DOUBLE LUCKY
BIOPHARMACEUTICAL LTD

Using Blockchain Technology + Industry Entity as the First Scenario

DOUBLE LUCKY BIOPHARMACEUTICAL LTD

DLucky Chain

Blockchain-based Traceability Solutions White Paper

I. Abstract

Since the 1990s, some developed countries have carried out the exploration of establishing medicines traceability system. Among them, SNI tracking and traceability of prescription medicines supply chain were established in the United States, and sNDC, which can be compatible with GTIN, was used as the SNI of most prescription medicines to establish the global standard of medicines marking. The European Union utilizes low-cost point-of-dispensing tests. In 2011, the European Parliament and the Council of the European Union adopted the *Falsified Medicines Directive*, which explicitly requires that every drug in circulation within the European Union be required to establish a security file that can verify its authenticity, and the Act lays a legal foundation for the establishment and implementation of the European Medicines Electronic Monitoring system that utilizes QR code matrix to code a single drug, and the EU adopts the dispensing point verification mode to realize the safety supervision and flow traceability of medicines, which has been widely used in Europe at present.

Although the United States, Japan and the European Union have established relatively sound legal systems and supporting organizations, their systems are not yet mature, and most countries and regions have not established sound legal and regulatory systems. Therefore, the DLucky Chain team initiates a traceability project for the medical industry.

As a matter of fact, members of the DLucky Chain team, mostly from the medical field, have in-depth research in the medical field. As members of the team have found an opportunity to solve the difficulty of medicines traceability from the blockchain technology, the DLucky Chain team introduces the blockchain technology to conduct unremitting investigation and research, so as to establish the global medicines traceability ecology.

In 2018, to achieve project implementation & to build ecosystem in the bio-medical field, DOUBLE LUCKY BIOPHARMACEUTICAL LTD., the sponsor of the DLucky Chain project, strategically invested in a pharmaceutical company (the pharmaceutical company is mainly engaged in the research and development and production of Periplaneta Americana related products). DLucky Chain will take this medicine company as the first application scenario and

has started the R&D of combining blockchain traceability technology with production equipment and production line. This project, combining software and hardware, captures the real-time information of every step in the production process from the production source to achieve complete traceability of medicines production and circulation.

Combined with blockchain technology, the DLucky Chain team launched a pharmaceutical traceability solution which takes the production and sales of related medical products as the initial research and test object. This pharmaceutical traceability solution will include: DLucky Medical Traceability Protocol which is designed specifically, the software & hardware scheme focusing on traceability of medicines production, an economy model which can reduce the cost of traceability of medicine.

Based on the integration ofrelevant resources in different regions of the industry, DLucky Chain introduces more medicines manufacturers and sellers so as to gradually establish a global medicine traceability ecology, and effectively enhance the security of the pharmaceutical industry.

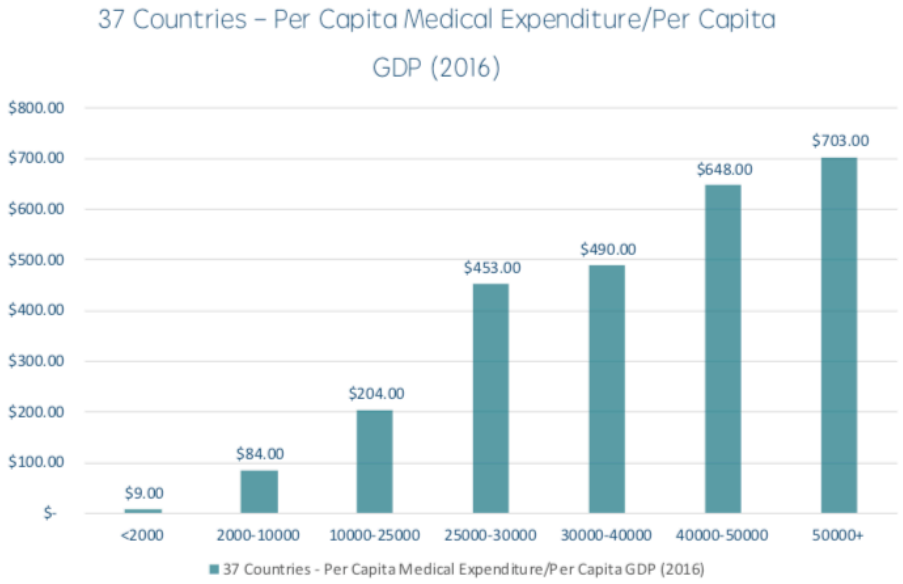
II. Market Profile

2.1 Medical Industry Overview

2.1.1 Development Status of Medical Industry

The development of global economy has promoted the development of pharmaceuticals industry. In the last century, the pharmaceuticals industry has grown rapidly and has stepped one of the top five economic pillar industries in the world. At present, the overall value of the pharmaceuticals industry has exceeded 5 trillion dollars, which is 1,000 times more than that of the 1920s.

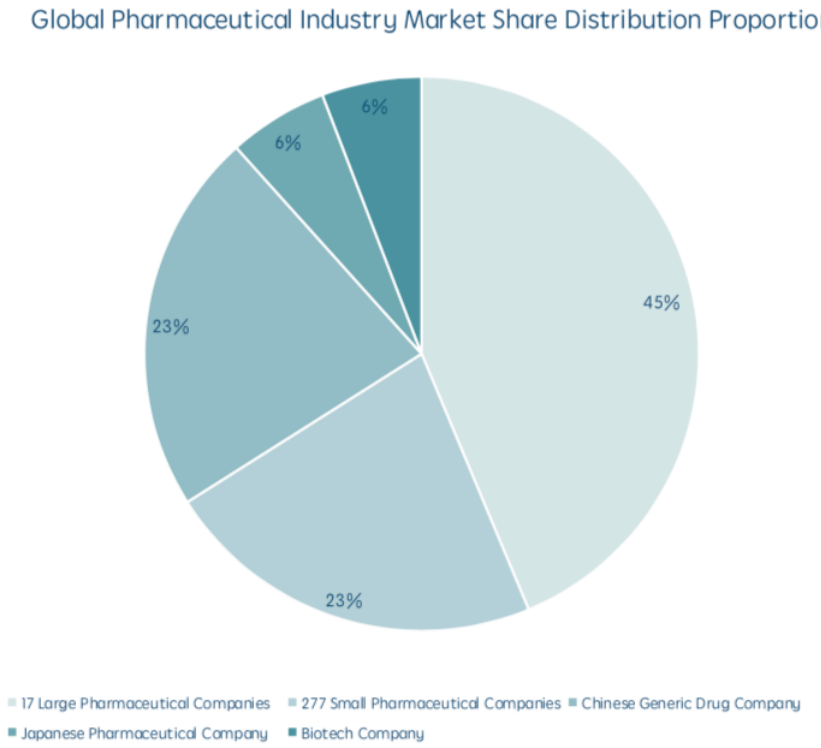
According to a research report① on the pharmaceutical market by commercial research companies, the global medicines market value in 2017 is $934.8 billion in terms of medicines market performance, and is expected to reach $1.042 trillion in 2021, with an expected growth rate of 5.8 %.With the development of global economy, the growth of GDP of various countries and the improvement of national income, as shown in the figure below, there is a significant growth trend of consumer demand in medicines.



① THE PHARMACEUTICALINDUSTRY AND GLOBAL HEALTH》,2018,International Federation of Pharmaceutical Manufacturers & Associations

As shown in the figure above, the medical expenditure② of 37 countries represented by the United States, Japan and Germany accounts for an average proportion of 1.33% of the GDP per capita.

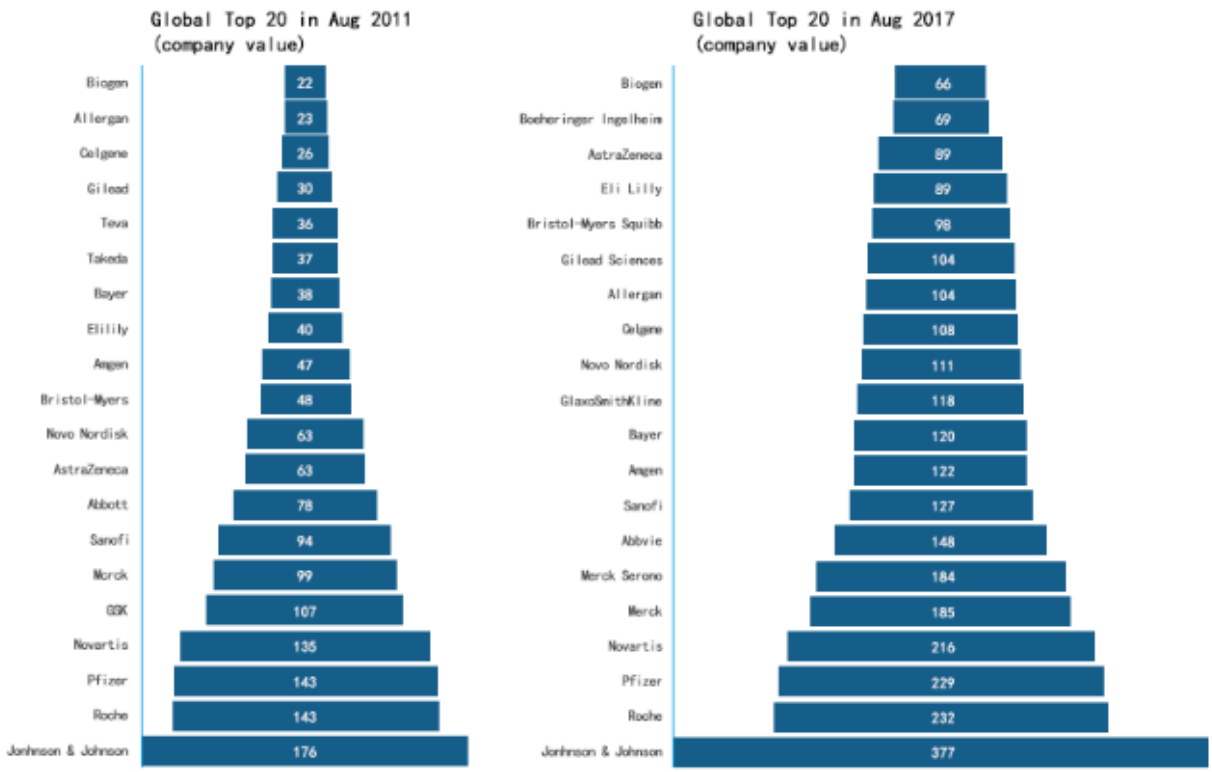
With the increasing market demand of medical industry, as the leading industry of medical industry, the global pharmaceutical industry is mainly dominated by 17 large pharmaceutical companies③, and its specific market share distribution is as follows:



As is shown in the figure, the pharmaceutical industry's market share increased significantly from 2011 to 2017. In August 2011, the global top 20 pharmaceutical companies had a total market capitalization of $1.45 billion; In 2017, the top 20 companies had a total market capitalization of $2.9 billion.

② Global Pharmaceutical Industry - Statistics & Facts ,2018, statista.com

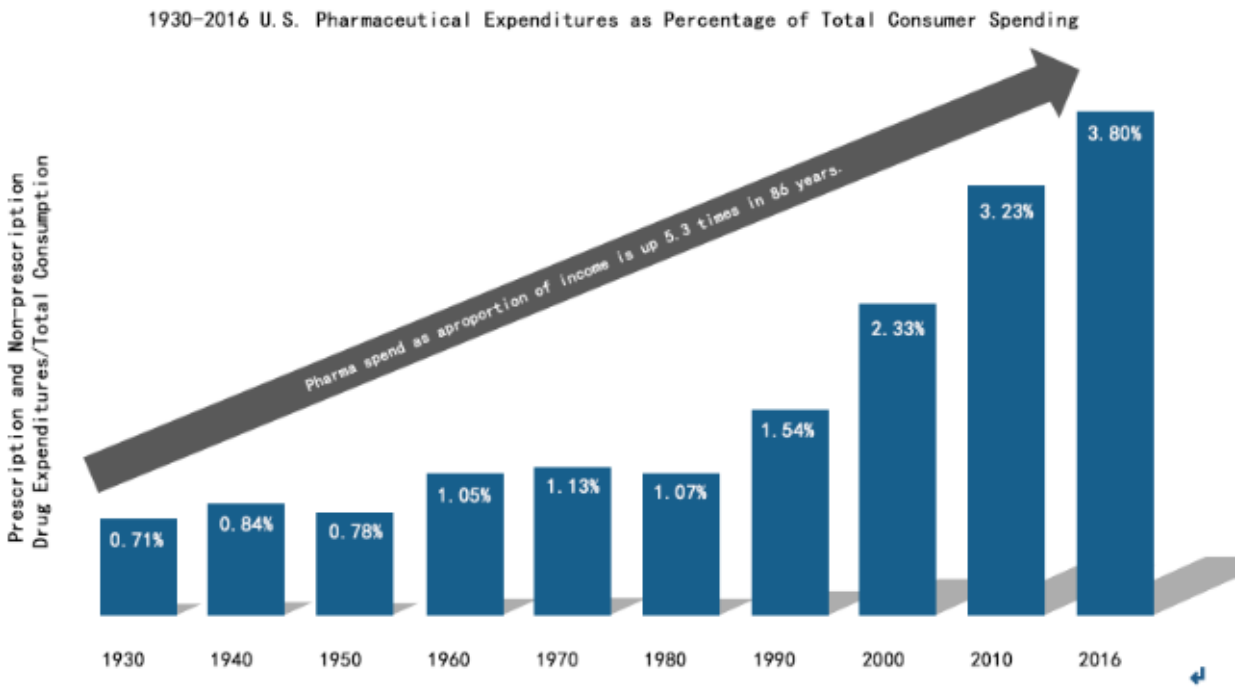
③ 2016 Top Markets Report Pharmaceuticals, 2017,Pharma2020.



Overview of U.S. Region

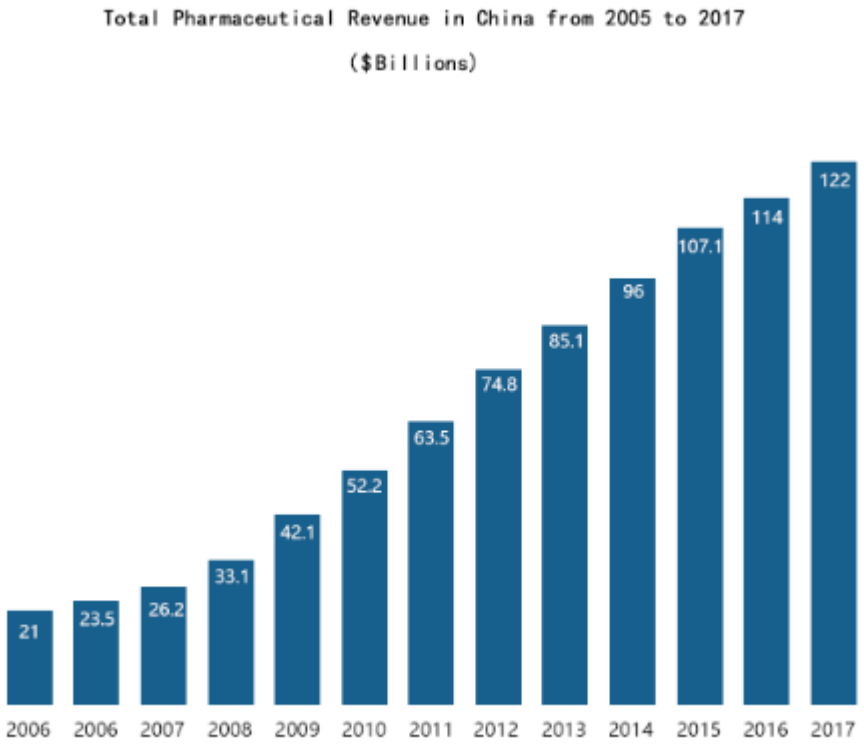
Since 1929, total national medicines spending in the United States has increased 900 times.

In less than a century, the health care industry, once described by economists as "luxury goods," has risen fivefold as a percentage of total consumer spending in America.


1930-2016 U.S. Pharmaceutical Expenditures as Percentage of Total Consumer Spending
Prescription and Non-prescription Drug Expenditures/Total Consumption
Pharma spend as aproportion of income is up 5.3 times in 86 years.
0.71%
0.84%
0.78%
1.05%
1.13%
1.07%
1.54%
2.33%
3.23%
3.80%
1930
1940
1950
1960
1970
1980
1990
2000
2010
2016

General Situation of China

Over the past few decades, China's pharmaceutical industry has made great progress, and its pharmaceutical market has increased sixfold in the past 13 years and has gradually developed into the second largest pharmaceutical market in the world. ④At present, China has about 4,600 pharmaceutical companies, 12000 wholesalers and 270000 retailers, producing and selling more than 10, 000 kinds of Chinese and western medicines and traditional Chinese medicines, mainly generic drugs and traditional Chinese medicines. China's central and local governments have made the medical industry one of the important economic sectors driving the strong economic development. In March 2018, the central committee of CPC held the First Meeting of the Committee on Comprehensive Deepening Reform that examined and approved a number of reforms, including medicine is to determine the content of the medical industry to further the reform trend of major policy signals, such as the new drug research and development, clinical trials, such as "good faith" the management of scientific research behavior, public hospital party building and three tax reductions for the pharmaceutical and distribution industries.⑤



④*Pharmaceutical medicines Global Market Report 2018*, March, 2018,MarketResearch.com.
⑤*Guiding opinions on reforming and perfecting the Comprehensive Supervision system of Medical and Health Industry, Opinions on strengthening Party Building in Public Hospitals.*

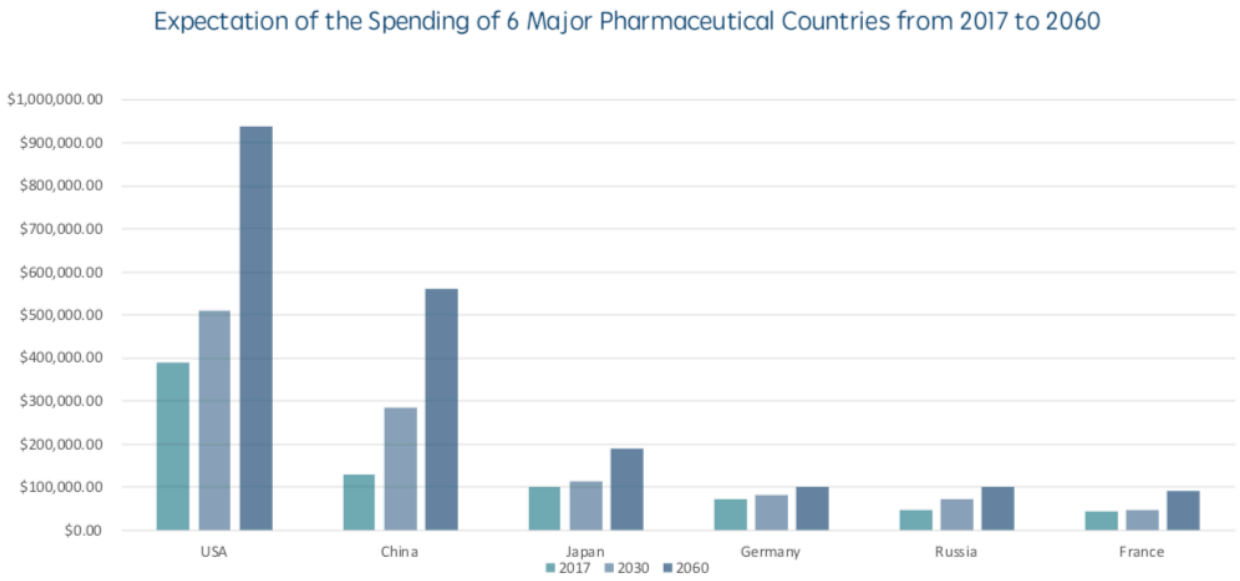
In recent years, the market value of China's pharmaceutical industry has shown a gradual growth trend, and China's top 20 pharmaceutical companies have gradually caught up with the top pharmaceutical companies in the world.

Top 20 Chinese Pharmaceutical Companies by Market Capitalization, Sept. 2017

Company	Value Rank	ValueEstimate ($mil)	2016 Revenue ($mil)
Yangtze River Pharma	1	$ 50,630	$ 8,300
Hengrui	2	$ 22,391	$ 1,606
CR Pharma Rx Segment	3	$ 19,087	$ 3,129
Qilu Pharma	4	$ 16,520	$ 1,666
Kangmei Pharma	5	$ 15,239	$ 3,159
Yunnan Baiyao	6	$ 13,505	$ 3,245
Fosun Pharma	7	$ 12,275	$ 2,125
Sinopharm - Rx Segment	8	$ 12,163	$ 1,994
CSPC Pharma	9	$ 9,252	$ 1,522
Huadong/ China Grand	10	$ 6,863	$ 3,634
Tasly Pharma	11	$ 6,209	$ 2,017
Sino Biopharma	12	$ 6,097	$ 1,990
Neptunus Group	13	$ 5,831	$ 956
Chongqing Zhifei Bio	14	$ 5,765	$ 65
Kanghong Pharma	15	$ 5,038	$ 365
Salubris Pharmaceuticals	16	$ 5,010	$ 543
Kelun Pharma	17	$ 5,008	$ 1,241
Humanwell	18	$ 4,782	$ 1,784
Dongbao Pharma	19	$ 4,670	$286

Overview of other Regions

EU pharmaceutical companies are subject to increasingly strict price controls, and the structural fiscal structure of the EU hinders GDP growth, which will reduce the influence of the EU in the global pharmaceutical sector. Japan's pharmaceutical industry's growth in the global pharmaceutical industry has also slowed as GDP growth has slowed to some extent.



As shown in the chart above, according to the business research company⑥, the market value of the US pharmaceutical market will double in the next 50 years, that of Japan, Germany and France will less than triple, and that of China will quadruple. In general, China will be the most promising country in the global medical industry market.

⑥ Pharmaceutical Medicines Global Market Report 2018, March, 2018,MarketResearch.com.

2.1.2 Opportunities and Challenges of International Medical Industry

1) Market Growth Slows

The United States has dominated the international pharmaceutical market, QuintilesIMS report⑦shows that growth in the U.S. pharmaceutical market will slow to single digits by 2021, between 6% and 9 % , down from 12 % in 2015. The slow growth in the market is due to slow innovation in hepatitis and cancer drugs, whose impact is expected to diminish in the coming years.

However, the United States will be the largest pharmaceutical market in the world, accounting for 53 % of all projected growth over the next five years. China is expected to account for 12 % of the growth in the global pharmaceutical market, continuing to be the second largest.

In terms of medicines, total global consumption of medicines will increase by about 3 % a year by 2021. The analysis shows⑧ that pricing issues, market access pressures, market capitalization growth in emerging pharmaceutical markets and the emergence of more generic drugs would lead to a decline in market value growth in the global pharmaceutical market.

2) Insufficient Innovation

As pharmaceutical companies generally control investment in research and development, the pace of launch of new pharmaceutical products has slowed to some extent. For example, new drugs developed by pharmaceutical companies have played a huge role in the treatment of Alzheimer Disease (AD), and Pfizer has completed the AD research program⑨.According to statista⑩, high failure rates, high costs for developing new drugs, an average cost of $2 billion, and a declining rate of return on investment are constraints to pharmaceutical innovation.

3) Biosimilar with Broad Prospects

There is no doubt that biosimilar has brought a new turning point to the pharmaceutical market,

⑦ Lifetime Trends in Bio-pharmaceutical Innovation》,2017,QuintilesIMS.
⑧ Pharmaceutical medicines Global Market Report 2018》,March, 2018,Market Research.com.
⑨ https://www.bbc.com/news/health-42633871
⑩ Global Pharmaceutical Industry - Statistics & Facts》,2018,statista.com

which is expected to grow by more than 20% [11] in the next five years, which will drive the rapid growth of the medical industry, and its price advantage is favored by consumers. However, there are also problems such as the lack of a sound regulatory mechanism and the need for clinical trials to gain market acceptance.

4) Aging

According to statista data, the current global aging population is increasing and the demand for long-term treatment for chronic diseases is increasing, which is an important factor driving the growth of the pharmaceutical market.

2.1.3 Opportunities and Challenges of Medical Industry in China

According to the Fortune World Top 500 in 2018, there are 13 pharmaceutical companies in total, and the pharmaceutical industry has always been a high-tech industry. With the impact of financial capital and the shortage of labor, many international pharmaceutical companies begin to turn to China's huge market, abundant and cheap labor and low-cost clinical trial resources. At present, joint ventures and wholly-owned enterprises play an important role in Chinese pharmaceutical enterprises and have become a major feature of the Chinese pharmaceutical market. Pfizer, Merck & Co., Inc., Roche, GSK, Novartis, bayer and other top 20 global pharmaceutical companies have chosen to invest in China, and even established large-scale research and development centers. In addition, they have expanded their business to wholesale enterprises in China's pharmaceutical market and continuously increased their share in the domestic market.Therefore, international pharmaceutical companies will have closer ties with China.

Since 1949, China's drug market has experienced 70 years of development, and its medicines's production and quantity have been improved to a great extent. As of July 2018, the number of domestic medicines has reached 166,138, while the total number of imported medicines is 4178, which is basically meets the daily needs the public. Although Chinese pharmaceutical enterprises have made great progress in recent years, the pattern of "scattered, chaotic and small" medical industry in China has not been completely improved to some extent. As at the

end of Nov. 2017,

(1)Medicines: there are 4,376 enterprises producing bulk drugs and preparations in China, including 1,046 enterprises producing Chinese herbal medicines, 472,000 enterprises possessing the medicines business license, 13,146 pharmaceutical wholesale enterprises, 5,409 pharmaceutical retail chain enterprises, 229,224 stores under its jurisdiction, 224,514 retail independent pharmacies and 453,738 retail pharmacy stores in total.

(2)Medical Apparatus & Instruments: There are 16, 000 medical device production enterprises and 410,000 medical device management enterprises in China.

(3)Health Products & Food: China has 2,317 health food production licenses, 159,000 food production licenses and 3,695 food additive production licenses. There are 149,000 food manufacturers and 3,685 food additive manufacturers.

The above data present the large number of enterprises in the production and circulation of medicine and food in China, excluding the manufacturers of specialty foods, packaging materials and containers and other related enterprises. Combine the above mentioned, China's pharmaceutical market has a large audience and a huge market potential.

2.2 Problems in Medical Industry

Although the global medical industry has made certain progress in management technology and circulation, there are still problems such as centralization, isolated island of information, chaotic circulation and fake medicines.

1) Centralized Storage Mode

Both the producer and the seller are stakeholders in the traceability chain. When the account book information is unfavorable to the account book depositary, who may tamper with the account book, so it is impossible to guarantee the authenticity of the traceability information.

2) Information Island

Market participants have a private ledger, and whether the ledger is electronic or physical does not change the fact that the owner can change the ledger at will. Traditional traceability also uses the service of a third party, but the interests of the third party may be the same as the manufacturer or the seller, so it is impossible to ensure the authenticity of the books.

3) Circulation Chaos

Although the medicine circulation channel only involves the manufacturer, the seller and the consumer, so it can transform into a variety of medicines circulation mode, so the illegal trade keeps going so that the medicines circulation is in chaos.

4) Inferior Medicine & Fake Medicine

As a special commodity in daily life, illegal behaviors often occur when interests are involved in medicine. Thus, inferior medicine and fake medicine are generated and cause physical injury and economic loss to consumers, as well as reputation loss and economic loss to manufacturers.

2.3 Overview of Medical Traceability Technology

2.3.1 Overview of Development of Anti-counterfeiting Technology and Medical Traceability Technology

At present, the anti-counterfeiting of medical traceability is supported by the following three core technologies:First, RFID, it refers to the automatic collection and reading of relevant information in the process of warehousing, storage and transportation through adding the logo of tape chip to the commodity.Second, QR code traceability technology. Consumers only need to shoot the QR code with a camera phone to query the relevant information of the product, and the query record will be retained in the system.

Third, commodity bar-code system, namely GSI system (global unified identification system). The system is an open standard system that integrates bar-code, radio frequency and other automatic data acquisition, electronic data exchange, global product classification, global data synchronization and product electronic code to serve the logistics supply chain.

Evolution of Anti-counterfeiting Techniques

Development Phase	Applied Technology	Distinctiveness	Counterfeit Difficulty	Comparability
First Generation	Laser anti-counterfeiting	difficult	easy	low
	Variable temperature anti-counterfeiting	easy	easy	/
Second Generation	Inquiry digital anti-counterfeiting	easy	easy	/
Third Generation	Texture anti-counterfeiting	easy	difficult	/
Fourth Generation	Safety line anti-counterfeiting paper	easy	difficult	/
Fifth Generation	QR code technology	easy	difficult	/
Sixth Generation	Humidity sensitive technology	easy	Technological Monopoly	/
Seventh Generation	Fingerprint anti-counterfeiting	easy	Unforgeable	/

2.3.2 Difficulties in Medical Industry Traceability

1) Anti-counterfeiting of external Packaging can not completely solve medicines Anti-counterfeiting

It is difficult to deal with medicines directly. For example, powdered or liquid drugs can only carry out anti-counterfeiting treatment level on the outer package, which provides fake space for counterfeiters.

2) Authenticity of Data in the Process of Traceability

In the process of medicines production and sales, traceability data is difficult to supervise and control, so it is difficult to ensure the authenticity of traceability information.

3) Different regulatory policies and standards of medical industry in different countries

In 2012, the WTO released data showing that only about one-third of countries had some or no drug regulation. In developing countries, more than 10 % of drugs may be counterfeit or substandard. There is no unified quality standard for medicines production and processing in all countries, and there is no perfect regulatory system, so there are differences between medicines products. The medicines data is so difficult to be unified that consumers do not have a unified platform to query all kinds of medicines data.

4) The development of medical industry traceability in China is slow

At present, the traceability system of supply chain in China requires enterprises as the main body to establish their own traceability system, but it can not realize the information sharing of supply chain. The coding rules of the traceability code, the traceability standard and the enactment of the medicines "identity card" are very critical steps, but China still fails to develop a complete traceability system in accordance with the international unified standards.

Aiming at the troubles of medical industry and the difficulty of medical traceability, DLucky Chain team proposes a solution of medical traceability based on blockchain technology.

III. Solution of DLucky Chain

3.1 Introduction of DLucky Chain

DLucky Chain is a global project initiated by DOUBLE LUCKY BIOPHARMACEUTICAL LTD., focusing on the medical industry. Based onEOS token issuancetechnical standard, DLucky Chain utilizes the irreversible distributed ledger recording feature of blockchain to solve the industry's problems such as the traceability of raw materials, production, sales and consumption, as well as anti-counterfeiting and authenticity verification.

Starting from the actual research and development of hardware and software, the DLucky Chain team focuses on the application of anti-counterfeiting traceability in the medical industry and establishes a team of experts in the medical field to locate the Asia-pacific region and accumulate experience to radiate to North America and Europe.

DLucky Chain is dedicated to the unique design of hardware and software required in the anti-counterfeiting process combined with the blockchain technology to create a real application of anti-counterfeiting traceability in the medical industry.

3.2 DLucky Medical TraceabilityProtocol

3.2.1 Introduction

DLuckyMedical Traceability Protocol is an application protocolfor the implementation of blockchain traceability technology based on the hardware and software developed by the DLucky Chain team and the hardware and software required by each role (manufacturer, seller and consumer) involved in the medical industry in the process of anti-counterfeiting traceability and the unique design combined with the blockchain technology. Based on the basic modules of EOS（supporting smart contract，providing role-based authorization, web tools for interface development,Schema, Schema-defined database, general API for multi-level database search, etc）, DLucky Medical TraceabilityProtocol has designed a series of

specifications and constraints forthe process of verification record, chain storage and anti-counterfeiting tracing of the source data， which through technical protocols between hardware and software and focuson the process of pharmaceutical industry traceability.

3.2.2 Principle Process

According to the relevant characteristics of the blockchain, if the block anchoring data and circulation changes are saved on the DLucky Chain, the data is decentralized, non-tampered and traceable, such as medicines raw material data, medicines flow data, etc. The decentralization avoids the data being controlled by the producer and the seller, and the non-tampering eliminates the possibility that the data is tampered with and ensures the authenticity and validity of the data. Data traceability allows queries to reach the source and allows anyone to view changes in medicines at every step.

1) Decentralization

Decentralization is the core of the blockchain technology based on the principle of cryptology. Any two parties that reach an agreement on the DLucky Chain can operate directly without the participation of a third party, and the operation results are recorded and maintained jointly by all currently participating nodes.

2) Traceability

DLucky Chain stores data in the form of blocks, and all historical data are recorded in different blocks, which are composed of chain structures through the time-stamp and Hash. Any piece of data on the DLucky Chain can be traced back to its original state through a chained structure.

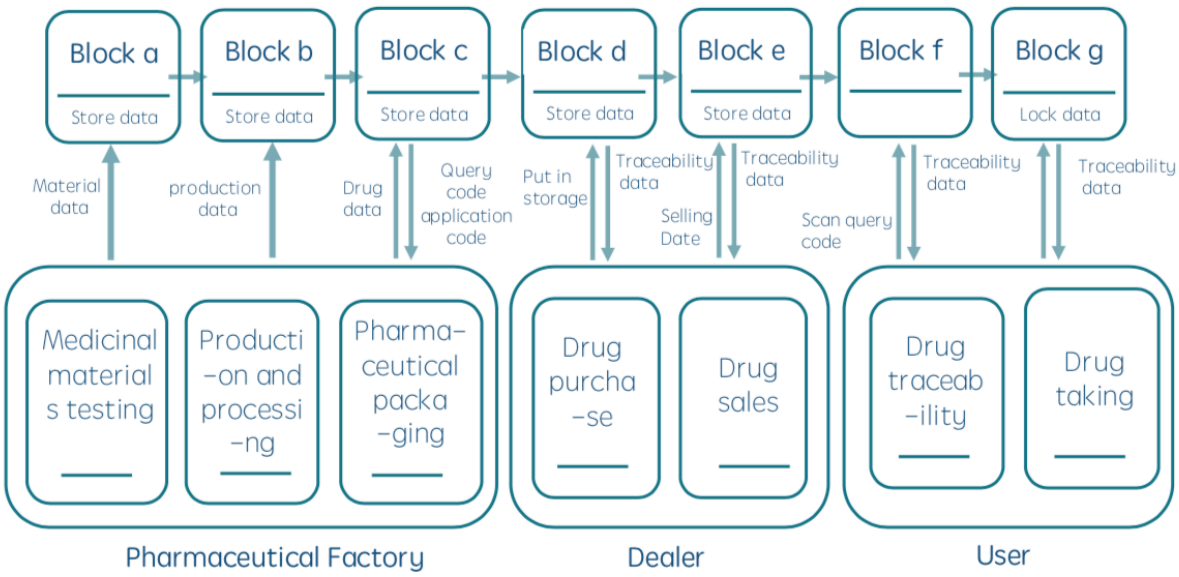
3) Non-tampered

After the information such as medicines and raw materials is added to DLucky Chain, it will be recorded by all nodes, and it will be related to each other before and after it is guaranteed by cryptology. Any tampered information will be abandoned by all nodes on DLucky Chain.

The process of tracing data records starts from the detection and storage of medicines raw materials by the pharmaceutical factory. The manufacturer can upload data to the input device

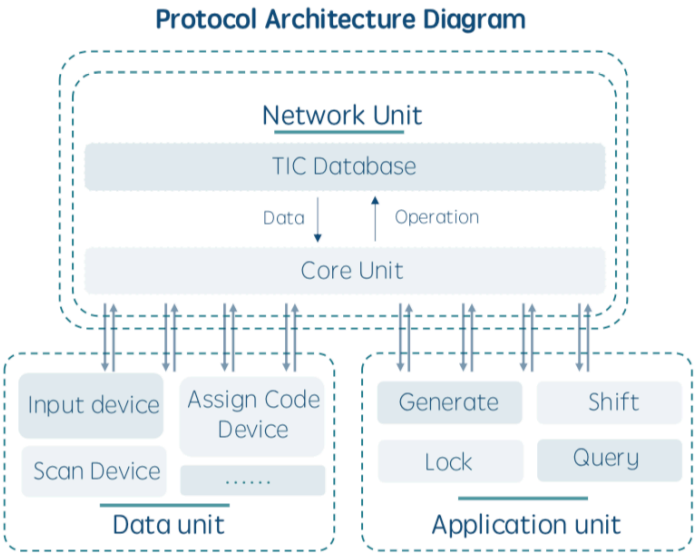
for authentication (Raw material testing data; Production machine data and QC data during production;Medicines data of finished products.). After being authenticated by the super node, the query code and application code will be returned. Finally, the consumer link, consumers through scanning the application code to complete the data lock, but also view traceability data.

The data chain and traceability process on the chain are shown in the following figure:



3.2.3 Protocol Architecture

The protocol architecture is roughly divided into three levels: data, network and application.



3.2.3.1 Data Element

1) Input Equipment

The input equipment is a device that inputs traceable data through sensors or manually. The device sequence ID is bound to the DLucky Chain network account authority, and the raw material data, production machine data, product data and so on are uploaded to the DLucky Chain network through introducing the permission to upload the raw material data, the production machine data and the product data to the DLucky Chain network. The process is applied to the producer. Data entry equipment can be embedded into the detection equipment installed in each link of the assembly line (Such as medicines processing, packaging and other links) to capture real-time information in the production process to ensure the authenticity and reliability of the uploaded data.

Input device upload data will do the following:

a. Access to DLucky Chain network

b. Whether ID has been authenticated and bound to account, if not, wait for binding.

c. Query if the binding account has permissions

d. Capture real-time data such as raw materials

e. Check the validity of the data against permissions

f. Encodes valid data

g. Upload encoded data to DLucky Chain network

2) Encoding Device

Encoding Device is a special device for printing product query code and application code by inputting the final data of product production. First, the device sequence ID is set to bind with the DLucky Chain network account permissions, so that the ultimate medicines and other data can be uploaded to the DLucky Chain network using the permissions. Then, the product query code and application code generated by DLucky Chain network are received. Finally, the product query code and application code are printed out through the built-in special QR code printer and applied to the end product. The device can be embedded and installed on the device in the packaging and warehousing link, and the application code and query code can be printed in the inner packaging.

The QR code generated / printed by Encoding Device does the following:

a. Access to DLucky Chain network

b.Whether ID has been authenticated and bound to account, if not, wait for binding.

c. Query if the binding account has permissions

d. Receive final medicines and other data

e. Check the validity of the data against permissions

f. Encodes valid data

g. Upload encoded data to DLucky Chain network

h. Receive product query code and application code generated in DLucky Chain network

i. Send the product query code and application code to the special QR code encoder for printing

j. Destroy the product query code and application code of the cache

3) Scan Device

Scan device is a device that views or manipulates the source data through scanning the product query code. At first, the device sequence ID is bound to the DLucky Chain network account permission, and then the operation is uploaded to the DLucky Chain network to receive the operation results and traceability information from the DLucky Chain network. This process is applied to the seller. Scan device can be a portable terminal, routing to DLucky Chain network through wireless network.

Scan device operation traceability data will carry out the following links:

a. Access to DLucky Chain network

b. Whether ID has been authenticated and bound to account, if not, wait for binding.

c. Query if the binding account has permissions

d. Get scan related data

e. Query relative traceability data based on scanned data

f. Retrieve traceable data status whether or not it is in circulation

g. Transfer the operation instructions to the DLucky Chain network

h. The seller receives the result and traceability information of blockchain network feedback.

3.2.3.2 Network Entity (NE)

1) Core Element

The core element, which is based on Ethereum blockchain main network deployment and running side chain DAPP, is responsible for data storage, processing, change and operation, which is the basis of all functions.

Each new data call side chain DAPP does the following:

a. Check the caller permissions and call types, and only permissions and types match to move on to the next step.

b. Retrieve the TIC database to find relevant data

c. Operate new data and related data

d. If the results cause data alternation, the results are written to the TIC database

e. Return the results and information to the caller

2)TIC Database

TIC database, a storage medium abstracted from a storage system on an independent DLucky Chain, is responsible for organizing and managing TIC status balance and global information. Different from assets on the chain, TIC is an identification automatically generated when each batch of raw material data is on the chain, and the quantitative information of the data is recorded through the balance and status, and it runs in the space of side chain DAPP.

The following steps are taken for the operation of the TIC database:

a. Check operator permissions

b. Check the operation type, pre-operate according to the type and get the result

c. Check whether the traceability data on the blockchain matches the results

d. Result matching, writing to TIC database

e. Update the TIC status balance and global information.

f. Return the results and updated information to the operator

3.2.3.3 Application Element

The application element contains different functional applications and is built on the upper level of the TIC database. It can operate the TIC database and control the TIC balance information, etc., for the manufacturers, sellers and consumers to invoke the core blockchain and manipulate the TIC database, and four basic application functions are designed in this layer.

Four basic application functions:

1）Generate

When controlling the generation of TIC for linking new raw material data, the anchoring between new TIC generation, traceability data and quantitative information can be realized to ensure one-to-one correspondence between physical and data.

2）Change

The direction of the chain data structure controlling TIC is used for the processing, production and sales links to record the changes of data attribute parameters after the processing and production of raw materials and the results of a variety of raw materials and intermediate products, so as to realize the chain growth of block traceability data in the TIC database.

3）Lock

Control TIC locking is used for user consumption traceability when raw materials are consumed or controlled traceability data into a state that cannot be changed (such as the final product is taken, destroyed, etc.). After TIC is locked, it will enter the state of never changing and can only be queried. The traceability data chain will be locked, which is the end point of the traceability data.

4）Inquiry

Do not make any changes to the TIC database, to retrieve and query the TIC database through the provided TIC identity and return the matching trace data chain information.

The traceability data types and corresponding TIC identification and description are as follows:

Data Type	TIC Identity Name	Notes
Raw material data	Raw-Ticket	At the beginning of RT, it is a string of characters obtained through Hash calculation, including storage time, material name, quantity batch, medicine base source site, collection time, detection data, detector identification and other data.
Processing data	Mac-Ticket	At the beginning of MT, it contains a series of characters obtained by Hash operation, including processing process, time, processing results, QC data, processor and tester identification, process parameters, equipment operation parameters, process leader and Raw-Ticket.
Products data	Pro-Ticket	At the beginning of PR, a string of characters obtained from Hash calculation of product name, production date, expiry date, specification, batch, manufacturer, QC data, quality licensor, mac-ticket and other data.
Circulation data	Cir-Ticket	At the beginning of CI, a string of characters obtained from Hash calculation of pro-ticket, circulation source and circulation target identification, circulation date, geographical information, pre-cir-ticket and other data.

IV. Technology Architecture

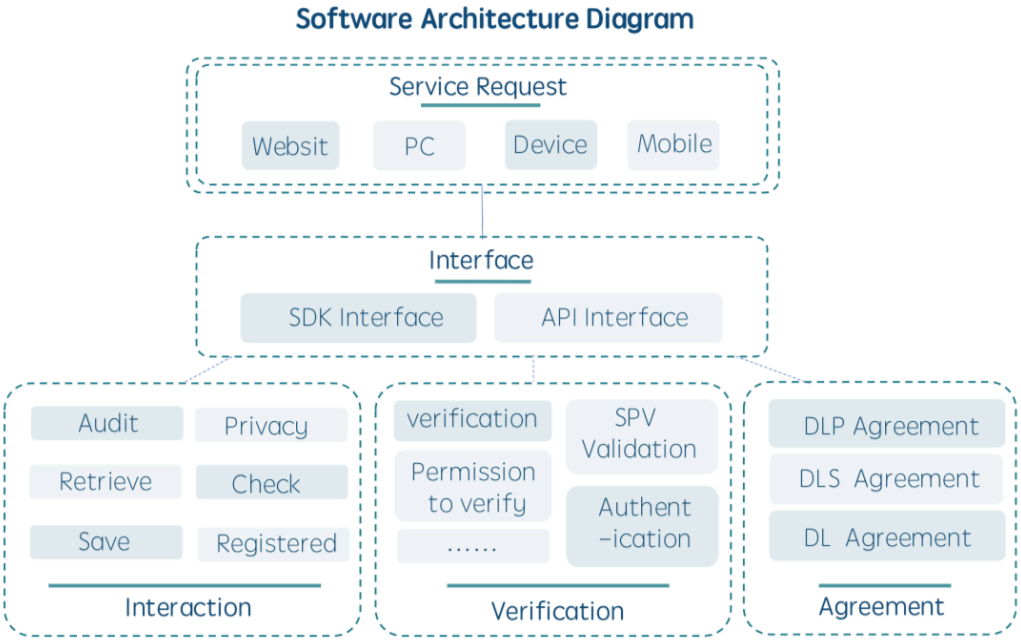
4.1 Software Architecture

As far as software is concerned, we provide basic service functions including protocols, interfaces, validation, interactions, and support functional extension and extension.

The main body of the network is the DLucky Chain main network, which is divided into two parts: infrastructure layer and business architecture layer.

The infrastructure layer mainly contains various protocols and interactions, which provides a basic guarantee for the construction of standardized and modular application templates. We will further integrate different cases across the industry and gradually improve the basic layer construction.

The main purpose of the service architecture layer is to provide standardized application templates for basic services such as data interface and information registration verification, including D-Tag data retrieval, super node data audit, data layering and privacy protection.



4.1.1 Protocol

The protocol includes application protocols for data processing and information security, including:

A. DLP embedding protocol: Batch processing of traceable data embeds data into blocks of DLucky Chain. Based on the requirement of medical traceability, the protocol adds extra traceability data structure and the DLuckyMedical Traceability Protocol version & the identification of consensus mechanism, on the basis of the original format structure of the data block, and together form a complete block with other data.

B. CLSP cross-line synchronization protocol: It is used to synchronize and collaborate data between operations. The protocol defines two types of data: one is data, the other is list. Data is a string of binary data, and a list is a nested recursive structure that can contain both data and lists, such as:

   ["Data",["Data","Data"],"Data",[[]],"Data",[""],"Data"]

   The data transmitted by the protocol need to be converted into the above two categories, so we have made the following rules:

   1) Data must start with [0x7F, 0xLL], 0xLL being the length of the data and not greater than 255.

   2) The single list must start with [0x80, 0xTT], 0xTT is the number of data items, up to 255data.

   3) The mixed list does not contain data, must start with [0xc0, 0xKK], 0xKK is the number of lists, up to 255single lists.

   4) Mixed list contains data must start with [0xFM, 0xMM], 0x0M, 0xMM is the number of lists and data items, the number of lists is the number of high six digits, the lower number is the number of data items, up to 64 lists and 64 data items.

Define an operation pool sequence D, and the system operates in sequence. When a new operation D (f (n, x) requests to enter the operation pool D, the following judgment will be made:

Bool R=D(f(n,x)) ∈D||n ∈D(i)∩D(f(n,x))&&Δx<0

When R is false, D (f (n, x) is a valid operation, put into the operation pool D, otherwise return to D (f (n, x).

DLS adopts relative synchronization mechanism. In each parallel cycle T, the processing line M with the earliest starting time is taken as the main line, and other subsequent parallel connections are regarded as from line S(side line). M will send real-time data Lm of this line to S, and all S will update Lm with real-time data LS of this line: LS’ =Lm∪ LS,ls= Lm∩LS,Update LS of this line to LS. When LS LS 'and LS does not equal circle, LS is fed back to M. M feeds S back to ls1, ls2... Replace: MS= Lm∪ls1∪ls2⋯; ms=ls1 ∩ls2⋯; When ms does not equal to circle circle, it means synchronization is completed; otherwise, Lm= Ms, send Lm for a new round of synchronization.

C. DL Privacy Protocol: This protocol ensures the privacy of user personal information and data.

4.1.2 Interface

When using the API gateway interface, all the DLucky Chain apis request a unified entrance, and the application only needs to interact with the gateway to ensure the correctness of the exchange protocol, without calling a specific service and caring about the change of access mode. For different applications of the same service, the DLucky Chain API gateway triages the service requests appropriately. The DLucky Chain API gateway support includes different access policies such as consistent hashing, IP-Hash, random access, and preferential access.

Moreover, we support applications developed by internal and third-party developers. We will release Software Development Kit (SDK) to assist in the creation and deployment of third-party applications, and the SDK includes a range of tools, databases, guides and templates for external developer development.

4.1.3 Verification

Verification is mainly used to verify the authenticity and validity of data, including authentication, authorization verification, man-machine verification, SPV verification and other popular verification methods. At the same time, applications that support third-party developers to call these scripts for developers to apply.

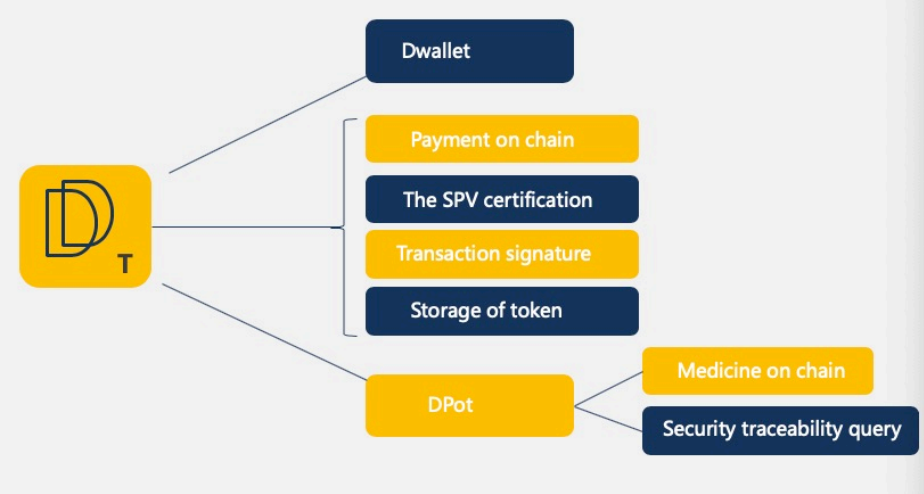
4.1.4 Interaction

We provide standardized application templates for basic services such as user information registration, data storage, tracing query, commodity retrieval, data audit and privacy protection, including service platforms such as DTag data retrieval, super node data audit and business information protection.

DTag

As a service platform access of DLucky Chain, DTag, a DAPP application developed based on the main network API of DLucky Chain, is a tool for interaction between DLucky Chain and users, it supports PC side WINDOWS system, Linux system, MAC OSX system and mobile side IOS system and Android system.

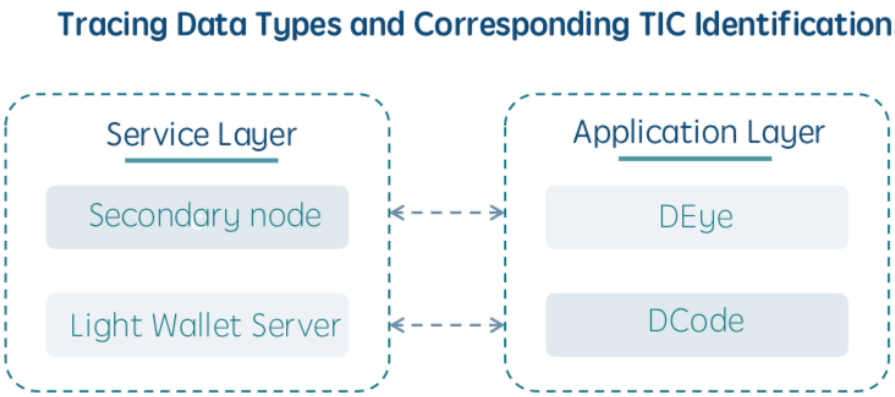
Composition of DTag: D-wallet is used for simple payment on DLucky Chain, SPV verification, transaction signature, and general certificate storage; The medicines chain is connected to the security query Port d-port, so users only need to open the camera and scan a specific tag to complete the medicines chain and the medicines query.



4.2 Hardware Architecture

As for hardware, it mainly includes secondary node, D-wallet server, DEye,DCode and so on. The device is divided into two parts, service layer and application layer.

The service layer is mainly auxiliary node, D-wallet server, which provides the basic equipment guarantee for accelerating the operation of blockchain network and fast operation.The application layer is mainly DEye,DCode,it for the user product data chain, sales and circulation and other basic application equipment. We will further integrate the whole industry, enhance the production links and gradually improve the development and construction of infrastructure.



4.2.1 Auxiliary Node

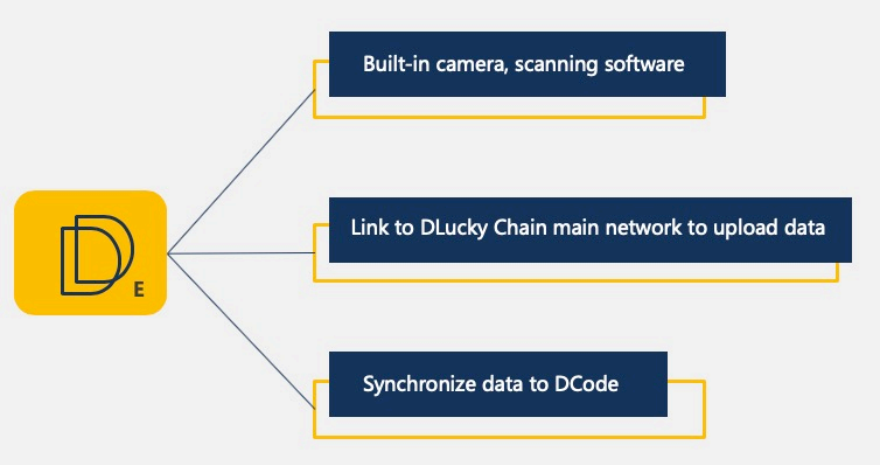
These nodes are deployed in different regions to provide storage backup for DLucky Chain, accelerate network TPS and store data on DLucky Chain, and provide secondary database node servers for faster query and retrieval, which do not affect the operation of the primary network, and provide services only for the safety of data.

4.2.2 D-wallet Server

D-wallet server is mainly used for simple payment on the chain, SPV verification, transaction signature, pass card storage, convenient data query and retrieval. The full node of DLucky Chain is deployed in the server and the data of DLucky Chain is saved completely.

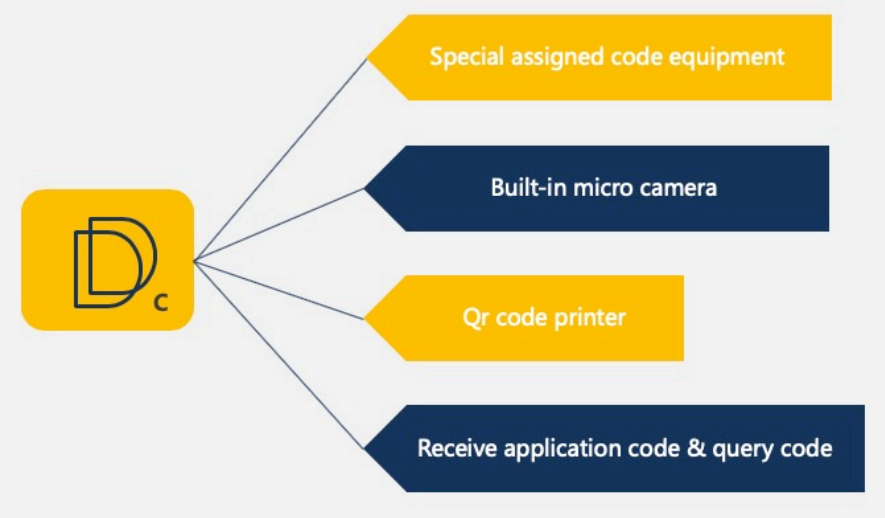
4.2.3 DEye

As an input device, DEye is connected with a built-in micro camera and scanning software. The deployment of light nodes connects to the main network of DLucky Chain through wireless routing, which can automatically upload the captured information and simultaneously synchronize the data to DCode. The manufacturer and the seller can upload the enterprise information independently to complete the authentication.



4.2.4 DCode

Access to DCode as Encoding Device, built-in micro camera, dedicated QR code printer, deployment of d-wallet server node access to the main blockchain network through the d-wallet server, it can receive the application code and query code sent by the main network through the d-wallet server, while conducts simple chain operation.



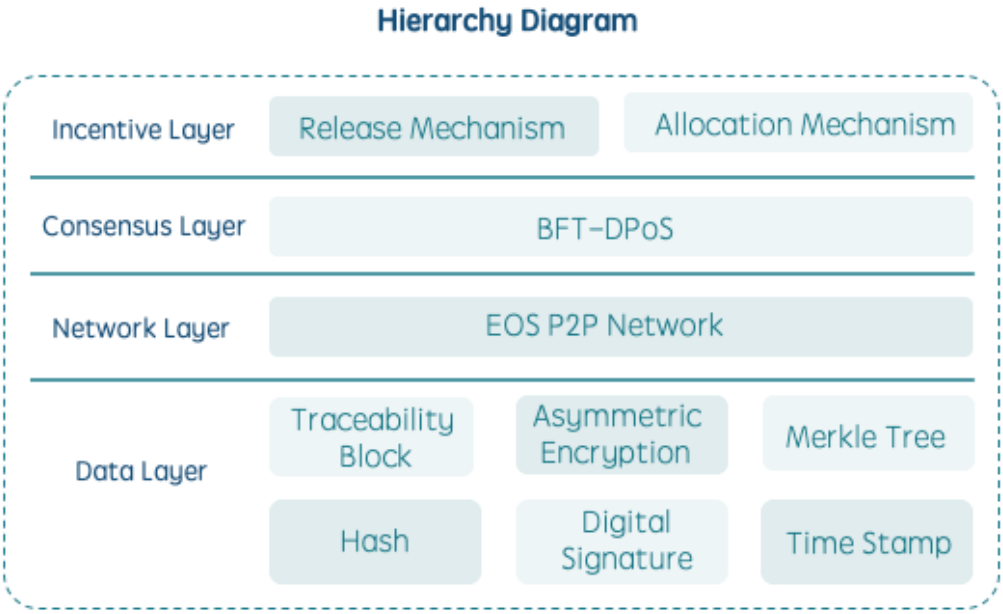
4.3 DLucky Chain Architecture

4.3.1 DLucky Chain Positioning

DLucky Chain is an anti-counterfeiting traceability project for medical industry. As a side chain development, DLucky Chain is a low cost, flexible and convenient slicing solution. DLucky Chain customizes a set of personalized books (TIC books) and block parameters (traceability blocks), and utilizes POA authoritative certification mechanism.

4.3.2 DLucky Chain Architecture

DLucky Chain was developed on the blockchain infrastructure model, and its architecture is shown in the figure:



4.3.3 Data Layer

The data layer encapsulates the chain structure of the underlying data block, as well as the related asymmetric public and private key data encryption technology and unix time-stamp, which is the lowest data structure. We adjust the format structure of data blocks to meet the requirements of anti-counterfeiting traceability, we call it traceability blocks.

Traceability Block:

Block data is mainly to save transaction data and traceability data, each block includes block Header and block Body.

Block Header contains basic information about blocks:

VersionBlock version number

High Block height

Hash Prev Block Previous block Hash

Hash Merkle Root Merkle root node Hash

Time Unix time-stamp

Nonce Random number

SignConsensus mechanism and version Identification for digital. signature and Block use and current block Hash

The block Body is an underlying database that records real data. The storage form is [k,v] key-value pair, and the [k,v] type underlying database is Level-DB, which is presented as a collection. The data includes transaction data and traceability data. The k value of the traceability data is the TIC identifier generated by the DLuckyMedical Traceability Protocol, while the v value is the real traceability data, which is encoded by the DLuckyMedical Traceability Protocol. The ledgers made up of traceability data are referred to as TIC ledgers (see 3.2DLuckyMedical Traceability Protocol for details).

Digital Signature :

Digital signature, also called digitally signed, is mainly used for data changer identification and anti-repudiation, which has the following three important features:

a. Only you can sign your own digital signature, others can only verify that the signature is you signed;

b. Digital signature needs to be bound to specific data.

c. Digital signatures cannot be forged.

The general steps for digital signature are as follows:

a. Generate public and private key pairs:(sk, pk) := generate Keys(key size)

b. Keep sk private key and distribute pk public key

c. Sign data with sk:sig:= sign(sk,data)

D. Send signature sig

e. Recipient validation: is Valid := verify(pk,message,sig)

In traceability block digital signature, data is composed of consensus mechanism and version identification, Nonceand current block Hash, which can verify the validity of digital signature information and data.

4.3.4 Network Layer

The network layer includes P2P networking mechanism, data propagation mechanism and data verification mechanism, etc. Blockchain needs to have automatic networking function, and the DLucky Chain network layer is developed based on the basis of EOS network and embedded in the DLuckyMedical Traceability Protocol.

4.3.5 Common Recognition Layer

Consensus mechanism algorithm is the core technology of blockchain. Given the anti-counterfeiting need of medical traceability, it needs to have certain authority and authenticity. We chose Proof of Authority(PoA) combining Proof of Work(PoW) and Proof of Stake(PoS) as the main consensus of DLucky Chain.

Proof of Authority(PoA):

POA protocol requires low computing power, no communication is needed between super equity nodes to reach a consensus, and the actual number of available super equity nodes does not affect the system continuity. In the POA protocol, the unix time-stamp-tn of block B (n) must satisfy tn = ts m ·Δ , in which m ∈ N and m p N (Δ is block generated time interval; N is block height, n>, 0; ts is the creation block (Unix time-stamp). The consensus ensures that each super-equity node has the same opportunity to be a block generator and that the sequence of blocks is random.When confirming the legitimate super-interest node that generates block B (n, t)(n is block height and t is block Unix time-stamp)::

Count ia(n,t)= R(n,t) MOD ‖ Aab(n,t) ‖ ,

Which Aab(n,t)= APA(B(n,t)) ∪ a,R(n,t):R(n,t) ≜ hash(n ∘ t),PA(·) Return to the parent block;\

If and only if Aab(n,t) [ia(n,t)] = a,

Confirm that the super equity node a is the legitimate generating node of block B (n, t).

POA has no power competition, protocol calculation Pb(n,t) =P PA(B(n,t)) + ‖ A b(n,t) ‖

The cumulative number of witnesses of block B (n, t) is obtained, and the bifurcation with the largest number of witnesses is selected as the main chain. If the amount of evidence is the same, the bifurcation with short length is selected as the main chain.

That is, when the latest block of branch B and B 'is B(n,t) and B' (n ',t ') respectively,
Let's calculate Pb(n, t) and Pb '(n', t '). when B(n,t)> B’ (n’ ,t’),
B as the main chain; When B (n, t) < B'(n, t'), B' is the main chain.
as B (n, t) = B (n 't'), '
When n < n', B is the main chain,
N > n', B 'is the main chain,
When n is equal to n ', the current main chain is preserved.

4.3.6 Incentive Layer

The incentive layer integrates economic factors into the blockchain technology system, including the distribution mechanism and distribution mechanism of economic incentives. In the blockchain system, only the nodes that abide by the rules and participate in the record can get the incentive and ensure that the whole system will develop in the direction of virtuous circle. In the anti-counterfeiting of medical traceability, a complete traceability data requires at least three parties (producer, seller, consumer) data. The DLucky Chain needs to fully record each traceability data line and provide incentives to participants of the complete traceability data line.

In the DLucky Chain system, with the aims to promote the active and standardized participation of consumers and users, only the complete traceability data line can be rewarded. These rewards can also save the traceability cost of the manufacturer and the seller and promote the more healthy development of the DLucky Chain system. (See Section V for details, Issuance and Distribution of Tokens)

V. Issuance and Distribution of Tokens

5.1 Issue and Distribution Plan of DLC

DLC is based on the native assets on the DLucky Chain, with a total 350 million, and it will never issue additional security tokens, and 20%DLC will be the initial token issuance.

DLC Distribution Scheme

DLC Share Distribution	Proportion	Quantity/Hundred million
Public Sale	20%	0.7
Community Partner	5%	0.175
Team & Consultant	20%	0.7
Token Model Pool	25%	0.875
Project & Community Operation	30%	1.05

5.2 Uses of Funds

Projects Using Funds	Distribution Proportion	Notes
Technology Development & Maintenance	25%	It is used to develop the traceability system, including DAPP application DTag developed by the main network API of DLucky Chain, auxiliary node, D-wallet server, DEye, DCode, etc
BD (Business Development)	39%	It is used to expand new product development channels, new drug application fields and application scene base expansion
Marketing*	19%	All marketing expenses of DLucky Chain
Administration & Management*	10%	Administrative expenses, including the salaries of administrative personnel and various materials and other costs
Laws, Regulations and Compliance	7%	It is used for filing, legal affairs and application fees in the course of the project

*Projects such as marketing and administration will be rewarded with additional DLC tokens in addition to the proportion of funds allocated. The additional DLC will be extracted from the Token model pool (see DLC allocation scheme for details).

5.3 Economic Model

As far as medical traceability is concerned, cost is always one of the main topics. After studying the existing traceability projects in the world, the, DLucky Chain team has designed an economic model that can effectively reduce the traceability cost of producers and sellers. The economic model is composed of DLC and DLCT circulation Token.

As a native asset of DLucky Chain, DLC can trade and consume DLC to generate DLCT. As a renewable asset, DLCT mainly plays an important role in the consumption of data chain in the process of tracing back to the source, as well as the shelf and trading process of offline drugstore medicines.

5.3.1 DLT Protocol

DLT protocol is a protocol for dynamic regulation of DLC-Generated DLCT ratio that can realize intelligent control of DLCT generated ratio through mathematical model so as to get rid of manual control.

For the control of generation ratio, the smart contract will collect the flow volume of DLCT on the chain on a regular basis and utilize the ARIMA model to calculate the generation ratio of DLCT.

In 1970, the ARIMA model was proposed for the first time, ARIMA (p. d, Q) the full name of the model is Auto-regressive Integrated Moving Average Model, acronym ARIMA,AR is auto-regression, p is auto-regression term, MA is moving average, q is the number of moving average terms, d is the number of differences made when the time series becomes stationary.

ARIMA model is a model in which the non-stationary time series is transformed into a stationary time series, and the dependent variables regression only its lag value and the present value and lag value of the random error term. The ARIMA model is based on the stationarity of the original sequence and the difference of the parts contained in the regression, including moving average process (MA), auto-regressive process (AR), Auto-regressive Integrated

Moving Average Model (ARMA) and ARIMA processes.

As a short-term prediction method with high accuracy, ARIMA model is widely used in the analysis of various types of time series data and describes the change of time series by means of extrapolation mechanism based on the change law of variables themselves. However, the premise of establishing the time series model is that the time series must be stable, but there is very little stability in the field of blockchain, so the common first-order difference method and second-order difference method should be used to transform the model before it is established, so as to ensure the stability of the time series while still maintaining the randomness of the time series.

Using BIC criterion: BIC = ln(n) * (Number of parameters in the model) - 2ln(Maximum likelihood function value of the model),n is the sample size, and the best p, q combination of the model is found by traversing the list of parameters of the model. At the same time, in the process of parameter estimation, the Yule-Walker method is mainly used to solve the problem. Moreover, the parameters of the model should be obtained by Levinson recurrence formula in order to avoid the calculation of inverse matrix in the process of solution.

AR model, MA model or ARIM model are selected automatically according to the parameters.

The prediction time series is obtained by reducing the difference operation. Through this model, the amount of DLCT required for market circulation is expected.

5.3.2 Protocol Application

DLC mainly acts as the medium of value transfer to facilitate the rapid value circulation inside and outside the DLucky Chain ecology, and it will be destroyed after some operations are carried out.

As an asset in circulation on the chain, DLCT secondary Token can be used to obtain DEye and DCode and pay the cost of data chain. DLCT secondary Token, as a chain circulation asset,

can be used to obtain DEye and DCode, to pay for the chain cost of data.

Follow these three principles:

First, DLCT can only be generated by DLC; Second, DLC can generate DLCT; only when destroyed. Third, the ratio of DLCT generated by DLC is determined by DLT protocol in real time.

5.3.3 Excitation Mechanism

Firstly, in the early stage of the project, the manufacturer and seller can obtain a certain amount of DLC through certification and it will be used to link the data to obtain DCode,DEye,medicines, production machinery and technical information, and so on.

Secondly, taking the consumer as the end point, when the consumer scans the application code, it means that the trace data sub-line has been recorded, and the manufacturer, seller and consumer can all get a certain amount of DLCT reward.

The design of this incentive mechanism reduces the cost of DLucky Chain traceability between manufacturer and seller, and also popularizes the traceability application of DLucky Chain.

VI. Application Scenario

The DLucky Chain team will strategically invested more than $4.5 million to upgrade the application scheme of the related pharmaceutical company, which has an estimated total asset of $44 million. This company is mainly engaged in the R&D, production of medicines in tumor and wound repair. (The main raw material is Periplaneta Americana) Pharmaceutical enterprises has a number of senior professionals in the field of medicine and mature medical patented production technology.

As the first application scenario, of DLucky Chain, the pharmaceutical enterprises takes the production process of Periplaneta Americana refined slices as an example to show the data chain and coding steps from raw materials to production completion.

After the raw materials are purchased to the factory, they are temporarily stored in the area to be examined and sampled by professional samplers according to the sampling principles, and the samples are sealed for inspection. After passing the test, the qualified report is uploaded to the chain, and the DEye system grabs the information of 1/1000000 electronic balance, liquid chromatograph, gas chromatograph, infrared spectrometer, ultraviolet spectrophotometer, moisture tester and so on. After receiving the product inspection conformity information, give the instruction to allow the product to enter the warehouse.

According to the instructions, the warehouse manager moves the raw materials into the qualified area and registers them for storage.

The steps of chain and coding of Periplaneta Americana refined slice data are as follows.

1) Storage of raw materials

After the raw materials are stored, the warehouse management personnel chain the data such as material name, material batch, material quantity, storage time, detection data, tester identification and so on through DEye.

2) Pick and prepare materials,

Periplaneta Americana raw materials placed on the picker, pick out the impurities can not be used, the rest of the collection, get the clean medicine, clean reserve. DEye collects the

operation data of related equipment of the drug washing machine and links the data;

3) Drying of Materials

The collected medicinal parts will be put on a plate and put into the HX-II type hot air circulation oven for drying. After drying, the medicinal materials need to be collected, sampled and tested for water with other utensils. Qualified medicinal materials will be transferred to the next process, and the unqualified medicinal materials continue to be dried until they are qualified. DEye collects the running data of HX-II hot-air circulation oven-related equipment, captures the testing data of moisture measuring instrument, etc., and links the data.

4) Material Crushing

The qualified materials transferred from the previous process are put into the LNM350 freezing ultra-fine grinder for crushing, and the qualified materials are collected after the cyclone separation, and the materials with substandard particle size are automatically returned to the crushing chamber for further crushing until the particle size is qualified. DEye collects the operation and particle size monitoring data of the ultra-micro grinding element, and links the data to the chain;

5) Material Sterilization

Collect and crush qualified materials and place the materials in the pulse sterilization cabinet of traditional Chinese medicine double-leaf type for sterilization. After sterilization, take samples of the materials for microbiological testing to ensure the sterilization effect. DEye collects operation data and microbial test data of mizone sterilization cabinet of traditional Chinese medicine, and links the data up;

6) Total Material mixing

The sterilized qualified materials are loaded into a two-dimensional moving mixer to ensure the uniformity of the materials. DEye collects the operation data of two-dimensional motion mixer, captures the detection data of one-millionth of electronic balance, liquid chromatograph, infrared spectrometer, and ultraviolet spectrophotometer of gas chromatograph, and links the data.

Transfer qualified materials to packaging process;

7) Inner Packing

BGD(bagged) : the qualified materials after mixing are transferred to the bag packing process, the small bag powder packaging machine is used for internal packaging, the packaged slices are sampled for air tightness testing, and the qualified materials are transferred to the outer packaging process.

Bottled: transfer the qualified materials after mixing into the bottling process, use the bottling linkage line for internal packaging, put the materials into the bottle after automatic metering, and take samples for sealing test after automatic capping, sealing and automatic labeling.

DEye collects the operation data of packaging assembly line, captures the detection data of air tightness and tightness, and the detection data of internal and external packaging materials, etc., and then links the data, receives the application code and query code returned by DLucky Chain network, and temporarily caches them in the DCode device.

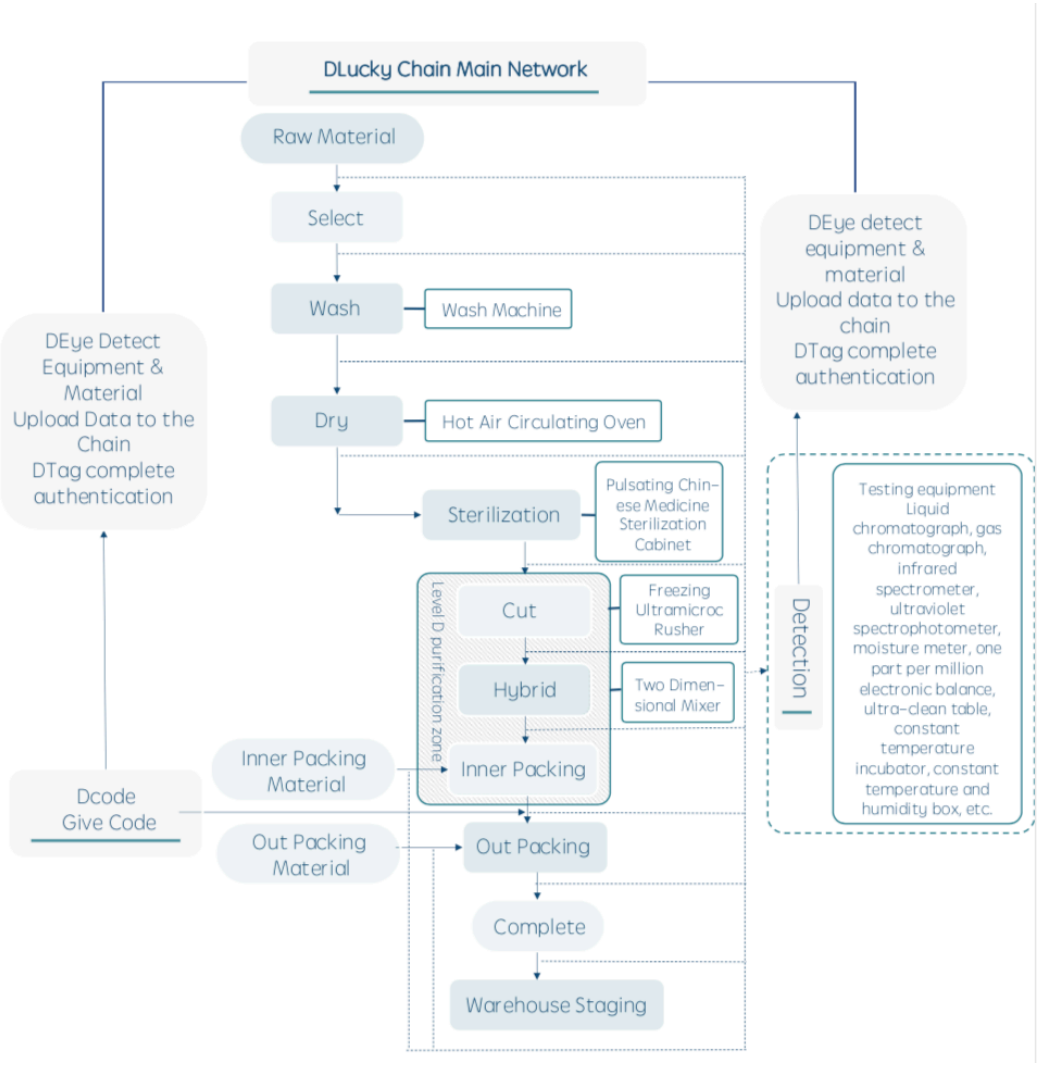
8) Packing Code

The qualified medicine is transferred to the traceability anti-counterfeiting code process. DCode gives the cache application code to the medicines, to print on the medicines package, and prints the cache query code on the outer packaging material to be used. After the above operation, DCode will destroy the cached application code and query code.

9) External packaging is stored in the warehouse.

After the Medicines code is completed, it is transferred to outsourcing, and the outer packaging material with printed query code is used for external packaging and packaged into the warehouse.

10) The process is as follows:



Tracing Back to the Source Flow of Periplaneta Americana

Refining Slice Production Process

6.1 Seller's Application Context

1) Medicines out of stock, Pharmaceutical enterprises scan query code, after confirming the chain of information, the drug will go out of the warehouse;

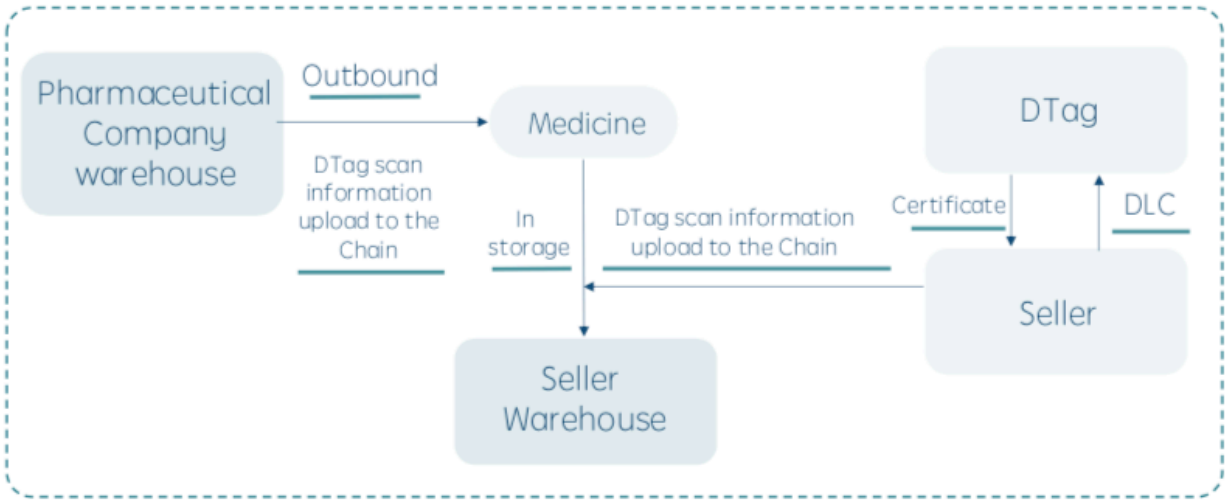
2) The seller uploads the information material to carry on the authentication, through the super node inspection, the seller attestation succeeds, obtains the partial DLC;

3) Medicines is shipped to the seller, and the seller scans the query code to confirm that the information is chained;

4) Medicines is stored in the warehouse.

5) Medicines multiple circulation process can be repeated as mentioned above.

Chart of Seller Traceability Flow

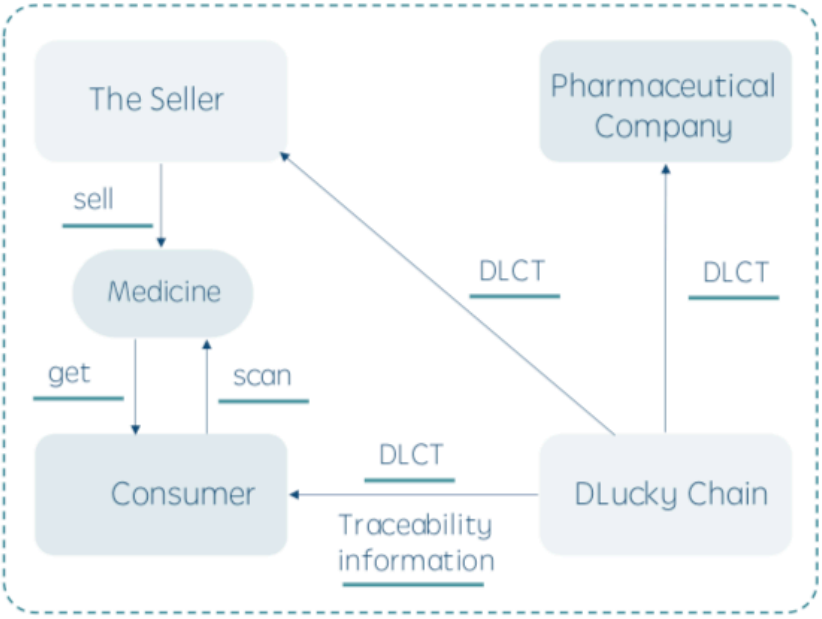


6.2 Consumer Link

1) Consumers get medicines from sellers;

2) Scan the query code to view the complete traceability information of the product;

3) Scan the application code, update the data record as consumed, and the system issues DLCT awards.



6.3 Application Prospects

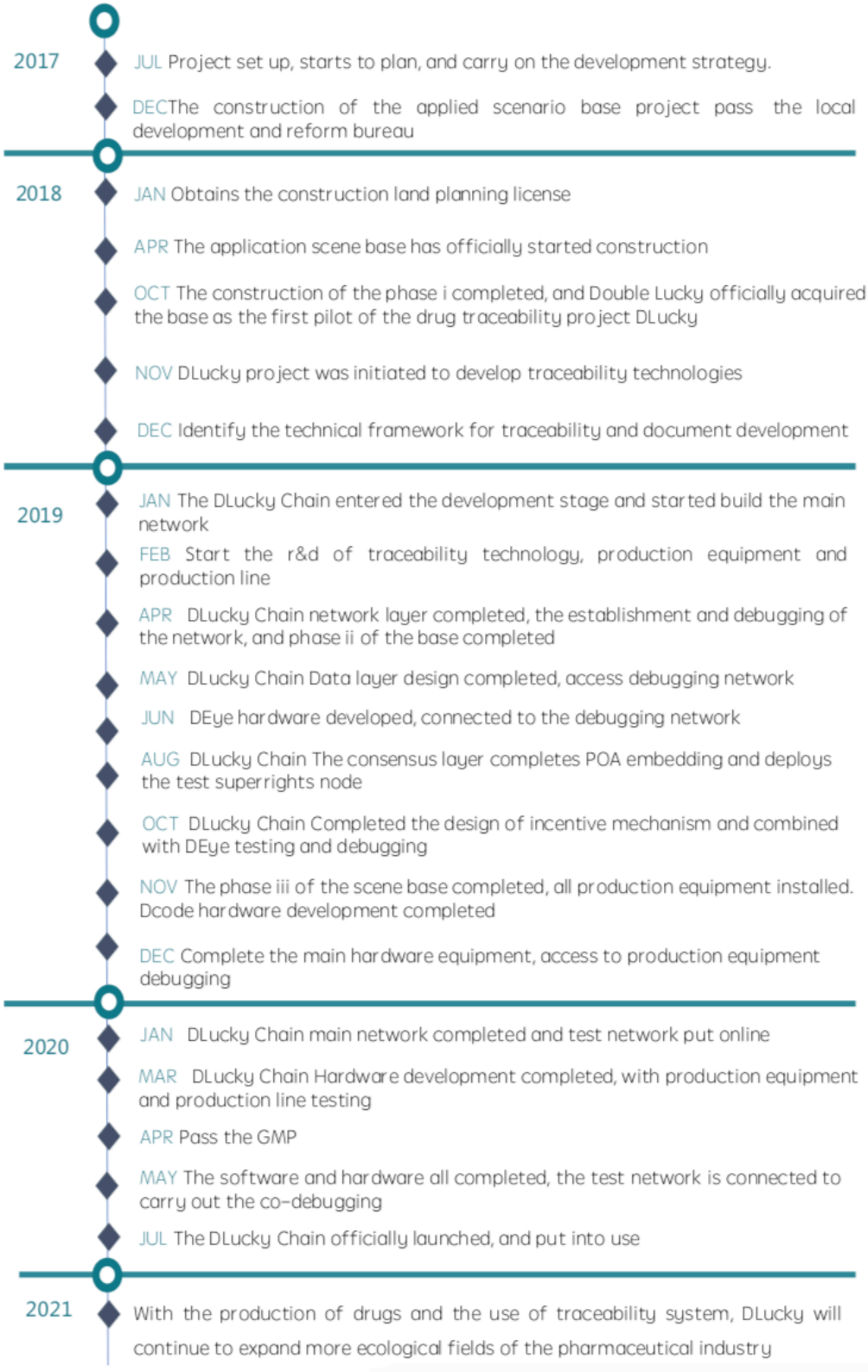
As the medical industry involves the sensitive data such as personal health and therapeutic effect, and most of the data are scattered in different institutions, so it is difficult to share the data and trace the source. The medical industry is one of the most suitable application context for blockchain technology. At present, from the introduction of medicinal materials, planting, harvesting and processing, or raw materials synthesis of chemical drugs in the early stage, medicine storage, production to finished products, through logistics transport to the terminal, such as drugstores, hospitals, e-commerce platforms, and finally from the terminal to the majority of consumers. In terms of the whole process from medicine storage to consumers, DLucky Chain from the very beginning focuses on traceability to eliminate medicines being fake.

After that, we still need to consider the quality of the raw material itself, which has a very crucial effect on the quality of medicines. In the late stage of consumer purchase, the use of special medicines and the treatment of expired medicines are also very important. In the future, we will lay out this module and provide pharmaceutical practitioners and consumers with traceability data to allow anyone to participate in trusted database validation and recording so that no intermediate party is needed.

Among the products with the same attribute raw materials, in addition to medicines, there are many kinds of product types, such as health food, ordinary food, special medical food, traditional Chinese medicine slices, formula particles, medical devices and so on. We will cooperate with more production enterprises and commercial enterprises, and connect all terminals with various types of products and technical data, so as to break the information island and create all-round traceability data, which will provide a basis for government departments to strengthen law enforcement measures and strengthen market supervision.

DLucky Chain will establish a true and credible medical traceability ecosystem under the government's legal system and regulatory system.

VII. Route Diagram



VIII. Our Team

Jia Kunfeng CEO

Master's degree, graduated from Beijing University of Traditional Chinese Medicine, majoring in pharmaceutical chemistry, Master of Business Administration of Renmin University of China, with Engineer title. Jia has been deputy general manager of Shandong Tianda Pharmaceutical Co., Ltd., deputy general manager of Shandong Shengbang (Sun Stone) Pharmaceutical Co., Ltd., and general manager of Zhejiang Guoguang Biopharmaceuticals Co., Ltd. Amend the position of vice general manager of Xiuzheng Pharmaceutical Group Industrial Corporation and general manager of Xiuzheng Health Group Industrial Corporation.

Shi Huazhang COO

MBA of Renmin University of China, Xianning Medical College Pharmacy with intermediate engineer title, and served as inspection engineer of Qingdao Sanli Chemical Technology Co., Ltd., deputy general manager of Imperial Suzhou Huaren Pharmaceutical Industry, Minister of quality Management of Imperial Qingdao Huaren Pharmaceutical Co., Ltd., Minister of production, Deputy General Manager of cost Center, Chief engineer and so on. From 2006 to 2008, organized Imperial Qingdao Huaren Pharmaceutical Co., Ltd. New solid preparation workshop construction project. From 2010 to 2012, involved in Imperial Qingdao Huaren Pharmaceutical Co., Ltd. Relocation construction project of high-tech zone.

Wang Jianbo CMO

Major in Bioengineering, Shandong University. With more than 20 years of medical marketing experience, he has been sales director of Shanxi Zhendong Pharmaceutical Co., Ltd., general manager of Shenyang Hongyao Group Pharmaceutical Co., Ltd., and total sales price of Shandong Dongeejiao Co., Ltd. And with strong team building and management ability, channel expansion and innovation ability, clinical, KA mall, chain, OTC and other channel resources integration ability. During the period of Shandong Donga Jiao Co., Ltd., Wang proposes the sales project strategy of "three years and 500 million" in East China, and compiled the "Dongeejiao Exclusive Work Project Guide", and set up the marketing center "New Agricultural Cooperation Project Group", and promotes the development and operation of the "five training project groups" in China, and sets up the model benchmark of the "Huang Gang Terminal" project, and formulates the "sand table exercise plan" to improve the working

skills of the regional managers, and to set up the "sand table exercise plan" to improve the working skills of the regional managers. During the period of Shenyang Hongyao Group Pharmaceutical Co., Ltd., Wang proposes the marketing strategy of "three focuses (focus distribution, focus terminal and focus strategic products)". During the period of Shanxi Zhendong Pharmaceutical Co., Ltd., Wang promotes the landing of "3 3 3 2" tactics, that is, three strategies, three grasp, three terminal and two goals.

Sun Yongcheng CIO

Sun graduated from Heilongjiang University of Chinese Medicine, majoring in traditional Chinese medicine, and has served as deputy director of Jiangsu Kangyuan Pharmaceutical Research Institute and Manager of Anhui Jiren Pharmaceutical Research Department. From 2011 to 2012, Sun organized and completed the project of "Research on key Technology Research of traditional Chinese Medicine injection preparation in National key Laboratory-Research on impurity removal Technology of traditional Chinese Medicine injection" and "Research on aseptic guarantee Technology of traditional Chinese Medicine injection". From 2011 to 2012, Sun organized and completed the project "Research on attenuation Law of different types of macro-porous adsorption Resin", which is the sub-project of "innovative pilot scale Research Technology platform of traditional Chinese Medicine". From 2011 to 2013, Sun was responsible for organizing the research work of "effective grouping (group) innovative traditional Chinese medicine development" in the national major new drug creation project "innovative Drug incubation Base for effective grouping (Group) of traditional Chinese Medicine in the treatment of Cardiovascular and Cerebrovascular Diseases". From 2012 to 2015, Sun was responsible for organizing and completing the study on the applicability of quality control technology in the process of "major new drug creation" science and technology project "technical transformation of migraine treatment drug Tianshu capsule". From 2012 to 2015, Sun was responsible for the implementation of the special fund project of scientific and technological achievements transformation in Jiangsu Province, "Research, development and industrialization of hyperlipidemia treatment drug XM capsule". From 2013 to 2016, Sun was responsible for organizing and completing the international cooperative research and development and industry of LongxueTongluo capsule, a special fund project for the transformation of scientific and technological achievements in Jiangsu Province.

IX. Reference

[1]International Federation of Pharmaceutical Manufacturers &Associations,THE PHARMACEUTICALINDUSTRY AND GLOBAL HEALTH", 2018.

[2]"2016 Top Markets Report Pharmaceuticals",2017,Pharma2020.

[3]"Pharmaceutical medicines Global Market Report 2018", 20[4]"Lifetime Trends in Biopharmaceutical Innovation",2017,QuintilesIMS

[5]"The Growing Pharmaceuticals Market: Expert Forecasts and Analysis",May 16, 2018,MarketResearch.com.

[6]"Global Pharmaceutical Industry - Statistics & Facts",2018,statista.com

[7]Hyndman, Rob J; Athanasopoulos, George"8.9 Seasonal ARIMA models. Forecasting principles and practice",2015-3,

[8]Development of an ARIMA Model for Monthly Rainfall Forecasting over Khordha District, Odisha, India. Recent Findings in Intelligent Computing Techniques ,Advances in Intelligent Systems and Computing. Advances in Intelligent Systems and Computing. 708. pp. 325-331,Swain,S

[9]EOS White Paper:
https://github.com/EOSIO/Documentation/blob/master/TechnicalWhitePaper.md

[10] Graphene Github: https://github.com/cryptonomex/graphene）

[11] (RDN) Raiden Network Token White Paper.

[12]Bitcoin: A Peer-to-Peer Electronic Cash System.

[13]"Notation for ARIMA Models". Time Series Forecasting System", 2015-3,System. SAS Institute.

[14] Box Jenkins model", 2013-5.SAP.

[15]"ARIMA Models and the Box-Jenkins Methodology", Applied Econometrics (Second ed.),2011,Palgrave MacMillan.

[16]TerenceC"Time Series Techniques for Economists",1990,Mills, Cambridge University Press.

［17］《2016-2021年中国中药行业市场运行形式分析及深度调查咨询报告》，2016年6月，中研普华。

［18］《2017年度药品检查报告》，2018，中国国家药监局。

［19］《TAC溯源链白皮书》。

［20］《中国国药品监管体系框架及构成要素分析》，2017年第36期。经济研究导刊。
［21］《2018区块链溯源应用白皮书》。
［22］《国际药品GMP监管体系对比分析》，2015.3，辽宁省药品检验检测院。
［23］《中国医药供应链现状》，2010年第6期，物流科技。

X. Statement

10.1 Disclaimer

This document conducts an introduction to the ecology, technology and fund-raising activities of DLucky Chain. For an overview of the terms and conditions of raising funds, please refer to the detailed terms and prospectus of DLucky Chain. The DLucky Chain project released by this white paper has been filed with the U.S. Securities and Exchange Commission under *Securities Regulation D* and *Securities Regulation S*.

This document does not provide any investment advice and advisory services, interested investors should read this document carefully. Any potential investor shall consult his or her lawyer and adviser on all legal, tax, regulatory, financial and related matters relating to his or her investment in this project.

This document cannot be any act of selling or inviting others to buy and sell any form of DLC and based on this form of contact, contract or commitment.

All data or cases cited in this document are for presentation purposes only or represent industry averages and do not constitute a guarantee of investor participation.

Given the unpredictable circumstances, the goals listed in this white paper are likely to change as a result. The team will spare no effort to achieve the goals mentioned in this white paper, but not fully committed to all individuals and groups who buy DLC at their own risk.

10.2 Risk Warning

As a new investment model, there are various risks in TOKEN investment, so potential investors need to carefully evaluate the investment risk and their own risk tolerance.

• Insufficient Information

As of the release date of this white paper, DLucky Chain is still in the development phase, and its consensus mechanisms, rules, algorithms, code and other technical details and parameters may be updated and changed frequently with the specific goals of the development and operation team. The development and operations team is incompetent and obligated to keep investors informed of every detail of the development process, and inadequate disclosure is inevitable and reasonable.

• DLC Sales Market risk

Given the close relationship between DLC sales market environment and the whole market, the overall low market situation or the existence of other uncontrollable factors may cause DLC itself to have a good prospect, but the price is still undervalued for a long time.

• Regulatory Risk

At present, blockchain technology has become the main target of supervision in major countries. If regulators intervene or exert influence, projects may be affected by them, such as statutory restrictions on their use. DLC may be restricted, hindering or even directly terminating the development of DLucky Chain applications and DLC.

• Lack of funds leads to risks that cannot be developed.

A significant drop in the DLC price held by the founding team or an unexpected development time may result in a shortage of development funds for the team, which may lead to the risk that the team cannot achieve the original development goals.

• Risk of hacker or theft

Hackers and other organizations or countries have the possibility of trying to interrupt the

functions of the DLucky Chain platform in any way, including, but not limited to, denial of service attacks, Sybil attacks, malware attacks, and so on.

• Risk caused by loss of private key

The relevant login credentials of the DLC owner need to be carefully saved by the holder, and the loss of these credentials will result in the loss of the DLC. The best way to securely store the login credentials is to store the keys in one or more secure locations, respectively, and it's best not to store it on a public computer. After the DLC is extracted from its own digital wallet, the only way to operate the address is the holder's relevant key (that is, the private key or wallet password). The user is personally responsible for protecting the key used to sign the circulation of the certificate of ownership of the asset. Moreover, user understands and accepts that if his private key file or password is lost or stolen, the obtained DLC associated with the user's account (address) or password will not be recoverable and will be permanently lost.

• Vulnerability risk or cryptology accelerated risk

The accelerated development of cryptology or the development of science and technology, such as the development of quantum computer, or the risk of cracking the project may lead to the loss of DLC.