

GHOST PAPER



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1. Abstract

THIS GHOSTPAPER IS CONTINUOUSLY BEING UPDATED BY THE TEAM. DEGAME LABS FOLLOWS AN AGILE PRODUCTION METHODOLOGY, THEREFORE THE PRESENTED IDEAS AND DESIGNS HERE CAN BE UPDATED OR ALTERED THROUGHOUT THE DEVELOPMENT PROCESS. WE WILL ANNOUNCE ALL MAJOR CHANGES AND UPDATES VIA OUR SOCIAL MEDIA ACCOUNTS. PLEASE FOLLOW US TO RECEIVE ALL THE UPDATES IN A TIMELY MANNER.

The blockchain-based gaming sector is poised for growth, but developers of such games face significant challenges in getting their games to market, particularly with respect to creating and storing environmental and level data. Data storage on the Ethereum blockchain can cost tens of thousands of dollars per gigabyte, making level data prohibitively expensive and prompting game developers to simply do without, focusing instead on collectible-item games with no spatial component. Also gas-fees are so high for a single transaction. Here we propose an alternative: a single shared, procedurally generated universe on the Polygon blockchain in which we can build our future games. By using procedural generation, our engine allows an entire universe, from astronomical down to human scale, to be stored on the blockchain in a trivial amount of space. We will be able to use this procedural world generation middleware to provide our games with settings and environments, without having to store any data on-chain or needing to develop our own world-generation algorithms. The entire system is powered by the GHOST(GHO) token, which will be distributed in presale and crowdsale.

2. Introduction

2.1 Gaming Industry

The gaming industry is constantly increasing its presence and audience across the world. For the past several years revenue from the gaming industry has surpassed both the movie and music industries COMBINED. Players are spending more hours engaged in playing games, strong communities are being created, and the limits of this exponential growth remain uncharted with no signs of it slowing down.

%40 OF THE WORLD POPULATION PLAYING GAMES

According to the latest global Video Game Consumer Segmentation report from DFC Intelligence, more than 3 billion people across the globe are playing games. This represents about 40% of the world population. Such massive adoption continues to bring tremendous growth to the video gaming industry which according to the newest Accenture report (NYSE: ACN NEW YORK; Apr. 29, 2021.) now exceeds \$300 Billion - much higher than previously estimated by experts. This growth is only increasing during the COVID-19 pandemic.

2.2 Crypto Market

Crypto currencies, DeFi and NFT on the other hand, continue to be the most hyped and constantly evolving investment opportunities for investors across the globe nowadays. The crypto market was able to bounce back from \$150 billion in March 2020 up to more than \$2.5 trillion; achieving more than 1600% growth in only a year's time.

2.3 DeFi Market Capitalization

In early 2019 there was only \$1 billion locked in the DEFI economy projects followed by \$2 billion in early 2020. According to CoinMarketCap in May 2021 there are more than 149 times more money locked in the ecosystem, creating additional income, in only two years' time, with total market cap reaching approximately \$150 billion. (05.21.2021 Coingecko)

2.4 Blockchain Gaming

Blockchain technology and online gaming have a long shared history. Since the founding of the first Bitcoin-based “dice” game, SatoshiDice, in 2012, online gaming has been a powerful force in the blockchain space. With projects like Spells of Genesis (2015), Ownage, and even an entire Rare-Pepe-based trading card economy, it is clear that the blockchain-based gaming sector is poised for growth. However, while the space of game item ownership management is relatively well-covered, a successful game needs more than just game items. Another critical component of a video game is the environmental and level design, and so far blockchain-based gaming has focused on games of chance or trading-card games and mostly neglected this facet of game design. Unfortunately, level design is expensive—a level designer with a bachelor’s degree and one year of experience costs a median of \$67,000 a year in San Francisco, CA, and level design services can cost as much as \$60 an hour on a freelance basis. Moreover, in a blockchain-based gaming context, where game rules may be implemented by a smart contract, storing this level data on-chain so that the game contracts can act on it presents a major expense. On Ethereum, on-chain storage can cost tens of thousands of dollars per gigabyte, and is in fact intended to be prohibitively expensive for high-volume use cases. The combination of these costs explains why current blockchain-based games avoid relying on levels and environments as much as possible, even when this results in a lower-quality experience.

3 Technology

3.1 What do we use?

We use 3 technologies to create our MMORPG Web3 game.

Unity (3D Game Development), Moralis(Web3 integrations) and Photon(Multiplayer backend)

Massively multiplayer online role-playing games (MMORPGs) such as World of Warcraft and RuneScape are extremely popular among different age groups. Moreover, since Web3 and blockchain gaming is becoming increasingly popular, we need to talk about Web3 MMORPG's advancement. As you may know, mainstream adoption of Web3 is expected within the next five years or so. Thus, now is the best time to build a blockchain MMORPG game with Unity.

- **Unity** is a cross-platform game engine. In our opinion, it's the most complete solution for game creation. Moreover, it is great to be able to use Web2 tools that we are familiar with for Web3 development.
- **Photon** is a game engine specialized in multiplayer game development. As such, it provides us with an app ID, which we can use inside Unity to cover most of our multiplayer needs. Another great thing about Photon is that it offers you to get started for free.
- **Moralis** is the ultimate Web3 development platform. When considering the current Web3 tech stack, Moralis is the tool to use. All things aside, it enables you to save 87% of development time. As such, Moralis makes the deployment of dApps across multiple programmable chains incredibly straightforward. Also, Moralis enables you to avoid dealing with all of the limitations of RPC nodes. That way, you get to devote your maximum attention to the frontend. Hence, you get to offer your customers a great Web3 UI.

3.2 Procedural Content Generation

A potential solution to both the high cost of level design and the high cost of on-chain level data storage comes in the form of procedural content generation techniques. Procedural content generation, especially as applied to level and environmental design, has a long history in traditional video

game development, ranging from *Rogue* (1980) to *Minecraft* (2009). It can allow small studios, like the developers of *Sir, You Are Being Hunted* (2014), to produce acres of British countryside on shoestring budgets, allowing for greater replay value, and allowing developers to make design decisions they otherwise might not be able to afford. Moreover, it is not just small “indie” studios or lone developers who use procedural content generation to reduce level design costs: large “AAA” productions like Bethesda’s *The Elder Scrolls IV: Oblivion* (2006) have used procedural generation to help create their game worlds. In the MMO space, *EVE Online* (2003), which remains one of the most popular science fiction MMOs despite its 14-year-long history, is set in a procedurally-generated galaxy spanning thousands of star systems and tens of thousands of planets. It is this universe, “New Eden”, to which much of the success of *EVE*’s developer, CCP Games, can be attributed. With the continuing success of *EVE*, as well as their more recent games *Gunjack*, *Gunjack 2*, and *Eve: Valkyrie* (2016) also set in the procedurally-generated New Eden universe. In addition to reducing environmental and level design costs, procedural content generation is a natural fit for blockchain-based game worlds, because it allows developers to drastically reduce the required storage space for level and environment data. As evidenced by “demoscene” games such as *.kkreiger* (2004), it is possible to generate levels and art assets that might otherwise be megabytes or gigabytes in size using only a few kilobytes of code. The original *Elite* (1984) generated eight galaxies of 256 planets each from its 200 kilobyte floppy disk. Even the much maligned *No Man’s Sky* (2016), despite its failings on the gameplay front, impressively managed to cram multiple galaxies and quintillions of playable planets into a small, by today’s standards, 2.6 GB download. While not every detail of a blockchain-based game’s environment and level data needs to be stored on-chain, anything that has an effect on gameplay will need to be accessible to any on-chain game logic. Given the return, in terms of playable content, on storage space investment, and the storage constraints of blockchain-based game development, procedural content generation is likely to be the default approach.

3.3 L-System

Procedural content generation is being prepared with L-System algorithm. An L-system or Lindenmayer system is a parallel rewriting system and a type of formal grammar. An L-system consists of an alphabet of symbols that can be

used to make strings, a collection of production rules that expand each symbol into some larger string of symbols, an initial "axiom" string from which to begin construction, and a mechanism for translating the generated strings into geometric structures. L-systems were introduced and developed in 1968 by Aristid Lindenmayer, a Hungarian theoretical biologist and botanist at the University of Utrecht. Lindenmayer used L-systems to describe the behaviour of plant cells and to model the growth processes of plant development. L-systems have also been used to model the morphology of a variety of organisms and can be used to generate self-similar fractals. You can get more information from this page: <https://en.wikipedia.org/wiki/L-system>

4. GhoVerse



GhoVerse is a web3 third-person MMORPG with Blockchain and NFT integration, P2E game between planet owners, town owners, ghosts and hunters, living in towns of ghost metaverse. You choose to be a town owner, a ghost or a hunter in the game. GhoVerse offers its players a massively multiplayer gaming experience. You can directly jump into the multiplayer mode or complete the single player campaigns first.

4.1 Planets

The game offers fully procedural planets meaning each game will be different. This will require you and your team to do some detective work to find out where the towns are and what the ghost is like and how to deal with it. We are planning to start with 1 planet and 100 towns. Each planet minted and owned will open its mystery to town owners first. After several towns are created on the planet, it will be alive to play and earn. A planet owner starts its life by minting a Planet NFT. After the mint, the planet owner starts earning tokens/minute. Planet owners will gain the highest revenue share from tokens and planet access fees.



Example Procedural Planet

4.2 Towns & P2E System

The game offers fully procedural towns meaning each planet will be different. Each planet will have a maximum of 100 towns. These towns will be sold as NFTs and town owners will gain Ghost tokens(GHO) from these towns every minute. The towns will be in an area of 1km x 1km square according to the planet and will be randomly distributed on that planet. When a new Ghost Town NFT is minted, it is placed in the planet to any random empty area. Towns will not be close to each other and it will be difficult to find them on the planet. When the users (ghosts and hunters) are used to that planet they will know where to go to find a specific town. A town is searched by the ghost to invade and to take the income of that town. Also hunters will search a specific town to protect the town and hunt the ghosts. When they clear that town or hunt a ghost they will take rewards from that town and take a specific amount of tokens from that ghost. If a ghost kills the hunter and takes his/her soul, then a specified amount of token will pass to the ghost. When entering the planet this specified amount of token will be sent to a shared pool owned by Ghost in Town so that they can be distributed to winners. As the competition increases in the planet, the specified amount of token to enter the planet will also increase.

4.3 Town Owners

A town owner starts its life by minting a Town NFT. After the mint, the town owner starts earning tokens/minute until his/her town is invaded by ghosts. Town owners also share the revenue generated by the planet entrance fees. Town must be cleared from the ghosts to produce income. When a town is invaded by ghosts, the town holder is informed from the discord channel (that can be changed in the future). After receiving the bad news, the town holder informs all hunters from a specific channel (discord) and asks for help. Hunters who react first and enter the planet will have a better chance to kill ghosts in that town.

Town owners can hire some hunters to protect the town. If a town owner is not always online to inform hunters or want to react and hunt ghosts immediately then he/she can hire hunters to do the protection. The hired hunter(s) will also share income of that town with the town owner. Each hunter hiring token/min is set by that hunter and the town owner decides which hunters to hire. Hunters can also be fired by the town owner if the town owner is not satisfied by the protection.

4.4 Ghosts



We have 3 types of ghosts (white, grey and black). 1st gen 10000 ghosts are ready to be minted at the time this document is created. When a user holds this ghost's NFT, he/she can enter the planet and start invading towns to earn tokens. At first entrance to the game, ghosts will take gift tokens according to

the rarity of NFT they own(black>grey>white and also accessories they have). For example, an account holding 5 Ghost NFTs or a rare NFT will have much more tokens at the beginning. If all tokens are lost during a loss in the game such as being hunted by a hunter, then the player can buy tokens with other coins to continue playing.

Ghosts will start earning tokens from invading a town after 15 mins spent in town. So if a ghost leaves the town and enters again the time begins from 0. After 15 mins, the ghost will start to get the income of that town. If a town is invaded by more than one ghost then the revenue will be shared. So ghosts can earn more if they find an empty or less crowded town.

Ghosts can earn tokens by taking the soul of the hunter also. When a ghost hits a hunter (near 1 meter), this ghost can take the hunter's soul. Ghosts will also have powers such as moving speed, visibility factor etc... So a ghost can choose to hide in the town or choose to take the soul of the hunter. If both are done, more revenue is earned.

4.5 Hunters



We have 8 types of hunters changing according to skin and face color. 1st gen 10000 hunters are ready to be minted at the time this document is created.

When a user holds this hunter NFT, he/she can enter the planet and start protecting towns to earn tokens. At first entrance to the game, hunters will take gift tokens according to rarity of NFT they own (according to accessories they have). For example, an account holding 5 Hunter NFTs or a rare NFT will have much more tokens at the beginning. If all tokens are lost during a loss in the game such as being killed by a ghost, then the user can buy tokens with other coins to continue playing.

Hunters will take reward tokens when they hunt a ghost. If a town is cleared then there is no need to be there. Hunters can leave that town and have a rest or visit other towns to hunt other ghosts. A town can be invaded when a town owner is sleeping. So the hunter can visit and check towns if there is a sign of ghost invasion.

Hunters can also earn token/min income by always protecting town. Each hunter hiring token/min is set by that hunter and the town owner decides which hunters to hire. Hunters can also be fired by the town owner if the town owner is not satisfied by the protection.

5. Economics

5.1 Tokenomics

The very foundation of Ghost In Town is based on the concept of collaborative development approach. We want to make sure that everyone who invests in our vision profits a fair share of the wealth we create as a community.

The Ghost token(GHO) is the governance token of our game, and it is essentially deflationary.

To facilitate a robust economic structure and a sustainable DAO mechanism, 1.000.000.000 Ghost token (GHO) will be minted (pre-mined) to eventually achieve an effective game platform decentralized governance model, fully built on the Polygon network.

GHO is the primary token to be used for all the transactions happening in the game, including the fee of the base game and the expansion packages. NFTs can be bought with MATIC or WETH from several marketplaces like Opensea and Rarible.



Our game is built from automatic decentralized mechanisms, which allows us to distribute tokens evenly according to a pre-calibrated algorithm. %32 of tokens are used for fundraising. %70 of raised funds collected from investors will go to liquidity and the rest %30 will be used for marketing. %48 of tokens is reserved for future expenses (presales, development, marketing, burning for stabilization) for the team. %20 of tokens will be used for rewards and staking.

This is our first funding plan:

Total supply	1,000,000,000 GHO
Total token for fundraising	310,995,000 GHO
Factory Address	0x9F20814ef6e25e7E6104E9914Fbc7474c50bbED7
Token name	Ghost Token
Token symbol	GHO
Token decimals	18
Liquidity	70%
Liquidity lockup time	36500 days (10 years)

5.2 Ghost Token (GHO)

The Ghost token, GHO, will be issued on the Polygon blockchain, and will be compatible with the ERC20 token standard. The GHO token will power the Ghost In Town metaverse game. In order to make use of the shared universe and to enter the planets, players will need to hold a configurable minimum balance of GHO. This minimum balance requirement will start at 100 GHO, which translates to a maximum possible player base of about 1 billion at the GHO token supply cap. The minimum balance requirement may be adjusted up or down later.

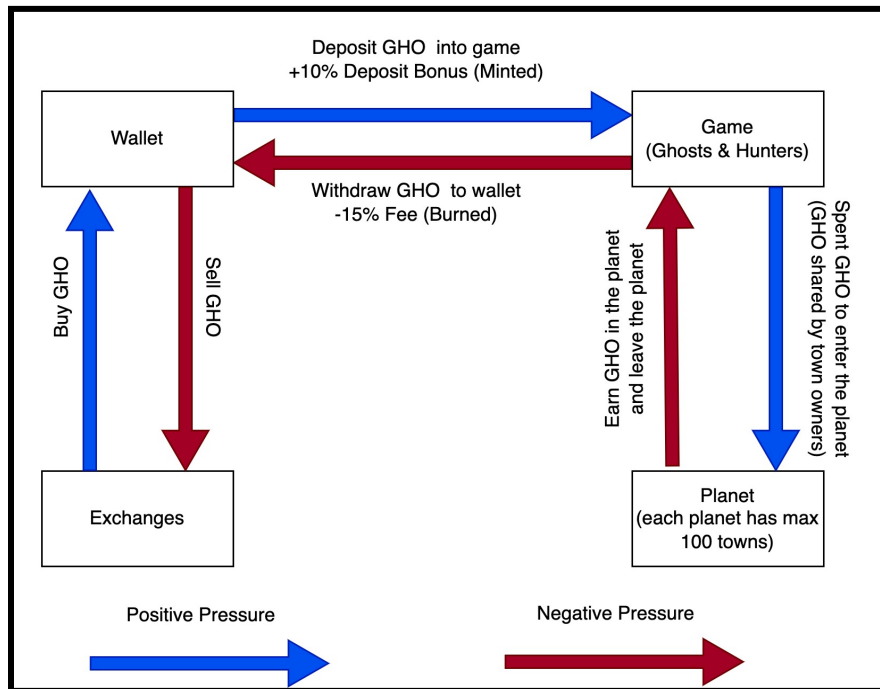
GHO tokens will be usable for entering the planet to play the game , to earn tokens in the game and exchanging in the market.

Improving ghosts, hunters and towns with assets will be available with NFTs.

5.3 Token Burns – Deflationary Mechanics

We will be burning tokens, time to time, to stabilize the economy. By depositing the game to enter the planets, %10 deposit bonus will be given to the player. %15 fee is taken from the player when withdrawal is requested and that fee tokens will be burned. The point here is to present deflationary mechanisms by burning some of the tokens, while providing token and asset rewards to players, especially to winners, to both reward them and motivate

them to keep playing. The net outcome of transactions will be always negative, however the exact parameters and ratios will be determined by the Council of the game and by the community. We will only be balancing the game initially until the DAO mechanisms are fully ready to take over that responsibility from us. We will repurchase our tokens on the secondary market on a regular basis to show our commitment and full accountability towards our community.



5.4 Long Term Commitment

Before finalizing the section, we wanted to reiterate that the entire development team of GhoVerse is committed to the project in full. We are aware that there are a lot of fraudulent schemes, scams and traps in the blockchain gaming space. According to CoinMarketCap analysis, “a significant share of blockchain based gaming projects are hidden traps, whose purpose is to misappropriate users’ money”. We are also observing a lot of projects whose sole focus is raising funds, without considering how to deliver the promises in a feasible manner. GhoVerse is none of the above. Please read carefully our whitepaper and notice years of preparation and a solid commitment of an international, talented and experienced team. To show our commitment to the game even further, we have put our team tokens extremely long cliff periods(10 years) as you will see in section “Tokenomics”.

Possibly the longest lock period ever seen in this industry. It is because we are all here for the long term. Building a future for ourselves, our families and for our community. This will be a long, but lucrative, fun, and immersive journey. Never forget, we are building this together.

6. Roadmap

September 2021: Concept and Idea

October 2021: Web3 Technology and use of tokens

November 2021: Working on idea and ghost concept

December 2021: Working on idea of towns and hunters

Q1 2022: Working on design of ghosts and traits

Q1 2022: Working on Unity and Web3 concept

Q2 2022: MMO Games and Photon Network for performance

Q3 2022: Preparation of 1st gen ghost NFTs(10000), website, discord and social media accounts

Q3 2022: Ghost NFTs WL Minting

Q3 2022: Hunter NFTs design and traits

Q3 2022: Ghost Token(GHO) Generation

Q4 2022: Ghost Token (GHO) Presale %32

Q4 2022: Ghost NFTs public minting

Q4 2022: Hunter NFTs(1st gen: 10000) WL minting

Q4 2022: Spoiler video from the game

Q4 2022: Hunter NFTs public minting

Q4 2022: Town NFTs for 1st planet generation (Supply:100)

Q1 2023: Small demo for the game

Q2 2023: First planet beta launch

Q2 2023: First planet live

More TBA

7. Team

Our team consists of software and game developers, game designers, business developers and social media managers. Co-Founder Ferhat Balaban is a computer engineer who has 25+ years experience in software development. We have been developing software since 2000 in our company. After bringing this idea in 2021 we created a new team for this project and funded from our company.

We are experienced developers, working in the software and game industry for years. GhoVerse will be soon in the beta stage, afterwards, we will create and add lots of content to the game and polish the game to its best possible version. So, we are confident in our ability to deliver an amazing metaverse and game, within our deadline, and with no compromises!

Our Company (DeGame Labs) is located in Istanbul / Turkey. You can contact us anytime from our company website and social media accounts.

8. Links

Metaverse website

<https://ghoverse.com>

Ghost collection website

<https://ghostintown.xyz>

1st Gen Ghost collection Rarible

<https://rarible.com/ghostintown>

1st Gen Ghost collection Opensea

<https://opensea.io/collection/ghost-in-town>

Discord

<https://discord.gg/ukgzhjRpng>

Twitter

<https://twitter.com/GhostInTownXyz>

Instagram

<https://www.instagram.com/ghostintownxyz/>

Company

<https://degamelabs.com/>