MEDICAL CHAIN

WHITE PAPER

Introduction

Since the dawn of history, there has been a war against diseases such as plague, cholera, Spanish flu, Asian flu, SARS, H1N1, Ebola, and the new coronary pneumonia. Each of these infectious diseases has cost humanity greatly.

Pandemics and infectious diseases cause tens of thousands of deaths and may destroy cities and countries and disintegrate civilisations. However, every time humans work to conquer infectious diseases, they also improve human health and hygiene concepts, improve medical and health care, and reform related systems, enhancing the ongoing well-being of the entire human race. Although these diseases are terrible, as long as humanity continues to improve its medical systems, it will ultimately win.

As part of this ongoing war, MEC seeks to make a contribution to the fight against disease.

Taking the name Medical chain (MEC), the firm wishes to support every hospital and every member of medical staff in the world that has made significant contributions to the safety of humanity during the current epidemic.

Abstract

In 2020, the spread of new coronavirus around the world has sounded the alarm for the world’ s medical industry. Seemingly adequate medical systems have fallen foul of the “information island phenomenon" and the lack of intelligent guidance platforms, leading to urban and rural medical assistance system chaos and other deficiencies.

The Medical chain team aim to combine medical and blockchain, integrate the results of predecessors, make research on the pain points of the medical industry, and take this as the starting point. The goal is to combine medical and blockchain business ecologies in a closed loop of global scope. The production of hospitals without borders globally will contribute to worldwide epidemic resistance as well as to the future of modern medical construction and the firm’ s own strength.

Keywords

disease, epidemic, modern medical treatment, human disease, blockchain technology, DPOS mechanism

Contents

1、Project Overview

The 21st century is already an era of rapid technological development in various industries, and almost all walks of life have seen unprecedented progress. Simultaneously, however, medical and health work are facing huge challenges. Medical information is gradually being transformed into a critical resource affecting multiple production factors, while medical automation technology and medical business process information are also subject to cumulative ongoing changes. Intelligent transformation and the precise processing and sharing of medical information and data have increasingly become major concerns in the medical industry. In such an era and against this industry background, blockchain + medical approaches have developed that show strong practical applications.

The characteristics of circulation, decentralisation, and collaboration within the data chain seen in blockchain technology are good approaches for the problem of medical data islands. The use of blockchain technology for the construction of digital healthcare to achieve medical informatisation is thus undoubtedly a key opportunity for the medical industry. The advantages of medical informatisation are a reflection of this, and the existing health care system can use these applications to accelerate the process of medical reform, identifying more efficient ways to develop medical and health service management.

Medical chain (MEC) is a self-developed public chain that aims to build an Internet of Things platform integrating open data management and an operation system based on 5G technology to continuously integrate blockchain technology into the medical industry. In the future, Medical chain (MEC) will seek to develop its leading position in the field of medical informatisation, being is committed to using blockchain technology to solve issues with global medical information opaqueness, data intercommunication blockages, and insufficient intelligence. New developments allow global medical informatisation to develop at a high speed and continuously, allowing the creation of open hospitals to serve users with multiple medical needs worldwide.

At present, an epidemic is raging all over the world, and the shelter system from China has proved to be one of the most effective methods of addressing the key problem of the epidemic's spread. Medical chain can play an important role in this, as after the construction of shelters without borders is completed, users around the world will be able to consult online sources for information on medical conditions, physiotherapy, etc., while the governments of various countries can access disaster warnings and learn about effective measures for epidemic prevention and treatment.

2、Background

2.1 Historical background

Epidemics are relatively common. In the 1960s, a plague outbreak worldwide caused more than 75 million deaths; the Spanish flu in the 1920s infected one third of the world ’s population; and in the early 21st century, cases of H1N1 exploded around the world.

Since December 2019, when a new coronavirus appeared, offline consumption has been greatly affected. Various industries are doing their best to help people and societies survive this catastrophe, particularly the medical industry. Since the outbreak of this new epidemic in December 2019, a lack of prevention and control has caused many people to become infected, and this new coronavirus has thus become a worldwide medical problem. The whole world is again shrouded in fear of infectious diseases.

The simultaneous plunge in crude oil prices, the meltdown of the Dow Jones, and general global financial turmoil have also affected everyone on the planet. The number of people infected every day, the increase in the number of unemployed people, and the news that all nations seem to be affected all mean that the search for a solution to this medical problem is urgent.

However, shortages of global medical supplies, large differences in medical environments, and the closure of medical information channels have greatly restricted the prevention and treatment of the new coronavirus, delaying effective treatment of the epidemic. The efficiency of traditional technical methods is too slow, and it is difficult to solve these issues globally. A "medical + blockchain" approach is a good solution to this, and several technical methods adopted by Medical chain, combined with China’s shelter hospitals, have shown to be effective. This shelter technology has not been applied in other countries outside of China, which has led to a high number of infections. The Medical chain approach should thus be applied in various countries to contribute to the prevention and control of epidemics worldwide.

2.2 Policy background

Blockchain technology is sometimes considered to be the next disruptive core technology after steam engines, electricity, and the Internet. If the steam engine releases productivity, electricity provides basic needs for life, and the Internet has completely changed the way information is transmitted, then the blockchain, as a machine for building trust, will completely change the way human society transmits value. The significance of blockchain is that it can be used to build a more reliable Internet system and fundamentally solve the issues of fraud and rent-seeking common in value exchange and transfer systems. With the development of

blockchain technology, the digital economy can become increasingly authentic and credible, and economic society can become more reasonable and transparent.

Due to the huge potential for the application of blockchain technology, many countries have begun to design development paths for blockchain at a national level. In the United States, this has prompted a national strategy, and the US government has formed a basic consensus on attitudes towards digital currencies and blockchain to strengthen supervision and develop blockchain technology. The World Bank is also very interested in blockchain technology, with the hope being that this technology can be used in developing countries to track the flow of funds more effectively and reduce corruption in the future.

2.3 Industry Focus

The medical industry is one of the most promising application areas for blockchain technology. As global healthcare enters the digital age, medical data security and patient privacy protection have become increasingly important. At present, medical data is showing explosive growth, and according to some forecasts, by the end of 2020, global data volumes will reach 40 trillion GB, about 30 times higher than in 2010. The application of blockchain provides the best solution for medical data storage due to its high redundancy, tamper-proofing, low cost, and ability to manage multiple signatures with complex permissions. Many companies in the medical industry have thus begun to apply blockchain technology to the field of medical information.

On 4 March 2016, the Estonian eHealth Foundation announced a partnership with corporate data security to promote the use of block chain technology to ensure the security of 100 million patient medical records, integrating the company's Keyless Signature Infrastructure (KSI) with blockchain technology and a Foundation Oracle data engine to allow relevant personnel to view patient cases in real time. On 31 May 2017, an American medical block chain solutions provider officially opened token sales to start the first encrypted token healthcare sector. The project uses a secure closed-loop distributed ledger system to connect parties in the healthcare ecosystem in a highly secure and blockchain-supported healthcare information exchange platform (HIE) to seamlessly exchange healthcare data. In August 2017, Illinois distributed and shared block chain technology to optimise medical certificate data and intelligence contracts and to help automate the interstate health-related medical license workflow. In October 2017, a Korean medical blockchain pilot project launched its personal health management platform, focusing on safety for consumers and giving them control over their personal health data, including, by means of block chain technology, sharing, access, and use of personal health data.

The development of domestic medical and health data blockchains is still in its infancy, and mature blockchain applications are still lacking, but the broad application prospects of blockchain technology in the medical field are supported by general consensus in the industry. In 2017, the Augusta data interconnection system, based on blockchain technology, began development to achieve a real interconnection of business data and to improve the experiences of both doctors and patients. At present, many government agencies, research institutions, and enterprises in various domestic medical industries have noted that they are closely following the wave of disruptive and

innovative technologies associated with blockchain, and they have begun to actively research and explore blockchain technology as applied in the field of medical information and applications. The current research hotspots for the application of blockchain technology to medical and health industries include personal health management, medical insurance claims, electronic medical records, clinical trials, medical claims, and HIE medical knowledge base platforms.

2.4 Industry pain points

2.4.1 Medical data security issues

The secure management of medical health data and effective privacy protection are key challenges. In addition to overreliance on data encryption technology, potential for hacker intrusions, and illegal logins, data loss and other technical issues that endanger data security also occur frequently. For example, in 2015, the American medical insurer Anthem was hacked and more than80 million personal information records were stolen. In 2017, the Amazon database was hacked and 47GB of medical data was exposed to the public accidentally; it was initially estimated that at least 150,000 patients were affected by this.

A network security report released by Verizon shows that, across the world, the medical industry is the only industry where the risk of internal threats is higher than that of external threats, however, and the leakage of medical data by practitioners has reached an alarming level. According to the report, there are three main reasons insiders leak information: one is economic interests, such as tax evasion or the use of stolen information to open credit lines (48%); the second is where celebrities' information is mined for curiosity or entertainment (31%); while the third is purely because the information is available (10%). In addition to these internal issues, however, another security risk for medical information is hacking, and in recent years, such security incidents have occurred all too frequently.

2.4.2 The phenomenon of medical "information islands"

There are many "information islands" within medical information systems, and the degree of interconnection between systems is not high. They therefore cannot meet the needs of various stakeholders, such as government departments, insurance industries, medical institutions, health service providers, researchers, or patients, and the value of medical health data cannot be fully utilised.

The extent of the problem of information islands exposed by the process of medical development cannot be ignored. One survey showed that more than 70% of hospitals have realised medical informatisation, that less than 3% of hospitals have realised effective data exchange. Medical big data is relatively scattered, and many information islands are yet to be breached. As the same medical record can be interpreted differently by different doctors, the fact that information between hospitals cannot be communicated is a great loss for patients. Information

islands also bring great inconvenience to doctors and hospital managers who use data and information regularly.

2.4.3 The privacy of patients' medical data cannot be guaranteed.

With the continuous innovation and development of Internet technology and the lack of related supporting legal systems, issues related to the protection of patient privacy and data security have become a key focus of attention. The use of medical data is not supervised throughout the process of collection and use, and the privacy of medical data is not effectively guaranteed. In June 2107, patient names, addresses, health insurance numbers and other medical information were posted on the Internet from a British clinic, leading to patient data exposure.

Failure to ensure the privacy of patient medical data has extremely serious consequences. These types of data, when sold, allow criminals access to new victims for various nefarious purposes.

2.4.4 Intelligent consultation platforms are not systematic enough.

As income levels increase, health needs change from traditional singular medical treatments to disease prevention, health management, and health promotion. The increased demand for resource efficiency thus continues to grow, and health management faces great opportunities for development. A common problem in the medical industry today is that the intelligent consultation platforms used are not systematic enough; users who want online consultations often cannot find reliable intelligent consultation platforms. According to relevant statistics, in 2015, the size of the sleep medical market was around US$254.09 billion. However, as personal medical data are scattered across various medical institutions, commercial personal health management services are often one-sided, unable to provide comprehensive and qualified personal health management services.

2.4.5 Insurance Claims

Insurance claims occur when an accident or incident occurs that affects an insured subject, whether property is damaged or the life or person of the subject is damaged, once the subject has agreed an insurance policy and paid the required insurance premiums to the insurance company. The contract usually stipulates that the act of compensation or incurring payment obligations directly reflects the insurance function and the performance of insurance liability.

Due to an inability to provide medical data in a timely and effective manner, patients encounter many problems when making medical insurance claims, however, including reduced and refused claims, and delays to claims. When patients are in treatment, it is very important that their medical fees are paid in good time, as this may directly affect access to ongoing medical treatment. Rapid and accurate claims settlement is thus extremely important.

3、Solutions

3.1 The construction of Medical chain

Medical chain has created an open, equitable, and safe medical blockchain. With the support of underlying blockchain technology , it can achieve reliable storage, traceable management, tamper-proofing, and effective medical health data privacy protection as part of an orderly and controllable set of value utilisation within the industry ecosystem, enabling all participants in the blockchain to create and share value.

In the Medical chain, individuals can establish complete and safe personal medical and health records based on personal authorisation. All personal health information data can be stored in the Medical chain in the form of health files, and individuals can share all or part of their personal medical data with medical institutions, medical health service providers, or commercial insurance institutions according to their individual needs to create value flow and allow the commercial development of medical health data.

As the Medical chain develops, doctors, patients, and research institutions can all benefit from the sharing of medical and health information. Patients can enjoy more professional and personalised medical and health services, as well as being able to handle medical and health-related insurance claims more easily, saving time and increasing the value of claims. For doctors, developing a more comprehensive understanding of patients' medical files may not only can save unnecessary time in repeated examinations but also provide more accurate judgments on the patient's condition and treatment, allowing the provision of accurate and high-quality medical services. For government regulators, this sharing can achieve more orderly and efficient supervision of the industry, while for individuals, research institutions, or enterprises who want to study medical and health information, they can use data provided by the platform after obtaining authorisation, using the SDK to create various medical information-related services and jointly promoting the development of the medical and health industry.

3.2 Data providers

After the user authorises it, a continuous aggregation of high- value medical data will accrue on the blockchain. Patient data can be used for insurance claims, health management, and personalised medical treatment, and data and information transactions can be conducted equitably based on patient authorisation. Anonymised data can also be authorised for insurance disease premium analysis, drug efficacy analysis, disease prevention and control, etc., effectively protecting patient privacy.

3.3 Data Consumers

Government public departments, medical institutions, health service providers, commercial insurance institutions, other operators in the industry, scientific researchers, and patients themselves can all join the blockchain to obtain relevant information technology services. Under the guarantee of security and controllability offered by the blockchain technology, and given the traceability of data usage, more medical data can be analysed and utilised, further realising the value of the data.

3.4 Third-party partners

Third party partners can create app stores on the blockchain platform. These partners can then put apps on the platform that provide artificial intelligence analysis, personal health management, natural language processing, document retrieval, report analysis, appointment registration, commercial insurance rapid settlement of claims, etc. to meet the needs of users

4、Application Scenarios

4.1 Application Cases

4.1.1 Health Management and Intelligent Guidance

Personal Health Management provides for health education, health assessment, health promotion, and health tracking by performing data analysis of personal lifestyle choices, personal medical history, personal health check-ups, etc. Specialised health management services, such as supervision and medical consultation are also possible. Medical chain has a distributed database that allows personal comprehensive health information to be accessed by medical service providers and health service providers, allowing patients to benefit from more complete, more accurate, and safer data services, and ultimately improving quality across the board by providing better personal health management services. Simultaneously, the intelligent guided diagnosis platform implemented by Medical chain will allow users to assess their medical problems.

4.1.2 Medical data visualisation

Medical data is currently held "island-style" in centralised storage in most places, making it difficult to share securely. Health insurance-related claims are still at the stage of relying on paper documents, reducing both efficiency and accuracy. Using Medical chain, data on medical equipment, medicines, and medical personnel will be perfectly linked to the chain; any available information will be saved to the chain, and the best configuration will also be obtained in each case. Medical staff and users can choose the data with the highest utilisation value to go on the chain, connecting their medical data islands, and promoting regional interoperability.

4.1.3 Insurance and risk control

In the current insurance business, the lack of reliable means of data collection and storage of personal information means that disputes between the insurance company and insured parties often occur, particularly where the insured party provides false or incomplete information. Where personal information is lacking, when a claim is settled, there may be disagreement on the determination of any exemption clauses, for example. Insurance companies face various risks from time to time, and any regulatory agency can only take pre-examination or post-restraint measures.

For other medical insurance institutions, Medical chain can be used to assist from the perspective of data management, effectively helping insurance companies improve their risk management capabilities, to improve risk management for policyholders and risk supervision for

the companies. For allied medical insurance institutions, the Shelter Foundation and the Medical chain project profits will provide sufficient funds for claims settlement, and Medical chain (MEC) users can enjoy the benefits of Medical chain medical insurance, including 60 to 70% of claims, unlimited borders, and prompt payment.

4.1.4 Scientific research

The development of new drugs can be used as an example. According to the 2016 Journal of Health Economics, it takes more than 10 years and 2.6 billion yuan for a pharmaceutical company to market a drug, though the cost, effort and time required for drug development are difficult to estimate. Many of these costs are exacerbated due to the high administrative costs of distributed multi-agency administrative supervision and clinical trial data collection. The use of Medical chain can help scientific research institutions and scientific researchers to conveniently and reliably manage the experimental results from multiple test sites and multiple test patients, reducing the cost of multi-centre test methods.

4.1.5 Urban and rural medical assistance

As sensitive data such as personal medical information are scattered across various medical institutions, urban and rural medical industries in different regions are very suitable application scenarios for blockchain technology. The blockchain can be used to realise the circulation and authorisation of residents' health information so that doctors at various levels of hospitals in various regions can quickly understand a patient's past medical history and access medical examination information when they are authorised to do so, avoiding unnecessary secondary examinations and saving on medical payments. This improved access to full medical services should thus help global medical reform. Medical chain will invest in urban and rural medical development, simplifying medical assistance and standardising the workflow of urban and rural medical services to improve the management of intelligent medical assistance services.

4.2 Commercial Features of Application Scenarios

Medical chain (MEC) is a developer-friendly common chain with the performance advantages of an underlying architecture based on the DPOS consensus mechanism. It also has supporting functions such as G-ID, GVM, BaaS, Blockcity-Pay, TEE, and Oracle Machine to facilitate the development of various applications.

The following features of the Medical chain (MEC) hint at the unlimited possibilities for commercial value within Medical chain (MEC).

4.2.1 High-Performance and Scalable

Medical chain (MEC) is a high-performance basic chain that has a theoretical processing capacity of up to 100,000 transactions per second. To facilitate the possibility of increasing business on the chain in the future, Medical chain (MEC) also supports vertical and horizontal expansion to quickly increase the transaction processing capacity per second.

4.2.2 Mass Data Provider

The Trusted Data Uplink and Trusted Data Exchange components of Medical chain (MEC) support data uplink and exchange in all fields. Developers are authorized by the data source in the Trusted Execution Environment (TEE) to then trade and use data. All applications developed on Medical chain (MEC) can access user personal data on receiving user authorisation. Based on this, developers can provide products and services completely personalised to these users.

4.2.3 Developer-friendly

The MEC has rich API and IDE tools and comprehensive multi-language development documents, as well as a developer portal that gathers all resources together to facilitate the entire process for developers from entry and release to commercial use.

4.2.4 Low-cost, high-availability BaaS storage service

Medical chain (MEC) provides additional support such as storage and verification blockchain as a service (BaaS) interfaces, based on the addition of multiple parties to the Medical chain (MEC) Account contract, as well as data storage and certificate storage services within a self-built high-availability IPFS service. The latter perfectly combines the efficient access capacity of IPFS with the efficient accounting capacity of MEC to ensure that any data storage in the chain has permanent traceability. Developers can thus develop blockchain applications full of practical value based on the BaaS-API, data transaction API, and native API.

4.2.5 Dynamic global parameter adjustment

Medical chain (MEC) can dynamically adjust global system parameters without forking. This function is called Dynamic Global Property (DGP). The governing board on the chain can initiate a proposal, such as a vote on the block size, and dynamic adjustment of global parameters such as block speed and transfer fee can be done immediately. Examples include adjusting block generation speed from 3 seconds to 1 second; adjusting the block size from 2M to 8M; and adjusting the transfer fee from 0.05MEC to 0.01MEC.

4.2.6 Extremely fast and convenient digital asset issue

Medical chain (MEC) has very simple digital asset issuance processes and standards (GUIA, Medical chain (MEC) UserIssuedAssets), allowing developers to freely issue and circulate data based on MEC digital assets.

5、Main network and eco-project profitability

Medical chain (MEC) aims to develop a complete medical block chain closed-loop ecology for the majority of medical users. The platform provides a trusted source, and the team adheres to the concepts of credit, decentralisation, multi-party access, universality, controllability, and privacy to create a safe and trusted distributed management application ecosystem.

With the development of the medical industry, data links now plays an unparalleled role in the entire ecology. To succeed, in addition to the efforts from the team, this project requires acceptance in the market. "Flow" is the essential nature of the platform for the development of a community, and the first stage must focus on traffic. As blockchain technology slowly matures, the distributed encrypted data structure of blockchain has natural advantages in data transmission, data updates, and data interaction, as well as offering practical solutions to dangers and problems such as data silos, data fraud, and data security in the medical industry.

In the Medical chain (MEC) ecology, users can obtain their own rights and interests by uploading medical information through a unique "Medical Mining" protocol. When other institutions use this data for R & D, the blockchain permanently marks and divides the rights and interests so that all users get maximum rights and interest protection. At the same time, a built-in mutual assistance medical insurance mechanism of the Medical chain (MEC) is provided to users at no cost, with no intermediary, and no threshold, so that users of MEC can enjoy medical insurance with the highest cost performance. More importantly, users can access the services of the medical AI exclusive to MEC, which is equivalent to having a family doctor accessible at all times.

Based on the concept above, Medical chain (MEC) will build a large-scale medical closed-loop ecosystem featuring five stakeholders: Medical chain (MEC), users, medical institutions, R & D enterprises, and AI providers, who will all also be beneficiaries.

When token sales reach 85% of the required total, Medical chain will establish a Shelter Foundation in Singapore, as well as establishing an open hospital funded by the Shelter Fund. By that time, well-known doctors from all over the world will have uploaded their own diagnosis and treatment experience on Medical chain, offering data support for Medical chain. Medical chain will thus establish a comprehensive intelligent consultation platform, and well-known doctors from various countries around the world will be virtually accessible on-line to serve the world's Medical chain users.

Users of Medical chain will all also have insurance rights through Medical chain: this insurance will cover 70% of the user's medical expenses, which will be paid by the Shelter insurance agency. For the remaining 30%, users can choose to pay in fiat money or MEC tokens.

Another key application in the Medical chain ecology is disaster warnings. This is a concept proposed by Medical chain for the first time based on the serious failure of the world's governments to control the novel coronavirus. The Shelter team will establish close contact with governments of various countries and monitor disease data in various regions in real time. Where any abnormal data, arises Medical chain will promptly give disaster warnings to associated countries and regional governments, thus striving to reduce the human loss caused by the illness.

MEC tokens will be interspersed throughout the main network ecology to empower the project ecology. These can be used as a data exchange medium to provide fast and convenient data exchange functions, as well as being used as identity tokens. The identities of all members thus have value, as MEC tokens have a payment function within the ecology. All payment-related behaviours can only be completed by means of MEC payments.

5.1 Governments and medical institutions

Governments and medical institutions can join the authorised node of the Medical chain (MEC) blockchain. When authorised, they can query users' past medical examination and treatment information, allowing them to propose more targeted treatment plans. Medical care involves many people's livelihood, and it is impossible to ignore the role of the government. Government agencies can strengthen regional health supervision and management by analysing medical Big Data from the blockchain to enable rapid and flexible medical resource allocation. For medical institutions, Medical chain (MEC) can facilitate in-depth cooperation between medical institutions, including project cooperation, strategic investment, and the establishment of joint venture companies to jointly improve any pain points in internal business and processes. To facilitate payment voucher between governments, medical institutions, and the Shelter platform, governments and medical institutions must purchase MEC tokens from the market to pay for viewing, using, and purchasing data.

5.2 Patients

Patients' authorised information will be permanently recorded on the blockchain, and this data can be provided to any group on request for a fee. Patients can also obtain treatment programmes and online medical consultations on the Shelter platform using MEC tokens. The MEC tokens used by such patients will be directly destroyed, promoting deflation in Medical chain (MEC).

5.3 Scientific research institutions

Medical researchers and big data research institutions conducting in-depth research on a wide range of medical data can use Medical chain (MEC) medical institution data to achieve precision evidence-based research, with costs lower than traditional research trials. After MEC goes online, the construction of the MEC medical ecology will begin, and MEC will promote in-depth

cooperation with various medical and associated companies. Sharing medical data between medical institutions benefit patients, and after the medical system is thereby improved, patients will receive more timely and effective treatment, improving hospital reputation and revenues. Around 30% of the profit from this part of the project will be used to pay for MEC ecological construction personnel, while the other 70% will be used to repurchase MEC tokens on the market to be transferred to a black hole address, creating a deflation market for tokens.

5.4 Insurance agencies

The Medical chain (MEC) blockchain platform and insurance companies can share medical insurance data in real time to improve the efficiency of claims settlement. This can also help provide patients with flexible and personalised health insurance products, thereby reducing dependence on medical insurance to a certain extent and giving users better health protection. Patients will enjoy different treatment levels according to the number of MECs they hold. The Shelter Fund will also establish a Shelter insurance agency in Singapore, so that users who hold MECs can enjoy a 60 to 70% medical fee reduction. Medical chain (MEC) will also cooperate with insurance institutions to provide them with accurate information about users; charges made to insurance institutions for this service will be used for the ecological development of Medical chain.

5.5 AI technology provider

AI models are subject to continuous evolution, and the Medical chain (MEC) code also needs to be continuously upgraded and iteratively calculated. Based on the repeated operation of the code under the consensus of the blockchain, different AI models and codes will be developed by countless development agencies. As part of process of continuous improvement of the AI model, versions will be sold to users with AI needs as requested, where copyright and distribution can be ensured. The profit from AI smart doctors in the Medical chain (MEC) ecosystem will be used to support research and development into AI and other Medical chain technology.

5.6 Third-party cooperation

Through contributing to the Big Data of the Medical chain (MEC) blockchain, patients can ensure access to their own complete medical treatment and health history records, and can authorise medical institutions, insurance institutions, and research institutions. to access their data as required to obtain more complete treatment solutions and more appropriate insurance products.

Third parties can create application stores on the blockchain platform. Third-party partners can thus make full use of any data on authorising users that exists on the platform to facilitate data analysis and business application services, such as personal health management, artificial intelligence, and big data health analysis applications. The data on MEC's platform is real-time,

reliable, storable, and traceable. Consumers can be used as nodes to join the Internet of Things blockchain platform to achieve transparency in production processes and improve the capacity of products, forming more efficient interactions between businesses and consumers. This can lead to increased frequency of consumption, improved consumption quality, and better consumption experiences. To achieve a win-win situation for enterprises and consumers, MEC will serve as the industry leader in medical + blockchain technology, integrating existing medical resources and leading the development of the global medical industry. MEC will use the future profits from its large platform of medical IoT to help the MEC token market operate smoothly.

6、Team Roadmap

September 2019: Medical Chain project approved and initiated.

January 2020: Medical Chain team built.

January 2020: COVID-19 outbreak found in Wuhan, Hubei, China, MEC Research and Development started ahead of time and entered the first phase.

June 2020: The first phase of the main network R & D is officially launched, and the developer program is officially launched.

July 2020: Project tokens sold worldwide.

August 2020: Medical Chain mainnet online.

October 2020: MEC will intend to reach a strategic cooperation with the development platform for wisdom medical system, and will jointly develop a medical data visualization system with blockchain technology as the core.

November 2020: MEC team will intend to reach a cooperation with SenseTime Group Ltd, YITU Technology, Megvii Technology, the development platform for wisdom medical system and other companies respectively, and will jointly develop the medical data visualization system with blockchain technology as the core. At the same time, the research and development of MEC robot team will have begun to set up.

December 2020: MEC team will have gotten 5 million USD investment from JRR Crypto for the design and development of MEC robot.

January 2021: MEC team will have reached strategic cooperation with New York Life Insurance Company in the United States.

January 2021: First dividend bonus for MEC Ranking: 15 million tokens.

February 2021: Medical Chain (MEC) decentralized application (DAPP) will have been officially launched, and the ecological construction will have been gradually completed. Project Global City Tour will have arrived in Italy as well as South Korea, and 30 large hospitals will have been promoted, serving 3 million users.

March 2021: MEC team will have reached strategic cooperation with American Cigna, Swiss Chubb Limited, and New China Life Insurance Company;

April 2021: MEC team will have received $10 million investment from Collinstar Capital Pty Ltd for the design and construction of worldwide medical insurance system.

April 2021: Second dividend bonus for MEC Ranking: 35 million tokens.

May 2021: The second phase R & D of MEC main chain will have been completed.

July 2021: Second dividend bonus for MEC Ranking: 50 million tokens.

August 2021: Medical Chain global medical insurance system will have been completed and put into use.

October 2021: Medical Chain robots will have been sold.

October 2021: Medical Chain medical and health care institutions will have been built.

November 2022: Medical Chain healthcare institutions will have been in official operation.

7、Investment institutions

Node capital

Node Capital focuses on the blockchain industry and is one of the earliest professional investment institutions in the world to deploy the blockchain industry ecology. Node Capital aims to connect key nodes in the blockchain ecology through project investment and cooperation, integrate industry resources, build an ecosystem, and promote the healthy and stable development of the blockchain industry.

Up to now, Node Capital has invested in nearly 200 companies, covering many projects in the ecosystem such as news information, exchanges, blockchain technology development and application, blockchain data mining and analysis, and third-party services, including golden Finance, Huobi, Chain Technology, Kushen Wallet, Scry, IOST, Zilliqa, Bgogo, BitTemple, B+, Baic, Gifto, Zipper, Beam, nervos, etc.

In July 2020, Node Capital invested USD 20 million in the medical chain (MEC) for medical fund construction and system architecture establishment.

IDG Capital

IDG Capital chooses to invest in companies whose products or services have the greatest market growth potential, covering the start-up, growth, maturity, pre-IPO, and post-IPO stages of leading companies in various industries. As the first foreign investment fund to enter the Chinese market, IDG Capital has become a leader in China's venture capital industry, not only providing funds to Chinese entrepreneurs, but also providing a series of value-added services and support after investment. IDG Capital currently has offices/offices in Hong Kong, Beijing, Shanghai, Guangzhou, Shenzhen, Hangzhou, Boston, Silicon Valley, San Francisco, Bangalore, Delhi, Ho Chi Minh City, Hanoi, Seoul and other places.

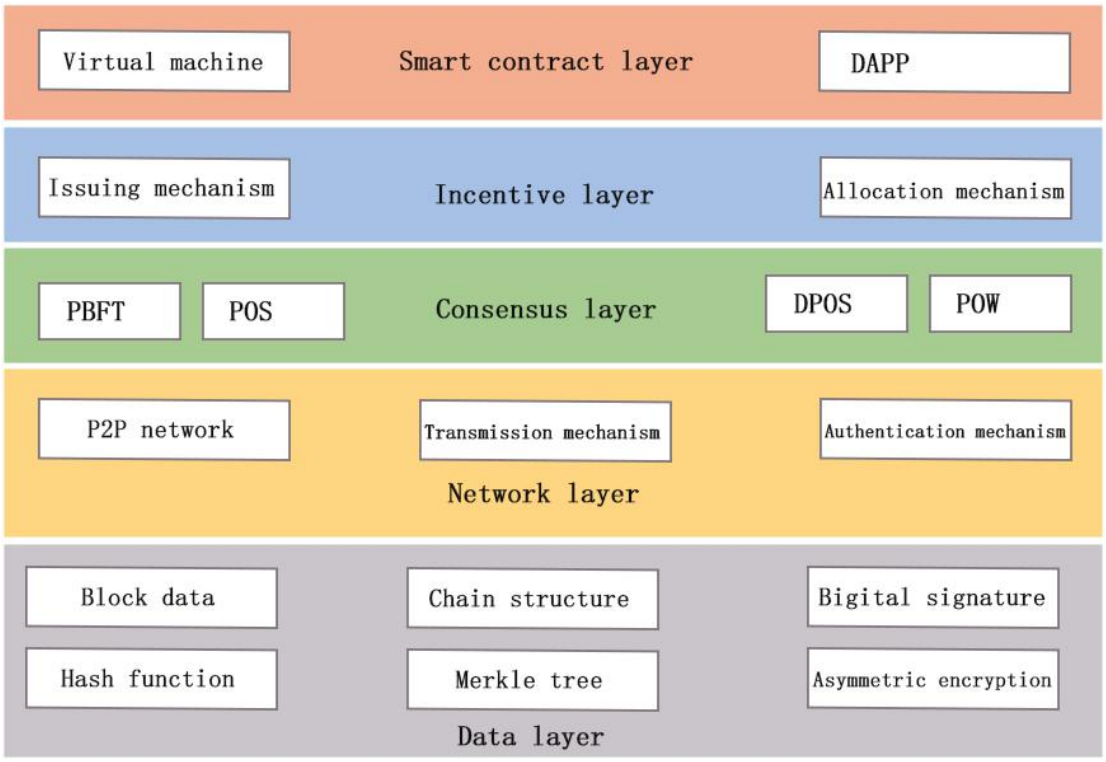
In May 2020, IDG Capital invested USD 15 million in the medical chain (MEC) for public chain research and development and system construction.

8、System architecture overview

Medical chain's underlying architecture includes a user service layer, an open platform layer, a development service layer, a business layer, and a blockchain service layer. The underlying architecture forms an IoT platform without borders based on 5G technology.

Compared with previous projects, the main advantage of the 5G technology used in Medical chain is the data transmission rate, which is much higher at up to 10Gbit/s, faster than the current wired Internet and much better than 4G, with LTE cellular networks being 100 times faster. Another advantage is lower network latency for a faster response time of less than 1 millisecond, were 4G is 30 to 70 milliseconds. Due to this faster data transmission, the data transfer in Medical chain will be more rapid, and the data uploaded by patients will reach medical institutions and scientific researchers in various countries in almost real time.

Medical chain system architecture diagram



8.1 User services layer

8.1.1 Client

To provide optimised client module support, Medical chain supports PC-side and mobile connectivity and functionality, allowing all users to participate in the block chain network functions, including registration, connecting to peer-to-peer networks, viewing smart contracts, writing smart contracts, using smart contracts, viewing wallets and forwarding or saving local copies of blockchains.

8.1.2 The Block chain browser

The Medical chain browser can help the administrator to view channels, block, transactions, view chain code, and access other information about Medical chain, allowing them to perform related management operations.

8.1.3 DAPP market

Medical chain provides decentralised applications (DAPPs), allowing third-party partners to develop contract suites on the blockchain to encode business logic and to permit persistent storage to meet strict consensus requirements. This helps the third-party partners to develop in the ecology, and also allows data providers and data consumers access to more useful applications.

8.2 Open platform layer

8.2.1 The OPEN API

Medical chain provides OPEN API services based on blockchain, which greatly reduces the threshold for partners' use of blockchain technology. Using the OPEN API interface in a Restful architecture style means that medical administration departments can view and analyse all medical business data stored on the blockchain by the various medical institutions in real time, strengthening business supervision, and improving the quality of medical management. Insurance institutions can use the medical blockchain to obtain patient medical information, complete online underwriting, process online claims and provide other services. Appointment and registration app manufacturers can obtain doctor scheduling information from the medical blockchain, allowing them to develop appointment, registration, and payment functions.

8.2.2 Intelligent routing

The Shelter module uses Sprint Cloud to implement intelligent routing and complete decentralised routing status assessments. Based on trusted routing status information, distributed routing algorithms provide smarter routing options for each blockchain node, improving the efficiency of business processing, and reducing the risk of routing attacks.

8.3 Development Service Layer

8.3.1 Registration Contract

Medical chain provides basic registration contract services for patients. The registration contract maps the patient ID to their Medical chain address identification.

8.3.2 Data storage contract

The data storage contract is a contract by which the patient and the medical institution jointly authorise Medical chain to store the patient's complete medical records. The patient’s data storage contract records the patient's medical record index set with various medical institutions, and whenever a patient generates a medical record in a medical institution, Medical chain will update the data to the patient's medical record index set, as soon as the patient and the medical institution jointly authorise this.

8.3.3 Data access contract

With the confirmation of the patient, a third-party organisation can sign a data access contract or other medical health or insurance related service contract on Medical chain to obtain the right to access patient data. The health service provider or insurance service provider then obtains the relevant medical data through a data link from Medical chain in order to offer personalised medical health or insurance services to the patient.

8.4 Business layer

8.4.1 Ledger

The general ledger subsystem of Medical chain includes two parts: world status and transaction log. Each participant in the system holds a copy of the ledger, and the world status section describes the state of the ledger at a given point in time, acting as the database of the

ledger. The transaction log section records all transactions leading to the current state, creating a historical record of the world status.

The ledger is a combination of world status and transaction log. The world status section of the ledger is a replaceable data storage area, and Medical chain uses the Level DB and file system to store the data set for the blockchain, and thus the overall state of the system, for a long time.

8.4.2 Chain code

Medical chain implements core business logic through chain code, an instruction that defines and modifies assets. Chain code thus queries or modifies key-value pairs or other database information by executing its own logics. The chain code function is then executed by the current state of the database and initialised by the transaction proposal. The result of chain code execution is a series of key-value writes (write sets) that are submitted to the blockchain network and applied to all nodes.

8.4.3 Channel

Medical chain provides the ability to create channels, allowing groups of participants to create separate transaction ledgers. This is a particularly important option for networks where some participants may be competitors and thus do not wish to disclose every transaction they make to everyone. If two or more participants form a channel, then only these participants have a copy of that channel's ledger.

8.5 Blockchain service layer

8.5.1 Authority management

In order to achieve a controllable network, the Shelter module provides membership identity services, managing user IDs and participant identities within the network. Access control lists provide additional layers of authority by authorising specific network operations. For example, a specific user ID may be allowed to call chain code applications, while deployment of new chain code is prohibited. The nature of the network used by Medical chain is that members know each other (identity) but they do not know what the others are doing (privacy confidentiality).

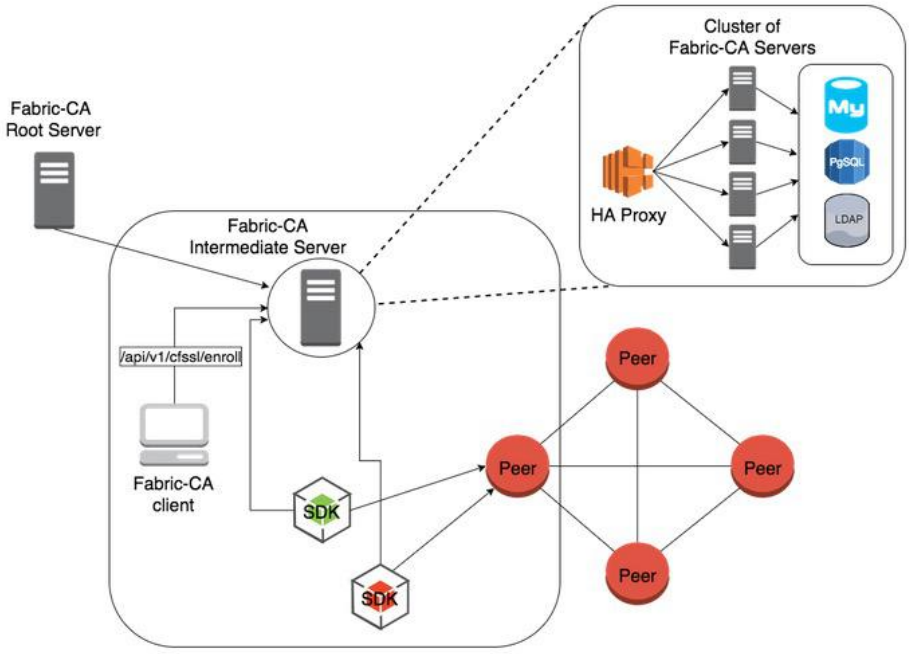
8.5.2 CA server

As shown in Figure 4-2, the CA server has a tree structure. The root node of the entire tree structure is the root CA (Root Server), and there are multiple intermediate CAs (Intermediate CA)

Each intermediate CA service cluster can be configured on the CA server, and a CA service cluster achieves load balancing through the application of pre-HAProxy.

Fabric CA provides two access methods to call the server, one called Client and the other SDK. Both calls are in the RESTFUL architectural style, and Medical chain currently supports calling via Client.

Medical chain CA Architecture



8.5.3 Consensus Service

The Sorting Service will process all transaction messages in the Fabric network. It will sort the transaction data received within a certain time, and package it to generate a transaction list.

Fabric currently supports two sorting types: Solo and Kafka. Medical chain uses Kafka distributed message system clusters to sequence transactions across the network, supporting high message concurrency and improving system throughput. The load balancing function of the cluster ensures the stability and reliability of Medical chain. The network broadcast sends a packaged transaction list to each participating node, and Medical chain uses the Gossip algorithm to ensure the consistency of the transaction list on each participating node.

9、Token Issuance

9.1 Total Issuance

The total issuance will be 1 billion; this total is constant and will never be exceeded. Initially based on ERC20 issuance, it will later develop its own main chain, with ERC20 tokens and main network tokens mapped at a 1:1 ratio.

9.2 Token distribution

MEC thinks that the output of mining by uploading data and mining by wisdom medical robot Dpos is 600 million (50% of which are mined by robots and 50% by uploading data)

ICO part: 250 million, the unsold part will be completely destroyed (wisdom medical users participating in ICO can obtain the lease right of wisdom medical robot, the right to obtain psychotropic drugs and the right to reduce medical expenses)

Volumes reserved by the team: 150 million

The part of volumes reserved by the team is allocated as follows:

Foundation 10%: reserved to support the operation of the foundation and to provide the necessary funds for the healthy development of Medical chain (MEC), including audits; consulting, legal and other third-party fees; and other management costs;

Technology development 30%: including costs; general expenses; and expenses directly attributed to release development, including funding hackathons, rewarding volunteers, and training programmes;

marketing 15%: Including business development; community planning and outreach; related demand survey and analysis; marketing formulation and execution; and other marketing expenses.

Public relations 10%: including public opinion monitoring; investor relationship maintenance; media relationship maintenance; and public relations

Team operation 17%: including the daily development costs of the project.

R & D sponsorship 8%: including conferences, research plans, and university outreach

Private investments 10%: early investor work

9.3 MEC Project Profit

First of all, MEC has started drug research and development work with well-known pharmaceutical companies after obtaining the investment, and has entered the clinical trial period recently. After the end of the trial period, the wisdom medical team will put the drug into use in a large scale in the world. The profit from the sale will be used for the next drug research and development, wisdom medical robot research and development, and to maintain the good operation of MEC in the secondary market. At the same time, MEC will carry out in-depth cooperation with other medical companies or other industries. For example, sharing medical data between medical institutions will benefit patients. After the medical system is improved, patients will receive more timely and effective treatment, so as to improve hospital reputation and improve revenue. 30% of the project profit will be used to pay MEC personnel for ecological construction, and the other 70% will be used to buy back MEC tokens in the market, and all of them will be transferred to the black hole address to help the token become an absolute deflation market.

At present, the wisdom medical care center has been completed and will be put into use. At the same time, the wisdom medical robot for MEC will accelerate the speed of research and development, and all users who participate in the early investment will have the opportunity to obtain the use right of the later wisdom medical robot and the reservation right of the wisdom medical care institution center. The wisdom medical robot has the function of mining, and the earlier the users participate in private placement, the more considerable profits they will obtain. When the robot goes online, users can also purchase robots with different computing power to mine.

Secondly, the Wisdom Medical will work with medical institutions and personnel to form a blockchain alliance across agencies and industries to study and formulate the industry standard and protocol framework of blockchain in the medical field. All users who join the alliance of “medical care plus blockchain” need to pay a certain amount of fees for alliance agreement. In addition to the necessary maintenance of the alliance, the rest of the income will be used to buy back MEC tokens in the market, as a reward to MEC users in the market.

Finally, the data of MEC platform is real-time, credible, storable and traceable. As a node, consumers can join the Internet of Things (IoT) blockchain platform to realize the transparency of robot production process, improve the premium ability of products, form efficient interaction between enterprises and consumers, improve the consumption frequency of consumers, facilitate the consumption quality and consumption experience, and realize a win-win situation between enterprises and consumers. As the industry leader of medical robot plus blockchain, MEC will integrate existing medical resources and lead the healthy development of global medical industry. MEC will use the profits from this medical IoT platform in the future to help the MEC token market run smoothly.

10、project sponsor

Heng Zhao

The initiator of Medical chain, and one of the main responsible persons addressing the novel coronavirus in China. He is a chief physician, master tutor and Professor of the Department of Infectious Diseases, Union Medical College Hospital, as well as a chief physician, master tutor, Doctor of Medicine, and postdoctoral fellow at Harvard Medical School, and a member and secretary of Wuhan Infectious Diseases Society.

Xiaohui Xu

Chief Architect of Medical chain. A full- stack engineer, familiar with various front-end technologies, with cross-terminal front-end development capabilities and data visualization product design and development experience. He is proficient in PHP, Node, and Python, and previously served as the core front-end development engineer for Zhejiang Daily Group and Real Estate Sales Crown.

Shengsong Li

Head of the intelligent guided diagnosis platform for Medical chain. He served as deputy director of the Department of Infectious Diseases, Union Medical College Hospital, Tongji Medical College, as well as being a member of the National Youth Committee of the Infectious and Parasitic Diseases Society of the Chinese Medical Association and standing editor of the Journal of Health and Clinical Medicine.

Xin Zhang

Head of System Maintenance for Medical chain. With his Mathematics and Computing degrees, and six years of software development experience, as well as being a Graphene community code contributor, familiar with the development of underlying blockchain technology, he plays a key role in ensuring system stability. He also has rich experience in P2P network development, as well as being proficient in C/C++ and Python. He previously worked for Vobile Broadcom as a senior Development Engineer.

Shuang Wang

Head of the Medical chain foundation. He has six years of experience in the medical industry, two years of experience in distributed ledger technology and cryptocurrency, and he has participated in due diligence on more than 100 blockchain projects. He has been engaged in the transformation of scientific research achievements, market evaluation, patentability evaluation, business development and other work in American universities.

Lihua Yang

President of the Medical chain council, associate professor, chief physician, master tutor. She is also a member of the Standing Committee of the Infectious and Parasitic Diseases Society of the Chinese Medical Association of Hubei Province, and the editorial board of the Journal of Clinical Internal Medicine. Scientific research achievements. She has published 20 papers, edited one monograph, and participated as an editor four times.

Fred Albert

Commercial Director of Medical chain. He has held senior management positions in several listed IT companies such as Chuangzhi Software and Guoxun International, as well as creating many technology companies that have received investment from the likes of IDG and other institutions. He has many years of experience in the medical, Internet, payment, and information security industries, and his experience and research skills as a blockchain researcher are critical.

Foley Edward

Head of the Medical chain Marketing Department, he has served as the head of the Sime Media and Google markets, gaining six years of marketing experience. He has been responsible for a large number of products' brand communications and market activities in various industries. He also has extensive experience in Internet marketing and brand strategy.

Kelly Morris

The head of the hospital without borders in Medical chain, she is a member of Massachusetts Medical International, with 10 years of experience in the traditional medical market. She has a professional and unique understanding of the medical industry, as well as being a blockchain enthusiast and highly sensitive to the digital financial market.

Rosalind Queen

Vice President of the Medical chain foundation. As the founder of JCI Medical Consulting Company, she has 15 years of experience in the medical industry, giving her a thorough understanding of the industry. She is committed to solving the pain points of the medical industry as well as being an in-depth blockchain researcher with her own insights on blockchain applications.

11、Competitive Outlook

Based on the contribution of Medical chain (MEC) to the fight against the new coronary pneumonia, the project has been noted by multiple capital investors, as well as approaching several large investors. In order to avoid a situation where the premiums are too severe, Medical chain has already rejected multiple capital investment requests.

In the future, the new Medical chain (MEC) medical + blockchain system will solidify the basic transaction rules of the existing financial system as part of its underlying protocol, promoting the standardisation and automation of the underlying logic, and allowing the distribution of high-level business applications. Realising the safe transfer of decentralised medical data can greatly reduce risk management complexity and control costs within the medical industry, thereby effectively improving operating efficiency and lowering the industry's entry barriers. As blockchain can provide decentralisation, tamper-proofing, safety, and reliability, all future medical treatment can benefit from blockchain technology.

In the future, the development direction of Medical chain will focus on the following points:

1. Developing in-depth cooperation with other medical or similar industry companies to address the "pain points" of various business processes. This might include cooperation with banks and medical technology companies, including project cooperation, strategic investment, and the establishment of joint venture companies.

2. The development of a blockchain alliance across institutions and industries to study and formulate standards and protocol frameworks to allow progression of the blockchain industry in the medical field.

3. For MEC to serve as the industry leader in medical + blockchain developments, integrating existing medical resources to lead the development of the global medical industry.

4. To build a hospital without borders to serve users and governments in all countries in the world, to truly achieve global medical integration.

The data on MEC's entire platform is real-time, reliable, storable, and traceable. Consumers can be used as nodes in the Internet of Things blockchain platform to achieve transparency in the production process and improve the capacity of products, as well as forming efficient interaction between businesses and consumers, increasing frequency of consumption, improving consumption quality, and developing better consumption experiences. These factors allow the development of a win-win situation for enterprises and consumers.

In the future, the blockchain technology and markets will gradually mature, allowing better integration of various application scenarios that may recreate the medical blockchain ecology. The era of blockchain has come, and MEC will continue to explore and innovate to improve

blockchain technology to bring convenience to all medical-related people and industries. MEC aims to stand at the forefront of development and move forward bravely.

12、Risk Tips and Disclaimer

12.1 Risk Tips

As a new investment model, digital asset investment has various risks. Potential investors must carefully evaluate these investment risks and their own risk tolerance.

This document a guide to the progress of the Medical chain (MEC) project. It is only intended to convey information and does not constitute the relevant opinions of a buyer of Medical chain (MEC). The above information or analysis does not constitute an investment decision, and this document does not constitute any form of investment advice, investment intention, or abetment investment.

This document does not constitute, nor can it be understood as providing, any trading behaviour or any invitation to buy or sell any form of virtual assets, nor is it any form of contract or commitment.

Relevant interested users must clearly understand the risks of the Medical chain (MEC) project. Once investors participate in the investment, they affirm that they understand and accept the risks of the project and are willing to personally bear all corresponding results or consequences of this.

The project team is not responsible for any asset losses caused by participating in the MEC project.

It is forbidden to use Medical chain (MEC) to engage in illegal transactions or activities such as money laundering, smuggling, commercial bribery, and violation of national laws. Any losses thus incurred will be borne by users.

12.2 Project Risk

Policy Risk: blockchain technology is at an early stage, and many countries have unclear regulatory policies on blockchain projects; the project may thus undergo changes in operating entities and operations management.

Fluctuation risk: the digital assets issued are not legal tender, and the price will fluctuate greatly, requiring investors to have a certain psychological capacity; the transaction of digital assets has extremely high risks (swells and falls, market manipulation, team dissolution, technical defects, etc.), as all virtual digital currencies are traded 24 hours a day globally, and there is no limit to fluctuations. The price is also subject to large fluctuations due to the influences of

speculators and global governments. It is strongly recommended that all investors participate in virtual currency transactions within the risk range they deem appropriate.

Technical risk: due to the constantly developing nature of blockchain technology, there is no guaranteed way to avoid technical vulnerabilities and hacker attacks during project operation.

Team risk: there is no guarantee against stress, physical, personal and other factors affecting staff involved in the development of Medical chain (MEC). The remaining core staff, on receiving any resignation, must ensure replacement within the team to make the project more stable.

12.3 Disclaimer

This article is solely for the purpose of conveying information and does not constitute advice on buying and selling digital currencies. The above information or analysis does not constitute any investment advice. Where investors participate in an investment, they affirm that they understand and accept the risks of the project, and that they are willing to bear the corresponding investment consequences.