



Smartshare Protocol

**Project White Paper of The Ecological Value Chain
of Smartshare Internet of Things**

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Abstract

Smartshare is an intelligent and credible decentralized blockchain technology platform designed to reshape the value ecosystem and data value of the Internet of things. Currently, the Internet of things terminals and the resulting volume of data are increasing. As for the Internet of things enterprises, the pressure of innovation in their business models is becoming more and more urgent. It does not only mean to improve the well-known framework of the public or simplify the original business models but also gain competitive advantages from the new technology and new opportunities.

Therefore, we think that the Internet of things enterprises need to fundamentally change their traditional way of value creation and value acquisition. On the other hand, more and more data are generated by the terminal equipment and joint behaviors by human beings and terminals, but the value and ownership of data are never really assigned, evaluated, quantified and used. Users, as producers of data, have never owned it and benefited from it, and the data value has been separated into isolated islands without an effective interworking mechanism.

We Smartshare think that the data generated by the joint behaviors by users and terminals is one of the most valuable data in human life. Smartshare will realize the reconfiguration of ecological value together with the right and transaction of data value in the Internet of things industry through the public blockchain technology and solutions of the Internet of things intelligent terminal industry.

Smartshare's products and technologies will implement the following three phases:

First, Smartshare is creating a public chain of industry values and is building a value ecosystem for the Internet of Things. Smartshare develops decentralized value-based public chains based on the characteristics of the Internet of Things (IoT) industry and supports a variety of industry applications. It provides hardware adaptations such as smart chips and SDKs, combines cryptography, distributed architecture, and the adoption of a DPOS consensus backbone, to build a secure and decentralized blockchain network that supports high concurrency.

Second, the decentralization of the data trading platform and the value circulation of the terminal data will be realized. Smartshare will solve the data value problems in the IoT terminal and realize the users' data rights and value trading via the decentralized trading platform, besides, it will protect the data value of users and devices.

Third, Smartshare aims to achieve the interconnection of all things and terminal value trading. In the interconnected network, the blockchain is used to decentralize the trusted environment and realize the value exchange among the terminals.

Finally, the vision of Smartshare is to use blockchain to activate the huge IoT industry. Both people and terminals become the components of Smartshare blockchain network, forming a value-based economic community based on terminals, service, and data usage rights and ownership as the trading vehicle.

Chapter I

The Overview of Industry and Blockchain Technology

- Development and Current Situation for IoT

The Internet connects people from all over the world to form a virtual online world. By connecting people, countless information and resources will flow quickly, create new wealth, and form a new economy. However, IoT is regarded as the extension of Internet, connecting “everything” through sensors, RFID (Radio Frequency Identification) technologies, and other technologies. Although the Internet has transformed the traditional economy and brought new vitality, the virtual world and the real world still have obstacles. The IoT expands the “connection” to open up the virtual world and the real world, forming a new world of “all things connected”.

Each device in IoT can act as an independent business entity, sharing capabilities and resources with other devices at very low transaction costs. On the IoT, each device can report its status, such as the smart watch, smart bracelet, and even the refrigerator in your family. These devices can collect and transmit data through the Internet to form our big data world.

In 2005, the global marketing scale for IoT has reached 62.4 billion dollars, a year-on-year increase of 29%. By 2018, the global IoT device market is expected to reach US\$103.6 billion. The compound growth rate will reach 21% from 2013 to 2018. The number of new IoT devices accessed in 2019 will increase from 1.691 billion units in 2015 to 30.54 billion units.

- The Problems faced by Internet of Things Industry

With the continuous advancement of technology, the development and application of IoT technology has achieved remarkable results in recent years. However, the Internet of Things technology is also faced with many problems and challenges, and several key problems are as followings:

- The waste of terminal resources and incomplete usage of numerous IoT facilities have resulted in idle resources. Many IoT vendors and users do not benefit from IoT data and terminals.

- It is difficult to form a valuable ecological system; although more and more terminals have solved the usage requirements of users, IoT enterprises lack operating mechanism and capacity. This leads to the phenomenon that there is no

way to maintain user ecosystem, to form the incentive system, or to establish the positive recycling eco-system between manufacturers and users.

- The deficiency of the centralized system, that is, any equipment is short of mutual trusting mechanism. All equipment needs to be checked with the data of IoT center. Once the database collapses, it will cause great losses to the entire IoT.

- Plenty of valuable data created by users is idle or stolen. Most of the centralization networking platform of terminal equipment enterprises or service providers have the authority to collect and analyze user data and control user equipment without user authorization, which poses a great threat to user privacy and security.

- Blockchain Technology Applied on Internet of Things Industry

Blockchain technology, also known as distributed ledger technology, is an Internet database technology, that is characterized by decentralization, openness, and transparency so that everyone can participate in database records. After the smart protocol technology appears, the blockchain evolves from the logger of information to the executor of the transaction. Low-cost, automated transaction can significantly reduce the cost of value exchange and combine with the IoT to develop the unimaginable scenarios . Blockchain technology can not only provide suitable solutions for recording data from all IoT units but also guarantee the data cannot be modified after being recorded.

In response to the problems faced by the current IoT industry, blockchain technology will be applied to solve the following problems:

- (1) The Distributed ledger guarantees that the data is not tampered with and uniqueness.

- (2) Smart protocols ensure the transaction be reliable and high-efficient.

- (3) The transmitting and storing architecture of distributed data should be peer to peer.

- (4) The data under the distributed environment should be protected via the encryption and authentication mechanism.

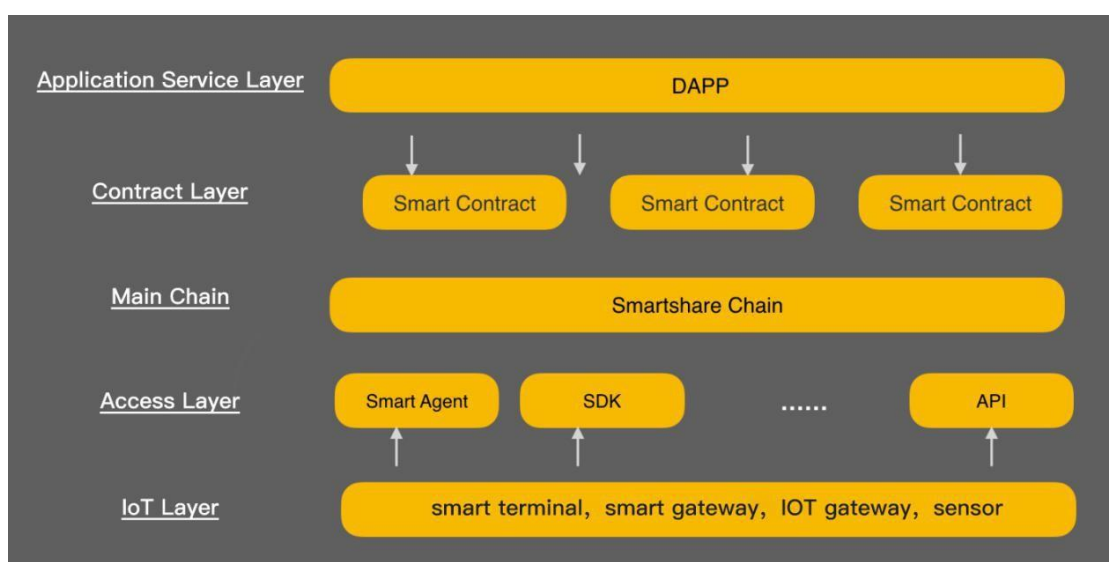
Smartshare will establish a blockchain ecosystem based on the IoT value flow as a core requirement.

Smartshare subverts the existing IoT industry-centric trading platform through blockchain technology, and uses SSP token to realize the quantification and value circulation of the terminals and data in the platform to enhance the ecological value of the IoT. Meanwhile, as an IoT industry value chain, Smartshare combines various scenarios of the Internet of Things industry for in-depth coverage and applications, and applies blockchain technology to more new businesses.

Chapter II Technical Architecture of Smartshare

1. Smartshare System Architecture

The Smartshare system architecture is composed of the IoT layer, access layer, main chain, contract layer, and application service layer.



Descriptions of the System Architecture

- **IoT Layer:**

Smartshare in-depth cooperation with the IoT vendors in order to enhance the use of terminal value for the benefit of the premise of sharing, continuing to build cooperative ecological chain.

- **Access Layer:**

Smartshare provides a series of smart chips, SDKs, and APIs to help developers access blockchain networks and build decentralized applications.

- **Main Chain:**

The main chain of Smartshare optimizes the DPOS consensus, greatly improving performances and meeting the high concurrency environment of the IoT.

- **Contract Layer:**

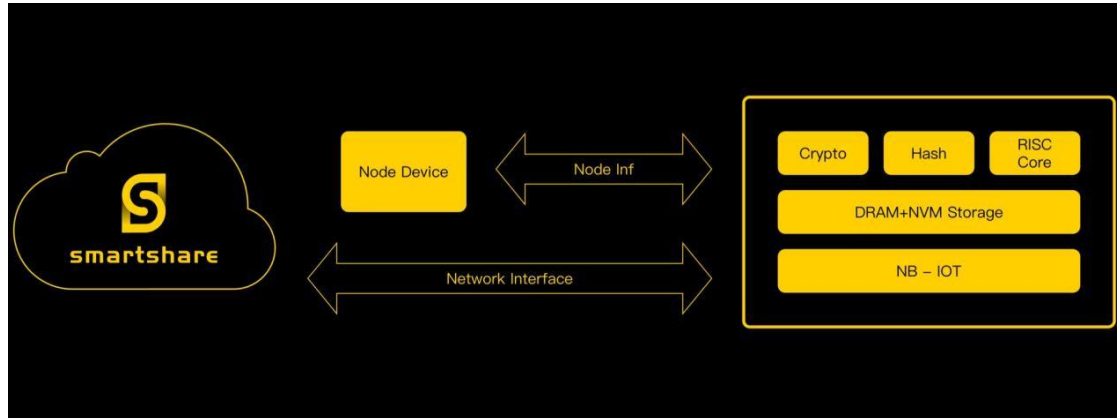
Smart protocols are applied to IoT to implement commercial contracts. According to different application scenarios, smart protocol modules that can automatically execute preset logic can be selectively added.

- **Application Service Layer:**

Developers can develop and submit DAPP according to the application development rules and business conduct guidelines of the cloud chain platform and follow the relevant regulations.

2. Smart Chip SmartAgent

The SA is built on a special security chip. The block diagram is as follows:



The SA is designed and implemented based on a dedicated security chip, providing better security and performance power consumption characteristics. The external dimensions can also be smaller. It is more conducive to system integration. The hardware-level trusted computing system improves the overall trust level of the shared network and provides a reliable basis for the development of the shared network.

Smartshare connects the entire ecosystem through ShareAgent. Each Smartshare node has one and only one ShareAgent (hereinafter referred to as SA) built on a dedicated smart chip. The core functions of the SA include: node authentication, node asset management, service measurement and distribution control, service price evaluation, and service billing settlement. Smartshare connects these nodes via SA to achieve shared value exchange.



• Node Authentication

The SA authenticates the legitimacy of the shared node. As a security element for the shared network authentication, the SA already has the basic legality of the shared network grant. At the same time, for the nodes of the nature of electronic

information equipment, SA also undertakes the function of identifying the legitimacy of the system equipment related to the node.

- **Node Asset Management**

The SA serves as an electronic wallet, which is responsible for receiving, paying, and storing node's digital currency assets. The SA is also responsible for managing other assets owned by the node in the shared network, for example, data assets stored in the shared storage, shared service information being provided externally, etc.

- **Service Descriptions**

Representing the node, the SA provides to the shared network the shared service information including service types, service definitions, etc.

- **Dealing with Transaction**

On behalf of the nodes, the SA provides service quotations to the shared network, including supply quotes and demand quotes. Based on the price of one's own party and the price of the service counter parties, it matches the transactions on the principle of benefiting oneself within the scope of the fair rules.

- **Service Measurement and Distribution Control**

The SA cooperates with the shared network to accurately measure the externally provided or accepted services of the node in a fair manner, records the unsettled service measurement information, and coordinates the process and steps of the node to provide or receive services. For example, during the process of sharing a storage service, tasks such as data transmission, confirmation, and routine health inspection of data stored on the node are coordinated.

- **Settlement**

Based on the established match trading contracts, the SA manages the settlement, transfer, etc. of deposits, installment payments, and final payments.

3. The Public Smartshare Chain

Smartshare Chain adopts DPOS as its consensus mechanism, and it improves and optimizes itself. It does not need to spend extra computing power to achieve the equity distribution after the production of blocks. According to the transaction status of the network, it can also dynamically determine whether the agent or all nodes verify the results of smart contracts.

Smartshare Chain will publish Token as an important economic tool for community incentive and consensus mechanisms. Token-holders not only gain the access to basic blockchain services such as contract release and network forks, but also participate in voting and gain token awards as agent nodes. The holder of each token is called an equity person, and the corresponding voting weight is assigned in accordance with the Token holding quantity. The agent node is selected by the equity holder. The first 99 agents with the highest number of votes in turn authenticate the transactions, and all the agent nodes determine the order which cannot be tampered with. An agent gains profits if he

works normally and gets punishment otherwise.

After optimization, this consensus mechanism can further enhance network trading capabilities. For example, for some smart contracts that take a long time or occupy a large internal state space. The agent only packages the hash value of the resulting transaction, and all nodes verify the hash value themselves. While verifying the smart contract quickly, the congestion of the entire network is reduced. In addition, optimizations in the consensus algorithm have also been achieved to prevent the agent nodes from being fixed to avoid gradually becoming a centralized network.

Besides, Smartshare Chain supports the IOT_Coin protocol. Each IOT firm can issue its own Token based on this agreement.

4. Smart contract

Smartshare provides Turing-complete smart contracts. IOT firms can publish their own smart contracts and build their own value-added services based on this.

We use modular design tools to abstract and simplify the blockchain by building a modular virtual machine- Lua Virtual Machine (hereafter referred to as LVM) to run smart contracts. This design can bring two benefits. First, it optimizes LVM performance to directly improve contract execution efficiency and reduce the interference factors caused by system coupling. Second, it weakens the relevance of blockchain networks and smart contract operation status. Even if there are problems with contract execution or if the virtual machine runs abnormally, the stability of the blockchain network can still be guaranteed.

5. Data Asset Platform

The interaction between people and terminals enables IoT devices to collect a great deal of data from physical world and life behavior. Smartshare holds that the user is the sole owner of this data and advocates returning ownership and revenue back to the user. The generation, storage, and transaction of data need to be authorized by the user and performed autonomously, and the distributed storage technology is used to protect user privacy and security. Users have the right to price data and conduct transactions. With the big data analysis technology, Smartshare provides the matched data resources to the data demanding parties who can only access to the data after paying the Token and obtaining the user's consent. Smartshare data asset platform aims to increase the value of data and return the value of data to users.

Taking the car terminal as an example, the user will generate data such as mileage and destination every day. After the user authorizes the consent, the data will be recorded on the main chain. The user can obtain Token as a reward, and the data asset platform analyzes the data based on data integration and ensures that the data is real and effective. The analyzed data can be provided data services for lending, insurance, etc. The demanding party uses the data to pay a

certain amount of Token rewards to the data provider, namely the users themselves. It will greatly shorten the process of establishing trust between users and enterprises, and greatly increase the efficiency of cooperation.

6. Distributed Application DAPP

Distributed Application (DAPP) is our user-oriented service that can be applied by our IoT partners to conduct business. As long as users have a wallet, they can easily use these services.

Users can create transaction services, set transaction terms, and receive payments. Buyers can view and obtain service information according as required and purchase services with services-supported tokens (including SSP).

DAPP will provide full-featured services. All our code, protocols and specifications will be open source, and we hope that others will expand the code to create more applications.

Chapter III

Application scene of Smartshare

1. IoT Intelligent Hardware Ecology Application

Smartshare provides a decentralized block chain technology platform for data sharing for the intelligent terminal in the IoT. For the problems of idleness of intelligent terminal and difficulties in ecologicalization, Smartshare makes use of original smart chip of SmartAgent and Token mechanism to activate the application value of the products and shared ecology of the data.

The Smartshare Foundation will form a shared cooperative alliance to support a variety of hardware and software devices. The development protocol supports the introduction of the third development teams and will continue to apply Smartshare to a wider range of application scenarios.

At present, Smartshare has carried out ecological cooperation with manufacturers which includes routers, robots, air purifiers, AI speakers and many other categories.

IoT Digital Currency Asset

For individuals or companies that have different digital asset distribution requirements for different IoT application platforms, Smartshare asset-based

smart contract-IoT_Coin can quickly publish digital currency and apply it to businesses.

2. IoT Sharing Economy Application

With the development and dissemination of cloud computing, deep learning and blockchain technology, people's demand for computing power has become more and more urgent. More and more enterprises are enhancing their computing power by the horizontally expanding the form of the computer room.

In fact, there is a computing power that is wasted most of our time, and the power of computing comes from the electronic devices that are owned by ourselves with an essential importance to our lives. These devices include personal computers and even smart phones. These smart devices will not achieve 100% of their performance when used in 90% time of our daily life. In contrast, if we can make full use of the idle computing power of the 90% time, it will be a very powerful computing resource.

Smartshare connects the whole ecology with the smart chip, and every smart chip of Smartshare installed on the intelligent terminal is an independent node. Via the Smartshare chain, these intelligent terminals are linked together to realize the exchange of shared value.

3. IoT Data Transaction Application

Take the terminal of intelligent meteorological equipment as an example. The device is equipped with various different spherical objects of sensors. It is also equipped with sensors such as temperature, humidity, light, air pressure, ultraviolet light and so on, in this way, the real-time weather conditions nearby can be measured. Users can start to picture the real-time weather conditions after purchasing the equipment. More important is that users can share these pictures through different channels and turn them into meteorologist among their friends. If you like, you can post real-time weather conditions via WeChat, micro-blog or e-mail, and the entire process of sharing is very simple.

This is a kind of resource sharing driven by pure interest. The user shares the data acquired by the terminal spontaneously, but they do not have obvious reward mechanisms, which leads to the inactivity of the frequency and extent of data sharing. Hence, the final effect on sharing is not reached.

Smartshare plans to achieve strategic cooperation with the equipment manufacturers. The meteorological equipment terminals will be accessed quickly through protocol support, and the value of shared data of the users will be calculated through the intelligent contract items, in this way, the token return could be achieved.

4. IoT Smart Terminal Asset Transaction

Blockchain-based smart contracts include transaction processing and preservation mechanisms, as well as a complete state machine for accepting and processing various smart contracts. The state processing and preservation of transactions are done on the blockchain. After the transaction and event information are disseminated into the smart contracts, the resource status in the contract resource set will be updated, which will trigger the smart contract to perform state machine judgment.

Taking the parking IoT lot smart terminal trading scheme as an example, the contract scheme defined by Smartshare is adopted. Both parking brake machines and vehicles can support the smart contract mechanism. The gate control devices of brake machines can launch parking fee information and pay for the amount of Token in the blockchain network. Vehicles can automatically perform Token settlement transaction with parking control devices, the whole process is fast and efficient, and the transaction information is recorded on the chain. The vehicle itself as an intelligent terminal can also get Token rewards through other contract terms such as the data owned by the trading vehicle itself, in this way, an ecological cycle of positive Token circulation has been formed.

Chapter Product and Project Planning

1. Product Planning

- Nov. 2017

The Initiating of Smartshare

- Dec. 2017

The Launch of Ecological Programme of Smartshare Smart Hardware
Blockchain

- Mar. 2018

The Launch of Smart-chip Smartagent

- Mar. 2018

The Launch of Smartshare Eco.Mall App

- Mar. 2018

The Launch of Smart Hardware Cooperation Solution, establishing strategic cooperation with many smart hardware manufacturers to promote various Smartshare collaborative products.

- Jun. 2018

The Online Launch of Smartshare Chain Beta

- Jul. 2018

The Launch of Wallet App of Smartshare Chain

- Aug. 2018

Smartshare Chain supports the launch and invocation of smart contract as well as IOT_Coin protocol.

- Sept.2018

The Launch of Data Property Platform, supporting data contract transactions

- Dec. 2019

An integrated solution for the blockchain apps of the IoT is formed to expand the ecological network.

2.Project and Ecological Cooperation

Smartshare, taking the premise of improving the terminal value usage and sharing, will have an in-depth cooperation with the internet of things manufacturers to continuously build up the cooperative ecological chain. Until now, results of the ecological alliance are as follows:

- In Dec. 2017, the strategic cooperation with Shenzhou Digital Chainbox is established.
- In Jan. 2018, the strategic cooperation with Mohuan Health is achieved, adding smart health products into the Smartshare ecological circle.
- In Mar. 2018, the blockchain air purifier is launched with Three Papas.
- In Mar. 2018, the cooperation with BHU Technology is made and a new blockchain router is launched.

- In Apr.2018, strategic cooperation is achieved with Shenzhou Digital, a company listed in Hong Kong stock exchange, to launch a smart sharing appliance -Xkey
- In May. 2018, strategic cooperation with CCTV Dengdeng Robot is made to launch a AI blockchain robot.
- In Sep. 2018, first self-developed smart product based blockchain Sleep Shell is initiated.
- More members will join the alliance team continuously. The expected number of the alliance manufacturers will surpass 100 by Dec 2019.



3. Route-map and Milestones

- 2016.2 Xinheyun Block Chain Laboratory
- 2017.11 The Completion of SSP Protocol Framework
- 2017.12 Launch SSP Token
- 2018.1 Launch SSP Protocol
- 2018.3 Launch SSP Eco-Strategy
- 2018.3 Launch SmartAgent Chip

2018.6 Cooperation with 10 Smart Hardwares

2019.12 Cooperation with 100 Smart Hardwares

2020.12 Build global blockchain based smart device sharing ecosystem