Cometh

a Defi-powered video game
with yield-generating NFTs

Abstract:

Cometh is a groundbreaking strategy and exploration game where players earn valuable tokens and craft items. Cometh employs the Decentralized Finance ecosystem to create a persistent and sustainable outer space. All the core features of the Ethereum blockchain play a role in Cometh which also employs scaling solutions to handle millions of users.

Cometh

Cometh 2020 F3
[NEOWISE]
on Jul 14 2020

Introduction:

Cometh is a blockchain-based massively multiplayer online role-playing strategy and exploration game. It uses the blockchain to create a persistent and programmatically-expanding world that the players can explore, hold and conquer. The players engage in several activities, including mining, piracy, manufacturing, trading, exploration, politics and combat. Cometh uses decentralized finance services to foster the sustainability of its internal economy and to expose the players to blockchain third parties.

As a player you control spaceships orbiting around giant stars. You can travel to other stars or explore the area nearby by interacting with other players and crafting items. While Cometh exposes a story designed to unravel itself over the course of 12 months, a player can either actively participate in the development of the story by teaming up with other players to push the boundaries of the known universe, or passively, by taking part in the politics and economy of Cometh.

Player-owned Assets:
Spaceships and Items

Spaceships in Cometh are vessels capable of mining asteroids and venturing uncharted space territories. From the blockchain perspective, spaceships are Non-Fungible Tokens based on the NFT standards ERC721, ERC1155 and EIP-2535. In basic solar systems, the spaceships have a circular trajectory around the sun. The surroundings of a spaceship are represented by a canvas of tiles. Spaceships may be upgraded with other NFTs such as better drilling tools, engines or crew members which affect the spaceships' abilities in the game.

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

NFTs minted by third parties can also be equipped in players' spaceships, creating esthetic or gaming effects.

The spaceships :

> Are provably rare, very stylish and sometimes also one of a kind
> Have a random color scheme impacting the game play
> Can be rented to other players
> Let you passively or actively mine asteroids
> Let you cooperate with other players to explore remote places of the galaxy
> Let you challenge other players to steal their cargo

Spaceships' Characteristics

Mining Specs

Every type of spaceship has a set of base values in Radar, Drill and Machinery. The sum of those base values depends on the level of rarity of a type of spaceship [0 for Common, 2 for Uncommon, 4 for Rare and 6 for Mythic]. In-game characteristics are derived from the base values:

- > Mining Range is influenced by the Radar
- > Mining Power is influenced by the Drill
- > Mining Cooldown is influenced by the Machinery
- > Rover Power is influenced by both the Drill and Machinery

For example, a Monocle is an uncommon spaceship manufactured by the Gotchi faction. Like all the Monocles, it has the base values of [4,1,-3] for [Radar, Drill, Machinery] and the subsequent in-game characteristics below:

Monocle · 41/200
Uncommon Gotchi

Mining Range
27 km

Mining Power
120

Mining Cooldown
480 s

Rover Power
40

Only 200 Monocles have ever been created, and each has a unique color scheme.

Color Scheme

Each spaceship has a primary and secondary color that are unique to its type and manufacture number. For the Monocle above, the primary color is Red [RBG 195,64,52 or HEX #c34034] and the secondary color is Purple [RGB 159, 71, 181 or HEX #9f47b5]. The color scheme of a spaceship has contextual influence with equipped perks, consumed items, hostile spaceship encounters and themed quests.

Boost   Hinder   Neutralize

Inventory

Each spaceship has an inventory with equipment slots depending on the rarity of the vessel. Any NFT can be equipped in a spaceship inventory slot; equipped NFTs are displayed to any players browsing the spaceship. The equipped NFT can change the spaceship characteristics, give special effects, or access to special features of Cometh like dedicated quests. At the very least, equipping a NFT brings social signaling through public display and consequent esthetic change.

Items: perks and consumables:

Using the resources they collect during space exploration, the players can craft items for the inventory of their spaceships (perks) and items for easing their journey in outer space (consumables). Crafted items have random attributes that have contextual consequences in-game. For example, a crafted gravity beacon (consumable) has a reach and number of uses that vary from one craft to another; a crafted titanium drill has a color and effect on mining power and durability that vary from one craft to another.

Outer Space Exploration

A blockchain-generated galactic environment

The universe of Cometh is procedurally generated from the blockchain's entropy. It contains valuable resources the players can dig out of asteroids or out of other players' hulls. It also contains buildings offering various services which are progressively deployed as solar systems grow in activity.

The universe offers three levels of exploration:

> The galaxy's map displays the solar systems that have already been opened (level 3)

> A solar system (level 2) is made of tiles showing the density of players, buildings available, guilds' influences, important comets passing by and unreached portals towards new systems

> A tile (level 1) displays the closest surroundings of a player, notably minable asteroids, player-controlled spaceships, buildings, interactive items and space anomalies

The artwork and game design present a pleasant environment the players can intuitively interact with, and which loads at lightspeed on both mobiles and lightweight desktops.
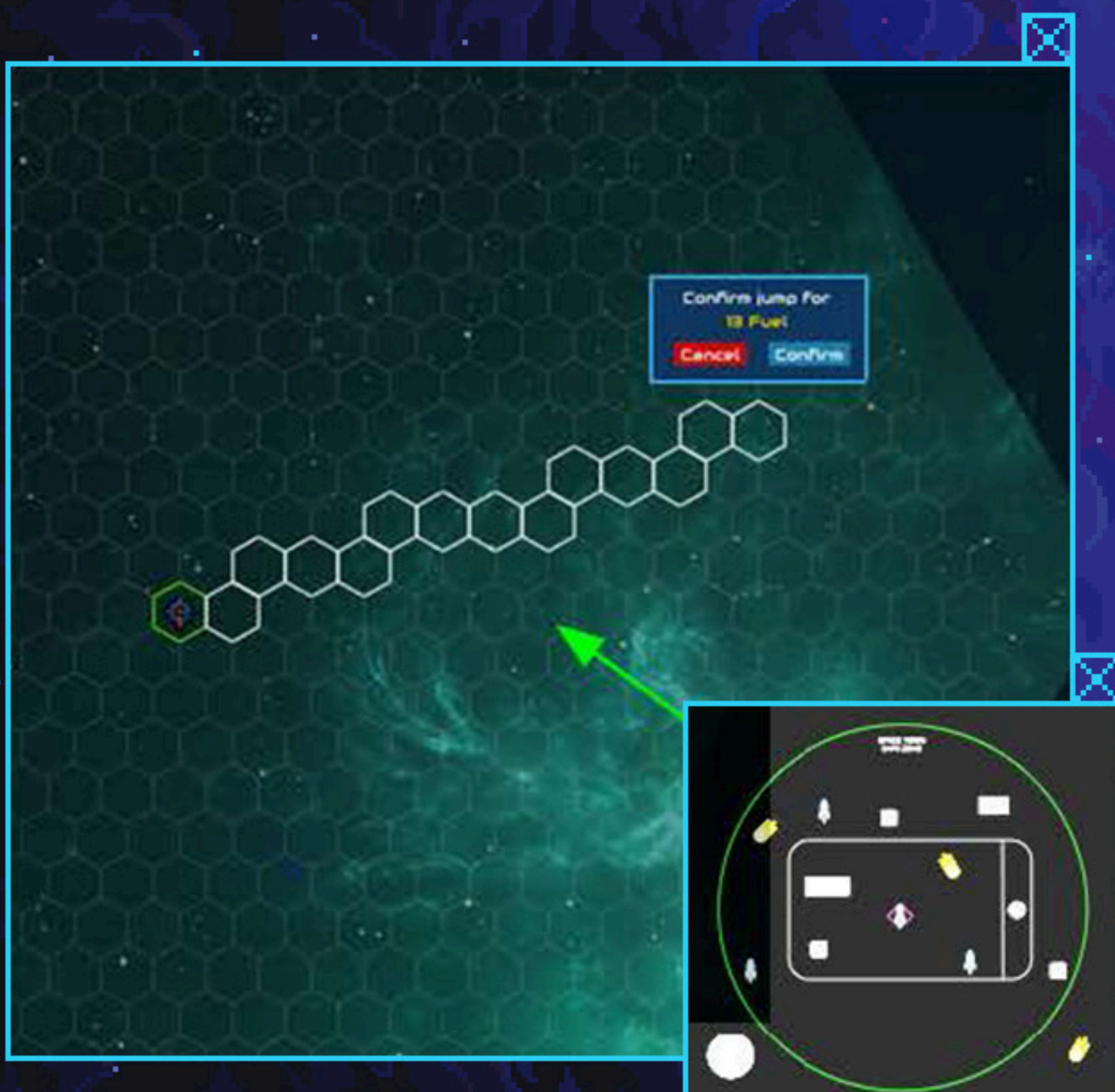
Level 1: mobile-friendly tile, moving costs a few DUST
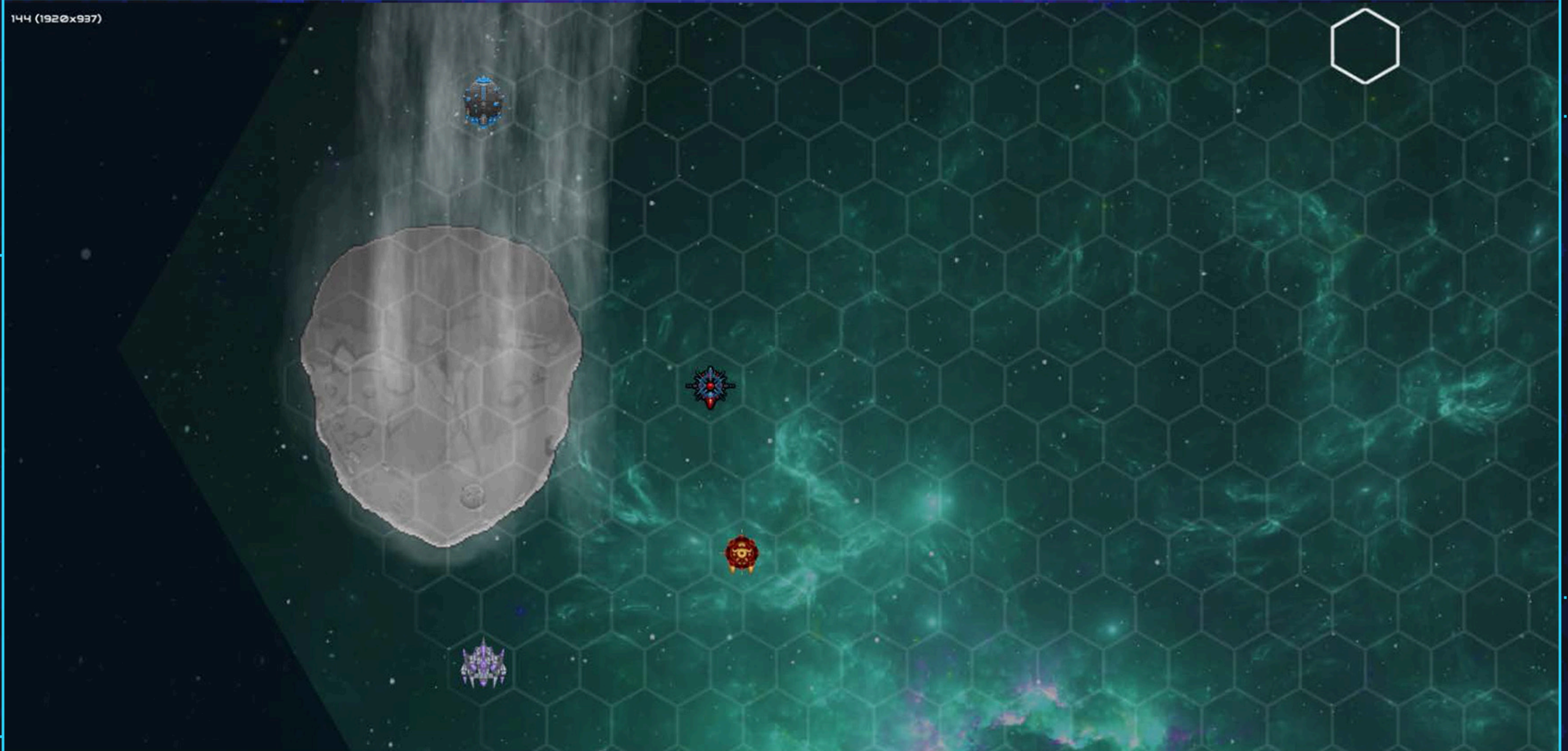
Level 2: moving costs some DUST

Level 3: crossing portals costs a lot of DUST

Blockchain space travel

In order to move within their close surroundings, players move from one tile to another by consuming Cometh interstellar fuel: The DUST. They can also travel longer distances by relying on other players and beacons to drag them – this service is known as pulling.

Pulling is the core mechanism of the game. Each spaceship can be selected by other players for a pulling service against a DUST fee paid to the spaceship's owner. Spaceships' owners are free to set and change their pulling fee at will. Nevertheless changing a pulling fee may be subjected to administrative constraints, such as a minimum delay for the update.

PULL PRICE 789

60

+ Miner

Player Name

+ Power

1000

+ Comet

12

Jumping to this miner costs

654

JUMP

9904

After being pulled, the spaceship that paid for the service ends up closer to the pulling point.

It's worth noting that finding the optimal pulling path to mine useful asteroids will be one of the challenges of the game. Both the market for pulling prices and the smart asteroid trajectories are dynamic, while letting spaceships approach puts the player at risk of space piracy. It's also expected that players will adapt their prices for the pulling service accordingly, so as to yield a rent when they are fixed at certain positions.

Inactive spaceships on unstabilized orbits gradually progress towards the closest star until their orbit stabilizes

Traveling from one Solar system to another can be done via established space portals.

Mining valuable resources

The asteroids of Cometh are smart contracts carrying many kinds of ERC20 tokens (including liquidity pool shares of a decentralized exchange) and non-Fungible Tokens (NFT). Asteroids are generated automatically and are sometimes triggered once a threshold is reached. Cometh exposes its players to a hub of decentralized finance services whose fees are used to create special loot for the players.

COMETH

Exploring the universe requires dedicated tools and perks to overcome space hazards. Hoarding, trading and crafting are common activities of the players. The native resources are tokens representing the chemical elements with various levels of purity. Although they can seem to be abundantly available in the game areas, all resources are limited in supply.

1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba		57 Hf	58 Ta	59 W	60 Re	61 Os	62 Ir	63 Pt	64 Au	65 Hg	66 Tl	67 Pb	68 Bi	69 Po	70 At	71 Rn
72 Fr	73 Ra		74 Rf	75 Db	76 Sg	77 Bh	78 Hs	79 Mt	80 Ds	81 Rg	82 Cn	83 Uut	84 Fl	85 Uup	86 Lv	87 Uus	88 Uuo

57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

The first solar systems of Cometh will expose Iron [Fe], Cobalt [Co], Germanium [Ge], Argent [Ag] and Titanium [Ti]. As new systems are discovered, the diversity of resources grows as do the available recipes for crafting consumable items and perks.

Solar system growth

A solar system grows and expands its available services with the cumulated mining activity. When a solar system has just been opened it contains:

> • A portal closely orbiting around the system's star and leading to a previously opened system
> • A neutral supply depot building
> • One or more remote portals leading to a new and unopened solar system

Mining activities in the system leads to a procedural deployment of new buildings. The first five stages of system development release in a random order: a cantina, a garage, a factory, a new portal to an existing system and a new depot. The following stages trigger the random deployment of one of the 5 building types. Except for the initial depot, all buildings can be taken over and contested by guilds or individual players.

While the buildings generate in-game resources and forms of revenue for their controllers, they also require upkeep commitments and defense against other parties.

This mechanism is designed to encourage sustainable expansion of the global influence of a guild or a player. For example:

> • A fastly-growing system will naturally tend to be hard to gain considerable control of for a single party.

> • The party in charge of a system with low mining activity may be tempted to hinder its growth so as to keep tight control over the area.

Buildings

The buildings in Cometh may be controlled by the players and their guilds. Buildings have recurring upkeep which the controller must pay in order to maintain control, and may be equipped with add-ons, enhancing the experience of players using them. They also offer different kinds of services, and their respective controllers retain a share of the amount spent by the players. There are 4 initial types of building:

> Garages for players to customize their spaceships and to repair their gear. Players whose spaceships have been drifting after multiple piracy encounters will recover their vessels at the garage.

> Depots for players to drop their cargo and to secure their mining rewards to their wallets.

> Cantinas for the players to change their crew members and to restore their status.

> Factories for the players to craft new items, perks and spaceships with the resources they harvested.

Guilds

The Guilds in Cometh are communities of players gathering around common goals. Every guild acts as a Decentralized Autonomous Organization whose wallets can hold any blockchain assets and manage the guild's activities.

As guild members are active in a solar system, their guild influence over the tiles of this system grows. Influence over the tiles decreases when guild members and neutral players lose battles in the sector. A portion of the mining activity of the tiles where the guild is the most influential goes to the guild's wallet.

Guilds can share their spaceships, consumables, perks and recipes but also claim control over buildings and emit guild emblems for their members. Control over a building can be challenged by opposing guilds in takeover attempts. The conditions to open a guild are based on spaceships and MUST 🛸 token pledged.

Guides

The lore of Cometh extends the stories deployed in the description of Cometh's NFTs. Lore-specific NFTs will be dropped by each asteroid and the full story will run over a twelve-month cycle. During this cycle, quests are programmatically generated and bring the players to new challenges involving the game mechanics. Finishing a quest triggers the reception of an achievement NFT perk that can open access to other quests. Quests available to a player are based on the equipped NFTs of the spaceships and blockchain history of these spaceships.
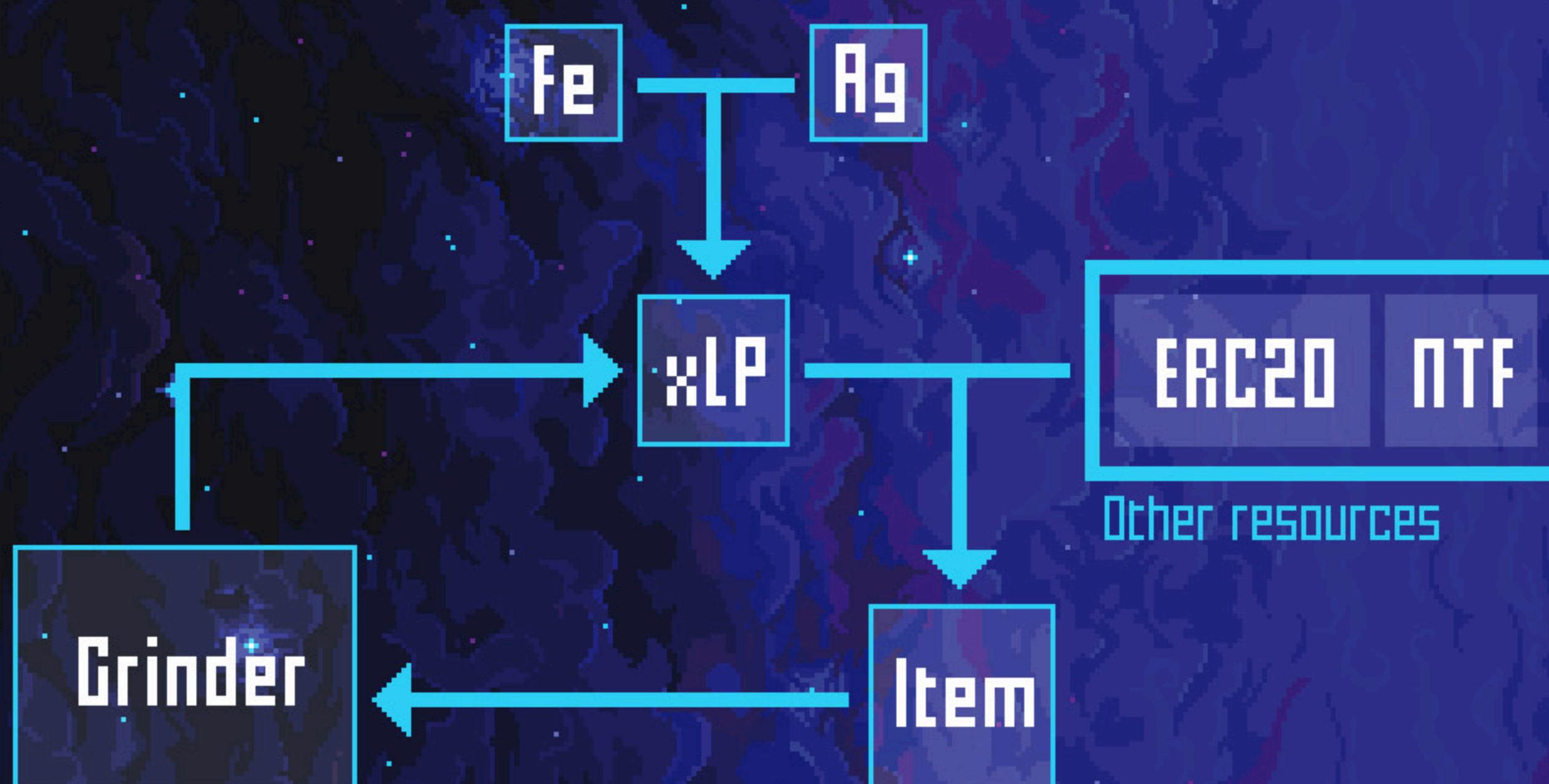
Cometh Beyond Galactic Economy

COMETH

Crafting goods

The crafting system is compatible with any ERC20 and players can freely search for undiscovered recipes. Crafting recipes for items are discovered or acquired by the players. Players may craft items directly on the premises of their spaceship, but also in dedicated factory buildings. Knowledge and control of recipes are strategic for the players and their guilds [see below]. Crafted items and compatible NFTs [including Spaceships] can be converted back into fungible commodities through the Cometh Grinder.

Fe — Ag

→ xLP → | ERC20 | NFT |

Other resources

Grinder ← Item

| IRON BAR | RADAR | BOOSTER |

43	SILVER ▼
08	GOLD ▼
20	COPPER ▼

CRAFT

Recipes are NFTs held by players, guilds and buildings. They involve the respective pool balance to maintain the sustainability of the economy.

The crafting system's recipes rely on ComethSwap to bring sustainability to the galactic economy. For example, if an excess of iron is harvested, the price of iron would drop [relative to other resources], while the crafting recipes involving iron would require more iron, thus automatically putting pressure on the price recovery of iron.

ComethMarket: The Galactic Marketplace to trade spaceships, perks, items and resources

Compatible NFTs can be listed and traded in the peer-to-peer galactic marketplace ComethMarket

ComethSwap: The Galactic Auto-Market-Maker for tradable resources

Resources and compatible ERC20 may be listed and traded in the peer-to-peer automated market maker: ComethSwap.
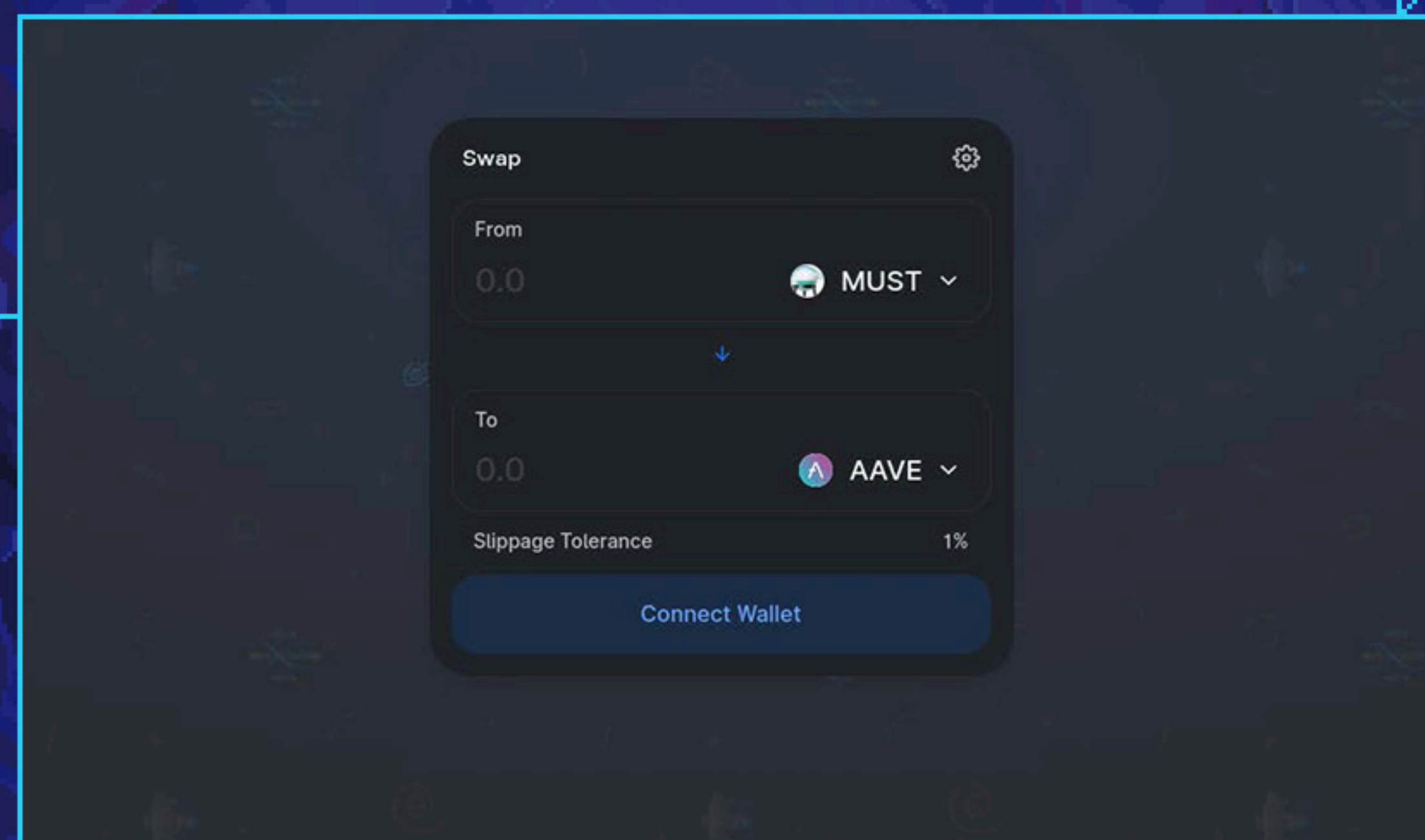
Cometh Rental system

This system allows players to put their game assets to work, granting the owner a share of the revenue generated from the tenant. The rental system of Cometh was initially limited to spaceships and had a rental contract with three main parameters: duration, revenue sharing percentage

and entry cost. Extending this already efficient system to other NFTs such as Cometh compatible perks, Cometh Beyond introduces new options like private or whitelisted offers, recurring rents and thresholds.

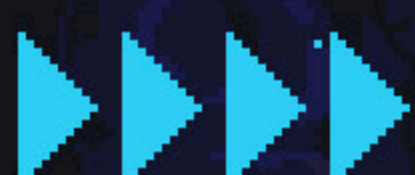## From MUST to DUST, accumulation mechanics and in-game impact

What is the MUST 🛸 ?

MUST is the ERC20 token that fuels Cometh's economics:

> When at rest, the MUST 🛸 lets the players earn new game assets

> Many in-game assets and services such as pulling on a spaceship have a price expressed in 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 the game.

MUST has a limited supply of 1,000,000 units – it is a precious commodity in Cometh and astronomical things may be done with it. Consequently the Cometh protocol leverages a smart-contract called the TUBE 🗼 to stores the MUST 🛸 of the players while also putting it at work.

In-game actions for a spaceship are free, up to a certain number of actions per day, based on the spaceship and its inventory. In order to move beyond the daily limit, the players can consume DUST generated from MUST 🛸 at stake for small tasks or consume MUST 🛸 itself for heavy duties.

What is the TUBE 🔋 ?

The MUST is fairly distributed to the players and Cometh's contributor through the TUBE 🔋. This smart contract facilitates several in-game mechanisms, including:

➤ NFT Farming: MUST stored in the TUBE 🔋 lets the players unlock NFTs based perks, upgrades, spaceships the players can freely use or transfer
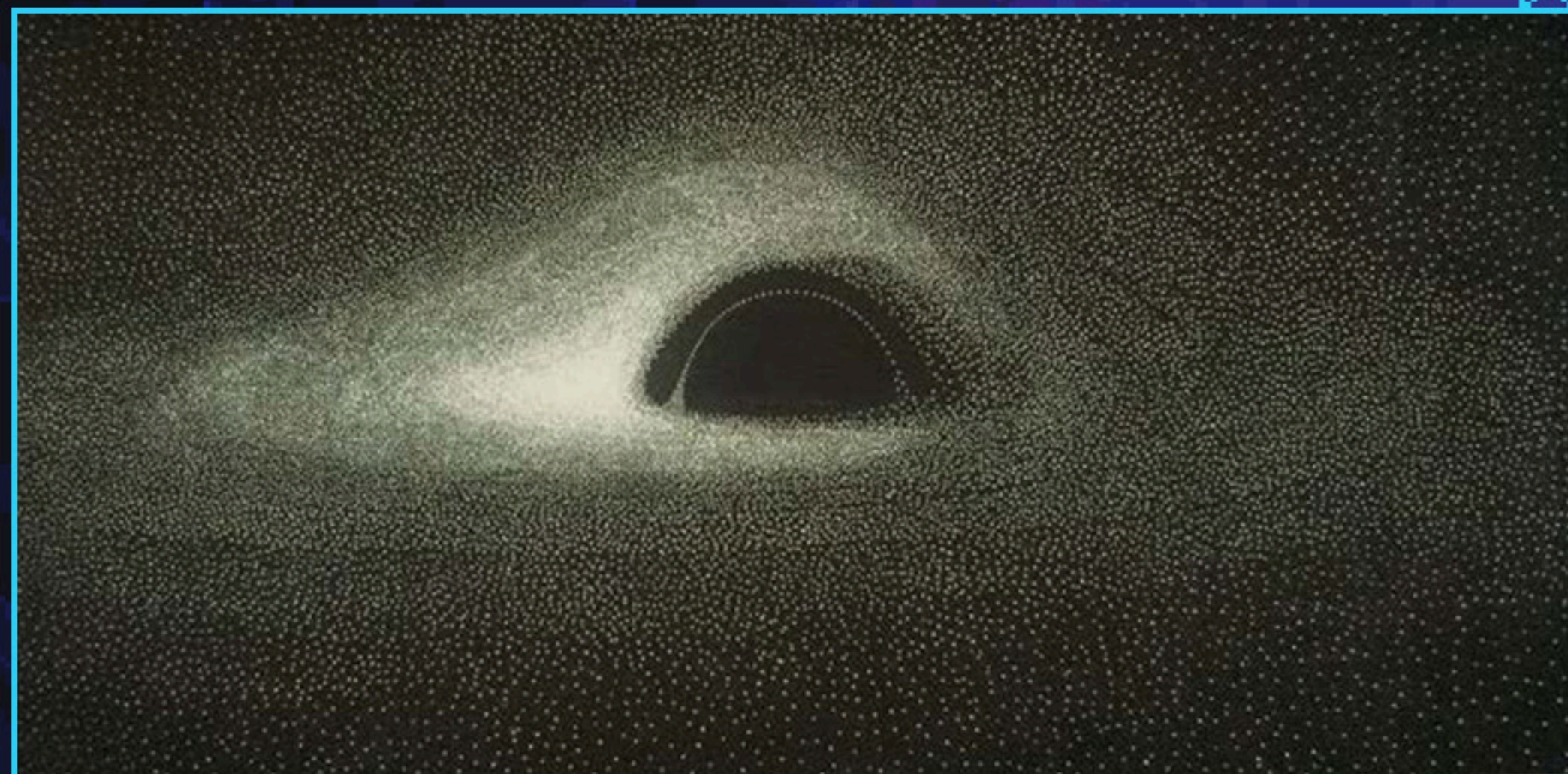
MUST tokens locked overtime in the TUBE create DUST counters the players can redeem new NFTs against.
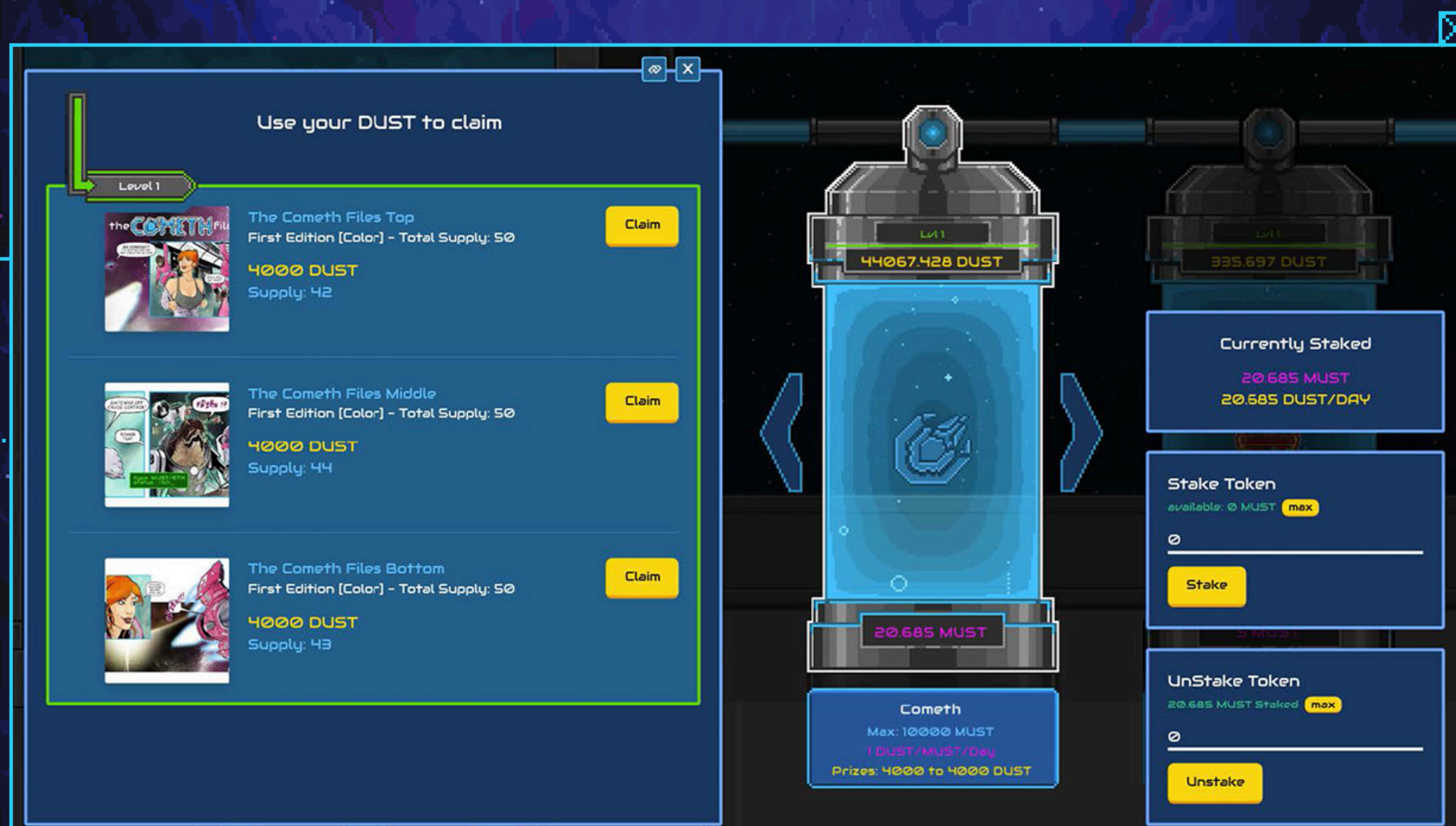
In-game enabler: Consuming DUST generated from MUST 🛸 stored in the TUBE 🔋 lets the players do extra actions.

Scaling: The TUBE 🔋 acts as a layer 2 gateway to allow gasless transfers of MUST 🛸 and access to compatible blockchain services.
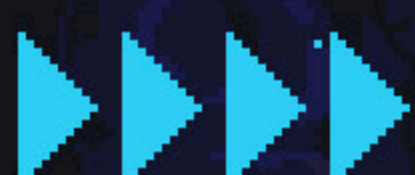
The very first simulated image of a black hole, calculated using a 1960s punch card IBM 7040 computer and plotted by hand by French astrophysicist Jean-Pierre Luminet in 1978.

MUST token economics

Cometh creates a persistent outer space with sustainable generation of new smart asteroids by leveraging the Decentralized Finance (Defi) ecosystem. On the one hand, Cometh introduces two tools for Defi enablement of the Players, the Melange and the Refinery and 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 for the balancing of the game and future development prioritization.

The Melange

In today's Defi landscape, interacting with applications is very costly in transaction fees, thus discouraging individuals to put their tokens to work. Cometh gives the opportunity to the players to cheaply access Defi protocols and to contribute to the sustainability of the game by doing so.

The Melange smart contract is designed for that purpose.

Cometh integrates external DeFi protocols exposed to the players from the scalable infrastructure hosting the game. The Melange optimizes the transaction costs for the players while collecting a small service fee redistributed as in-game loot.

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

The Refinery

Players can dispose of tokens they no longer require by allowing the Refinery smart contract to spend the tokens. The Refinery refines tokens it has been allowed to spend into MUST 🛸 tokens on Cometh's layer 2 infrastructure. Anyone can activate the refining process and get compensated in MUST 🛸 for bearing the transaction fees associated with it.

The Refinery is a cheap and efficient gateway to the game, but also to access layer 2 decentralized exchange for efficient wallet management: ComethSwap.

ComethSwap

Uniswap is the standard way for millions of people to freely exchange tokens and to provide liquidity on token pairs. Even though the volume of swaps is currently significant, it remains hindered by transaction costs consumed on applications such as Uniswap. Liquidity providers perceive these fees to be in the tens of millions of USD.

Cometh includes ComethSwap, a fork of Uniswap deployed on Ethereum sidechains (including Polygon), and on an Optimistic Rollup layer 2, in order to offer an opportunity to the players to swap tokens without having to pay for the usually deterring transaction costs. While players will be able to swap without hassle, the liquidity providers are set to realize more fees in a decentralized exchange where swaps happen more often.

Cometh Beyond Layer 2: Optimistic Rollups

Optimistic Rollups are arguably the most promising scalability solution for blockchains today. Optimistic Rollups allow for generalized smart contract interaction in the Ethereum Virtual Machine, and interact very elegantly with Ethereum-based chain.

Cometh Beyond runs on top of Cometh's own Optimistic Rollup Layer 2, using the technology developed by Offchainlabs and currently supporting Arbitrum on Ethereum Mainnet. 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." [1]

[1] https://developer.offchainlabs.com/docs/rollup_basics

This layer 2 addition to Cometh's infrastructure aims at delivering the best game experience to Cometh players by removing the majority of the fees one has to pay when casting a blockchain transaction. Cometh will be the first blockchain game delivering a real free-to-play gaming experience to its players. The native token of this infrastructure will be a token generated from staking MUST🔵 tokens. Although this infrastructure is initially dedicated to run Cometh's gaming applications, it will likely open up to third parties in the future.

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 emerges it is important to let the community decide on what the parameters of Cometh games should be.

The Galactic Council is the governance body for Cometh games' balancing and improvement. It is composed of the multisig signers elected by the MUST🔵 holders. Cometh multisig will notably be in charge of allocating the Dev Funds and overseeing the transition between 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 holders of MUST🔵 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.

Space Technology Roadmap

Short Term Roadmap:

October	November	December	January	February	April
Optimistic Rollup PoC deployment	Battle module & Inventory Alpha access	Cometh Beyond, Rollup & Marketing Alpha	Cometh Beyond Mobile app Alpha access	Defi partners integration	Cometh Beyond Global release
New In-game free system	Crafting system Alpha Deployment	Early partners integration		Cometh Beyond Beta release	

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 (Oct. 2021): 76,900 🛸 granted to liquidity providers, initial contributors and as cashback on NFT purchases across 6,000 unique holders on Ethereum and Polygon.

Optimistic rollup bonding: 18,000 🛸

Liquidity Provider and DeFi incentivization reserve: 409,000 🛸 used to promote volume of transactions on Cometh Defi services.

Melange & Refinery incentivization reserve: 297,600 🛸 used to promote volume of transactions on Cometh cross layer services.

Future Development reserve: 198,500 🛸 used to finance future developments and games relying on Cometh NFTs.

Total MUST 🛸 supply: 1,000,000