Vankia Chain

The Solutions and Trading Platform of Data Capitalization of Blockchain IOT

White Paper
Version 6.0.0

June 13, 2018

Table of Contents

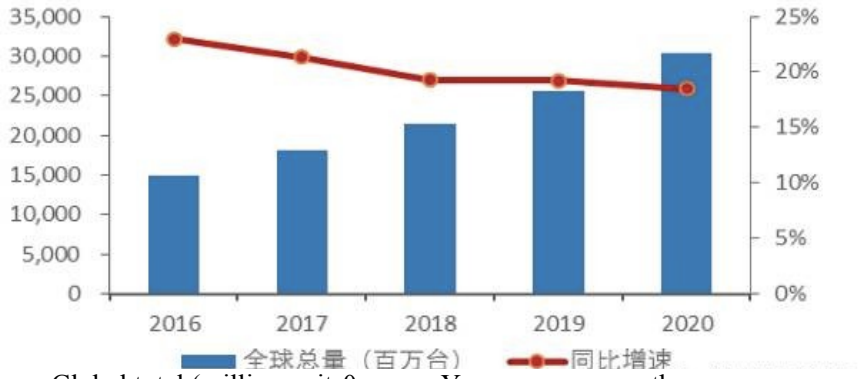
Chapter 1 Introduction

1.1 Introduction to the IOT

In the next 2-3 years, with 5G sequentially deployed, governments have issued policies related to the development of the Internet of things in succession. Traditional enterprises and IT giants have sequentially laid out Industry 4.0 and Internet of things strategy, and the Internet of things has permeated in many fields, such as industry, civil service, public utility and so on. With the generation of massive data of the Internets of things, artificial intelligence and blockchain technology will be more valued. A global era of smart Internet has arrived.

1.2 Challenges brought by the development of new technology, such as IOT and AI

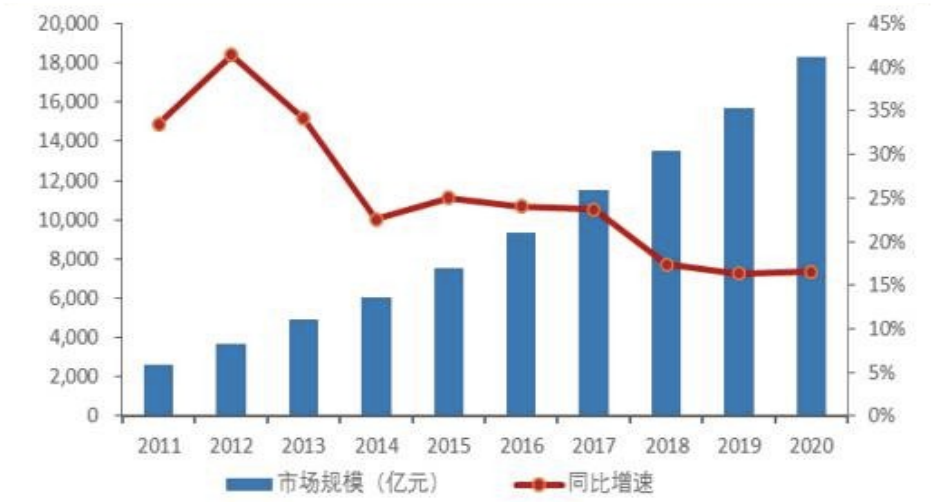
According to IDC data, the world's Internet of things installation equipment has reached 14 billion 866 million in 2016. Five years later, the agency predicted that the number of equipment in the world will exceed 30 billion, with a compound annual growth rate of 20.2%.



Global total (million units0 Year-on-year growth

Chart 1.1 the growth chart of the installation equipment of global IOT

According to the forecast of China Industrial Information Network, the IOT market will grow from 930 billion yuan in 2016 to 18300 billion yuan in 2020 in the next 5 years, and the overall scale will be multiplied by multiple.



Market size (100 million yuan) Year-on-year growth

Chart 1.2 the growth of IOT Market in China in recent years

According to the statistics of IDC, the total investment in the global IOT market in 2016 was US $736 billion 900 million. By 2020, the number will reach $12899 billion and the annual compound growth rate will be about 15.02%. In the next few years, the IOT will expand rapidly around the world.

As the IOT becomes an inevitable trend, there from the challenges are also enormous.

Challenge 1: The rapid deployment of the IOT brings about the generation of mass data. The intelligent interconnection needs of IOT have begun to go beyond the boundary of the human brain, and it brings great opportunities for artificial intelligence.

Challenge 2: Personal data goes to the foreground. Big data is not only the symbol of centralization platform and Internet era, but also the key to generate value for data mining platform

Challenge 3: It is inevitable for personal data to be authorized from the platform side to become personal assets, and the value of data is no longer serving as a platform alone. Therefore, how to implement collection, aggregation, and registration of right, grade pricing, trading and security in the process becomes a top priority.

1.3 The pain point demands confronted by the evolution from the Internet to IOT

The wide application of the Internet makes each person produce a large amount of data every day. It has great value in the background of every centralized product and system. Therefore, big data become an industry, and the application value after

data mining is huge. However with the advent of artificial intelligence, IOT and blockchaining technology, data becomes the food of artificial intelligence, and personal data will become an inevitable trend of personal use of AI. However, there are still huge obstacles to the use and confirmation of personal data. Specifically, there are the following questions:

1.3.1 Difficulties in data acquisition and the question of inconclusive power

In the centralized technology system of the Internet era, users' information and equipment are uniformly stored on the central server. The individual has no choice except the trust platform. The personal data can only be asleep on the platform, or it can only be excavated by the platform. Although the rights of the individual are known to be used, there is no way to appeal, nor is there any way to protect and use them. This is the problem brought about by personal data assets which cannot be confirmed. .

The first step of blockchain is to collect such data, and then to confirm the data with blockchain technology.

It is necessary to explain that the evolution of the Internet to the IOT is a long process. The centralization platform in the Internet era is characterized by high efficiency. Thus centralization storage by the blockchain takes a certain amount of time.

1.3.2 Lack of trust caused by data assets transaction security

In fact, the collection of personal data is not difficult. Because of the lack of safe and effective storage and less tools for desensitization, Data cleaning technology only can be done by large platform. So in the Internet age, the concept of big data prevails. Thus the personal use of data is extremely difficult.

In Internet era, transfer means the data in the form of real right after a data transaction. The data is deposited on the purchaser's storage device, which causes the risk of reusing or being traded two times. Although there are also institutions that develop the system which only provides the right to use, they still benefit from the platform. Individuals have no way of the right of confirmation and gain no benefit.

1.3.3 The retroactive problem of data asset transaction

In Internet era, once the data transaction occurs, they are prone to be sold again by the buyer, or even change it into a harmful information transaction. The original holder of the data is hard to gain profits again, and it is also difficult to protect data from being detrimental, thereby damaging the rights and power of the holder.

1.3.4 The processing, rating pricing, transaction costs problems of data assets

Due to the above reasons, the personal large data set stored by the platform is difficult to be held or confirmed by the individuals, thus it is hard to become an asset, which seriously hinders the secondary processing of data assets to add value, and the corresponding asset rating pricing is less likely to talk about, and there is no personal capitalization of data. Transaction data assets for personal use costs a lot, and even face great risk.

1.4 Why adopts the blockchain technology

Because blockchain technology can become a tool for large-scale collaboration between people without mutual trust, so it can be applied to many traditional centralization to dealing with the transactions that were originally handled by intermediary agencies, which means making data acquisition and transaction become possible.

1. A secure trust mechanism: Secure and trustworthy storage mode is the biggest contribution of blockchains to data capitalization. In reality, a large amount of intermediary cost can be saved, which makes the cost of transaction and acquiring the users' trust lower, and trust even becomes the first obstacle to personal data capitalization. The adoption of trustworthy technology ensures the information security of individual users, and it makes personal data transactional and trustworthy become possible. In the Internet era, the huge cost comes from the fear in the heart, so breaking down the psychological barrier to safety is the first important thing.

2. No tampering and encryption security

The use of the blockchain cryptography solves the problem of data security. However, the characteristics of point to point make each device relatively "isolated" which makes the hackers cannot obtain equipment information and control it in a large scale. The one-way hashing algorithm is used in blockchain. At the same time, each newly generated block is pushed forward in strict order of time. Owing to the

irreversibility of time, any attempt to tamper with the data information in the blockchain is easy to be traced back. It leads to exclusion by other nodes, which can restrict related illegal acts.

3. Decentralized distributed storage:

Blockchain technology is based on the decentralized point-to-point peer to peer network, using the distributed data base to identify, transmit and record information.

1.5 Future vision of personal data capitalization

In the developed IOT in 2020s, there are many computing devices for each person, from home to office, from municipal facilities to travel equipment, from weather stations to various networking information institutions. Massive data will pour around people, and the brain cannot deal with this information. Personal handheld terminals (not necessarily mobile phones) will load more artificial intelligence tools for processing information (App or Dap). Personal information through security verification enters these tools through secure and trusted channels and trading methods. The information serves us meticulously through the intelligent contract system constructed by blockchain. Artificial intelligence, through the processing of information, forms a distributed network robot to serve us, and they'll know more about us than we do.

Chapter 2 Vankia Chain

2.1 Visions for Vankia Chain

2.1.1 Solutions to Blockchain-based IOT (Internet of Things) Data Assetization

With the popularity and use of the IOT intelligent terminals, hundreds of millions of non-standard formats have been generated. And a large number of data in a chaotic state without unified data collation and corresponding value. Not only that, data isolation has resulted in the “Internet of Things data island”. If we can unite the major smart terminal manufacturers and Internet platforms to form a unified data standard, it will benefit the whole society. Vankia Chain has emerged as a result of this. It has collected sensor data through an intelligent module developed by itself to achieve privacy and sensitization of data, complete the data winding, and finally achieve data assetization and tradable.

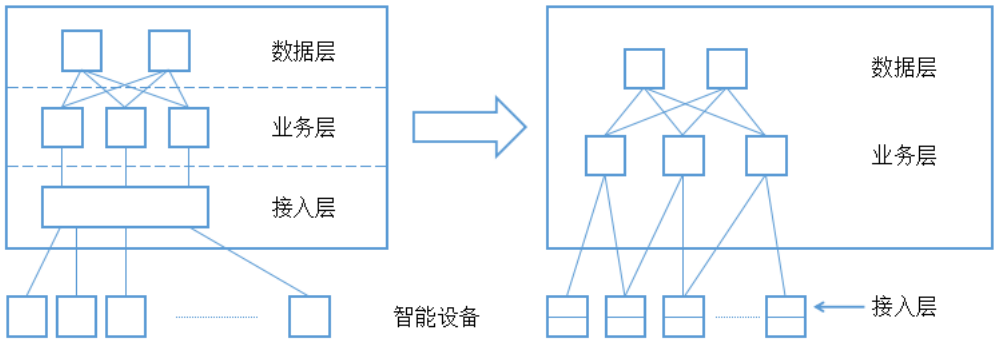


Chart 2.2 Blockchains running on parallel networks

数据层 data layer

业务层 business logic layer

接入层 access layer

智能设备 intelligent device

2.1.2 Building a trading platform of blockchain IOT data asset

While smart devices are widely used, massive amounts of smart devices are also putting tremendous pressure on the IOT platform that they rely. According to authoritative agencies, smart devices are expected to exceed 30 billion units in four to five years, which are 1-2 orders of magnitude higher than the number of users of

Internet products. Using current internet access technologies to support such an order of magnitude will still face enormous challenges.

Vankia Chain uses its own research and development capabilities in hardware to strengthen the edge computing capabilities of intelligent hardware and connect smart devices to the IOT platform connector to transfer the various smart hardware layers, thereby dispersing the pressure of the platform to support massive devices. The more devices it support, the more stable and robust the platform is.

2.2 Design Principles

Two major challenges facing the Internet of Things—effective management of equipment with geometric progression and safeguarding users' data security Traditional solutions will have greater difficulties, but Vankia Chain will solve the existing problems through the blockchain approach.

Blockchain technology provides a point-to-point direct interconnection of data transmission methods for the Internet of Things, so that the entire Internet of Things solution does not require the introduction of large-scale data centers for data synchronization and management control, and the blockchain network to complete the management and control of distributed Internet of Things and save data efficiently. All Internet of Things information is stored in the blockchain, forming a trusted source of data for the Internet of Things.

Blockchain data encryption protection and authentication mechanisms reliably protect data security and privacy. Though the third party invaded the network to obtain stored data, it could not steal the contents of real data, and could not delete or modify the data.

2.2.1 Compatibility of Industry Data

In order to solve the phenomenon of "data islands", Vankia Chain supports any manufacturer to publish its own industry applications on the platform neutrality and they can use the common industry solutions on the chain. According to different rules, Vankia chain makes data desensitization and data protection for user, manufacturer, and developer data.

2.2.2 Security of Data Storage

Paying tribute to Nakamoto, using traditional secure cryptography to create a

great blockchain. Vankia Chain is responsible for ensuring the security of data storage as the basic application platform of the Internet of Things. It adopts the technical principle of the side chain, combines with IFPS side chain for data storage. The public chain stores only the data-based hash.

2.2.3 Commonality/Usability of Intelligent Terminals

We will design and implement a variety of terminals for the Vankia Chain to meet its needs in different operating systems and devices (including large servers, mobile devices, and micro devices) to handle different usage scenarios. At the same time based on the standard JSON-RPC/Web Socket/MQTT to provide remote API call service.

The terminal of the Vankia chain will be designed into a multilingual version, including but not limited to commonly used C, Java and even JavaScript, so that different types of developers can use relatively familiar language for development.

2.2.4 Token Value Added

The number of devices connected to the Internet of Things (IOT) devices based on the Vankia chain increases, resulting in a huge amount of confirming data assets. At the same time, the release and applications based on the blockchain apps will speed up the flow of tokens and bring about the appreciation of tokens.

Chapter 3 Design Plan of Vankia Chain

3.1 Technology Stack of Vankia Chain

3.1.1 Mesh Network

Mesh Network, also known as "multi-hop network", is a dynamic network architecture that can be continuously extended to achieve the transmission between wireless devices. Its core is to allow each node in the network to send and receive signals, so that existing problems of ordinary wireless technologies such as low scalability and poor transmission reliability could be solved. A large number of terminal equipment in the network can automatically connect into a mesh structure through wireless. Each node in the network has an automatic routing function, and each node only communicates with neighboring nodes. Therefore, it is a self-organizing, self-managed intelligent network, without backbone network it can be used to build a flexible network. The traditional wireless communication network must be designed and arranged in advance as its transmission path is fixed, but the transmission path of the mesh network is dynamic.

Mesh network is also called "multi-hop network", it is dynamic and scalable network architecture and can be efficiently transmitted between wireless devices. In the traditional wireless LAN, if users want to communicate with each other, they will first access a fixed access point (AP). This type of access is called single-hop network. In multi-hop networks, any wireless device node can act as both an AP and a router. This has the advantage that if the nearest node is congested due to heavy traffic, then the data can re-selected for a small traffic path for transmission. According to the network conditions, data packets are transmitted sequentially from one node to multiple nodes and finally arrive at the destination. This access method is multi-hop access.

In fact, the Internet is a typical "wired multi-hop" network. For example, if we want to send an e-mail, the e-mail does not reach the recipient's mailbox directly. Instead, it is forwarded from one server to another through a router and finally to the user's mailbox. In the process of forwarding, the router will generally choose a better path so that email can be delivered to the user's mailbox as soon as possible. Therefore, the Wireless Mesh network can be referred to as a wireless version of the Internet. The biggest difference from the traditional wireless communication system is that it can automatically find the best path, passing packetized data from one routing node to another at last to the destination. These characteristics make Wireless Mesh

networks unparalleled in comparison with traditional point-to-point and point-to-multipoint communication networks such as cellular communications.

In a Mesh network, a node can not only transmit and receive information, but also act as a router to forward information to its neighbors. As more nodes are connected and the number of possible paths increases, the total bandwidth also increases greatly.

In addition, the power required to transmit data is also small because each short hop has a short transmission distance. Since multi-hop networks generally use lower power to transmit data to adjacent nodes, the wireless signal interference between nodes is also small, at the same time, the network channel quality and channel utilization efficiency are greatly improved, so that higher network capacity can be achieved. For example, in a high-density urban network environment, a Mesh network can reduce the mutual interference between adjacent users using a wireless network, and greatly increase the channel utilization efficiency.

3.1.2 DPoS Consensus Algorithm

DPoS (Delegated Proof of Stake), created by bit stock team, is a high performance decentralized consensus algorithm in the blockchain and has been considered as a more safe and rational consensus mechanism of low cost.

DPoS requires clients, trustworthy accounts gaining votes in the top 21 during community election, to create blocks. Other clients' accounts whose voted rankings are not in the top 21, will be included as candidates. In order to become official clients, they have to gain enough user trusts by community canvassing. Users vote in accordance with VKT percentage they hold in the total amount. When production cycle of 21 blocks is completed, client representatives in the top 21 will be readjusted, and those whose rankings are lower than 21 will be downgraded to candidates. 21 blocks in each cycle are randomly generated by 21 representatives. And each block is generated in 3 seconds. Newly created blocks are broadcasted on the Internet and added into the blockchain.

In general, a DPoS blockchain will not diverge, because block producers produce blocks by cooperation rather than competition. Even if it diverges, consensus will be automatically switched to the longest chain. The reason to operate in this way is that the speed of adding a blockchain branch to a block is relevant to the proportion of block producers sharing same consensus. In other words, blockchain branches with

more producers will grow faster than those with fewer producers. Besides, a producer will not produce blocks simultaneously on two branches. If one is caught doing such things, there is a good chance that he will be exposed by user votes. Cryptographic credentials corresponding to these dual production behaviors can be utilized to remove abusers automatically.

Generally, DPoS blockchain will absolutely have block producers involved. Averagely, after 1.5 seconds since the beginning of a transaction broadcast, there is 99.9% probability that the transaction is confirmed, except some special cases, including software bugs, network congestion and the situation that a malicious block producer creates two or more branches. To ensure the absolute irreversibility of a transaction, a node can take the option to wait until 15 of 21 block producers give confirmations. According to Vankia chain software configuration, it takes 45 seconds in average generally. By default, all nodes will assume the block irreversible when 15 of 21 producers give confirmations, and will not witch to branches without this block regardless of the length.

In 9 seconds after diverging starts, a node can warn users that it is quite plausible that they are in branches. After losing 2 blocks in succession, there is 95% probability to confirm a node is in branches. After losing 3 blocks in succession, there is 99% probability to confirm. A robustness prediction model can be constructed through parameters including nodes loss, recent participation rate, etc. so as to warn operators of problems emerging.

Reactions to such warning completely depend on commercial transaction nature, however, the simplest solution is to wait for 15/21 confirmations until warning disappears.

3.1.3 Chain Code and Virtual Machine

Internet of Things (IOT) is a magnificent ecosystem where business logic of varied IOT products is of great diversity. As a basic system supporting IOT, Vankia chain provides developers with a set of Turing complete on-chain programming mechanisms--Chain Code and Virtual Machine (VM) as well as simple and efficient extension services, so that they can quickly and handily develop DAPPs meeting individual requirements.

Virtual Machine is an execution circumstance of Chain Code. Referring to EOS design, Vankia chain employs independent virtual machine structure. All Virtual Machines with sufficient operating efficiency, which are compliant with Vankia chain's sandbox standard, can be easily connected to Virtual Machine interfaces. Therefore, Vankia chain does not prescribe a limit to Chain Code programming language.

By using Chain Code, developers can issue digital assets and launch ICO on Vankia chain, and interact with the world out of the chain.

3.1.4 VEX

VEX is a cross-chain operation protocol enabled by Vankia chain, containing cross-chain assets exchange protocol and cross-chain transaction interaction protocol. The former allows users to exchange digital assets on different blockchains, while the latter can ensure various steps of distributed transactions being implemented on varied blockchains, as well as the consistency of transactions.

3.1.5 BaaS Service

IOT devices on Vankia chain generate massive interactive data at all times, which directly or indirectly reflect details of human life and are digital assets of Vankia chain users with very high value. Certainly, since the volume of these data is extremely large, they are not feasible to be written into blocks.

IPFS (Interplanetary File System) is a point-to-point distributed hypermedia distribution protocol, can connect all computing devices with same file management mode.

IPFS can be perfectly combined with Vankia chain, so that users are able to utilize IPFS to handle massive data, and then store corresponding encrypted hash in the blockchain with date stamps. Thus, data do not have to be carried on the chain, saving blockchain network bandwidth, providing effective data protection.

DOC (Digital assets Ownership Certification) is a digital assets ownership certification function developed by Vankia chain combining IPFS, to run ownership certification for every piece of data generated by IOT devices on Vankia chain and then to store certified data on IPFS after encryption.

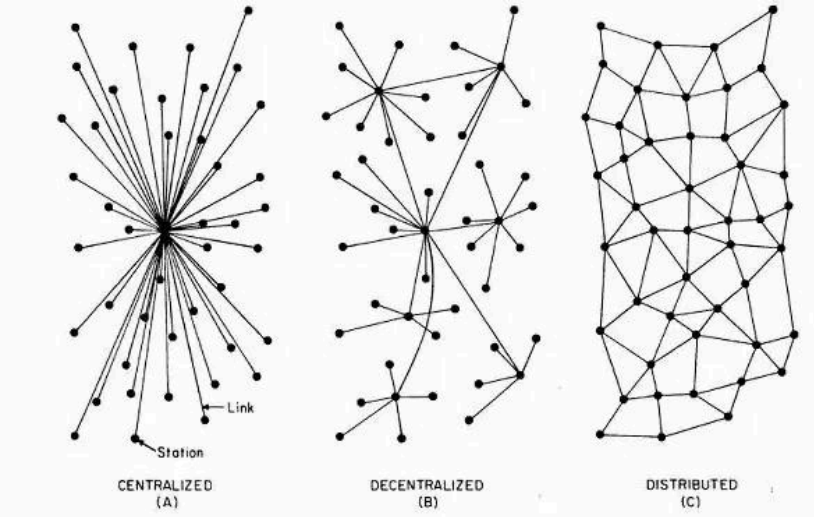


Chart 3.1 IPFS model

3.2 Solutions for Vankia Chain

3.2.1 Overall Structure

Fig 3.2.1 shows the overall structure of Vankia chain: Vankia chain uses the DPos consensus mechanism. For message transfer required by IOT, the chain employs Mqtt communication protocol to enable real-time message transfer. There are variant solutions for different industry applications, requiring operating on Chain Code, which supports application upgrades. Vankia chain also supports EVM.

Data Exchange	Dapp	Wallet	Storage Services	MQTT	
SDK	Data Transaction		BaaS API	ChainCode	
Block	DPOS	BaaS	DOC	Transactions	VM
Blockchain					

Chart 3.2.1 Overall structure of Vankia chain

3.2.2 Hierarchical Network

To provide double protection of security and low delay, Vankia chain system has layered the network, so that one can choose varied networks for communication based on variant data exchanges.

Account network is allowed by employing optimized Grapheme (grapheme engine), which was proposed and enabled by Bit shares team. The origin version of Grapheme supports 100,000 transactions per second, while optimized version can support millions of transactions per second. Combining Mesh Network-based technology and MQTT gateway, communication network layer ensures IOT communication requirements of higher speed. Additionally, Vankia chain also establishes Vankia Flow suitable for flow transmission, to meet flow transmission requirements of users.

3.3 Vankia Chain Initial Data Obtain Products

3.3.1 Intelligent Communication Module

Module subsidy exchange data: Vankia chain is connected to intelligent hardware through the hardware module developed by it. The intelligent hardware has built-in blockchain light nodes, which can realize non-network communication, non-network control, etc., and the product chain of hardware module + platform + App has been initially formed, providing hardware module development based on ad hoc network chip and platform development based on blockchain. Vankia chain provides a decentralized point-to-point distributed IOT bottom-level protocol, allowing network devices to connect with each other without a network, and forming an intelligent hardware access infrastructure network.

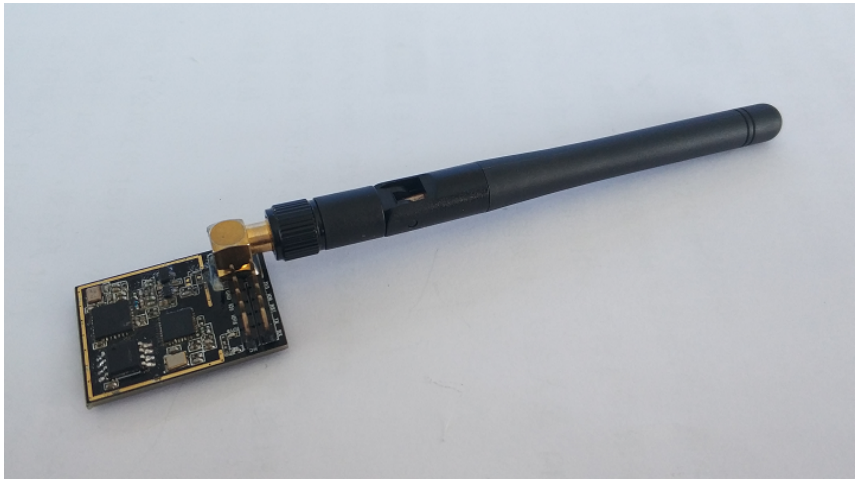


Chart 3.3.1 Smart Lora Node developed by Vankia chain

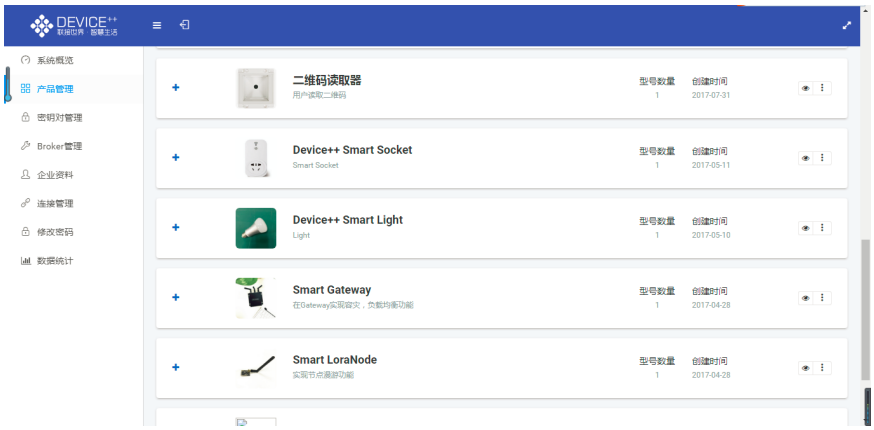


Chart 3.3.2 Cloud platform developed by Vankia chain

Chart 3.3.3 App developed by Vankia chain

3.3.2 Intelligent Data Acquisition Terminal

Vankia chain has developed intelligent data acquisition device relying on its own patented technology. The device is developed by using remote sensing technology, video parsing technology, detection technology and artificial intelligence technology in the cloud combined with third party data sources, making it capable of collecting multiple data such as the collection of urban mobility, community resident population, and the situation of exhibition participants. The device writes the collected data into

the blockchain, which guarantees the fairness of the data and also guarantees the protection of the privacy of users.

Chart 3.3.2 Vankia intelligent date acquisition terminal

3.3.3 Blockchain-based IOT Application Platform

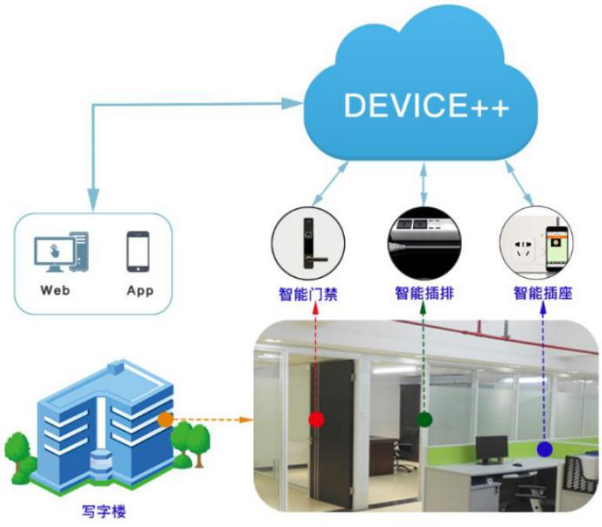
Vankia chain supports powerful Chain Code, and developers can complete customized functions based on chain code. On the basis, the application module provided by Vankia chain enables non-technical users to complete the design, publish and manage decentralized applications with “what they see is what they get.”

Users can still use Chain Code to submit customized decentralized applications by editing the code.

And functional modules provided for IOT applications or products to create digital cash and one-click publishing industry applications. Combined with the DAPP of Vankia chain, users can quickly create, publish, and manage decentralized networking applications without writing any code.

Industry applications are implemented on the basis of chain code, so users can create and publish complex logic application systems by writing code.

Chart 3.3.3 Application Model of Vankia Industry



Smart Gate

Smart Strip

Smart Socket

Office Building

3.4 Vankia chain Data Exchange

Data Exchange is a module of Vankia chain that implements data management and exchanges based on Chain Code and IPFS distributed storage technology. Users can make use of the module to manage data generated by their own applications and IOT devices. Vankia chain also provides digital assets transaction function, so that they can exploit it to put their data on sale or publish data purchasing requirements. The system comes with very helpful matching system and Digital Asset Ownership Certification system to ensure security and benefits of their data.

Product features

Do not cache and precipitate transaction data: The data exchange provides a trading channel. The blockchain only stores data transaction summaries, vouchers, digital copyright, and some basic information that other exchanges need to rely on. It does not store the transaction source data and encrypted source data. Therefore, there is no possibility that someone will forcibly break all books after synchronizing them and get the data.

Privacy protection: Personal data traded in the exchange need to be confirmed by their own authorization. The original intention of alliance members to purchase personal data on the exchange is to obtain more personal information, but this transaction is still a matter of privacy. As long as it is personal privacy data, it requires the consent of the individual himself.

Data copyright: Doc is a technical control means for blockchain to authenticate the copyright of data, which is a special asset. When a data transaction intelligent contract comes into effect, the data will be stamped with a permanent digital certificate to prove that the producer of the data and the value and income rights generated by the data will be permanently owned by the producer in the future, this is the realization of data authenticity and traceability.

3.5 Vankia Chain Economic Models

Two kinds of tokens are designed, namely, VKG and VKT.

VKG is used by a company (enterprise or institution, etc.) in the data trading platform of Vankia chain, and another company to buy and sell data, and the RMB 1:1 anchored, the value is constant, and is conducive to the stability of the cost.

As a digital asset on the Vankia chain, VKT is an important medium for communication.

The way individual users get VKT:

Contribute to the community by generating data, get VKT

Data transactions with individual users or companies income VKT

The way individual users use VKT:

Use BaaS services will consume VKT

Use third party applications will consume VKT

Data transactions with users or companies will pay VKT

The way developers get VKT:

Earn service fee VKT through DAPP

Sale the data acquisition from DAPPs to income VKT

The way developers use VKT:

Use BaaS services will consume VKT

Register as a developer will consume VKT

The industry solutions to the Vankia chain also require VKT consumption.

The way businesses get VKT:

Data transaction revenue with personal users VKT

The way companies use VKT:

Data transaction payment with individual users VKT

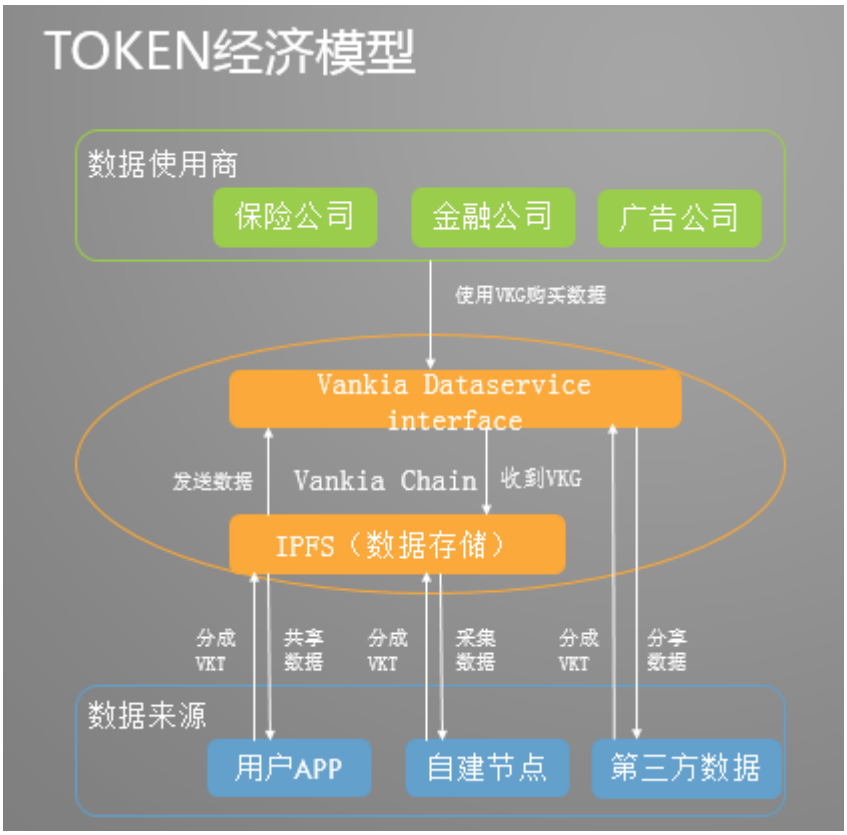


图 3.5 万加链 TOKEN 经济模型

Chart 3.5 Vankia Chain TOKEN economic models

TOKEN economic model

Data user

Insurance company

Finance company

Advertising company

Purchase data using VKG

Send data

Data storage

Divided into VKT

Shared data

Divided into VKT

Data collection

Divided into VKT

Shared data

Data sources

User APP

Self-built node

Third-party data

3.6 Tsinghua-Qingdao Big Data Engineering Research Center Lab

Vankia chain has explored in IOT for many years. Blockchain-based IOT platform construction, hardware and software research and development as well as industry solutions implementation have all been affirmed and supported by relevant agencies. In August, 2017, Vankia chain jointly established “Blockchain IOT Lab” with Tsinghua-Qingdao Big Data Engineering Research Center of Tsinghua University, focusing on advancing exploration and application of blockchain in IOT.

Chart 3.6 Vankia chain jointly established Lab with Tsinghua University

Chapter 4 **Implementation and Iteration of Vankia Chain**

4.1 Chain Roadmap

Chart 4.1 Roadmap

Release public chain in December, 2018

Release test chain in August, 2018

Private placement in February, 2018

Released Lora Smart Node in December, 2017, since then hardware network nodes with network roaming ability was born

Released Lora Smart Gateway in April, 2017, since then the first Lora with disaster recovery and decentralized function was born

Signed contract with Hengye Technology in November, 2016, providing security and protection private cloud

Released Device++ 0.9 in September, 2016

Signed contract with Ai-Thinker in August, 2016, providing IOT public cloud

5.1 Team

To better promote the implementation of Vankia chain programs, experts in domains of IoT and blockchain are invited as consultants.

5.2 Core Team

- **Jinggang Wu-CEO**

Major in computer software of Tsinghua University. He is the director of IoT Blockchain Lab of Tsinghua-Qingdao Big Data Engineering Research Center, and a member of Big Data Expert Consultation Committee of Qingdao Big Data Promotion Association.

- **Zhouhui Deng-CTO**

He used to be server-side vice president of MOJI Weather. Having 15 years' Internet research and development experience and rich experience in optimizing and improving service quality with Internet and mobile Internet as well as new business framework design and operation. He accumulated large amount of resources in Internet finance and blockchain domains, and has served as vice president of Lilidai, senior system architect of Hongsanban, etc.

- **Zhaojun San-COO**

Economics and Management Master of Tianjin University. The general manager of a large copper production enterprises in China, holding 6 years' copper cash and futures trading experience. He is quite familiar with industry ecology of intelligent hardware programs and deeply involved in blockchain programs of intelligent hardware based on IoT basic communication.

- **Xing Wang-CMO**

Senior Internet entrepreneur, holding 6 years' experience in blockchain investment, having in-depth understanding and experience of blockchain ICO, leading teams to participate in investment and run multiple blockchain ICO programs with significant revenues.

Foundation

6.1 Vankia Chain Foundation

Vankia chain foundation devotes itself to initiating and promoting transparency of Vankia chain development, construction as well as management, so as to advance safe and healthy development of its open source ecology. The foundation will help to manage general affairs and privilege issues of Vankia chain open source community program, by establishing favorable governance structure. The goal of the structure mainly considers sustainability of open source community, management effectiveness and security of raising funds. Decision committee will be responsible for foundation decision making, and set up strategic planning center, technology development center, marketing center and daily management center.

6.2 Vankia Chain Foundation Management Structure

- Decision Committee

Vankia chain decision committee is responsible for management and decision-making of major affairs of Vankia chain, including but not limited to recruiting and relieving central leaders and making major decisions. The two-year term decision-making committee member can be reappointed. The committee sets one chairman, who is voted by committee members.

Members of the first session of decision-making committee are elected by Vankia chain investors, and have rights to recommend candidate members. At last, members will vote on candidates' qualifications.

- Strategic Planning Center

Vankia chain Strategic Planning Center is in charge of exploring feasibility to utilize Vankia chain and emerging industries in a combined manner, and carrying out commercial implementation solutions. The center is composed of veterans in blockchain and IoT domains, and will organize and participate in various industry exchanges irregularly.

- Technology Development and Research Center

Vankia chain Technology Development and Research Center is mainly responsible for technology development, test, review, etc., and will hold

technology exchanges irregularly. Staffs of the center are recruited from Vankia chain technology community.

- Marketing Center

Vankia chain Marketing Center focuses on marketing efforts, including technologies, brands, products and community promotion.

- Daily Management Center

Vankia chain Daily Management Center is primarily responsible daily works such as finance, personnel matters, legal affairs and administration. It also takes charge of reviewing funds utilization of Vankia chain foundations, avoiding varied potential legal risks, as well as managing daily affairs such as administration management and salary system.

References

Satoshi Nakamoto. Bitcoin: A Peer-to-Peer Electronic Cash System. https://bitcoin.org/bitcoin.pdf , Oct 2008.

1) Vitalik Buterin and Ethereum Wiki. Ethereum White Paper : A Next-Generation Smart Contract and Decentralized Application Platform. https://github.com/ethereum/wiki/wiki/White-Paper .

2) Wikipedia.Directed acyclic graph. https://en.wikipedia.org/wiki/Directed_acyclic_graph .

3) Sergio Demian Lerner. DagCoin: a cryptocurrency without blocksDirected acyclic graph. https://bitslog.files.wordpress.com/2015/09/dagcoin-v41.pdf , September 2015.

4) Serguei Popov for Jinn Labs. The tangle. https://iota.org/IOTA_Whitepaper.pdf , April 2016.

5) Anton Churyumov. Byteball: A Decentralized System for Storage and Transfer of Value. https://byteball.org/Byteball.pdf , September 2016.

6) IPLD. The data model of the content-addressable web. https://ipld.io/ .

7) Daniel Larimer, Ned Scott, Valentine Zavgorodnev, Benjamin Johnson, James Calfee, and Michael Vandeberg. Steem: An incentivized, blockchain-based social media platform. https://steem.io/SteemWhitePaper.pdf .

8) Daniel J. Bernstein, Niels Duif, Tanja Lange, Peter Schwabe, and Bo-Yin Yang. High-speed high-security signatures. https://ed25519.cr.yp.to/ed25519-20110926.pdf , September 2011.

9) Bitcoin Wiki. Secp256k1. https://en.bitcoin.it/wiki/Secp256k1 .

10) Daniel J. Bernstein, Peter Birkner, Marc Joye, Tanja Lange, and Christiane Peters. Twisted Edwards curves. http://eprint.iacr.org/2008/013.pdf , March 2008.

11) Wikipedia. Base32. https://en.wikipedia.org/wiki/Base32 .

12) Bitcoin Wiki. Base58Check encoding. https://en.bitcoin.it/wiki/Base58Check_encoding .

13) Pieter Wuille and Greg Maxwell. BIP-173: Base32 address format for native v0-16 witness outputs. https://github.com/bitcoin/bips/blob/master/bip-0173.mediawiki .

14) Bitcoin Wiki. Double-spending. https://en.bitcoin.it/wiki/Double-spending .

15) Bitcoin Wiki. Chain Reorganization. https://en.bitcoin.it/wiki/Chain_Reorganization .

16) Jameson Lopp. The Challenges of Block Chain Indexing. https://medium.com/@lopp/the-challenges-of-block-chain-indexing-30527cf4bfbd .

17) Jae Kwon and Ethan Buchman. Cosmos : A Network of Distributed Ledgers. https://cosmos.network/whitepaper .

18) Gavin Wood. Polkadot : Vision For A Heterogeneous Multi-chain Framework. https://github.com/polkadot-io/polkadotpaper/raw/master/PolkaDotPaper.pdf , Oct 2016.