Research on Architecture and Related Technology of IOT

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Abstract: People's lives are increasingly inseparable from the Internet. Through the web platform, you can learn, read, shop, and more. Following the Internet, a new term “IOT” has emerged. Unlike the Internet, the IOT has a networked information technology that promotes the development of the network and is the development trend of the future network. Therefore, the architecture and technology research of the IOT are highly valued by various fields. This paper analyzes the problems of the architecture and technology of the IOT.

1. Introduction

The community has drawn great attention to the IOT in a relatively short period of time, indicating that many people believe that the IOT may have a huge impact on human society and people's daily lives. Regardless of whether it is domestic or foreign, the research and development of the IOT is in its infancy. There are still some confusions about the positioning and characteristics of the IOT. The system model and structure of the IOT have not yet formed standards. The research and development of the IOT is in China. There is also a certain degree of blindness. From the perspective of scientific research, there are some issues worth considering in the research and development of the IOT. For example, is the IOT a sensor network? What is the core technology of IoT research and development? What is the innovative technology of the IOT? What are the essential differences between the IOT and the Internet? How to carry out valuable things for China's economic and social development? Networked research and development? Based on the analysis of IoT-related technologies and applications, this paper attempts to answer the above questions about the IOT. Based on the analysis and research of existing IoT technology solutions, an attempt is made to propose an IoT interconnection. The architecture is used to guide the theoretical research of the IOT. On the basis of analyzing and researching the application examples of the IOT, an attempt is made to propose an IoT system model to guide the research and application system development of the IOT technology standards. On the basis of the above research, we try to find out the characteristics of the IOT different from the Internet, and derive the basic principles of scientific research and development of the IOT, and provide a scientific basis for the research and development of the IOT in China.

2. IOT Architecture Analysis

Now that the IOT is in the early stages of development, there are many theoretical analyses of the characteristics and aspects of the architecture of the IOT. The interconnection of systems between items and items mentioned in the definition of the IOT can summarize a feature, namely the World Wide Web of articles. This is a user-centric, embedded World Wide Web system in the IOT, systematically managing user-published information and processing user-acquired information in a timely manner, serving the user's application-oriented IOT. The other is the autonomous architecture of the IOT. The structure is a structural system design of a heterogeneous IOT operating in a wireless communication environment based on research and development of autonomous communication technologies. The core technology of the design is autonomous. The task of the network control plane is accomplished through the end-autonomous component-intermediate node-autonomous component-end level, and also ensures a non-essential feature of the communication system: evolvability.

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It can be seen that the four levels are interrelated and functioning. The management side plays an interaction between the management and coordination of the other three aspects in the autonomous architecture. The knowledge plane provides the knowledge adaptive control control surface needed for control decision; the control plane is responsible for sending configuration messages to the data plane and controlling the throughput and reliability of the data plane; the data plane is mainly responsible for data grouping and delivery. This is an autonomous architecture system unique to the IOT.

In the overall structure of the IOT, the data perception layer exists as a foundation and plays a very important role. The data-aware layer collects data mainly through a reader, GP S, camera, and the like. The data-aware layer is the beginning of the overall structure of the IOT. Its main task is to collect and transmit data. Data is collected by tools such as GP s, camera and reader, and the data is transmitted to the relevant data by short-distance transmission through wireless technologies such as iz g B ee, Bluetooth, etc. or prior art technologies such as industrial fieldbus. In the device so that the device can process the data.

In the structure of the IOT, the data transmission network layer is built on the basis of the current Internet system. It is mainly responsible for transmitting the collected data and plays a key role in the entire IoT system. It is mainly responsible for transmitting the data collected by the sensing layer and short-distance transmission to the gateway device to the data center through long-distance transmission. . The data transmission network layer has high requirements for the performance of the Internet. However, in the current Internet status, the requirements of the data transmission network layer cannot be effectively met, so it has certain constraints on the development of the IOT. Therefore, in order to have a higher and deeper development of the IOT, it is necessary to upgrade and re-integrate the existing Internet.

The ultimate goal of the development of the IOT is to apply. So the application layer is the core of the IoT architecture. The application layer mainly receives data collected and transmitted by the data sensing layer and the long-distance data transmission network layer, and then performs data processing through a certain technology, so as to have correct judgment and control for the entire system, thereby realizing the entire IOT. Management. The application layer in the IOT can be divided into the terminal device layer and the application layer, which together bear the work of the object network in different industries and different fields.

3. IOT related technologies

In the development of the IOT, the sensor identification technology is the core technology in data acquisition, which is mainly responsible for the entire data collection. The sensor identification technology is mainly used to collect data by using microelectronic technology, so that various information such as sound, light, electricity, heat, force, etc. can be collected, and the received data can be sent to the data processing in the IOT. Layer, making the first step of the work of the IOT.

Bluetooth technology. Bluetooth technology is also a type of wireless transmission technology. It transmits data by means of high frequency modulation, time division multiple access, and the like. The current development of Bluetooth technology is mainly for mobile device vendors. It effectively simplifies the complex data transmission between computers and mobile devices, and its data transmission has high efficiency. It is a widely used data transmission technology. Must be z I GB E E technology. z i g B e e technology is a wireless transmission technology that mainly uses packet switching and frequency modulation technology to transmit data. The technology has many advantages such as high security performance, low cost, high reliability, strong adaptability, network capacity, and low power consumption. At present, the technology is also widely used, and it can be used very effectively in the IOT. The shortcoming of this technology is that the data carrying capacity is weak and the data transmission range is relatively small.

The role of RF I D technology is mainly at the perception layer of the IOT. The technology transmits data recognized by the sensing layer to a database through wireless transmission or wired transmission, and learns data sharing and exchange through the Internet. The structure of RF I D technology is mainly divided into three parts, namely antenna, reader and electronic tag. In these

three parts, the antenna mainly receives and transmits signals. The reader mainly reads and writes data. The electronic tags mainly store data. The technology has a very strong environmental adaptability and can be applied in various fields. And it is basically fully automated and has very high productivity. At present, the application of this technology is very extensive in the fields of document management, monitoring, security, etc., and with the further development of the IOT, the technology will have a wider application. .

In the technology application of the IOT, information processing technology enables interaction between people and computers. Information processing technology mainly through the calculation and mining of data, so as to effectively process the data, and finally present the data in front of people through a simplified interface, so that the application of the IOT can be finally realized.

4. Questions about the development of IoT

The first is the issue of technical standards. The standard is a communication rule that relates to the communication between things in the IOT. There are different standards in countries, so cooperation between countries needs to be strengthened to find a standard that is generally accepted. Second is the issue of security. The items in the IOT are more closely linked, and the items and people are connected. As a result, information collection and exchange equipment are used in large quantities, and data leakage has become an increasingly serious problem. How to achieve a large amount of data and user privacy protection has become a problem to be solved. Third, the issue of agreement. The IOT is an extension of the Internet. At the core level of the IOT, it is based on TCP/IP. However, at the access level, there are various types of protocols, such as CPRS, SMS, sensors, TD-SCDMA, and cable. The IOT requires a unified Internet. The basis of the agreement. Fourth, the terminal problem. In addition to its own functions, IoT terminals also have functions such as sensors and network access, and different industry needs are different. How to meet the diversified needs of terminal products is a big challenge for operators. Fifth, the address problem. Every item needs to be addressed in the IOT and requires an address. The IOT requires more IP addresses, and IPv4 resources are running out. It needs IPv6 to support it. The transition from IPv4 to IPv6 is a long process, so once the IOT uses IPv6 addresses, there will inevitably be compatibility issues with IPv4. Sixth, the cost issue. At present, the cost of components such as chips required for the IOT is relatively high. If it is natural to put all the items into the identification chip, it is still necessary to consider how to effectively solve this problem. Seventh, the issue of scale. Scale is an important indicator of the performance of operators. The price of terminals, the diversity of products, the depth and breadth of industry applications will have an impact on the scale of users. How to achieve scale is a problem to be discussed. Eighth, business model issues. The business model of the IOT in business applications is not yet clear, and the business model issue deserves further exploration. Ninth, the industry chain problem. Upstream technologies and industries such as automatic control, information sensing, and radio frequency identification required by the IOT are mature or mature, and downstream applications exist in a single form. The development of the IOT requires the joint efforts of the industrial chain to realize the linkage of upstream and downstream industries and the inter-professional linkage, thus driving the entire industrial chain and jointly promoting the development of the IOT. To establish an effective IOT, there are two major difficulties that must be solved: First, scale, only if it has the scale, can the intelligence of the item be effective; second, the liquidity, the items are usually not static, but are in motion. The state must keep the item in motion, and even at high speeds, it can monitor and track the item at any time.

5. Conclusion

With the continuous advancement and development of information technology, the development and research of the IOT architecture and technology is the direction of future scientific development, and it is also the direction of scientific research personnel. Due to the profound structure and design of the IOT, in order to achieve results in the structure and design of the IOT, it is necessary to be

proficient in embedded systems and network systems to realize the timely and effective processing and integration of information on the IOT and become the target of the network platform. . As far as the current situation is concerned, the architecture and technology of the IOT are still immature, and there are still many problems in construction and management. Therefore, the IOT is an arduous and huge task that requires long-term design, development, and perfect system. But also pay attention to the characteristics of the security and reliability of the IOT. Establishing a security certification organization for the IOT in different fields to avoid the urgency of the IoT structure and technology developers or production organizations to neglect the security and reliability of the IOT, causing unnecessary losses to users of the IOT. As long as we have the determination and perseverance to study and develop the structure and technology of the IOT, we will achieve the final success.

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