The Development of IoT Technology in the Field of Intelligent Building

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Abstract. This paper describes the existing concepts of IoT and briefly explains author's understanding of IoT. Based on characteristics of intelligent building technology in the era of IoT and its effect on the field of intelligent building, on the basis of a brief description of the current situation of IoT developing in China, it explains the application and development of IoT technology in the field of intelligent building, indicating IoT Technology has a huge developing opportunity in the field of intelligent building, and the time of IoT has reached.

Keywords: IoT Technology, Intelligent Building, Internet of Things

1. Introduction

The deep integration of informatization and industrialization has given rise to IoT. The IoT can also be said to be the consequence of the integration of information technique and sensor / control technique. Its architecture is formed by integrating the physical structure (such as optical, electromechanical devices) with IT structure together [1].

So far, there is no absolute definition of the Internet of things. Here are some popular descriptions: MIT in USA uses "IoT" to describe the world of connecting computers to real sensor networks through networks (1999).

The notion of ITU is: IoT is a network that realizes the interconnection of devices all over the world through RFID, intelligent computing and other technologies (2005).

The report of research about developing IoT industry (April 8, 2010) points out that IoT is a system formed by physical entities with self identification, perception and intelligence, based on the interconnection of communication technology. These physical devices can achieve coordination and interaction without human intervention, and provide people with intelligent and intensive services.

The conclusion of China Internet of things Conference (2010.6.29) is: all the characteristics of sensing objects with sensor and sensing technology can realize the interconnection between things, people and things, people and people at any time according to the fixed protocol, and realize the network of intelligent identification, location and tracking management.

The current situation of smart building technique contains 20 ~ 30 small systems, which can be
clarified into two types: traditional and technical applications. Most of the traditional and technical applying systems are IP networked architecture, building equipment monitoring, security, all in one card, etc., have developed the integrated integration subsystem on the ITP / IP network platform. The all-in-one card contains many contents, such as access control, consumption and so on. Now it has been integrated into an integrated integration subsystem [2]. Smart building technique covers all industries, from traditional "weak current" to "integrated system", smart building technique covers digital city, which is one of the core technologies for building digital city, smart building technique is a vital technique to build green houses, standards and specifications are increasingly perfect.

2. Impact of Internet of things on Intelligent Building Technology

![Figure 1](image-url)  
**Figure 1.** Realization of Internet of Things in Intelligent Building

Through the sensor networking technology, the devices are widely used in most subsystems. It can be said that many subsystems have been quasi Internet of things or IoT. What is the form of IoT? There are three aspects: one is sensor networking, one is internet protocol, the other is device website. Now many sub-systems are in the form of Internet of things [3]. For example: smart home, building equipment monitoring, security, one card and other systems.

2.1. Sensor Networking Mode of Intelligent Building Equipment

One way / two way, one way / multiple way, TCP / IP network, non TCP / IP network, no direct interaction / direct interaction between devices. Simple such as one card / video monitoring, etc. Complex such as smart home / building equipment monitoring.

2.2. Internet of Things Form of Intelligent Building

Home network connects home appliances, security, curtains, remote meters. Home network can be wireless, power carrier, Ethernet, etc. Many family network systems aren't sustained by TCP / IP. The whole home must have intelligent home controller to master the networking of these equipment. After each home has an intelligent family controller, you can connect with the residents through Ethernet in the team, and the peoples can also feed back some information about the home [4]. It's either a mobile communicating net or an Ethernet network.

2.3. The form of Internet of Things in Building Equipment Monitoring System

At present, building equipment monitoring system is commonly used in three layers: management layer, control layer and field bus. The characteristics of the device through sensor networking are things and things, things and people, multi IO, real-time, field bus oriented. The fieldbus has LonWork
/ BACnet / MODBUS and other non TCP / IP stack networks. Form a logical device connected to the Internet architecture, build a device website, and realize the functions of management and monitoring.

2.4. Cloud Computing and Intelligent Building
Cloud computing uses more energy consumption measurement and energy conservation management system in intelligent buildings. It is unnecessary to set up energy consumption measurement and energy conservation management system in each building. As long as a cloud computing platform is used to unify these, a total energy consumption measurement and energy conservation management system will be formed. Because cloud computing is actually a kind of public service on the Internet. It is aimed at the Internet architecture and the Internet of things architecture. Smart building integrating is an integration, maintenance and management system. If the maintenance and management of intelligent buildings follow the road of Internet of things, our intelligent buildings can not use a set of intelligent building maintenance and management team in each building, and can be realized with a cloud architecture, unified management, very convenient.

3. Internal Network Architecture of Smart Building
In intelligent buildings, most IoT data is collected by the SCM system or PLC system in each subsystem. Generally speaking, these systems’ data are industrial Internet systems, and thus it is generally necessary to pack these data into Ethernet datagram by using the physical layer bridge. In them, the IoT data of power supply system and water supply system are mainly collected by PLC system, as shown in figure 2, and the data of monitoring system and other intelligent building subsystems are mainly collected by SCM system.

**Figure 2. Intranet Architecture of the Internet of Things of Intelligent Building**

Generally speaking, any data information can be connected with the mobile terminal through the mobile base station of the intranet system or the public network system, so that the intelligent building managers can easily query and manipulate the data. At the same time, under the switch of the internal network office system, the monitoring workstation is arranged for the attendant of the property company to manage the whole intelligent building.

Although most of the intelligent building's Internet of things systems are different, its essential operation state is similar to the structure of Figure 1 and Figure 2 in this paper. Therefore, the research on the general implementation mode of intelligent building is of positive significance to the design, operation and maintenance of the Internet of things of intelligent building. In general, the central computer room of intelligent building is relatively simple, without security equipment such as load balancing, mirror server, DDoS redundancy, etc., but generally with security equipment such as hardware firewall. Therefore, there is no engineering difficulty in the network hardware of the Internet of things system of intelligent building. The biggest difficulty lies in data integration, deep mining,
fuzzy control, machine learning and data visualization.

4. Summary
IoT produces a big impact on the area of smart buildings, which will completely subvert the conventional way of thinking. In the past, the idea of Has always been to separate physical structure and it structure: - on the one hand, buildings, roads, etc., on the other hand, data centers, networks, etc. In the time of IoT, Sensors and other chips are inserted and equipped in a variety of objects, such as high-speed rail, viaducts, tunnels in mountains, national highways, urban buildings, urban water supply systems, power grids, dams, oil and gas pipelines, reinforced concrete, pipelines, etc., and then the "Internet of things" and the existing Internet are integrated into a unified infrastructure to realize the integration of human society and physical systems, so as to achieve the integration of the integrated network The purpose of real-time management and control of personnel, machines, equipment and infrastructure in the network. Internet of things is to digitize objects. From this point of view, infrastructure can be seen as a brand new earth construction site. The operation of the whole world is carried out on it, such as economic management, production operation, social management and even personal life.

References
[1] Guofang Kuang,Yingcun Cao. Application of RFID Technology in Building Intelligent Logistics System in Internet of Things[P].,2016.
[2] Bo Zhang. Intelligent Building Security System Design based on Internet of Things Technology[P].,2015.
[3] Guofang Kuang,Zhenfang Song. Building Intelligent Precise Logistics Service System by Key Technologies of RFID in the Internet of Things[P].,2017.
[4] Anonymous. Intelligent Buildings and the Impact of the Internet of Things[J]. Systems Contractor News,2017,24(4).