THEOS

DeFi Paradise for NFTs

Welcome to the instant liquidity protocol for non-fungible tokens.
We are a decentralized creator-based financial ecosystem.

theos THEOS RESEARCH LAB

INDEX

The Hyper Economy Operating System (THEOS)

"Symbolic communication mechanisms played a significant part in the evolutionary process by allowing plants, animals and humans to exchange individual experiences and thus turning collections of relatively isolated organisms into adaptive distributed cognition systems. By providing aggregated information on comparative values of goods and services to participants with bounded interests and rationality, the economic signalling mechanisms give them incentives to adjust their consumption and production efforts in accordance with the collective requirements of all other agents in the system. The suggested model of a "hypereconomic" system combines flows of globally aggregated scalar information on prices with mechanisms for sharing knowledge about situational utilities of groups of resources. The project presents methods for combining value and utility signalling mechanisms, introduces non-scalar representations of common experiences analogous to derivative financial instruments and researches their efficiency in different types of economics environments."

Source: https://ieeexplore.ieee.org/document/713811

Abstract

We propose THEOS, an ecosystem design that is set to accommodate the demands of the emerging hyper-economy. While not a vigorously defined academic term, hyper-economy is an ecosystem that is much closer to the Arrow-Debreu complete markets setup, an ecosystem that builds upon the assumption of availability of global instant liquidity for any asset as well as transparent and complete information sets available to every market agent.From an economic viewpoint, NFTs are the integral building blocks upon which the world's new and inclusive financial operating system will be built. We envisage a world where an NFT is just as likely to serve as a mortgage contract for a previously unbanked family in South America, as it is to represent a digital art work auctioned at Christie's. We build an NFT marketplace that is capable of automated dynamic pricing of any non-fungible asset, ranging in variety from a mortgage or an insurance contract, all the way to a new Guns'n'Roses single. To wrap the message up more concisely, THEOS is built around the concept of instant liquidity for any NFT with built-in economic incentives to stimulate efficient price discovery. But it is also much more than that. Let us show you how deep the rabbit hole really goes.

Introduction

THEOS is the hyper-chain ultimate liquidity sourcing environment amalgamating the paradigms of fungible and non-fungible tokens, elevating every NFT defining characteristic (uniqueness, rarity, authenticity, indivisibility, ownership and verifiability) within a DeFi carbon-neutral platform.

The advent of NFTs and the subsequent exponential growth of the NFT total value locked (TVL) has left many wondering as to both, the merits of this phenomenon, and its long term sustainability. How can 64 pixel pictures of artistic value generate millions in consistent dollar volume across the decentralized NFT trading platforms? But NFTs transcend the boundaries of traditional finance, to represent much more than simple value transfer.

Let's try defining one of crypto's most important primitives: the non-fungible token. NFTs basically take data and turn it into liquid intellectual property. That data could be art, virtual goods for games, reputation scores, raw bundled personal and commercial data, etc.

Since the explosion in NFT interest in the second half of the past year, every metric of value has been surpassing its previous high almost on a daily basis. Total value locked, average price of NFT purchases, and total market capitalization of transactions have been brought to the forefront of the digital asset industry. Over 250% and 100% growth rates have been taking place in 2019 and 2020 respectively, with higher estimates for subsequent years. Throughout the past year, the NFT scene has adapted and is now able to accommodate not only particular artists looking for alternative ways of monetizing their art, but also numerous sizable institutions from traditional finance and beyond.

Non-traditional returns have been attracting hordes of participants to the space. The value proposition is simple: to leverage the unique benefits of decentralized technology, while empowering artists or owners to have control over the creation, ownership and decision of their unique intellectual property[1].

But despite the increased momentum and wider adoption of NFTs, there are still several areas that when improved upon, can

---

1   Credits to Messari Crypto Theses 2021

transform a socially interesting trend into a massive distributed system capable of creating and transacting value at a staggering velocity — encapsulating almost any imaginable asset class, and creating some new ones[2]. THEOS is the step towards realizing this vision. THEOS is a decentralized hybrid NFT marketplace that delivers smart contract infrastructure capable of fusing the securitization practice from traditional finance and AMM logic to ultimately arrive at market mechanisms for instant liquidity for NFTs.

We are more than that, however. THEOS system is also capable of the exact opposite: use NFTs to facilitate price discovery and transferability of fungible but illiquid assets, such as pre-money project tokens. All these concepts are technological breakthroughs that THEOS brings to the table. These innovations, however, would not have that much value per se unless wrapped around a killer DApp with sound tokenomics and bar-setting UX.

In what follows we will give a general overview of THEOS system components and agents and entities shaping its ecosystem.

Important Definitions

ODYSSEY pools: These pools are smart contracts that enable the pooling of NFT's on an algorithmic/auction basis and simultaneous issuance of ERC20's, the liquidity tokens for a pool of non-fungible tokens. This is similar in principle to pooling illiquid mortgages off banks' balance sheets into special vehicles where such mortgages can later be securitized effectively giving them deep secondary markets liquidity. The use cases are, however, much wider than that;

DELPHI pools (Reverse mining pools): DELPHI pools are smart contracts that enable the possibility of "attaching" a pool of ERC20's to an NFT and enabling custom release/vesting schedules for the fungible tokens when the said NFT is staked. Imagine sending a gift card to one's nephew with some cash inside it. Alternatively, one can think of a transfer of a vested stake in some project's tokens on a pre-money landmark;

---

2   E.g., launchpad allocation-entitling NFTs

THEOS token: THEOS ecosystem's native token.

Agents in THEOS

Before moving on and describing the key mechanics of the system, it is imperative to introduce the agents within the THEOS ecosystem:
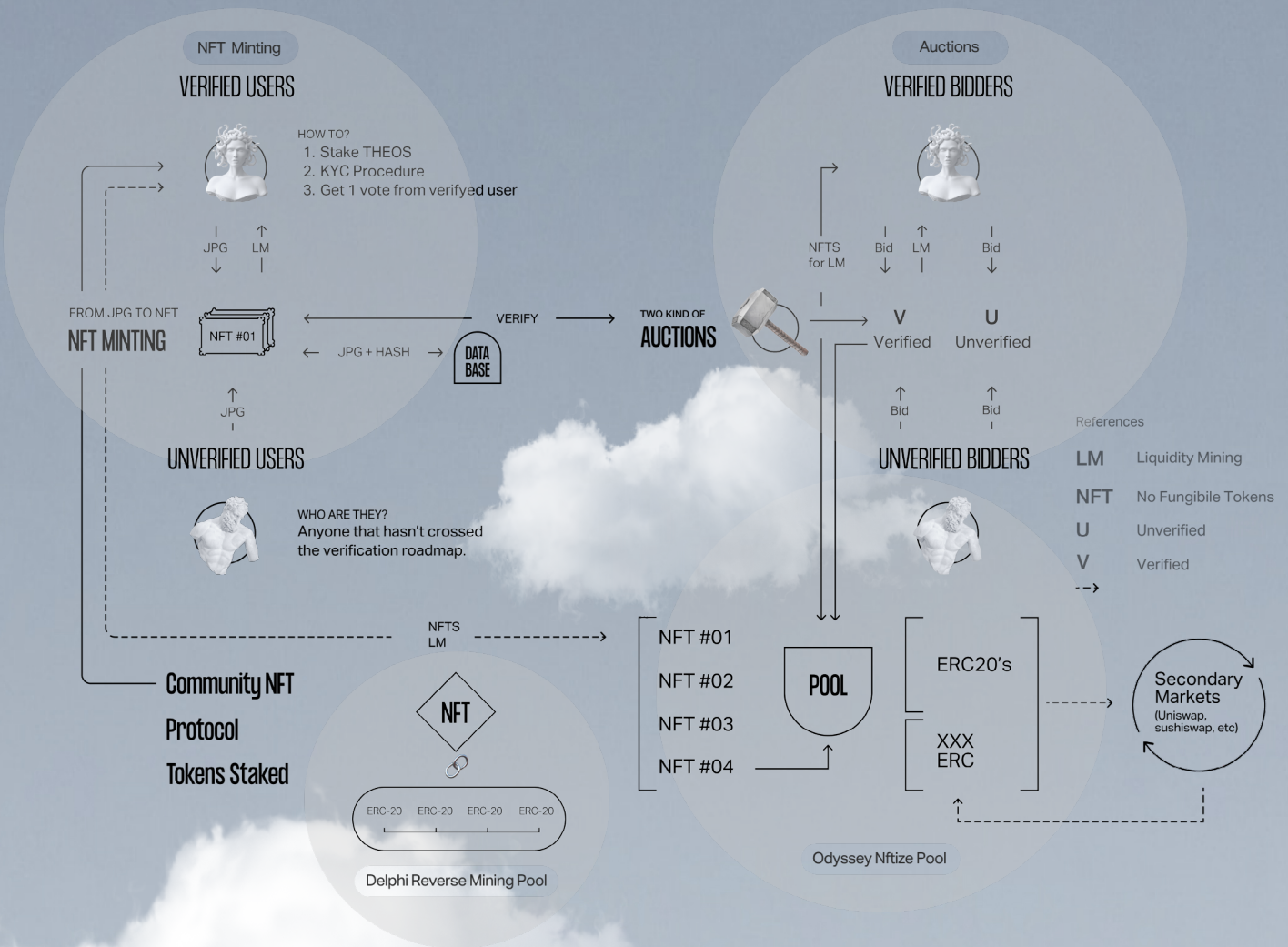
NFT Minters - NFT Minters can carry out a number of actions: mint NFTs by depositing unique files, sell them on the marketplace, set NFTs for auctions, and engage in collaboration mechanics. Furthermore, Top Creators will be able to get access to DELPHI pools (see below) by virtue of community vote;

Users - Users can participate and bid on auctions, buy and sell NFTs. Likewise, users as well as NFT minters can use the ODYSSEY smart contracts to get instant liquidity for one's NFTs. This mechanics will be explained in more detail below;

Stakers - Stakers are those who have staked THEOS tokens. Many platform features are only available to THEOS stakers. Importantly, only users who stake THEOS can attain verified user status. Voting for best creators, system parameters, accessing some high profile auctions and many other platform features require having some liquid THEOS staked. More about this can be found in the tokenomics section.

Pool Originators - Any user can initiate the creation of an NFT pool and issue ERC20 representing shares of ownership of the said pool. Such pools are called ODYSSEY pools. Also, any user can create a DELPHI pool, a basic NFT with the pool of ERC20's uniquely associated with it;

Cause Pool Originators - These types of pools will allow pool originators and users to elaborate upon their vision for having to receive a donation or contribution, and if capable of convincing a community, they can receive rebates from the general platform activity. These pools are super entities basically earning some percent of platform's general liquidity mining rewards.

NFT Minting

VERIFIED USERS

HOW TO?
1. Stake THEOS
2. KYC Procedure
3. Get 1 vote from verifyed user

JPG   LM

FROM JPG TO NFT

NFT MINTING

NFT #01

← JPG + HASH →   DATA BASE

VERIFY →

TWO KIND OF
AUCTIONS

JPG

UNVERIFIED USERS

WHO ARE THEY?
Anyone that hasn't crossed
the verification roadmap.

Auctions

VERIFIED BIDDERS

NFTS for LM   Bid   LM   Bid

V   U
Verified   Unverified

Bid   Bid

UNVERIFIED BIDDERS

References

LM   Liquidity Mining
NFT   No Fungibile Tokens
U   Unverified
V   Verified

NFTS
LM

Community NFT
Protocol
Tokens Staked

NFT

ERC-20   ERC-20   ERC-20   ERC-20

Delphi Reverse Mining Pool

NFT #01
NFT #02
NFT #03
NFT #04

POOL

ERC20's

XXX
ERC

Secondary
Markets
(Uniswap,
sushiswap, etc)

Odyssey Nftize Pool

Key THEOS Mechanics

This section provides a brief explanation of the full set of mechanics present on the THEOS system. Mind that the intended design of THEOS is to be permissionless, in other words, we enable anyone to use the platform (say, create an NFT), but many key platform features will only be available to verified users (more on this below):

NFT Minting and Authenticity Assurance - NFTs can be minted by verified and unverified users. When issued, an NFT possesses 3 key characteristics that take on blockchains' native properties:

It is signed (issued) by a unique account;

It has a time-stamp of issuance;

It contains a unique hash of a file stored on a decentralized storage network. This action of depositing a file on to a decentralized storage infrastructure is a part of the minting transaction.

Collaborative NFT Minting - In a fashion similar to that described in point (1) above, signing of the minted NFT can be done from multiple unique accounts. Defining characteristics remain constant, with a unique property that allows co-signing the issuance of an NFT, thereby providing and assuring authenticity of collaboration, instead of the typical solo contribution;

Auctioning of an NFT - A number of auction mechanisms can be employed by NFT Minters to auction off a freshly minted NFT or, users in general, to initiate secondary market activity for an arbitrary NFT. These include English, Dutch, and Vickrey Auctions;

Creation of an ODYSSEY Pool - Multiple NFTs can be pooled together into a single pool that is driven by the same financial logic

as mortgage conduits that enabled asset backed securities (or ABSs) in mortgage markets - securitization. Securitization is an old concept that throughout its lifetime has saved trillions of dollars in reduced mortgage rates for US households. These savings came from the ability to find instant liquidity for such contracts. How does this work in the THEOS setting? Let us explain. Users can deposit their NFTs into ODYSSEY pools, thus receiving ODYSSEY index tokens (ERC20 liquidity tokens) and liquidity mining rewards for liquidity provision (THEOS tokens), and can buy back NFTs from it by burning index tokens (ERC20's). No trades are allowed against ODYSSEY pools. ODYSSEY index tokens are basic ERC20's and are freely tradeable on any relevant secondary market (such as Uniswap). ODYSSEY pools represent a unique set of features that enables instant liquidity for freshly minted (or those that are out there on the market) NFTs. Instant liquidity implies instant price discovery.

Creation of a DELPHI Pool: Yet another integral part of the THEOS ecosystem are the so-called DELPHI pools. The technology and the idea behind it is simple - NFTs can have a pool of mineable fungible tokens uniquely 'associated' with them. The only way to acquire these ERC20 tokens is through staking the NFT that they are associated with into special contracts. These are like DELPHI's bags. There will be various business cases for DELPHI pools, however, the genesis case will be community voting (proportional to stake) for the best NFT minters (i.e. creators). These winning NFT minters will be granted a special DELPHI NFT with a 'bag' of THEOS tokens that can be mined upon staking of the DELPHI NFT. These special tokens can be used upon the winner's discretion. For better contextualization of DELPHI NFT, one can think of it as a concept opposite to that of ODYSSEY pool.

THEOS platform actions

Acquiring the 'Verified' status for a user

Users can have a verified and an unverified status. There are a number of requirements to be fulfilled to acquire a 'verified' status on the THEOS platform:

An account has to be generated and KYC'ed through one of THEOS decentralized compliance partners. Mind, THEOS is a decentralized platform and is not dealing with PII and compliance related matters. All the interactions will be automated;

Applying for verification is only possible after staking a small amount of THEOS;

After the verification, some of the existing verified accounts will have to 'vouch' for the freshly generated account. The exact mechanics of this is still to be determined and can be implemented by minnting a limited number of vouch NFTs per verified account. The wallet holding such NFT after its first transfer is considered to be vouched for.

Verified creators are likewise entitled to part take in monthly community votes. We will elaborate upon what this process entails below.

The NFT Minting Process

In this section we will elaborate more holistically on the NFT minting process:

Anyone with an account can mint NFTs;

Only verified creators are entitled for liquidity mining rewards for minting NFTs;

Additionally, only NFTs that have received a predetermined number of 'likes' are entitled to receive liquidity mining rewards. This incentivizes the creation of high quality content;

NFTs entitled for liquidity mining rewards are referred to as 'verified' NFTs;

Minting of an NFT implies mapping of its creators and storing of the source file on one (or several) decentralized storage networks, storing it's hash in the token itself [3];

Unlike the ownership mapping, creators' mapping cannot be changed after the NFT is initiated. This can serve for example to pay royalty to the creators during a trade on a NFT market;

An optional feature to be specified is a small fee embedded in the NFT itself - every transaction with it will carry a certain royalty component that will be transferred to the initial issuer.

NFTs Liquidity

There are a number of ways creators can source liquidity for NFTs - auctions and ODYSSEY pools;

Auctions

As noted, there are many auction types available: English, Dutch, Sealed Bid and Vickrey; each available to be employed by the Auction Originator.

Similarly to NFT creators and NFTs, auctions can also be either Verified or Unverified. Creating a Verified auction can only be done by a Verified user for a Verified NFT. Only Verified bidders participating in such a pool are entitled for auction liquidity mining rewards. Unverified bidders cannot participate in Verified auctions. Unverified bidders and Verified bidders participating in Unverified auctions are not entitled for liquidity mining rewards. Liquidity mining rewards are distributed on a pro-rata basis and split 50/50 between auction originators and bidders for every lot.

---

3   It's important to clarify: the current EIP721 standard for NFT only tracks ownership of the NFT which can be transferred from one address to another. In THEOS we are standing firmly behind the idea that today when artistic endeavors of all kinds are concerned, the origin of an NFT is as important as the actual source file behind it. To track creators of an NFT we will use a mapping from the tokenID to a dynamic array of creators.

List of the auction types includes:

(001) English auction: NFTs owner specifies the starting price and end time. Bidders submit their bids publicly and openly.

(002) Dutch auction: NFTs owner specifies the starting price and end time. The price decreases linearly over time. The first bidder to accept the price gets the NFT.

(003) Sealed bid: NFTs owner specifies the minimum price and end time. In this time window each bidder will commit a hash of his bidding price. After this period the interested bidders will reveal their bids (which have to agree with the committed hash). The highest bid wins.

(004) Vickrey auction: like sealed bid where the highest bid wins, but the price paid is the second highest bid.

The ODYSSEY Process

The second way that an NFT can get liquidity on THEOS is through the ODYSSEY process:

Nowadays it is challenging to utilize NFTs in ways similar to fungible tokens (ERC20) - i.e. trading, lending, liquidity provision. Here we offer NFT owners a quick way to receive liquidity backed by their NFT without depreciating its value. NFTs from one smart contract (one collection) will be assigned a liquidity pool, which is at the same time an ERC20 contract:

(A) Any user can deposit one's NFT into the pool and immediately mints a fixed amount V of ERC20 tokens which one can use at one's will e.g. sell them on a secondary market. The amount V is set by the pool originator;

(B) On the other hand, by depositing back (burning) V ERC20 tokens users can retrieve an NFT (not necessarily his/her own)

from step (a);

(C) NFTs from the same group can have different values. Assume user A has an NFT B which deems to be worth V+i ERC20 tokens. The user can deposit the NFT into the pool to get V ERC20 tokens but at the same time the user assigns a value V+i to the locked NFT. Anyone can buy back this NFT by depositingV+i ERC20 tokens to the pool, from which V tokens are burned and the rest i are sent to user A. Apart from that, User A can buy back the NFT by simply burning V ERC20;

(D) Step (c) makes the pool not only a liquidity sourcing vehicle but also, effectively, an NFT marketplace. As such, we believe that the pools has to be liquid, with more NFTs open to be buy back. Thus we want to prevent the cases where a user assignes (a deposited NFT) a value higher than its real market worth in order to prevent others from buying back, because the user's intention was just to receive the initial liquidity of V ERC20 tokens. Therefore two solutions are proposed, both are basic fees (temporal and economic) imposed upon the depositing party and some governance mechanisms atop:

> **Timelock:** the NFT's original owner has to wait for a certain period before being able to retrieve his NFT back with the base V ERC20 tokens. The higher the value he/she assigns to the locked NFT the longer he/she has to wait. The timelock will be capped with an upper threshold.

> **Fee:** Similar to the timelock mechanism, however here the higher the value the user assigns to the locked NFT the more one has to pay to be able to retrieve the user's NFT with the base V ERC20. The fee can be capped by an upper threshold.

> **Cast out mechanism**: When created by the original depositary or group thereof, an ODYSSEY pool can be set to be either a permissionless one or a private. If set to private, the ODYSSEY index token holders have an option to 'cast out' an NFT, basically reversing the inbound transaction. If done this way, there's a small penalty imposed upon the depository to compensate for voting transaction costs.

There are projects where users can freely create new NFTs. In such projects usually NFTs have very low real value. To accommodate this scenario we only allow certain NFTs, which we call Verified, to enter the pool. To become Verified NFTs have to fulfill certain criteria, one of which is for example being created by Verified addresses.

The pool described in point (1) above is not suitable for expensive NFTs whose value is hard to determine, so it is not worth it for owners to use the pool to extract a significantly lower amount of liquidity. For those who believe that their coin is worth much more than the amount V to be minted, an auction can be initiated. Basically, in this scenario the holders of the existing ODYSSEY index tokens bid for a new NFT to enter the pool. The bid size is the % of dilution of the initial pool that one can suffer. The resulting dilution, however, is not pro-rata: the winning bid will dilute more than one's pool peers. For these particular NFTs we can use an auction platform to either sell these NFTs for other ERC20 tokens or determine the minted amount to enter the liquidity pool.

For the latter, the NFT's owner needs to create a proposal regarding his NFT, particularly the minted amount (the liquidity amount he would want to receive) and buy back said amount (the amount to burn to buy back the NFT). This proposal is subject to a vote by, for example, ERC20 tokens stakers, protocol tokens stakers, pool owners. When the vote reaches a certain threshold (a parameter which can be set during pool initiation) the proposal will be subsequently verified and approved by the platform administrator.

The last step is to prevent vote manipulation when a substantial amount of liquidity is owned by one person, hence would be able to create a malicious proposal to mint liquidity. Since voting on Ethereum is a gas intensive process a fee can be charged for each attempt to get to the liquidity pool through voting.

THEOS Utility Tokenomics

The following section will describe the tokenomics of the

THEOS ecosystem, with its native token, THEOS, at its core. Token utility revolves around two key agent-token interactions: staking and liquidity mining. All the key features of the THEOS platform are enabled by THEOS tokenomics. In this way, THEOS is the lifeblood of the protocol fueling key agent interactions and providing game theoretically coherent framework that stimulates agent behaviour facilitating the ecosystem growth.

Token Staking Utility

Stakers of the THEOS tokens are entitled to the following:

ODYSSEY pool creation will only be available to those staking >X(1) THEOS tokens;

There are several fees associated with the ODYSSEY pool that will be distributed among stakers:

creation fee,

inbound/outbound fee;

ODYSSEY pool fees can be reduced to net network fees for those staking >X(2) THEOS tokens;

When staked, THEOS tokens enable reduction/removal of platform fees;

Staking >X(3) THEOS tokens enables one to receive verified status for the account (subject to fulfilling compliance and vouching requirements);

A Verified status for an account enables liquidity mining for minting NFTs, auctioning of NFTs and adding liquidity to the ODYSSEY pools. Such accounts are also eligible for community voting;

Staking THEOS tokens is required to access high profile auctions (those hosted by verified accounts). Only those staking >X(4) can participate.

Unstaking action carries a fee with it that is distributed across the remaining stakers;

Transaction fees from trading ODYSSEY ERC20's are partially directed to special claim pools and are available for claiming by the THEOS stakers;

Finally, only THEOS stakers can participate in the governance layer. The governance layer is where all the voting happens. Top creators, accounts receiving the 'cause' pools status and various system parameters are subject to community voting. THEOS employs a one-coin-one-vote mechanism with stakes capped at X(5).

All the 'X' parameters are to be determined and announced in due course.

Token Liquidity Mining Utility

Liquidity provision rewards are available for any agent, irrespective of whether they have staked THEOS tokens or not (assuming no indirect dependencies):

Providing liquidity to ODYSSEY pools makes one eligible for liquidity mining rewards;

A small percentage of the inbound/outbound price of the ODYSSEY tokens is to reward THEOS stakers. In other words, actions of adding and removing liquidity to and from the ODYSSEY pool are not free and the fees generated are rewarded to THEOS stakers;

DELPHI NFTs are basically personal liquidity mining pools: anyone can mint a DELPHI NFT, attach an arbitrary pool of ERC20's and thereafter store, stake, transfer or sell it;

Bidding in NFT auctions is incentivized by enabling liquidity mining for auctions hosted by the Verified users.

DELPHI pools

Properties

The NFT can track the creator - either individual or a group of creators. Currently the EIP721 standard for NFTs only tracks ownership of the NFT which can be transferred from one address to another. To track creators of an NFT we will use a mapping from tokenID to a dynamic array of creators as follows:

```solidity
mapping(uint256 => address[]) creators;
```

Unlike the ownership mapping the creators mapping cannot be changed after the NFT is initiated. Can serve for example to pay royalty to the creators during a trade on a NFT market.

The NFT can be staked so that one can receive a vested reward. The reward can be described by the following struct in Solidity:

```solidity
struct VestedReward {
    uint256 NFTIndex
    uint256 start;
    uint256 cliff;


    uint256 duration;
    uint256 total;
    uint256 claimed;
    uint256 initial;
}


function vestedAmount(VestedReward storage vestedReward,
uint256 endTime)
    public
    view
    returns (uint256 amount)
{


function release(VestedReward storage vestedReward) public
returns (uint256 amount)
```

where <u>start</u> is the start time of reward scheme, which releases <u>initial</u> in the <u>beginning</u> afterwards follows a <u>cliff</u> period of no additional reward emission, then increases linearly over <u>duration</u> until it reaches total. When an NFT is staked, users can call <u>release()</u> to get their reward as denoted by the function <u>vestedAmount()</u> minus the value <u>claimed</u>.

Choosing a Smart Contract Platform

Perhaps the most pertinent question that any blockchain start-up launching in the space today must ask itself is, which blockchain protocol do we choose? This question is a critical area of focus for THEOS, as we must take steps to align our social and environmental responsibility with the sustainability and vision of the underlying protocol.

Therefore, choosing a smart contract platform becomes a decision that is equally weighted in both business acumen and corporate responsibility. Firstly, any protocol we choose must have live or planned smart contract capabilities—therefore layer one protocols, such as Bitcoin, are automatically ruled out. Secondly, a contender must also

meet our focus on environmental and social sustainability.

Compared to Proof of Work (PoW) consensus mechanisms (e.g. like Bitcoin employs), Proof of stake (PoS) consensus mechanisms have been shown to offer a myriad of benefits to energy efficiency. However, to date, few protocols have been able to implement a pure PoS consensus mechanism which offers the same security guarantees of 'classical' PoW blockchains such as Bitcoin.

There are certainly promising developments on the horizon, for example Ethereum 2.0 and Polkadot, which both focus on PoS and scalability. There are also a multitude of other layer-2 protocols, most of which focus on solving both energy inefficiency and scalability. In our overall vision, THEOS must take into account both affordability for our platform from a business case, and sustainability for our ethical considerations. At present, the Cardano looks best aligned with these requirements.

Cardano has an ultra-low energy consumption through its PoS consensus mechanism, estimated to be over a million times more energy

efficient than the Bitcoin network, while maintaining the same rigorous security guarantees. This would allow THEOS to meet global sustainable development goals, and achieve our goal of carbon-neutrality. This gives THEOS the potential to become the world's first sustainable social and financial NFT operating system.

Therefore, despite the fact that smart contracts on Cardano are estimated to be some months from full functionality, we have identified its overall ecosystem as one of the most socially responsible, environmentally friendly, and most promising from a business perspective. This is not to say that other blockchains may not introduce comparable features and focus areas. We will keep a close eye on developments in the layer-2 protocol space as we move forward, to identify the blockchain which aligns most closely with THEOS missions.

Disclaimer

The information in this document should not be considered exhaustive and does not imply any elements of a contractual relationship. Its sole purpose is to provide relevant and reasonable information to potential token holders, in order for them to determine, whether to undertake a thorough analysis of the company with the intent of acquiring THEOS Tokens. Nothing in this document shall be deemed to constitute a prospectus of any sort of solicitation for investment, nor does it, in any way, pertain to an offering or a solicitation to buy any securities in any jurisdiction. The document is not composed in accordance with, and is not subject to, laws or regulations of any jurisdiction, which are designed to protect investors. Certain statements, estimates, and financial information, contained within this document, constitute forward-looking, or pro-forma statements and information. Such statements or information involve known and unknown risks and uncertainties, which may cause actual events or results to differ materially from the estimates or the results implied or expressed, in such forward-looking statements.