

## **Final report**

### **1. Program Overview**

The combination of blockchain and the Internet of Things has very good prospects. The combination of blockchain and Smart Lock is one of the possible applications. Based on the Smart Lock, we hope to establish a smart, reliable, and valuable platform for sharing economy companies and all other business that may use Smart Lock.

### **2. Program Goal**

Our goal is to begin from why we need to build such a product and what we believe. First, we have faith at Sharing economy. Not only like uber and airbnb, we believe people also can share some commodities. For example, the programme named Library of Things is on a mission to make borrowing better than buying. We believe even though it is still small scale which created by some passionate individuals, but if it become the mainstream, we could address many fundamental problems which our society faces including: financial hardship, environmentally, socially and well-being. Second, we think blockchain technology can fix many problems which stack sharing economy now. For example, we can use the traceable and immutable characteristics to build the credit system which can help sharing companies to reduce the lost of their products. Also, the consensus mechanism can help companies to address some unnecessary disputes.

Thus, we want to use the combination of blockchain and IOT to achieve this goal and the first step is to build a Smart Lock which can upload the information of tenement to the blockchain. We believe smartlock will be a door which can connect the physic world to digital world. We want to build a Smart Lock which can help some landlords to easily track and maintain their houses without using the third party who may leak their personal information to others.

*Keywords: sharing economy, blockchain technology, library of things, traceable and immutable, consensus mechanism, IOT, Smart Lock, personal information, airbnb*

### **3. Introduction**

Compared with traditional locks, the advantages of smart locks are that they are more convenient and safer. Smart locks are the foundation of smart furniture, and we believe that the combination of blockchain and smart locks will create something more valuable. A smart lock based on blockchain technology can connect to the Internet and people can control it through smart contracts on the blockchain. Any person who controls the lock can issue one or more private keys and perform complex customizations on the private key, setting when the lock is opened and when it is locked. In this way, the sharing economy can be further decentralized, easily renting, sharing and selling anything that can be locked up. Smart Lock allows users to pay directly to a lock and then open it. The renter can also change the

customization of the private key at any time, making the entire experience more convenient and safe.

#### 4. Business Value

Smart Lock provide an easy way for landlords and real estate agencies to manage their real estate. Using Smart lock can convert physical assets into digital assets for management and trading. Also, Smart Lock provide an easy way for tenants to perform the contract and return the key. The signing, execution and completion of the contract can be done remotely. That means a lot of Convenience.

The value of smart lock is not only reflected in renting. So far, blockchain has made great achievements in managing digital assets. We hope there is a way to use blockchain to manage physical assets. The first step is converting physical assets into digital assets. The question is how to establish a reliable and trusted link between the physical assets and digital assets. we think Smart Lock can be one of the solutions. Physical assets need a digital assets representation in blockchain. The first step is building the relationship between physical assets and digital assets. Normal process is generating a Smart Tags, then paste the Smart Tag on the physical assets. The smart lock can be the container of the Smart Tag. It can be the key to build a relationship between physical assets and digital assets.



#### 5. Technical design and rationale

Hardware:

Raspberry PI

We will use a raspberry Pi as the microcontroller help us to transfer people's behavior to corresponding computer language. Also, it will automatically run the smartcontract and uploading record to the blockchain. Because raspberry Pi 3.0 has its own wifi component, only thing we need is to build a environment for it and connect it with the user interface.

Pi camera:

It mainly in charge of scan the QR code which create by the mobile. Also it can help us to take the picture of the visitors and send it to our mailbox through the internet.

LED light:

I add it for showing the lock condition as the indicator light.

Software:

We want to build a ios application which can help us do the identity work for the costumer. Also it will has the login interface which help us to figure you are a customer or a landlord. Different kind of user have different acessibility.

For customer, they can use their mobile to do identity to create their own id, when the landlord give their acessibility, they can use their id to open the lock. Also they can use the application to give grade for the house and landlord which will be recorded on the blockchain as well as our credit system.

For landlord, they can use our application to fill in some basic information like the start date and end date of the room and the cleaning company which will help them clean the house after the renting. Then our application will create a smart contract and upload to the blockchain which can help them easily sign the contract without conflict.

Blockchain:

We will build our system based on Ethereum network. We will use private blockchain which can controled by the landlords. Instead of using proof of work, we prefer using proof of stack. And the digital coins is still under our discussion. Mainly it will help us to maintain the platform and the credit system.

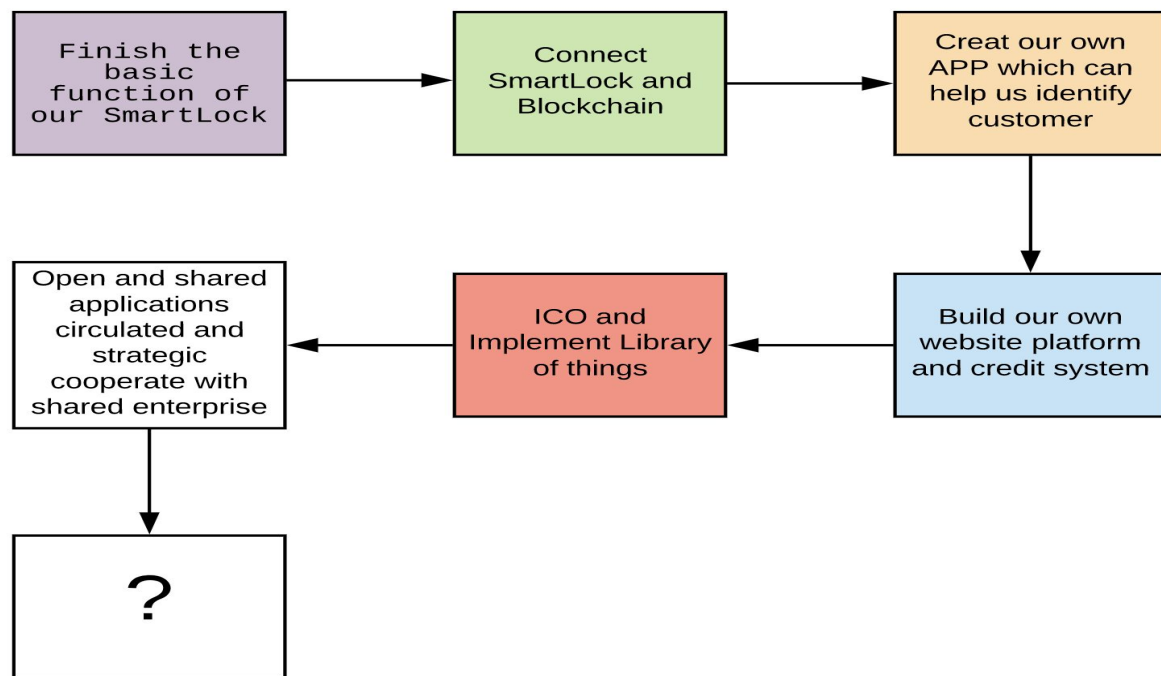
## **6. Risks and response to risks**

We think the most important issue is about trust, is about how build the trust between renters and customers, that is renting trust issue. In traditional way, trust issue can be resolved by trusted third parties. Our suggestion is using blockchain to create turst. Property information, landlord and tenant identity information, and leasing contract information will all be verified through the blockchain.

However, though the blockchain can be decentralized, the assistance of trusted third parties is also a good way to build the trust between merchants and customers. A third party combined with blockchain can do better in trust issue.

## **7. Future Work**

First, finish the basic function of our Smart Lock. Second, connect Smart Lock and blockchain. Third, creat our own app which can help us identify customer. Then, build our website platform and credit system. After that, do ICO and implement library of things. At last, open and shared applications with shared enterprise.



## 8. Token policy

- Token allocation scheme Total: 10 billion
- Token Public issuance this time: 4 billion
- Early investors: 1 billion
- Foundation management: 5 billion
- Token release plan: Accepted currency: Bitcoin (BTC), Ether (ETH); Direct issue: 4 billion; ETH and BTC collected at the end of crowdfunding are managed by the Foundation's account; Deblocking PBS collected by investors includes 4 cycles. The length of a cycle is 30 days and 1/4 the total stock of Token is deblocked each time.
- Use of funds: Technology development: 23%; Community maintenance: 15%; Commercial operations: 10%; Law and Compliance: 2%; Reserves: 50%.

## The reason we want to do project with sharing economy

Congruence between the image a company portrays externally and the way it operates internally is critical today. People are pulling back the curtains on companies and revealing how well, or not, their internal cultures are aligned with external images.

People only want to associate themselves with brands that reflect their personal values. And with more than enough options to choose from in any given category, customers easily and quickly shift their loyalties when they perceive any cognitive dissonance. A company that doesn't integrate its culture and its brand may go undetected for a while -- but eventually customers will discover the lack of alignment lose all trust and respect for the brand.

In this sense, our platform is an easy way to fix the trust problem between the companies and customers. For customers, we keep track and record the performance of the company,

eliminate the possibility that the company may delete or distort the data and our platform provide a place for customers to protect their own rights and interests. The most important thing is they can get the feedback efficiently from the platform.

For company, they do not need cost much money and time to root causes, all the data are trackable in our system, also they do not need to pay much money to supervise staffs, our system can help them to regulate employee performance and behavior.

All in all, our platform can improve the share-economy system, no matter from business and technical. Our first step is implementing the data recording with blockchain technology, then we will try to launch our platform, the last step is issuing our own token.