Bitrent - Platform Description

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# 1. Purpose

## 1.1 Vision

The platform solves two main issues of the current construction industry:

1. Finding investors
2. Monitoring the process of construction

Immersing into details, using RNT coins (Bitrent platform currency), users from all over the world can take part in the joint funding of construction of any building that is registered on the platform. So, a seed capital to start a construction could be found without applying for fund sources and early stage investors would be able to get excess profit even from small inputs.

While adding a project to the system, creators shall upload all project documents which is added to the project node in the Bitrent blockchain. After all needed sources are found and a constructor has been chosen, deal participants (developer and constructor) define terms and ‘sign’ smart contract.

Real-time construction monitoring fulfills by the usage of RFID tags during construction which allows omitting 3d party confirmation/audit of the construction process.

Omitting 3d party audit service, developer saves budget sources to implement equipment as to correspond to “green standards” like Active house, LEED, BREEAM, and etc. If the project doesn’t match these standards it cannot be registered in the system.

# 2. Description

## 2.1 Platform Functionality Division

The platform is represented by a web interface which links all system components and allows users to easily use and interact with the platform functionality. The functionality is divided into 3 main parts:

### Investment

Components: buildings catalog, user profiles (see [2.2 User Roles](#_n1dwxqop9400)).

The users are able to invest into the project even a small amounts of money. It’s possible by the aid of smart contracts which record and track each backer investments and calculate the benefits. The use of smart contracts in this way guarantees that a project backer will get his/her coins according to the smart contract conditions.

In the web interface, the idea is implemented by introducing building catalogue so as each user could be able to browse and find a project to back.

### Construction

Developer and Constructor build and sign a smart contract (see [2.4 Smart Contract Constructor](#_swgh2s1n389q)) which define each party's’ responsibilities, deadlines, rewards, and penalty costs.

The platform will have integration with Oracle Primavera P6. Using this cloud service integration the platform shall monitor and regulate the observance of the smart contract terms and conditions.

In the web-interface, investors will be able to monitor construction in real time via Roadmap section of the Project Profile page (see [3. Design](#_aycmx4n2tmro)).

**Real-time monitoring:**

Analyzing a project BIM model experts define buildings units to attach RFID tags or barcodes. Each tag/barcode is entered into the digital progress statement and has 4 statuses (1. In the system 2. Attached 3. Implemented 4. Approved ).

Bitrent platform smart contracts are linked with integrated service database and when construction is started and tags/barcodes statuses are changed it’s statuses are changed in the project Roadmap sections and all participants (investors, developers, constructors) are notified.

### Operation

As the Bitrent buildings are constructed according to “green standards” they have diverse sensors installed. When a building is used sensors gather data on how the building operates and send it to the Bitrent platform which processes and represent it in the easy-to-understand diagrams, figures, and tables.

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1. Dismantlement

As while construction were used tags and barcodes, it becomes possible to follow where goes construction debris after the building dismantlement. It’s an important part of the building lifecycle as 30% of the world’s waste *is* a construction debris and if demolition waste is utilized according to green standards the world *will become a better place to live.*

## 2.2 User roles

### Admins

A team of Bitrent experts who is responsible for users verification, conflicts handling, and support. *Also, if a fraud is discovered in the project (for instance, in the blockchain marked that a stage is completed but in reality it’s not) Admins are allowed to make entries into the project blockchain.*

### Investors

Don’t need verification to sign up. Are allowed to view project pages without possibility to make entries in the project blockchain node.\*

Are able to input sources in a project using web-interface functionality (see [2.1 Investments](#_h5gxgcq947fq)).

Has personal wallet from which payments go to a project wallet, and to which come dividends from accomplished projects according to the smart contract terms and conditions.

\*Exception: when an investor discovers that a fraud has appeared in the project and has proofs, he/she shall address to Admins *to manual regulation.*

### Developers

Should be verified by the system administrators as legal developer. When verified, are able to create a project which must be evaluated by Experts (see [2.2 Experts](#_2cvd9xz2imp7)) and also its documentation must be verified by admins. Is able to choose terms and condition for the project smart contract and make agreement with Constructor to accomplish a project building. This role is confirmed by ledger to make entries straight to the project node.

### Constructors

Should be verified by the system administrators as legal constructor. When verified, are able to apply as a contractor to a project. This role is confirmed by ledger to make entries straight to the project node.

### Experts

Profiles are not listed in the system, only Admins (see [2.2 Admins](#_r6v3erc2z90j)) can see profile info. Admin shall prove that an Expert has enough experience and expertise to evaluate projects. Experts are able to evaluate projects by a set number of criterias.

## 2.3 Blockchain Description

**Basis - Hyperledger Fabric**

Distributed ledger gives the flexibility and security to make transactions visible to select parties with the correct encryption keys.

It has different peer types (see [2.2 User Roles](#_n1dwxqop9400)). So, the blockchain looks up an endorser identity and then sends transactions only to the peers that are involved to generate a result. So as to differentiate verification procedures and introduce different terms and condition for Bitrent platform usage.

## 2.4 Smart Contract Constructor

MVP will include one smart contract with *diverse methods* to which will call the platform backend while operating.

In the UI it will look like each project has its own smart contract generated specially for it. Participants choose optional methods that are marked in the backend and saved to the project blockchain node and when conditions change statuses backend calls to the chosen method to act in accordance with its terms and conditions.

## 2.5 Project Lifecycle

### Creating project in the system

* Filing in description fields
* Attaching documentation
* Project verification
* Project evaluation
* Project publication

### Uploading documents

As the system has integration with 3d party services, nodes keep and save only links to the source, where all documentation is located. Such a solution lowers blockchain maintenance cost. Nevertheless, all changes will be saved in nodes as if something changes in the source hash of the link changes too.

### Construction monitoring

Monitoring is handled by RFID tags or barcode integration in building units which are record in 3-rd party servicу (Oracle Primavera P6) then sent to the smart contract and marked in the project blockchain node. When the tag/barcode status is marked in the node, all the node participants are notified and changes can be observed on the project roadmap section.

### Building delivery

Is handled by the platform functionality including smart contract terms and conditions.Which accelerate and simplifies current way of ownership document transfer.

### Building management

As Bitrent buildings are constructed according to green standards like Active house, LEED, BREEAM, and etc. They have implemented sensors which transmit data to the platform to process it, form statistics, and display it as easy to understand diagrams, figures, and tables.

Also, the sensors make entries in the project blockchain node when exceptional cases appear (such as blackouts, facility breakdowns etc.).

### Building dismantling

By the aid of sensors it’s possible to follow where goes construction debris after the building dismantlement and make sure that waste is utilized according to green standards.

# 3. Design

# 4. Glossary

**Project** - a node in the blockchain that contains links to all documentation (BIM, other), also a smart contract which regulates processes is attached to it. In UI it is represented by a separate page.

**Building catalog** - the list of all projects that are registered in the system.

**Progress statement -** the report on construction delivery.

**Project evaluation -** the rating which is given by Experts (see [2.2 Experts](#_2cvd9xz2imp7)) to a project, Is formed by the scoring project characteristics using set of criterias which are implemented into the system.