Cometh
A DeFi powered Blockchain game with yield generating NFT

Abstract

Cometh is a groundbreaking strategy game where players can win valuable tokens and that leverages the Decentralized Finance (DeFi) ecosystem to create a persistent and sustainable outer space. All the core features of the Ethereum blockchain play a role in Cometh which also leverages an Optimistic Rollup layer 2 scaling solution.
Introduction

Cometh is a game: as a player you control spaceships (also called astrominers) orbiting around giant stars and your goal is to position yourself close to the asteroids (also known as smart asteroids) passing by. When you are close enough, you will be able to mine tokens from that asteroid. In order to better position yourself, your spaceship can be pulled towards other spaceships by paying them a fee. Players can play around with these fees and try to leverage their strategic position in outer space.

What are smart asteroids?

Smart asteroids are smart contracts representing asteroids in the game. In compliance to Kepler’s 1st law\(^1\), smart asteroids have an elliptical trajectory around the star they orbit. The trajectory parameters of a smart asteroid are drawn at random from the block hash in which the asteroid appears\(^2\).

\(^1\) [https://en.wikipedia.org/wiki/Kepler%27s_laws_of_planetary_motion#First_law](https://en.wikipedia.org/wiki/Kepler%27s_laws_of_planetary_motion#First_law)

\(^2\) We acknowledge that the blockhash is not a super good source of randomness and commit to migrating to a better solution like randao when it’s available. There is no need to worry as so far in our simulations, that the cost of manipulating the blockhash largely outweighs the potential gains.
How are smart asteroids generated?

The creation of new *smart asteroids* is a decentralized process left to the **Cometh Generator**. It is a smart contract that can collect all sorts of Ethereum based assets like ERC20 tokens (this includes liquidity pool shares of decentralized exchanges) and Ether. Once a certain threshold of accumulated tokens is reached, anyone can call the **Cometh Generator** and trigger the deployment of a new *smart asteroid*.

The accumulation of valuable tokens on the **Cometh Generator** takes advantage of the Decentralized Finance ecosystem to achieve a sustainable rhythm of new smart asteroid deployments.

![The surface of the asteroid Ryugu taken by the Japanese spacecraft Hayabusa-2](image)

*(can you dig out some DAI or USDC tokens?)*

What are spaceships in Cometh?

Spaceships are vessels capable of mining smart asteroids. On the blockchain, spaceships are Non-Fungible Tokens (NFTs) based on the standards [ERC721](#) and [ERC1155](#). The spaceships have a circle trajectory around the sun. The initial parameters of a spaceship trajectory are drawn at random from the block hash in which it was created. A spaceship
can be pulled in space towards another spaceship in order to get closer to a smart asteroid.

Spaceships can be upgraded with other NFTs such as better **drilling tools, engines** or **crew members** that have effects of the spaceship abilities in game.

What gives the spaceships value?

Spaceships...

- Are **provably rare**, have their own style and can sometimes also be a one of a kind
- Let you passively or actively **mine asteroids**
- Let you **collect tokens** from other players willing to pay for pulling
How does spaceship pull work?

Pulling is the core mechanism of the game. Each spaceship can be selected by other players for a pulling service against a fee paid to the spaceship’s owner. Spaceships’ owners are free to set and change the fee they charge at will. Once a spaceship has been pulled, its trajectory parameters change to become the sum of both trajectories (its own and the ones of the “puller”) divided by two. The trajectory remains the same for the spaceship that provided the service (the “puller”).

It’s worth noting that finding the optimal pulling path to mine smart asteroids will be one of the main challenges of the game. Both individual prices for pulling and smart asteroid trajectories are dynamic. It’s also expected that players will adapt their price for pulling
services accordingly to earn a somewhat regular income when they are close to smart asteroids.

In order to have a common unit of account in the game, all prices are defined in MUST 📊. MUST is not just another easy to remember ticker, it’s also an acronym for Most Useful Space Thing. As astronaut and moonwalker Buzz Aldrin famously said “[…] MUST be the engine of future achievement, not a slow dimming light from a time once bright”³.

What can the players do to optimize mining?

Players rely on their skills to find action sequences that lead to the most mining rewards. While pulling changes the position and the orbit of a spaceship, the players can also leverage the perks of their spaceship: the engine, the drill tool and the aura. In the future, crew members will also play a role.

The engine of the spaceship can switch between different thrusters varying in colors and dragging the spaceships along the orbit slower or faster. The drill tools are spheres floating around the spaceship that have special effects on the mining such as guaranteed rewards when mining a specific token. The aura of the spaceship impacts the mining efficiency depending on the depletion of the asteroid and the distance to the asteroid.

³“Let me say, as I sit here before you today, having walked on the Moon, that I am myself still awed by that miracle. That awe, in me and in each of us… must be the engine of future achievement, not a slow dimming light from a time once bright.” – Buzz Aldrin, Daily News, May 1997.
Some aura will help digging asteroids that are full of tokens (digging in the surface), some others will help for almost depleted asteroids (digging deeper into the asteroids).

Skilled players will be on the lookout for cheap to reach asteroids in terms of pulling costs, that will yield the highest rewards based on the perks available to the players, and will pick the right thruster to stay as long as possible near the asteroid.

**What is the MUST 🍼 token?**

MUST is the ERC20 token that fuels Cometh’s economics:
- When at rest, the MUST 🍼 lets the players **earn new game assets**
- **Pulling service** of a given spaceship has a price expressed in MUST and chosen by the spaceship’s owner. By default, all spaceships start with a pull service price of 0.001 MUST 🍼
- **When acquiring** a spaceship from the Cometh protocol, the owner receives a portion of the spaceship’s price in MUST 🍼 to kickstart the player’s activity in game

**The MUST has a limited supply of 1,000,000 units.** It is a precious commodity in Cometh and astronomical stuff can be done with it. Consequently, the Cometh protocol leverages a smart contract called TUBE 🍼 to store the MUST 🍼 of the players while also putting it at work.

**What is the TUBE 🍼 token?**

MUST is fairly distributed to the players and Cometh contributors through the TUBE 🍼. This smart contract facilitates several in-game mechanisms:

- **NFT farming:** MUST 🍼 stored in the TUBE 🍼 let the players unlock perks, upgrades and rare spaceships the players can freely use or transfer. MUST 🍼 tokens locked overtime in the TUBE create DUST counters the players can redeem new NFTs against.
• **MUST staking**: the TUBE collects MUST from deposits but also from other mechanisms so the deposits value in MUST grows over time;

• **Scaling**: the TUBE acts as a layer 2 gateway to allow gasless transfers of MUST between players.

Deposits of MUST are represented by TUBE shares corresponding to the amount of MUST deposited over the total of MUST in the TUBE. TUBE shares can only be converted back to MUST.

*The very first simulated image of a black hole calculated using a 1960s punch card IBM 7040 computer and plotted by hand by French astrophysicist Jean-Pierre Luminet in 1978.*
**MUST 🚀 token economics**

As mentioned at the beginning of this paper, Cometh creates a persistent outer space with a sustainable generation of new *smart asteroids* by leveraging the Decentralized Finance (DeFi) ecosystem. On one hand, Cometh introduces two DeFi tools to the players, the Melange and the Refinery. On the other hand, Cometh distributes the MUST 🚀 tokens to players contributing to the game sustainability. Players holding MUST 🚀 will be able to participate in the governance of the game as well as receive MUST generated by the protocol.

### The Melange

In today’s DeFi landscape, interacting with applications is very costly in ETH fees thus discouraging individuals to put their tokens at work. Cometh gives the opportunity to the players to both mutualize their DeFi actions and contribute to the sustainability of the game. The Melange smart contract is designed for that purpose.

Players can transfer any yield generating tokens in the Melange which collects the yield and drops it into the Cometh Generator. The Melange smart contract allows players to make significant savings on these transfer costs by doing several interactions in one go. The yield generated by the tokens is distributed to the Cometh Generator thus ensuring a sustainable flow of new *smart asteroids* for the players to compete on mine.

The Melange is a layer 2 gateway to DeFi applications that will be integrated along the way and thus allowing gasless interactions for the player.

### The Refinery

Players can get rid of tokens they don’t want to hold anymore by allowing the Refinery smart contract to spend the tokens for players. The Refinery refines tokens it has been allowed to spend into MUST tokens dropped in the TUBE 🚀. Anyone can activate the refining process and get compensated in MUST 🚀 for bearing the ETH fees associated with it. After the refining process, players whose tokens have been refined perceive the corresponding TUBE Shares.
The **Refinery** is technically a gateway to a layer 2 version of a decentralized exchange that allows for nearly feeless swap for the players: **ComethSwap**.

**ComethSwap**

Uniswap is the standard way for thousands of people to freely exchange tokens and to provide liquidity on token pairs. Liquidity providers perceive fees on the swaps for which volume, albeit significant today, remains hindered by the transaction cost of the blockchain. The monthly transaction cost consumed on applications like Uniswap is in the ten million range in USD.

Cometh includes an **Optimistic Rollup** based Uniswap in order to offer an opportunity to the players to swap tokens without having to pay for gas. While players will be able to swap without hassle, liquidity providers are set to perceive more fees compared to a regular decentralized exchange: since swaps fees are bound to be very low, swaps will be much more frequent. There is an incentive for both players (very low fees) and liquidity providers (fees perceived on a higher transaction count) to use such an exchange.

Similarly to other versions of Uniswap (like Sushiswap) which are incentivizing liquidity providers and token holders to contribute to their ecosystem, a small portion of the fees generated on **ComethSwap** will be sent over to the **Cometh Generator** or converted in MUST and dropped in the TUBE.

**Layer 2: Optimistic Rollups**

**Optimistic Rollups** are the most advanced and promising scalability solution. They run similarly to the Ethereum Virtual Machine and they interact very elegantly with the mainnet. Benefits are enormous, for instance *rolling up* brings the cost of an ERC20 transfer from 45.000 to about 300 gas. The goal here is to have the network reach consensus for a batch of transactions rather than doing so for each individual transaction as it is the case today. These batches of transactions can still be checked and verified at any time by anyone, and there is a strong incentive for all participants to act honestly (game theory). More on Optimistic Rollups here.

Cometh layer 2 is built on top of Offchainlabs’ Arbitrum. This infrastructure is open to everyone and easy to integrate: "Arbitrum Rollup chain is a super scaled Layer 2 (L2) chain."
Like all Rollups, the Arbitrum Rollup chain is built on top of and secured by the Ethereum blockchain, and all transaction data is logged on Ethereum. From a user and developer perspective, interacting with Arbitrum feels exactly like interacting with Ethereum. Arbitrum supports the same RPC interface as Ethereum, supports all EVM languages, and natively supports all Ethereum tooling without any special adapters. The only way in which an Arbitrum Rollup chain does not resemble Ethereum is the cost: transactions on Arbitrum cost a small fraction of what they would if run natively on Ethereum.\(^4\)

Cometh layer 2 will be live early February and bridged to the mainnet for everyone to use and enjoy Ethereum powered applications at scale.

**Governance: The Galactic Council**

Finding the optimal value for parameters in an economic model is hard and even harder when the system is evolving. As a community of players emerge it is important to let the community decide on what the parameters of Cometh should be.

The Galactic Council is the governance body of Cometh and is composed of the multisig signers elected by MUST holders. Cometh multisig will notably oversee the allocation of the Dev Funds and insure the transition between new versions of Cometh’s smart contracts.

Holders of MUST can propose changes in the parameters of the protocol, request new features or be elected at the Galactic Council if they have a minimum amount of 1000 MUST. Any MUST holder can vote on proposals and election of the Galactic Council.

A non-exhaustive list of economic parameters and finances of Cometh is displayed in the annexes.

\(^4\) [https://developer.offchainlabs.com/docs/rollup_basics](https://developer.offchainlabs.com/docs/rollup_basics)
ANNEXE 1 - Space Technology Roadmap

Short Term Roadmap

<table>
<thead>
<tr>
<th>FEBRUARY 2021</th>
<th>MARCH 2021</th>
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</thead>
<tbody>
<tr>
<td>Funds Router v1</td>
<td>Cometh Generator v2</td>
</tr>
<tr>
<td>Cometh Generator v1</td>
<td>New spaceships Campaign</td>
</tr>
<tr>
<td>Refinery v1</td>
<td>Refinery v2</td>
</tr>
<tr>
<td>New spaceships Campaign</td>
<td>Governance: Game Parameters</td>
</tr>
<tr>
<td>Governance: Galactic Council</td>
<td>Optimistic Rollup Melange</td>
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<tr>
<td>Optimistic Rollup Layer 2</td>
<td>Optimistic Rollup Layer 2</td>
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<tr>
<td>Cometh Game v1</td>
<td>Cometh Game v2</td>
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<tr>
<td>Optimistic Rollup Layer 2 TUBE v2</td>
<td>Optimistic Rollup Layer 2 TUBE v3</td>
</tr>
<tr>
<td>Optimistic Rollup ComethSwap</td>
<td>Optimistic Rollup ComethSwap v2</td>
</tr>
<tr>
<td>Yield Farming on Layer 2</td>
<td>Optimistic Rollup integration of DeFi apps - Melange</td>
</tr>
</tbody>
</table>

In the long run, the roadmap will focus on the development of new games leveraging the NFTs of Cometh and the integration of more DeFi applications.

ANNEXE 2 - MUST distribution

MUST is to be distributed fairly among players and in a way that will support future developments as well as a vibrant ecosystem.

Initial circulating MUST supply: 32,000 granted to initial contributors for and to the development team involved prior to the launch.

Optimistic rollup bonding: 18,000.
Liquidity provider incentivization reserve: 450,000
Melange & Refinery incentivization reserve: 300,000
Future Development reserve: 200,000
Total MUST supply: 1,000,000
At the beginning of Cometh, a portion of the NFT sales proceeds will be partially converted in MUST and will be granted as cashback (in MUST) to the NFT buyers. This MUST will be dropped in the TUBE to foster distribution of MUST to the players.

Liquidity Provider incentivization will start on Layer 1 with an ETH/MUST pool comprised of 18,000 MUST distributed over 270 days, it will progressively extend to other pools on layer 1 and 2 by the Galactic Council according to the players’ recommendations.

### ANNEXE 3 - Figures

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Initial Rate</th>
<th>Dev Fund</th>
<th>Melange &amp; Refinery</th>
<th>Liquidity Pool</th>
<th>TUBE</th>
<th>Cometh Gen.</th>
<th>Ops</th>
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<tbody>
<tr>
<td>L2 Exit fee</td>
<td>Users move funds out of the L2</td>
<td>0</td>
<td>0%</td>
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<tr>
<td>Staking exit fee</td>
<td>Users move MUST out of staking</td>
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<tr>
<td>Pulling fee</td>
<td>Players pull one ship to another</td>
<td>0.05%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
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<td>L2Swap Fees</td>
<td>Users swap, LPs take a fee</td>
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<td>-%</td>
<td>-%</td>
<td>-%</td>
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<td>L2Swap share (1-%=LP)</td>
<td>% of LP fee tax</td>
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<tr>
<td>NFT sales (1-% = cashback)</td>
<td>% of NFT Sales proceeds used on Cometh</td>
<td>70%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>20%</td>
<td>80%</td>
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<td>NFT Cashback</td>
<td>% of NFT Sales proceeds in cashback</td>
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<td>-%</td>
<td>-%</td>
<td>-%</td>
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<td>L2 to L1 fee (Melange)</td>
<td>Users interact with a L1 dapp from the L2</td>
<td>0.05%</td>
<td>0%</td>
<td>0%</td>
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<tr>
<td>Wormhole fee</td>
<td>Players enter the game or switch from 1 star to another</td>
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<tr>
<td>Max Spaceships per Star</td>
<td>Maximum # of spaceships per star</td>
<td>1000</td>
<td>-%</td>
<td>-%</td>
<td>-%</td>
<td>-%</td>
<td>-%</td>
<td>-%</td>
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<tr>
<td>Max Asteroids per Star</td>
<td>Maximum # of Asteroids per star</td>
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<td>-%</td>
<td>-%</td>
<td>-%</td>
<td>-%</td>
<td>-%</td>
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<tr>
<td>Max NFT per campaign</td>
<td>Maximum # of NFT created per campaign</td>
<td>1000</td>
<td>-%</td>
<td>-%</td>
<td>-%</td>
<td>-%</td>
<td>-%</td>
<td>-%</td>
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<tr>
<td>NFT unlocked by staking</td>
<td>% of a NFT campaign unlockable with MUST staking</td>
<td>50%</td>
<td>-%</td>
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<td>-%</td>
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<tr>
<td>NFT OpenSea</td>
<td>% of secondary market proceeds for Cometh</td>
<td>3%</td>
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<td>20%</td>
<td>80%</td>
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