

IOTF

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Preface abstract

IOTF is an intelligent and trusted decentralized blockchain platform designed to reshape the value ecosystem of IoT and the value of data. The current IoT terminals and the resulting amount of data are increasing. For IoT companies, the pressure of innovation in their business models is becoming more and more urgent. It not only refers to perfecting the well-known framework of the public and simplifying the original business model, but also needs to gain competitive advantage from new technologies and new opportunities. Therefore, we think that the enterprise needs to fundamentally change their traditional value creation and value acquisition. In addition, the terminal equipment and people produced more and more data, but the value and ownership of the data have never been truly attributed, evaluated, quantified and enabled. As the producer of the data, they have never owned it and benefited from it, and the value of the data has been separated into isolated islands without forming an effective interworking mechanism. However, we think that the data produced by households and terminals are the most valuable data in the industry. The IOTF will realize the ecological value reconstruction and data value confirmation and transaction of the Internet of Things industry through the self-developed IoT intelligent terminal industry public chain technology and solutions.

The products and technologies of IOTF will be implemented in the following three phases:

First, create a public chain of industry value and build an ecosystem of value for the Internet of Things. The IOTF is based on the features of IOT application to develop the decentralized value public chain, supports various industry applications and provides hardware smart chips, SDK and other adaptations, combining cryptography technology,

distributed architecture, and main chain of DPOS consensus, building a secure, decentralized, highly concurrency blockchain network.

Second, the IOTF will solve the data value problem of the IoT terminal, realize the user's data rights and value transactions through the decentralized trading platform, and protect the data value of users and devices.

Third, realize the interconnection of everything and the transaction of terminal value. The value exchange between the terminal and the terminal can be realized by transforming the trusted environment through the block chain of the interconnection of everything.

Finally, the vision of IOTF is to activate the huge Internet of Things, and at the same time use 5G network, 5G Internet of everything, people and terminal to become the composition of IOTF blockchain network, forming a value economic community based on terminal, service, data ownership and ownership as transaction carrier.

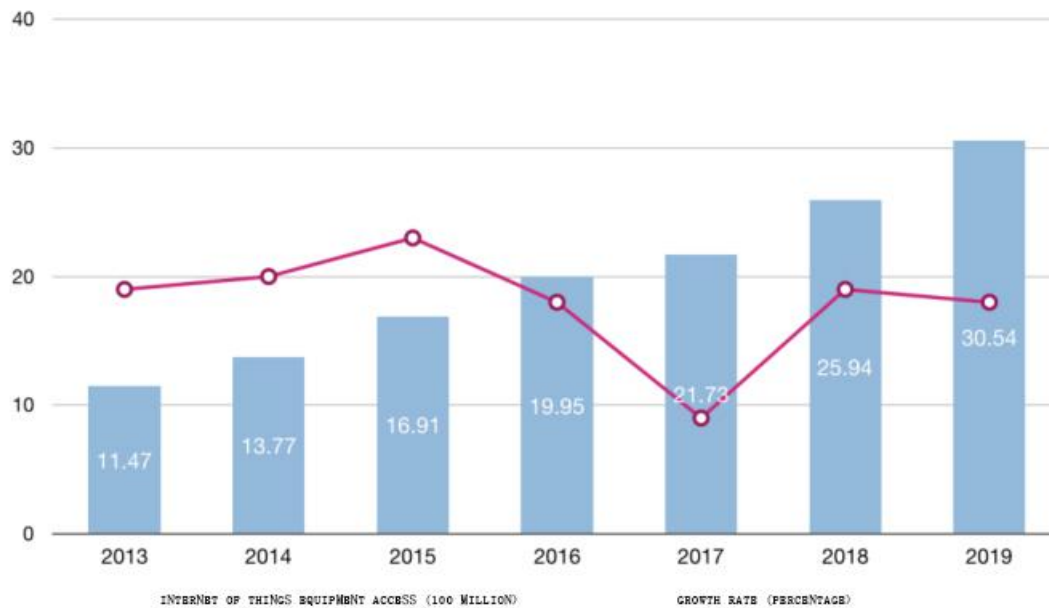
Chapter 1 Industry Overview and Blockchain Technology

1.1 The Development and present situation of the Internet of Things

Interconnection is the connection of the whole world and the formation of a virtual world. By connecting the information, resources will flow quickly, create new wealth and form a new economy. The IOT is the extension of the Internet, which connects the "everything" through the sensor, (RFID) radio frequency identification and other technologies. Although interconnection changes the traditional economy and brings new life, there are still obstacles to the virtual world and the real world. The Internet of things expands the connection, opens up the virtual world and the real world, and forms a new world of interconnectedness of all things.

Each device in IOT can act as a separate business subject, sharing energy and resources with other devices at a very low transaction cost. On IOT platform, each device can report the status of the device. Such as the Smart watch, the Smart band, your refrigerator, and these devices can collect and transmit data through the Internet to make up our data world.

In 2015, the size of the global IOT market reached \$62.4 billion, an increase of 29 percent. The global IOT equipment market is expected to reach \$103.6 billion by 2018, the compound growth rate will reach 21 percent from 2013 to 2018, and the number of new connected devices will increase from 1.691 billion in 2015 to 3.054 billion units in 2019.



1.2 Problems faced by the Internet of Things Industry

With the continuous progress of technology, the development and application of IOT technology has made remarkable achievements in recent years. However, the Internet of Things technology also faces many problems and challenges. The key issues that are more prominent are as follows:

Waste of terminal resources. The use of a large number of IoT infrastructure is not perfect, resulting in idle resources, and many IoT vendors and users have not benefited from IoT data and terminals.

It is difficult to form a valuable ecosystem. Although more and more terminals solve the needs of users, there is a general lack of operating mechanism and operational ability of IOT enterprises, and the incentive mechanism is also not formed. The mechanism ultimately fails to form a positive circular ecosystem between users and manufacturers.

Defects of the centralization system. There is no mutual trust mechanism between devices and devices. All devices need to be checked with the data in the IOT center, and once the database collapses, it will cause great loss to the entire IOT.

A large amount of valuable data created by users is idle or stolen. Most of the centralized networking platforms of terminal equipment enterprises or service providers have the right to collect and analyze user data and control user equipment without authorization from users, which poses a great threat to user privacy and security.

1.3 5G brief introduction, why do we need 5G

4G LTE mobile data services are still developing rapidly in terms of coverage and speed capabilities. So why do we need 5 gigabytes, especially 4G LTE connections are already faster than home fiber connections.

We'll explain everything in the following, but you know, a variety of experiments have been carried out on 5G, and 5G smartphones will be fully available in 2019. Motorola has just released the latest flagship Moto Z3, which will go on sale in 2019 and will become the first smartphone in the United States to support 5G networks through Mods accessories. 5G networks will gradually begin to appear in our lives in the coming years.

It is worth noting that 5G does not fully represent mobile phones. In the future, laptops and tablets will also have built-in 5G network connections. In fact, there are already laptops that support 4G network connections. With the support of 5G in the future, our life will completely abandon the wired network and have home broadband that relies entirely on cellular networks.

What is 5G

5G is the name of the current next generation mobile data connection and is the next generation of 4G. 4G is still accelerating, but there are several main advantages to switching to 5G networks, which we will explain below.

The 5G will provide incredible high-speed broadband speed, but

more importantly, no matter where you perform every function you want, no matter how many people you connect at the same time, it will have enough capacity to ensure all operations.

The 5G will run on a new hyperspectral band that uses higher frequency signals than 4G. The new band will be much smaller than it is now, which is crucial to the use of the Internet of Things. However, the signal will not be transmitted far away, so more access points will be needed closer (described in more detail later).

Professor Andy Sutton, chief network architect at EE, argues that the goal of 5G is to become completely "invisible". It should be a "right there" technology, just like electricity. It will enable device manufacturers to implement the Internet of Things because it will always exist and can be utilized without regionalization.

Why do we need 5G

One of the main benefits of 5G technology over 4G is not only its transmission speed, which may be between 10 Gbps and 100 Gbps, and more importantly, low delay.

Currently, 4G delays range from 40 milliseconds to 60 milliseconds, which is low delay, but not sufficient to provide real-time response. For example, multiplayer games require lower delays to ensure that the remote server responds immediately when you press a button.

The potential ultra-low delay of 5 gigabytes may be between 1 millisecond and 10 milliseconds. For example, this will allow you to watch a live broadcast of an audience on a football field and another shot angle to watch the game, matching the situation on the court without any apparent delay. This will also open a door for virtual reality and AR applications to provide services in real time.

Capacity is also an important factor. As time goes on, the Internet of Things becomes more and more important, and electronic devices and items use intelligence and interconnection that they have never had before. The pressure on bandwidth will continue to grow. That's why 5

5G is needed to provide millions of new connections to networking technology.

The Internet of Things era: equipment explosion growth

Analysts predict that by 2020, everyone in the UK alone will own and use 27 connected devices. There will be 50 billion connected devices around the world. These technologies range from existing technologies, such as smartphones, tablets and smartwatches, to refrigerators, cars, augmented reality glasses, and even smart clothes.

Some of them will require a large amount of data to move back and forth, while others may only need to send and receive small packets. 5G systems themselves will understand and recognize this and allocate bandwidth separately, so that there is no unnecessary pressure on a single connection point.

As part of the "heterogeneous network", these points or units will be used in LTE-A, technology will be added and improved to adapt to 5G. Wherever the user is, the cell automatically talks to each device to provide the best and most efficient service.

The larger network units will be used in the same way as they are now and will cover a wide range of areas, but urban areas will also be covered by smaller units installed on lampposts, on the roofs of shops and houses, and even in bricks in new buildings. Each will ensure that the connection will be standardized and appear to be standard.

4K streaming video capacity is also important for the future of video streams. EE expects 76 percent of its data traffic to be used for streaming video by 2030. Most of them are 4 K ultra high definition, or even 8 K resolution.

4G data rate can solve this problem. It is expected that 14 Mbps connections should handle streaming media 4 K video and 18 Mbps 8 K video. But if everyone does this at the same time, as statistics show, it will be difficult for the network to meet demand.

Other non-consumer areas will also get better services in 5G, but as

EE itself acknowledges, some applications of low latency and high capacity networks have not even been taken into account. You need to have enough technology to solve its problems.

Finally, another major benefit of 5G technology is that standards and spectrum bands will be retained globally. In the UK, for example, your 5G phone will use exactly the same system and spectrum band as the United States, South Korea and anywhere else.

1.4 Application of Block chain Technology in Internet of Things Industry

Block chain technology is called distributed account book technology, which is a kind of interconnection database technology, which is characterized by de-centralization, openness and transparency, so that each can participate in database records. After the advent of intelligent contract technology, blockchain will evolve from the recorder of information to the executor of the transaction. Low-cost transactions can greatly reduce the cost of value exchange, and the combination can develop scenarios that could not have been imagined before. Block chain technology can not only provide an appropriate solution for recording the data of all IoT units, but also ensure that the data is recorded, and then it can not be changed.

In view of the current problems in the industry, block chain technology will be used to solve the following problems:

- (1) The distributed account book ensures that the data is not tampered with, uniqueness;
- (2) Smart contracts ensure transaction reliability and efficiency.
- (3) The structure of point-to-point distributed data transmission and storage;
- (4) The encryption protection and verification mechanism of data in distributed environment;

