

Foreword

# Blockchain application innovation in Beijing municipal services

## Blue book

(First edition)

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### Foreword

General Secretary Xi Jinping pointed out in the 18th collective study of the Political Bureau of the CPC Central Committee that As an important breakthrough for independent innovation of core technology, blockchain accelerates the promotion of blockchain technology and Industrial innovation and development; we must explore and use the blockchain data sharing model to realize cross-department of government data Doors, cross-regional maintenance and utilization, promote business collaboration, and deepen the "run at most once" Reforms will bring a better experience of government services to the people. The National Development and Reform Commission made it clear Blockchain is included in the construction of new infrastructure, and the blockchain is identified as a new technology infrastructure Important position and role. Beijing has set up a special class for blockchain work, from technological breakthroughs and applications

Demonstration, industrial cultivation, talent cultivation, etc., comprehensively promote the innovation and development of blockchain.

Globally, as the technical foundation of "programmable society"-Blockchain 3.0

The underlying core technology is not yet mature and still needs innovation and breakthroughs. We are in blockchain technology

The period of innovation and development opportunities for ecology, application markets, and industrial models needs to seize this key and

Major opportunities, adhere to the principles of independent innovation and application leadership, and concentrate on conquering key nuclear

Technology, research and development of independently controllable blockchain underlying engine, and construction of independently controllable blockchain technology

Technology ecology, actively explore the innovative application of blockchain scenes, promote the development of the blockchain industry, and explore

Blockchain application scenarios and digital economic model innovation, promote the integration of blockchain technology and industrial innovation

Together, it laid a solid foundation for the arrival of the "programmable society".

Blockchain will become a digital economy and digital society due to the trust mechanism inherent in its technology

The cornerstone of the project, and as a "trusted" information infrastructure in the "new infrastructure"

He plays a key role in information technology and promotes the development of "programmable society". Zone-based

The "programmable government affairs" of the blockchain will be the application form of government affairs in the era of the blockchain 3.0

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The important content of "programming society" can promote and nurture the construction of blockchain infrastructure and promote

Digital government speeds up construction.

With regard to government data governance and coordinated application of government services, my country has

Government information system integration and sharing vigorously promoted by the high-level government has alleviated the

The situation of "stove in a row and segmentation" supports some effective coordination of government services

application. However, most existing big data systems and applications focus on the data processing flow,

While neglecting the definition and clarity of responsibilities, rights and benefits in the data sharing process, it is difficult to ensure data

Real-time, synchronization and consistency, leading to the problem of difficult data sharing and business collaboration

It has not been fundamentally resolved. "Programmable government" based on blockchain 3.0 provides a

New solutions will help to truly eliminate "data silos" and "value silos" and promote

Cross-departmental and cross-regional maintenance and utilization of government data are supported, supporting blockchain-based government

Collaborative application of business services.

As one of the important tasks of the overall layout of Beijing's blockchain, since November 2019

Since then, the Municipal Services Bureau, the Municipal Science and Technology Commission, and the Municipal Economic and Information Bureau have spearheaded the promotion of Beijing

Action plan for blockchain application in government services. In universities, research institutes, and industry

With the full follow-up and in-depth participation of the integrated expert team formed by the

However, blockchain application scenarios such as the Resource Committee, the Municipal Commerce Bureau, the Municipal Finance Bureau, and the Municipal Finance Bureau take the lead

Departments and 4 pilot areas of Haidian, Xicheng, Chaoyang and Shunyi, work overtime and work harder

Construction of blockchain applications in the area of government services has currently been implemented in 140 specific scenarios.

Has achieved initial results in promoting data sharing and business collaboration, etc.

Industrial re-production has made positive contributions.

Beijing takes "Shoushan" as the standard and concentrates domestic first-class universities and research institutes

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And the technological research and development strength of enterprises and institutions, taking the lead in exploring innovative applications based on blockchain technology

Application, value application and landing application, continue to optimize the business environment and enhance the government service experience,

Further promote the capital governance system and capacity modernization, and strive to build a capital based, demonstration

Blockchain application innovation in the field of government services in the country. At the same time, as a rapidly developing Emerging technologies, the underlying foundation of blockchain technology and upper-layer applications are still in the early stages of development, The role, value, and application of blockchain technology in the field of government services are still continuing. Continuous thinking and exploration are still in the spiral of "cognition-exploration-feedback-improvement" Early stage of development.

"Hundreds of mountains start from climbing." Beijing Municipal Services Bureau and other departments will be in the city Under the unified planning and deployment of block chain innovation and development, it is supported by the spirit of innovation and iterative optimization Continue to explore the application of blockchain in the field of government services. This blue book is not just Beijing The review and summary of the first phase of the application of blockchain application innovation in the field of government services is more condensed The thinking and exploration of the expert group, relevant departments, pilot units and industry companies hope to be able to Brother units in the area of government services provide some references. We also look forward to communicating with you, Explore together and use the new generation of information technology such as blockchain to serve government affairs. "Chengwangban" provides newer, faster and better support.

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Beijing Municipal Administration Service Blockchain Application Innovation Blue Book

## Chapter One Blockchain is to promote the national governance system and governance capabilities Modern "new infrastructure"

### 1. Development achievements and current bottlenecks of my country's digital government

Digital government is an important part of my country's current promotion of the modernization of the national governance system and governance capabilities content. The Fourth Plenary Session of the Nineteenth Central Committee of the Party clearly required, Institutional rules for administrative management using technical means such as artificial intelligence. Promote the construction of digital government, Strengthen the orderly sharing of data." On March 31, 2020, General Secretary Xi Jinping inspected Hangzhou City The city brain operation command center pointed out that "using big data, cloud computing, blockchain, artificial Intelligent and other cutting-edge technologies promote the innovation of urban management methods, management models, and management concepts. From characterization to intelligence to intelligence, making the city smarter and smarter is to promote The only way to modernize the urban governance system and governance capabilities."

In the field of digital government, my country has conducted large-scale construction and application practices for many years, It has gone through multiple stages of innovation and popularization: digitalization, networking, and intelligence. In recent years Significant results have been achieved in "Internet + government affairs" and government data sharing, including Beijing The practice in some cities, including the people, has given the people a greater sense of gain Staff have higher efficiency.

On the other hand, large-scale data sharing and collaborative application in the field of government affairs are also in practice Encountered new challenges. First, the decentralized construction model adopted by China's government service system, During the development process, line segmentation, data islands, etc. were generated, which affected the business process to be further optimized. The problem. The concept and technology of the blockchain can be provided for governments at all levels in the country and Beijing

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Chapter One Blockchain is the "new infrastructure" that promotes the modernization of the national governance system and governance capabilities

Provide new technical tools, collaborative platforms and infrastructure to promote cross-level, cross-department and cross-region

Domain for data sharing.

Secondly, as the basic object of information technology processing-the data itself's confirmation, traceability,

Issues such as auditing and credibility are that the aforementioned large-scale application of information technology cannot fundamentally solved. The underlying core technology of the blockchain can help establish a data trust mechanism to achieve

The authenticity, non-tampering and traceability of trusted data requires further integration including blockchain technology

The new generation of information technology, including technology, achieves innovation and breakthroughs in technology systems and application practices.

Finally, due to changes in the status information and license data of various subjects in the field of government affairs,

Frequently, the handling of government service matters is very dependent on the real-time and accuracy of this information,

Therefore, using blockchain technology to allow relevant parties to obtain information and verify information in a timely manner can improve

The overall level of government services.

## 2. Blockchain 3.0: Building a trusted infrastructure for digital government

Blockchain 3.0 features "programmable society" as its main feature. "Programmable society" will be Zhi

The contract can serve as a bridge between the real world and the digital world, using blockchain as the underlying trust base

Infrastructure empowers various industries. "Blockchain+" will bring huge development to the digital economy

Change and opportunity. Digital government and "Internet + government affairs" are programmable based on blockchain 3.0

The main application scenarios of Cheng Society will present the application form of "programmable government affairs"

The construction of the word government has entered a new stage. "Programmable government" is based on the blockchain 3.0 Trust Base

Infrastructure, restructure the network and data architecture, and integrate into innovation with a trusted mechanism

Integrate the underlying technology to improve and support the growing application of innovative government affairs.

(1) From digital assets to trusted infrastructure, the origin and development trend of blockchain

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Blockchain technology originated from the scholar who changed its name to "Satoshi Nakamoto"

The foundational paper "Bitcoin: A Peer-to-Peer Electronic Cash System" published in 2008.

After more than ten years of development, blockchain technology has been applied in multiple scenarios. According to technology

Differences in technical characteristics and application directions can roughly divide the development process of blockchain into blocks

There are three stages: chain 1.0, blockchain 2.0, and blockchain 3.0.

In the era of blockchain 1.0, digital assets such as Bitcoin are typical representatives, and its goal is to achieve

Functions such as payment and circulation of digital assets. Blockchain 2.0 era is based on "Ethereum"

The smart contract application of the watch is a typical feature of the "programmable finance" era, mainly used in gold

In the field of financing, without the intervention of a third party, it can solve digital asset exchange, transfer operations,

Inter-bank payment and other issues. Blockchain 3.0 era refers to providing blockchain solutions for various industries

In the era of "programmable society", blockchain technology will be used as a trusted infrastructure in the future.

The application scenarios of various industries beyond the financial industry. Through a trust machine composed of blockchain

High-efficiency collaboration can support various complex business logic, optimize government services, promote

Digital government and other aspects have broad development prospects.

(2) Create "programmable government affairs" and push the construction of digital government into a new stage

General Secretary Xi Jinping emphasized during the 18th collective study of the Political Bureau of the CPC Central Committee

Suo uses the blockchain data sharing model to realize the cross-departmental and cross-regional maintenance of government data

And use, promote business collaborative management, deepen the "run at most once" reform, for the people

Bring a better government service experience.

In order to implement the important instructions of General Secretary Xi Jinping

The deployment requirements of blockchain technology and industrial innovation development. In February 2020, the Beijing Municipal Government Service Administration Bureau, Municipal Science and Technology Commission, Municipal Economic and Information Bureau issued the "Beijing

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Action Plan for Blockchain Application in Government Services (2020). March 2020, North

The Standing Committee of the Beijing Municipal People's Congress reviewed and approved

Example". Article 2 of the General Regulations of the "Regulations" clearly states "to build a new generation of information technology such as blockchain

Based on the data sharing and business collaboration system." The "Regulations" proposed in Article 17 "building

Establish an enterprise electronic identity authentication information system based on blockchain to reduce the need for enterprises

"Materials provided", Article 28 states that "The government and relevant departments should unify government services

Standards, innovative government services, and promote blockchain, artificial intelligence, big data, and the Internet of Things

The application of new-generation information technologies such as the Internet in the field of government services has continuously improved the quality of government services

Volume, providing regulated, convenient and efficient government services to market participants", Article 35

It is proposed that "the electronic data generated in the application of blockchain technology can be used to handle government affairs

Article Basis and Archival Materials", Article 44 puts forward "the use of blockchain technology to promote

Value-added electronic special invoices and other electronic bills." It can be seen that

The Business Environment Regulations should promote the application of blockchain in the field of government services and the application of blockchain technology.

The effectiveness of electronic data generated in use, invoices and other electronic bill applications, corporate electronic body

The certification information and other aspects were clarified and provided the basis.

In order to continuously optimize the business environment and enhance the government service experience, Beijing uses blockchain

As a breakthrough, vigorously develop "Internet + government" service technology, speed up construction and implementation

Now "programmable government affairs". "Programmable government" refers to the

"Programming society" stage, comprehensive use of blockchain, big data, artificial intelligence, cloud computing

Such as a new generation of information technology, a trusted infrastructure based on blockchain technology,

The sharing of business data is the starting point, and the government service applications are led by government service items and applications.

form. Based on blockchain technology distributed, transparent and credible, tamper-proof, traceable and other technologies

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Technical features, programmable government affairs through consensus mechanism, distributed ledger, smart contract and other functions

Features, to ensure openness and transparency of government affairs, to achieve trusted traceability and optimization of government affairs data sharing

Business collaboration and service processes, improve the efficiency of government services, and promote the construction of digital government

Enter a new stage.

(3) To build a credible infrastructure for digital government and comprehensively promote programmable government applications

Programmable government is based on various information technologies such as blockchain, big data, artificial intelligence, etc.

The important application form of the blockchain 3.0 era is also the goal of the new stage of digital government construction

One. The construction of programmable government affairs can be divided into three aspects:

One is to build a blockchain digital government trusted infrastructure. Blockchain is programmable government affairs

The foundation of trust is also the underlying trust mechanism of the trusted Internet in the future. Should speed up the construction of blockchain

Trusted infrastructure and common underlying blockchain platform to avoid isolation and isolation between blockchain systems

Disperse each other to form new "data islands" and "value islands". Adhere to independent innovation,

The principle of industry leadership, the first to realize the application of blockchain in the field of government affairs, and promote the Beijing blockchain

Industrial development drives the construction of national blockchain infrastructure.

The second is to realize the trusted sharing and exchange of data. Optimize data based on blockchain basic trust facilities  
Share exchanges and business processes, clarify data sharing responsibilities and rights, and build a big data service network  
With the value network, the shared data is real and credible, real-time circulation, clear authorization, and traceable footprint,  
Promote the cross-departmental and cross-regional maintenance and utilization of government affairs data.

The third is to deepen the coordination of government services based on blockchain, and promote government services and production  
Integration and innovation of cross-system data in the service industry. Beijing's blockchain government application has been taken  
The initial results have been achieved, and it should continue to be coordinated and promoted to improve the basic common application based on the blockchain;  
Deepen the pilot, generally blossom, implement specific business applications in different fields, and promote business processes

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Chapter One Blockchain is the "new infrastructure" that promotes the modernization of the national governance system and governance capabilities

Optimize and improve the government service experience; at the same time, promote the integration of industrial big data and government big data,  
Strengthen the connection and synergy of economic information and social information.

### 3. From the perspective of "new infrastructure" to promote innovation in the application of blockchain in the area of government services

Blockchain is defined as the new technology infrastructure in the "new infrastructure", and its "connection" technology  
The significance of the technology is prominent. On the one hand, the blockchain will connect to the existing proprietary network to serve government affairs,  
Information interconnection of financial, industrial and other proprietary networks; on the other hand, blockchain will be linked with cloud computing technology  
Technology integration, serving the information exchange and value between the original diversified cloud network and application platform  
circulation.

The blockchain is based on point-to-point distributed accounting technology, consensus mechanism, and asymmetric encryption  
Laws and smart contracts and other technologies can build a strong foundation of trust for all parties involved,  
Provide technical support for the trusted data interaction of all parties on the chain. Introduced in government information reform  
Blockchain technology can realize the authorized sharing of government affairs data, business collaboration, and consolidate smart government  
Foundation of the government.

Comprehensively solve the problem of data credibility in digital government and "Internet + government affairs",  
Application-oriented construction of a new generation of converged information system requires  
Technical infrastructure construction. Critical information infrastructure refers to national security, socioeconomic,  
Public interest closely related facilities, taking into account the current global and domestic economic and industrial technology  
Ecological environment, trusted infrastructure based on Blockchain 3.0 technology should be considered as the key  
Information technology infrastructure should be managed by the government as an important part of the new infrastructure  
Guidance and overall planning related to the overall construction, so as to support the overall  
Innovative applications and practices on the trust information infrastructure.

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### 4. The possibility of innovative application of blockchain application in Beijing's government services

Behavior and value

Beijing is my country's political center, cultural center, international exchange center, scientific and technological innovation center,  
It is also a leading city in my country's digital government and "Internet + government" practice. In the policy environment  
In terms of aspects, the municipal party committee and the municipal government actively implement the national  
Newly developed series of important policies have formulated action plans for blockchain application in the area of government services.  
In terms of technical foundation, Beijing has a large number of colleges and universities and technology enterprises, bringing together a large number of  
Academics, professors and technical backbones have the domestic first-class R&D strength and industrial foundation. Real

In terms of practicing the basics, Beijing has already explored in the areas of government service data sharing and scenario application Practice and experience basis. In terms of enterprises, Beijing has a series of technology leaders such as JD.com and Baidu.

The first Internet companies all have many attempts in blockchain independent innovation and application practice

And build trees.

Beijing closely combines blockchain technology with digital government construction, and actively explores block-based

Chain's data sharing model and business collaboration model will build Beijing into my country's government

Pioneer in the modernization of management systems and governance capabilities, providing an indication for our government's digital governance practices

A model for the establishment of government blockchain applications in fraternal provinces and cities across the country and even in the "Belt and Road" countries

The design has extremely high reference and reference significance.

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## Chapter 2 Blockchain Innovation and Development Blueprint in Beijing's Government Services

Blockchain technology can build a true and undeniable foundation of trust for digital governments.

Provide a complete set of governance structure to solve the "Internet + government" technology, mechanism, process,

Implementation and other issues to provide new perspectives and technical means to continuously optimize the business environment and improve

Significant effect of government service experience.

The value of blockchain in the field of government affairs is mainly reflected in three aspects. One is to help promote

Into the data circulation, play the value of data as a factor of production. Traditional big data technology only

Solve the problem of data collection, and data can only play value when it is truly circulated. Blockchain

It can provide effective technical guarantee for data confirmation, circulation and opening. The second is to help

Coordinated business management, deepening the "run at most once" reform, using blockchain technology to achieve business

Cross-departmental and cross-regional coordination and compliance management to improve online and offline integration

Service capabilities, enhance the sense of access of citizens, improve the business environment of enterprises, and enhance the government

Governance level. The third is to improve government transparency, effectively enhance the governance capacity of digital government, increase

Strong government credibility and execution.

The blockchain passes the 1.0 period represented by digital assets, and the smart contract represents 2.0

Period, is entering the 3.0 era that empowers social governance, but is generally in the early stages of technological development,

Technology is rapidly iterating, standard specifications are not yet formed, and the application technology of blockchain and industrial integration

The technique is still in its infancy, and its development in the field of government services is also in its infancy. Grasp the overall planning

Planning and top-level design, strengthen independent R&D capabilities of key core technologies, and carry out scene construction traction

The mature development of technology is the difficulty for Beijing to promote the innovation and development of blockchain in the field of government services,

Key points and points.

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### 1. Unified thinking, planning first, and courage to practice

The report of the Nineteenth National Congress of the Communist Party of China clearly pointed out

Re-cultivate professional ability and professional spirit. The greatest impact on human society since this century



It is the change of science and technology, science and technology are advancing by leaps and bounds, and it is a social and economic development. All aspects have brought subversive effects, a large number of social problems and economic problems around the world. The problems are solved by the development of science and technology. Regarding the overall situation of the capital's construction of science and technology innovation centers, leading cadres have put forward higher requirements in adapting to changes in science and technology. In the innovation and development of blockchain, it is precisely the need for leading cadres at all levels to unify their thinking and courage. For practice, actively use new technology, new concepts, and new methods to solve the "cannot, dare not, Reluctance" question.

Blockchain application scenarios in the field of government services have top-down, unified planning, and unified. The unique advantages of deployment, the overall planning and top-level design of the blockchain construction in the field of Beijing's government services. The plan will focus on five aspects. One is to build a city-wide unified government blockchain technology and application Standards; Second, build data circulation, openness and sharing around business needs in the government services Capacity; three is to promote cross-department and cross-regional government business integration service capacity building; four It is from the government business to build a digital government governance structure based on blockchain; fifth is synchronization. Promote the formulation and improvement of relevant laws and regulations, and ensure the orderly and compliant implementation of blockchain construction.

In 2020, Beijing has successively issued the Several Opinions on the Development of High-Quality Economic Development in Beijing", "Beijing Blockchain Innovation Development Action Plan (2020-2022)" and "Beijing Government Affairs Service Blockchain Application Action Plan Planning (2020)" (see Appendix I for details) and other documents, forming a "group-style" policy package, Provides a strong overall plan and top plan for the innovative development of blockchain and improving the level of government services

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#### Chapter 2 Blockchain Innovation and Development Blueprint in Beijing's Government Services

Layer design. Based on overall planning and top-level design, driven by business application needs, Be brave in practice and promote the landing of blockchain scenarios in the field of government services.

### 2. Driven by demand, continue to promote the construction of application scenarios

In early 2020, the Beijing Municipal Government Service Bureau, the Municipal Science and Technology Commission, and the Municipal Economic and Information Bureau jointly Promulgated the "Beijing Government Affairs Service Blockchain Application Action Plan (2020)" as a Blockchain is used in the overall planning of government service scenarios, guiding the continuous expansion of application scale and promotion. The demonstration application will be launched. According to the deployment of the action plan, the various committees and bureaus in Beijing have launched the district. The pilot application of block chain technology in the field of government affairs services. In terms of innovation, blockchain technology can be used to solve the "Internet + government services" technology, Mechanism, process, implementation and other issues to provide updated perspectives and technical means, on the one hand. By leveraging the advantages of blockchain in the trusted sharing of data, the number of cross-department and cross-institution. According to data sharing, on the other hand, on the basis of data sharing, through smart contracts to promote business cooperation. Handle with automation to reduce manual intervention and improve efficiency.

Chapter 3 of the Blue Book selects representative application innovation practices to elaborate. The application scenarios, application scope, and construction process of each case have their own characteristics. From different perspectives, Based on different backgrounds, the recognition of blockchain technology has its own emphasis, but it is not difficult to see that in the technology Standards, application directions, and future plans have formed some foundations for reference.

In terms of technology, select the underlying blockchain technology with independent intellectual property rights. Underlying skills As a beneficial support for the application of government affairs, its importance is self-evident. Thanks to blockchain technology. Both the body and the application in the field of government affairs are still in the initial stage, and there is no unified standard and complete Equipment, but the self-controllability of the underlying technology will ensure that "Internet + government" is in a

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The key to coordinated development in a safe and credible environment, future independent intellectual property rights and "Internet + Government" industry standard system will be closely integrated to help the government better improve management and Service quality actively promotes the construction and development of "Internet + government affairs".

At the application level, first of all, the future digital identity based on blockchain will become a Important and basic application direction. Taking individual or enterprise as a unit, various government agencies will Various public records such as certificates, materials, and documents are recorded on the blockchain, forming a comprehensive number of individuals Word archives, and give this digital archive a unique digital identity. Combined with encryption authentication, Cryptography technologies such as privacy protection, realize individual information in the case of individual authorization and multi-party verification "Self-certification", without the need for a third-party organization to issue a certificate. This application will greatly reduce The information required by the masses in the service, but also to reduce the verification in the approval process of government departments Work, truly achieve efficiency and cost reduction, and the "Internet + government" simple, efficient appeal Perfect fit.

Secondly, on top of digital identity, continue to use blockchain technology to build a credit system Step by step to build a credible society. As a new generation of information technology infrastructure, blockchain is equal to each other The characteristics of the letter can effectively connect the current independent "Internet + government" system. Relying on digital identity, multi-faceted and comprehensive information aggregation, and then cooperate with scientific and reasonable Credit evaluation model, using smart contract technology to give individuals and businesses a fair and objective Credit score. This new type of credit relationship can promote the transformation of administrative approval from conditional approval Approval for "credit realization", and also urged individuals and companies to value their performance in social activities, Cherish the situation of your credit, gradually influence and promote the optimization and reorganization of the work flow of government departments.

Finally, at the application level, blockchain technology will effectively reduce the cost of government data opening. Blockchain technology can carry out some sensitive data or personal privacy information through cryptography technology

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Protection, and through credible authorization, realize the horizontal sharing and circulation of data, making more government affairs The information is disclosed and used, the usage and circulation information can be traced back, and will not be tampered with. Utilization zone The connection of blockchain technology effectively reduces the construction cost of data opening and deepens government data development The depth and breadth of liberalization provide more participation for government management, social construction, public supervision, etc. Examination information, give full play to the role of government information resources.

In the 18th collective study of the Political Bureau of the CPC Central Committee in 2019, it was pointed out that blockchain technology should Use has been extended to digital finance, Internet of Things, intelligent manufacturing, supply chain management, digital asset transactions Yi and many other fields. The areas that have completed digitization should be selected for blockchain application innovation Focus on tackling key issues, carry out product traceability, supply chain finance, intellectual property protection, and judicial dispute investigation Solutions such as a series of blockchain application attempts, combing benchmark applications, leading the ecology, and promoting the block The accelerated development of chain application innovation. In addition, Beijing is also an important port for cross-border trade. The long chain and multi-subject of the global supply chain are naturally suitable for the application of blockchain technology and should be explored And promote the application of blockchain in cross-border trade, and open up various regulatory departments related to cross-border trade Data, comprehensively improve the efficiency of the supply chain operation of cross-border trade and reduce transaction costs. In numbers In the financial field, combined with the Beijing financial supervision sandbox, the use of blockchain, artificial intelligence, federal Technologies such as learning serve the opening and sharing of financial data, and use blockchain as financial data Connector for power, sharing, traceability and verification, serving the opening of financial data and promoting financial Continuous innovation in service models.

From the initial application attempts in the field of government services, we can gain insight into the transparency of blockchain technology,

Non-tamperable, traceable and other technical characteristics can meet the future development of "Internet + government"

Needs, in the future, it is necessary to plan its government affairs in terms of standardization, interoperability, security, etc.

Application and promotion in the field. Beijing Municipal Committees and Bureaus fully open up scenarios and data to promote government affairs

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The fusion of data and economic information data, and fully absorb the existing field in the implementation of subsequent scenarios

King's construction experience, continue to optimize and improve the details according to business needs, and expand the regulations after maturity

Model, bring points to face, promote the use of all aspects of the user and deepen the use of other areas

Application or copying. Through orderly planning, construction and promotion, avoid repeated construction and production

The risk of creating a new information silo, multiple parties form a joint force, and together form the impact of the "Beijing Plan"

Reinforce, and effectively empower Beijing's government big data construction results over the past decade or so to enterprises,

Forming economic growth momentum.

### 3. Guideline, formulate uniform standards and norms in the field of government services

After years of construction and development, "Internet + Government Affairs" in Beijing has been built to face the market

In the areas of core government affairs such as supervision, justice, finance, taxation, population, social security, and public safety

Comprehensive information system has initially formed a comprehensive coordination, sustainable development, vertical and horizontal coverage, reasonable

Layout and benefit the public "Internet + government" service system, promoting the promotion of government organizations

The optimization and reorganization of the structure and work flow have basically realized the comprehensive provision of high-quality,

Standardized, transparent, and management and services in line with international standards. But at the same time, during the construction process

China also faces a series of problems: First, the phenomenon of "data silos" still exists, and various departments

Different needs for informatization, different standards and data formats adopted, which seriously hinders government affairs

The effective circulation of data elements; second, the informatization level of various departments is unbalanced, and each informatization system

Relatively independent planning and construction, lack of cross-regional, cross-departmental, and cross-platform interconnection and technical support

Ability to support; third, it is difficult to manage and coordinate, and it is difficult to coordinate the internal processes of various departments.

There is no unified and effective information coordination mechanism.

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Cross-department multi-process approval solution based on blockchain

In the area of government services, Beijing has actively explored the application of blockchain integration. As integrated and innovative application of multiple IT technologies, using distributed storage of blockchain, non-tampering, Contract mechanism and other characteristics can be used for cross-regional, cross-departmental and cross-level government data exchange, Provide technical support for information sharing and full life cycle management, and promote the solution of government information system Issues such as decentralized construction and data silos, gathering cross-regional information resources and promoting inter-departmental co-construction Sharing, to achieve cross-level business collaboration, so as to comprehensively promote blockchain technology in government service Deepen the application of the domain, ensure the security of government affairs data and personal privacy, and enhance the public Service capacity and administrative efficiency.

In terms of the blockchain industry, Beijing also has a good industrial development foundation. Reliance

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The capital resources advantages of governance center, cultural center, international exchange center and technological innovation center, Beijing has issued relevant support policies one after another, insisting on market leadership, government guidance, systematic planning, Overall planning and layout, comprehensively promote the accelerated development of the blockchain industry, and strive to build The integrated blockchain comprehensively develops the industrial ecology, exploring the application of blockchain technology in the field of government affairs The cable laid a solid foundation. But at the same time, in the integration of blockchain and government services There are also a series of problems: First, the blockchain industry is still in the early stages of development and there is a certain process Industry chaos, lack of unified and effective decision-making basis and supervision methods to regulate industry health Development; second, the technical level and R&D capabilities of various enterprises are uneven, lacking a set of fair rights Wei's standardized evaluation and identification method and selection guide; third is the comprehensive governance system of the blockchain industry Not yet formed, the risk supervision and security guarantee capabilities need to be strengthened; the fourth is between the blockchain systems Difficult interconnection, lack of a cross-chain standard system that can consolidate industry consensus to guide the application The implementation has hindered the development and application of blockchain technology to a certain extent.

In order to promote the construction of blockchain applications in Beijing's government affairs field, work in Under the guidance of the class, the "Beijing Government Affairs Blockchain Platform Technical Specification (Draft)" was developed, focusing on "Five Principles and Two Requirements", that is, establish industry regulatory compliance, standards leadership, and interconnection The five development principles of communication, safe controllability and independent innovation propose a quality model for the blockchain platform Basic requirements and expansion requirements, so as to standardize and guide the healthy development of Beijing's blockchain industry. Through the "Beijing Government Affairs Blockchain Platform Technical Specification (Draft)", Blockchain service providers, for the relevant parties in the blockchain industry, provide decision-making supervision basis, Apply innovative guidance and construction development ideas to promote the coordinated development of the blockchain industry ecology.

Based on norms and standards, driven by technological innovation, and protected by the environment, to Safe and controllable as the bottom line, giving play to the modernization of blockchain technology in the national governance system and governance capabilities

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Application value in other aspects, to promote the application of blockchain technology in the field of government services, not It is only an important measure to improve the management, public service and emergency management capabilities of the Beijing Municipal Government. And it is to promote the innovation of blockchain technology in supporting the real economy to improve quality and efficiency, and the digital economy model. power.

#### 4. Open source co-construction and construction of the underlying blockchain technology platform in the field of government services

Starting from the practical guarantee of blockchain application compliance and data security in the field of government services, Fully support the construction of Beijing government affairs blockchain application scenarios, and create autonomous and controllable blockchain underlying technology

A surgical platform is necessary.

"Beijing Blockchain Innovation Development Action Plan (2020-2022)" clearly put forward

To build the underlying open source technology platform and ecology of the blockchain and promote the construction of the blockchain industry alliance

Key tasks. On the one hand, encourage scientific research institutions, colleges and universities to base themselves on the key of blockchain

Core technological achievements, build an independent and controllable underlying open source technology platform, and explore and develop based on

Blockchain's trusted chips, intelligent servers and operating systems, to build areas with international influence

The blockchain open source community builds an innovative and active blockchain open source ecosystem. On the other hand, around technology,

Application and industrial development promote the construction of blockchain industry alliances, attracting government, industry, learning, research, capital,

With the participation of multiple parties, in blockchain technology, achievements, applications, standards, training, evaluation

Carry out cooperation and exchanges in other areas to build an industrial ecosystem of collaborative innovation and mutual benefit.

At present, Beijing is promoting the construction of the underlying open-source technology platform of the blockchain to serve the future

Continued application in government services. In the construction of open source technology platform, follow the open source

The principle of continuous improvement, with an open and inclusive attitude, encourages enterprises in different technical fields and industries,

Universities and research institutes participate in the co-construction, refer to the formation and operation of the global mature open source technology community

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Ways to gather multiple forces to jointly build blockchain open source technology and ecology, and jointly create services for Beijing,

Radiation nationwide, autonomous and controllable blockchain underlying technology platform.

To support the future innovation and development of blockchain, the open source underlying technology platform in Beijing has been built

In the process, the following ideas will be considered:

(1) Loose coupling. The underlying architecture has a clear hierarchical structure and clear boundaries.

Layer technology decoupling or weak coupling to achieve a convenient and friendly iterative evolution environment;

(2) Security. Crypto algorithm, consensus mechanism, smart contract and other core algorithm security

Controllable

(3) Compatibility. The underlying architecture is horizontally compatible with each functional sub-module and backward compatible with the future

Technology iteration

(4) Modularity. Adopt modular design, adapt node resource management, bottom frame adaptation,

Application chain management, node gateway, CA management, authority management, operation and maintenance management and monitoring

The modules can be designed and implemented separately, and the looseness between the modules can be achieved through the clearly defined module interface service.

Coupling to obtain good scalability of the entire system;

(5) Strong expansion. Homogeneous blockchains are interconnected through interoperable protocols, heterogeneous

Blockchain realizes interconnection through relay;

(6) Strong privacy. Provide for transaction subjects and transaction information including but not limited to zero knowledge

Privacy protection technologies such as proof of identity, ring signatures, homomorphic encryption, multi-party secure computing, etc.

It meets the privacy protection needs of users in a trusted environment.

In specific practice, data security is the key foundation for data and business

Private protection is a powerful guarantee for data sharing, with the platform personalized configuration as application scenario customization

The solution uses cross-chain technology as a bridge to realize the trusted interconnection of multiple chains including government applications

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Interoperability and scalability to avoid blockchain data islands. With loose coupling, pluggable, mold

The technology integration features of block and backward compatibility are the core design concepts, and gradually absorb the underlying technology

Research advanced theories, technologies, and codes, driven by application practices to promote blockchain technology

Technology and applications continue to innovate.

##### 5. Inclusive and easy-to-use, construction of common infrastructure for government affairs blockchain application

The innovation and application of global blockchain has been comprehensively turned to "enterprise-level" services, more and more Of application development companies, technology enthusiasts, and application companies need to quickly access the blockchain network.

BaaS (Blockchain as a Service, Blockchain as a Service) as an emerging technology in the past two years

Platform, can help enterprises, governments and developers to build exclusive areas more quickly and at low cost

Blockchain alliance chain network. In addition, the integration of blockchain and cloud computing infrastructure is also a technology

Technology development direction, in a complex and heterogeneous multi-cloud environment, blockchain as a service platform is expected to become

Connection bridge for "cross-cloud" exchange of data. Encourage leading blockchain companies, technology companies,

Internet companies, actively promote the integration of blockchain technology and cloud computing technology, open

Easy-to-use blockchain infrastructure helps businesses and governments access and apply blockchain at low cost

Technology, truly realize the "out of the box" of the underlying technology of the blockchain.

The Beijing Municipal Directory Blockchain is one of the core parts of the municipal big data platform, mainly

Provide services to municipal departments, districts and related social institutions (data area)

Responsibilities, directories and systems of various departments and districts are locked on the "chain", and the "on account" is completed.

Strong correlation between current data and responsibilities, real-time detection of data changes, and data retention throughout the process

Mark, to ensure that the catalogs of all departments and districts are visible, available, and appraisable, and is a collection of big data in Beijing

Gather and share, optimize the business environment to provide support.

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The next step is to meet the needs of the construction of blockchain application scenarios in Beijing's government services.

Beijing improves the two-tier directory blockchain system in the urban area and forms the basic technical architecture design of the government affairs blockchain

The plan clarifies the relationship between the basic blockchain platform and the directory blockchain and blockchain applications in various fields.

The government cloud provides computing, storage and network resources, based on the underlying technology platform, and gradually builds

Established BaaS for government affairs, providing "administration and sharing" for government affairs application scenarios

The blockchain application support service reduces the threshold for the use of blockchain technology, which is convenient for users to quickly

The construction of government service blockchain application scenarios is also conducive to the intensive construction of subsequent government service application scenarios

Assume. Through the construction of common infrastructure for government applications, cross-chain docking of existing applications can be achieved.

Open up different blockchain application scenarios, realize the interconnection of government data, and gradually integrate government affairs blocks

The basic chain platform has become a credible information infrastructure that supports the development of the Internet of Value.

In the construction of Beijing government affairs BaaS, it is mainly considered to provide

Functions and features for future technology development. For example, the one-stop service feature provides integrated

Multiple cloud resources, underlying framework, operating environment, key management, development SDK and gateway API

One-stop blockchain deployment and operation services; efficient interconnection features, no matter what

The underlying architecture, all applications can be interconnected; flexible resource configuration features, oriented

Application, dynamically adjust computing resources, network resources, storage resources, etc.; security environment characteristics,

BaaS provides a unified operating environment for government services, including but not limited to algorithm security environment, data

According to the security environment, network security environment, contract security environment, interface security environment, etc.; the bottom

Separation of technology and application features enables application builders to deploy and operate and maintain the underlying architecture without any sense.

##### Sixth, supporting security, comprehensive and multi-angle protection of blockchain innovation and development

The innovation and development of blockchain in the area of government services is inseparable from the overall development of the blockchain field

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## Chapter 2 Blockchain Innovation and Development Blueprint in Beijing's Government Services

Steps, so it is necessary to introduce in the industrial ecology, capital guarantee, talent cultivation, regulatory policies, public opinion Guidance and other aspects to strengthen protection and guidance in all directions and from various angles, and establish and improve a fund guarantee mechanism, Cultivate and improve the linked blockchain industry, build a leading blockchain talent echelon, and pay attention to information Protection and security prevention and control, standardize and guide the healthy development of blockchain, and create a healthy public opinion environment, Thereby creating a favorable environment for innovation and development in the field of blockchain.

In terms of industrial development, we must seize the opportunity of blockchain technology integration, function expansion, and industrial subdivision, Accelerate the layout around the core of the blockchain and related industries, promote blockchain, artificial intelligence, and large numbers Deep integration of advantageous industries such as data and Internet of Things. Cultivating a collection of innovative blockchain enterprises in Beijing Group to create a nationally renowned and globally influential blockchain innovative leading enterprise; construction zone Blockchain innovation and entrepreneurship service platform to promote the transformation of scientific and technological achievements and provide one-stop innovation and innovation Business incubation services to stimulate innovation and entrepreneurship; building a blockchain industry innovation development base, focusing on Point to build industrial bases in Haidian District, Chaoyang District, Tongzhou District, introduce a number of outstanding enterprises and develop Completely improve the supporting service system; set up a blockchain investment fund to support innovation projects at all stages, Establish a service mechanism for blockchain companies to connect with the capital market and accelerate the realization of listing and financing in the capital market Capital; promote the construction of the blockchain industry alliance, attracting government, industry, learning, research, capital, and utilization The main body joins and builds an industrial ecology in which multiple parties collaborate on innovation and achieve mutual benefit.

In terms of talent team construction, strengthen the introduction of the world's top professional talents on the blockchain Various forms of high-level talent training platforms, cultivating a group of leading figures and high-level innovation teams, Form a first-class blockchain talent echelon with reasonable structure and multi-disciplinary integration to improve blockchain technology Continuous innovation ability. Introduce talents at home and abroad who are in urgent need of key core technology areas of blockchain, Leading technology talents and innovation and entrepreneurship teams. Encourage and guide relevant universities to rely on disciplines and scientific research projects Project and laboratory construction, to train a batch of high-level compound innovative talents. Encourage blockchain companies

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Carry out professional and technical personnel training, incorporate blockchain training into government cadre education and training, and support Blockchain technology related seminars.

In terms of regulations and policies, Beijing adopts inclusive and prudential supervision principles for the blockchain field as a whole then. "Beijing Regulations on Optimizing Business Environment" proposes "building a new generation of information such as blockchain Technology-based data sharing and business collaboration system", and clearly "blockchain technology application The electronic data generated in the above can be used as the basis and archive materials for handling government affairs." Explore the formulation of policies and regulations for blockchain technology and application management to standardize and guide blockchain health Development; research and improve the risk management mechanism of blockchain, and strengthen the technology and application of blockchain Guidance and standardization of directions; reasonable protection of the rights and interests of corporate masses and personal information according to law And business information.

Seven, the overall goal

In the future, Beijing will follow the "Beijing Action Plan for Accelerating New Infrastructure Construction (2020-2022)", "Beijing's Action Plan to Improve New Services and Further Optimize the Business Environment", "Beijing Beijing Municipal Government Service Service Blockchain Application Action Plan (2020) and other requirements The goal of the business environment is to promote the online The whole process of government services is electronic, reducing materials, running, time limit and links to the maximum extent. Promote the task of blockchain technology serving the construction of smart government application infrastructure, follow the trial and test The development path of using, continuously optimizing and demonstrating promotion promotes the building of common technology for the foundation of government blockchain

Technology platforms and infrastructure, a batch of representative applications, and a batch of practical results

Business scenarios, forming a batch of internationally leading technological achievements

The intention is to lay a solid foundation for the continuous expansion of blockchain applications and the development of blockchain technology ecology.

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## Chapter 3 Innovation Practice of Blockchain Application in Beijing Government Affairs Service

Beijing tightly revolves around the theme of government service scenes to break the key to the field of government service

Problems, core bottlenecks, pain points and plugging points are used as "hands" and entry points to solidly promote government services

Blockchain applications in the business field. The Municipal Planning and Natural Resources Commission, the Municipal Bureau of Commerce and other leading departments and Haidian,

The four pilot areas of Xicheng, Chaoyang and Shunyi currently have 140 application scenarios, with an average reduction of

40% of the materials, more than 310 items that are difficult to get through the traditional data sharing model, many

The number of scene runs was reduced from five or six times to "at most one run." Among them, through high-frequency electricity

Sub-license "on the chain", 253 items related to enterprises, 65 items for individuals, no need to bring papers

Qualification certificates can be handled, and 100,000 service materials can be streamlined throughout the year; real estate registration scenarios are practical

Currently, the "full-process online office" and other businesses such as "inter-enterprise stock non-residential trading" have reduced the movement by 100,000 people;

Established the first loan service center, and launched small and medium-sized enterprises to confirm power and supply chain financial service platforms and enterprises

Industry electronic identity authentication information system, enterprises fill in data reduction by 80%, time to open an account in a bank

Save 40%; build a unified billing platform for blockchain in the field of finance and taxation, in advance in medical care, donations, etc.

Pilot application of blockchain financial electronic bills in the field; the launch of the Beijing Airport International Logistics blockchain service

Business platform to improve the efficiency of foreign trade customs clearance; Haidian, Xicheng, Chaoyang, Shunyi and other areas have landed in China

District-level pilot scenarios such as the identification of Guancun high-tech enterprises, nurse practice registration, and medical assistance.

In the process of exploring innovation of blockchain applications in Beijing's government services, according to the blockchain

Technology plays a different role in the application of scenarios and solves different problems. It can serve government affairs.

Blockchain applications in the field are divided into "data sharing and exchange", "business collaborative management" and "electronic certificate deposit"

There are three types of "storage". Among them, "data sharing exchange" is a basic application

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Existing data sharing and exchange of multiple systems for a single item, further improving the efficiency of item review;

"Business collaborative management" is based on data sharing and exchange, according to the theme of business applications

Standard, through the blockchain to achieve multiple items according to the "theme" "series" and "parallel".

Improving the efficiency of the whole process of handling subject matters is an "upgraded" application of data sharing and exchange;

"Electronic certificate storage and registration" is based on data sharing and exchange.

Special legal significance and business value data are stored on the chain, with "certification" and "zhao" as data

The shared exchange manifestations enhance the credibility and verification efficiency of licenses and related documents.

Through case collection and expert selection, a total of 12 outstanding cases of application innovation were selected.

According to the way of structured case presentation, introduce the recognition of blockchain technology in excellent case scenarios

Knowledge and understanding, solutions to existing problems, preliminary effects of scenario applications, etc.

### 1. Municipal Commerce Bureau Airport International Logistics Blockchain Platform

Data sharing exchange



Municipal Commerce Bureau Airport International Logistics Blockchain Platform mainly focuses on data sharing and exchange, involving Municipal Commerce Bureau, Beijing Customs, State Administration of Taxation Beijing Taxation Bureau, Capital Airport and Daxing

6 units including airport airport park and cargo terminal.

#### 1. Existing problems or bottlenecks

In the traditional mode of airport international logistics, trading companies and logistics participating in the customs clearance process There are many enterprise units such as enterprises, agency enterprises, park operation units and supervision units, The process is complex, and the important role played by international trade logistics and customs clearance data in the business has There is commercial confidentiality, and participants cannot and will not share publicly, resulting in data barriers form. Difficult data integration makes multi-department collaboration difficult, time-consuming, and inefficient process collaboration.

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### Chapter 3 Innovation Practice of Blockchain Application in Beijing Government Affairs Service

At the same time, security problems such as data errors and responsibility positioning cannot be solved well and are difficult to eliminate Participants' concerns about data security and ownership.

#### 2. Blockchain technology's understanding and understanding of solving existing problems

Through the use of blockchain technology, the international port document information, trade information, Logistics information, customs clearance information, tax information, etc. on the chain, in the international trade logistics and customs clearance association During the operation, through blockchain deposit, verification and collaborative sharing, with the support of blockchain technology, each Data collaboration, conditional sharing, non-tampering, collaborative verification, non-repudiation, and Cross-border trade is safer and more credible, so that cross-border trade is more efficient, safer and more convenient Goal.

#### 3. Principles of blockchain technology selection

According to the design requirements of the project and user analysis, comprehensive consideration of efficiency, compatibility, safety The selection principle of fullness and scalability requires the following technical characteristics of blockchain technology:

In terms of security design, it provides multi-pronged privacy protection, cryptographic algorithms, and CA support. Provide users with trusted, safe and fast blockchain applications at the user layer, and can use services Various solutions provided by the platform.

Provides a Web management and control platform, supports operation and maintenance of the underlying platform, and flexibly determines areas The scale of the blockchain deployment and the operating status of the nodes.

Support simple and easy-to-use interface to realize certificate storage and smart contract execution, application interface Use the key to authorize.

#### 4. Overall architecture

This project is built using blockchain technology. The Beijing Municipal Bureau of Commerce and North Construction of the Beijing Customs node.

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The overall architecture of the platform is divided into 4 layers: SaaS layer, BaaS layer, PaaS layer, IaaS layer, IaaS belongs to the infrastructure service layer, PaaS belongs to the platform service layer, and BaaS belongs to the blockchain-based Basic service layer, SaaS belongs to the application service layer.

Blockchain basic platform construction mainly includes: platform integration, interface development, platform CA Integration, smart contract and other functions.

The application service layer includes access services and blockchain application services, of which access services include Service access for external enterprises and service access for internal competent authorities. Main package of blockchain application platform

It includes three parts: comprehensive service system, operation management system and data collection system.

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The service objects of the comprehensive service system are various foreign trade enterprises, logistics enterprises, warehousing and freight enterprises. The main functions include: aircraft dynamic query, manifest dynamic query, customs dynamic query, Pickup dynamic inquiry, delivery dynamic inquiry, bayonet entry and exit dynamic inquiry, vehicle record information inquiry, Cargo logistics dynamic query, cargo inspection dynamic query and export tax refund dynamic query.

The users of the operation management system are the operation and maintenance department and the competent department of this platform. Operations Management. The main function of the management system is to show the business operation of the blockchain platform to the staff of the operator condition. The main functions include: business query statistics (divided into query and statistics of import logistics situation and Export logistics situation query and statistics two modules), function usage statistics (divided into business functions Usage query and statistics and enterprise usage query and statistics two modules), system operation Kanban (divided into two: import and export business operation display and blockchain node operation display Modules).

#### 5. Application effect

Through the online operation of the airport international logistics blockchain platform, it has changed the logistics clearance of enterprises. The current status of data needs to be obtained through multiple platforms separately to achieve tracking of logistics through a window. Clear the status information of each node; at the same time, the competent department can obtain online through the one-stop blockchain. Obtaining credible data shared by enterprises and customs improves the analysis timeliness of business environment assessment indicators. Sex, which simplifies the management and supervision process.

From the launch in March to the end of May, there are more than 3 million pieces of customs clearance logistics data on the chain. 121 companies have used the blockchain system to query and verify various functions a total of 7,784 times.

#### 6. Inspiration and thinking

Through the implementation of the project, various collaboration units, trading enterprises, and logistics enterprises have been realized in Beijing. The query of the data storage chain of the airport international logistics block chain platform makes the operation of the business manageable and controllable.

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Reduced decision-making costs and improved the comprehensive competitiveness of foreign trade enterprises; at the same time, through the use of blockchain. The characteristics of difficult tampering, difficult forgery and traceability improve the level and efficiency of port supervision and improve the port

Shore competitiveness, optimize the trading environment, and improve macro decision support.

## 2. Facilitation of Beijing-Tianjin-Hebei Customs Clearance

### Data sharing exchange

Municipal Commerce Bureau Beijing-Tianjin-Hebei customs clearance facilitation scenario uses blockchain technology to achieve Beijing-Tianjin-Hebei shipping Logistics data sharing and exchange, involving the Municipal Commerce Bureau, Beijing Customs, Tianjin Port Group, Tianjin Customs, 5 units including the Beijing Taxation Bureau of the State Administration of Taxation.

#### 1. Existing problems or bottlenecks

The World Bank annually evaluates the business environment of various countries in order to accurately grasp Beijing's cross-border The 8 sub-indicators of trade data need to be evaluated by Beijing enterprises in Tianjin Port and Hebei-related seaports The import and export timeliness and costs involved in obtaining logistics and customs clearance data at the Beijing-Tianjin-Hebei port. And this There are data collection channels that are not fixed, collection methods are not smooth, and data analysis is incomplete Face to face issues.

#### 2. Blockchain technology's understanding and understanding of solving existing problems

Beijing-Tianjin-Hebei shipping logistics data sharing, through the Tianjin Port, Tianjin Customs (under construction), Ship information, manifest information, wharf loading and unloading, stacking at Tangshan Port (under construction) and other marine ports On-site pick-up, entry and exit gate data, and Beijing import and export enterprises in Beijing Customs, Tianjin The customs clearance status declared by the Customs and Shijiazhuang Customs adopts the blockchain method in Beijing, Tianjin and Hebei Multiple nodes in three places. Realize rapid and synchronous data sharing, and ensure the authenticity and timeliness of data, In order to solve the problem of data dispersion, collection channels are not fixed, collection methods are not smooth.

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### 3. Blockchain technology selection principles

When selecting the blockchain technology, the Beijing-Tianjin-Hebei customs clearance logistics data sharing platform mainly considers Consider the following aspects: Data security: data on the chain involves the progress of Beijing companies in Beijing, Tianjin and Hebei Export data and time-sensitive data for customs clearance must ensure that the data access range is controllable and the data exchange is safe; Scalability: The chain involves the deployment of multiple units in Beijing, Tianjin and Hebei, and needs to adapt to the network of each unit Complete, data management requirements; easy to manage: can easily run each node Monitor and monitor data exchange.

#### 4. Overall architecture

This project is built with blockchain technology and designed in Beijing Commercial Bureau (built), Beijing Customs (built), Tianjin Customs (under construction), Tianjin Port (built), Tangshan Port (under construction) The establishment of nodes, the overall network architecture is as follows:

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In terms of application, the system involves multiple roles of marine import and export, including shipping companies, shipping agencies, Tally company, yard company, local customs, port customs, etc. Businesses in and out of the three places Customs clearance, logistics data, including main information of customs declaration form, customs clearance status information, ship Dynamics, manifest data, port area loading and unloading information, yard outage information, etc. Developed for the enterprise One-stop customs clearance logistics data query and retrieval application provides Beijing Enterprise Shipping with the Beijing Commerce Bureau Import and export monitoring system. The main functional architecture is as follows:

As shown in the figure, the main functional architecture is divided into user access layer, portal integration layer, business function Energy layer, data layer, application support layer, infrastructure layer.

The user access layer mainly provides user access methods. This system provides users with Browser access, APP access, etc.

The portal integration layer is mainly used by enterprises through the Beijing-Tianjin-Hebei customs clearance shipping logistics data sharing platform Households and government users provide data query and management functions.

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The business function layer is mainly divided into two parts: the enterprise end and the management end, including the ship schedule check. Inquiries, Customs Logistics Linkage Inquiries, Import Master Order Diversion and Allocation Inquiries, Inbound Cargo Inquiries, Ships Inquiry of ship's ship number, inquiry of ship's efficiency, statistics of customs declaration number, statistics of manifest number, other Statistics, customs clearance time evaluation, customs clearance time, overall customs clearance time, customs clearance time setting And other functions, the enterprise can control its access to data range permissions through different enterprise identities, manage The end controls its data access scope authority through authorization.

The data layer mainly includes the technology of avoiding repeated construction and generating new information islands from the blockchain The platform obtains the business system data on the chain, mainly including maritime import data, maritime export data, Permission data, log data, etc.

The application support layer mainly includes the business system. The data on the chain is uploaded to the blockchain technology platform to achieve data sharing. Among them, the on-chain client The unified management and distribution of the blockchain platform provides a powerful guarantee for security management.

Infrastructure layer mainly includes P2P network, storage, operating system, database, etc. Design to provide basic support for upper-layer applications.

#### 5. Application effect

At present, the Beijing-Tianjin-Hebei Shipping Sharing System has gathered 23968 customs declarations and 78305 Customs clearance status data, 2980 ship movements avoid repeated construction and generate new information island states, 882,544 pieces of loading and unloading ship data, the total data volume reached 985,801 pieces. A single ticket was initially realized

Full process traceability of goods: including document node time and border time, full flow for a certain ticket business

Process tracking; realizing dynamic inquiries of enterprises in port: taking a single enterprise as a dimension

Inquiry and statistics of logistics information; realizing dynamic inquiries in Hong Kong in a single period: using time as the dimension

Degree, inquire and count the logistics data of all relevant enterprises in the port within a certain period of time;

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Build a Beijing-Tianjin-Hebei cross-border trade facilitation system, promote the interconnection and interoperability of customs logistics information in the three places,

Enterprise business collaboration.

#### 6. Inspire and think

The reduction of the cost of enterprise logistics clearance and the improvement of efficiency are the most fundamental reasons for the improvement of enterprise competitiveness

Ben's motivation. Foreign trade management departments such as the Commerce Bureau and Customs, through the establishment of a blockchain platform, can

Enough to comprehensively monitor the entire timeliness from the ship, to the wharf, to the customs declaration, to release. For optimization

Customs clearance environment, improve customs clearance efficiency, provide the most direct data support, and further enhance Beijing-Tianjin-Hebei

The competitiveness of the port makes the import and export of Beijing enterprises smoother.

### 3. The Municipal Financial Supervision Bureau based on the blockchain enterprise electronic identity authentication information system

Data sharing exchange

City Financial Supervision Bureau based on blockchain enterprise electronic identity authentication information system (eKYC)

Mainly focus on data sharing and exchange, involving the Municipal Financial Supervision Bureau, the PBC Administration, Beijing

Banking and Insurance Regulatory Bureau, National Internet Emergency Center, Beijing Financial Technology Research Institute, various commercial banks

Wait for multiple units.

#### 1. Existing problems or bottlenecks

For a long time, enterprises have to go to banks for financial services such as opening accounts or applying for credit.

Carry all kinds of supporting documents and fill in relevant information. Due to the professionalism of banking, customers

Missing, wrong, or missing certification materials occur from time to time, often requiring multiple round trips,

Time-consuming and laborious.

At the same time, in the process of information review, the bank has not completed the data due to scattered data acquisition channels

Due to various reasons, the time for customer identity verification and information verification is long, and the efficiency of customer due diligence is not high.

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#### 2. Blockchain technology's understanding and understanding of solving existing problems

To reduce the application materials and data in the process of opening an account and applying for credit from a company to a bank

Write items to promote mutual recognition of customer application materials between banks, avoiding repeated reporting in multiple banks,

Repeat proof, can use blockchain technology to establish a collection of regulatory departments, data support, business execution

A trusted alliance chain with three types of nodes as a whole.

The automatic filing and multi-dimensional verification of the application information of the enterprise now form a multi-party collaboration and trust

Working mechanism of mutual recognition and unified authentication. Bank account opening and credit data review should be

Using blockchain technology, it is possible to transform banks from "single fighting alone" into "joint operations" with multiple trusted nodes,

Play an active role in enriching bank due diligence methods and improving the efficiency of due diligence.

#### 3. Principles of blockchain technology selection

Transaction data security. The traditional blockchain only achieves the anonymity of the identity of the transaction subject; this

The system not only anonymizes the identity of the transaction subject, but also protects the security of the transaction data.

The transaction speed is fast. Blockchain public chain will make the transaction confirmation time change because there are many consensus nodes Long; the system consists of trusted nodes forming an alliance chain, supporting high concurrency and strong technical security.

The consensus mechanism is appropriate. Consensus mechanism will bring trust cost, safety and efficiency issues.

Select the appropriate mechanism according to the appropriate scenario; the system selects asynchronous Byzantine fault-tolerant consensus algorithm.

#### 4. Overall architecture

Blockchain-based enterprise electronic identity authentication information system (hereinafter referred to as "eKYC system" Unified") to achieve inclusive and convenient user experience, authoritative and credible data services, real-time and effective Supervision.

Online service, Pratt & Whitney is convenient. For enterprise users, provide enterprise data sharing authorization,

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Data management and other functions, while protecting the legitimate rights and interests of enterprises as data subjects, optimize

User business management experience; Provide shared data acquisition and update for financial institutions such as banks

Function to realize automatic pre-filling and multi-dimensional verification of information required by the business, speed up business processing

Process, reduce business risk.

Data service, authoritative and credible. By linking government data, authority data, banks

Data provides data support for enterprises to handle financial institution business. Bank unilaterally confirmed enterprises

After the data is collected and shared by the eKYC system, it becomes corporate data of mutual recognition and mutual recognition between banks.

Form a trusted share of corporate data.

Supervision and supervision, effective in real time. Banks and other business execution nodes, municipal financial supervision bureau, etc.

Data support nodes such as regulatory authority nodes and the National Internet Emergency Center constitute a trusted alliance

Chain to form consensus verification and credible delivery of business operations, business processes, and key data on the chain,

Support real-time and effective supervision in the event. Business operations on the chain, that is, banking business operations,

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Authoritative data agency operations are deeply nested with on-chain transactions, leaving traces on the chain; business processes are on-chain,

The deep correlation between the transactions on the chain forms the transaction chain, which is a single operation and the entire process.

Confirm on the layer chain; key data is on the chain, key business data is stored in the hash or encryption

The distributed ledger of the blockchain realizes cross-validation and supervision of on-chain transactions and off-chain business.

#### 5. Application effect

Take the first pilot case "Beijing" on the day of the eKYC system launch on March 15, 2020

"Taihao Environment Co., Ltd. opened the settlement account of Zhongguancun Bank" as an example to illustrate the platform

The initial results achieved. The company applied to Zhongguancun Bank for opening a settlement account for the loan business Account, Zhongguancun Bank applied to the eKYC system to query enterprise data, and the eKYC system was integrated Relevant trusted data to help the company streamline account entry data entry and achieve corporate account opening letter Automated reporting of information and verification of multi-dimensional information greatly shortens customer identity verification and information Verification time. At present, the eKYC system has helped Zhongguancun Bank, Baixin Bank and Minsheng Bank have completed more than 50 cases of corporate data review pilots.

#### 6. Inspiration and thinking

As a major basic system for the city to further optimize the capital's financial and credit business environment Innovative, the eKYC system has been included in the "Beijing Regulations on Optimizing Business Environment". In the future Relying on the "Changrong Project" to connect various financial service platforms in this city, and truly form multi-party collaboration, Working mechanism for mutual information and unified authentication. eKYC system reduces the number of enterprises to fill in data, Starting with the "small cut" of providing materials, and promoting the realization of a one-stop online financial and credit business Handle, solve the problems of financing difficulties, expensive financing, and slow financing of small and micro enterprises, and achieve technological innovation Newly empower "big innovations" that improve the quality and efficiency of financial services.

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#### 4. The Municipal Finance Bureau uses blockchain technology to promote the application of financial electronic bills

Data sharing and exchange, business collaboration

City Finance Bureau promotes the application of financial electronic bills based on blockchain technology

Shared exchanges and business coordination are handled in the early stage at the Municipal Finance Bureau, 1 hospital, 1 school, 2

The Home Foundation conducted a pilot.

##### 1. Existing problems or bottlenecks

Fiscal bills are widely used in various fields and are closely related to the work of enterprises and the masses.

In the circulation of financial electronic bills, the circulation status is not easy to record, the financial department, the reimbursement form

The audit department is difficult to verify the process. At the same time, because the data of fiscal electronic bills are stored in

Financial departments and ticket-using units are subject to docking and authority control under the existing information system architecture

Due to various factors, there is still a bottleneck in the efficiency of data sharing and business collaboration.

##### 2. Blockchain technology's understanding and understanding of solving existing problems

Blockchain technology has privacy protection, trusted circulation, use of traces, high concurrency, and

Multi-party participation and other characteristics, using these features can help financial electronic bills in business supervision and

Resolve the crux of the application of social circulation. For example, the application of blockchain technology, for the record

Bill invoicing, production supervision, printing and even reimbursement status, time and track provide new solutions,

Allow authorized units or individuals to inquire all the electronic bills according to the key elements of the bills

Information and status not only solve the security problem of data sharing, but also through the disclosure of data

Measures such as transparency, non-tampering and collective maintenance have reduced information asymmetry and contributed to new

Bill information transmission and trust mechanism.

##### 3. Principles of blockchain technology selection

According to the business management model of "chain at source, authorized use, trusted circulation, intelligent supervision",

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Build a financial electronic bill blockchain network, and establish a social application ecosystem of financial electronic bills

"Union" to realize the sharing of financial electronic bill information and promote the application of financial electronic bills in various fields.

In the preliminary pilot application, the specific principles are as follows:

(1) Meet the electronic bill business performance requirements and adapt to the short-term high concurrent invoicing needs.

(2) To meet the needs of business changes caused by possible future policy adjustments, the business should communicate

Through smart contracts.

(3) The blockchain platform should meet certain scalability and be able to support complex blockchains

Network structure.

(4) The selected blockchain platform should meet independent and controllable requirements, and no intellectual property risk is involved.

#### 4. Overall architecture

The overall structure of the financial electronic bill blockchain platform is shown in the following figure:

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The blockchain infrastructure layer provides the basic operating environment of the blockchain, including the blockchain foundation

Interfaces, contract engines, certificate services, node consensus mechanisms, and blockchain ledger management

Basic services.

Business service layer, reduce the development difficulty of the upper business application layer and shield the underlying blockchain

The technical obstacles of the basic platform for the business application layer to implement business contracts based on the blockchain environment

And make sure to avoid waste of resources caused by repeated development.

Business application layer, fully reuse the existing parties including the financial electronic bill system and other parties

The achievements of business system construction, based on the existing system, only do the necessary minimum upgrade and transformation,

Access to the blockchain through related blockchain service components to realize the existing system and blockchain

Function docking.

#### 5. Application effect

The use of blockchain technology to promote the application of financial electronic bills has implemented the technical advantages to

In the actual business work, the full promotion of the blockchain in the field of financial electronic bills has been fully utilized

Improve data sharing, optimize business processes, reduce operating costs, improve collaboration efficiency, and build

The application effect of the letter system. As of the end of May, the city's blockchain financial electronic bills have

After implementing pilot applications in the fields of medical care, public welfare donations and education, a total of

64,404 sub-notes.

Taking medical electronic bills as an example, after the payment is completed by the self-service machine, the citizens can pass the hand

The WeChat applet on the machine can view the own medical electronic bills and trace the tickets in real time

According to the application trajectory. Patients not only save time in line to collect tickets, but also no longer worry about appearing

Issues such as loss of bills, verification of bills, and inability to reimburse, patients no longer have to deal with these "little troubles"

Troubled, the medical experience further improved.

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For patients who need insurance reimbursement, based on the blockchain, submit electronic tickets online  
According to other materials, it can easily and efficiently complete the reimbursement of commercial medical insurance. Insurance company  
Use the trajectory information of the electronic bills on the blockchain to trace back, view clearly and reimburse clearly  
Clearly, it saves the insured's claim settlement time and reduces the cost of insurance company claims review.  
Effectiveness improves the service experience.

#### 6. Inspiration and thinking

The financial department is the policy maker and leader of the reform trend of fiscal bills.  
The efficiency and quality of the bill-up service depends on the policy support and technical support of the financial sector. therefore  
The financial department should deeply integrate the pain points and difficulties encountered in the social application of fiscal bills and make overall plans  
Plan and do a good job in leading the trend, use the characteristics of blockchain technology to provide support services for the invoicing unit,  
Inject new impetus into the city's optimized business environment, help the public service run out of new speed, and give enterprises  
Bring more sense of gain to the masses.

### V. Haidian District's financial service platform for SMEs based on blockchain

Data sharing and exchange, business collaboration

The financial service platform for small and medium-sized enterprises based on blockchain in Haidian District  
According to shared exchange and business coordination, the construction units include Haidian District, Beijing Financial Control, and Weixin  
The Edge Computing Research Institute and Baixin Bank. The pilot units include Haidian District's budget units and districts.  
It is a state-owned enterprise and related cooperative banks.

#### 1. Existing problems or bottlenecks

SMEs occupy an extremely important position in the national economy, subject to the letter of credit  
Poor conditions, poor financial system, few mortgage-backed assets, weak risk resistance, etc.

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For reasons, SMEs have been facing difficulties in financing, expensive financing, and slow financing. to this end,  
According to the deployment of relevant work of the municipal government, Haidian District cooperates with Beijing Financial Holding Group (hereinafter referred to as  
Called "Beijing Financial Control"), Beijing Microchip Edge Computing Research Institute, and Baixin Bank  
Exhibition "Blockchain-based SME Financial Service Platform" (hereinafter referred to as "Platform")  
Construction work.

#### 2. Blockchain technology's understanding and understanding of solving existing problems

Blockchain is a trusted distributed shared ledger technology, which uses a blockchain-type data structure to store transactions  
Easy data, use cryptography to ensure the security of data transmission and access, and data privacy.  
The distributed consensus algorithm guarantees data consistency, and automatically triggers verification verification through smart contracts  
Easy and operational data. Blockchain technology helps to achieve information sharing and consistent decision among multiple subjects  
Policies to ensure the traceability, openness and transparency, non-tampering,  
Non-repudiation and non-forgery, in order to solve the trust risk in a multi-agent environment and reduce transaction costs  
This, to improve the efficiency of collaboration provides a new solution.

The platform applies blockchain technology to achieve effective risk prevention and control. Key number of proof of confirmation  
Data, such as the amount of the account, the time of remittance, the information of both parties, the contract information, and the time of confirmation  
Etc.) Deposit certificates on the chain, and realize the confirmation data between different nodes through a consensus mechanism  
The secure and synchronous sharing of the system ensures the credibility and tamper-proofness of the confirmation certificate. Platform phases  
Customs subjects (SMEs, government units, state-owned enterprises, finance bureaus, SASAC, confirmation of power

Centers and banks) According to the corresponding authority, you can always know the company's power confirmation and financing situation.

Effectively eliminate the use of false accounts/false contracts for financing, and the same confirmation of power verification

Capital and other violations.

### 3. Principles of blockchain technology selection

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In terms of the selection of the underlying blockchain technology platform, follow the principles of independent innovation and safe and controllable. Then, the underlying blockchain platform independently developed by the Microchip Edge Computing Research Institute is used. platform involves a large amount of government and state-owned enterprise procurement contract information, including the contract amount and contract execution. The situation is the business private information of the enterprise, so it needs to be based on autonomous and safe and controllable bottom chain building, through a variety of security technologies such as data encryption and digital signatures, to ensure the security of data safe sharing and protection of private information.

### 4. Overall architecture

The platform takes the government and state-owned enterprise procurement contracts and the confirmation of accounts receivable as the starting point. The binding assessment mechanism for Party A's unit is determined, and the financial institution shall prove to be Party B's. The industry provides financial services such as supply chain financing. The platform is based on the small and micro financial service platform of Beijing Financial Control Unified entrance, the blockchain network includes the confirmation center, Beijing Financial Control, Finance Bureau, and SASAC 5 nodes with Baixin Bank. After registering and logging in the Xiaowei Financial Services Platform, the enterprise of Party B may provide. Submit an application for confirmation of rights with municipal/district budget units, state-owned enterprises, or accounts receivable. The confirmation center will conduct a formal review of the application materials, and after passing, the platform will automatically distribute to the corresponding Party A unit and related supervision unit (urban finance bureau or urban SASAC). Party A unit. It is necessary to review the application of Party B within the specified time limit. Blockchain technology confirmation certificate, Party B enterprises can use this certificate to apply for financial institutions to provide financial products such as "confirmation of power". Banks can review and credit management for financing applications. Management and loan management. The platform also aggregates various financial resources such as financing guarantees and asset management. It can quickly provide a full range of supply chain financial services for small, medium and micro enterprises.

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### 5. Application effect

The platform effectively utilizes the public procurement data of the government and state-owned enterprises as well as multiple parties of blockchain technology. The advantages of consensus and non-tampering ensure the credibility and non-tampering of the power confirmation certificate.

Enterprises provide high-quality credit certificates, which solve

The problem of contract authenticity provides SMEs with efficient and fast financing channels. In related materials

Under the premise of complete materials, SMEs can complete the application process in only 1 minute, and within 5 days

Obtain the authority of Party A's unit within it. Compared with the traditional financing model, it has realized enterprise transaction contracts

The credit transmission has widened the financing channels of enterprises. Enterprises fill in the application for loans online

Amount, interest rate, time limit and other information and associated proof of power confirmation can quickly dock bank orders

Financial products such as loans. The bank can view the confirmation certificate of the enterprise's rights online through the platform.

Carry out rapid credit approval for the same information and account receivable information.

#### 6. Inspiration and thinking

Supply chain finance is one of the effective ways to ease the financing difficulties of SMEs, but in practice

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### Chapter 3 Innovation Practice of Blockchain Application in Beijing Government Affairs Service

There are still many problems in operation, and the biggest challenge is "difficult to confirm power". Masters

Information is split between entities, transaction authenticity is difficult to ensure, credit transmission is not smooth, and the supply chain

The original intention of finance to solve the financing difficulties of SMEs has not really landed. Blockchain-based

The small business financial service platform effectively uses the technical advantages of the blockchain, while

Good supervision system and clear process system to form a long-term mechanism

Corporate financing provides a safer and more transparent solution.

#### 6. The Municipal Planning and Natural Resources Commission based on the blockchain real estate registration system

Data sharing and exchange, business collaboration, electronic certificate storage, including 7 specific scenarios

Municipal Planning and Natural Resources Commission based on blockchain real estate registration system

The advantages of technology in data sharing and exchange, business collaboration and electronic certificate storage, etc.

Now there is registration of non-residential real estate transactions, mortgage registration, mortgage cancellation registration,

Husband and wife change their names, fill in streamlined materials for one-netcom business, and register one-netcom business flow

7 scenarios including process optimization, real estate registration electronic license data on-chain and application promotion, involving

Municipal Planning and Natural Resources Commission, Housing and Urban-rural Construction Commission, Taxation Bureau, Public Security, Market Supervision Bureau, Civil Affairs, Bank

11 units including insurance supervision, provident fund center, electric power, gas, Gehua cable.

##### 1. Existing problems or bottlenecks

(1) There are credibility problems in the promotion and application of electronic licenses;

(2) The business volume of mortgage registration and mortgage cancellation registration is large, and the workload of examination and approval is large;

(3) Repeated submission of materials and verification for registration of non-residential real estate transactions between enterprises

The problem of long tax time;

(4) There are many materials that need to be submitted for the change of husband and wife business;

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(5) The usage rate of data sharing information is low, and there are many materials to be filled in the one network communication business;

(6) The business process of OneNet needs to be further optimized.

##### 2. The combination of real estate registration and blockchain technology application

(1) Real estate registration business, relevant information on-chain certificate, real estate registration electronic certificate

Store certificates on the chain to ensure credibility of electronic licenses; real estate registration from public security, civil affairs, market supervision

The data sharing process and results of the management department and other departments are uploaded to the chain for certificate storage to realize the traceability of the sharing process.

The automatic approval process and results of the real estate registration business are uploaded to the chain for deposit certificate to realize the mortgage Smart second batch of sales registration services.

(2) The department that uses electronic licenses can verify and verify the electronic licenses.

When the ordinary people use the real estate registration electronic license for business processing, the applicant will be shown

Compare and verify the electronic license information with the electronic license information stored on the blockchain to verify the authenticity of the license

Pseudo; can also be used as a blockchain user, directly pull from the blockchain by entering query conditions

Electronic license data to support business processing.

(3) Reducing links, reducing materials and related business departments, banks, utilities, and real estate registration

Departments such as heat establish alliance chains, optimize business environment reform requirements, and utilize new technologies and information to share

Enjoy the promotion of real estate registration reduction links and materials reduction to facilitate enterprises and the masses.

3. Design and selection principles

(1) Make full use of big data platform and directory chain for data exchange and sharing of committees and offices.

(2) The construction of the blockchain platform is based on the city's unified standards and specifications.

(3) According to the requirements of optimizing the business environment reform, optimize the process, reduce the application materials, shrink

Short processing time provides simple processing procedures for enterprises and the masses.

(4) Process design and optimization based on approval rules and data status to ensure approval

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Safe and avoid the risk of approval.

(5) Build in accordance with the requirements of the third level of system and other security, strengthen network security, and ensure data delivery

Mutual security.

(6) The blockchain platform is designed in accordance with the principles of simplicity, safety and order.

4. Overall architecture

(1) Business system: a system that is closely related to the user and integrates the user's behavior or structure

If it is recorded, the recorded data will be uploaded to the blockchain through the blockchain front-end system.

(2) Blockchain front-end system: the certificate depositing platform interacts with the chain through front-end services,

As a bridging layer, the front-end service is responsible for processing platform requests and conducting serial inspections on the requests

Certificate, and then interact with the chain. The front-end will ensure the consistency and fault tolerance of the platform data.

The current service can also be restored when certain unknown abnormalities occur. When an unknown exception occurs on the chain, the

After the restoration of business parameters, compensation and on-chain.

business system	Municipal Regulation and Supervision	City Provisional Fund	Municipal Housing Finance	Public Utility Commission	Banking Supervision	Hydroelectric heating

Blockchain front	Authentication	Data online	data query	Chain management
	Contract management			

Real estate blockchain consensus mechanism privacy protection Authentication The bottom of the blockchain

Basic services	load	grid	server	operating system
	database			

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(3) Block chain system: Real estate block chain, the data of the business layer is uploaded to the chain for certificate storage,

To meet the needs of data sharing and non-tampering.

(4) Basic service load: load balancing is built on the existing network structure, which provides

Provides a cheap, effective, and transparent method to expand the bandwidth of network devices and servers and increase throughput

Throughput, strengthen network data processing capabilities, improve network flexibility and availability. Whole set

The system will configure the load of the single node service to ensure that a node is down for some reason

After that, the entire set of services can continue to complete the business normally.

Server: The entire system runs on a stable operating system to ensure stable service

Qualitative.

Network: Based on infrastructure between systems, firewalls, etc., to ensure service network environment

Environment security.

5. Application effect

"Blockchain + real estate registration" involves a total of self-regulation committees, housing construction committees, tax bureaus, public security,

Market Supervision Bureau, Civil Affairs, Banking and Insurance Supervision, Provident Fund Center, Electric Power, Gas, Gehua Cable

As a total of 11 departments joined the real estate blockchain platform. Through the blockchain data sharing model,

At present, the ZFPC has obtained the cooperation of the public security, market supervision bureau, civil affairs, taxation, housing construction and other departments.

Data sharing, of which the public security department and market supervision department have achieved national data sharing, the Ministry of Civil Affairs

The door has achieved data sharing for marriage registration in Beijing after 2003. The tax department has

To realize the sharing of deed tax payment information, the housing construction department has achieved the sharing of information on the net sign. Blockchain

While ensuring the safe handling of non-face-to-face examination and approval business, technology has enabled enterprises and the masses to slow down,

Reduce materials and time.

(1) Reduce running speed. Non-residential real estate transaction registration and mortgage registration

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After being able to approve and approve the intelligent review and approval of mortgage cancellation registration, the annual review

The period can reduce the number of people in the registration hall by about 1.2 million. Since the system went live, there have been fewer registrations

The number of people in the lobby is about 100,000.

(2) Less material. Application of blockchain data sharing model, streamlined ID card, marriage

Photocopy of multiple applications such as certificate/divorce certificate, business license, tax payment certificate, etc.

Each year, it is expected to reduce the applicant's materials by about 400,000.

(3) Reduce time. Non-residential real estate transaction registration and mortgage registration

Applicants can approve and approve the mortgage cancellation registration. After the intelligent approval is implemented, the applicant does not need to

Go to the site, save the applicant time, according to the on-site processing of each business about the applicant

It takes about 4 hours to calculate, and it takes about half an hour to calculate each business online.

Save the people about 4.2 million hours. At the same time, compared with on-site

Registration business personnel reduced the "acceptance" link and improved the efficiency of business processing,

Save the time of registration staff. Moreover, after online processing, the reception window of the lobby can be reduced

quantity.

6. Inspiration and thinking

Using the blockchain data sharing model, through electronic license sharing and government service data cross

Departments, cross-regional maintenance and utilization, sharing verification, to minimize materials, reduce running,

Reduce the time limit, realize "data on-chain, service plus code", deepen "up to one run" "one time

No need to run", promote the "full network office" and "citywide network office" to improve the satisfaction of the corporate masses,

Lay a solid foundation for continuous expansion of blockchain applications. In the next step we will continue to expand and extend,

Promote other application scenarios of "Blockchain + Real Estate Registration", promote the convenience of our municipal services,

Intelligent, promote the modernization of social governance in our city.

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## 7. The Municipal Services Bureau's multi-terminal application of electronic licenses based on blockchain

Data sharing and exchange, business coordination, electronic certificate storage

The Municipal Services Bureau is based on the multi-terminal application of electronic licenses based on blockchain.

The advantages of data sharing and exchange, business collaborative processing and electronic certificate storage, etc.

The gates include Municipal Services Bureau, Municipal Economic Information Bureau, Shunyi District Government, Xicheng District Government,

There are more than 60 units in Dongcheng District Government and other urban areas.

### 1. Existing problems or bottlenecks

When dealing with various matters for current enterprises and individuals, there is a forgotten license and repeated submission

Many, a series of pain points and difficult problems such as difficult verification of licenses, based on the establishment of the Beijing License Center

To set up achievements, the Municipal Services Bureau is actively exploring the use of blockchain technology in electronic licenses across regions and

In door sharing applications, focus on solving the following problems: prevent the license data from being stolen or tampered;

In the use of electronic licenses, the public can conveniently authorize the use of electronic licenses; notify the public of the use of the licenses

Trace, so that the public can rest assured to use electronic licenses.

### 2. Blockchain technology's understanding and understanding of solving existing problems

Through the distributed, tamper-proof and traceable features of the blockchain, Beijing Municipal Government Services

The Bureau creates a trusted environment for multi-party authentication for the application of electronic license

Provide basic technical support for the entire process according to application data security, authorized applications, and cross-regional mutual recognition

Support, so that the application of electronic licenses in government services is more credible, safe and efficient.

### 3. Principles of blockchain technology selection

(1) Maturity. Combined with the applicability of government service scenarios, the relevant solutions of the alliance chain are selected

The scheme can provide standardized and fast-access blockchain application building services, and has been in

Practice in many application scenarios such as finance, real estate, automotive, medical and government services.

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(2) Compliance. Blockchain information service providers are required to

The relevant requirements of the "Chain Information Service Management Regulations" are recommended from the blockchain information service record list

Select the appropriate technical support unit.

(3) Security and privacy. Ensure that the data owner can decide the field according to his own wishes

Level data authorization, to achieve accurate data sharing without revealing other information, data

All parties have full ownership and control over their own data.

(4) Scalability. Technical architecture can have more inclusiveness and greater flexibility,

Its various modules have flexible pluggability, which is convenient to support various future legal and regulatory environments

The landing of distributed ledger technology.

(5) Technical support. Adopt domestic blockchain technology platform with independent intellectual property rights,

Single chain only needs 4 cores 2.1GHz common CPU to break through 25,000 TPS, and can pass multiple chains

Technical support millions of TPS.

### 4. Overall architecture

The overall architecture includes a four-layer structure, and the basic support layer and business presentation layer rely on the existing

Resources to avoid repeated construction and waste.

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The blockchain core layer provides the blockchain platform kernel, blockchain encryption platform and blockchain management Management platform.

Among them, the platform core includes: (1) Alliance chain consensus mechanism: support for supporting endorsement based models -Type consensus mechanism, while supporting the Raft consensus mechanism. (2) Blockchain ledger management: through Through the common record and maintenance of the ledger by different nodes, the public data in the blockchain system is formed Management, anti-tampering, traceable mechanism. (3) Blockchain node identity management: based on number The word signature realizes the identity management of the node, and the digital signature service is used by the receiver to confirm the data sheet The integrity and unforgeability of the element. The encryption platform implements data through multiple cryptographic techniques Privacy protection, including multi-level key protection mechanism, multiple cryptographic protocols, field level Core technologies such as encryption and authorization decryption, 3D zero-knowledge proof. Management platform helps users achieve The rapid deployment and convenient management of the blockchain network solves the practical application of blockchain technology High barriers and complicated operations. Provide users with blockchain network parameter management, network Rich network member CA management, node management, smart contract management, consensus and network supervision, etc. Features.

The smart contract layer provides smart contract writing, release, and review for designing related business scenarios Standardize and support the application of government affairs such as digital identities, electronic licenses, and government affairs.

The blockchain business support layer provides trusted identity authentication, authentication center, and trusted electronic certificate According to the service, authorization service and government blockchain supervision platform, etc., it also links the underlying network of the blockchain Network and other participants' business systems or other blockchain systems to deeply integrate and integrate data The call interface of the node and the function of the password service provide unified and easy-to-use functions REST style blockchain API access interface.

The business application layer provides business scenarios such as docking of real estate transactions, social security processing, and traceability of food and medicine.

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#### 5. Application effect

As of the end of April, two levels of government services in the urban area (subject to category 6 + public services)

The online availability rate has reached more than 97%. The Municipal Services Bureau, together with the Municipal Economic Information Bureau, Shunyi District Government, Xicheng District Government, Dongcheng District Government, in more than 60 relevant departments in the urban area

With strong support, use blockchain technology to vigorously promote electronic licenses in comprehensive window services

Applications. Currently, electronic business licenses, ID cards, household registration books, residence permits,

7 kinds of high-frequency electronic licenses, such as driving license, marriage certificate and divorce certificate, have realized enterprises involved in the municipal affairs center

There are 253 items in the category and 65 items in the individual category.

Copy, authorized by mobile phone can handle business.

#### 6. Inspiration and thinking

The Municipal Services Bureau can use block chain technology to make government services a "mass errand"

For "Information Run", change "People Run Back and forth" to "Department Cooperation", and "Passive Service"  
For "active service", increase the sense of access of the working people, reduce operating costs, and achieve service

The purpose of government affairs application and improving the quality and efficiency of government affairs management are

Promotion has an important role in promoting. This year, the Municipal Services Bureau will continue to implement and continuously optimize

Blockchain technology in electronic file sharing application, government service service item management, unified user space

Implementation of multiple application scenarios such as time, informed commitment approval, first loan service center, etc.

Manage and reform", optimize the business environment, and help modernize the government's governance system and capabilities,

Realize that government services go beyond development and do the best government services.

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### 8. Pilot application of blockchain in the field of government services in Haidian District

Data sharing and exchange, business collaboration, electronic certificate storage, including 100 specific scenarios

Based on the results of the pilot application of blockchain in 2019, Haidian District

"Blockchain + government services" national demonstration benchmark, using blockchain technology in data sharing and exchange,

Advantages in business coordination and electronic certificate storage, etc., Zhongguancun high-tech

The company determined that I want to open a gallery (decoration area is less than 300 m<sup>2</sup>) and apply for unemployment on a monthly basis

Insurance, subsidies for the training of high-skilled talents in Haidian District, I want to apply for the Beijing Science and Technology Award

100 specific scenarios including Haidian Human Resources and Social Security Bureau, District Health and Health Commission, District Public Fund

Source Center, District Sports Bureau, District Commerce Bureau, District Culture and Tourism Bureau, District Disabled Persons' Federation, District Agriculture and Rural Bureau,

District Statistics Bureau, District Overseas Chinese Affairs Office, Haidian Branch of the Municipal Planning and Natural Resources Commission, etc.

Obtained staged results.

#### 1. Existing problems or bottlenecks

With the deepening of the "deregulation" reform and the continuous optimization of the business environment, the Haidian District Government

The service faces four major problems and bottlenecks that need to be broken through. One is to disperse

There are unclear rights and responsibilities in the sharing of business service data and hidden dangers of information security in the sharing process;

The clerk needs to submit a lot of license materials to prove "I am me" during the process,

The service experience needs to be improved; the third is that the approver has manual review work efficiency during the approval process

Not high, difficult to identify the authenticity of materials and other performance risks; Fourth, there is post-mortem paper storage of government services

Problems such as large file size and difficulty in tracing the source of process supervision.

#### 2. Blockchain technology's understanding and understanding of solving existing problems

Blockchain is distributed data storage, point-to-point transmission, consensus mechanism, encryption algorithm, etc.

A new type of application that combines computer technology with decentralization, openness, autonomy, and trust

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Information cannot be tampered with, anonymity and other characteristics.

As the first city in the city to use blockchain technology, Haidian District has fully landed in the field of government services

Of the pilot area, give full play to the technical characteristics of the blockchain, from clarifying the data responsibilities of government departments and

Effectively protect the rights and interests of social public data, and share data in a "available and invisible" way

The on-chain verification is realized through the query interface and encrypted transmission, neither doing any original data

Modification, there is no need to copy the full amount of data, and the data verification transaction process will also be on-chain to ensure



The data security and sharing process cannot be tampered with. The operator gave a "brush face" through the Haidiantong APP Rights or authorized in the comprehensive window of the government service hall "scan the code first and then brush the face" Sub-business license authorization, no need to submit ID card, account book, business license and other on-chain certificates According to the materials, more than 1,600 government affairs services can be handled. On this basis, Haidian District was established In the field of government services, the leading group and working class for deepening the application of blockchain technology are provided by the district government Led by the bureau, all units participate together, and provide proof and confirmation based on the blockchain platform (General Letter Information verification), certification and reduction of materials (reporting the blockchain to extract and reduce materials), and second batch of certification (approval Four major service support: link verification) and certificate traceability (trusted traceability of service process) Ability, from informing promises, accepting vacancies, assisting agents, two-way delivery, replacing certificates with materials, etc. From a perspective, the in-depth optimization of the work process to achieve 100 government affairs service items or scenarios Blockchain applications are implemented on the ground.

### 3. The selection principle of blockchain technology

Haidian District Government Services Blockchain technology selection follows independent and controllable, flexible expansion and business Adaptation principles.

#### (1) Self-controllable, safe and reliable. Blockchain application of government services involves individuals

Data such as personal materials, electronic licenses and the results of the work of relevant government departments, information security level

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Higher. Therefore, the Haidian District Government Service Blockchain is built on an autonomous and safe and controllable bottom chain. At the same time, on the basis of the district government affairs cloud platform and the government affairs network security guarantee system, the use of data encryption, Digital signatures, virus protection, intrusion detection and other security techniques ensure the platform's security, Stable and reliable operation.

(2) Standard specifications, flexible expansion. The construction of the Haidian District Government Blockchain Platform follows the country Home and Beijing blockchain application related standards, through the development of corresponding interface standards, data exchange Standards, etc., to promote the standardization of government service data on-chain processes and application system development interface standards To ensure the safe circulation of sensitive data on the chain. At the same time, the platform can It can flexibly increase nodes and unlimited expansion according to the scene requirements.

(3) Business adaptation and iterative upgrade. The Haidian District government affairs blockchain platform can be based on actual International business needs to expand the functions of upper-layer applications. On the basis of the four types of service support capabilities of certification approval and certification services, according to the needs of business development, Flexible configuration of various functions to achieve rapid development, rapid deployment and iterative upgrade, suitable for cross Diversified business applications for business and cross-departmental collaboration.

### 4. Overall architecture

The Haidian District government service blockchain application is based on autonomous and controllable blockchain underlying technology, Through the three-tier architecture of blockchain basic platform, BaaS management platform and business authentication platform, the Authorization methods such as joint living body verification (natural person), dynamic code verification (corporate legal person), etc. Four types of service support are provided for certification and confirmation, certification and reduction of materials, second approval of certification and certification services. Simultaneously, The support capacity of blockchain government services will also be carried out with the deepening of reforms and the deepening of blockchain applications Dynamic expansion.

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The Haidian District government affairs blockchain is composed of 5 sub-chains.

(1) License chain: all kinds of license information are uploaded to the chain through the HASH value generated by the encryption algorithm, including time stamp, data provider public key, provider private key signature, license material type information, etc., used for verification of license data and query of license results.

(2) Authentication chain: users and system authentication credentials, to achieve authentication information sharing, provide individuals, the identity verification of commissions and bureaus and business systems.

(3) Authorization chain: record user authorization information and realize the authorization of the authorized person's license use and provide traceability of authorization information.

(4) Directory chain: the directory information of certificates and licenses that can be shared by the committee and office is on the chain, including the record certificate license type, license metadata information, certification system certification information, certification system authorization information, cross-regional mutual recognition of licenses can be achieved by realizing the same license resources.

(5) Event chain: It is used to store the whole process data of the certification office and provide traceability for evidence collection.

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#### 5. Application effect

As of the end of May, the Haidian District Government Services Blockchain has achieved resident ID cards, household registration books, residence permit, marriage information, information for the disabled, business license, patent certificate information, etc. 31 Nearly 300 data necklaces of similar licenses are applied. Among them, there are 7 categories of national data and the number of municipal levels According to 20 categories, 4 district-level data. At present, blockchain technology is already in the Haidian government service network Go to the lobby, Haidiantong APP, WeChat mobile terminal, self-service terminal and lobby heard window application to achieve Real-time verification of materials and identities for 1,621 district-level government services. At the same time, based on the area The four capabilities that Blockchain can provide are based on working with various business units to optimize business processes. There are 100 application scenarios for blockchain deepening. Matters or scenes that have landed are reduced on average More than 44% of the materials submitted by the person Now "only run once", a total of 1988 cases and 16013 license data blockchains are generated

Platform for verification. The application effect is embodied in the following four aspects:

(1) Data use is safer. Blockchain can effectively protect the number of government service applications

According to security, there is no need to share the full amount of data of each department, and the user department must go through the "smart contract" Personnel authorization can trigger a single use of data specified by other departments. Handling the right to end data use That is invalid, avoid using the department to look up information from other departments, and prevent the data from being used for other purposes and Risk of mass leakage.

(2) The window service is more efficient. Blockchain triggers various departments through "smart contracts"

Real-time and accurate data sharing, effectively assisting the review without changing the original approval process Approved personnel verify the authenticity of the material, greatly improving the efficiency of formal and prudential review, Reduce the risk of window staff performing duties. Window staff have high stickiness to blockchain platforms and should Good experience.

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(3) Collaboration across departments is more convenient. Haidian District Government Blockchain Platform and Business of Various Departments

The system does not conflict or contradict, without changing the approval authority of each department and the premise of system operation

Next, integrate the various processing links of tandem approval, greatly reduce the business processing time, and achieve

Parallel approval has a similar flattening effect. At the same time, it is extremely easy to realize government services and social services

The cross-domain collaboration can provide the public with more dimensions and deeper integration services. E.g.,

The Municipal Planning and Natural Resources Commission can meet the application requirements of blockchain through the data query interface.

Under the premise of not changing the existing system and ensuring data security, realize the use of data and

Support to the business.

(4) It is more convenient for the masses to work. All kinds of service materials are directly verified and undertaken by the licensing department

Take responsibility for data validity, effectively reduce the relevant service materials that the masses need to submit.

The process is simple, which subverts the public's impression that the administrative examination and approval are cumbersome and complicated,

"One step" online and "one time" offline, the public's sense of service has greatly improved.

In general, Haidian has effectively promoted the Haidian District government service through the application of blockchain technology

Business quality and efficiency, and the business environment has been further optimized

The new ecosystem of Haidian government service empowered by technology.

## 6. Inspiration and thinking

The blockchain platform in Haidian District does not change the original system, change the original process, and does not affect

The core of the original data is the safe, controllable and accurate transactional data sharing.

Establish a safe and credible cross-departmental data circulation runway and realize government services through data circulation

"One Internet Connection" and cross-sector collaboration with social services to provide more dimensions,

Deeper integration services.

On this basis, Haidian District will focus on the two full life cycles of individuals and enterprises

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Starting from the characteristics and life stages of people, we use the data on the chain to create one person and one "file",

One enterprise, one "file" (smart contract file, after the agent authorizes, pull the data on the chain to generate real

Archives), on the one hand "let data gather to everyone", on the other hand use knowledge graph,

AI technology such as natural language analysis, based on the personal characteristics of the agent, the life cycle

Pre-service needs, provide personalized and intelligent service guides, service processes, service materials,

Service form (automatically merge and disassemble tables) to realize multi-level intelligent guidance and personalized theme scenes

Service, combined with the statistical data and social data shared by the future blockchain, to provide clerks

Active and precise services throughout the life cycle.

## 9. Pilot application of blockchain in Xicheng District's government services

Data sharing and exchange, business coordination, electronic certificate storage, including 9 specific scenarios

The application of blockchain scenarios in the government service field of Xicheng District leverages blockchain technology in data sharing

Advantages in terms of exchanges, business coordination, and electronic certificate storage

Mainland residents marriage registration certificate verification, medical assistance services for social assistance targets, minimum urban and rural

Identification of living security objects, cancellation of corporate social security accounts, changes in the establishment of micro-loan enterprises,

There are 9 specific scenarios including supermarkets, construction waste acceptance permits, and joint acceptance of construction projects.

Involved in Xicheng District Administrative Service Bureau, District Science and Technology Bureau, District Civil Affairs Bureau, District Human Resources and Social Security Bureau, District Regulations

Self-government committee, district housing construction committee, district urban management committee, district market supervision bureau, district medical insurance bureau, district finance Service Bureau and other units.

#### 1. Existing problems or bottlenecks

Enterprises and the masses are faced with many links, many materials, long waiting time, multiple departments or The problem of multiple windows running repeatedly affects the service experience and efficiency;

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In terms of data sharing and business collaboration, there are data "unwilling to hand over, dare not use", and the traceability mechanism is not Problems such as perfection, unclear responsibilities and rights, unable to fully and effectively support the business, reducing administrative services Service quality.

Taking the identification scene of the urban and rural minimum living security object as an example, when the masses apply for the identification of minimum living security, Need to bring materials to the street to submit the application, the street government service center for applications that meet the requirements Please accept and carry out a survey of the family's economic situation, and submit the eligible ones to the residents Administrative departments, district civil affairs departments review, publicize and decide on application qualifications, Specially issued urban and rural residents the minimum living security payment certificate, and establish a ledger. Street service When personnel verify the applicant's family economic situation, a total of public security, civil affairs, social security, 11 data from 10 departments including housing construction, disabled people's federation, transportation and taxation. The original data is Obtained through peer-to-peer exchange between committees and offices, the applicant's economic verification data is required Only after applying to the district and city civil affairs bureaus for reviewing the streets, can the streets be fed back to the street affairs Personnel, and then review and determine, often takes 5-15 working days. In addition, according to civil affairs Departmental work requirements, the street staff should conduct at least half a year on the identified people with minimum living standards Review, each review involves the application of data verification, the workload is relatively large.

#### 2. Blockchain technology's understanding and understanding of solving existing problems

Block chain anti-tampering and traceable technical characteristics establish a credible consensus among various committees and offices Mechanism to create a cross-organizational, cross-departmental, full-service business system with unique advantages The advantages. Use distributed account books, smart contracts and other management methods to solve the low data sharing rate, Issues such as unclear powers and responsibilities, to achieve the goals of reducing materials, reducing links, reducing time limits, and High staff satisfaction and experience.

The goal of the Xicheng District blockchain platform is to establish a fully integrated government application scenario

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New West City's characteristic blockchain ecology has the main task of breaking through departmental barriers, promoting data sharing, Optimize business processes and build a credible system. By building a basic blockchain platform in Xicheng District, and The urban shared exchange system and government service related systems are organically integrated to provide areas for government service Blockchain runtime environment and underlying infrastructure; by building a blockchain government application platform, Integrate the business process of the blockchain application scenario, realize the blockchain data call and application based on the application scenario Verification, integration of business logic, integration of on-chain and off-chain, so as to optimize the process of handling matters, Further improve the data sharing efficiency of government services.

#### 3. Principles of blockchain technology selection

(1) Independent research and development, business orientation, and practical results. In this project design, the Taiwan is based on the survey results of the current business processes and system usage of various scenarios, and The premise of reducing materials to a great extent, reducing running speed, and improving the efficiency of approval, using the advantages of blockchain technology,

In-depth analysis of the existence of pain points, integration into the status quo acceptance process, focus on application effectiveness, and practical suggestions

High blockchain application platform promotes and supports business.

(2) Resource integration access services, echoing city-level standards, creating district-level platforms. In number

According to the resource access, the district-level data exchange platform and the two-level shared exchange in the urban area are effectively used

The achievements in the construction of the platform and the city-level directory chain realize the integration and utilization of the data level, while combining

The actual needs of the scene provide direct access to the bureau to further ensure the effectiveness of the data

And reliability.

(3) Hierarchical multi-chain supports larger-scale business expansion, and application scenarios quickly land. through

Through the encapsulation of the government application component layer, the government-related systems are shielded from the high complexity of the blockchain

The underlying mechanism and atomic function of the system provide external scene-based general services, making the government affairs system

It can realize relevant business application scenarios more quickly and conveniently. High-speed cross-chain in isomorphic chain

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Interaction, and support cross-chain interaction with heterogeneous chains by adding trust nodes to each other, and communicate with different networks

Cross-chain interaction through connectors.

(4) Flexible expansion and extension of application scenarios. Through the application component layer in government affairs

Business encapsulation, which can be flexibly expanded to application scenarios in different fields, and related government affairs systems are not

Need to pay attention to the relatively complicated process of combining business and blockchain technology, only need to pay attention to political

The business service interface provided by the business application component layer ensures the business supported by the blockchain platform

Unlimited extension of business scenarios to meet high performance, high scalability, high compatibility and strong ease of use

Features.

#### 4. Overall architecture

Based on the basic platform of the blockchain, the construction of blockchain applications in the government service area of Xicheng District

Platform, focusing on corporate cancellation, verification of marriage registration certificates of mainland residents, and social assistance

Such as medical assistance services, identification of the minimum living security targets for urban and rural residents, and corporate social security accounts

Account cancellation, change of micro-loan company establishment, I want to run a supermarket, construction waste consumption permit

Nine application scenarios including the joint completion and acceptance of construction projects and construction projects to create a pilot application of blockchain service.

(1) Basic platform. Applied independent research and development, safe and controllable blockchain technology, and

Super chain operation and maintenance management capabilities, building a high-performance and scalable blockchain network to support multiple parties

Mutual recognition of data storage and safe sharing.

Blockchain basic platform adopts layered pluggable logical architecture, including platform technology group

Software, the underlying infrastructure of the blockchain, infrastructure adaptation, etc. Platform technology components: Weiping

The platform provides runtime management services, including resource scheduling, node deployment, certificate issuance, and

Staff management, contract management, data management, cross-chain interoperability, chain security management, management services

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Services and tools. The underlying framework of the blockchain: encapsulates the core technology of the underlying blockchain, including distributed storage, peer-to-peer network, smart contract engine, security encryption and decryption and consensus algorithm. In order to ensure the openness of the technology, different underlying technical frameworks can be integrated to support Support different government affairs application scenarios. Infrastructure adaptation: providing infrastructure for blockchain platforms The ability to implement adaptation, including resource allocation and scheduling, application mirror warehouse, data archiving service Business etc. Cloud infrastructure: the infrastructure that is run by the government cloud platform for the blockchain basic platform Implementation environment, flexible supply of blockchain computing resources. Blockchain data sharing center depends on the district Blockchain basic platform, unified management of data sharing based on blockchain, including data Directory management, authorization management of data resources, management of party members and identities, users Management with roles, etc. At the same time, support the various bureaus to rely on the system to manage their own common Share data resources and data needs, and share and transfer data resources on the chain.

(2) Application platform. Provide various functional characteristics and functions based on blockchain

Configuration management, support data on-chain, and support application scenarios. The business scene management system,

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#### Chapter 3 Innovation Practice of Blockchain Application in Beijing Government Affairs Service

Service management system, node self-managed self-managed system. For business application scenarios, local governments Provide support to the data requirements of various bureaus and offices, and encapsulate common business in blockchain application scenarios Process and functional interface to implement blockchain data call and verification based on application scenarios, business Logical integration, on-chain and off-chain integration.

Business scene management provides customized functions based on application scenarios, flexibly adapting to many different Service scenarios; support the smooth running of application scenarios and ensure the ability of application scenarios during landing Enough to call quickly and deploy quickly.

Service management maintains the service interface open to the outside of the application system and integrates it into the system Service interface provided by a third party for configuration management and authorization management of the service, each access party Management of authorized credentials and supervise their use.

Node self-operated self-management gives the commission to manage its own smart contracts, own nodes and other capabilities, Complete the data sharing and authorized use of the commission and bureau.

The open service system provides external services that are internal to the system or have been integrated into the system. The call interface of the three-party service provides authorization verification and permission verification services of the access party; Apply load balancing, distributed deployment and other mechanisms to cope with high concurrency and high frequency service adjustment Used scenes.

(3) Scene service. In order to allow private enterprises to target, smooth multi-channel processing, the West City "e "Service", the comprehensive management platform of Xicheng District provides services for the service entrance. 9 government affairs have been completed Service application scenarios are implemented, and future application scenarios for government services can be continuously expanded.

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5. Application effect

Application scenario	Before applying blockchain	After applying the blockchain
Business cancellation	Newspaper announcement link offline. Submit 3 materials, at least run 2 times.	Newspaper announcement link is done online, "Zero Materials", "Zero errands", canceled Ring saves the submission of paper newspapers, Achieved 16.7% reduction in materials.
Mainland residence registration	Information is not standardized, the public security household registration information, as an account	Information is not standardized, it can be live on the spot
Verification	Run one less time and send to the police station	Verification of residence to return to the police station
Social assistance		
Elephant medical service	Clerk travels to and from the street. Institute, submit 3 materials for processing. Deposit relief.	Submit 1 material to achieve reduction 66.7%. Achieve real-time verification. The result is electronic.
Urban and rural living guarantee object	Public security, civil affairs, social security, housing, Construction, Paralympic Federation, Transportation, Taxation	Gather 6 data from 5 departments. Checking in seconds now, to improve the speed of acceptance. For at least every six months after recognition of Dibao Work requirements for verification, street
Affirm	11 items from 10 departments according to. The data is through the bureau. Point-to-point exchange. Taken, it needs 5-15 workers. Work day.	Clerks can also use blockchain. The platform can check and verify the minimum living security people at any time. The latest data

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Application scenario	Before applying blockchain	After applying the blockchain
Corporate Social Security Account cancellation	First completed in the Market Supervision Administration. Enterprise cancellation, carry out the approval chain is traceable, the optimization camp	Submit materials, cancel the settlement. Business chain is traceable, the optimization camp
Small loan	Applicant users submit online. "Change of Microfinance Company"	Applicant users submit online. "Change of Microfinance Company"
Business establishment change	After applying, you need to fill in as required. Submit information and upload to submit the application. Materials, conduct district-level preliminary review. Clerk reduced running 1 time, reduced	After applying, you need to fill in as required. Submit information and upload to submit the application. Materials, conduct district-level preliminary review. Clerk reduced running 1 time, reduced
I want to run a supermarket	Enterprises need to receive financial office approval. After the result, go to the market monitor. Supervisory Board, conduct corporate letter. Information changes.	Enterprises need to receive financial office approval. Shorten the review time for the initial review. After the result, go to the market monitor. Supervisory Board, conduct corporate letter. Information changes.
	If the clerk needs to open a supermarket, After obtaining a business license, you will also need to apply for: food business license, Public gathering places put into use, Fire safety inspection before business, Acceptance of the construction project	Reduce materials, reduce time, reduce links: Through the application of blockchain technology, Certificates on the chain, material data sharing, Verification and mutual trust, "Fill in one form and merge Joint Approval", effectively reducing
	Filing, water withdrawal permit, town permit to discharge sewage into the drainage network, Plaque logo setting query etc. tired. 7 links, at least 20 Materials, run 7 times throughout.	Significantly reduce the materials and time required for service between, Through data sharing and system communication, Expected to reduce the service time at least 7 Days, reduce 4 service links, shrink Reduce 6 repeated submissions

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Application scenario Before applying blockchain After applying the blockchain

Businesses are accepting permits for approval to consume for consumption of construction waste  
 When possible, after submitting the application, the city is using blockchain technology,  
 Management Committee to review the application and the quality of the enterprise  
 Quality, such as business license, and multi-party verification to achieve "reduction link",  
 Transport permit, vehicle permit, etc. Reducing material", "Reducing time".  
 Information and need to be verified through the municipal supervision bureau, transportation management  
 This process takes 5 working days and requires of Traffic Management and Public Security Bureau  
 License acceptance To review the certificates issued by various departments and check, pre-check  
 Pieces, materials. There is a long process of materials, such as on-site  
 No material sharing, difficult manual inspection process reduce 4+ materials,  
 Wait for the pain. Reduce approval time 2+ working days.

Acceptance of joint completion of construction projects  
 Urban Planning Department of Natural Resources City regulations through the blockchain platform  
 Gate, urban construction archives management and construction of the Natural Resources Committee  
 Fangcheng and rural construction department approval and supervision for fire protection  
 Management department, civil defense department and water utility of completion and acceptance  
 Department, Public Security Fire Department, construction architect, before rebuilding  
 Departments and tap water, drainage approval of drawings and actual acceptance on site  
 Gas, electricity and other professional information  
 Joint completion A total of 14 units, each unit needs the lowest number of actual inspections on site  
 acceptance Line special acceptance, separate acceptance to 1 to improve fire acceptance,  
 In conclusion, many acceptance units have improved acceptance efficiency and accuracy,  
 The process is complex, companies should submit the application for approval.  
 The amount of 22+ types of acceptance materials.

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6. Inspiration and thinking

Overall, blockchain technology has improved

The instant mutual trust efficiency with the masses has realized the change of information transmission method in the field of government services

Changes have led to changes in government data governance. Specifically, it includes the following four aspects.

First, the application of blockchain technology in the field of government services can be gradually expanded from point to face

Application depth and breadth, to inform the promised service, tolerance acceptance service, help agency service,

The extension of service systems such as entrusted authorization services and credit services can improve the application of new technologies.

Public satisfaction and sense of gain.

The second is to actively explore "Blockchain +" and improve the sharing of government affairs data and management models.

Implementation, which has improved the efficiency of the use of government data resources by various departments at all levels.

While decentralizing the value of government affairs data, it has fundamentally improved the timeliness and business title of data acquisition

The fluency of connection and the timeliness of government services.

The third is to use the efficient circulation of the blockchain, non-intervention, traceability, tamper resistance, and prevention

Denial and other characteristics, establish inter-regional, inter-departmental, and inter-level intergovernmental data supply and demand systems,

Effectively expand the breadth and depth of data collaboration, improve the security and availability of data sharing

Rely on sex.



The fourth is to deal with the characteristics of high frequency and rigid demand in the field of government services for comprehensive acceptance.

Blockchain + shared exchange method, in the current "exchange beforehand" and "event" based on national standards

On the basis of the "pre-integration" mechanism, actively develop "discovery in the event", "demand in the event", "event

The ability to exchange data in China, strengthen the government's ability to organize data, and deepen intergovernmental data collaboration

The same ability, improve the business efficiency of all levels and departments, and enhance the government's social governance, government services

The comprehensive level of business and other fields.

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### 10. Pilot application of blockchain in Chaoyang District government services

Data sharing and exchange, business collaboration, electronic certificate storage, including 5 specific scenarios

Chaoyang District is based on the application of the "Chaohaoban" themed service items based on the blockchain, giving play to the blockchain

The advantages of technology in data sharing and exchange, business collaboration and electronic certificate storage, etc.,

Realize "I want to open a barber shop", "I want to open a beauty shop", "I want to open a parking lot (above ground)", "Ground

5 specific scenarios, including parking lot filing (including civil air defense), medical insurance reimbursement,

There are 3 units including Yang District Administrative Service Bureau, Chaoyang District Market Supervision and Administration Bureau, Beijing Economic and Information Bureau.

#### 1. Existing problems or bottlenecks

In the application of North Korea's theme service matters, it involves business entity identity authentication and materials

Collect two important links. When the government service center conducts business to the masses, it needs

Access to the data of enterprises or individual industrial and commercial households of the Municipal Supervision Bureau, and the documents collected by the front-end system

Connect to the back-end archive system.

(1) The process of corporate identity authentication is cumbersome, and authentication is not authoritative. Because there is no

To get through the data, the service people need to manually submit a lot of information when handling online, service experience

Poor; staff can only check the enterprise information through manual search, efficiency

Low and there are security risks.

(2) The front-end system and back-end filing system for the collection of subject matter materials are two systems,

This caused manual entry during archiving.

(3) Chaoyang District combines the "Notification Commitment Approval System" vigorously promoted by Beijing

In the easy-to-do business, but the "information commitment" is only retained in paper, and there are a lot of follow-up

Management of paper materials.

In the medical insurance reimbursement electronic voucher scenario, it involves enterprise identity authentication and medical insurance

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There are two important links for reimbursement vouchers, and the government affairs service center conducts business

When it comes to time management, the enterprise legal person data of the Municipal Supervision Bureau and the medical insurance reimbursement data of the Medical Insurance Bureau shall be used as support. In the traditional business process, because the data is not connected, two major problems arise:

(1) The process of corporate identity authentication is cumbersome, and authentication is not authoritative. Because there is no

To get through the data, the service people need to manually submit a lot of information when handling online, service experience

Poor; staff can only check the enterprise information through manual search, efficiency

Low and there are security risks.

(2) The medical insurance voucher data needs to be manually entered twice, and the data is not standard. Because no

If you have access to data with the Medical Insurance Bureau, you can only manually enter the relevant data in the form of a form, and then

Issue the voucher to the working people, this method results in low data transmission efficiency and business processing

Slow and low data accuracy.

## 2. Blockchain technology's understanding and understanding of solving existing problems

Blockchain has the characteristics of multi-party consensus, difficult tampering, transparency and traceability.

Blockchain accesses the business entity data of the city supervision bureau to help the business entity identify identity more conveniently

At the same time, through docking with the micro platform of the government affairs service center, the

"Knowledge Commitment" and other materials are stored on the blockchain, on the one hand, it guarantees that the materials are not

Tampering to prevent denial, on the other hand, it can form a mapping with the files in the filing system

Follow-up management.

In the application of medical insurance reimbursement electronic voucher scenarios, the blockchain has a decentralized and multiple

The characteristics of Fang consensus are more standardized and

Carry out business data sharing in this scenario in a low-cost way, thus breaking the government service center,

The data island between the Municipal Supervision Bureau and the Medical Insurance Bureau reduces the secondary entry phenomenon and improves the efficiency of the masses.

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## 3. Principles of blockchain technology selection

This scenario involves the real materials and data of the masses, and considers the business handling

The demand is high, so the underlying blockchain technology is required to be safe, autonomous and controllable when the model is selected, and its technology

The technical strength should be in the leading level in the industry under the evaluation results of relevant official institutions to support the cost

Scene business requirements.

## 4. Overall architecture

In the scene of Chaohao's theme service matters based on blockchain technology, the "city level"

The two-tier blockchain architecture system of "directory chain" and "district-level application chain" has implemented the Municipal Supervision Bureau Law.

Open up the data of the human database and communicate with the application chain through the Chaoyang District government service micro platform

Mutually, transfer the call instruction and return the result. At the same time, government services

Taiwan will transmit the handling status of the materials and matters submitted by the masses to the blockchain, and

The application chain is used to store certificates to ensure that the materials cannot be tampered with. The public service micro

The platform sends instructions to the blockchain, you can view the event handling situation, and enhance the

Satisfaction.

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## 5. Application effect

Before, people need to go to the lobby to queue up and call the number, and then the staff manually

After entering 5 items of information about clerks, the clerks can directly access the data through the blockchain

Connect to make an appointment online, and automatically transfer the information from the appointment to the system, reducing 5 items

Manual input of data; in addition, in this scenario

Deposit certificates on the blockchain to ensure that it cannot be tampered with. In "I want to open a barber shop", "I want to open a barber shop" "Beauty shop", "I want to open a parking lot (above ground)", "Filing for underground parking (including civil air defense)"

During the three-week period when the four subject matters were launched, more than 400 materials were co-existed on the chain.

Handle matters 3 to 4 times a day on average. In the application of medical insurance reimbursement electronic vouchers,

Compared with the use of blockchain technology, the number of service links in this scenario has been reduced from 7 to 6,

It used to be necessary to fill in 9 items of information and upload 4 items of image materials in the enterprise certification process.

2 items of information need to be filled in to realize the second batch and second operation of the masses in the "enterprise certification" link;

On the other hand, compared with the original people who need to get a voucher offline after 15 days, now

Medical insurance vouchers can be issued online electronically, realizing reimbursement vouchers

"No need to run", eliminating the "secondary entry" of reimbursement data by the staff.

#### 6. Inspiration and thinking

Through the construction of this block chain pilot work, Chaoyang District Administrative Service Center deeply recognized

Recognized that the blockchain technology is a "full netcom" and "one netcom office" for the construction of government services

The important role of the service platform also recognizes the new

If the service policy is to be widely implemented, it is necessary to combine new technologies and methods such as blockchain to ensure

The certificate is promoted in a safe and controllable situation, and ultimately guaranteed in both technology and policy,

Empower government services.

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## 11. Pilot Application of Blockchain in Shunyi District Government Services

Data sharing and exchange, business collaboration, electronic certificate storage, including 6 specific scenarios

Shunyi District uses blockchain technology in data sharing and exchange, business collaboration and electronic

Advantages such as deposit certificate, to achieve enterprise registration, environmental assessment, food business license,

More than 20 commissions and bureaus such as publication business licenses, construction permits, fire inspections, and fire records

Approval data is shared on the chain, and 7 types of electronic licenses such as ID cards and driving licenses are shared.

Carry out "I want to open an imported food supermarket", "I want to open a fruit shop", "I want to open a restaurant",

5 theme fields: "I want to open a car wash" and "I want to open a gym (excluding swimming)"

The application scenario of the joint examination and joint office of combining multiple tables with one table and splitting multiple tables with one table has realized more than 30

103 district-level personal application scenarios, 280 legal person application scenarios, and 26 townships

Street application scenarios, using blockchain technology for face verification to obtain electronic licenses, in the comprehensive

Window to carry out PAD face brushing authorization "handless" application scenario landing, for enterprises and natural persons

Reduce information and materials in matters handling, and effectively optimize the experience of enterprises and the masses.

### 1. Existing problems or bottlenecks

The subject matter is a service for a certain type of scenario, this type of service involves multiple commissions

For multiple matters of the Bureau, the handling process is complicated. For example, I want to open an imported food supermarket, which involves business

12 matters including license handling, foreign trade operator registration and registration, at least more than 40 items are required

Materials, run more than 12 times throughout the journey. Taken together, there are the following problems in handling the subject matter:

There are many work links, and more materials are submitted; the data between the committees and offices is not available, and the same materials must be repeated

Submit, such as business license, legal person ID card. The committee and bureau need to check the materials separately, not

Mutual trust; in the process of doing things, you need the original license and authorize others to handle it on your behalf, and the privacy information is easy

Leakage; service filings are streamed in paper archives, and the process is difficult to trace.

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## 2. Blockchain technology's understanding and understanding of solving existing problems

Blockchain technology has the characteristics of decentralization, traceability and non-tampering, Shunyi District

By building a blockchain government service platform, license data will be passed through the block according to user authorization

Chain platform to share, the relevant data information content cannot be saved and downloaded throughout the process.

According to "Do Not Land". Realize the safe and reliable sharing of electronic licenses and avoid them to the greatest extent

Information leakage, ensure the information security of the agent. Taking advantage of the immutable nature of the blockchain, the

Keep certificates throughout the process to ensure the traceability of the entire process.

## 3. Principles of blockchain technology selection

(1) Platform technology unity: Shunyi District government affairs blockchain platform adopts alliance chain technology,

Provide the core privacy protection, consensus mechanism, permission management, contract engine and other cores of the blockchain

At the same time, the core components are deeply integrated with the infrastructure to ensure the unity of the platform.

(2) Rationality of platform application: Relying on the underlying capabilities of the government affairs blockchain platform, the main package

Including authentication, verification, authorization and supervision services, etc., to build thematic government affairs according to business scenarios

The service function provides convenient services for natural persons, legal persons and government agencies.

(3) Application security throughout: the use of blockchain ledger security, smart contract security,

Encryption technology and distributed storage, etc., provide blockchain-based subject matter applications to ensure information

It cannot be tampered with, so that citizens and enterprises can conveniently handle government affairs.

(4) Scalability: The blockchain technology platform is scalable and supports business

Flexible expansion of development.

(5) Technical compliance and independent controllability: Blockchain information services comply with the Central Network Information Office

The relevant requirements of the "Regulations for the Management of Blockchain Information Services" adopt domestically owned independent intellectual property

The right blockchain technology platform.

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## 4. Overall architecture

There are a total of five layers of architecture in the theme of blockchain in Shunyi District: business presentation layer, business application layer, Blockchain business support layer, smart contract layer, and blockchain core layer.

Business presentation layer: Provides service entrances such as mobile terminal, PC terminal, and self-service terminal.

Business application layer: provide me to open imported food supermarkets, I want to open restaurants, and I want to open water Fruit shop, I want to open a car wash shop, I want to open a gym and other subject matters.

Business Support Layer: Provides middleware capabilities for blockchain government services and provides natural persons/laws Person/institution trusted identity authentication, authentication center, trusted electronic license service, authorization service and Government blockchain supervision platform.

Smart contract layer: Provides smart contract writing, publishing, and reviewing design related business scenarios The nuclear specification supports the application of government affairs such as digital identities, electronic licenses, and government affairs.

Blockchain core layer: Provides blockchain platform core, encryption and blockchain management functions, The encryption module adopts the national encryption algorithm and is compatible with the mainstream blockchain platform of domestic manufacturers.

## 5. Application effect

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## Chapter 3 Innovation Practice of Blockchain Application in Beijing Government Affairs Service

(1) Safe data sharing: by promoting 7 types of electronic licenses such as ID cards and driving licenses

Sharing, business registration, environmental assessment, food business license, publication business license,

Sharing of data fields such as construction permits, fire acceptance, and fire registration. Face recognition through PAD

Don't authenticate, after data authorization, realize data sharing and automatic verification between committees and offices. and

Achieve one form of reporting for multiple committees and bureaus, one acceptance, and parallel approval, effectively reducing

Affairs, reduce the running of the staff, reduce the submission of materials;

(2) Information privacy and security: With the help of the blockchain's multi-centralized synchronous accounting, data addition

Features such as confidentiality and data cannot be tampered with, connect to the city's unified identity authentication, electronic license center, chain

SSE permits full privacy protection throughout. Relevant data information content cannot be saved and downloaded throughout the process,

Realize the data "do not fall to the ground", avoid information leakage to the greatest extent, and ensure the information security of the personnel;

(3) Traceability throughout the archive: at key nodes such as subject matter declaration, authorization, and certification,

On-chain certificate deposit and filing of the data for declaration and certificate issuance to ensure the openness and transparency of data use,

The process of document processing is traceable and cannot be tampered with.

## 6. Inspiration and thinking

The application of blockchain technology in the sharing of government services data has fully utilized the blockchain

Value, innovated the data sharing model, and realized the safe and reliable sharing of data. By putting people

Face recognition combined with blockchain technology, in the identity verification of agents, electronic license authorization, electronic

License verification, electronic license application and other links have further clarified data ownership, management rights,

The right of use and security management model are used to optimize government service processes, promote government data sharing, and reduce

Low "digital government" operating costs and improving the efficiency of collaborative government work will play an important role.

Promote the transformation of "Internet + government services" from "information services" to "value services" and "trust"

"Service", effectively empower the national governance system and modernization of governance capabilities.

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## 12. Blockchain application of government services in Beijing Economic and Technological Development Zone

Data sharing and exchange, business coordination, electronic certificate storage, including 2 specific scenarios

The Economic and Technological Development Zone has built a working chain platform for the development zone, and the development is launched based on the blockchain

The technical policy fulfills two scenarios: "one-stop" service platform and "examination management" management platform,

Involving the Bureau of Economics and Information Technology, Science and Technology Commission, Housing Provident Fund Management Center, Finance Bureau, Public Security Bureau,

6 units including the Market Supervision Administration.

## 1. Existing problems or bottlenecks

The Economic and Technological Development Zone implements the notification and commitment system of government affairs and "standard land"

In the pilot reform of the transfer management, it is necessary to give full play to the advantages of blockchain technology, and

Sharing, streamlining the approval materials, optimizing the approval process, reducing application costs, improving collaboration efficiency,

Construction of a credible system and other aspects need to be further strengthened to achieve "most administrative approval

"Run once" to help the economic and technological development zone create a world-class business environment.

## 2. Blockchain technology's understanding and understanding of solving existing problems

Utilize the technical characteristics of blockchain distribution, traceability, and non-tampering, combined with economic technology

The application situation of the three government affairs systems in the technical development zone has extracted five general government affairs blockchain scenarios.

Mainly includes the establishment of enterprise digital identity and credit system; the use of blockchain electronic license to achieve

Streamline materials; use blockchain electronic deposit certificate to ensure the authenticity of data; when verifying data, intelligently obtain cross-departmental data support; approval information is uploaded to the whole process and traceable.

### 3. Principles of blockchain technology selection

Adhere to the planning and design of "one chain supports multiple applications", support multi-chain and cross-chain operations, With powerful authority management, each department can ensure data privacy and achieve trusted sharing, bottom Independent research and development of layer technology, integration of national secret algorithm, has outstanding technical capabilities and

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## Chapter 3 Innovation Practice of Blockchain Application in Beijing Government Affairs Service

The complete solution.

### 4. Overall architecture

Adhere to the principles of autonomy, safety and control, follow the city's unified standards and norms, divided into three Complete the overall construction of the blockchain in the economic and technological development zone at the stage Enterprise is on the chain, also enterprise integration".

First, build the underlying platform of the blockchain-the working chain, using different data accounts This book supports the relevant demand of the city's government information systems for blockchain technology. Secondly, points Integrate various government affairs informatization systems and work chains at the stage, with "examination and management" and "policy fulfillment" Wait for the hand to create a model project. Finally, gradually realize the Cross-chain communication or interface connection of systems such as electronic files and unified identity authentication platforms Credible authorization of sub-licenses, data sharing, electronic filing of government affairs, no tampering, Traceability, improve the effectiveness of supervision.

Independent research and development of the underlying technology, which can support the customized requirements and high performance of different government applications And support massive data storage. Through detailed account classification and hierarchical classification authorization, the

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Manage accounts in the blockchain system to achieve logic clarity, segregate business and protect phases

The purpose of data content.

The Blockchain platform of the Economic and Technological Development Zone optimally encapsulates the underlying technology of the blockchain, Adopt a hierarchical architecture, with clear division of labor at each level and collaboration with each other. Platform and application system Decoupling at the interface layer, providing Web console, SDK and API interface to support future access A variety of government blockchain applications. The platform has three types of business services, resource management and monitoring operation and maintenance Capabilities, including rapid deployment, management of users, certificates, and contracts on the chain, Provide intelligent operation and maintenance for real-time monitoring of the work chain.

### 5. Application effect

When applying, only need to fill in a declaration form, after authorization, the staff can check the letter on the chain

interest. Information such as corporate identity, electronic license, and stored electronic materials do not have to be filled in again

Or repeat the submission. During the audit, the audit department directly queries the relevant data on the chain, one-click operation

Data from other departments can be obtained, and the approval time has been shortened from a few weeks to a few minutes in the past.

When the notification commitment system is used, the credit score of an enterprise can be used as a basis for monitoring the enterprise.

For the implementation of the hierarchical management system such as the notification commitment system.

#### 6. Inspiration and thinking

The use of blockchain technology in enterprise digital identity, after a long time, full application

Business data accumulation and continuous adjustment of credit evaluation models to build a scientific and comprehensive corporate credit evaluation

Sub-system. With this system as the support, the government approval process has gradually evolved from conditional review to

Relying on the review of comprehensive credit information of enterprises, it can better adapt to the simplification of government information and clean government

Development requirements.

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## Chapter 4 Summary and Outlook

The information generated and precipitated in the field of government services can not only support the progress of government services, It should also serve society in a controlled manner and play an important role in people's livelihood, such as credit, education, and medical care.

Greater effect. However, the traditional "Internet + government affairs" and government information construction, mainly

If the modern information technology is used to provide technical support for government affairs, it will be more reflected as "business

Business-oriented, demand-driven", and because the business change cycle is relatively long, information

The planning, construction and application of information can be carried out in a long time, and the information construction is often lagging behind

Due to business development requirements.

The development and deepening of "Internet + government affairs", which is aimed at enterprises and public services

Informatization of government affairs puts forward higher requirements. On the one hand, the "Internet + government" system was established

Based on the guide, the construction of "Internet + government" will break the information island and realize the interconnection

Interoperability to standardize business elements and streamline business processes requires business, technology, and innovation

Mutual integration, interaction, data-driven, process transformation become "Internet + government services"

The key factors for innovative development, deepening development and sustainable development; on the other hand, with big data,

The new generation of information technology represented by artificial intelligence and blockchain break through the guidance of business needs, from

The dimension of integrated development of technology and business provides a further development of "Internet + government services"

Provide innovative perspective, technical support and efficient operation.

The new generation of information technology such as blockchain is more reflected in the rapid development of technology itself and human

The characteristics of the integration of our cognitive iteration and practice of technology are usually "to learn while doing

Improvement", so the traditional "first-year planning start, two-year tender construction, three-year operation"

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The construction method cannot meet the new requirements of rapid development of government services and deepening of reforms.

The situation of the interest-based project "the time when it goes online is also the day when demand expires" also needs to be changed urgently. Beijing

In the process of innovation in the application of blockchain in the area of government services, through the top-level planning-the district

Blockchain is combined with the pain points and difficulties in the field of government affairs services;

Build integrated teams across colleges, institutes, enterprises and application units; product iteration—borrow  
 Based on the experience of Internet companies, we will use the ideas of polishing products, running fast, and constantly iterating.  
 Optimizing application and technology platform step by step; interactive enhancement-through technical exchange, product exchange and application  
 Use communication to give play to the common talents of government staff, academic experts, and enterprise technicians  
 Wisdom and practical experience, efficiently explore the pilot application of innovation leadership and practice landing.

From the perspective of the first stage of the pilot and application innovation, blockchain technology can solve  
 Technical issues, mechanism issues, process issues, implementation issues of "Internet + government services"  
 Provide updated perspectives and technical means. However, due to the rapid development of blockchain technology itself  
 In the process of development, everyone from different perspectives, based on different backgrounds on the blockchain technology  
 Cognition also has its own emphasis on the key characteristics, core values and application of blockchain technology  
 The understanding of the environment also varies. At present, the underlying technology of blockchain in society is mostly around digital  
 Designed for asset trading and financial scenarios, there are insufficient throughput, insufficient scalability, and storage costs  
 This uncontrollable technical bottleneck does not exactly match the needs of industry scenarios including government services  
 Match. To this end, there is an urgent need for future-oriented "programmable government" based on blockchain 3.0 and "programmable"  
 "Cheng society" scene, break through a batch of core key technologies, improve independent innovation consensus algorithm, excellent  
 To improve the distributed ledger structure, improve the efficiency of smart contracts, and improve the efficiency of peer-to-peer communication networks, etc.,  
 R&D of the underlying basic technology and supporting platform with core intellectual property rights to make blockchain technology more  
 Good service scenarios and business needs.

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## Chapter 4 Summary and Outlook

In the exploration of blockchain application innovation in Beijing's government services, the  
 To encourage innovation, advance fast, and continuously summarize in practice", the Municipal Services Bureau,  
 Pilot units, expert groups and implementation units are integrated through cross-organization, cross-domain and cross-border  
 Research, technical demonstration and other methods, "seeking common ground while seeking differences", explored a new generation of information technology  
 A new model of rapid integration of technology and business. It should be said that in just six months, from planning,  
 Demonstration, model selection to development, implementation, and operation  
 Newly realized the "Internet" speed in the field of government services, and truly implemented the "product-oriented,  
 The spirit of "Internet +" to encourage innovation, rapid iteration, and tolerance for trial and error.

The release of "Beijing Government Service Service Blockchain Application Innovation Blue Book (First Edition)",  
 It is a staged summary of Beijing's experience, and also a blockchain application innovation in Beijing's government services  
 Explore a small step. Through the thinking and precipitation of the Blue Book, Beijing's government services  
 The blockchain application innovation and integration team will continue to forge ahead, explore, and continue to serve Beijing  
 The application innovation and actual effect of municipal services contribute to the strength, and the construction is more refined and diversified  
 High-quality digital government that is more intelligent, more convenient, and more convenient  
 Modernization, creating a new benchmark for government digital governance. Also welcome more government service agencies, high  
 Schools, industry experts, and innovative companies joined together to further deepen the "Internet +  
 "Service" and seek common development and common wisdom.

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## Appendix 1: Blockchain Application Action Plan of Beijing Municipal Government Service

Beijing Municipal Services Administration, Beijing Municipal Science and Technology Commission, Beijing Economic and The Information Technology Bureau issued the "Blockchain Application in Beijing's Government Services" on February 20, 2020. The Action Plan (2020) has the following content.

In order to deeply implement General Secretary Xi Jinping's use of the blockchain data sharing model for the people, the important speech spirit of the public to bring a better experience in government services, implement the deployment requirements of fast blockchain technology and industrial innovation and development, give full play to the advantages of blockchain technology, vigorously promote e-government services in the field of municipal services, and deepen the reform and optimization of "decentralized service". This business plan is specially formulated for the business environment and the promotion of profitability and convenience.

### 1. General requirements

#### (1) Raise awareness

Blockchain technology is a new type of information and network technology that integrates distributed ledger, non-symmetric encryption, consensus algorithms, smart contracts and other key technologies, promoting data sharing and optimization of business processes, reducing operating costs, improving collaboration efficiency, building a credible system, etc. Technical advantages are widely used in cross-department collaboration, multi-link business, low-cost trust and other scenarios. Vigorously promote the application of blockchain in the area of government services, which is conducive to further improving government service data efficiency and business collaboration, helping the government's digital transformation, which is conducive to the transformation of government functions. Building a service-oriented government is conducive to innovating government management methods and building a new type of social governance system.

#### (2) Basic principles

Adhere to technology for the people. Practice the people-centered development thinking, focus on people's livelihood,

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Business and entrepreneurship needs, develop diversified application scenarios, and use technology to empower business groups. The public brings more sense of gain.

Adhere to the problem-oriented. Break the data sharing rate of traditional data sharing and business collaboration. Low, poor control, weak timeliness, unclear powers and responsibilities, unsuccessful coordination, etc. Now the shared data is real and credible, real-time circulation, clear power confirmation, traceable traceability, and promote government affairs. According to cross-departmental and cross-regional maintenance and utilization, promote business collaboration and upgrade government services. Service experience.

Adhere to the first class. Introduce advanced concepts at home and abroad, adopt cutting-edge technology, introduce a batch of typical applications and demonstration models of blockchain in the field of government services, creating innovation-driven, technologically empowered, application-driven, high-profile blockchain application highland.

Adhere to innovation and lead. Maintain sensitivity and inclusiveness of new technologies and applications, do science and technology. The leader and promoter of innovation, using Beijing's sophisticated technology innovation resources, integrating cloud computing, big data, artificial intelligence, 5G, Internet of Things and other technologies promote the innovative application of blockchain technology. Do a good job in innovation services, speed up industrial development, and create an atmosphere of innovation.

#### (3) Work objectives

In 2020, the biggest scene around the government service "full network office, full network communication office". Minimize materials, reduce running, reduce time limit, reduce links, and promote blockchain technology in government services. In the field of business, try and use, continue to optimize, demonstrate and promote, and implement a batch of representative common applications. Build a batch of business scenes with practical effects, and form a batch of technology with international leading level. Technological achievements, to enhance the satisfaction of enterprises, and to continue to expand blockchain applications and develop blockchain. The technology ecology lays a good foundation.

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## 2. Common basic applications

(1) Multi-terminal application of electronic license. Digitize the licenses issued by the issuing authorities to

E-licensing platform, and upload key feature values to the chain

"Jingtong" mobile client and multi-terminal certification application for WeChat, Alipay, Baidu and other small programs,

Realize "real person", "real certificate" and "real thing" and create electronic certificates such as verification, issuance and management

Full chain sharing application mode, while preventing third-party programs from retaining user license data, ensuring

Data privacy and security. Combined with face recognition technology, it can be authorized by the applicant after face authentication

Retrieve information about electronic licenses, and do business without carrying the original license. Build data

Error correction and evaluation mechanism are used to effectively improve the quality of electronic license data in our city.

(2) Electronic file sharing application. Relying on online government affairs service hall and municipal unified administrative review

Approved management platform and self-built government service information system of each unit

The key features of electronic archives formed in the work of "One Netcom Office" are uploaded to the chain to prevent data tampering,

Realize safe storage, solid certificate storage, and shared utilization.

(3) Identity management and authorization management (one-time authentication, multi-terminal authorization). Relying on the whole city

An identity authentication platform, digitize identification certificates such as ID cards, driver's licenses, household registration books, etc.

Combined with electronic business license, supporting natural persons and legal persons to use identity authentication services when doing online affairs,

Realize credible verification and independent authorization of digital identities. On the government website, "Beijing Tong" mobile

Clients and various service ports such as WeChat, Alipay, Baidu and other small programs

You can refer to and call the digital identity to complete the material submission during online declaration, and realize the entire process of encrypted transmission

Loss, fully protect the privacy of the data owner.

(4) Unified user space application. Use blockchain technology to connect online and offline offices

Applicants' user information, behavior information, electronic licenses, consultations, complaints, suggestions

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Discuss and wait for the data, carry out refined management and use, construct a unified user space, and prevent data tampering,

Realize data homology and multi-end synchronization.

(5) Simplified materials for comprehensive windows. Clerks use "Beijing Tong" mobile client or scan

Describe the QR code of the service, authorize the electronic license used for the service, and the comprehensive window worker

The staff inspects and verifies the agent's electronic license, and at the same time

The field data is on the chain, streamlining the service materials, and enhancing the company's mass service experience.

(6) Administration of government service matters. Conduct decentralization, cancellation, and change of government affairs service matters

Record the whole process, use time stamps to prove it, prevent random modification, and improve government services

The seriousness and authority in advancing the reform of "deregulation and service" to achieve "no approval outside the catalog".

(7) Informing the commitment for approval. Combine 5G, biometrics, electronic signature and other technologies to apply

People do not need to sign the commitment letter on the spot, and make it according to law through remote video, electronic signature, etc.

Their commitments that meet the approval conditions notified by the administrative organs are included in the use of certificates and credit supervision.

## 3. Specific business applications

(8) Real estate registration. Absorb Haidian District's pilot experience and promote the planning of natural resources and housing

Fangcheng and rural construction, public security, market supervision, civil affairs, taxation and other departments share ID cards, marriage certificates, Real estate certificate, tax payment and other information, real estate information, land information, registration business letter

The information recorded in the real estate register such as interest and the results of planning acceptance, land payment and verification results, Share data such as housing transactions, completion and acceptance records, and house purchase qualification verification, and at the same time

The financial system is incorporated into the alliance chain for data exchange, realizing mortgage registration of real estate in financial institutions

Business related to real estate registration, such as registration and cancellation of mortgage registration, and expand and extend real estate to the front and back

The registration chain further improves the efficiency of real estate registration.

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(IX) Facilitation of Beijing-Tianjin-Hebei customs clearance. Realize Beijing-Tianjin-Hebei through customs logistics block chain

Customs and logistics information interconnection, with Tianjin Port, Hebei-related ports, and customs of the two places, etc.

Share the data of shipping, logistics, customs clearance status of enterprises entering and leaving ports to provide enterprises with

Convenient cross-border trade business environment.

(10) Beijing Airport International Logistics Platform. Order, packing list, invoice, warehouse receipt, report

Customs declaration, value added tax, export tax rebate and other electronic bills, trade data, customs data, logistics data

According to the chain, shorten logistics time, reduce logistics costs, and strengthen the credit management of logistics enterprises,

Help small and medium-sized enterprises to improve their business capabilities.

(11) Apply for building permit. Sort out and apply for construction project planning permits and architectural drawings

Paper review results, construction project construction permits, construction acceptance records, preliminary consultation procedures for receiving water,

Before accepting water supply and drainage inspection, civil air defense engineering design plan review, fire inspection, etc.

Periodic review requirements and processing results, data sharing and business collaboration through blockchain technology,

Improve the efficiency of the review of building permit processing requirements.

(12) Obtain credit. Strengthen the relationship between financial management departments, financial institutions and government departments

Interoperability and interoperability of data, optimize the process of collateral pledge loans, and increase the transparency of collateral pledge registration inquiry

Sex and convenience, and reduce the cost and time of pledged loans. Use shared data to be small

Micro-enterprises, individual industrial and commercial households, etc. provide tailor-made, targeted financial products

Difficult and expensive financing for small and micro enterprises. Use blockchain cross-chain mutual recognition and encryption authorization technology

Technology, "let the algorithm run", promote credit business application, approval, issuance, post-loan management and

Shared use of corporate repayment.

(13) First loan service center. Open the first loan service center in the municipal service center

Use blockchain smart contract technology to plan natural resources, civil affairs, and people in the loan process

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The precision of information sharing needs of Lishang Social Security and other departments, as well as guarantee companies, banks and other institutions, make

Government service data realizes field-level accurate information sharing and protection sharing for non-governmental organization data

Data security and user privacy security.

(14) One card office. Use blockchain smart contract and encryption authorization technology to automatically root

According to the identity card information of the person responsible for the completion of the required real property certificate, project planning license, business

Obtain and verify electronic licenses such as licenses, return the verification results and review the verification process and results

Keep traces on the chain, realize the "one license for electricity", reduce the processing time, and protect the security of user license data.

(15) Deputy Center Government Affairs Service Hall. Comprehensive use of blockchain, 5G, artificial intelligence

And other new technologies, build an intelligent government service hall in the city's sub-center, and build government service data

New model of shared application, improve the integrity, consistency and sense of science and technology of government services  
 Demonstrate the best service innovation demonstration, "Internet +" technology innovation demonstration, cross-level communication  
 Demonstration of management innovation.

(16) Beijing-Tianjin-Hebei "One Net Connect Office". Start a business, social security, provident fund, etc.

Focus on promoting a batch of high-frequency government service matters. The data of the three provinces and cities are shared across regions and information is not  
 Local sharing, licenses and approval results can be mutually recognized in different places, so that the business people can work in different places and promote  
 Going to the three places to further deepen the "One Network Office".

(17) Electronic livelihood card application. Build a unified rights and interests information sharing application platform, use  
 Blockchain technology integrates the third-generation social security card, the certificate of the disabled, the pension and disability card, the civil affairs card,  
 Beijing Medical Card, Elementary and Middle School Student Cards, Park Annual Passes, Electric Cards, Water Cards, Gas Cards, etc.  
 Use the background data of the card to build an electronic livelihood card based on a new digital carrier to achieve social  
 Comprehensive integration of functions such as security, public services, financial debits, medical payment settlement, and public transportation  
 application.

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(18) Unified electronic bill platform in the field of finance and taxation. Development of blockchain financial electronic bills,  
 Realize online circulation, application and reimbursement and other functions. Development of blockchain electronic invoices  
 Establish a data sharing mechanism between tax authorities and taxpayers, invoicing companies, and reimbursement companies to ensure  
 The authenticity and circulation process of invoices can be traced back, at the same time in tax refund, tax relief, tax accounting, etc.  
 In terms of using blockchain technology to improve efficiency. Integrate and integrate financial electronic bills based on blockchain  
 And tax electronic invoices, conduct pilot projects in education, medical, transportation and other industries to achieve financial and financial  
 Common sharing of bill information in the tax field.

(19) Integration and sharing of public resource trading platforms. Speed up the construction of public funds at the municipal and district levels  
 Source transaction blockchain basic platform, promote the city's public resource transaction data sharing, strengthen transactions  
 Process certificate management, anti-tampering of transaction information, improve credit supervision level, and promote digital certificates  
 CA mutual recognition, promote the application of electronic business license and electronic guarantee. All kinds of public resources in the city  
 Transaction activity credit data is stored and shared on the blockchain for mutual recognition. Expanding the scope of transaction data sharing  
 To achieve mutual recognition of city-wide corporate performance sharing. Build on the basis of mobile internet technology,  
 A mobile application that combines multiple identity authentication technologies to promote mobile mutual recognition of CA electronic seals.  
 Build and promote the city's public resource transaction guarantee financial service platform to provide  
 Provide tender guarantee and performance guarantee services, and promote electronic guarantees. Promote platform transaction data credibility  
 Sharing and credible deposit in the transaction process, effectively reduce transaction costs, improve transaction efficiency, create  
 A good business environment for cross-platform, cross-region, and cross-recognition sharing of public resource transaction information.  
 On this basis, explore the construction of public resource trading associations in the Beijing-Tianjin-Hebei region and other cities across the country  
 Alliance chain.

(20) Approval and filing of radio and television related business licenses. Produced by radio and television programs  
 Focusing on the establishment of business licenses and other businesses, the market entity information and relevant

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Relevant violation information, improve the efficiency and accuracy of approval. Connect to the relevant business records of the State Administration of Radio, Film and Television  
 System data, reduce the number of times to log in to different systems to query data, and improve the efficiency of record approval.

(21) Notary business. Explore the application of blockchain technology in the field of notarization

The relevant data is shared among multiple departments to improve the reliability and credibility of notarized documents.

(22) Introduction of talents. Combined with technologies such as face recognition, the electronic

Licenses, calling for information such as resident status, marriage certificate, residence, education, etc., automatically matching verification,

Issuing an electronic certificate of "permitted to move in" and printing approval documents online to achieve college student settlement and points

Settled "without running once".

(23) Intellectual property funding. Establish intellectual property funding projects involving various districts and departments

Chain, for public services, finance,

Cross-chain sharing of information in multiple fields such as technology, enterprise changes, etc., to achieve the on-chain and off-chain data of each unit chain

According to the collaboration, provide efficient and transparent intellectual property funding information services.

(24) Information sharing in different places of provident fund business. With public security, social security, civil affairs, and markets

Supervision, taxation and other units cooperate in the resident status, household registration, enterprise change, house purchase, renting,

Real estate ownership, housing loans, retirement and marital status are shared to realize

The function of "Proof of Deposit" and "Discipline for Losing Credit".

(25) "Let's take action as soon as possible". 12345 appeals for calls, acceptance, dispatch, signing,

The whole process elements such as disposal, feedback, and return visits are put on the chain, and the data of all links and related parties are promoted

Chain marks, based on untamperable data on the chain, to form an integrated evaluation result, real-time public

Show the ranking of assessment, build real-time interconnection, data sharing, linkage coordination, open and fair

Intelligent service mechanism of the citizen hotline.

(26) Checking the economic status of residents helps the society to provide accurate assistance. With the police (transit),

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Human social security, taxation, provident fund, housing urban and rural construction, banks, securities companies, etc.,

Withdrawal of residents' population, vehicles, social security, pension, medical insurance, tax payment, real estate, provident fund

Multi-party verification of the status and other information, for the approval of the old-age service subsidies and grants

Of social assistance objects are given to coal-fired self-heating assistance, to eligible social assistance objects

Provide clean energy self-heating subsidies, and provide social assistance to new education students

Assisting in payment and subsidizing social assistance targets to participate in basic medical insurance for urban and rural residents

Will provide support for precision work.

(27) Information supervision of pension service agencies and employees. For citizens in the field of elderly care services

Social security payment, tax payment, credit, safety production, fire protection, food safety, etc.

Basic information of the legal representative, credit information, criminal record, etc.

Professional qualifications, education level, infectious diseases and other information, as well as supporting elder care facilities in newly built communities,

New community supporting health service stations (points), pension land planning and other data for real-time multi-party sharing

To enhance the credit supervision capacity of pension service institutions and employees.

(28) Verification of the authenticity of house lease information. Using blockchain technology to achieve identity

Records such as certificates, real estate property certificates, etc. are uploaded to the chain, realizing the authorization verification of house property rights information, guaranteeing

The parties to the rental house trust each other.

(29) Blockchain application in the government service area of Beijing Economic and Technological Development Zone. Cost-effective

The government authorizes the municipal authority for the construction of the Beijing Economic and Technological Development Zone to use blocks

Chain technology realizes the development construction project approval platform and development reform, planning natural resources, housing

Housing, urban and rural construction, urban management, landscaping, transportation, water affairs, environmental protection, civil air defense and other departments

The data sharing and business collaboration of the approval system promotes the complete construction of the project from project establishment to completion and filing

The process is "a set of system for approval". Combined with the "access-approval-management-law enforcement" of the development zone

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Chain management mechanism, the use of blockchain technology to establish a "review management" management platform to achieve Real-time and accurate push of approval, management and law enforcement information. Establish the development zone policy to honor "one-stop" Service platform, through the blockchain to improve corporate credit, market supervision, taxation, finance and other fields Trusted data sharing.

#### Fourth, district-level application pilot

(30) Pilot application of blockchain in Xicheng District's government services. Promote blockchain technology in Medical assistance, marriage registration, corporate social security account cancellation, urban and rural minimum living security object recognition Construction, construction waste consumption permit, joint completion inspection of construction projects, establishment of micro-credit company Nine scenarios including the identification of pilots for change, corporate cancellation, and "I want to run a supermarket" were launched. Focus on the hospital deposit reduction and exemption and the immediate settlement service for discharge. The certificate information of the person is on the chain to realize mutual recognition. Link to information on marriage registration of mainland residents Marriage registration information verification is carried out at any time, and marriage registration can be applied immediately after verification. Through blockchain technology Promote the intelligent verification of corporate identity, corporate cancellation and other information, and realize the cancellation of corporate social security accounts Key application, full-process online office. Focus on current employees and individual employees, real-time inspection of public security, The identity, marriage, income and other information of civil affairs and other departments, and the diagnosis certificate of Dibao is now applying for "reduction of materials" and "reduction of time" Contain the data of construction waste consumption on the chain, shorten it The time for permit approval is consumed, and the credit management of construction waste consumption enterprises is strengthened. Shared verification housing Information on departments such as urban and rural construction, planning of natural resources, public security and fire protection, and completion of construction projects Fast and intelligent inspection and acceptance. Focusing on the identification of pilot projects for the establishment and change of microfinance companies, Focus on the change of approval items of directors and chairman of small loan companies Proof, proof of no criminal record and other information, to achieve urban linkage approval. Through blockchain technology

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Open the relevant data of enterprise cancellation such as business license and tax completion, and put on the electronic cancellation notice The use of chain sharing reduces the number of corporate cancellations. Around "I want to run a supermarket", through the blockchain Technology promotes "one form application, parallel processing".

(31) Pilot application of blockchain in Chaoyang District government services. Advance blockchain technology Reimbursement of electronic vouchers and "I want to open a barber shop", "I want to open a beauty shop" and "I want to open" 5 scenes including parking lot (above ground), "underground parking lot filing (including civil air defense)" and other scenarios. Use blockchain technology to get through relevant data of government service centers, medical insurance, market supervision and other departments According to data, simplify the certification process, reduce secondary entry, and promote medical insurance reimbursement electronic vouchers for direct use Services such as hospital visits and drug purchase in pharmacies. Combined with the "Chaohoban" comprehensive window upgrade, pass the zone Blockchain technology and data sharing in health, water, transportation, ecological environment, civil air defense and other departments, Realize "I want to open a barber shop", "I want to open a beauty shop", "I want to open a parking lot (above ground)" The subject matter such as the next parking lot record (including civil air defense) is handled quickly.

(32) Pilot application of blockchain in the field of government services in Haidian District. Advance blockchain technology In high-tech enterprise services, enterprise life cycle services, personal life cycle services, "office A good thing" and other 9 scenes in 4 categories have been implemented. Optimize high-tech enterprise services, use areas Blockchain technology provides identity authentication, face recognition, data application authentication, authentication certificate viewing, etc. Function, use blockchain technology in the training subsidies for highly skilled personnel. High-tech in Zhongguancun Technology enterprise identification scenarios use blockchain technology to explore the construction of enterprises with Haidian characteristics Life cycle service chain. Focus on the high-frequency matters in the entire life cycle of the individual, linking the public security and people Relevant data from Li Social Security, Civil Affairs and other departments are processed on the Employment and Unemployment Registration Certificate (Street Town), monthly

Applying for unemployment insurance benefits (street town) and other 2 scenarios using blockchain technology  
 "Smart Approval" service provided by the district. Promote blockchain technology in "I want to open a bookstore" "I

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appendix

"I want to open a gallery", "I want to open a museum", "I want to open a VR experience museum", and "I want to apply for Beijing  
 The scientific and technological progress awards and other subject matters have been implemented.

(33) Pilot application of blockchain in Shunyi District's government services. Advance blockchain technology  
 Register as a nurse practitioner, renew the qualification certificate for road transport practitioners, "I want to open a hotel",  
 7 scenes such as "I want to open a fruit shop" are launched. Use blockchain technology to get through public security,  
 Data from the health and other departments to promote nurses' practice registration and road transport practitioner qualifications  
 Renewal of the package will be processed in real time. Through electronic license data sharing and multi-department collaboration data on-chain,  
 Automatic verification of current licenses and promotion of "I want to open imported food supermarkets", "I want to open restaurants" and "I  
 To open a fruit shop "I want to open a car wash" "I want to open a gym (excluding swimming)" and other topics  
 Matters are handled quickly.

#### V. Strengthen organization and implementation

(1) Strengthen organizational leadership. Under the leadership of the city's blockchain work class, in accordance with the city's promotion  
 The overall requirements of blockchain technology and industrial development, the Municipal Science and Technology Commission is responsible for top-level design, overall coordination  
 And technical guidance; the Municipal Services Bureau is responsible for advancing the coordination and supervision of the entire municipal services area  
 Chain application work, coordination of key and difficult issues in business collaboration; Municipal Economic and Information Technology Bureau  
 Responsible for providing technical environment and data sharing guarantee for business applications; Municipal Justice Bureau is responsible for surrounding the block  
 The legal effect of electronic data, electronic certificate deposit, etc. as the basis for approval and archived materials in the chain application  
 Strengthen research on issues and improve legal guarantees; the Municipal Finance Bureau is responsible for capital guarantees.  
 (2) Unified application support. Adhere to the principle of independent security and controllability, according to the city's blockchain technology  
 Construction of technical and application specifications guide, relying on the city's big data platform catalog blockchain to promote  
 Innovative application and deep integration of blockchain technology in the field of government services to provide blockchain applications

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Common support such as information on-chain, data verification, smart contract deployment and cross-chain mutual recognition are information  
 Sharing and business collaboration provide credible, safe and convenient technical services.

(3) Collaborative implementation. All districts and departments should attach great importance to and deeply promote government services  
 In the field of blockchain application work, strengthen personnel, technology and funding guarantees to ensure smooth and practical work  
 Shi. Encourage all districts and departments to boldly explore and actively experiment, and form their own unique experiences and practices.  
 Leading units for application of various scenarios should unify construction ideas, clarify application priorities, and follow the city's blocks  
 The unified standard specification of chain application promotes data identification and analysis of scene applications, and selection of blockchain technology  
 Type and adaptation, coordinate and coordinate data sharing and business collaboration, and promote the effectiveness of various scenarios. each  
 Responsible units should actively and proactively connect to further optimize and integrate business processes. Pilot District Government  
 List the coordination list of municipal departments, and establish and cooperate with municipal departments to improve the coordination mechanism;  
 The city-level departments concerned should strengthen the guidance on district-level applications, and implement policy authorization, data sharing, and business  
 Support is provided in collaboration. Blockchain in the government service field organized by the city's blockchain work team  
 Apply the expert team to follow the whole process, guide the whole process, and promote the related work throughout the process.

(4) Conduct training exchanges. Strengthen blockchain training and improve the blockchain  
 Knowledge level, master the core value of blockchain, highlight advantages and applicable scenarios, etc. Study hard

Learn the advanced experience of blockchain application in the field of government affairs at home and abroad, carry out business exchanges, and promote common Same improvement.

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appendix

## Appendix 2: Technical Specifications of Beijing Municipal Government Blockchain Platform (Draft)

Blockchain as a new technology integrating multiple IT technologies, its characteristics, value and application The scope is gradually extended to financial services, government services, industrial services, supply chain services, culture Services, education services and other fields are forming a safe, reliable and efficient value system And governance model. In recent years, blockchain technology has developed rapidly, and a number of blockchain-based Support platforms and systems, their application capabilities are gradually strengthening, but the development of the industry is fragmented Phenomenon, there is a certain blindness in the application of the industry, which hinders the blockchain technology to a certain extent Its own development and application have landed.

"Beijing Municipal Government Blockchain Platform Technical Specifications" mainly provides the following functions:  
 The application of government affairs provides relevant decision-making and supervision basis, and promotes the establishment of a comprehensive governance body for the blockchain industry System and innovative supervision model to enhance risk supervision and safety assurance capabilities;  
 The chain service provider provides application and innovation guidance to promote the key core of the blockchain with standardized means Focus on technology research and development to consolidate the main body of the blockchain industry and the foundation for technological integration and development;  
 The user of the chain government service provides configuration and selection guidelines to ensure the safe implementation of the blockchain service;  
 The fourth is to provide the construction and development basis for the relevant parties in the "industry, government, industry, research and service funds" of the blockchain industry and Ideas to promote and improve the coordinated development of the blockchain industry ecology.

### range

The blockchain referred to in this specification refers to a block that has been confirmed by consensus using cryptographic links A distributed ledger that is added sequentially.

The blockchain platform mentioned in this specification refers to a platform that provides services based on blockchain technology.

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This specification is aimed at relevant parties in the blockchain industry in Beijing, and stipulates that blockchain technology is in compliance Performance, function, performance, security, reliability, maintainability, portability, compatibility and Nine aspects of technical requirements such as ease of use apply to:

- (1) Provide correct guidelines for the implementation of blockchain applications;
- (2) Promote the implementation of blockchain services;
- (3) Unified understanding of the implementation of blockchain technology to provide guidance for blockchain service applications

Guidance

- (4) Reduce the risk of blockchain technology application and enhance the effect of technology application.



in principle

Regulatory compliance principles

Relevant parties in the blockchain industry should comply with relevant national laws and regulatory requirements, including but not limited to:

September 25, 2000 State Council "Administrative Measures on Internet Information Services";

January 16, 2013 State Council "Regulations on the Protection of Information Network Transmission Rights" (State Council

Order 634);

November 7, 2016 Standing Committee of the National People's Congress

National Cybersecurity Law;

On September 04, 2017, the People's Bank of China and other six ministries and commissions

Announcement of Capital Risks;

January 10, 2019 National Internet Information Office "Blockchain Information Service Management

Regulations;

May 06, 2019 "Security Requirements for Blockchain Service Information Network" of the Ministry of Public Security;

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May 25, 2019 State Cyberspace Administration, "Data Security Management Measures (for comments draft)";

July 03, 2020 "Data Security Law (Draft)".

Standard guiding principle

Blockchain service providers should have the technical conditions suitable for their services, their technology

The plan shall comply with relevant standards and specifications, including but not limited to:

CBD-Forum-001-2017 Blockchain reference architecture;

CBD-Forum-001-2017 Blockchain data format specification;

GB/T 25069-2010 Information security technical terminology;

GB/T 32399-2015 Information Technology Cloud Computing Reference Architecture;

GB/T 11457-2006 Information technology software engineering terminology;

GB/T 25058-2019 Information Security Technology Network Security Level Protection Implementation Guide;

GB/T 25000.10-2016 System and software engineering system and software quality requirements and evaluation

ISO 23257 Blockchain and Distributed Accounting Technology-Reference Architecture (Blockchain

and distributed ledger technologies-Reference architecture);

ISO 22739 Blockchain and Distributed Accounting Technology-Terminology (Blockchain and

distributed ledger technologies-Terminology);

Interconnection principle

Interconnection refers to the construction of a peer-to-peer network structure based on blockchain data to realize blocks

The chains are connected to each other to build a three-dimensional value structure that records historical data of value delivery on the entire network

Structure. In a heterogeneous or cross-chain environment, different blockchains are connected to each other, and there is uniformity on the blockchain

The mathematical expression method and mapping model of attribute data mapping to solve the data on the blockchain

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Correlation, forming a three-dimensional blockchain space for cross-region, cross-scenario and cross-departmental application.

Blockchain service providers should be based on the principle of interconnection and interworking, while meeting business needs,

To meet the needs of future interconnection between various blockchain systems.

## Safe and controllable principle

The blockchain service provider should provide a secure and controllable blockchain platform or system, focusing on Around the country encryption algorithm application and blockchain chip research and development, including the implementation of blockchain system software And the production, upgrade and maintenance of hardware to realize the safe and controllable whole process.

## The principle of independent innovation

Blockchain service providers should enhance their own R&D and innovation capabilities, and actively carry out technological innovation, Application innovation and model innovation.

Technological innovation, focusing on distributed storage, encryption algorithms, consensus mechanisms, smart contracts, Technological breakthroughs such as user privacy, data security, and cross-chain, encourage blockchain service providers to build Multi-directional R&D system to improve own technological innovation R&D capability.

Application innovation, facing the integration of blockchain technology and industry, encouraging blockchain service providers to explore The development model of deep integration of blockchain technology and real economy enriches the application scenarios of blockchain.

Model innovation, centering on the blockchain business model and industrial ecology, encouraging blockchain service improvement Suppliers explore the establishment of a new business collaboration model to promote structural upgrades on the supply side State injects new kinetic energy.

## Terms, definitions and abbreviations

## Terms and definitions

The following terms and definitions apply to this document.

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## appendix

## Blockchain

Distribution using cryptographic technology links to add blocks confirmed by consensus in order Style ledger.

## Chained-block data structure

Transaction processing that takes place over a period of time is stored in units of blocks, and cryptography The algorithm connects blocks into a chain of data structures in chronological order.

[CBD-Forum-001-2017 Blockchain Reference Architecture, Definition 2.2.2]

## Peer-to-peer network

A computer network that contains only nodes with equivalent control and operation capabilities.

[GB/T 5271.18-2008]

## Smart contract

A contract defined in digital form that can enforce its own terms.

In the field of blockchain technology, smart contracts refer to triggering based on booking events, non-tampering, Automatically executed computer program.

[CBD-Forum-001-2017 Blockchain Reference Architecture, Definition 2.2.7]

## Encryption/encryption

The process of cryptographically transforming data to produce ciphertext. Generally contains a set of transformations, This transformation uses a set of algorithms and a set of input parameters. The input parameter is usually called the key.

[GB/T 25069-2010]

## Interoperability

The ability of two or more systems or components to exchange information and use the exchanged information with each other;

The ability of two or more systems to interoperate.

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[GB/T 11457-2006]

Acronyms

The following abbreviations apply to this document.

API Application Programming Interface

BSC Blockchain Service Customer

Blockchain platform quality model

The quality model of the blockchain platform in this specification refers to the quality model in GB/T25000.10,

Divided into compliance, function, performance, security, reliability, maintainability, portability,

Nine aspects of compatibility and ease of use, as shown in the following figure:

Blockchain platform quality model

Basic requirements

The basic requirements of the blockchain platform mainly include compliance, function, performance, security and

Five parts of reliability.

Compliance requirements

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The compliance requirements of the blockchain platform are mainly from customer identification, supervision and inspection, privacy protection

Protection and content filtering are regulated in four aspects.

Customer identification requirements

Index item skills requirement

- It should have user registration management, illegal and harmful information prevention and control, etc.
- Information network security mechanism;
- Subject responsibility for information content security management should be implemented;
- A true identity authentication system and procedures appropriate to its business should be established
- The target audience includes individuals and organizations using blockchain services;
- The authentication process needs to be collected to show that the users of the blockchain service are real
- Valid information for identity. If regulatory requirements for a specific business or industry
- If there are other stricter requirements for identity authentication, follow its regulations.

Supervision and inspection requirements

Index item skills requirement

- Corresponding regulatory roles and functions should be set up;
- Open interfaces and authorities with supervisory functions;
- Data support and technical assistance should be provided;
- Clear text information should be provided for inspection;
- Information that does not meet the requirements of national laws and regulations should be screened
- supervised check Hide or refuse to deal with;
- It should pass the conformity assessment of national authoritative third-party standards, including
- But not limited to function, performance, etc.;

- A log information storage mechanism suitable for the business should be equipped  
The relevant records shall be kept for more than six months in accordance with the audit requirements.

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## Privacy protection requirements

Index item

skills requirement

- When collecting, storing, applying, disclosing, deleting or blocking data,  
Should obtain the authorization of the privacy subject;
- When collecting, storing, applying, disclosing and deleting or blocking data,  
The privacy of service users should be protected and the storage of sensitive data  
Security measures such as encryption, desensitization, and isolated storage should be adopted;
- Collect, store, apply, disclose and delete or block data  
When necessary, the necessary privacy protection management regulations and emergency treatment should be established  
Method.

## Content filtering requirements

Index item

skills requirement

- The purpose, scope, method, format and process of collecting data should be clearly defined;
- The requirements for sharing open attributes, categories and levels of collected data should be determined;
- Collect data in accordance with laws and regulations  
Letters prohibited by laws and regulations such as disorder of social order and violation of the legal rights and interests of others  
Interest, and shall not infringe upon the legitimate rights and interests of the collected objects;
- Ensure that the collected data is safe, complete and credible;
- Data collection log records should be established, and log storage and archiving regulations should be determined  
Then, ensure that the data collection and application process can be traced back.

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Index item

skills requirement

- In the process of data processing, the data should be correct, reliable and complete,  
Do not forge or tamper with data;
- After receiving the transaction request initiated by the user or other nodes, respond to the data  
Content to be identified and filtered before performing the corresponding operation  
Information required by laws and regulations should be blocked or refused to be processed;
- It is recommended to provide data validity verification function to ensure data structure, language and regulations  
The standard, input and output, and digital signature meet the design requirements.
- When writing data to the block, it should ensure compliance with the consensus mechanism;
- The bookkeeping node should identify and filter the generated blocks  
Information required by national laws and regulations should be blocked or refused to be processed;
- Support the deletion of data on the chain that does not meet the requirements of national laws and regulations  
Or shield;
- Data record storage should support persistent storage of ledger records, while meeting  
Integrity and consistency of multi-node data records.
- When reading data, the blockchain system should verify the block data in a trusted environment  
Perform correct and complete decryption;
- When converting data, make sure to convert the read data into what the system needs  
Parsing format;

- When restoring data, make sure to restore the converted data into readable information;
  - In the process of data filtering and protection, the content after analysis should be sensitive Sensibility filtering and privacy protection.
  - According to relevant national laws, regulations and specifications, through software filtering, Manual review and other means to review the upcoming blockchain information;
  - The reporting function of illegal and illegal content shall be provided, and shielding, Ability to delete or block, prompt, etc., and keep logs for auditing.
- Back up It should be backed up and archived regularly to ensure that the content can be checked.

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Functional requirements

The functional requirements of the blockchain platform are mainly from the user layer, API layer, and distributed accounting technology. Platform, infrastructure and platform management are regulated in five aspects.

User level requirements

Index item	skills requirement
User function	Should support blockchain service customers to access and use blockchain services, including Command line interactive function, graphic interactive function, application interactive function, event Elements such as business submission functions.
Business functions	<ul style="list-style-type: none"> <li>· Should support the choice of blockchain services, users can access blockchain services Independent choice;</li> <li>· Should support the subscription of blockchain services, users can access blockchain services</li> </ul>
Management functions	<ul style="list-style-type: none"> <li>· Should support the use of blockchain accounts, users can use the ledger to do a Some business</li> <li>· Should meet business requirements for financial management.</li> <li>· Should support the increase and query of membership in the system;</li> <li>· Support the freezing and restoration of member accounts;</li> <li>· Support the ability to recover or recover after the key is lost;</li> <li>· It should support the setting of members' permissions and do different levels of operations;</li> <li>· Store user data in ciphertext;</li> <li>· Should support fault detection;</li> <li>· Should support issues and information security incident management;</li> <li>· Should support the monitoring of node resources.</li> </ul>

API layer requirements

Index item	skills requirement
Access management	<ul style="list-style-type: none"> <li>· Should support querying the specified account through the query tool or query interface Status and basic information, total height information of the designated block, and Information on fixed-height blocks, block identification, designated identification Business information;</li> <li>· Should support the submission of a system-supportable thing through the service interface Business request.</li> <li>· It should support querying the status of nodes through query tools;</li> <li>· Should support starting node process;</li> </ul>

- It should support the consensus service of starting/closing consensus nodes;
- Should support the shutdown node process;
- Node management:
  - Should support detection and monitoring node bandwidth;
  - It should support the configuration of admission/exit configuration on the configuration platform;
  - Should support the transaction submitted on the node;
  - It should support adding/deleting nodes through a consensus mechanism.
- Should support node access configuration;
- Should support node quasi-exit configuration;
- Node authorization:
  - Should support node transaction processing;
  - Should support ledger to query authorization configuration;
  - Should support the prohibition of query configuration of the ledger.
- Should support the release of new content on the chain;
- Should support increasing the number of existing chain content;
- Ledger application:
  - It should support the distribution of a certain amount of on-chain content to designated users;
  - Should support the exchange of content on the chain between different users;
  - Logic verification before consensus and result calculation after consensus should be supported.

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- |            |                    |
|------------|--------------------|
| Index item | skills requirement |
|------------|--------------------|
- The interactive protocol should be upgraded with the software version;
  - Should have the number and function of interfaces to meet the business snowball;
  - The system should be backward compatible at the protocol level, and the protocol version should be adopted
- Interfaces and interactive protocols
- Number to distinguish;
  - A set of software should support all kinds of customers using different protocols
  - Provide services.

Distributed accounting platform layer requirements

- |            |                    |
|------------|--------------------|
| Index item | skills requirement |
|------------|--------------------|
- Should support multiple nodes to participate in consensus and confirmation;
  - Should prevent independent nodes from recording or modifying information without consensus;
  - Malicious fault tolerance caused by physical failure should be supported;
  - Should support the consensus mechanism without stopping the network service
  - Dynamic upgrade or switch.
- Consensus mechanism
- Should support persistent storage of ledger records;
  - Should support multiple nodes to have complete block records;
  - Support the provision of authentic data records to authorized persons;
  - The data consistency of each node with the same ledger record should be ensured.
- Ledger records
- Should support visitors who hold the correct key to decrypt and access data;
  - Should support the use of national secret algorithm;
  - It should be supported that the visitor who holds the wrong key cannot decrypt and access the data.
- Encryption Algorithm
- It should meet the speed and security strength requirements of the business for the digest algorithm,
  - Meet storage and verification requirements;
- Summary algorithm
- Should have the ability to resist cracking, if necessary, a higher cracking meter should be used
  - Calculate the complexity of the summary algorithm.

- |            |                    |
|------------|--------------------|
| Index item | skills requirement |
|------------|--------------------|
- Should support the international mainstream digital signature algorithm, such as RSA digital signature
  - Algorithms, ECDSA, etc.;

- Should support my country's trade secret digital signature algorithm, such as SM2 digital signature Algorithms, etc.;
- digital signature · Should have the ability to resist cracking, should regularly review the digital signature algorithm
- The security of the asymmetric encryption algorithm and digest algorithm used in
- If necessary, use asymmetric encryption algorithms that break the computational complexity and Summary algorithm.

- Should support the timing of unified ledger recording;
- Timing service · The absolute reliability of the time source should be guaranteed and maintained;
- The consistency of the time source between multiple nodes should be guaranteed;
- With timing fault tolerance.

- Should provide programming language support, provide an integrated development environment;
- Should support static and dynamic inspection of contract content;
- Should provide support for running carriers, such as virtual machines;
- Smart contract Should support the interaction of external data sources and smart contracts;
- Malicious tampering with smart contract content should be prevented;
- Should support contract content upgrade under multi-party consensus;
- It should support writing contract content to the ledger.

Infrastructure layer requirements

Index item skills requirement

- It should support point-to-point communication between nodes in the blockchain;
- Peer-to-peer network · It should support secure communication between peers;
- Multicast capability based on point-to-point communication should be supported;
- The identification of dynamic addition/reduction of nodes should be supported.

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Index item skills requirement

- Ensure that peer-to-peer networks can be deployed and used by each node;
- storage · It should support peer-to-peer networks that can be queried by each node;
- Should support efficient and stable data services.

Calculation The computing power should be able to meet the requirements of each node and be able to withstand certain business Business pressure to ensure the continuous and stable operation of nodes.

Platform management requirements

Index item skills requirement

- Should support users to visually create, manage and maintain blockchain networks and application;
- Visualization · It should have the characteristics of rapid deployment, convenience and ease of use, high safety and reliability;
- Implement unified management of computing resources, communication resources, storage resources, etc.
- Should provide application development capabilities based on the blockchain platform, allowing applications to be developed
- Development support Process and application deployment process is simple and efficient.
- The user management capabilities of the blockchain platform should be provided;
- Controlling ability · Smart contract management capabilities should be provided;
- Should provide multi-mode deployment functions, such as cross-cloud deployment, hybrid cloud Deployment, privatization deployment, etc.

Performance requirements

Resource utilization requirements

Index item skills requirement

- Should meet the business requirements for CPU occupancy rate, the main parameters
- Satisfaction of CPU usage Examine the maximum percentage of processor execution non-idle thread time
- Whether it meets the restrictions of demand.

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Index item	skills requirement
Satisfaction of memory usage	Should meet the requirements of business for memory space occupation rate, the main reference is to refer to the average number of effective physical memory used to run the process Whether the quantity meets the demand limit.
External memory time load	Should meet business requirements for external storage time load, mainly whether external memory is monopolized during the operation efficiency test Whether the time limit meets the requirements.
Occupancy of external storage	Should meet the business requirements for the occupancy rate of external storage space, the main reference is to refer to whether the used external storage space meets the requirements.
Transmission bandwidth load	Should meet business requirements for transmission bandwidth load, mainly whether the maximum transmission bandwidth meets the required limit.
I/O device occupancy	Should meet the business requirements for I/O device occupancy rate, the main reference is to refer to the specified I/O device in each unit time, set
Satisfaction	Whether the proportion of standby busy time meets the demand limit.

Time characteristics

Index item	skills requirement
Response time satisfaction	Should meet the business requirements for response time, the main reference is to refer to whether the response time of the command meets the requirements.
Turnaround time satisfaction	Should meet business requirements for turnaround time, the main reference is to refer to whether the time interval between the start of the job and the completion of the job is full sufficient demand.
Satisfaction of throughput rate	Should meet the business requirements for throughput rate, when the main reference is to refer to whether the number of tasks to be processed meets the demand.

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Capacity requirements

Index item	skills requirement
Maximum number of requests	Should meet the business requirements for the maximum number of requests, the main reference is to refer to whether the maximum number of requests can be processed per unit time
Fullness	Whether it meets the demand.
Accumulated transaction capacity	Should meet the business requirements for the cumulative capacity of the transaction, the main reference is to refer to whether the maximum cumulative number of transactions that can be processed is
Satisfaction	Whether it meets the demand.
Data throughput capacity	Should meet the business requirements for data throughput capacity, the main reference is to refer to whether within the stipulated time, can the maximum amount of data processed be reached?
Satisfaction	Meet the needs.
Data processing capacity	Should meet the business requirements for data processing capacity, the main reference is to refer to whether for specified data processing or data storage functions,
Satisfaction	Whether the maximum data volume meets the demand.

Security requirements

Network security level protection requirements

Index item	skills requirement
Network security level protection	Should comply with information security GB/T 22239 "Information Security Technology Network Basic Requirements for Network Security Level Protection" and related standards for software quality Claim.



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## Guarantee mechanism requirements

Index item

skills requirement

- Should be equipped with bad information detection and prevention mechanisms to prevent such information Spread of information
- An emergency response mechanism should be established to interrupt or Block the spread of bad information;
- If the blockchain network is maintained by multiple participants, it should be formulated Coordination mechanism to ensure that emergency measures for bad information can be Implementation among multiple parties;
- Safety management rules and conventions should be formulated and service signed with users Business agreement, clarifying the rights and obligations of both parties, and violating laws and regulations Users should take warnings, restrict functions, stop services, etc.
- Disposal measures, timely elimination of violations of laws and regulations, keeping records And report to the relevant competent department.

## Confidentiality requirements

Index item

skills requirement

- Access to data Controllability of access data refers to unauthorized data access by the blockchain system
- Controllability Ask the extent to which the ability to control meets the needs
- The extent to which the right data access rules are satisfied.
- Access-operated Controllability of access operations refers to unauthorized access operations of the blockchain system
- Controllability The degree to which the ability to perform control meets the demand
- The degree to which the right operation rules are satisfied.
- Data encrypted The correctness of data encryption refers to the correctness of data items by the blockchain system
- Correctness The degree to which the encryption/decryption ability meets the demand
- Confirm whether the encrypted/decrypted data items meet the requirements.
- Data encrypted The integrity of data encryption refers to the encryption of data items by the blockchain system /
- Completeness The degree of decryption meets the degree of demand, this indicator examines the encrypted/decrypted
- Whether the confidential data items meet the requirements.

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Index item

skills requirement

- Cryptographic algorithm Proportion of encryption algorithms that have been approved.
- strength

## Integrity requirements

Index item

skills requirement

- Data resistance Anti-corruption of data refers to the ability of the blockchain system to prevent data from being corrupted
- Error According to the degree of demand, this indicator examines the data during the operation to avoid the occurrence of
- The degree of corruption.
- Intrinsic data Inherent data corruption resistance refers to the blockchain system preventing data corruption
- Anti-corruption The degree of the method adopted meets the demand, the indicator examines the blockchain system
- Whether the number of implemented anti-corruption methods meets the requirements.
- Buffer overflow Blockchain system modules with user input have been used to check
- Prevention The proportion of memory accesses that stop buffer overflow.

## Non-repudiation requirements

Index item	skills requirement
Digitally signed Utilization	The utilization of digital signature refers to the use of digital signature transmission data to meet the needs Degree, this indicator examines whether the degree of utilization of digital signatures meets the needs.
Event sending Non-repudiation	Non-repudiation of sending events means that the software prevents entities from denying sending events And the extent of their behavior, this indicator examines the entity's undeniable sending of events, The degree of behavior.
Receiving events Non-repudiation	Non-repudiation of receiving events means that the software prevents entities from denying receiving events And the extent of their behavior, this indicator examines the entity's undeniable receipt of events, The degree of behavior.

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Traceability requirements

Index item	skills requirement
Access to data Auditability	Auditability of access data refers to access to blockchain systems and data to users The extent to which the ability to conduct audit trails meets the needs Whether the log and database record the access data is complete.
Access type Auditability	The auditability of the access type refers to the audit of the access type of the user record The degree of tracking ability meets the demand, the indicator checks the system log And whether the database records the access type is complete.
Log saver Fit	Log preservation compliance means that the actual time for the log to be safely stored is in compliance The degree of demand, this indicator checks whether the log storage time meets the demand begging.

Authenticity requirement

Index item	skills requirement
The authentication method is full Fullness	The extent to which the identity authentication method used by the blockchain system meets the needs, the The index checks whether the number of authentication methods provided by the blockchain system meets the needs Requirements, such as different login methods.
The authentication rules are full Fullness	The number of authentication rules implemented by the blockchain system on secure data meets the needs The authentication rules of the system meet the requirements, for example, in the same login method Different rule requirements.

Reliability requirements

Maturity requirements

Index item	skills requirement
Defect elimination Satisfaction	Should meet the business requirements for defect elimination rate, the main reference has been corrected The ratio of the defects to the defects found has met the requirements.

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Index item	skills requirement
Mean failure time Meet every other degree	Should meet the business requirements for the mean time between failures, the main reference The average time between software failures within a certain operating cycle is full To the extent required.
Full failure density Fullness	Should meet the requirements of the business for the failure density, mainly refer to the The degree to which the number of faults found in the software of the measurement unit meets the requirements.
Full defect density Fullness	Should meet the business requirements for defect density, mainly refer to the The number of defects found in the software for the unit of measurement (eg per thousand lines) meets The degree of request.

Verify coverage Should meet the business requirements for verification coverage, mainly refer to the actual completion  
The ratio of the completed verification task to the verification task to be completed.

## Usability requirements

Index item	skills requirement
Service time rate	Should meet the business requirements for service time rate, the main reference service Time rate refers to the actual service time and needs to be provided by the blockchain system The ratio of service hours. This indicator is to measure the tested blockchain system To what extent the service time actually provided by the system meets the requirements.
Mean failure interval	It should meet the business requirements for the mean time between failures. The test cannot be provided by the blockchain system within a certain operating cycle.
Time satisfaction	The degree to which the average time meets the requirements. This indicator is to measure the blockchain To what extent does the average system downtime meet the requirements.
Special conditions	Should meet the requirements of the business for the failure density, the main reference is in the special Under the conditions, the normal running time of the software meets the requirements. The finger
Time satisfaction	The target is to measure the running time of the special conditions of the blockchain system Meet the requirements to a certain extent.

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## Fault tolerance requirements

Index item	skills requirement
Avoid full downtime	Should meet the business requirements for avoiding downtime, the main reference to avoid The downtime satisfaction degree refers to failures that do not cause downtime and loss of the blockchain system
Fullness	The degree to which the efficiency ratio meets the requirements.
Avoid failure rate	Should meet the business requirements for avoiding failure rate, the main reference to avoid
Fullness	Failure rate satisfaction refers to the failure and failure of the blockchain system that has not caused failure The extent to which the ratio of faults found meets the requirements.
Resist errors	Should meet the business requirements for resisting misoperation rates, mainly Reference to prevent the occurrence of misoperation rate refers to the actual implementation of the blockchain system
Operating rate	The effective design to resist misoperation should be designed to resist misoperation The proportion in.
Redundancy rate	Should meet the business requirements for redundancy rate, mainly refer to the redundancy rate index In order to avoid failure, the actual blockchain system components are prepared The ratio of copies to parts that need to be backed up.

## Recoverability requirements

Index item	skills requirement
Easy to recover	Should meet the business requirements for easy recovery, the main reference is in different Common events or when needed, the blockchain system is restored to before failure or The ability to specify status.
Backup data rate	Should meet the business requirements for the backup data rate, the main reference is The proportion of effective backup data in the data to be backed up.
Restartability	Should meet business requirements for restartability, the main reference Restartability means that after a downtime, the blockchain system can The ratio of successful restarts to the number of restarts is satisfied within the time The degree of request.

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Index item	skills requirement
Fault notification time	Should meet the business requirements for the time of failure notification, the main reference

Satisfaction When a failure occurs, the time spent by the blockchain system to notify the failure is full to the extent required.

#### Expansion requirements

Expansion requirements include: maintainability, portability, compatibility and ease of use.

The evaluation and selection schemes of this specification only contain the basic requirements, not the expansion requirements. phase

The relevant parties should further promote the implementation of expansion requirements based on the specific needs of each blockchain project.

#### Maintainability

Index item skills requirement

Should meet the business requirements for modularity. Modular refers to the blockchain system

During the maintenance process, the support degree of each function module to the implementation of maintenance, the main

To include:

##### Modular

- The degree of coupling between modules: the strength of the dependencies that exist between modules;
- The rationality of the module structure: the degree to which the module structure meets the requirements, including Including code, predefined code.

Should meet business requirements for reusability. Reusability refers to blockchain

Modules or module codes in the system can be used for other software or system

Degree, mainly including:

##### Reusability

- Module reuse rate: Blockchain system modules can be used in other blockchains
- Degree of system
- Standardization of comments: the degree to which the comments of the code comply with the specifications of the comments;
- Code standardization: the degree to which the code is written in compliance with the code writing specifications;
- Normativeness of the document: the degree to which the writing of the document complies with the specification of the document.

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Index item skills requirement

Should meet business requirements for ease of analysis. Ease of analysis refers to blockchain

The system can be diagnosed with its own defects or causes of failure or identified to be modified

The ease of the part mainly includes:

- Accuracy of diagnosis: Whether the blockchain system can accurately diagnose the dimension
- Guard point
- Diagnosis time satisfaction: the effective diagnosis and maintenance goals of the blockchain system
- The degree of time required to meet the time expected by the user;
- Validity of clues: Can the blockchain system provide sufficient maintenance clues
- To support maintenance implementation;
- Clue comprehensibility: whether the implementer can understand the time correctly and effectively
- Clues provided by the maintenance process;
- Ability to audit and track: when the software is defective, invalid or needs to be repaired
- Whether the time can effectively track the specific operation of the cause.

Should meet the business requirements for easy modification. Easy to modify refers to the block

The ease of implementation and modification of the chain system mainly includes:

- Modifiability of the code: whether the maintenance implementer can modify the code to
- Maintain specified functions;
- Configurability: Can the maintenance implementer easily change the configuration parameters to
- Implement changes;
- The efficiency of the change cycle, whether the user's question is within an acceptable time
- Settle within
- Efficiency of maintenance implementation: whether the maintenance process can be performed within an acceptable time
- Completed within limits;
- Modification complexity: whether maintenance can be easily performed to solve the problem;
- Modifiable revertibility: software with similar functions such as revocation, in
- After the modification, whether it can be restored to the state before modification normally;
- Controllability of software changes: can users easily identify revised
- version.

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Index item	skills requirement
Testability	<p>Should meet business requirements for testability. Testability refers to the block The ease with which the chain system is confirmed by the modified component. Evaluation elements include:</p> <ul style="list-style-type: none"> <li>· Automatic verifiability: whether it can pass the automatic verification of the blockchain system Certificate to complete;</li> <li>· Restartability of the test: after the maintenance, can the test point be easily executed OK test.</li> </ul>
portability	
Index item	skills requirement
Adaptability	<p>Adaptability means that the blockchain system is satisfied under different constraints The degree of ease mainly includes:</p> <ul style="list-style-type: none"> <li>· Hardware adaptability: the adaptability of the target blockchain system to changes in the hardware environment Adaptability</li> <li>· Operating system adaptability: the target blockchain system changes to the operating system Adaptability</li> <li>· Database adaptability: the adaptability of the target blockchain system to database changes Adaptability</li> <li>· Support the adaptability of the blockchain system: the tested blockchain system is Adaptability to changes</li> <li>· Adaptability of the organizational environment: the tested blockchain system responds to changes in the organizational environment Adaptability</li> <li>· Adaptability of the communication environment: the tested blockchain system responds to changes in the communication environment Adaptability</li> <li>· Data structure adaptability: the tested blockchain system changes the data structure Adaptability</li> <li>· User-friendliness of transplantation: the tested blockchain system is easily grasped by users ability.</li> </ul>
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Index item	skills requirement
Easy to install	<p>Ease of installation means that the software installation package of the blockchain system can be used in a specific environment The degree of effective installation mainly includes:</p> <ul style="list-style-type: none"> <li>· Installation correctness: During the migration process, the software package of the blockchain system is installed Can it run normally after being installed in a new environment;</li> <li>· Ease of installation: During the migration process, the difficulty of installing the blockchain system degree;</li> <li>· Ease of uninstallation, during the migration process, the ease of uninstallation of the blockchain system degree;</li> <li>· Installation impact: During the migration process, the blockchain system software package is installed Whether the installation process will affect the operation of other software or the environment and Set up</li> <li>· Installation integrity: During the migration process, the function of the blockchain system after installation Completeness</li> <li>· Installation flexibility: During the migration process, is the software installation process Customized by users;</li> <li>· Installation efficiency: During the migration process, from the beginning of the installation to the end of the installation time needed.</li> </ul>
Easy to replace	<p>Easily replaceable refers to software in the same environment (including software environment, hardware environment Environment, operating system, etc.) the difficulty of replacing other software, mainly including:</p> <ul style="list-style-type: none"> <li>· Data continuity: after software update, upgrade or replacement of other software, Whether the same data can continue to be used;</li> <li>· Inclusion of functions: after software update, upgrade or replacement of other software, Whether similar functions can be used normally;</li> <li>· Consistency of user support functions: software updates, upgrades or replacements</li> </ul>

After the software, whether the new function is consistent with the user's expectations, can it be used Household acceptance.

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compatibility

Index item

skills requirement

- A unified data format should be defined to meet business  
For data consistency requirements, it is recommended to refer to "CBD-Forum-001-2017 Blockchain Data Format Specification", with  
For details, please refer to the following "Blockchain Data Format Specification";
  - Should meet business requirements for data consistency. Data consistency  
Refers to the blockchain system to reduce data synchronization delay and ensure the number of  
The consistency of data to avoid the degree of data confusion and misalignment.  
You can test by running the specified business on the blockchain system  
Data synchronization delay data, and the degree of data consistency;
  - Should meet business requirements for interoperability. Interoperability  
Test blockchain system to achieve interoperability with other blockchain systems  
Degree of work. Can test the tested blockchain system with other  
The blockchain is used in communication protocols, APIs and block data formats, etc.  
Test for connectivity and communication.
- Interoperability
- Coexistence
- Should meet business requirements for coexistence. Sharing with other products  
Under the condition of general environment and resources, products can be effectively executed  
Its required functions and will not negatively affect other products  
Degree.

Ease of use

Index item

skills requirement

- Should meet the business requirements for legibility. Users can identify blockchain products  
Whether the product or system is suitable for their requirements.
  - Should meet the business requirements for ease of learning. Mainly refer to the designated use ring  
In the context of the environment, blockchain products or systems are effective, efficient,  
In order to learn to use the product or system, the characteristics  
The target may be the degree of use by the specified user.
- Legibility
- Easy to learn

Index item

skills requirement

- Should meet business requirements for ease of operation. Main reference products or system tools  
There is a degree of property that is easy to operate and control.
- User error It should meet the requirements of the business to defend against user errors. Main reference system  
Defensive The degree of protection against user errors.
- User Interface Should meet the business requirements for user interface comfort. Main reference user community  
Comfort Face provides a pleasant and satisfying level of interaction.
- Should meet business requirements for accessibility. Mainly refer to the specified use  
Accessibility In the environment, in order to achieve the specified goal, the product or system is  
The extent to which the characteristics and abilities of individuals are used.

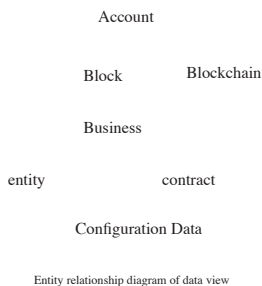
Blockchain data format specification

data structure

Data structures related to blockchain technology include blocks, transactions, entities, contracts, accounts, Six main data objects of configuration data. The core data objects of the blockchain include blocks, Transactions, entities and contracts. Each block data object contains one or more transaction data pairs Like, each transaction object includes an attribute data object of the entity class, and also includes the business logic of the transaction Edit, which is the contract data object. In addition to the core data objects of the blockchain, including configuration data objects, Provide the configuration information required during the normal operation of the blockchain system. Configure data objects and zones The core data objects of the blockchain jointly build the basic data foundation required for the operation of the blockchain. And account The user data object represents the data structure corresponding to the actual initiator of the blockchain business and related parties. The following figure shows the relationship between entities related to the data view.

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Data Classification

Data Classification	Explanation
Account data	The account is the actual initiator and related party of the blockchain transaction, recorded in the block All transaction information is linked to related accounts. Every blockchain service Business customers must have one or more accounts to use blockchain services.
Block data	In the design of blockchain technology, a block refers to what happens within a given time Transaction processing will be organized into data structures. Normally, the block consists of Block header and block body. The block header contains control information related to the block, The block body contains specific transaction data.
Transaction data	Transaction refers to the specific business actions carried on the blockchain system. The transaction includes both And digital asset transaction type transactions, including other non-transaction type transactions.
Entity data	Entities are some specific attributes of the transaction, including the initiator address and receiver Address, storage data and physical data remarks.
Contract data	Contracts, also known as smart contracts, are a set of contracts defined in the form of computer code Promise, and the contract participants can execute the promised agreement, that is: using a computer Write conditional agreement reached by contract participants in code form When triggered, the blockchain system automatically executes the protocol. According to the application scenario With the same demand, the blockchain system can selectively provide smart contract functions.

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Data Classification	Explanation
Configuration Data	Configuration data refers to the configuration information required during the normal operation of the blockchain system, Including consensus protocol version number, software version number and network communication bottom peer Node configuration information, etc.

Data element attributes

Attribute name	Property description
	The Chinese name of the Chinese name data element shall remain unique under certain contexts.
	The English name of the English name data element should remain unique under certain contexts.

Data types describe the characteristics and basic elements of data elements, the data used in this standard

Types mainly include: string type, integer type, array type.

The data length describes the length of the data element. In this standard, a fixed-length or indefinite-length table is used

It shows the recommended byte length.

The data description details the content of the data element and the meaning of the expression.

The data remarks describe whether the data element is necessary, and it is divided into mandatory and optional in this standard.

Data identification is the unique identification of each data element, the number is hierarchical classification, respectively

symbol Data classification and data elements are serially coded and recorded in sequence. Front

The code is the data classification number, and the subsequent segment code is the serial number of the data element.

Data specification format

Account data format

(1) Account public key

Attributes content

Chinese name account public key

English name Account Public Key

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Attributes content

Types of String

length Fixed length, 64 bytes recommended

Explanation The public part of the key pair generated for the user according to the PKI system.

Remarks required

(2) Account private key

Attributes content

Chinese name account private key

English name Account Private Key

Types of String

length Fixed length, recommended 32 bytes

Explanation The undisclosed part of the key pair generated for the user according to the PKI system.

Remarks required

(3) Digital certificate

Attributes content

Chinese name digital certificate

English name Digital Certificate

Types of Array

length Variable length

Explanation A digital certificate is a digital signature signed by a certificate authority that contains a public password  
Key owner information and public key files.

Remarks Optional

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(4) The institution to which the account belongs

Attributes content



Chinese name  
 English name Institution  
 Types of Array  
 length Variable length  
 Explanation Institutions are independent members who join the blockchain network and can Enterprises, organizations, groups, etc., accounts can belong to a certain organization relationship Institutions.  
 Remarks Optional

## Block data format

(1) Block height  
 Attributes content

Chinese name block height  
 English name Block Height  
 Types of Integer  
 length Fixed length  
 Explanation Identify the block number and describe the position of the block in the blockchain.  
 Remarks Optional

(2) Block identification  
 Attributes content

Chinese name block identification  
 English name Block Identity

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Attributes content

Types of String  
 length Fixed length, recommended length 32 bytes  
 Explanation Usually refers to the block summary, the unique identification of the block in the blockchain.  
 Remarks required

(3) Version information  
 Attributes content

Chinese name block version  
 English name Block Version  
 Types of String  
 length Variable length  
 Explanation The current block version number, mainly corresponding to the current block header structure and each word The meaning of the paragraph.  
 Remarks Optional

(4) Summary value of the previous block  
 Attributes content

Summary value of the previous block of the Chinese name  
 English Name Previous Block Hash  
 Types of String  
 length Fixed length, recommended length 32 bytes  
 Explanation Usually refers to the block summary of the previous block, the only block in the blockchain Logo.  
 Remarks required

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## (5) Merkel roots

Attributes content

Chinese name Merkel root

English name Merkel Tree Root

Types of String

length Fixed length, recommended length 32 bytes

Explanation The summary generated by the relevant information in this block through the tree structure algorithm Important value.

Remarks The root of the transaction tree is required, and the status and receipt root are optional

## (6) Block time stamp

Attributes content

Chinese name block timestamp

English name Block Timestamp

Types of Integer

length Fixed length, recommended length 8 bytes

Explanation Represents the generation time scale (positive integer) of this block, starting from 1970 Time counting, the precision is milliseconds, the positive sequence increases.

Remarks required

## (7) Transaction list

Attributes content

Chinese name transaction list

English name Transaction List

Types of Array

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Attributes content

length Variable length

Explanation A list of transactions in the block, each transaction usually represents a business operation.

Remarks required

Transaction data format

## (1) Transaction identification

Attributes content

Chinese name transaction ID

English name Transaction ID

Types of String

length Fixed length

Explanation In transaction processing, the unique identification of transaction data can be guaranteed, usually a hash value.

Remarks required

## (2) Transaction type

Attributes content

Chinese name transaction type

English name Transaction Type

Types of String or integer

length Fixed length

Explanation When performing a transaction operation, define the event type of the transaction operation, you can have Or multiple types.

Remarks Optional

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(3) Signer

Attributes content

Chinese name signer

English name Signer

Types of String

length Fixed length

Explanation When performing a transaction operation, the set of signers who signed the transaction.

Remarks Optional

(4) Transaction timestamp

Attributes content

Chinese name transaction timestamp

English name Timestamp

Types of Integer

length 32 bytes

Explanation A positive integer, counting time from 1970, with an accuracy of milliseconds and a positive sequence increase.

Remarks Optional

Entity data format

(1) Initiator address

Attributes content

Chinese name initiator address

English name Sender

Types of String

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Attributes content

length Fixed length

Explanation The initiator or source account of the transaction operation, as the sole initiator of the transaction Logo.

Remarks required

(2) Receiver address

Attributes content

Chinese name receiver address

English name Recipient

Types of String

length Fixed length

Explanation The receiver in the transaction operation is used as the unique identifier of the transaction operation object.

Remarks Optional

## (3) Additional data

Attributes	content
------------	---------

Chinese name storage data

English name Data

Types of String

length Fixed length

Explanation The optional fields provided for some business needs can be added to the business needs.  
Additional data.

Remarks Optional

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## (4) Remarks of entity data

Attributes	content
------------	---------

Chinese name entity data remarks

English name Memo

Types of String

length Variable length

Explanation In the transaction operation, you can prepare for the text, ID and hash types of the transaction  
Note field.

Remarks Optional

Contract data format

## (1) Contract identification

Attributes	content
------------	---------

Chinese name contract identification

English name Contract ID

Types of String

length Fixed length

Explanation After the contract is deployed on the blockchain, it is marked by a uniquely determined address  
Knowledge, for the caller to access the contract code, state storage, etc.

Remarks The logo is generally composed of the account information that created the contract + serial number + other contract  
The contract information (optional) is generated by an optional digest algorithm, which is required to be generated  
The identification is unique, definite and available. Optional

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## (2) Contract version number

Attributes	content
------------	---------

Chinese name contract version number

English name Contract Version

Types of String

length Variable length

Explanation Binary code for smart contract code and compilation released on the blockchain  
Code data, use the version number to identify different versions.

Remarks A smart contract continues to provide a business function, but due to changing needs, Or have different characteristics for different problem domains and need to be versioned Divide. Optional

(3) Contract code  
Attributes content

Chinese name contract code

English name Contract Code

Types of String

length Variable length

Explanation The executable instructions of the contract are compiled and generated by the designated compiler for the block The virtual machine on the chain is called and executed.

Remarks According to different virtual machine systems, the contract code uses different computer languages Write and generate binary executable instructions by different compilers. Optional

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(4) Contract storage  
Attributes content

Chinese name contract storage

Weigh

English name contract Storage

Weigh

Types of Array

length Variable length

Explanation The collection of state data generated by the contract execution process, its content and the logic of the contract The series is closely related.

Remarks It can be saved in key-value format or relational database. Optional

Configuration data format

(1) Agreement version number  
Attributes content

Chinese name agreement version number

English name Protocol Version

Types of String

length Variable length

Explanation For communication between blockchain nodes and external applications and blockchain nodes, For interactive protocols, use version numbers to identify different protocol versions.

Remarks Blockchain protocols can be upgraded with software versions and have different interfaces, Function, general blockchain software should be backward compatible at the protocol level, using Discuss the version number, a set of software can use different protocols Various clients provide services. Optional

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(2) Software version number  
Attributes content

Chinese name software version number  
 English name Software Version  
 Types of String  
 length Variable length  
 Explanation For the blockchain software itself, including code and binary software forms, use The version number identifies different release versions.  
 Remarks Blockchain software can target different software life cycles, as well as different Application scenarios, different target users, use different versions. required

(3) Node identification  
 Attributes content

Chinese name node identification  
 English name Peer ID  
 Types of String  
 length Variable length  
 Explanation The unique identifier of a blockchain node can use the node's public key as the unique identifier.  
 Remarks required

(4) Node address  
 Attributes content

Chinese name node address  
 English name Peer Address  
 Types of String  
 length Undefined length according to IPv4 and IPv6 definition

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Attributes content

Explanation The IP address of the blockchain network node.  
 Remarks required

(5) Node public key  
 Attributes content

Chinese name node public key  
 English name Peer Public Key  
 Types of String  
 length Fixed length  
 Explanation Public key information of blockchain network nodes.  
 Remarks Optional

Data item identifier	Data Classification	Data identification
Account data	Account public key	01_001
	Account private key	01_002
	Digital certificate	01_003
	Account affiliation	01_004
Block data	Block height	02_001
	Block identification	02_002
	Version Information	02_003
	Summary value of the previous block	02_004
	Merkel roots	02_005
	Block timestamp	02_006
	Transaction list	02_007

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data structure	Data Classification	Data identification
Transaction data	Transaction ID	03_001
	Transaction type	03_002
	Signer	03_003
	Transaction timestamp	03_004
Entity data	Initiator address	04_001
	Receiver address	04_002
	Storing data	04_003
Contract data	Entity data notes	04_004
	Contract identification	05_001
	Contract version number	05_002
	Contract code	05_003
Configuration Data	Contract storage	05_004
	Consensus protocol version number	06_001
	Software version number	06_002
	Node ID	06_003
	Node address	06_004
	Node public key	06_005

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### Appendix 3: Expert Group of Beijing Blockchain Working Class

#### Technology Group

Dong Jin (Full-time) Dean of Beijing Microchip Edge Computing Research Institute

Zheng Zhiming, Academician of Chinese Academy of Sciences, Professor of Beijing University of Aeronautics and Astronautics

Zheng Weimin, Academician of the Chinese Academy of Engineering, Professor of the Department of Computer Science and Technology, Tsinghua University

Chai Yueting, Director of National Engineering Laboratory of E-commerce Transaction Technology

Cao Peng, Vice President of Jingdong Digital Technology Group

Zheng Haojian Vice President of Tencent, Head of Tencent Blockchain

Xiao Wei Baidu Distinguished Scientist and General Manager of Blockchain

#### Expert Group on Blockchain Application in Government Services

Huang Gang (Team Leader) Deputy Dean of the Artificial Intelligence Research Institute of Peking University

Yu Yanan Head of Baidu Blockchain Products

Wang Meng, head of Ping An government affairs blockchain

Liu Quan, Dean of Blockchain Research Institute

Liu Wenjing Head of Blockchain Product Application, Jingdong Digital Technology Group

Lu Zhaohai, Vice President of Siyuan Zhengtong Technology Group

Shao Bing Head of Tencent Cloud Blockchain Products

Zou Tao Blockchain Strategy Director of Ant Financial

Meng Fanliang Head of Huawei Blockchain

Tang Lin Director of Blockchain R&D Center, Beijing Microchip Edge Computing Research Institute

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## Appendix IV: Blockchain application construction in Beijing's government services

### Main participants of organizational unit

Municipal Services Bureau  
 Wang Jun Pu Xueru Zhu Qin Xiyang Wang Yi  
 Li Zunwei Fu Xiangbo Gao Wenbin Liu Qian Li Yiming  
 Municipal Science and Technology Commission  
 Xu Qiang Xu Xinchao Tang Chao Zhou Yuan  
 Municipal Economic and Information Bureau  
 Wang Gang Pan Feng Liu Xu Zhu Haodong Zhao Yanfang  
 Jia Xiaofeng Gao Song

Municipal Bureau of Commerce  
 Wu Xiangyang Wang Jiefu Xu Yaoguang  
 Municipal Financial Supervision Bureau  
 Li Yan Liu Yang Meng Yang  
 Municipal Finance Bureau  
 Zhang Hongyu Pei Geng Jin Liwen Zhu Lijun Qin Zhaolei  
 Municipal Planning and Natural Resources Commission  
 Xiao Ping Zhan Yi Pan Jiawen Ren Haiying Song Zhihong  
 Ren Chao Luan Peng Tan Luyuan  
 Haidian District Government  
 Zeng Jin Li Junjie Lin Jianhua Ma Xueyin Hu Yuguo  
 Chen Huiying Chen Lei Wang Jianqiang Shu Bilei Li Nan  
 Chen Qifei  
 Xicheng District Government  
 Nie Jieying Xia Shumin Yang Qiuyu Xin Zhan Lin Haibo  
 Ma Zhenfeng Wei Shuxue  
 Chaoyang District Government  
 Wang Zhimian Li Xiaojing Liu Lin Tian Wei  
 Shunyi District Government  
 Zhi Xianwei Jiang Huiqin Li Fei Zhang Mingyu  
 Beijing Economic and Technological Development Zone Administrative Committee  
 Chen Xiaonan Zheng Haitao Wang Yanhai Wang Feicheng

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## Appendix V: Blockchain Application Scenarios in Beijing Government Affairs Service

### Technology Implementation Unit

(names not listed in order)

National Internet Emergency Center

Beijing Microchip Edge Computing Research Institute

Beijing Financial Holding Group

Beijing Institute of Financial Technology

Beijing Surveying Design Institute

Beijing Zhonghai Epoch Digital Technology Development Co., Ltd.

Beijing Lianzhong Xinan Technology Co., Ltd.

JD Digital Technology Holdings Limited



China Shipping Siyuan (Beijing) Technology Co., Ltd.

CCB Financial Technology Co., Ltd.

Huawei Technologies Co., Ltd

Ping An International Smart City Technology Co., Ltd.

Hangzhou FunChain Technology Co., Ltd.

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