# finalbiome

# Whitepaper

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# Contents

# Introduction

> *Metaverse is a combination of multiple elements of technology, including virtual reality, augmented reality and video where users "live" within a digital universe.[1]*

> *The metaverse is a concept of a persistent, online, 3D universe that combines multiple different virtual spaces. You can think of it as a future iteration of the internet.[2]*

What's it like to live in the world with all-mighty gods and magic?

How would the economy change if some group of people has a capability of unlimited creation of any physical object? or money? gold? Mona Lisa painting?

What would happen to collecting business if there is a replicator who can replicate any object at an atomic level?

These are the questions to futurologists and philosophers, but when we speak of metaverse we are trying to coexist with this or overlook it.

Behind the incredible capabilities and advantages inherent in blockchain and its abstractions – fungible and non-fungible tokens, we tend to miss a very important aspect of the metaverse – it includes gods and magic.

Everything is fine when we speak about traditional collecting NFT[3] of some pixel art which exists in a known limited number.

But the universe cannot be limited by a predetermined set of entities. Creation and transformation are the integral parts of the universe's existence.

And in metaverses the gods and magic come into play: material objects appear from nowhere and according to some internally inexplicable logic. Yes, later on somebody owns and manages them. After their creation there is the truth that specific someone possesses them, there is a transparency; and we know the entire history of this object, who and how long owned it and what happened to it. But we know nothing about the rules under which it was created. Is it really unique? And what's most important – does it have a value by the right of its creation?

In the real world even counterfeit Nike sneakers have their own value created through their production – resources spent (materials, labor, money, and time).

And what about the metaverse? It has gods and magic. In this case the value by the right of creation equals zero.

Are you ready to live in a world where magicians materialize any object from nowhere, and gods transform gravity into a payment method, and your savings become toxic?

Life is possible in a balanced medium only, where the energy conservation law cannot be revised.

The process of value creation shall be an integral part of the universe. Only in this case it is possible to achieve the real balance.

The huge number of outstanding minds are busy with creating metaverses, building up standards and rules of the game. However, it often becomes an abstraction of N-th order and is poorly applicable at the current stage of our development.

Realizing the perspective of the work in this direction, and understanding that it is impossible to fully comprehend the role and the future of the metaverses, it is beyond our horizon of events, we can be sure of one thing – unused technology is a technology for the sake of technology. Only the technology being used can result in a real impetus to its development in the right applied direction.

And here games come to our assistance. Games are the most simple and obvious method of modeling, study and development of metaverses. Of their laws and regularities.

## Mass Adoption without the Mass

As of today, there are a lot of blockchain games which should have popularized the technology. However, their popularity is negligible compared to ordinary video games.

And there are a lot of reasons for that.

For the game developers it is a high technological threshold for entry, the need to invent new methods to monetize projects, complexity of economic model calculation with high degree of uncertainty, as well as blockchain technological limitations forcing us to look for trade-offs, and hence, to significantly reduce the creative component in the games.

For gamers it means an absolutely unfriendly interface of interaction with blockchain, making onboarding into a new game hard.

Blockchains, in turn, have their own price and a resource payment model which is poorly compatible with the games.

All of these barriers resulted in the Play to Earn business model. This is the trade-off when the gamers are lured with the motive of earning money, the gamers who are ready to get into the nuts and bolts of the complex game entry, to buy the crypto currency beforehand, install wallets, register at exchange market, etc., and what's most important – ready to take risks. To take risks in the universe where there are gods and magic.

But this is far from entertainment, and mass adoption is practically impossible.

FinalBiome makes it possible to create games with all the advantages of blockchain and without the trade-offs. Game metaverses as entertainment.

# Breaking Down Barriers

FinalBiome aims at removing all the barriers impeding a large-scale expansion of video games into web3 technologies.

Below we provide the platform key aspects which are described in more details further on in the relevant sections.

## Not a Token but an Asset

NFT development according to the rules beyond the metaverse does not guarantee their stability in time and does not protect the game owner from a temptation to generate them for his/her own personal needs, to change the rules of their issuance/creation, and as a result to change the balance fundamentally, depreciate NFTs developed before the rule changes, and to crash the market.

And nothing protects the gamer from depreciation (due to the same reasons) of NFTs he/she holds.

FinalBiome focuses on the transparency of the game assets production and introduces the notion of NFA (non-fungible asset). A developer can configure the game logic, the rules for assets creation, but he cannot create them on his own, circumventing this logic. This logic is stored on-chain. NFAs are created by gamers in the manner of Proof of Work when the gamer shall spend the resources provided for by the creation logic (other assets, money, time).

This ensures the transparency of asset generation, and places value on the asset on the right of its production.

All qualitative characteristics of the asset are stored inside it, including the information on resources spent to produce it.

## Absence of Technological Threshold

Development of blockchain games requires from their developers the specific high-level competences and introduces an additional layer of logic for the interaction with blockchain. This stack of technologies requires to enlist additional experts in this area, and bears additional risks for the game project.

FinalBiome implements capabilities of no-code implementation of the game logic, the rules of which allow the gamers to create and interact with their game assets.

## Financial Model of the Game Project and Monetization

The main challenge for the teams developing a blockchain game is to calculate the financial model and the project monetization. The design and calculation of tokenomic, issuance of its own token, listing on the exchange markets, ensuring liquidity, and a lot of other tasks drive the game development out of scope. And uncertainty of the token cost and the market volatility make it impossible to use the methods for project economic evaluation which are well-established at the markets.

The project monetization becomes market-dependent, and its management becomes a separate art for the project team.

FinalBiome brings back the widely-used methods for the game monetization and the financial model evaluation.

The main means of payment between a developer and a gamer is the BIO – a stablecoin pegged to USD. It rules out all the uncertainties of the volatile market for the developers and the gamers, and allows the developer to calculate the project financial model accurately and with high quality. And the possibilities of assets ownership and management stay, including the trade.

## No Costs for Gamers

Blockchains such as Ethereum are pretty expensive. A move of one token can reach more than $30 [4]. It becomes an insurmountable barrier for the mass adoption technology and its use by someone other than die-hard crypto enthusiasts.

Games generate a huge volume of transactions, and if a gamer has to pay for each transaction, then the freemium games publication becomes practically impossible. And they can make up more than 80% among mobile games [5].

FinalBiome is designed as a fee-less blockchain for gamers, and it removes the main barrier – payment for each move.

## Clean User Experience

The existing blockchain games force their users to get immersed in numerous new terms, to use several different apps and interfaces, and it becomes an insurmountable obstacle for the most part of the users.

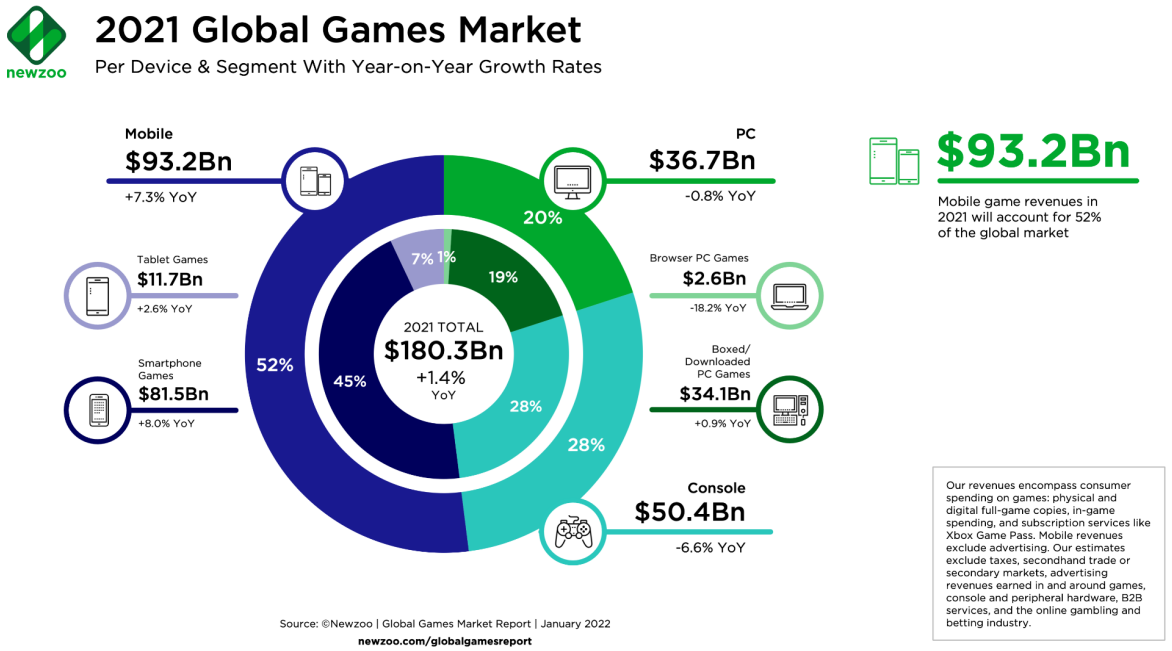
FinalBiome offers a single user-friendly application where a user can manage his/her assets in each game, refill the balance, trade and exchange his/her assets, as well as withdraw money.

FinalBiome aims at making the onboarding into the game no more difficult than entering an ordinary game. Any additional actions which could be required to ensure the legal compliance will be requested only if a gamer conducts a certain transaction requiring this. For example, the assets trade.

Thus, FinalBiome lowers the entry threshold for the users down to the level of an ordinary game.

# Market and Game Platforms

The market size of the ordinary, not blockchain, games in 2021 made up $180.3 billion [6].




These figures do not account for secondary markets maintained by gold farmers trading in-game assets, characters upgrading, and in-game gold mining.

The blockchain games market made up $2.32 billion in sales during Q3 and representing 22% of total NFT trading volume industry-wide.[7]

These markets do not overlap: the blockchain games market is limited by the Play to Earn model only, requires advanced competencies and knowledge for those who wish to play these games. And moreover, it requires advance payment before the start of the game (buying the game tokens or providing funds to pay the gas fee). And that's why it is limited by crypto-enthusiasts only.

As of today, there are several projects somehow trying to mitigate the obstacles for the mass adoption blockchain games and which can be considered as FinalBiome competitors.

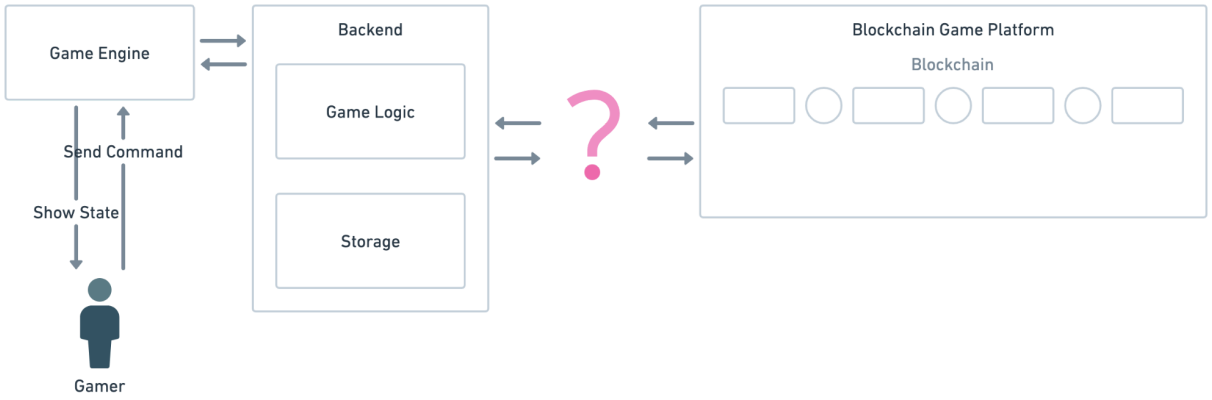
## Game Platforms

The existing blockchain projects aimed at the game industry can be divided into two types by the blockchain application method:

1. Game platform with blockchain as a game assets storage
2. Game platform with off-chain backend and blockchain as a game assets storage

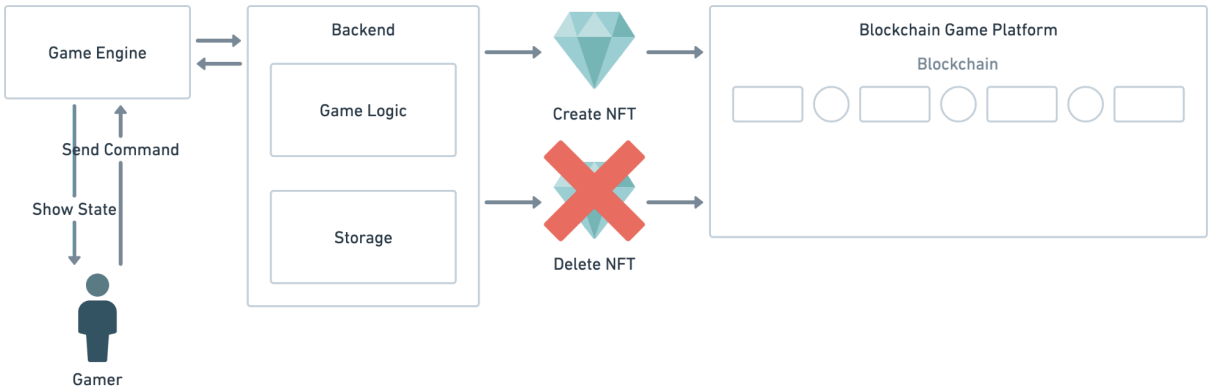
In general, the game consists of three main blocks

- Game Engine which is the game interface for a gamer
- Backend Game Logic which contains the game logic
- Backend Storage which stores the game status




## Game Platform with Blockchain as a Game Assets Storage

Game platforms with blockchain as a game assets storage offer a convenient and adapted for the game needs interface of interaction with blockchain for storage and management of game assets in the form of NFTs.




The developers still have to develop on their side the logic and storage, and to store part of the data (the resulting game assets) in blockchain.

For developers:

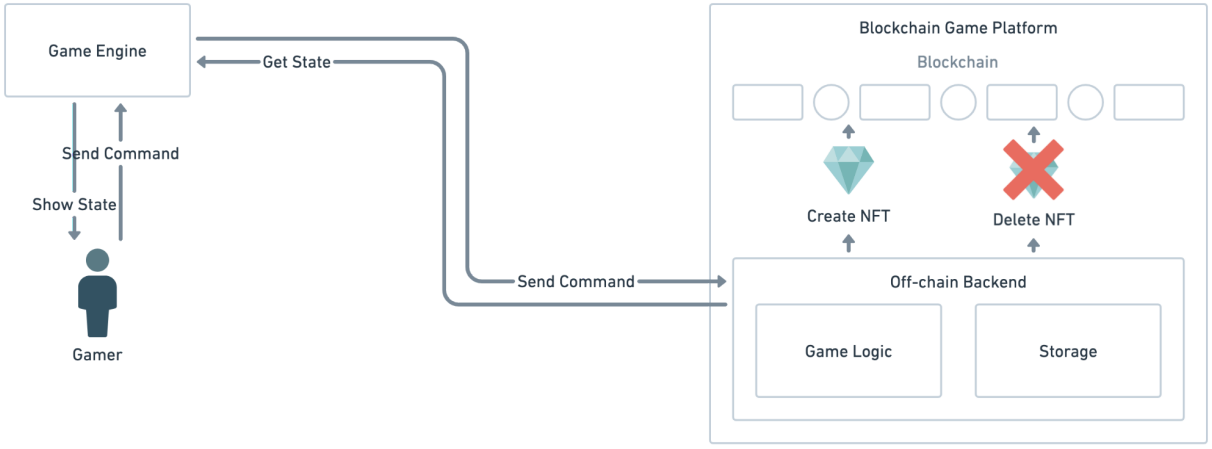
- It is possible to call their game a blockchain game

- More development work – integration with the platform is additionally needed
- The application is limited by Play to Earn Model, or they need to additionally develop a method to pay for transactions themselves instead of the gamer
- Work with in-app purchases is the developers' responsibility

For gamers:

- Rules of game asset creation are not transparent
- Asset value is controlled in a black box of the backend game
- What exactly shall be stored in blockchain is decided by the developer
- The existing asset value can be changed in time through changes in the game logic

## Game Platform with Off-Chain Backend and Blockchain as a Game Assets Storage




The platform allows a capability on its side to implement the game logic and storage outside blockchain.

The developer develops the logic and the game storage on the platform's side, and the interaction with the blockchain for the game asset storage takes place there too.

For developers:

- It is possible to call their game a blockchain game
- More development work – integration with the platform is additionally needed
- The application is limited by Play to Earn Model, or they need to additionally develop a method to pay for transactions themselves instead of the gamer
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For gamers:

- Rules of game asset creation are not transparent
- Asset value is controlled in a black box of the backend game
- What exactly shall be stored in blockchain is decided by the developer
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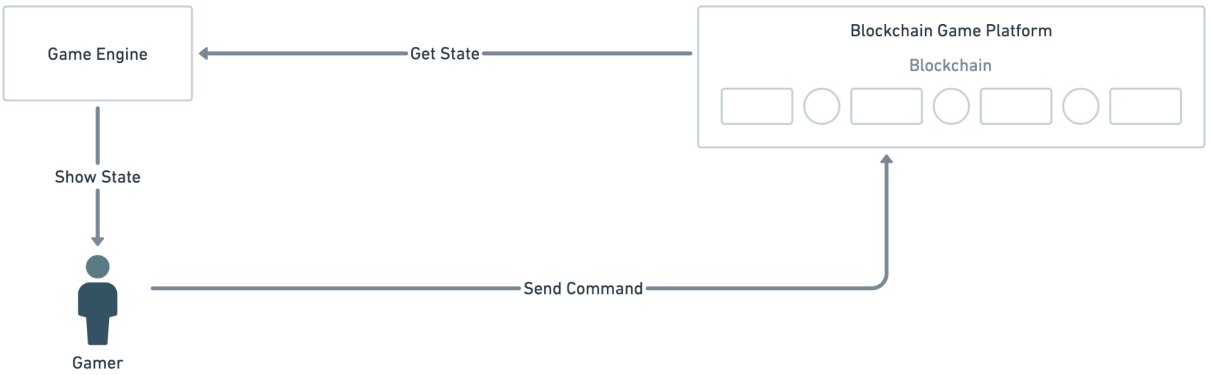
# True Blockchain Paradigm

FinalBiome offers the game building architecture which is fundamentally different from the existing models. It transfers the whole game logic into blockchain – **Game platform with on-chain game logic**.




Game Engine plays the role of visual interface only, reflecting the current status of the game which is fully stored on-chain. Any action by a gamer is a direct command to blockchain, which changes the game status according to the logic provided for by the developer and stored on-chain, and is implemented on behalf of the gamer only.

For developers:

- The game fully corresponds to dApp paradigm, blockchain stores not only assets, but the logic of their creation too
- You have to develop Game Engine only, the game logic is configured at the platform
- The application is not limited by some business model, and it is possible to use the traditional monetization methods
- In-app purchases are provided by the platform from the box

For the gamers:

- The rules for game asset development are transparent and invariable

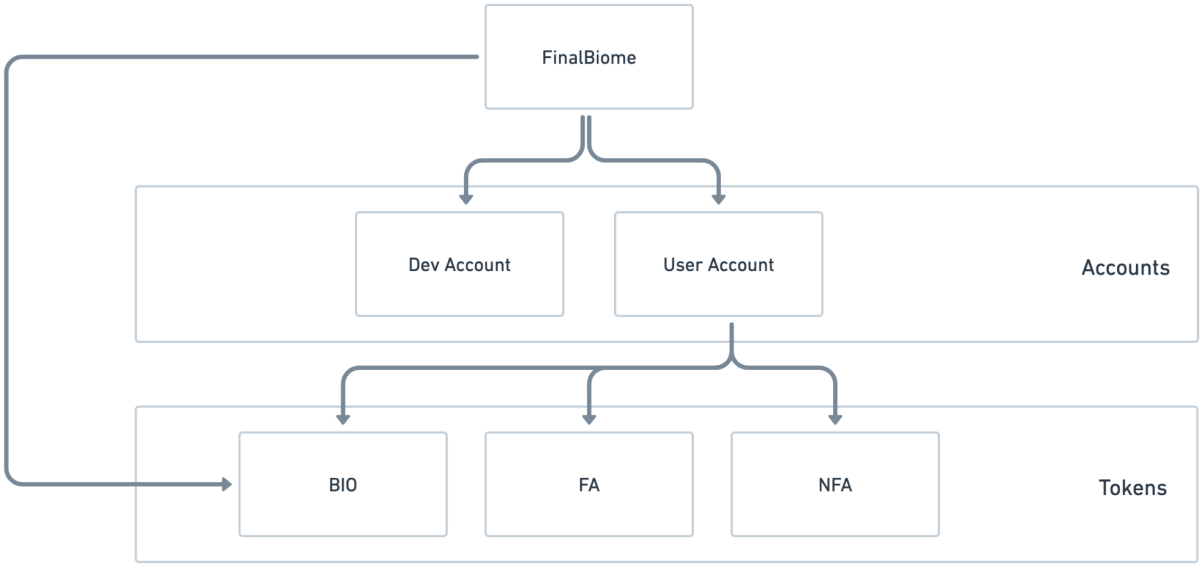
- The asset value is inherent in the asset proper
- The whole game logic is stored on-chain
- The asset value does not change in time
- The asset is created by a gamer: by efforts, actions and expenses of the gamer

# Features

## Accounts

FinalBiome has two main account types:

- Developer Account
- User Account




User Account is the gamer's account on FinalBiome. The user account is global all over the platform.

Developer Account is the game developer's account on FinalBiome. On behalf of this account the game is configured.

The fundamental thing here is the division of the accounts' authorities. Developer Account cannot own assets, create them and trade them. The main role of the Developer Account is to configure the rules for their generation and use.

And the User Account is the real creator and owner of the game assets, and it has the right to manage them.

In other words, an asset can be created in the game only and according to the rules preset in the game.

# Assets

Any FinalBiome game uses the resources owned and managed by the gamers.

The game assets are subdivided into fungible and non-fungible.

**Fungible Assets (FA)** are non-unique resources which can be spent partially and are globally used in the game. For example, gold, energy, etc.

**Non-Fungible Assets (NFA)** are unique resources, one-of-a-kind each. The game logic always assumes gamer interaction with NFA, comparison of two or more NFAs, their creation, destruction or consolidation. For instance, a knight kills an orc, and gold falls out of the orc. In this example, two NFAs (Knight and Orc) are compared through the game mechanics and the “Orc” NFA is destroyed (if the preset conditions are met), and the “Gold” FA is created.

Any actions (creation, destruction, consolidation, etc.) with NFA are carried out through Mechanics.

# Mechanics

Any game is a set of various resources controlled by a gamer. An action with a resource and interaction between several resources are provided for by the developer according to the game legend.

Mechanics is a predetermined logic which carries out the preprogrammed actions with one or several NFA.

For instance, in the above example of the knight fighting the orc, the battle process is the mechanic which performs action with them based on their characteristics (destroys, generates new assets, or changes their characteristics).

Creation, destruction and changing of the game asset characteristics can be carried out only through the mechanics which can be launched on behalf of User Account only.

# Generators

The unique features and characteristics of the game resource make up the highest value for the gamer. And assigning these features beyond the chain, i.e. in the game engine, will result in onset of risks associated with intentional or accidental depreciation of the existing assets of such class, undermining the market balance which entails the loss of reputation and credibility of FinalBiome.

Generators in FinalBiome allow to build the required random processes into the game logic.

The asset characteristics which are to be randomly defined in FinalBiome are shaped on-chain. The generators store random values distribution parameters in the chain and generate the required values during the game asset creation and changing.

The generators can be used both during defining the asset features, and during the mechanics operation, when, e.g., a certain action success should be random.

## Marketplace

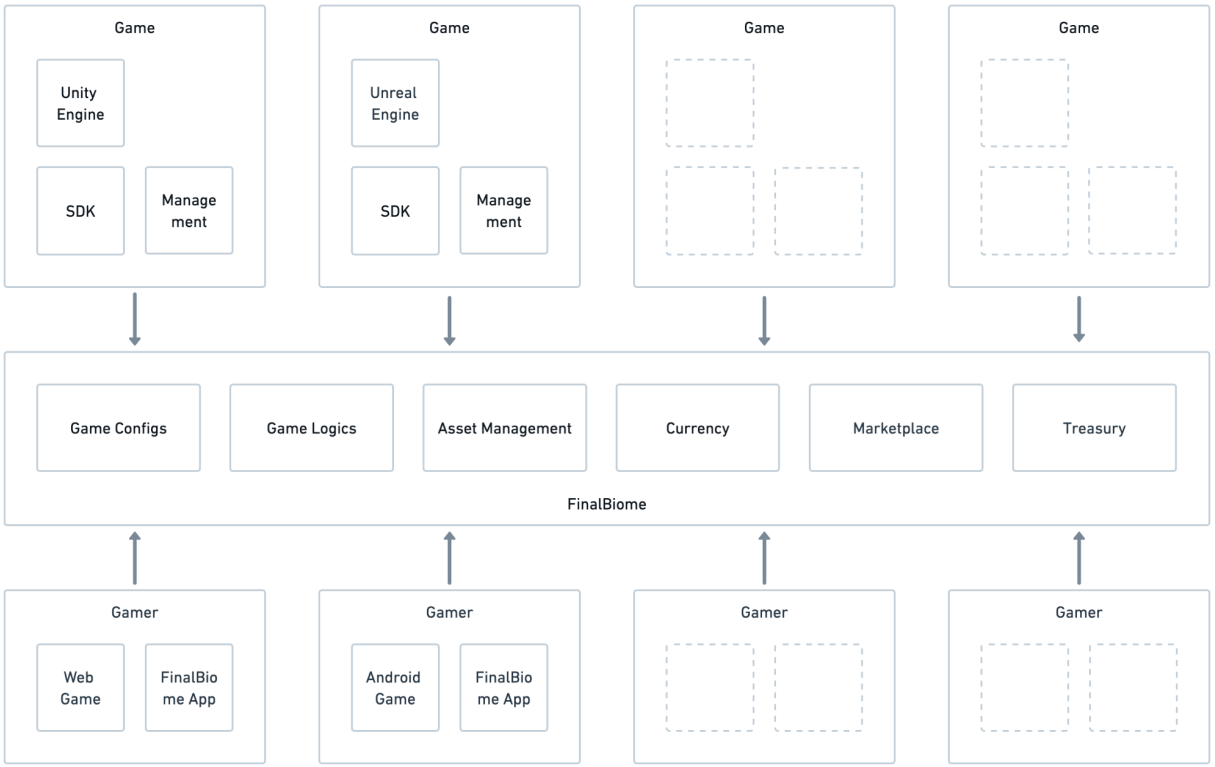
One of the FinalBiome goals is to give the games a capability to exchange and trade the game assets. All FinalBiome-based games have the game assets compatible with NFT, and the gamers can legally exchange, dispose of, and sell the in-game assets within the FinalBiome framework without the risk of being deceived.

The acquired assets can be used in the games for which they are intended.

The marketplace provides the gamers with a platform for peer-to-peer in-game asset trade.

Any User Account which owns the traded assets can buy and offer them for sale.

# Logic Architecture



# Platform-side Modules

## Game Configs

Store the game configuration – the name, description, list and configuration (class, name, order of generation/destruction, etc.) of the assets used in the game.

## Game Logics

Implements business logic and the game mechanics on the basis of a specific game configuration through the game assets manipulation according to the logic configured and/or implemented on smart contracts specific for the game.

## Asset Management

A subsystem for asset management, storage and generation. Each asset has a class and is linked to a specific game.

## Currency

The platform payment currency is BIO. It is the gamers' instrument of payment for purchasing in-game assets (if applicable) and various boosts.

## Marketplace

It’s a marketplace for the game assets trade between the gamers. The trade can be performed using both any in-game currency (currency of games published on the platform), and BIO.

## Treasury

FinalBiome fees are stored in the Treasury, which is under governance of FBS holders.

# Game-Side Modules

## SDK

The platform-based SDK for the game engines which allows to integrate FinalBiome into the game without the specific knowledge.

## Management

Web app to manage the game configuration.

# Game-Side Modules

## Game App

Mobile or web game which uses FinalBiome as a backend.

### FinalBiome App

Mobile or web application which allows a gamer to manage, buy and sell his/her assets, refill or withdraw money, interact with other gamers and receive a social approval.

## Basic Game Developer Flow

1. The game developer is registered in the system, getting the Developer Account
    - KYC procedure
2. Configures the game in Management App
    - Main data (name, logo, genre, etc.)
    - Chooses/configures a set of game assets, algorithm for their creation/destruction
    - As necessary, adds specific smart contracts if some logic is not available in FinalBiome from the box
3. Introduces FinalBiome SDK into his Game Engine and links the assets configured in p.2 in it.
4. Implements the visual part of the game on his/her Game Engine.

# BIO

The game asset trade requires the use of universal payment instrument.

The game assets sale for various game tokens not related to each other will lead to the users' confusion, to non-transparent, non-market pricing.

The token emission shall be transparent and provide a possibility of external monitoring.

However, the emission of the game tokens needed for implementation of the game legend is practically uncontrolled, since they are defined and emitted by the game developers. And to establish the market price between even two game tokens one needs to implement complex mathematical models (liquidity pools, etc.) and to control them. And it significantly complicates the FinalBiome entry for the game developers, and will require that they contribute fiat liquidity which will eventually undermine FinalBiome advantages.

Resolution of this problem involves the use of a universal payment instrument which will be used for the game assets trade for any FinalBiome games.

# Stablecoin

The universal FinalBiome payment instrument is BIO.

BIO is a fiat-collateralized stablecoin, which means that one unit of tokenized fiat currency is backed by one unit of reserved fiat.

Its value is pegged to the US dollar in a fixed ratio: 1 BIO = 1 USD.

It allows the gamers and game developers to be confident in stable cost of in-app assets. It eliminates the volatility risks, hence makes the game project economic model certain for the developer.

BIO emitent is FinalBiome, and emission is carried out when US dollar is transferred to the company's payment account.

During BIO redemption FinalBiome charges a commission in order to support reserves to ensure stability, legal compliance, maintaining licenses, auditors, the business infrastructure required by the regulator, and other FinalBiome costs.

# BIO Minting and Redemption Sequences

FinalBiome Network automatically manages the minting and redemption (burning) of BIO tokens, which can be used for both the in-app and marketplace purchases.

Users who visit a mobile or web application, created and maintained by a FinalBiome, can transfer fiat funds into a FinalBiome account. FinalBiome then executes a series of commands to verify, mint, and validate fiat tokens pegged to the value of those deposited funds. The user can then transfer those BIO elsewhere in order to use them.

Redemption follows the reverse sequence: BIO tokens are burned when a user visits a mobile or web application maintained by FinalBiome. Upon successful verification and validation, funds from underlying fiat reserves would be transferred to the user’s external bank.

## Workflow

Alice is a gamer, and she would like to purchase in-game asset. To do that she should hold some BIO tokens.

Alice visits a web or mobile application created and maintained by FinalBiome. Alice signs in to a gamer account and then begins the deposit process in order to turn her US dollars into BIO tokens. The deposit process requires Alice to transfer US dollars from her bank account into the FinalBiome account. Alice has a limit on the amount of funds she may transfer (and thus the number of BIO tokens she may acquire) in a given time period.

Once Alice's transfer is settled, FinalBiome Network executes the process required to transfer BIO tokens to Alice. These tokens may be taken from existing reserves from the FinalBiome buffer of pre-funded fiat assets to increase the speed of the process. If such reserves are not available, then the FinalBiome Network mints new BIO tokens. Alice then receives the BIO tokens, and the value of those tokens directly corresponds to the value of the funds she deposited into the FinalBiome account.

Now Alice can purchase in-game assets. FinalBiome maintains a blacklist of forbidden addresses in order to protect Alice and other FinalBiome Network participants from the known bad actors and to ensure regulatory compliance.

When Alice — or one of Alice's counterparties — wishes to redeem the BIO tokens and withdraw the underlying fiat dollars, then the process is executed in reverse: Alice returns to the web or mobile application and sends the command to redeem the BIO tokens. FinalBiome executes a transfer of underlying dollar reserves into Alice's registered bank account.

The BIO tokens are withdrawn from circulation, and either placed in reserve to service future requests, or else burned/destroyed if the value of those tokens exceeds the prefunded fiat buffer maintained by FinalBiome. This process is required to meet the KYC requirements and it is subject to authentication and authorization, verification, validation, and compliance.

# Monetization

FinalBiome monetization is based on commission from transactions with BIO.

The main task of the monetization implementation is the following. The gamer shall not pay for the game process, but shall pay only for transactions which are useful from his/her standpoint.

The useful transactions are

- In-game asset sale
- BIO redemption (withdrawal of the money earned into USD)

## In-Game Asset Sale

The commission is imposed on the trade of any assets and fungible tokens available for the trade; the asset availability for the trade is defined by the developer during the game design process.

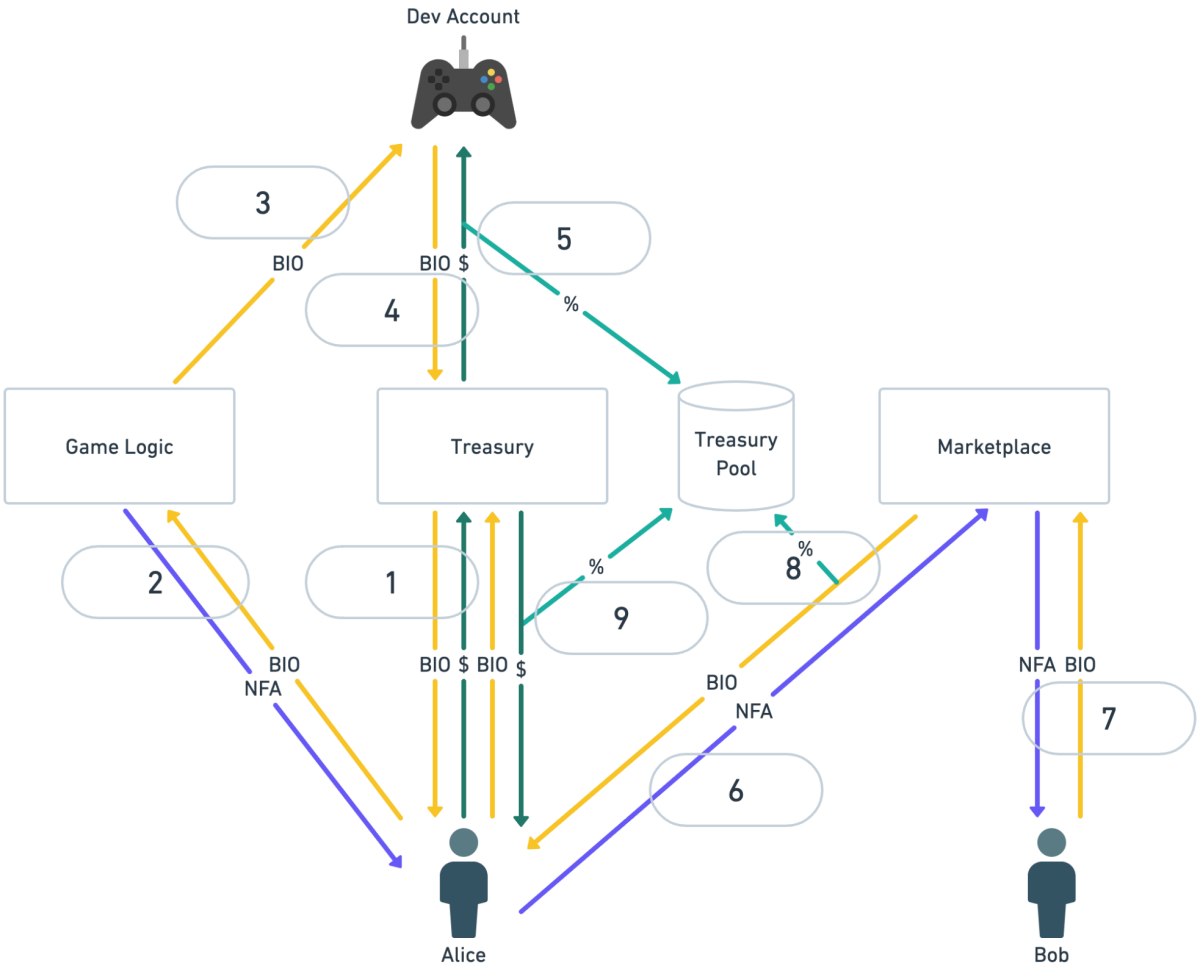
During the in-game asset sale at the marketplace the seller is subject to a commission in BIO, if the asset is being sold in BIO. The commission is charged at the moment of BIO transfer to the seller's account and is deducted from the total price of the sale. If the asset is being sold for in-game currency of any other game, then the commission is charged in FBS tokens which should be available for the seller before he submits the asset for sale, and the amount of FBS

tokens charged as commission will be frozen on the seller's account till completion or cancellation of the deal. The commission amount is transferred to the Treasury when the total paid for the asset is transferred to the seller.

# BIO Redemption

If a BIO holder, a gamer or a developer redeems BIO transferring the correspondent amount of USD to the bank account, FinalBiome charges the commission from the redemption amount.

# Workflows




## In-Game Monetization Workflow

Alice plays a shooter, and she wants to acquire an additional ammunition in the game. The shooter game allows her to do it. In the game Alice can buy the ammunition she needs for BIO.

If she does not have BIO in her wallet, she buys it for USD, using her credit card in a mobile or web application (1). For each USD she gets 1 BIO. Having BIO now Alice can purchase the

ammunition she needs for the game. A certain game mechanic is configured in the game by the developer which allows Alice to purchase the ammunition for BIO (2).

BIO paid for the ammunition go to the game developer's account (3).

When the developer wants to withdraw the earned BIO into US dollars, he redeems them into FinalBiome Treasury and gets USD into his bank account equal to the redeemed amount of BIO (4) minus the BIO redemption commission (5).

### In-Trading Monetization Workflow

Alice has a good day today – she shot a sniper and got his weapon. But Alice is not a sniper and does not need his sniper rifle. And she decides to sell the sniper rifle, because she needs to refill the ammunition, and she needs BIO for that.

Alice puts the rifle on the marketplace and sets a price at which she is ready to sell it (6).

Bob – an experienced sniper – sees the sniper rifle on the marketplace which he's been hunting for a long time and buys it (7) at Alice's price. Alice gets BIO minus the trade commission amount which is defined as a percent of the price (8). Alice can use the BIO she got for further purchases on the marketplace, in-app purchases, or redeem them. If Alice decides to redeem them, then this transaction is subject to commission.

### Cross Game Trading Monetization Workflow

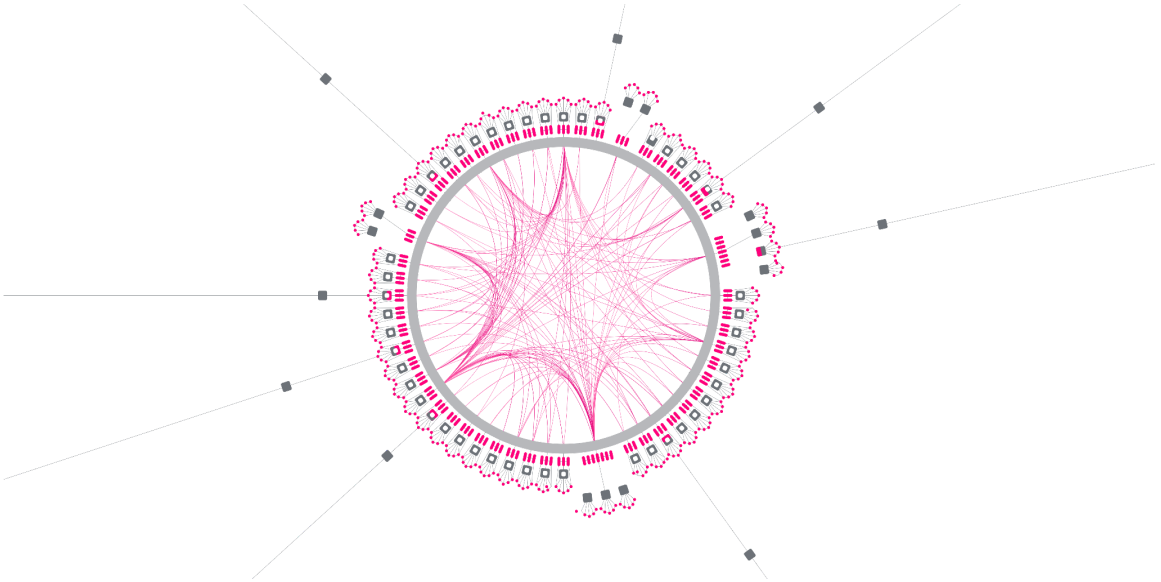
Bob plays several games on FinalBiome, and he, as any gamer on FinalBiome, has a capability to put on market or buy something, using not only BIO but in-game currency also, if the game developer opened the capability of in-game currency trade. Bob needs additional energy for his MMORPG character, and he decides to sell his old sniper rifle for energy required in his MMORPG. Any cross-game trade is subject to commission in FBS tokens, and Bob has to have them available, and when he places the rifle on the market, the correspondent commission in FBS tokens is frozen in his account. If the lot is sold, then this commission is transferred to the FinalBiome Treasury. If Bob decides to withdraw the rifle from the marketplace, then the frozen amount of FBS is unfrozen and becomes available for Bob for his future needs.

# Blockchain

To implement all FinalBiome features the existing blockchains are not suitable. Implementation of its own blockchain would require a resolution of an extensive stack of technical and administrative tasks to ensure the blockchain infrastructure. That's why FinalBiome is built as a Polkadot-based blockchain.

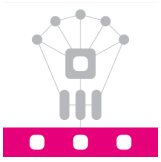
# Polkadot

Polkadot is the next-generation blockchain protocol that unites an entire network of purpose-built blockchains, allowing them to operate seamlessly together at scale [8].



For FinalBiome Polkadot provides the network security, consensus and framework which results in significant reduction of costs of FinalBiome technical implementation and allows to focus on the useful part of the platform only.

The main parts of Polkadot



### Relay Chain

The heart of Polkadot, responsible for the network shared security, consensus and cross-chain interoperability.

### Validators

Secure the relay chain by staking dots, validating proofs from collators and participating in consensus with other validators.

### Parachains

Sovereign blockchains which can have their own tokens and optimize their functionality for specific cases of their use.

### Collators

Maintain shards by collecting shard transactions from users and producing proofs for a validator.

FinalBiome blockchain is a parachain which uses Polkadot Validators for their consensus, and at the same time implements specific tasks of the platform and has its own economy.

FinalBiome Collator nodes are responsible for transactions on parachain, and the security is provided for by Polkadot Validators, thereby allowing FinalBiome users not to pay for the validation.

## Game Development Opportunities

For game developers FinalBiome provides a library of algorithms for no code implementation of the required game logic. But in case the available algorithms do not suffice, FinalBiome allows the game developers to independently implement the required algorithms on the basis of smart contracts using Ink! framework and the development language Rust.

Providing the developers with a possibility to use other languages for the smart contract implementation is the subject for further research and implementation by the FinalBiome team.

## Collator Nomination

Nomination of FinalBiome Collator Nodes will be granted to users who will vote for the most effective Collator Nodes. Collators with the maximum number of votes will be allowed to process transactions and get compensated for that. The nominators will have to stake utility tokens and will be able to get compensated for the oversight from the amount received by the active Collator Node.

This model for selecting the active Collator Nodes ensures the use of the most reliable and accessible Collator Nodes.

Utility tokens staked by a user for nomination stop being available for the use.

## Collators

FinalBiome network will require 10 active collator nodes and backup nodes to store a full copy of the network and data status.

All active Collator Nodes will get the compensation from Collator Pool. The node operator can define a commission in percent of the award as his income. The collator's income is visible for everyone and will have influence over whether he will be elected by nominators for staking.

Potential collators who would like to create their own node will have to stake a certain number of utility tokens without getting compensation from Collator Pool. Only collator nodes which became active will get compensation for the network service from the Collator Pool.

Collators who do not provide the service cannot charge the commission for their services. In this case the nominators will transfer their shares to other nodes if the collator node is offline.

If some organization needs local access to the chain data, it can launch a full collator node, define its role as backup by staking some amount of BIO. In case some collator node goes offline, the backup node will be used as a collator (priority according to tokens stake amount among backup nodes) and get compensated from Collator Pool for providing on-demand service.

# Token Economy

## FinalBiome Shards

FinalBiome Shards (FBS) is a native token for FinalBiome Network.

FBS tokens serve two key functions in FinalBiome Network:

- Network Utility Token

  FBS is a native fee token (e.g., fee for smart contracts), and it is also utilized in staking for collators and other network activities.

- Governance of the Network

  As governance tokens, FBS tokens provide their holders the right to vote in Treasury governance, referendum, network upgrade and more.

The FBS token holders will have a possibility to get an award for staking their FBS tokens and to participate in the key issues of the governance.

The node operators will get awards in FBS tokens for their work.

The game developers will also be able to get grants in FBS tokens for creation and further development of their games in FinalBiome.

Transition to full decentralization of FinalBiome governance will be conducted gradually.

Treasury will be created which will accumulate income from transactions subject to commission, as well as part of awards for staking. This treasury will be eventually controlled by FBS tokens holders, as soon as the network becomes sufficiently decentralized.

The Treasury income will be composed of the following:

- Marketplace transaction commissions
- BIO redemption commissions
- Commissions in FBS during cross game assets trade and exchange.

Additional income flows into the Treasury will appear in the course of opening new capabilities, such as commission charged for smart contracts executions, external integration, asset renting out, in-game ad, and many others.

# Minting and Distribution

The total supply of FBS tokens will be minted at the launch of the mainnet and will be distributed to:

- FinalBiome Team
  20% will be reserved for the FinalBiome Team
- Ecosystem
  5% will be reserved for Ecosystem development, e.g., rewards as grants and bounties for game developers
- Reserved
  10% will be reserved as FinalBiome Treasury
- Reward
  35% will be distributed as reward to IPO participants and network contributors, including early participants and collators
- Strategic Investors
  30% will be distributed to the strategic investors:
    - Seed Investors — 19%
    - Ventures — 11%

FBS tokens are subject to re-denomination.

# Initial Parachain Offering

There are two ways to participate in Polkadot network:

- Be deployed as Parachain with permanent on-going security
- Be deployed as Parathread with pay-as-you-go security renting economic model.

## Parachain

Joining the Polkadot Network as a Parachain is a perfect option of deploying FinalBiome Network. In order to do this, one needs to win the auction of slot leasing for Parachain which is conducted by Polkadot. The auction assumes bidding, and the auction participant with the highest bid wins within time allocated by the auction.

To make slot reservation for Parachain FinalBiome will require the DOT holders to freeze their DOTs as a collective application for a slot for conducting Crowdloan IPO (Initial Parachain Offering). In case of IPO success, the FBS tokens will be distributed to the DOT holders as a compensation for lost income resulted from DOT freezing during the first round of 24 months.

FinalBiome plans to lease a Parachain slot three times, 24 months each, i.e., for six years with subsequent FinalBiome transfer to an independent autonomous network.

## Parathread

If the auction for the Parachain slot leasing is unsuccessful, FinalBiome will be launched as Parathread. The enlisted DOT will be unfrozen for their use by the holders, and FBS will be also minted during the launch, but they will be distributed only among FinalBiome founders and seed investors according to the initial plan. The rest will be reserved for participation in the next IPO.

Unlike Parachain, Parathread has gas costs which, in turn, depend on the scope (frequency) of validations on the network. The more often the validation is performed, the more secure the network is, but the higher are the gas costs. The FBS holders will participate in determining the validation frequency through voting. The gas costs will be covered from the game asset trade commissions, and in case they are insufficient, then from public sale of minimum necessary FBS amount from reserve in order to cover the gas costs on an everyday basis.

## Parachain Slot Lease

We plan to lease the Parachain slot for six years with subsequent FinalBiome separation into a separate independent blockchain with a bridge to Polkadot Network.

Assuming that DOTs are estimated to generate a net effective annual return of $r$ for DOT holders, we will distribute a proportion of FSB tokens reserved in the Rewards pool, a total of $r * N$ units of FBS tokens, to IPO participants during the six years, as a reward for freezing their DOTs for our lease of the Parachain slot.

⚠ The share of tokens in the Reward Reserve and the amount of the FBS tokens reward is constantly reviewed and subject to change.

### Reward Calculation

Taking into account that net effective annual return for DOT holders is $r$, expenditure on each auction will be the following:

$C_n = (1 + r)^n$, where $n$ is the auction period.

In our case the auction will take place at $0$, $2$ and $4$ periods (years). All the FBS tokens allocated as IPO Reward will be fully distributed among the participants of the three IPO.

Then the proportion of FBS tokens allocated from IPO Reward as a reward for a specific auction will be the following:

$$P_n = \frac{C_n}{\sum_{k=0}^{2} C_{k*2}} = \frac{(1+r)^n}{(1+r)^0+(1+r)^2+(1+r)^4}$$

Thus, all the tokens allocated as IPO Reward will be fully distributed among the participants of the three IPO:

$$P_0 + P_2 + P_4 = 100\%$$

At $r = 10\%$ and a share of FBS tokens allocated as IPO Reward in the amount of $30\%$ of total supply which equals $T$, the reward will be distributed as follows:

Auction #1 — $8.17\% * T$

Auction #2 — $9.88\% * T$

Auction #3 — $11.95\% * T$

By then FinalBiome is expected to be ready to be upgraded to an independent blockchain bridging to Polkadot, and all FBS holders will be invited to vote whether to upgrade to independent blockchain or lease another round of Parachain slot by minting more FBS tokens as rewards for the fourth round IPO participants.

## Distribution of FBS Tokens as IPO Reward

The FBS tokens reserved as IPO reward are planned to be distributed to IPO participants during the first six years.

For the purpose of preventing a drastic reduction of FBS token price at the expense of steep increase of the number of free tokens while distributing them as a reward, the reward will be paid in regular small portions.

All the tokens planned for distribution as a reward from Reward Reserve in each round between each IPO participant, will be distributed in proportion to the DOT share of each IPO participant in every network block.

Since the FBS tokens are distributed for the purpose of compensation for the loss of profit from the frozen DOT, the initial assessment of FBS token for the IPO participant in the first round will be derivable from the IPO success.

## Initial Liquidity Injection

After a Parachain slot is secured by winning the first Parachain auction, a small proportion of FBS tokens reserved in Treasury will be available at public sales events before the launch of mainnet, to inject initial liquidity to the network.

FBS tokens sold through public sales events will be distributed to the participants immediately and will be ready to be traded at the launch of the mainnet.

### Distribution of FBS Tokens to Other Parties

Tokens distributed to other parties, such as Strategic Partners, cannot be traded for a fixed period of time (transfer schedule will vary from 12 to 24 months after the mainnet launch) to ensure the market stability.

# Roadmap

## Phase 1

- FA, NFA, Mechanics implementation
- Testnet
- FinalBiome App (Wallet)
- BIO token launch
- Private Sale

## Phase 2

- Marketplace
- Westend Testnet
- Collator Node Staking
- Security Audit
- First game release

## Phase 3

- Mainnet
- Governance
- Treasury Pool
- Smart Contracts
- Public sale

# Challenges and Risks

The project implementation will involve a number of challenges and risks to be addressed by the team.

## Blockchain Gaming Limitations

Despite the obvious advantages of blockchain use for game assets storage and management, the efficiency of smart contracts and each transaction commissions significantly limit the technology use to a very narrow number of genres and, in fact, the only one business model – Play to Earn.

For that very reason we chose the technology stack based on Polkadot which allows us to deploy our own blockchain specialized for the game needs. This significantly reduces the required resources and associated risks, compared to the blockchain development from scratch. And unlike the widely used network resource payment model (for transactions), our model allows us to implement the game with any business model.

## Blockchain's Lack of User Experience

The overwhelming number of blockchain game projects face huge problems with the user's experience. A user has to register some wallet which he/she has to choose, somehow transfer funds to it, often via the exchange market, where he/she also has to go through KYC, without making mistakes at any step. That's why there are a huge number of various guides helping with this, but one has to distinguish a right guide from a fraudulent one.

FinalBiome implements a flow to which an ordinary user is accustomed: in one application you can refill a balance, withdraw funds, manage your game assets, and boast of your achievements before other platform users. This reduces the entry threshold for users down to the one familiar to any credit card and smart phone owner. And developers of the games from the box get a simple and user-friendly payment system, asset store, social stimulation system, etc.

## App Store Limits

As of today, the majority of application stores prohibit publication of games involving blockchain. And this significantly reduces the audience coverage and forces the developers to get published as a web application or via a link to Android game distributive.

The FinalBiome team has a solution for this problem. However, at the current stage of the project we are not ready to share this solution with an unlimited number of people.

## KYC Requirements

In the majority of the current blockchain game projects a user faces KYC requirements, and often even before he/she starts to play. It considerably narrows down the funnel of attracting new users, especially those who do not intend to invest money in the game. The reason includes, among others, the need to use exchange markets to get the required tokens.

FinalBiome monetization is designed so that the KYC procedure will be required only for money withdrawal. It will considerably reduce the number of user actions needed to start the game and will dramatically cut down the refusal index.

## Steep Learning Curve

The developers who decide to launch a blockchain game project have to spend a significant amount of time mastering technology stack specific for blockchain, studying new programming languages, selecting a blockchain for implementation of the project, developing and testing the implementation. Besides spending the additional time of several hundreds of hours, the project acquires a number of new risks – the correct selection of a blockchain, the smart contracts structure, correct calculation of economic model, etc. All the above makes a valid economic assessment of the whole project practically impossible. And for indie developers the launch of a blockchain game becomes impossible.

FinalBiome realizes the principle of configuring, but not development of the game logic. It allows the developers not to dive into intricacies of blockchain technologies, and not to address blockchain implementation. The game developers focus only on development of useful, creative and game components of the project. For cases not covered by FinalBiome from the box we provide for a possibility of customizing on the basis of smart contracts.

## Gamers' Trust

Changes in a game mathematical model which can be made by the game owner, result in changing its balance, and cause gamers frustration, depreciation of assets they own, and eventually, lead to their disappointment and distrust. It relates both to the conventional games, and blockchain games. That's why one of the most important functions assumed by FinalBiome is separation of authorities between the game owners and gamers. The game assets cannot be created by the game owner, the game assets are created solely in a proof of work manner by gamer's actions. The game owner cannot change requirements to production (mining) of a specific asset, hence cannot retrospectively depreciate it.

## Fraud

One of the challenges for an open game platform based on blockchain to which it is technically possible to get connected beyond the game interface and implement scripts imitating user actions, is to identify such unreliable accounts, prevent the fraud manipulations and

domination over law-abiding gamers. Consequences of ignoring such risk will involve not only the negative attitude of some part of the gamers towards the game, but also for the game whose assets are freely traded it might result in asset manipulation and the crash of these assets market.

The FinalBiome team realizes the gravity of these risks and takes them into account in the platform design.

As of today, there is no single specific solution for this problem of risk mitigation. It involves the current stage of the platform building. There are options for this risk mitigation, such as introducing on-chain observers for retrospective machine learning analysis and anomaly detection in gamers' actions, real time rate limit, and so on. The selection of the optimal solutions will be the subject for future research.

# Team

FinalBiome is launched by a seasoned team of like-minded people with successful experience in game and software products and platforms development, social networks and online services.

**Sergey Kovalev**, Chief Executive Officer

Experienced in launching a software and services development studio, multiple end user and b2b products, such as social network, messenger, e-comm platform and others.

Successfully participated in the Accelerator Program in OneValley (formerly GSV Labs, https://gsvlabs.com/), Redwood City, CA with one of the projects.

15+ years experience as CTO, CIO, CEO and Founder.

**Tim Garifov**, Chief Customer Officer

Lead game designer at blockchain game Honeywood.io, Windy.app, and Armadillo Games. Participated in more than 500 projects as UI/UX designer, game designer and content creator.

WMO Award 2020 winner in the Best App Design category.

Tim has created apps and blockchain games with a total audience of over 10 million users and over $50 million in revenue.

**Mikhail Nikitenko**, Chief Marketing Officer

Michael is an investor and ambassador for many different blockchain projects. He has extensive experience in retail business development and a broad understanding of the cryptocurrency market.

A strong supporter of the future of web3, focused on community growth, market research, marketing, and overall project development. He is currently the Strategic Growth Coordinator at InvArch, also helps Mangata, Portal DEFI, and is an advisor at Honeywood.io.

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