A Comparative Study on the Architecture Internet of Things and its' Implementation method

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Abstract: With the rapid development of science and technology, Internet-based the Internet of things was born and achieved good results. In order to further build a complete Internet of things system, to achieve the design of the Internet of things, we need to constitute the object of the network structure of the indicators of comparative study, and on this basis, the Internet of things connected to the way and do more in-depth to achieve the unity of the object network architecture and implementation methods. This paper mainly analyzes the two types of Internet of Things system, and makes a brief comparative study of the important indicators, and then introduces the connection method and realization method of Internet of Things based on the concept of Internet of Things and architecture.

1. The Internet of Things and architecture outlined

1.1 Networking

Internet of things a new type of electronic technology or data network system which is based on the Internet technology development. This electronic technology or network system is mainly based on electronic product coding, and the use of RFID identification technology to identify all entities in the world logo identification, to achieve dynamic monitoring of physical items [1]. The understanding of the Internet of Things can be considered from two dimensions. First, from the function point of view, the Internet of things is through the network digital model for the exchange of data information, the virtual space and the actual connection of objects through the network system can achieve over time control, which will use the digital calculation module, data calculation and so on. In addition, technically speaking, the Internet of Things is about the RFID technology, remote sensing technology, nanotechnology and intelligent identification technology connected structure. Of course, the Internet of Things itself is an expansion of Internet technology, because the Internet of Things is mainly based on the development of network technology, and then it controls a wider range of physical items. However, in the evolution of development, the Internet of Things is also a business or application, especially in today's society, expect technical innovation the Internet of things also continue to develop the Internet of things model which is optimize its application to the user experience.

1.2 Architecture

In a broad sense architecture is the relationship within the various components and components of a system, between the relevant relations on the Internet of things that is the design principles the Internet of things will achieve, design developers in accordance with the architecture to network system planning and design, and to ensure that the final system design is consistent with the principles and norms. There are two types of object network architecture in the physical network, namely SENSEI and IoT-A [2]. SENSEIA architecture is a global WS and AN network in series, and then realize the real world network; as IoT-A architecture it is a reference model of Internet of things design, that is,

for the Internet of Things system design the key system components module, and through the experimental model, simulation system and prototype model to verify it to verify whether it conforms to the design principles and related rules.

2. The object network architecture comparative study

2.1 Internet of Things architecture

In the elaboration of the concept of architecture, we know that architecture is of vital importance to the design and implementation of the Internet of Things system, because the designers of the Internet of Things system need to develop and design according to the principles and rules of the Internet of Things, later also maintain the system under the norms of the Internet of things. To build the architecture of the Internet of Things, we first need to extract the relevant parts and components from the system according to the application requirements, but in the extraction we will find that sometimes from different dimensions to choose, it may lead to Internet of Things architecture will vary in performance. The object network architecture study mainly from three levels: the application layer, network layer and the perception layer (see Table 1). There are several evaluation indexes of the composition of the Internet of Things, namely, horizontal, environmental perception, environmental interaction, scalability, security, survivability and interoperability. The horizontal and scalability is the basic evaluation indicators of multiple attributes of the system, the main means of the level refers that the system can be collected from different communication, transmission and information processing technology together, and then applied on the basis of the collection in different areas. Scalability refers that the Internet of Things system can be extended, so it does not slow down the performance as the device increases. In addition, the environmental perception and environmental interaction is the unique property of the Internet of Things system, the environment perception refers to the Internet of things analysis on the surrounding environment for parameter extraction, The interaction of the environment refers to the Internet of things make some adjustments on the basis of the environment perception, according to the perceived data on the system operation command, making the output of the command is in line with environmental changes.

We can explain the structure of the Internet of Things from two aspects, first of all from the perspective of the function of the Internet of Things architecture. The Internet of Things system is a network system that implements data connection through remote sensing, identification, data analysis, and control. Therefore, the architecture of the Internet of Things includes functions such as perception, transmission and processing. The first architecture of the Internet of Things, Networked Auto-ID architecture, which connects the world-wide physical objects with the network through RFID identification models and remote sensing devices, and then give Intelligent identification and control. In this architecture there may be such as two-dimensional code, magnetic stripe, infrared scanner or optical identification devices such as reading terminals and the identify and resolve server. Second, the difference between this structure and Networked Auto-ID is that although both use the RFID identification model and remote sensing equipment, the uID IoT architecture also used the analog data sensor, collect and analysis information through the sensor to the surrounding environment, and then realize the information service of the Internet of Things system. Third, the USN architecture is more common in the Internet of Things architecture, but the architecture has not yet made a specific definition. This architecture consists of five parts, that is, divided the Internet of Things system into five areas, namely, perception, access, network infrastructure, middleware and application modules. In addition, there are MSM architecture and Physical-net architecture. The former refers to the mode of communication, the latter is the architecture that collect and publish service information, and give dynamic mobility management. In addition, we can also introduce Internet of things architecture from the perspective of the model. Mainly MNN and SOF two levels, the former refers to the body's neural network system, while the latter refers to the social organization of data management center. This point of view is the use of the body's data information of the Internet of Things, such as the Internet of Things in the perception of the node as the body of the organ, the Internet of things in the information

data network as the body's neural network system, the information server is also the center of the Internet of Things [3].

2.2 A comparative study of the Internet of Things

Based on the above description of the Internet of things on the Internet, we have to conduct a comparative study of the Internet of Things architecture, first of all we should have deep understanding on the object network architecture type and evaluation indicators. This paper mainly give a comparative analysis on the basis of the Internet of Things architecture from the two types. They are back-end centralized and front-end distributed (see Table 2). There are many information in the Internet of Things system that needs to be processed. The back-end centralized approach is to transfer the vast majority of the processing information, user requests and others to the back-end data processing server in the Internet of Things. As mentioned above: The uID IoT architecture or the USN architecture. The front-end distribution is the work of the Internet of Things in the processing of information to the front of the remote sensing equipment, such as M2M and Iot-A. We compare the two types of the Internet of Things system in depth, the analysis and research found that the USN architecture and Iot-A architecture were in line with the basic structure of the structure and the future development of the Internet of Things system. Therefore, the USN architecture and the Iot-A architecture are the reference structure of the Internet of Things system. It is the two types of the Internet of Things architecture, namely, the backend centralized and front end of the main architecture in the distribution. The future development of the Internet of things network architecture, will design and optimize the Internet of things system, it can be derived more to meet the needs of the application of the Internet of Things architecture which is based on the two systems.

3. The connection and implementation methods

When the Internet of Things system is running, it is necessary to connect the physical items and the virtual network space through different connection methods. The connection is also carried out according to the service and protocol requirements in the Internet of Things system, and the design and implement the structure of Internet of Things system. There are two kinds of direct connection and auxiliary connection in the connection mode. In the implementation method, we can understand from the three aspects of service realization, security service and semantic service.

3.1 Connection method

The connection method of the Internet of Things system is divided into direct connection and auxiliary connection. As the name suggests direct connection is directly access the smart items into the network system, and then achieve the connection with other items. This approach is relatively high demand for smart items, but because you do not need to use the gateway and network nodes, so the demand is relatively small in these two aspects, and the flexibility of the business model is poor. Auxiliary connection is the use of gateways and servers to achieve physical objects and network connections, and then connected the world of goods into a material model structure. On the one hand, the use of the gateway to help the connection means that the intelligent items and other items or servers to achieve the connection, first of all to enter the gateway, the gateway as a buffer point of connection, and then come into the system and other items and remote servers connect them. This kind of auxiliary connection has relatively low, need for smart goods, but the demand for the gateway and the node is large, in addition, the business configuration model is also more flexible. On the other hand, through the server for auxiliary connections. In this connection mode we will use two servers, that is, local support server and remote server, this connection is through the local public support server collection to achieve the remote server connection. Which requires less gateway and computing, the requirements of the higher networking, but the node and business configuration is also more flexible.

3.2 Implementation method

From the connected way of the Internet of Things, it can be seen that in the future if we want to

achieve better items connected, we need to communicate through the agreement. Therefore, in the concrete realization method of the Internet of things, we can study the related attributes of the Internet of Things system, from three aspects.

3.2.1 service implementation. First of all, service implementation, in different systems there are a variety of ways to achieve, such as in the EP system, through a number of EPC information system [4], inquiries the connected items. In order to ensure the validity of the query, or to optimize the query service, you can create a query related to the model or based on synchronization information model. Through the establishment of this model, you can get a more complete query structure, found all relevant information.

3.2.2 security services. Followed by security services. Internet of Things as a kind of natural and Internet network system it also has security problems as the other Internet system. The security problem in the Internet of Things system is mainly for the product identification, transmission and query the process of security risks. For example, in the identification of items, may be due to the system's hardware and software vulnerabilities lead to object recognition technology did not play the desired effect, resulting that it cannot be accurately identified. For instance, in the process of carrying out the identification of data transmission products, it will also occur in the process of security problems, especially when the data more and more processing information increases, the Internet of things transmission system may fail, seriously affecting the data transmission. In the query of the items, the security issues arise mainly because the query system is not established if the integrity of the query may be wrong or incomplete query, which will query the system placed in an unsafe environment, the database Information is easy to tampered with. Therefore, the way to achieve the Internet of things should be considered the safety of Internet of things, to provide security services. For example, the establishment of security mechanisms, mainly to establish the encryption mechanism, the establishment of the encryption mechanism can be based on whether the information is symmetric key to achieve.

3.2.3 Semantic services. Semantic service is mainly applied to the concept of semantic web. Because the Internet of Things needs to run according to the different architecture or application needs to take different language specifications, which will provide a different semantic services, and then to deal with the data. The realization of semantic services allows the system to automate data processing and integration.

Table 1 Architecture of Internet of Things

Internet level	content	direction
Application layer	Specific application, data processing analysis and so on	Intelligent transportation, intelligent home, telemedicine, logistics monitoring, pollution monitoring, etc .; cloud computing, data collection, analysis
Network layer	Wide area network communication	Internet, 3G / 4G and other mobile networks, cable television networks, satellite networks and so on
Sensing layer	Short-range wireless communication, data acquisition, execution control	Infrared, Bluetooth; RFID, remote sensing, access gateway and so on

Table 2 Internet of Things architecture type

Type name	architecture
Back-end centralized	uID IoT architecture USN architecture
Front end distributed	M2 and Iot-A

4. Conclusion

In summary, The Internet of Things system is the premise of the design and realization of the Internet of Things system. Therefore, in the future development of the Internet of things, it is necessary to carry out a comparative study on the Internet of Things system. In addition, according to the Internet connection and auxiliary connection of these two connections, in the way of things can be achieved we can give a comparative analysis from the service implementation, security services and semantic services three aspects. With the rapid development of the economy, the demand for the Internet of Things will be expanded quickly, so the relevant scholars need to study deeply on the Internet of Things system and implementation, in order to achieve the Internet of things architecture and implementation into a unity in the future.

References

[1] Huang Yulan. Object network architecture research [J]. Internet of things technology, 2011 (2): 58-62.

[2] Lv Shaoxin. Comparison of the architecture and implementation of the Internet of Things [J]. Computer fans, 2016 (04): 190-191.

[3] Shen Subin, Mao Yanqin, Fan Quli, Zongping, Huang Wei. Conceptual model and architecture of Internet of Things [J]. JOURNAL OF NANJING UNIVERSITY OF POSTS AND TELECOMMUNICATIONS (NATURAL SCIENCE EDITION, 2010 (4): 1-8.

[4] Chen Ting-bin, Lu Yan-xia, Yuan Lei.Study on Web Services combinatorial scheduling method of Internet of things for dynamic service [J]. Information Journal, 2011 (S2): 134-137.