

Avatar System Whitepaper

version 0.1

July 28, 2022

Contents

1	Introduction	2
2	Basic Components	2
3	PFP	5
4	Paragon	5
4.1	Attributes	6
4.2	Tiers	8
4.3	Stamping	8
4.4	Breeding	9
4.5	Fusing	9
4.6	Initial Supply	10
5	Avatar	11
6	Character	12
7	Other NFT Classes	13

1 Introduction

Oxford Dictionary defines avatar¹ as *an image that represents you in online games, chat rooms, etc. and that you can move around the screen*. Well, that doesn't help much. Let's use the word Representative to prevent any misuse of the terms defined later in this paper.

Oxford is right in one thing - the Representative is how people identify themselves in a service where they can interact with others. Some people disclose their real identity while others create fake profiles; some like to create Representatives of the opposite gender than themselves, and some prefer to look like aliens. Everyone can be anything they want on the internet, and in the metaverse, the possibilities should be truly limitless.

In Heavenland, we wanted to take the Representative to a whole new level and even allow them to be bred. We wanted to enable Representatives to bring any favourite profile picture as many distinguished profile picture (PFP) NFT collections grew to many peoples' hearts. We want the Representative to earn achievements and badges. We want them to have physical qualities and abilities seen in superhero movies. We want them to be able to learn new things, to get any shape imaginable.

Welcome to Heavenland's Avatar System.

2 Basic Components

Heavenland's Avatar System is composed of 4 components, each of which is described in a later section

- PFP,
- Paragon,
- Avatar, and
- Character.

The relation between the first 3 of them is illustrated in Image 1; how they are represented in the game shows Image 2.

¹<https://dictionary.cambridge.org/dictionary/english/avatar>

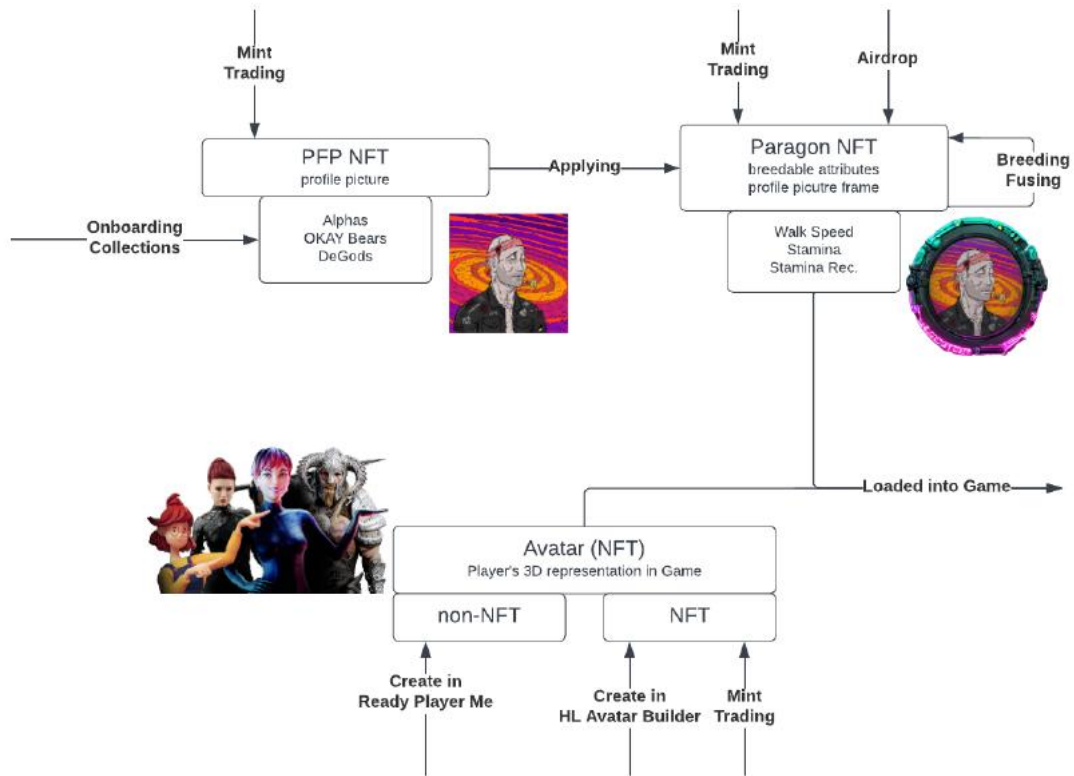


Image 1: Basic relation between PFP, Paragon and Avatar. Diagram shows how each of these components can be obtained and what operations will be performed with them. As PFP, we've used one NFT from [DeGods](#) collection.

PFP represents a profile picture. In Heavenland, the only profile pictures allowed are those from NFT collections, and Heavenland brings a new utility to them. PFPs are described in detail in [Section 3](#).

Paragon is a new class of NFT that Heavenland introduces, defining 9 attributes giving bonuses to some physical qualities players have in the game (like sprint speed and jump height). Visually, you can think of Paragon NFT as a frame. A PFP that the player owns can be inserted into the frame, so you can think of PFP + Paragon as an enhanced profile picture. Paragon NFT is the breedable component of the Avatar system. Paragons are described in detail in [Section 4](#).

Avatar is a 3D representation of the player in the game. It's a figure that moves as the player commands. Avatars are described in detail in [Section 5](#).

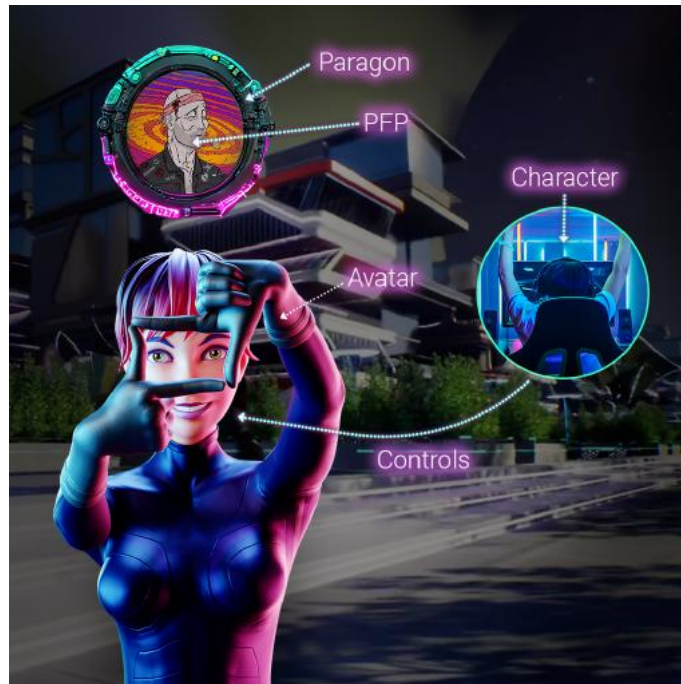


Image 2: In-game illustration of basic components. As PFP, we've used one NFT from [DeGods](#) collection.

Character is off-chain storage of the player's progress in the game. The Character can gather achievements, level up or die if entering some deadly mini-game. The Character can attain different physical shapes (Avatars) and qualities (Paragons). Characters are described in detail in Section 6.

What are the reasons why we've introduced these 4 classes?

- People like PFPs, and look for their utilities, so we want PFPs to be used as profile pictures in Heavenland. As there are many types of them, some pixelized, some photorealistic, some hand-drawn, there is no way how we could breed them.
- We want Avatars to be fully customizable - even outside the humanoid bodies. We were forced to start adapting ready-made solutions before creating our own, which prohibits us from transforming Avatar into NFT and thus prohibits any breeding.
- Progress in the game must be stored off-chain, so the Character object has been created.
- We've extracted several numeric attributes that can be easily used for breeding, and those attributes are used to define Paragons.

Every component is described in detail further.

3 PFP

PFPs (Profile Picture NFTs) are booming, and especially on Solana, projects are very creative and, next to artful graphics, they find ingenious ways to bring utilities to PFP holders. Some PFP collections are backed by real companies distributing part of their revenue to PFP holders; some allow generating a passive income more directly, like PFP staking. Some PFPs grant access or discounts to some services within a given ecosystem. Although utilities can differ, all the popular PFP collections have one in common - they have built a loyal, tied community of NFT holders, and Heavenland aims to make their community even more proud.

In Heavenland, PFPs are utilized to be inserted into Paragon NFTs, so-called Paragon Stamping, described in detail in [Section 4.3](#).

Heavenland has created its PFP collection - Heavenland Alphas, but will onboard already established collections to allow diversity. Stamped Paragons will work as one of the player's interpretations in the game, allowing PFPs to be visible in

- a badge floating above the Avatar,
- mini-game lobbies, leaderboards, guilds,
- in-game chat and other social channels,
- event calendar,
- ... simply put, all over the Heavenland.

Next to the Paragon Stamping, Heavenland offers additional utilities for PFP collections, described in [Get Integrated Paper](#).

4 Paragon

Paragon is a new class of NFT that's been introduced in Heavenland. It's breedable, it provides a lot of utilities to its owner, and it looks sexy. Paragon is very closely tied with PFP - if PFP is a profile picture, Paragon is the frame around it, which enhances not only the PFP but also the avatar qualities in the game. Heavenland has onboarded a Marvel artist to make sure Paragons will be something extraordinary. It's still a work in progress, but the latest Paragon version is shown in [Image 3](#).

Because Paragon is a new concept, it will take time to understand it properly. We recommend you get some refreshment before digging deeper into this section - there will be a lot of stuff to digest.

We'll define all the attributes Paragon NFTs will have, their possible values and what they represent. Paragons are breedable, but next to breeding, two additional operations can be done with them. We must also specify the initial supply of Paragons. Everything you'll ever need to know about Paragons is here.



Image 3: Simple illustration how Paragon will look like. As PFP, we've used one NFT from [DeGods](#) collection.

4.1 Attributes

Every Paragon has 9 core attributes, 2 additional attributes derived directly from them, and 2 attributes required for Paragon operations to work correctly. That's 13 attributes in total. The 9 core attributes have a direct impact on how the Avatar moves in the game and influences

- **walk speed**,
- **sprint speed**,
- **translocation**, which is short-distance teleportation,
- **jump height**, and
- **stamina**, which is something that's being drained during a sprint or when translocating and recovers when standing still or walking.

On the NFT level, these 9 core attributes will have a value between 0 and 100. The value of 0 provides no bonus, the value of 100 provides the full bonus, and any value

between provides a bonus directly proportionate to the attribute value. Note that all the core attributes will directly impact the open world of Heavenland. It will be up to the creators of mini-games what attributes and which way they adapt. The 9 core attributes are ²

- **Stamina** [200-500]
maximum level of stamina
- **Stamina Recovery Rate** [10-20 per second]
how much stamina recovers each second when standing still or walking
- **Stamina Usage during Sprint** [5-10 per second]
how much stamina is consumed per second of sprint
- **Stamina Usage per Translocation** [50-100]
how much stamina is consumed per translocation
- **Walk Speed** [1-2 meters per second]
movement speed of normal walk
- **Sprint Speed** [5-10 meters per second]
movement speed of sprint
- **Jump Height** [0.5-1.5 meters]
height of the jump
- **Max Translocation Distance** [100-250 meters]
maximum translocation distance, the target location must be visible
- **Translocation Recovery** [2-10 seconds]
how much time does it take to unlock stamina usage after translocation;
stamina does not recover in this interval

Next to the core attributes, we define 4 additional attributes

- **Score** [0-900]
the sum of the core attributes
- **Tier** [0-5]
divides Paragons into 6 Tiers based on the score
- **Breed Count** [0-5]
how many times was the Paragon used for breeding
- **PFP Mint**
mint address of PFP the Paragon was stamped with (if there is any)

²numbers shown next to them in the square brackets are only illustrative and will be adjusted according to the game mechanics

Tier	Score Range	Core Attribute Range
0	0-99	0-50
1	100-199	0-60
2	200-299	0-70
3	300-399	0-80
4	400-499	0-90
5	500-900	0-100

Table 1: Basic characteristics of Paragons.

4.2 Tiers

There will be 6 Tiers in total, Tier0 being the most ordinary and abundant, allowing Score only up to 99, and Tier5 being the most precious, allowing any value of Score bigger than 500. Each Paragon will have different graphical visualization, so the more precious Paragons are easily recognizable.

Each Tier limits not only the Score but also the value of each core attribute to the range summarized in Table 1. Tier0 Paragon, even if it can have Score 99, doesn't allow to have one core attribute of value 99 and the rest 0.

4.3 Stamping

You can think of this operation as stamping Paragon NFT with PFP, costing a symbolic **10 HTO**. Stamping will update Paragon NFT on the Solana blockchain (i.e. update its attributes and image). Single PFP can be used to stamp as many Paragon NFTs as desired, and the stamped Paragon NFTs can then be sold in the marketplace. Any Paragon NFT can be re-stamped (i.e., its PFP can be replaced by another one). The basic schema for stamping is shown in Image 4.

Anyone having the stamped Paragon NFT can use it in the game - there is no need to own the PFP that's been used for stamping. Still, those holding the PFP will be easily recognizable in the game as they receive a unique mark to be recognized by others as actual PFP owners.

For PFP collections to be eligible for stamping, they must be approved by Heavenland. This is only to prevent dicks and other content some can find abusive from popping up in Heavenland.

You can still utilize Paragon, which is not stamped - instead of PFP, the Paragon will contain a general character icon.

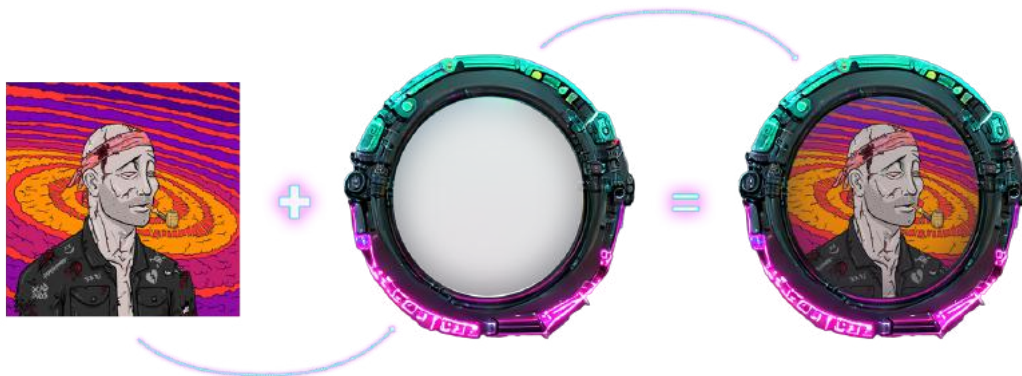


Image 4: Schema of stamping operation, where PFP is inserted into Paragon to create stamped Paragon. As PFP, we've used one NFT from [DeGods](#) collection.

4.4 Breeding

Two Tier0 Paragons are bred to produce a new Tier0 Paragon. The original Paragons and the new Paragon are unlocked after some time and returned to the wallet. Breeding will cost a symbolic **10 HTO** and the breeding time will increase based on the Breed Count attribute of the Paragons being bred. The breeding time will range between 1 and 24 hours.

Breeding is the operation that increases the supply of Paragons, and it's applicable for Tier0 Paragons only. The basic schema for breeding is shown in Image 5.

All the magic behind how the breeding works will be revealed once we've run all the required simulations to be sure all the constants are correctly set and the whole system is sustainable.

4.5 Fusing

Five TierN Paragons are fused to produce a new Tier(N+1) Paragon. The original Paragons are burned, and the resulting Paragon is unlocked after some time and returned to the wallet. Fusing cost and time will increase with N, the Tier of Paragons being fused. The cost will start at **20 HTO** for Tier0 and won't exceed 1,000 HTO even for the highest fusible Tier. Fusing is more time-consuming than breeding and can take several days to finish.

Fusing is the operation reducing the supply of Paragons and is applicable for



Image 5: Schema of breeding operation, where two Tier0 Paragons are bred to produce a new Paragon of the same Tier. As PFPs, we've used NFTs from [DeGods](#) and [Spirits of Pappataz](#) collections.

Paragons from Tier0 to Tier4. The basic schema for breeding is shown in Image 6.

All the magic behind how the fusing works will be revealed once we've run all the required simulations to be sure all the constants are correctly set and the whole system is sustainable.

4.6 Initial Supply

There will be 3,333 Tier0 Paragons that will be airdropped to Alpha NFT holders. The only way how new Paragons can be created is through Paragon Breeding or Paragon Fusing. Only in the rare case that the supply of Tier0 Paragons is depleted (we don't expect this to happen) will Heavenland step in and generate several new Tier0 Paragons.

The initial distribution will consider the Alphas' rarity (how it's calculated on [HowRareIs](#)). The more rare the Alpha, the higher the chance a Paragon of higher Score will be airdropped to Alpha's holder. Note that because all the airdropped Paragons will be of Tier0, the Score won't be greater than 99 for any airdropped Paragon NFT.



Image 6: Schema of fusing operation, where five Paragons are bred to produce a new Paragon of higher Tier (different frame in the resulting Paragon can be noted). As PFPs, we've used NFTs from [DeGods](#), [Spirits of Pappataz](#), [Primates](#), [Art of Mob](#), and [Yeah Tigers](#) collections.

5 Avatar

Avatar is a word that takes so many meanings it's hard to avoid using it ambiguously - we've used it even in the title of this paper because we couldn't think of anything better. Avatar in Avatar System Whitepaper is a 3D body that the player controls (like when Sam Worthington enters his avatar in the Avatar movie).

We want the avatar to be highly customizable, as in [Image 7](#) - its height, colour of skin, and different wearables that can transform the avatar even into some cartoon figure. Avatars cannot be limited to humanoid bodies - they can have as many legs, hands or heads as they want.

The problem is that the more customizable the avatars are, the more difficult it is to develop a system that will create them. Avatar diversity is a big priority, so we've decided to go with ready-made solutions so this diversity can be adapted in Heavenland from the beginning.

Avatars in the early stages of Heavenland won't be NFTs. They'll be represented solely by 3D objects created in [Ready Player Me](#), from which they will be saved in the player's inventory. Ready Player Me offers high variability, and its avatars are highly optimized for game usage - everything that Heavenland needs.

We have plans to develop our own Avatar Builder and onboard some existing NFT collections of avatars to enable everyone to have their desired avatar as an



Image 7: Wide variety of avatars.

NFT.

6 Character

All the previous components of the Avatar System were mainly about the visual look. Character is about additional in-game attributes the player can attain in Heavenland or its mini-games, and is closely tied with what the player has achieved in Heavenland.

The player can gather achievements by completing different tasks - gathered achievements are connected to the player's Character. If the player enters a mini-game, all the data mini-game needs to store are connected to the Character. This information can include gathered XP, strength or power of mini-game RPG character, collected weapons and much more. Some mini-games can be deadly, so Characters can die to be respawned later.

The best way to understand Character is shown on the login scheme shown in Image 8. The player is logged into the game (there will be different ways to do this), and when this happens, its inventory is loaded - Characters, Avatars, Paragons and other assets he owns. The first thing he selects is Character. After selecting a Character, he selects his name, Paragon and Avatar, followed by selecting a location where to spawn into the game.

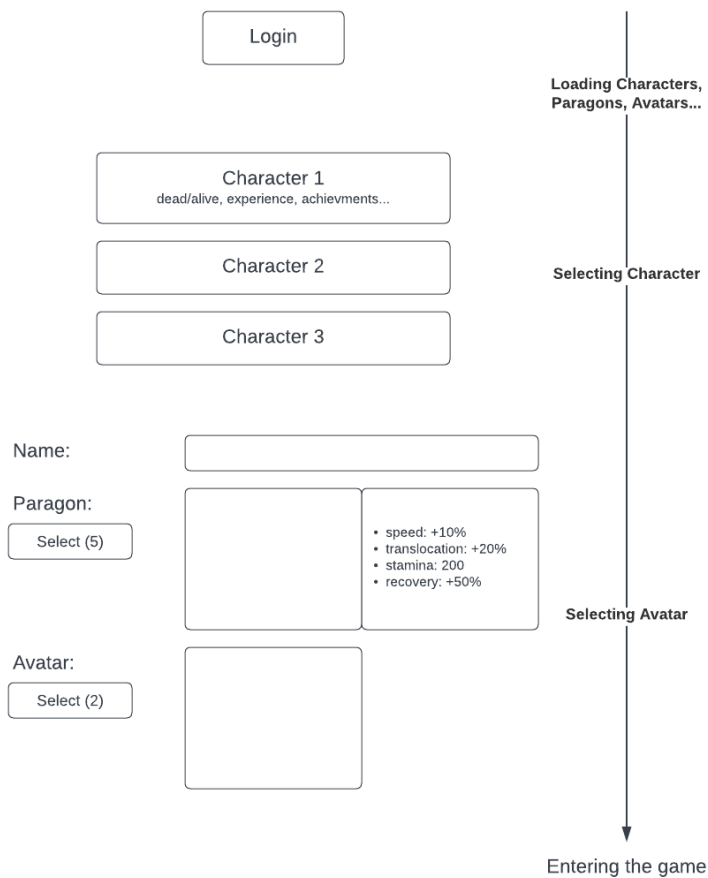


Image 8: Player's login into the game. After login, player selects Character, followed by name, Paragon and Avatar.

Characters are designed to allow players to have more than one Character.

7 Other NFT Classes

All the previous components of the Avatar System will be available from the beginning as they are something like MVP (minimal viable product) to what Heavenland promised to deliver. Nonetheless, Avatar System will expand for new NFT classes as there are many things players can do with their avatars.

The first thing is setting the Avatar name. In the beginning, everyone will be able to use the name they want, but we want to allow players to have their unique name registered just like Decentraland has introduced it³. This will force us to introduce a name service that will issue original Name NFTs.

³You can watch Decentraland's Name NFTs being traded on [OpenSea](#).

Avatar gestures are another big topic. Heavenland will create a default set of gestures players can use by their avatars, but more complex gestures can also be subject to NFTification.

Avatar customization is again a big topic, where only those owning a given Asset NFT will be able to put it on their Avatar.

Possibilities are endless, and we hope we won't be alone in our endeavour to bring the best possible Avatar System to life. We want everyone to have a chance to participate in this system, to have enough freedom to create Avatar they want without the need to pay anything. But at the same time, we want everyone willing to pay to be able to pay for something special, created not only by Heavenland but also by those who put their time and effort into making Heavenland avatars truly unique.

The journey has just begun.