is completely decentralized, meaning that no central authority has control over the system. This eliminates the need for intermediaries, making transactions faster, cheaper, and more secure.
- **Automated Market Making:** The Tyche Protocol uses an automated market-making algorithm to match buyers and sellers and determine the price of assets. This eliminates the need for a centralized exchange and offers a more efficient and fair market.
- **Token Agnostic:** The Tyche Protocol is token agnostic, meaning that users can trade any token they wish, as long as it is supported by the Evmos platform. This allows for a more diverse and dynamic market.
- **Low Fees:** The Tyche Protocol has low transaction fees, making it more accessible and affordable for all users.
- **Secure:** The Tyche Protocol is built on top of the Evmos blockchain and secured by 150 validators, providing a secure and transparent ledger of all transactions.
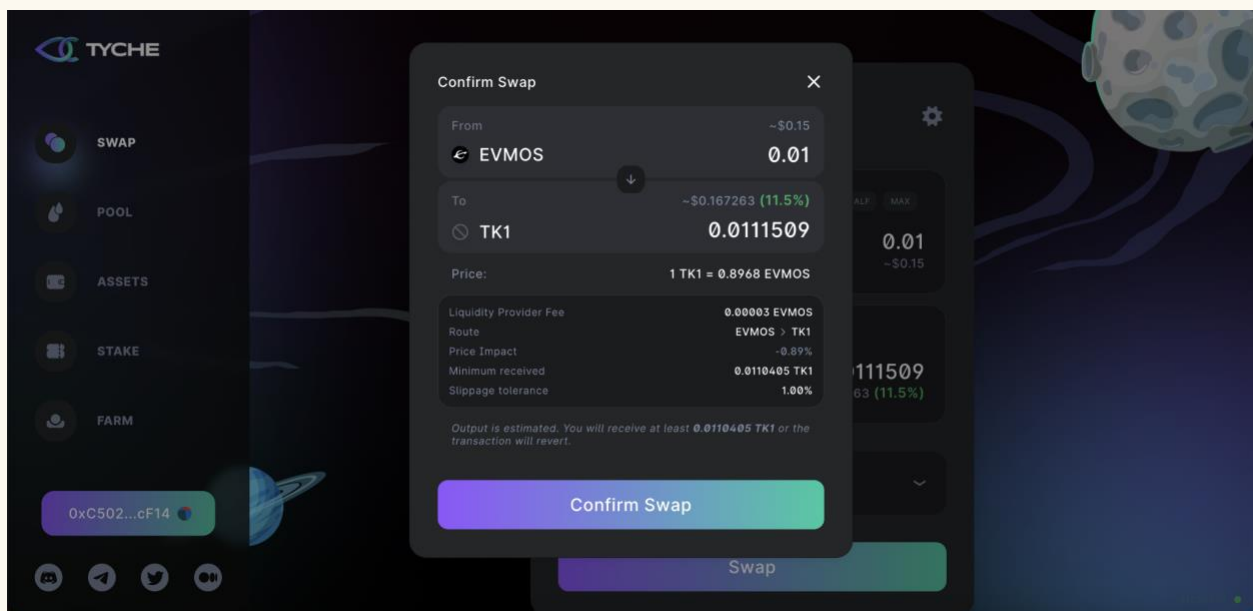
BASIC AMM Design Components

Liquidity Pool: The Heart of Tyche AMM

The Tyche Protocol operates on a liquidity pool, which is a collection of assets provided by users who want to participate in the platform. When a user deposits assets into the liquidity pool, they receive a proportional share of the pool in return. This shared pool of assets is what allows the Tyche Protocol to match buyers and sellers and determine the price of assets based on supply and demand.

Constant Product Formula: Setting Asset Prices Automatically

The constant product formula is a mathematical equation used by the Tyche Protocol to determine the price of assets. This formula takes into account the total value of the liquidity pool and the relative amounts of the different assets in the pool. By using this formula, the Tyche Protocol is able to automatically set the price of assets based on market conditions, providing a fair and reflective market for all users.

Token Weighting: Balancing the Market

Token weighting is a process used by the Tyche Protocol to determine the relative importance of different assets in the liquidity pool. By weighing the assets, the platform is able to calculate the price of assets in a balanced manner that accurately reflects market conditions.

Trade Execution: Efficient and Intermediary-Free

The Tyche Protocol offers fast and efficient trade execution, allowing users to trade assets without the need for intermediaries. When a user wants to trade an asset, the Tyche Protocol automatically matches them with a buyer or seller and executes the trade. This reduces the time and costs associated with traditional exchanges, making DeFi more accessible to everyone.

Risks of AMM

Price impact

Price impact is the effect of the user's trade over the market price of an underlying asset pair. It is in direct correlation with the amount of liquidity in the pool. It can be simply measured by the percentage volume of the user's trade with the base reference of total underlying liquidity in the pool price impact can be especially high for illiquid markets/pairs, and may cause a trader to lose a significant portion of their funds.

Impermanent loss

is a phenomenon that can occur in decentralized finance (DeFi) platforms that use Automated Market Maker (AMM) algorithms. It refers to the loss in value that liquidity providers experience when the price of the tokens in a liquidity pool changes.

IL example

For example, let's say Alice has deposited equal amounts of Evmos (EVM) and USDC into a liquidity pool to provide liquidity. The initial value of the pool is $100,000 with $50,000 in EVM and $50,000 in USDC.

A few days later, the price of EVM increased relative to USDC. As a result, the value of the pool increases to $120,000, with $60,000 in EVM and $60,000 in USDC. However, Alice's share of the pool is still worth $50,000. This means that she has experienced an impermanent loss of $10,000, despite the overall value of the pool increasing.

In this scenario, Alice's impermanent loss was caused by the change in the price of the tokens in the pool. As the price of EVM increased relative to USDC, the relative weight of EVM in the pool increased, causing Alice's share of the pool to decrease in value.

It's important to note that impermanent loss is a normal part of providing liquidity in AMM pools and can be mitigated by carefully considering the tokens and market conditions before providing liquidity.

Yield farming

Yield farming on the Tyche DEX (decentralized exchange) involves earning rewards in the form of TYCHE tokens by staking (locking) certain cryptocurrency assets in the liquidity pools on the exchange. Liquidity pools are a collection of funds provided by liquidity providers (LPs) for users to trade against, and in return, LPs earn a portion of the transaction fees as rewards.

To participate in yield farming on the Tyche DEX, users can deposit their cryptocurrency assets into the liquidity pools of their choice. By doing so, they become liquidity providers and earn a portion of the transaction fees generated by trades on the exchange. In addition, they will also earn TYCHE tokens as rewards for their contribution to the liquidity pool.The amount of TYCHE tokens earned through yield farming on the Tyche DEX depends on the amount of liquidity provided, the duration of staking, and the prevailing market conditions. The reward distribution is based on a proportional allocation system, which means that the more liquidity a user provides, the greater their share of the

rewards.
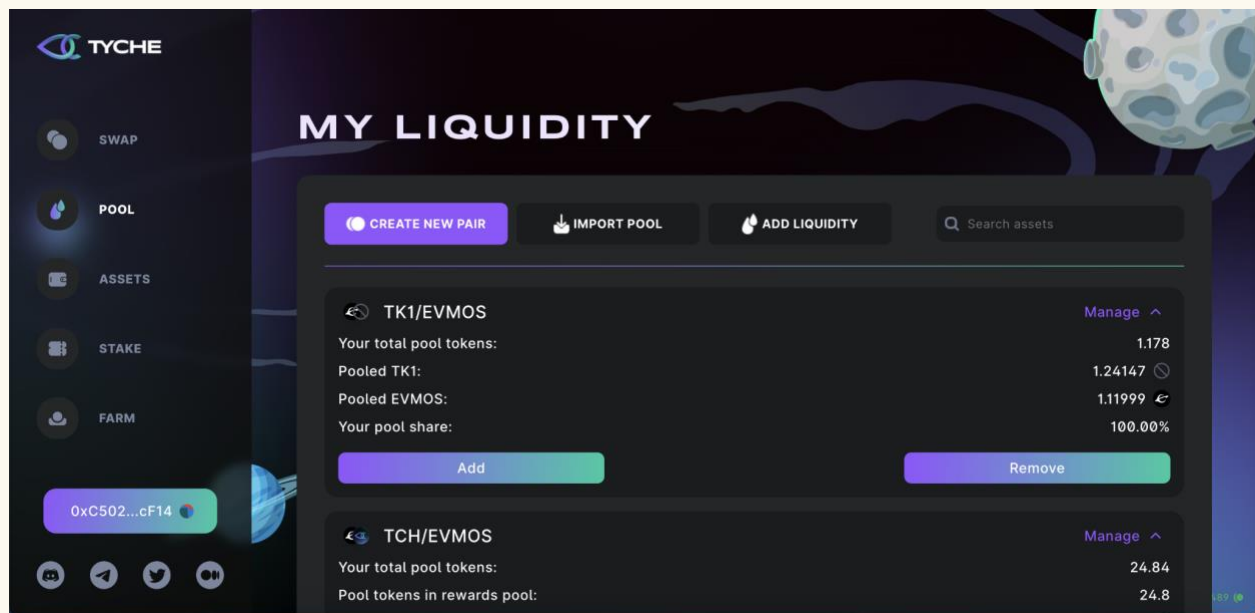
Yield farming on the Tyche DEX is an excellent way for users to earn additional income on their cryptocurrency holdings. However, it is essential to understand the risks associated with yield farming, such as price volatility, impermanent loss, and smart contract risk, before participating. As such, we encourage our users to do their due diligence and make informed decisions when it comes to yield farming on our platform

Tokens and Pools

At the launch of TYCHE DEX the expected pools are
- EVMOS:USDC
- EVMOS:ETH
- EVMOS:ATOM
- TYCHE:USDC
- TYCHE:ATOM
- TYCHE:EVMOS

(The list of pools may change)

Swap fees

The swap fees generated through the trade will go to following parties.
- Liquidity providers 83%
- Team 17%

TYCHE DEX Aggregator

Tyche Dex aggregator aims to provide its traders with the opportunity to source liquidity from across various DEXs deployed on EVMOS. To solve the issues of low liquidity pools on the standalone AMMs. With the existing market conditions, most of the pools in any single dex are unusable due to high price impact. But together these pools will be useful through the TYCHE DEX aggregator.

Aggregator

A DEX aggregator provides the best value possible for a swap, rather than traders having to check manually across each DEX, which can be time-consuming and ineffective.

Tyche DEX aggregator will source liquidity from different DEXs on evmos and thus offer users better token swap rates than they could get on any single DEX including Tyche Dex.

This will provide a single point of entry for traders and easy access to various trading pools using a single dashboard across the available platforms, allowing to optimize slippage, swap fees, and token prices to benefit Tyche users.

Tyche Aggregator functionality is directly referenced from the 1-inch dex aggregator.

TYCHE NFT lending Protocol (NFLP)

The prime feature of the TYCHE protocol is Its NFT lending protocol, where users will be able to borrow the Crypto Assets from the protocol against their NFT as collateral.

Collateral

In the financial world is a valuable asset that a borrower pledges as security for a loan. When a home buyer obtains a mortgage, the home serves as the collateral for the loan. In the centralized/decentralized lending platforms, you can borrow funds against your Asset class cryptocurrencies. A loan that is secured by collateral comes with a lower interest rate than an unsecured loan. In the event of a default/liquidation, a lender will seize the asset.

NFT as collateral

In the TYCHE NFLP (Non-fungible lending protocol) the protocol will allow users to pledge their whitelisted NFTs for the debt position.

Types of Lending

P2P lending (peer-to-peer)

Peer-to-peer (P2P) lending enables individuals to obtain loans directly from other individuals, cutting out the financial institution as the middleman. DApps that facilitate P2P lending have greatly increased its adoption as an alternative method of financing.
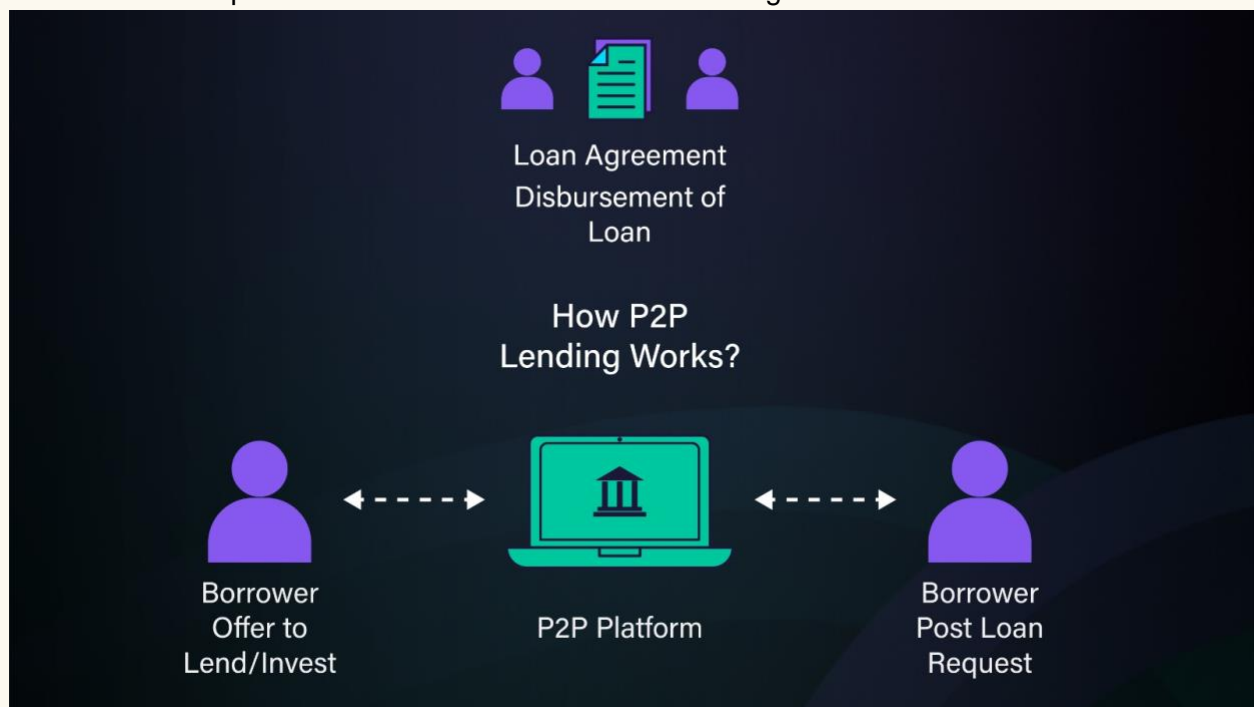
P2P lending is also known as "social lending" or "crowd lending."

Peer-to-peer (P2P) lending is a form of financial technology that allows people to lend or borrow money from one another..P2P platforms facilitate the agreement through smart contracts. The loan rate can be higher than the platform loan as lenders set their % interest rate. Peer-to-peer lending's biggest drawback can be the availability of funds available to borrow or lend given the market circumstances.

Biggest problem; "It can take an extraordinary amount of time to find the right lender who values your NFT as much as you do" You might value your 99th ranked/10000 NFT at 4x the floor price but The lender might only lend you the money basis on the floor price of that NFT.

Protocol lending (Peer-to-pool)

The DeFi lending process is simple. It focuses on offering crypto loans with a trustless approach. This means that the users can easily lock their crypto assets on the DeFi lending platform without worrying about intermediaries. The borrowers can directly opt for loans from the decentralized platform with the help of P2P lending.
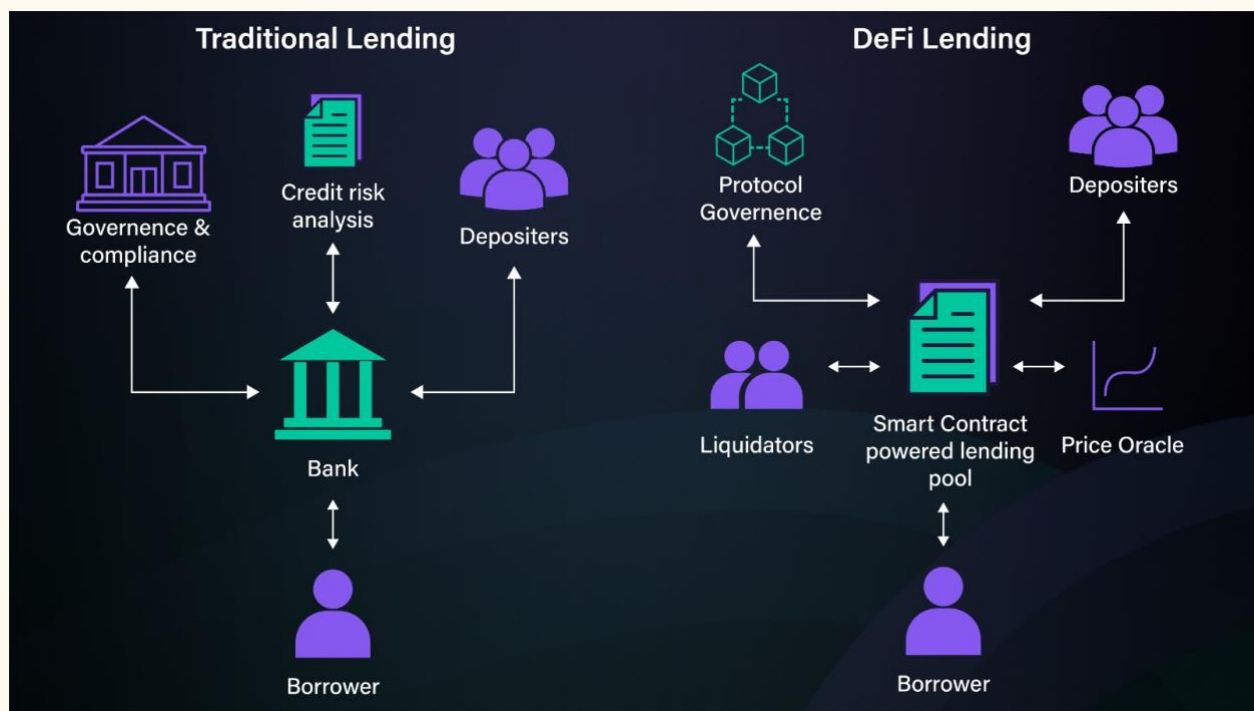
In addition to it, the DeFi lending protocol helps lenders to earn interest on crypto assets. As compared to the conventional loan processing system of banks, DeFi lending enables individuals to become a lender just like a bank. An individual can easily lend their assets to others and accrue interest on that loan. Just like the loan offices in traditional banks, DeFi lending mainly relies on lending pools where the users can add their assets to the lending pool and ensure quick distribution among borrowers through smart contracts.

With various mechanisms for the allocation of interest to investors, it is crucial for lenders to identify the type of interest. Borrowers also need to do their part of the research on the lending pools as each pool has a different borrowing approach.

Biggest problem; in the peer-to-pool model you have resolved the issue of speed of transaction as all the parameters (LTV, loan rate, funds, duration) are already set but in the case of NFT pool-to-peer what will someone do with the liquidations? The platform might sell these NFTs (pledged as collaterals) to their native marketplace. But this creates a gap between liquid assets poolers have pooled and the liquid assets pools withdraw at any point in time.

x= The USD value of single asset pool
y= The USD value pool has withdrawn against their NFTs
k= liquidations
a= liquid pledged assets
c= NFT (non-liquid assets)
At any point of time the pool where there has been no lending transaction should be
x=y
At any point of time the poll where there has been lending transaction should be
x=(x-y)+a

But in the NFT peer-to-pool lending the equation will be
x=(x-y-k)+c
In the ideal scenario (x-y-k)+c > (x-y)+a

***But c is always a risk in the equation.

The equation x = y represents the value of a single asset pool in USD and the value that has been withdrawn from the pool against their non-liquid assets (NFTs). The equation is used to describe the situation where there has been no lending transaction in the pool.

In the case where there has been a lending transaction, the equation x = (x - y) + a is used. Here, "a" represents the liquid pledged assets, which are assets that have been pledged as collateral in a lending transaction. This equation accounts for the change in the value of the pool due to the lending transaction.

In the case of NFT peer-to-pool lending, the equation x = (x - y - k) + c is used, where "c" represents the non-liquid assets (NFTs) and "k" represents liquidations, which are the process of selling pledged assets to repay a loan in case of default. This equation takes into account both the lending transaction and the risk of liquidation.

In the ideal scenario, (x - y - k) + c should be greater than (x - y) + a, indicating that the value of the pool has increased due to the lending transaction and the presence of non-liquid assets. However, it's important to note that "c" (the non-liquid assets) is always a risk in the equation and can lead to a decrease in the value of the pool.

Equation of "risk".

The equation to describe the risk in NFT peer-to-pool lending can be represented as:

Risk = (x - y - k) + c - (x - y) - a

Where "x" represents the USD value of the single asset pool, "y" represents the USD value that has been withdrawn from the pool against NFTs, "k" represents liquidations, "a" represents liquid pledged assets, and "c" represents non-liquid assets (NFTs). The difference between the right-hand side and the left-hand side of the equation represents the risk associated with the NFT peer-to-pool lending scenario.

The equation for "liquidation"

The formula for liquidation can be represented as

Liquidation = k = a - (x - y - c)

Where "k" represents liquidations, "a" represents liquid pledged assets, "x" represents the USD value of the single asset pool, "y" represents the USD value that has been withdrawn from the pool against NFTs, and "c" represents non-liquid assets (NFTs). The equation calculates the amount of liquid pledged assets that must be sold in order to repay a loan in case of default. If the value of the right-hand side of the equation becomes negative, it indicates that the pledged assets are insufficient to repay the loan, triggering a liquidation.

Finding "c"

Given the equation: x = (x - y - k) + c

We can isolate "c" by rearranging the equation as follows:

c = x - (x - y - k)

c = x - x + y + k

c = y + k

So, "c" represents the sum of the USD value that has been withdrawn from the pool against NFTs (y) and the amount of liquidations (k).

Example of liquidation

Let's assume that the current value of the single asset pool is 1,000 USD and the USD value that has been withdrawn from the pool against NFTs is 200 USD. Additionally, let's assume that an NFT worth 100 USD has been pledged as collateral in a lending transaction.

If the value of the pool drops below a certain threshold, a liquidation process is triggered to sell the pledged NFT to repay the loan. In this case, let's assume that the value of the pool drops to 800 USD.

The formula for liquidation is:

Liquidation = k = a - (x - y - c)

Where "k" represents liquidations, "a" represents liquid pledged assets, "x" represents the USD value of the single asset pool, "y" represents the USD value that has been withdrawn from the pool against NFTs, and "c" represents non-liquid assets (NFTs).

Plugging in the values, we get:

k = 100 - (800 - 200 - 100)

k = 100 - (800 - 300)

k = 100 - 500

k = -400

RISK equation in protocol loan model redefined

Risk = (V_i - V_c) / V_i

Where:

- *V_i = Initial value of NFT collateral*
- *V_c = Current value of NFT collateral*

Liquidation formula:

Liquidation Price = (B + P) / (Q - L)

Where:

- *B = Total borrowed amount*
- *P = Liquidation penalty*
- *Q = Quantity of collateral (represented in the value of NFT collateral)*
- *L = Discount applied during liquidation (usually a percentage)*

here is a hypothetical example:

Let's say the current market value of the NFT collateral is $1,000, and the borrower has borrowed $500. The liquidation penalty is 5% of the borrowed amount, or $25. The platform decides to apply a 10% discount during liquidation to incentivize buyers to purchase the collateral quickly.

Using the liquidation formula, we can calculate the liquidation price:

Liquidation Price = (B + P) / (Q - L)

*Liquidation Price = ($500 + $25) / ($1,000 - 10% * $1,000)*

Liquidation Price = $525 / $900

Liquidation Price = $0.5833 per dollar of NFT collateral

Tyche NFT lending model

The Tyche NFT lending model is a hybrid model designed in a way to protect borrowers and lenders and solve the problems of both peer-to-peer and peer-to-pool problems. Where a borrower will not wait for the lender for funds on the lender's position and we will solve this equation *(x-y-k)+c > (x-y)+a*

"(x-y-k)+c > (x-y)+a" an example

Suppose we have a single asset pool that consists of USDC and NFTs. The value of the pool is $100 (x), and $50 (y) has been withdrawn against the NFTs. The value of the liquidated assets (a) is $40 and the value of the NFTs (c) is $60.

The equation (x - y - k) + c represents the value of the pool after liquidations (k), assuming the NFTs can be sold to cover the loss.

The equation (x - y) + a represents the value of the pool after liquidations if only the liquid assets (a) are used to cover the loss.

So,

(x - y - k) + c = (100 - 50 - k) + 60 = 60 + 60 - k = 120 - k

(x - y) + a = (100 - 50) + 40 = 90

Now, if we substitute the values, we get

120 - k > 90

k < 30

Since k represents the number of liquidations, a value of fewer than 30 means that there are sufficient NFTs to cover the losses, even in the event of liquidation.

So, in this hypothetical example, the equation (x - y - k) + c > (x - y) + a holds true, indicating that the value of the NFTs is sufficient to repay the loan, even in the event of liquidation.

Lending platform solvency

$V\_t >= (B + P) / (1 - L)$

Where:

V_t = Total value of the NFT collateral held by the platform
B = Total amount borrowed by borrowers
P = Total amount of liquidation penalties owed by borrowers
L = Discount applied to the liquidation price, expressed as a decimal between 0 and 1

This expression represents the minimum amount of NFT collateral that the platform needs to hold in order to ensure that it can cover all outstanding loans and liquidation penalties, even if all collateral is liquidated at the discounted liquidation price. If the value of the NFT collateral held by the platform falls below this minimum threshold, the platform may become insolvent and unable to meet its obligations to borrowers and lenders.

Simplified Tyche NFT lending model

1. Borrowers will be able to borrow against their whitelisted NFTs instantly from the pool.
2. The first pool of Tyche tokens will be funded by the protocol (specific allocation in the tokenomics)
3. LTV will be decided by the governance vote, governed by Tyche DAO. (LTV will be less than the floor price and will change accordingly)
4. The borrower gets a Tyche loan against their NFT collateral.
5. Tyche protocol will list this NFT in the p2p lending market.
6. If another peer buys the liability they will start earning the % rate until now the protocol was earning.
7. But it will remain in the p2p lending market, someone wants to buy the liability at better rates. It will be an option.
8. In case no one buys the liability, and liquidation is approaching, the protocol will list the NFT on the native marketplace of that NFT, at 1.5X of LTV and less than the floor. To liquidate the position.

Overall, the simplified Tyche NFT lending model provides an efficient and secure way for borrowers to access funds quickly and for lenders to earn a return on their investment. With its innovative features and strong governance structure, the Tyche protocol is well-positioned to transform the lending industry and bring greater efficiency to the market.

● Instant borrowing: Borrowers can borrow against their whitelisted NFTs instantly from the pool. This eliminates the need for lengthy application processes and provides borrowers with quick access to funds.
● Tyche token pool: The first pool of Tyche tokens will be funded by the protocol, which means that borrowers can benefit from this funding allocation while ensuring that the liquidity of the platform remains stable.

- Governance vote: The loan-to-value (LTV) will be decided by the governance vote, which is governed by the Tyche DAO. This ensures that the LTV remains within a specific range and adjusts according to market conditions, providing greater stability to the platform.
- Collateralized loan: The borrower gets a Tyche loan against their NFT collateral, which ensures that the loan is fully collateralized and reduces the risk for lenders.
- P2P lending market: Tyche protocol will list the NFT collateral in the peer-to-peer (P2P) lending market, which provides an opportunity for other users to purchase the liability and earn the interest rate.
- Native marketplace liquidation: In case no one buys the liability, and liquidation is approaching, the protocol will list the NFT on the native marketplace of that NFT, at 1.5X of LTV and less than the floor. To liquidate the position. This ensures that the platform remains stable and provides protection for lenders in case of default.
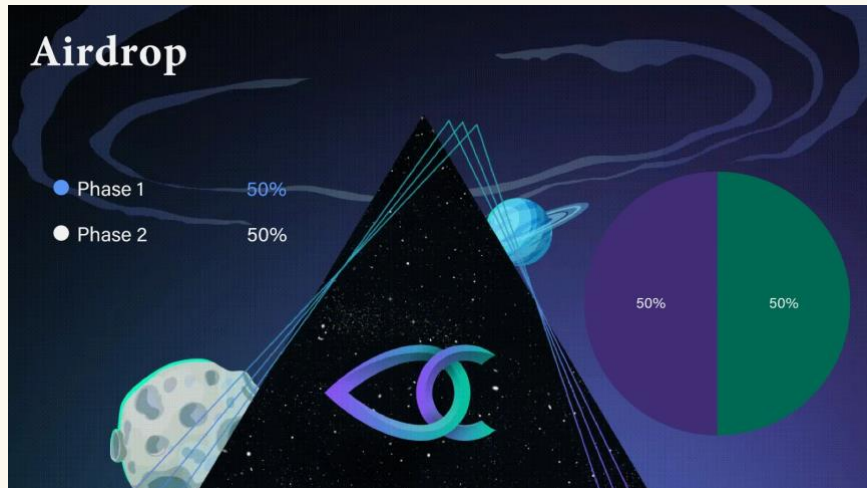
Tyche Tokenomics

Detailed tokenomics structure to distribute its tokens and incentivize its community. With 500 million tokens Max Supply.
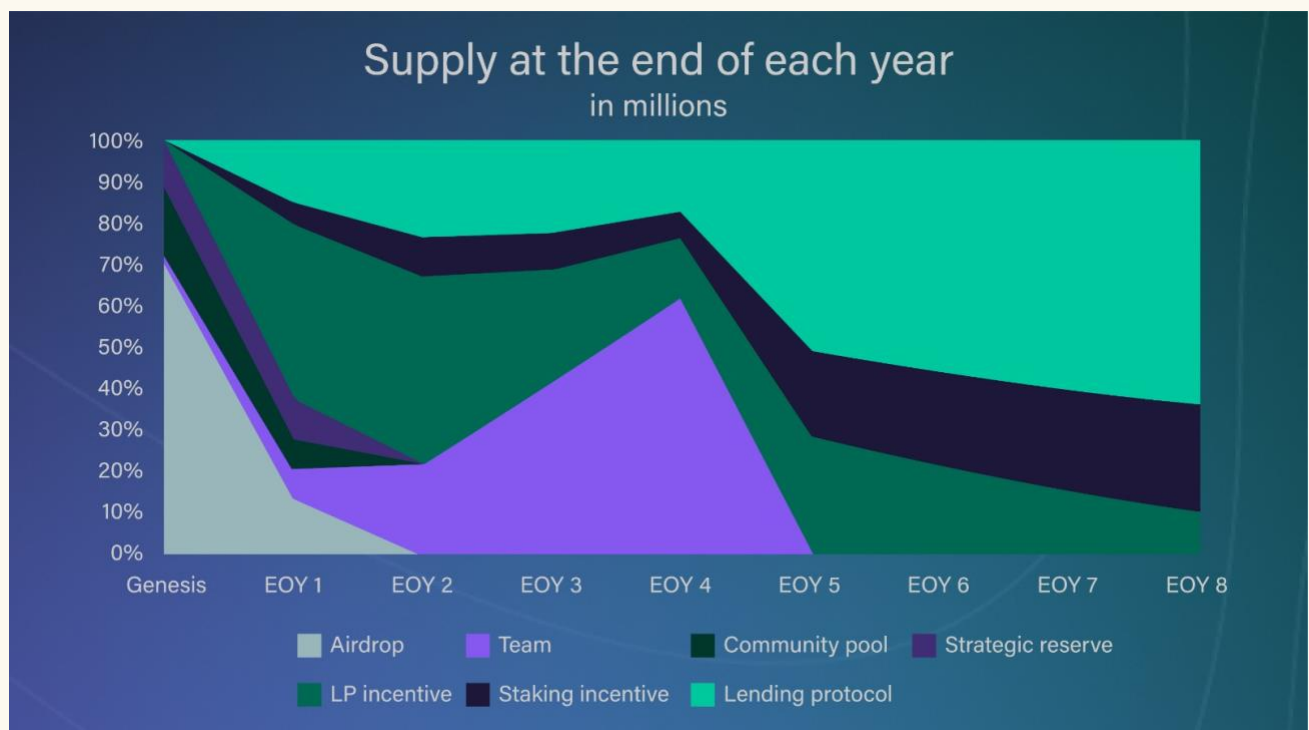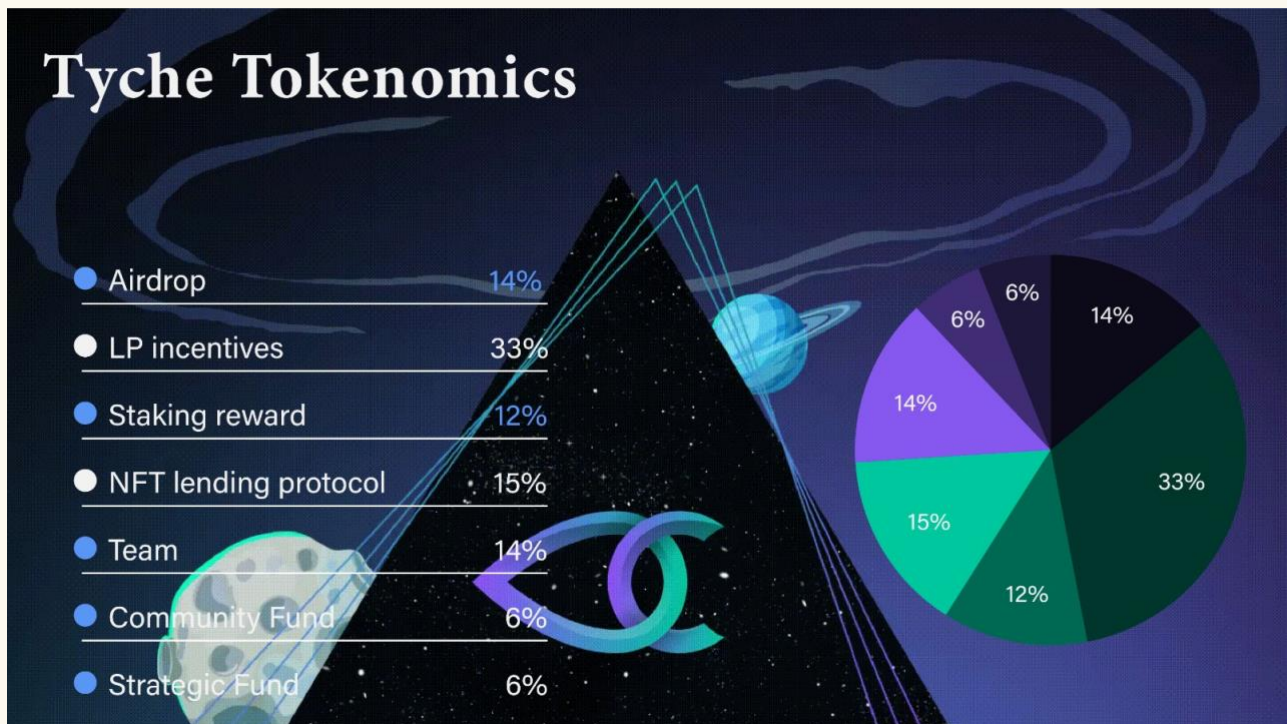
Airdrop:

14% of the total Tyche token supply, or 70 million tokens, will be distributed through an airdrop. The tokens will be unlocked in two parts.


LP incentives:

 33% of the total Tyche token supply, or 165 million tokens, will be used to incentivize liquidity providers. These tokens will be unlocked daily for 8 years.

Staking reward:

 12% of the total Tyche token supply, or 60 million tokens, will be used for staking rewards. These tokens will also be unlocked daily for 8 years.

NFT lending protocol:

 15% of the total Tyche token supply, or 75 million tokens, will be used for the NFT lending protocol. These tokens will also be unlocked daily for 8 years.

Total incentive allocation
300 million tokens
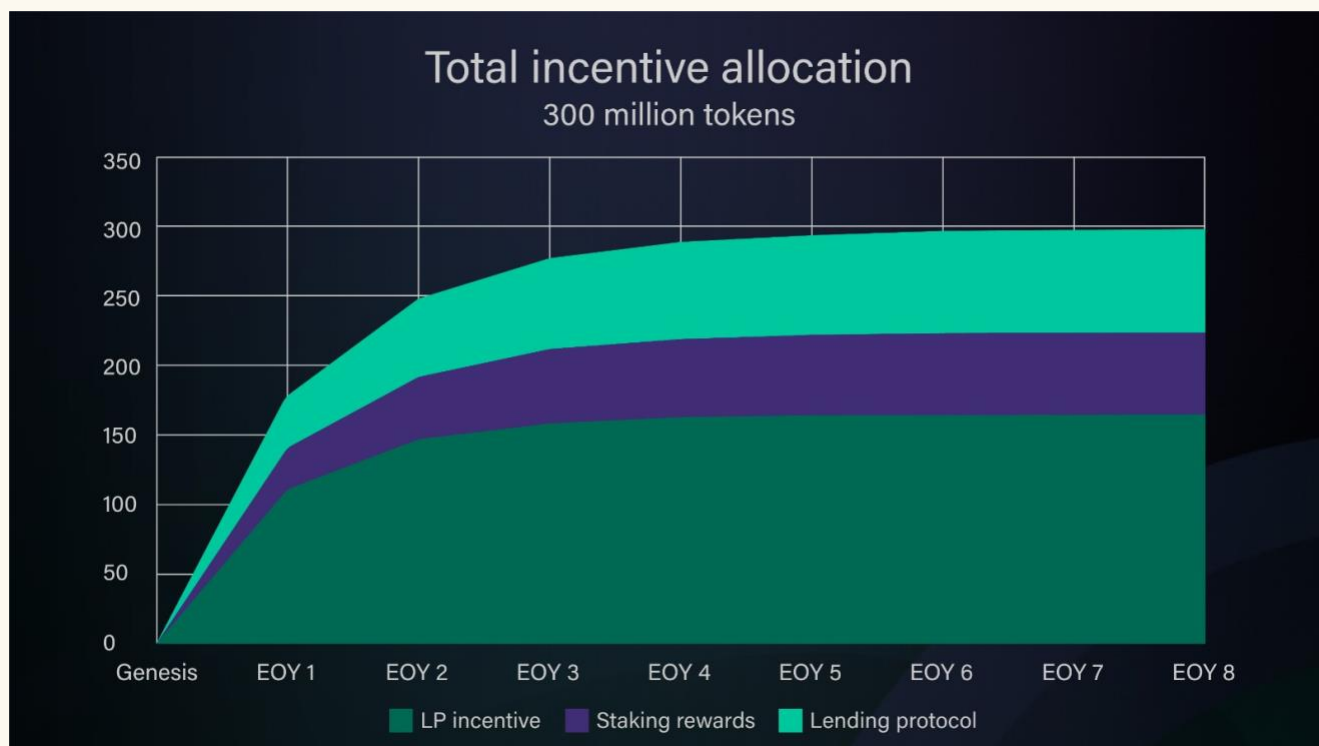
Team:

14% of the total Tyche token supply, or 70 million tokens, will be allocated to the team. These tokens will be unlocked daily for 4 years.

Community Fund:

6% of the total Tyche token supply, or 30 million tokens, will be allocated to the community fund. These tokens will be unlocked daily for 1 year.

Strategic fund:

6% of the total Tyche token supply, or 30 million tokens, will be allocated to the strategic fund. These tokens will also be unlocked daily for 1 year. The total supply of Tyche tokens is 500 million, and all tokens will be unlocked over time as per the schedule outlined above.

Circulating supply

At the genesis, there will be 50,000,000 TYCHE tokens in circulation, which represents 10% of the total token supply. In Year 1, the token supply increases to 326,000,000 TYCHE tokens, which represents 65% of the total token supply. By the end of Year 2, the token supply reaches 413,916,667 Tyche token supply will be distributed over a period of eight years, with the majority of

tokens being distributed in the early years. By the end of Year 3, more than 80% of the total token supply will be distributed.
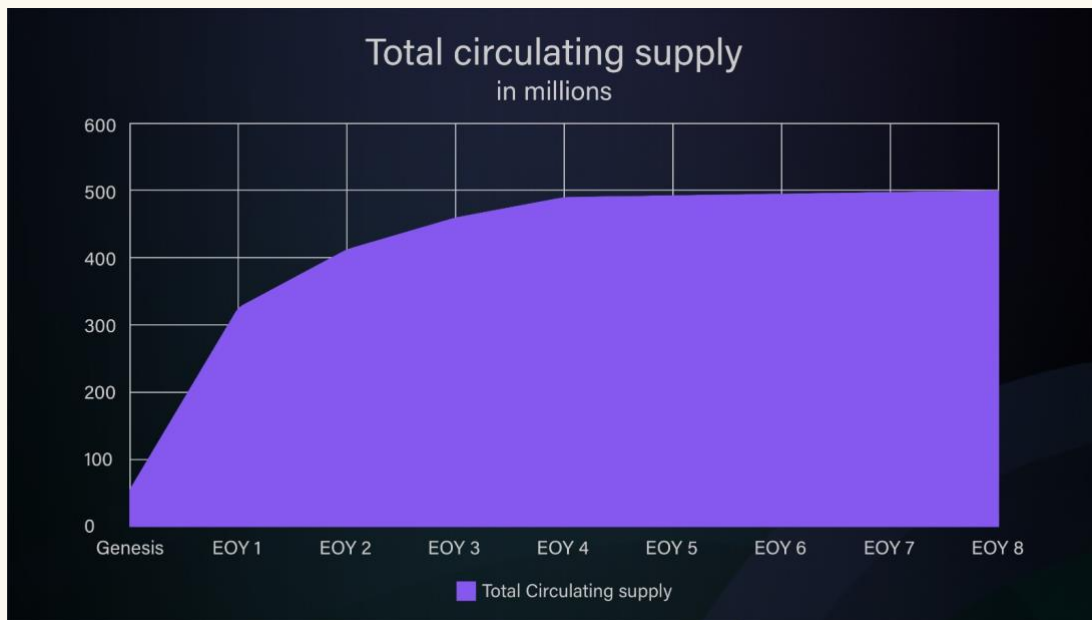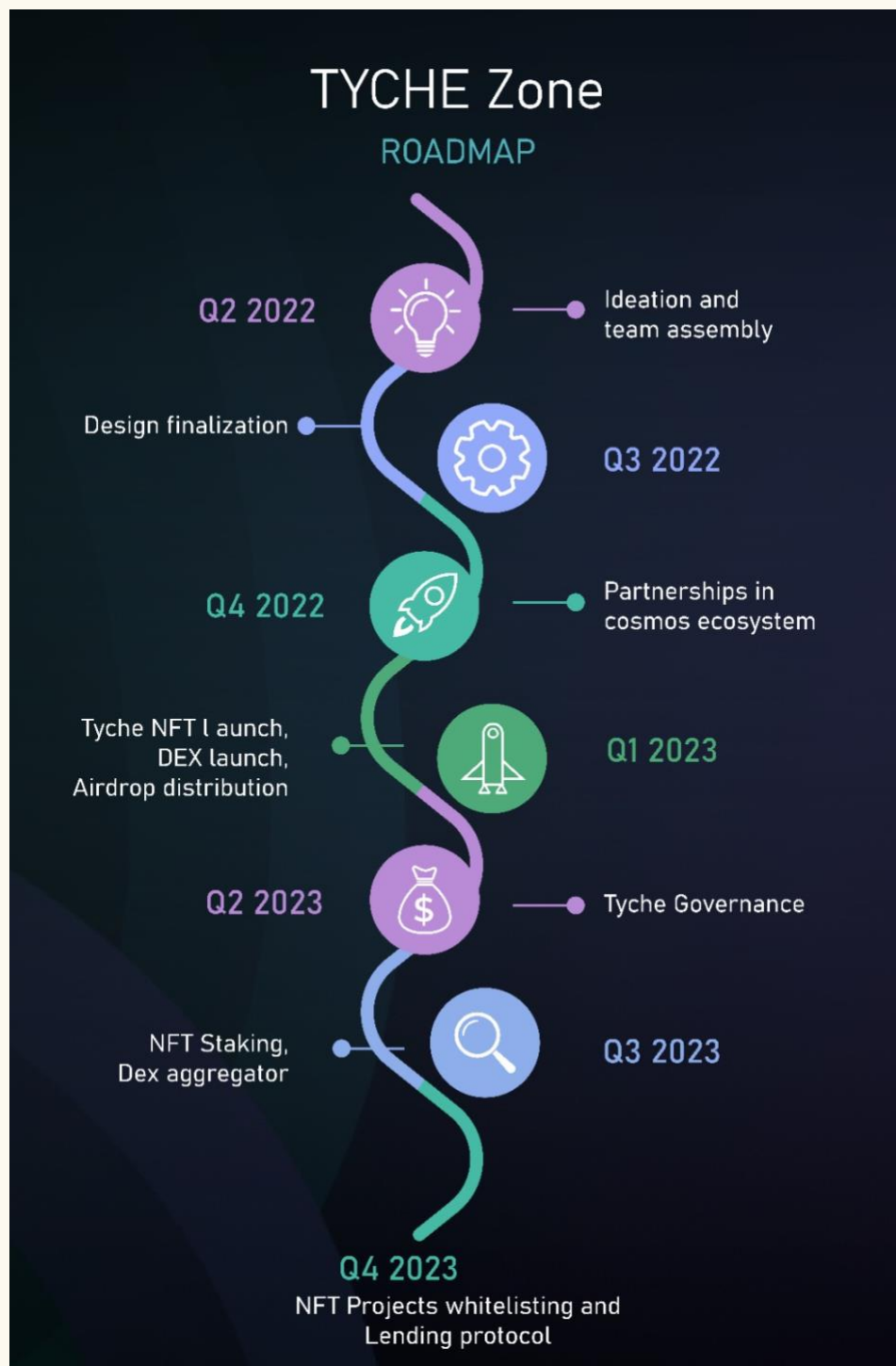

Genesis Supply

10% of the total supply of 50 million Tyche tokens will be minted on the genesis and these minted tokens will be mainly used for the Airdrop purposes.
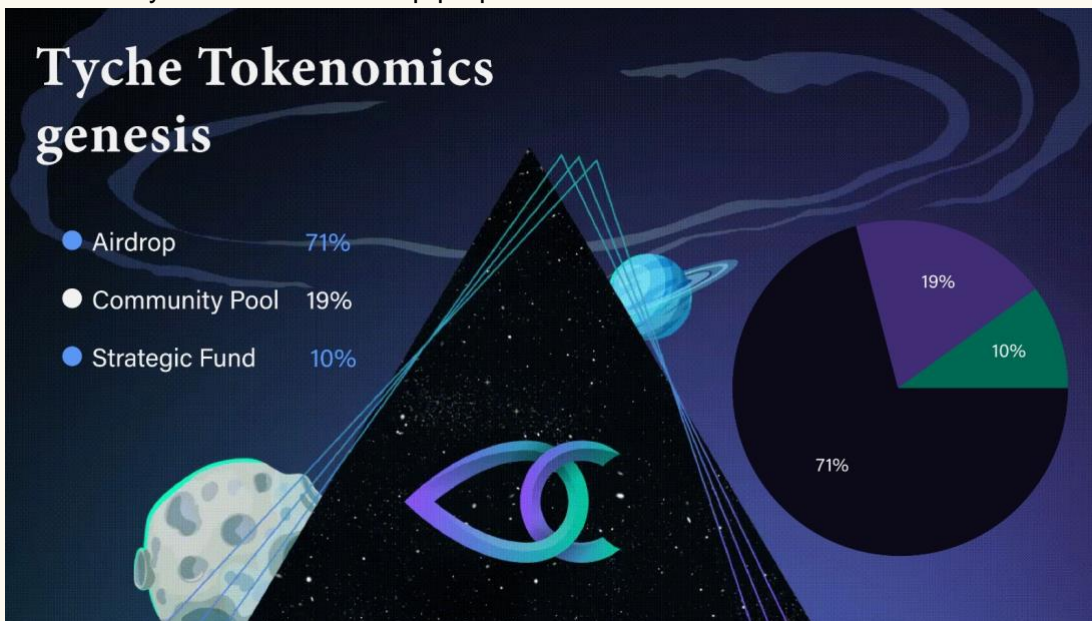
Road map

Tyche NFT

Tyche NFT is a unique digital asset that represents the goddess of luck and fortune in the world of crypto. Inspired by Greek mythology, Tyche NFTs are limited edition tokens that are designed to be collected and traded by fans of the classics, art collectors, and crypto enthusiasts alike.

One of the key benefits of Tyche NFTs is their staking utility, which enables holders to earn additional rewards by staking their tokens in a Tyche staking pool. This provides an incentive for collectors and investors to hold onto Tyche NFTs rather than sell them, which can help to stabilize the price of the tokens and provide liquidity to the market. Additionally, Tyche NFT holders will be eligible for a TYCHE token airdrop, which can provide further value and utility within the Tyche ecosystem.

Overall, Tyche NFTs offers a unique combination of art, mythology, and crypto, making them an attractive investment opportunity for those who value both the aesthetic and financial potential of digital assets. Whether you are a collector, investor, or simply a fan of Greek mythology, Tyche NFTs are a one-of-a-kind way to engage with the world of crypto and potentially earn rewards along the way

NFT staking

Refers to the process of holding or locking up non-fungible tokens (NFTs) in exchange for rewards or benefits. Staking NFTs involves depositing them in a smart contract or protocol that incentivizes holders by offering rewards in the form of additional NFTs, cryptocurrency, or other types of tokens.

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