F1® Delta Time - White Paper

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Version 1.0

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Introduction

About This Document

This document is a high-level introduction to the concepts that will be utilised in *F1® Delta Time,* as well as a deeper dive into the blockchain elements of the game itself, its economy, and how non-fungible and fungible tokens will exist within this experience.

Any game related terminology is used as a reference only, and will be subject to change as the game continues through development. This should be treated as a living document that will be updated as development progresses and aspects of the game evolve.

We have purposely decided to focus on those aspects of the blockchain implementation which are integral to the game itself, rather than deeply explaining the general uses of blockchain technology and history of blockchain. However, some high-level explainers will be present throughout the document for the purpose of creating context.

About Formula 1®

Formula 1® is the premier global motorsport. Each season, the combination of elite athleticism meets the pinnacle of engineering to bring the fastest and most thrilling motorsport on the planet to a global audience of fans.

About Animoca Brands

Headquartered in Hong Kong, Animoca Brands [ASX: AB1] is one of the premier mobile game developers in Asia. It has a proven track record of pairing globally recognisable brands with engaging, award-winning game design.

Blockchain - The Technology

A blockchain is an unalterable ledger, a database that doesn't get overwritten as new data is added; instead, new data is added to it. Thanks to the combination of cryptography and distributed consensus, the transaction history is protected from being overwritten, and the validity of the entire history can be verified.

What a blockchain allows thanks to this format is a decentralized system where transactions and ownership can be verified by anybody, because all data that passes through a blockchain remains on it. For example, a switch in ownership doesn't erase the previous owner, but instead adds a new owner to the history.

This format of verified ownership and uneditable states can be expanded and interpreted in ways which enable the design of new game experiences.

The Ethereum Blockchain

Ethereum is a decentralised public blockchain that operates using the Proof-of-Work consensus model. As a fully decentralised system, one can independently create an account (referred to as a wallet) and use it without the need of any third party or central authority. The primary currency of Ethereum is ether [ETH].

Ethereum supports "Smart Contracts", which are autonomous programs deployed on the chain with which users can interact with freely and confidently, since the definition (the source code) of a Smart Contract dictates how the program will operate. Smart Contracts allow the development and deployment of a wide range of decentralised applications ranging from simple concepts such as tokens, escrows, and markets to highly complex entirely decentralised systems such as decentralised autonomous organisations (DAOs).

As of writing, the Ethereum blockchain has the second largest market capitalisation, and has been adopted by a number of developers looking to build decentralised applications due to the support of Smart Contracts.

More information on Ethereum can be found here: https://www.ethereum.org/

F1® Delta Time – Introduction

F1® Delta Time is a blockchain-based game that will utilise the Ethereum blockchain and ERC-721 and ERC-20 standards for non-fungible and fungible tokens, respectively.

F1® Delta Time consists of two main components: the Collectibles Game and the Racing Game. Both components are described in this document.

The Collectibles Game centers around obtaining and trading rare virtual items including Cars, Drivers, Components, and Trinkets. It adds gamification to the collection of non-fungible tokens (referred to as "Collectibles" in *F1® Delta Time*), adding layers such as achievements and leaderboards. The design of the collectibles component of the game simulates traditional scarcity-based collecting games or activities, like football stickers, baseball cards, or model collection.

The Racing Game will be a gaming experience similar to traditional racing games. The player will be able to take their Collectibles (Cars, Drivers, Components, Trinkets) and manage them into a race-ready Grand Prix entrant. Gameplay is presented through a 2.5D perspective overlooking the selected track, with the player in command of their racing car's acceleration and braking.

Both the Collectibles Game and Racing Game are in development, with more details about both to be issued as development progresses.

Token Economy

F1® Delta Time will utilise the Ethereum token standards ERC-20 (fungible) and ERC-721 (non-fungible).

The game is designed around the finite nature of tokens, with the intent that the limited supply will drive the value of the Collectibles. The ERC-721 standard allows the on-token design and Collectible exclusivity to be verifiable and unalterable.

The ERC-20 standard will provide the basis for the meta-game and economy, which is the REV token. REV tokens (or REVs) are used as the medium of exchange in *F1® Delta Time*, and are supported through a number of features - from being rewarded for completing player milestones, to being used to enter races.

It should be noted that REV is not a token exclusive to *F1® Delta Time*. REV will be utilised across a number of Animoca Brands titles, increasing the overall utility of the token.

Tokenisation - Introduction

The below section will outline how *F1® Delta Time* utilises ERC-20 and ERC-721 tokens.

Non-Fungible Tokens

In *F1® Delta Time*, a Collectible - a non-fungible token [NFT] - is a piece of digital content that is unique. As an NFT, a Collectible can be fully owned by a player, with that player having the ultimate permission to use, trade, or sell the Collectible.

Most critical game content in *F1® Delta Time* is comprised of NFTs: Cars, Drivers, Components, Tracks, and Trinkets, with Components referring to sets of different parts or equipment-type Collectibles that can be attached to a Car or Driver to improve their base performance.

For example, a Driver token has the attachable Components of Gloves, Suit, Boots, Helmet, and Trinket. Each one of these Components will impact the Driver's base Stats, granting better potential performance during the Racing Game.

All NFTs in *F1® Delta Time* will be compliant with the ERC-721 standard.

Fungible Tokens

A fungible token [FT] is non-unique and mutually interchangeable. *F1® Delta Time* will utilise REV as the in-game fungible token. REV - like the Collectibles - can be fully owned by a player, but rather than acting as a piece of content within the game, REV acts as the game's primary currency.

This currency is used in a number of ways: to purchase certain types of Collectibles, as a player reward for completing certain actions or achievements, as a fee to compete in the Racing Game, and to use as rewards for races.

Both the fungible and non-fungible tokens have a finite supply.

REV is built on the ERC-20 standard. The total minting volume and distribution manner for REV will be shared at a later date.

F1® Delta Time – The Collectibles

The following section contains details about how the ERC-721 tokens are designed, how they operate, and how they exist inside the game's economy.

Collectibles Classification

There are two main classes of collectible tokens: Standalone and Composable Tokens. Composable Tokens are designed to be combined for racing.

Composable Tokens come in two distinct categories: Primary Tokens and Component Tokens. Primary Tokens can be thought of as docks where Component Tokens can be attached. Primary Tokens are represented by Cars and Drivers, while their respective set of Components are designated as Parts and Gear.

Composable Tokens Mapping:
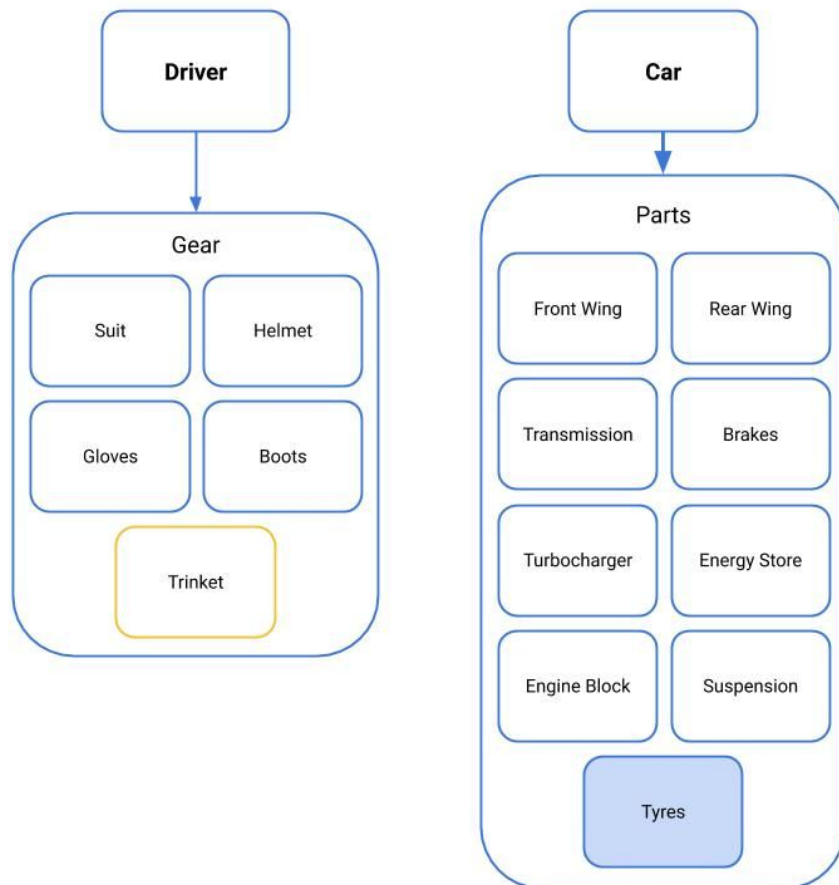
A Trinket can be attached as a Gear Component Token

Component Tokens do not have a specific manufacturer, and are therefore available to be associated with any of the Primary Tokens, regardless of the Team. Component Tokens do

not affect the appearance of Primary Tokens. For example, regardless of which Gear you have attached to Sebastian Vettel, the base Sebastian Vettel visual asset will look the same.

Primary Tokens are limited in their association. Whereas Component Tokens can be attached to any Primary Token (with the limitation that Parts are limited to Cars, and Gear is limited to Drivers), Primary Tokens can only be associated with a Driver or Car belonging to the same Team. For instance, Lewis Hamilton, who is on the Mercedes team, can only race in a Mercedes car for the Mercedes team.

Standalone Tokens such as Tracks and Trophies work independently and are not involved in any composition logic.

Collectibles Anatomy

F1® Delta Time will utilise the ERC-721 standard for all Collectibles in the game.

Cars, Drivers and Components

The anatomy of each Collectible consists of both performance and non-performance based attributes, stored on the token itself. Non-performance based attributes include Type, SubType, Rarity, Season, Grand Prix and Team and Collection - while performance-based attributes are referred to as the Racing Stats. There are at least 4 Racing Stats for each of these Collectibles, with Cars and Parts having one set of Racing Stats, and Drivers and Gear having a different set of Racing Stats.

The Racing Stats will have a value between 100 - 1000, with the value being dictated by the rarity of the Collectible. Higher rarity Collectibles have higher Racing Stats. These attributes will impact the potential performance during the Racing Game.

Tyres

Tyres have a unique set of Racing Stats that follow a similar format to the other Racing Stats found in Collectibles, but they are also designed to degrade through use. There are 5 types of Tyres for the 2019 content Season: Hard, Medium, Soft, Intermediate, and Wet. The performance of a Driver and Car on a Track will be altered depending on the type of Tyre that is used. For example, if the player uses a Wet Tyre on a Dry Circuit, the overall performance possible from the Driver and Car will be lowered due to the Tyre/Track mismatch.

Tyres do not expire completely, but require a cooldown period before they can be used again. Each Tyre has three levels of degradation, with each level offering a defined contribution to the performance. A Tyre with no degradation will perform at 100%, but a Tyre with Level 2 degradation (degradation coming from the previous use) will only perform at 70%. Players can either wait a set amount of time for the Tyre to return to 100%, swap in another 100% Tyre, or use REVs to restore the Tyre to 100%.

Trinkets

A Trinket is a non-typical and rare type of Gear. It represents a lucky charm that drivers might bring with them when they race.

Trinkets may carry specific effects such as standard boosts to Racing Stats or more general bonuses. For example, a Trinket could grant a 2% increase to all Grip Racing Stats, or mitigate the penalties resulting from using the wrong Tyres for a particular type of weather.

Typically, Trinkets are the best way to increase the Luck factor in a racing composition.

Tracks

The core attributes of a Track relate to the weather. Each Track will have a specific weather Stat, which considers a combination of basic weather types: Dry, Wet, Damp. The type of weather will inform players as to which Tyres they should have prepared for racing on a Track.

For example, if the Track weather is set to Damp, the player may want to set Intermediate Tyres to get the highest possible performance from their car.

Not all weather attributes are static. Some Tracks may contain a variable to the weather, such as allowing for Damp Track to become Wet during the race. This weather variable ties directly to the pit strategy that a player may choose.

A variable weather attribute does not guarantee that the weather will change, but provides a chance for it to do so. The chance of the weather change is also viewable on the Track Token, represented as a percentage.

Trophies

Unlike the other Tokens, Trophies do not affect Racing Stats or the Racing Game from a play or performance perspective. Trophies will have a cosmetic effect in the meta-elements of the game.

Collectibles Metadata

Below is a sample of what type of information players can expect to see from the Composable Tokens.

Example of Metadata content:

```
{
  "id": 111,
  "name": "1-1-1",
  "description": "The 1-1-1 is the very first official Formula 1 non-fungible token. This is the first car to be released for F1 Delta Time, and we made this a hyper-limited edition: there is just one single 1-1-1, and there will never be another. It's truly a one-of-a-kind digital collectible.",
  "image": "https://nft.f1deltatime.com/image/1-1-1.png",
  "external_url": "https://www.f1deltatime.com/nft-preview/?id=111",
  "youtube_url": "https://www.youtube.com/watch?v=ubo010n1Jns",
  "packed_attrs": "0x6f006f6f006f03e903e903e9000000010000026f0001",
  "internal_attributes": {
    "Type": "Car",
    "Racing": {
      "TopSpeed": 1001,
      "Acceleration": 1001,
      "Grip": 1001,
      "Luck": 111,
      "Effect": 111,
      "Special1": 111,
      "Special2": 111
    },
    "Rarity": 0,
    "Tier": "Apex",
    "Track": "None",
    "Season": "2019",
    "Team": "F1® Delta Time",
    "Collection": "Prime",
  }
}
```

Here is a non-exhaustive list of content that can be found in the Metadata:
- Non-Visual Elements
  - Name
  - Description
  - Team
  - Track
  - Rarity
  - Collection
  - Racing Stats

- Visual Elements (visible on the Store, Market and Wallet)
  - 2D Thumbnail
  - Additional 2D images
  - 3D Model: a fully rendered 3D model. For Cars and Drivers, this will be representative of what will appear in the Racing Game.
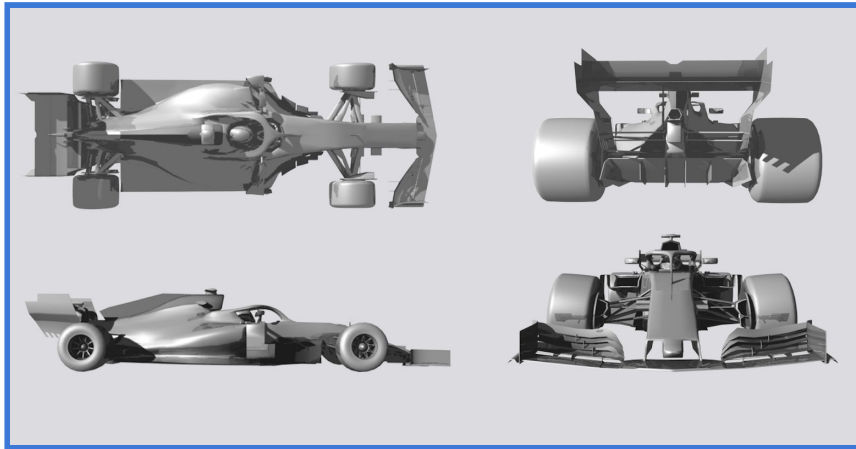
Driver 2D Thumbnail (Concept):

Driver 3D Model (Concept):

Racing Car 3D Model (Concept):

Note: Some initial Collectibles will be based on the 2019 Formula 1 Season, and some Collectibles will include original designs.

Rarity

Rarity is generated differently for Primary Tokens and Component Tokens.

Primary Token Rarity is partially dictated by the performance of the actual Car and Driver during an official Grand Prix, with the Collectibles generated having Stats influenced by Qualifying, Race Results, Lap Times, and other race variables.

The Rarity is dictated by the real-world results of relevant drivers and cars during an actual Formula 1 Grand Prix. If a particular driver and car wins, or places high in the results, the corresponding Collectibles will be minted with higher Stats and also higher Rarity.

For all Collectibles, there are 4 standard Rarity levels: Common (white), Epic (purple), Legendary (gold) and Apex (prismatic), with rarity spread on a spectrum inversely to Racing Stats. Legendary NFTs will have higher Racing Stats and lowered availability, Common NFTs will have lower Racing Stats, but higher availability. Apex rarity level is reserved for exclusive and one-of-a-kind NFTs released on special occasions.

Trinkets and Tracks are minted in a far lower volume than the gameplay related Collectibles. With their Rarity levels not following the standard levels of Rarity.

Racing Stats

Each Collectible will have at least 4 Stats that will potentially impact the performance of the Car and Driver during the Racing Game. The combination of Stats will affect key factors typical of a motorsport race, including speed, acceleration, cornering, recovery, and others.

Car-related Stats

- **Max Speed:** This Stat governs the total straight line speed of a Car. Having a high value here is important in circuits that have a high number of straights.

- **Acceleration:** This governs the amount of time it takes for your Car to hit higher speeds. If a circuit has a high number of corners, or your Car overbrakes or miscorners, having high Acceleration will bring your Car back to the optimum pace at the quickest rate.

- **Grip:** This Stat will affect how your Car corners. Circuits with a high number of corners, or Cars with high Max Speed, will find it particularly beneficial to have a high Grip Stat.

- **Luck:** Luck is applied in a number of different ways. It can be applied in the form of a minor boost to Stats, or it can affect a Track's variable weather. The effects of Luck can expand beyond this.

Driver-related Stats

- **Concentration:** Concentration affects how Drivers recover from mistakes. If your Driver slips and makes unforced errors, their Concentration stat will govern how quickly they will be able to realign.

- **Aggression:** An Aggressive Driver will be more inclined to go at higher speeds, which is not always advantageous - without the right type of Car, this makes it easier to move away from the optimum raceline.

- **Stamina:** A high Stamina Stat means that the Driver's performance for the duration of the race will be consistent, with a lower Stat meaning that your Driver could trigger more unforced errors as the race progresses.

- **Luck:** Luck doesn't vary between Collectible types. Whether applied to a Car, Driver, Component or Trinket, Luck will have the same scale of potential impacts.

These Stats are part of the on-chain information recorded on the ERC-721 non-fungible tokens. They are not alterable after the token has been minted.

Collections

All of the Collectibles in *F1® Delta Time* can carry a Collection attribute. This attribute does not have an impact on play, but identifies the Collectible as being extremely rare. Not every Collectible will be associated with a Collection.

If players are able to collect all of the Collectibles that are part of a Collection, they will receive a reward. Collections can be identified in the metadata through the Collection name.

Collection rewards are only redeemable once, regardless of whether they are sold or traded, or moved into another player owned Wallet.

Collectible Generation

The minting of Collectibles is dependent on the type of Collectible. For non-exclusive Composable Collectibles, they are minted in response to real-word race results. This is the case for both the Primary and Component Collectibles.

Composable Generation

All standard Composable Collectibles are minted based on the results of a real-world Grand Prix. This means that there are 21 batches of Collectibles for the 2019 season.

Before minting, data from multiple aspects of the race weekend is analyzed. This includes: qualifying, final result, fastest laps (per-driver and overall). This information determines how Collectibles will be assigned Rarity, and Rarity will determine the volume of tokens to be minted.

This method of generating Collectibles means that the Cars and Drivers that are Legendary, Epic or Common for one race, will be different race-to-race.

Component Collectibles will be minted alongside each Grand Prix. This ensures that a continuous flow of Collectibles are made available as the projected player base grows.

Trinkets are considered Composable Tokens, but they will be generated at a very low natural rate, and will not necessarily be influenced by the results of a Grand Prix.

Standalone Generation

Standalone Collectibles include two types: Tracks and Trophies.

Trophies are generated in a similar manner to Trinkets, with the possibility of being generated independently of real-world races. The volume minted will be dependent on the effect.

Initially, Tracks will be heavily limited in number: only 21 will be minted, reflecting the number of Tracks included in the Formula 1 2019 season. Future Tracks may be minted with varied weather effects, allowing for more play variety.

Collectible Acquisition

There are multiple ways for players to acquire and purchase Collectibles.

Giveaways

Throughout the release of *F1® Delta Time*, we will be running a series of events and initiatives where participation can be rewarded with Collectibles. Examples include community-based race weekend events, where correct results predictions can be rewarded with Collectibles.

Store

The Store will be the primary point of sale for new Collectibles. Once a Grand Prix has ended, the Collectibles that are minted as a result of that race are made available via the Store, and purchasable through a variety of methods.

Fixed-Price Sales

Fixed-Price Sales refers to sales that happen under a predetermined price. The price of the Collectible item or bundle, will not necessarily reflect the open market price. It will be dependent on a number of factors including the volume available, properties, and market value.

Auctions

Certain Collectibles will be purchasable via Auction. There will be two Auction types presented: English Auctions (ascending) and Dutch Auctions (descending).

Content Types

Not all items will be available via a single, direct purchase, most Collectibles may be purchasable as part of a bundle. The majority of standard Composable Collectibles will be sold in this manner, with bundles selling in varied combinations, rarities, volume, and prices.

Randomised Bundles

Bundles provide the player the opportunity to purchase a predetermined selection of content, with the content and quality contained within the bundle reported transparently. Bundles may be composed of any Collectibles, and be of any Rarity. Bundles will be priced based on the content within the Bundle, or sold on Auction.

Single Items

Some Collectibles will be put on sale singly. These could be listed on Auctions, or direct Fixed-Priced Sales. This is not limited to rare items, and standard Collectibles will at times also be listed under this method of purchase.

Note: purchasing and acquisition of Collectibles are subject to change, and will be updated based on usage data, feedback, and our own assessments.

F1® Delta Time – The Collectibles Game

The Collectibles Game is currently in development. While a number of features are complete, the overall feature set remains to be finalised, with additional changes and the continued evolution of features expected based on post-launch data.

Once released, the Collectibles Game will be managed as a Games-as-a-Service platform, with new content and features regularly added, to make it a truly live game experience.

Leaderboards

The Collectibles Game will track a number of player progress elements, like the amount of Collectibles owned, value of Collectibles, quality of Collectibles, and more.

Each of the tracked progress elements will be presented as Leaderboards, so that players can compete for rankings. Certain rewards will be granted to players who hold Leaderboard positions for specific periods of time, or by simply attaining a position for the first time. Rewards will be assigned based on loot tables including a variety of Collectibles or REV. The type of reward will be directly influenced by the scale of the achievement.

Achievement Merits

The Collectibles that you have obtained will go towards completing achievements, with the game awarding Merits when specific milestones are achieved. These rewards could be other Collectibles or REV, the quality and amount being dependent on the type of Merit earned.

For example, a Merit might require a player to collect a complete set of Car Collectibles, one for each team, or a complete team including both Drivers and a Car.

Factory

In the Factory, players will be able to change the composition of their Cars and Drivers, based on their owned Collectibles.

Like the rest of the Collectibles Game, the Factory is also tied to the Leaderboard and Collection Merit systems.

The Factory is also directly related to the Racing Game. Cars and Drivers assembled in the Factory are usable in the Racing Game.

F1® Delta Time – The Racing Game

Multiplayer Game

The Racing Game section of *F1® Delta Time* is where players will combine the performance of their Car and Driver with their own skill at playing the game.

To enter a race, players require a Car, Driver and Tyres. The other Components are optional. When players have constructed their perfect combination of Car and Driver, and any Components, they are ready to race.

The Racing game is an asynchronous multiplayer Grand Prix that will play out on one of the Formula 1 2019 Tracks. To participate in the Grand Prix, players will need to pay the entry fee in REV tokens.

Upon entering the race, the player will have to complete a Warm-Up Lap and a Qualifying Lap. This core gameplay is performed by accelerating and braking through the track. Corners have optimum braking and acceleration points that are marked as zones, with the player receiving better momentum and speed if the braking or acceleration is done within the optimum point of the zone.

This play session will be performed from a 2.5D or isometric-like perspective, so that the player can view all of the track at once. The braking and acceleration zones will be marked on the track, with colour gradients signifying the optimum points. For example, green zones will be where the player should aim their braking, while the yellow or red zones will impact momentum and the potential lap time. Each corner - on both entrance and exit - will have zone applied to it.

The accuracy and performance of the Driver and Car will be affected by the Stats of the Car, the Driver and all of the active attached Components. The higher Stats will grant larger zones for braking and accelerating, meaning that the margin of error increases for better Cars and Drivers.

Data will be taken from the Warm-Up Lap, Qualifying Lap, Car and Driver configuration, and Track attributes, to then simulate the final results of the race. The gameplay session will contribute to around 80% of this potential result, with the other 20% coming from the remaining data.

After the race is complete, the REV tokens used as the entry fee will be distributed to the winners of the race, with the amount awarded determined by their race performance.

Matchmaking will be in place, so that players are more likely matched to others who have a similar Car and Driver Stat base. Allowing for more even competition.

Features for a Decentralised Economy

In *F1 Delta Time*, the Tracks are also Collectibles. All of the races that happen in the game are performed on these Track Collectibles.

Owners of Tracks are in a unique position to collect dividends, in the form of REV, for hosting races.

To enter a race, players are required to pay an amount of REV as an entry fee. When a race is completed, the REV pool composed of these entry fees is distributed among the race participants and the Track owner. This allows Track owners to receive a passive income of REV.

Owners of Tracks are also able to set entry fee limits for their Tracks. There will be a minimum fee enforced to ensure that operational costs are covered, but upper limits are at the discretion of the Track's owner.

Tracks are extremely rare Collectibles, with the initial run being limited to 21 - one for each official Grand Prix race in the 2019 season. Each Track Collectible will also contain the weather variable, with the variable being dependent on the real world location of the race.

The game client will handle race requests so that Track owners do not have to manually accept requests. A Track can host multiple concurrent races.

Notes

- Details and terminology in this document are subject to change, as this information is referencing a product in development.
- The REV ERC-20 token is a standalone token that will have utility inside *F1® Delta Time*, but is not an *F1® Delta Time* product. Details on the REV token will be provided at a later date, with those details breaking down the full anatomy, volume, and distribution.
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