DECENTRALIZED APPLICATION FOR LEASE/RENT LODGINGS BASED ON BLOCKCHAIN

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Abstract

This paper is devoted for a problem of storing a large data flow in decentralized applications based on Blockchain technology. Blockchain technology provides transparency and consistency of data but storing a large data stream in the Blockchain causes problems. This paper provides main methods of data store in decentralized applications, also it describes implementation of application for lease/rent lodgings using blockchain approach.

Key words: *Decentralized application (Dapp), Blockchain, Data store*

1 INTRODUCTION

Currently there are a lot of 'Uber' type services on the market such as Uber, Airbnb, Kickstarter etc. The services support a process of each transaction from providing communication until getting review of a result. The services receive payment from each transaction. Blockchain technology implementation in the current `Uber` model will reduce costs and improve the security of transactions.

Blockchain transaction reduces financial institutions fees (such Visa, MasterCard) (3%), foreign transaction fees (3%) and currency conversion fees (1%). A client should pay only a little fee for transaction execution. Also, data in Blockchain transparent and consistent [1].

The aim of project is to create `Uber `type decentralized application for lease/rent lodgings based on Blockchain. The main use-cases of application is represented in figure 1.
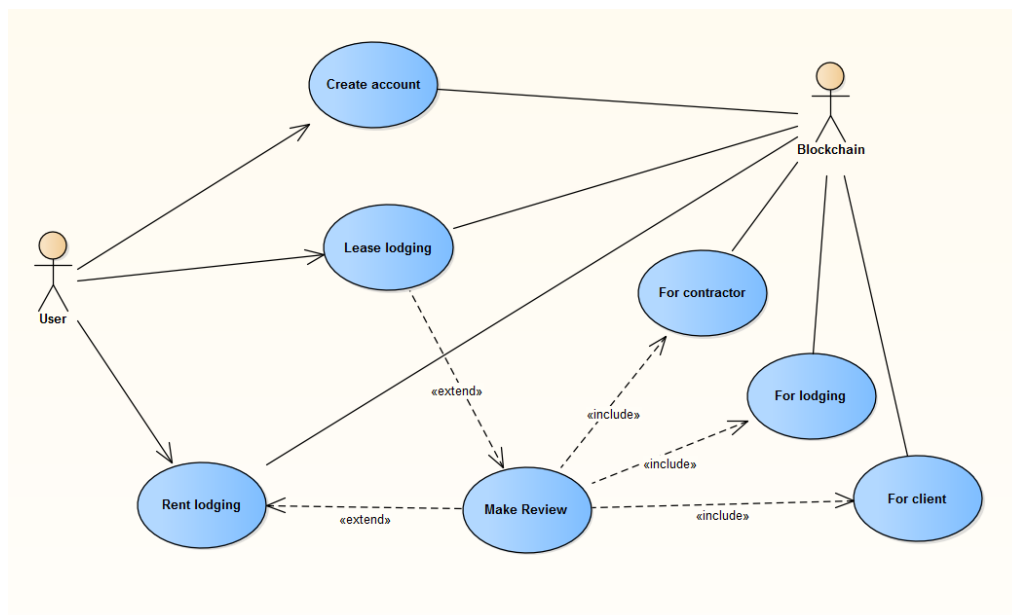

Fig 1. Use-case diagram

2 APPLICATION ARCHITECTURE

This software solution consists of the following parts:

1. Server part
2. Blockchain smart-contracts
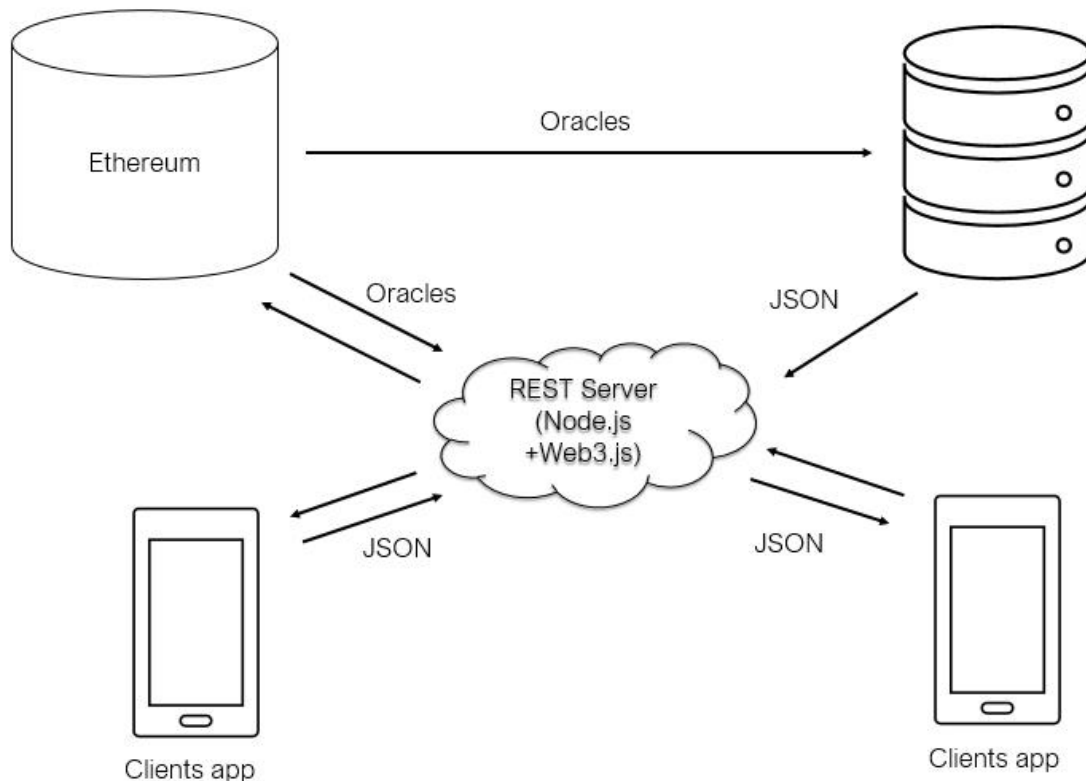3. Data base
4. Client part.

Fig 2. Application architecture [2]

There is a problem with storing a large data flow in Blockchain. Storing a lot of data in Blockchain is inefficient, slow and costly. In the project used an architecture that reduces amount of information stored in the Blockchain.

The figure 2 represents architecture of the decentralized application. All extra data of application is stored Off-chain. The important information for business logic is stored in Blockchain network. All entries in Blockchain occur through smart-contracts [2].

The services such Ethereum, Dash, EOS, IOTA etc. use as a core of Blockchain for decentralized applications [3]. Interaction with Blockchain core occurs through a server via REST requests.

3 TOOLS AND METHODS

Ethereum was chosen as a core of Blockchain network. Tokens of standard of ERC20 which superstructure over Ether (Ethereum crypto-currency), have high liquidity and can use to exchange for other tokens of the system [4]. A lot of projects use Ethereum. Solidity language had used for implementation smart-contracts in Ethereum network. The Ethereum Rospten test network was used.

Node.js software platform was used as backend. Node.js has high performance, an active community and is supported by large companies [5]. Json format use for transferring data. The server is hosted on Heroku service. For communication with Ethereum Blockchain used Web3.js module. Oracles were used for interaction of Ethereum network with Off-chain [6].

Android OS was chosen as client platform. Android SDK, Kotlin and Java languages were used for implementation. SQLite is used as local database. MVVM was used as architectural pattern.

4   DISCUSSION OF RESULTS

MVP of the project was implemented. The figures 3 represents main menu of client application. List of available lodgings is loaded from centralized database. The figures 4 – 5 represents menu of detailed information about lodging.
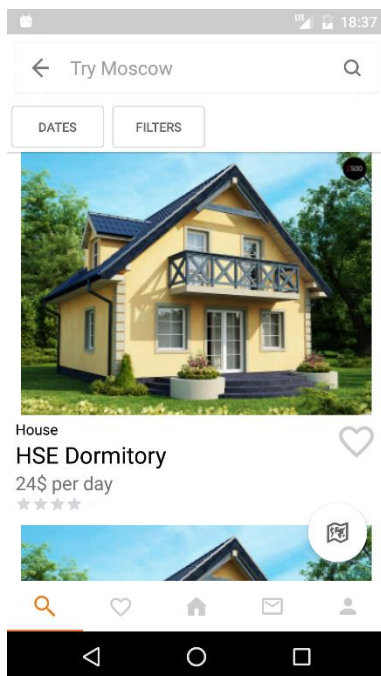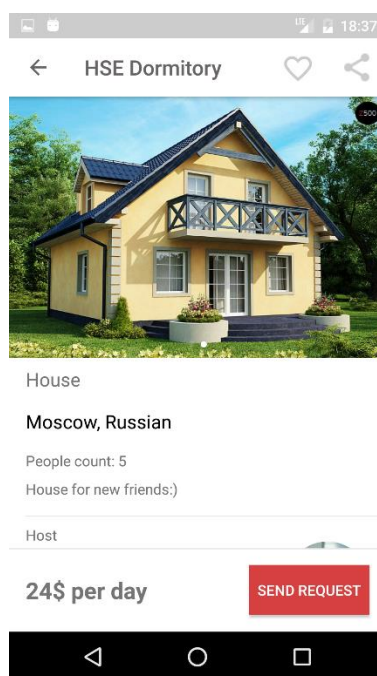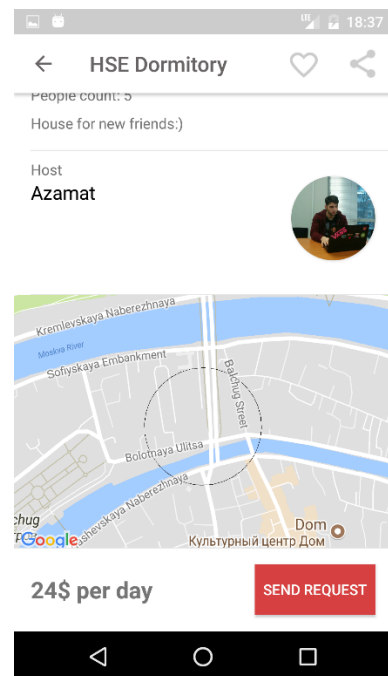

| **Fig 3.** | **Fig 4.** | **Fig 5.** |

The figures 7- 8 represents the process of an contract applying. The contract data is written to the database and Blockchain network. The figure 9 represent information about the new contract.
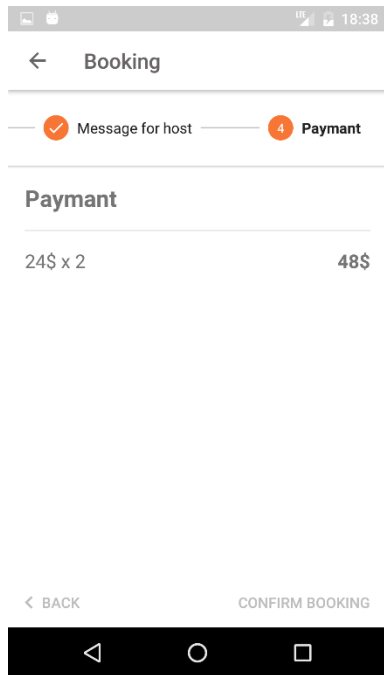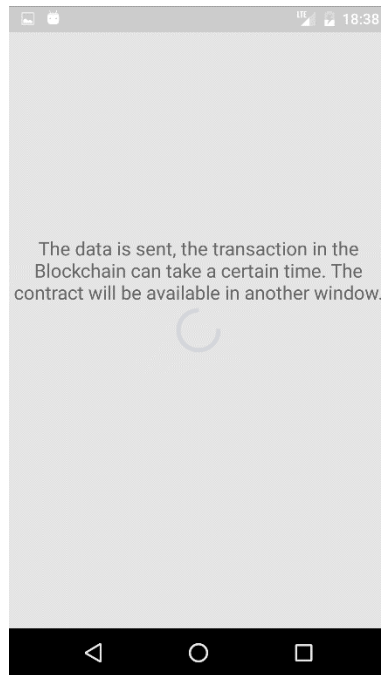
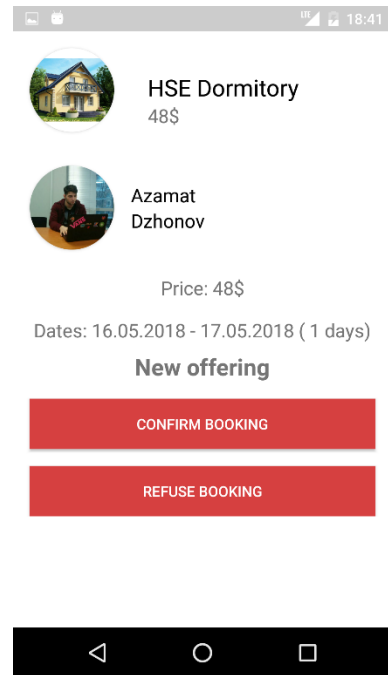**Fig 7.**   **Fig 8.**   **Fig 9.**

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