Expload

Blue Paper 0.2

A Development and Digital Distribution Platform for Decentralized Games

English version
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expload.com

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1. Intro

We have all witnessed the success of CryptoKitties. The game's explosive growth was fuelled by the gamification of activities related to the collection and creation of new, one-of-a-kind kitties, as well as the use of hyping techniques around the unique collectables. As you may recall, one of the kitties was resold for $114,000.

Today, we see a plenitude of games seeking to replicate this success, to name a few:

- Fishbank fishbank.io
- A card game mythereum.io
- A card game cryptosaga.io

The game market is developing an overall trend towards blockchainization of the in-game economy. However, there are a number of challenges impeding the mass distribution of decentralized games:

- The existing decentralized games run on Ethereum and are thereby restricted by the low capacity and steep gas prices in performing smart contract function calls
- The entrance barrier for developers is rather high, given that decentralized game development is a non-trivial task that requires specific expertise from the development team
- There is no digital game distribution platform widely recognized amongst classic gamers

To address these challenges, we are creating a Expload platform specifically tailored to develop and distribute decentralized games:

Challenge	Solution
Ethereum's low capacity	A fast consensus blockchain to maintain the transaction capacity specific to computer games. A virtual machine for smart contracts with an optimal gas price policy from the game market perspective.
High entrance barrier for developers	SDK embedded into games and integrated with the main game engines (Unity, UE, etc.), that provides a rich framework and a toolkit for fast development.
No platform for mass distribution of decentralized games	A user application with a game store, a crypto wallet, an inventory of in-game items earned from a variety of games, and a space for socialising and community & clan building.

The **Expload** platform is an analogue of **Steam** for decentralized games.

2. Platform overview

Note: *The platform's technical description is constantly updated to potentially significantly change in the course of technical solution selection and first games integration.*

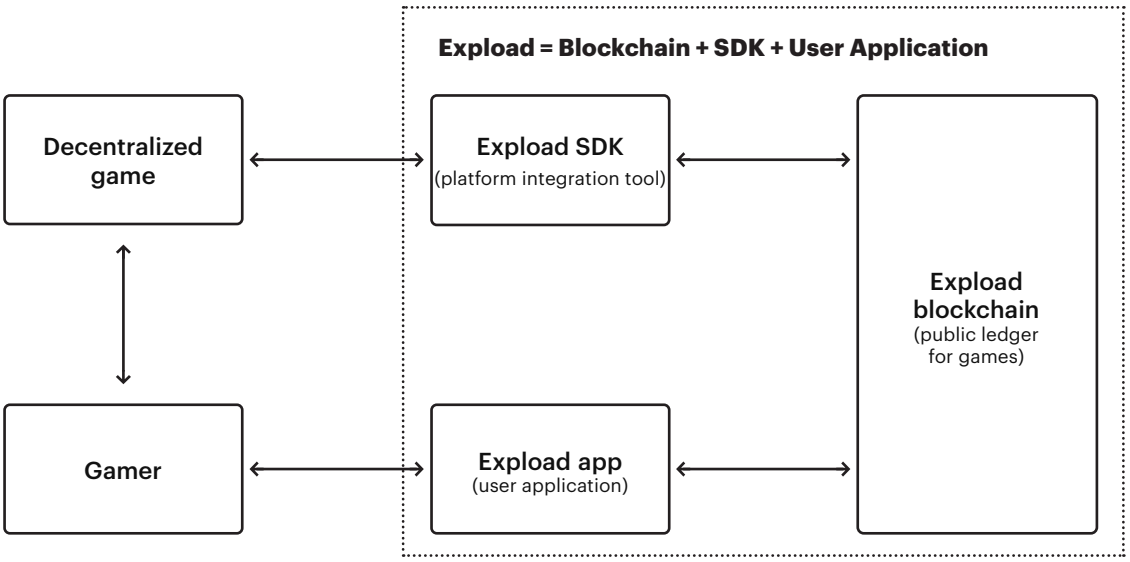
2.1. Architecture

Expload is a development and digital distribution platform for decentralized games.

Decentralized game — a game where part of the mechanics and/or the entire economy is implemented as a set of smart contracts that are performed in a decentralized environment (on the blockchain).

The Expload platform is comprised of three components:

- Expload **blockchain**
- Expload **SDK**
- Expload **app** for users



With the Expload platform, game developers receive access to:

- SDK for the rapid development of decentralized games
- A decentralized game distribution platform:
  - A new game distribution channel
  - Control over the second-hand market of digital copies
- A crowdfunding space for decentralized games
- A legal solution for cryptocurrency related activities
- SDK for guild and clan integration with the decentralized economy

For gamers, the Expload platform provides the following opportunities:

- Classic and decentralized game store
- Inventory for in-game item storage and management
- Marketplace to trade/exchange in-game items
- Crypto wallet integrated with crypto exchanges
- Crowdfunding space for decentralized games
- Platform to build communities, clans and guilds

Nota bene: *for mass distribution amongst classic gamers, the platform will support both fiat money and other cryptocurrencies.*

2.2. Expload Blockchain

The blockchain underpinning the Expload platform is based on the Tendermint library (tendermint.com) and possesses the following features:

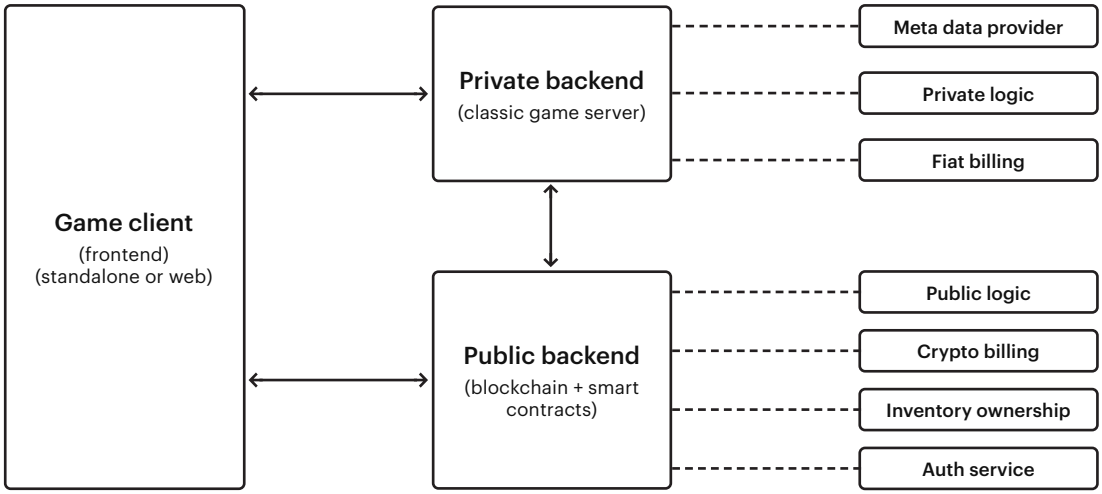
- BFT consensus
- Virtual machine designed from scratch specifically for games
- C# as an underlying smart contract language
- Ethereum VM bytecode translation into Expload VM bytecode

2.3. Decentralized Game Architecture

Three components of a decentralized game:

- Game client. A standalone or web application that a user directly interacts with
- Private backend. A centralised server owned by the game developer:
    - Executes the game logic hidden from gamers (private logic). Whether a piece of logic is to be executed on the private or public server, is decided by the developer. Logic in its entirety may be implemented on the blockchain
    - Provides metadata for the public server. Such as images for assets represented as tokens on the public backend (blockchain)
    - Fiat billing
- Public backend. A set of smart contracts performed in a decentralized environment (on the blockchain):
    - Executes the game logic exposed to gamers (public logic)

- Secures transparent ownership of the in-game inventory. Contains the rules for inventory emission, sale and resale
- Cryptocurrency billing
- User authentication



2.4. Digital Asset Requirements

Below are the requirements to be met by a decentralized game developer to obtain access to the Expload platform and ensure gameplay integrity:

- Assets to be globalized by a company shall be emitted within a smart contract (public game logic). The emission algorithm shall guarantee the uniqueness of items and their limited emission

- An asset can be transferred from one owner to another within the global economic space (public game logic) only, not within a game (for transparency and simplification it can be presented as a game)

The above requirements need further exploration and can be changed or withdrawn afterwards.

2.5. Software Development Kit (SDK)

Expload SDK is a high level development tool for decentralized games. It aims to popularise blockchain game development through easy access for game studios.

Expload SDK components:

- **Expload API:**
    - Low level blockchain interface
    - Authorisation service interface
    - Acquiring service interface
    - Smart contract interaction interface

- **Expload Framework:**
  - Standard smart contract library
  - Standard authorization UI
  - Standard acquiring UI
  - Standard auction UI
- **Expload Toolchain:**
  - A visual constructor for the quick setup of a set of smart contracts
  - Forth, C# and Solidity translators to Expload's VM bytecode
  - Deployment tools
  - Test environment
  - Administration, telemetry and analytics tools for launched games

2.6. Expload API

API will be primarily integrated with the following game engines and operating systems:

- C# integration for Unity
- C++ integration for Unreal Engine and other proprietary game engines
- JavaScript library for WebApps
- Native integration for iOS
- Native integration for Android

2.6.1. Low Level Blockchain Interface

The low level Expload API is devised for client application interaction with the Expload blockchain through RPC calls to the node.

Core functions:

- Broadcast transactions
- View transaction history
- Compile and deploy smart contracts
- Call upon smart contract methods
- Subscribe to smart contract events

2.6.2. Authorisation Service Interface

API for user authentication in a game through the Expload wallet ID. Authorisation serves to bind the digital assets owned by a wallet holder on the Expload blockchain, to the in-game entities.

If a user is authenticated in a game through third-party services or his/her own authentication system, the user's account is bound to the wallet ID on the game's private server end.

The security of simultaneous authentication by several services needs a deeper exploration. Game authentication through Facebook accounts is extremely popular. However, a game developer's failure to prevent the leakage of matched Facebook accounts and wallet IDs may have negative consequences for the platform as a whole.

2.7. Expload Framework

2.7.1. Standard Smart Contract Library

A library containing security proven smart contracts to be inherited by developers in building their own smart contracts, with minimal code added.

The base library provides for the following smart contracts:

- Emission of in-game inventory (gamer owned digital assets)
- Exclusive item emission
- Item lease
- Auction
- Cross-game exchange of items
- Tournament prize pool
- Crowdfunding
- Digital distribution
- Guild bank
- Guild officers
- Rewards for user generated quests

2.7.2. Type Class Library to Bind Private and Public Logic

A type class library enables communication between the game logic executed on the private server and the game logic executed on the public server.

2.7.3. Standard UI Solutions

The Expload platform contains UI patterns for faster game development, namely for:

- In-game authorisation
- In-game acquiring
- In-game auction

2.8. Expload Toolchain

2.8.1. Smart Blue Prints

A visual constructor of public game logic within smart contracts.

The Expload platform provides a standard smart contract library for base game logic programming. For purposes more sophisticated than resale inventory emission (for instance, the DNA mixing rules for cat breeding), a developer needs to write a custom code for the smart contract.

There are two approaches to game logic programming:

- Without a prototyping tool:
    A. A game designer writes a specification
    B. A programmer realises the specification
    C. A game designer tests the prototype
    D. The running through of the iteration cycles until the acceptable gameplay is achieved

- With a prototyping tool:

    A. A game designer assembles the prototype on the visual constructor

    B. A game designer tests the prototype

    C. The running through of the iteration cycles until the acceptable gameplay is achieved

    D. A programmer removes logic redundancy

Smart Blue Prints is a second approach tool.

2.8.2. Developer Tools

Tools to develop, administer and operate games, with the functions as follows:

- Forth, C# and Solidity translators to Exploadʼs VM bytecode
- Deployment tools
- Test environment
- Administration, telemetry and analytics tools for launched games

2.9. User Application

The Exploadplatform provides gamers with an application comprising:

- Classic and decentralized game store/marketplace
- Own game library
- In-game item storage and management inventory

- In-game item trading/exchange marketplace
- A crypto wallet integrated with crypto exchanges
- A decentralized game crowdfunding platform
- Platform to build communities, clans and guilds

The application is implemented for the following platforms (in order of priority):

- PC
- Web
- Android
- iOS
- MacOS/Linux

User functions supported by the platforms:

Function	**PC**	**Web**	**Android**	**iOS**	**MacOS/ Linux**
Game store	+	+	?*	?*	+
Game library	+	+	+	+	+
Game launcher	+	only browser based	-	-	+
Wallet	+	+	+	+	+
Inventory	+	+	+	+	+
Crowdfunding	+	+	?*	?*	+
Guilds	+	+	+	+	+

?* It's not yet certain whether a full-featured Expload application capable of accepting cryptocurrencies can be implemented for mobile platforms, until Apple and Google make their stance clear on accepting cryptocurrency on their mobile platforms.

3. Functionality for Game Developers (Tech Spec)

3.1. Decentralized Game Mechanics

- Blockchain based emission of in-game inventory:
    - Item emission and initial ownership transfer to gamers:
        - New item emission within a smart contract. The ownership is transferred to the game
        - Item ownership transfer to a gamer. Payments are made in fiat money outside of the blockchain
        - Item ownership transfer to a gamer. Payments are made in the Expcoin cryptocurrency within the smart contract
    - Gamer-to-gamer resale of items:
        - Item withdrawal from the game to make it available for resale
        - Item transfer/resale regulation. Setting an item resale fee to the benefit of the game developer and the Exploud platform (to guarantee the game is displayed on the platform's marketplace)
    - Item fusion. The mechanics for new item generation based on the existing items:
        - The programmable random mechanics for item fusion within the smart contract
        - A possibility to use True Random

- User generated content:
  - A user can create and trade new unique items, such as and for instance, a one-of-a-kind coat colour pattern kitty. Afterwards, the same pattern kitty (DNA) cannot be created
- Exclusive items:
  - The possibility to produce a limited series of exclusive items for opinion leaders, such as popular streamers, to be distributed during their streaming sessions
  - The auction mechanics for item sale by opinion leaders
- Lease:
  - Arranging item lease from one user to another
- Loot box mechanism:
  - The sale of loot boxes and loot cases that have a certain probability to contain rare items
- Cross-game exchange of items:
  - The possibility to exchange items across games within the appellate programs. Technically, the exchange is exercised through direct smart contract interaction and involves both game developers

- Tournament mechanics:
  - Holding tournaments according to the rules set by the smart contract
  - The prize pool regulations described in the smart contract
  - Open proceeds distribution from sales of emitted items to the tournament prize pool. For example, a game emits new items on a regular basis and allocates 50% of the proceeds to the game's tournament prize pool. The distribution mechanics are detailed in the smart contract

3.2. Game Crowdfunding

Expload enables game developers to run crowdfunding campaigns.

A crowdfunding scenario:

- A developer intends to create a game by raising money through crowdfunding
- A developer considers the unique values:
    - The unique items
    - Keys to the digital copies with the unique properties. A game's unique copies can find a ready made market amongst collectors
- A developer produces a smart contract on the Expload platform for the crowdfunding purposes
- The future gamers/collectors/investors buy the inventory as regulated by the smart contract, thereby financing the proposed development

What the platform offers:

- A standard crowdfunding smart contract
- A platform for the public sale of a tokenized inventory

3.3. Game Distribution

Game developers can use Expload as a game distribution platform.

Developer's scenario:

- A developer intends to create a game based on the Expload platform
- A developer decides upon:
  - Pricing policy
  - Version classification (Classic, Premium, etc.)
  - Version resale mechanism (developer fee, platform fee, number of resales permitted, etc.)
- A developer produces a smart contract on the Expload platform to incorporate the selected parameters
- A developer uploads the game's digital copy (for standalone games) for CDN distribution on the Expload platform

Gamer's scenario:

- A gamer goes to the Expload platform
- A gamer buys a game's digital copy, either for fiat money or cryptocurrency
- A gamer plays the game having authorised on the Expload platform through the wallet ID
- A gamer decides to sell the game putting it up for sale on the Expload platform
- The second-hand game is acquired by a new owner

How to attract gamers to the second-hand game market:

- Through unique game copies (valuable collectables)
- Through unique items tied to the respective digital copies

The platform shall provide for:

- A constructor to enable game sales:
  - Meta data binding (Art, Description, etc.)
  - Classifiable types of digital copies
    (such as Normal and Premium game versions)
  - A standard smart contract linked to the accounts/Smart contract audit
- A mechanism for binding the game copy ID to the user account
- A mechanism for digital copy ownership transfer/resale to another user, where a resale fee may be charged
- User authentication in a game through the Expload account
- A distribution and promotion platform (application/portal)
- CDN for standalone game distribution

3.4. Guilds on the Blockchain

- Guild bank
- Guild officers
- Rewards for user generated quests
- Business-building mechanisms

4. Business Model

- Capitalization of the Expload cryptocurrency
- Attention economy within the Expload app
- Item resale fee, charged by Expload in accordance with the game's smart contract. We cannot obligate game developers to include our fee in the smart contract, without impairing decentralisation. However, our fee can be set in the smart contract as a prerequisite for displaying a game on the Expload application marketplace

5. Tokenomy

- Gas for smart contract performance
- A common currency for cross-game item exchange

6. Use Case: Crypto Citadels

6.1. Concept

A crypto asset collection game based on the Tower Defense combat mechanics

6.2. Combat Mechanics

The combat mechanics are derived from the classic Tower Defense:

- Waves of attackers follow their paths
- Towers are immovable structures shooting at the enemies
- The goal is to obstruct the attackers from reaching the final destination. A round is considered lost if a certain number of enemies break through

6.3. Tournament Mechanics

The combats are run as tournaments taking place once in X hours.

Tournaments are held in automatic mode following the scenario below:

- **T** hours before the tournament starts **N** maps are generated
- The registered gamers place the towers from their inventories on the maps
- A tournament consists of several rounds with an increasing number of attackers and a decreasing number of gamers
- The prize pool is distributed amongst the winners

To be able to win the tournament, a gamer needs to obtain more powerful towers.

6.4. RPG, Fusion & Collection Mechanics

Each tower has the following parameters:

- **Level [0, ∞)**
- Combat attributes
- Skin/Exterior/Decorations

Mechanics:

- The developer emits new **Level 0** towers at regular intervals
- A gamer may purchase a tower either from the developer or other gamers
- A gamer may fuse two or more same level towers into a next level tower (e.g. **Level 2 + Level 2 >>> Level 3**)
- Tower fusion results in more advanced parameters. The fusion mechanism provides for unique tower generation
- Higher level towers are less likely to fuse successfully. To ensure a successful fusion, a gamer may opt to make a contribution in cryptocurrency

6.5. Game Economy

How game developers earn their income:

- 50% of proceeds from sale of regularly emitted Level 0 towers.
- 2% tower resale fee (⅓ of the fee amount)
- Fix price for increasing the probability of successful tower fusion

How gamers earn their income:

- Tower resale
- Rewards for winning tournaments (allocated from the prize pool)

How the prize pool is replenished:

- 50% of proceeds from sale of regularly emitted Level 0 towers
- 2% tower resale fee (⅓ of the fee amount)

The Expload platform derives its income from:

- 2% tower resale fee (⅓ of the fee amount)