The Internet of Things Technology Development and Application -- Zhengzhou Airport as An Example

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Abstract. In order to understand the trend of the development of the Internet of things, and the role of development and construction in the future, this article introduces the developing situation of the Internet of things at home and abroad. Summarizes the architecture and key technologies of IoT, this paper expounds the application of the Internet of things, the last development of the Internet of things industry of our country is prospected. Combining with the development of the Internet of things industry area, Zhengzhou Airport development makes us on the Internet of things has a comprehensive and accurate understanding and awareness.

1 Development status at home and abroad

Networking is an important part of the strategic emerging industries, is following the computer, Internet and mobile communication is a new round of revolution of information technology [1]. Information technology is promoting the further application in all walks of life in a new round of the wave of information technology. According to the definition of the International Telecommunication Union (ITU), the Internet of things mainly solves the problem of the thing to thing (T2T), human to thing (H2T), the human to human (H2H) [2]. The Internet is based on the Internet, through the radio frequency identification (RFID) [3], infrared sensors, GPS, laser scanners and other information sensing equipment, according to the agreed protocol to anything connected with the Internet, information exchange and communication, to realize intelligent identification, positioning, tracking, monitoring and management of a network. The Internet of things is a new system of real time interaction between the virtual network and the real world [4-5]. It is the extension and expansion on the basis of the Internet, with the telecommunications network, radio and television network and Internet network [6-7].

1.1 The Internet of things in the developed countries and districts development

The United States attaches great importance to the strategic position of the Internet of things. In February 2009, Obama signed a \$787 billion economic stimulus plan, including plans to invest \$11 billion intelligent power grid, the wisdom medical \$19 billion. In October 2009, the U.S. government approval to spend \$3.4 billion to establish intelligent power grid investment fund, the remaining \$4.7 billion from the folk. In October 2009, the European commission in the form of a policy paper released IoT strategy, based on the Internet to help the EU in leading the global intelligent infrastructure development, in addition to the ICT development plans to invest 400 million euros, launched more than 90 research and development projects to raise the level of intelligent network, the commission will also be in an annual increase of 200

million euros from 2011 to 2013 to further strengthen research and development efforts, at the same time fund earmarked 300 million euros. Support IoT related public-private partnerships for short-term projects. South Korea in 2006 put forward a 10-year U - Korea8 strategy, Korea communications commission in September 2010 passed the "Internet of things the infrastructure construction of basic planning", established IoT market as a new growth engine, determines the constructing IoT infrastructure, development of the Internet service, developing the Internet of things technology, creating an environment of spread of the Internet of things, and other areas of the four, and 12 subjects. Japan, Australia, Singapore, France, Germany and other developed countries to speed up the deployment of the next generation of Internet of things network infrastructure.

1.2 Domestic development of Internet of things

China attaches great importance to the development of the Internet of things industry, the Internet of things as a strategic emerging industries to focus on and promote. In 2006 the State Council issued the "national long-term science and technology development plan (2006 ~ 2020)" on "important areas and priority themes", "major projects" and "advanced technology" has involved Internet content. In 2009, put forward 3 requirements of the development of the Internet of things in Wuxi Premier Wen Jiabao visits: (1) combine the sensing system in 3G and TD; (2) in the major national science and technology projects. To accelerate the development of sensor networks; (3) the establishment of the heart China sensing information as soon as possible, or "perception China center". Premier Wen Jiabao's important speech opened a new era in the development of China's Internet of things. 2010 two sessions of the government work report to foster strategic emerging industries to accelerate the development of the Internet of things applications. The local government subsequently period of time to carry out the construction of rapid development planning and the pilot project of the networking industry. Introduced a number of preferential policies to support industrial development; industry alliance, alliance enterprises have set up. In the standard setting, technical development and market environment has carried out a lot of work. In recent years, the development of the Internet of things Chinese the policy environment continues to improve, significantly accelerate the technological progress. In Wuxi set up a national sensing innovation demonstration zone as a sign, the Chinese Internet of things is accelerating the development of the local government of the Internet of things economic development showed a high enthusiasm and enthusiasm. Through the joint efforts of government and industry, China Internet industry rising strength, has made some achievements in the research of key technology, semiconductor, software and other fields. The domestic standardization work pace at present. China has made significant progress in wireless sensor network, communication technology, micro sensor, sensor, terminal G mobile station. Has the materials, technology, devices, network system to complete industrial chain.

2 Internet of things architecture and key technologies

Internet of things is a comprehensive technology of information, communication, sensor, automatic control and so on. The key technologies of sensing layer include sensor, RFID, near distance wireless communication, self organizing network, middleware, embedded system. Network layer key technologies include M2M, cognitive radio, heterogeneous integration, business capacity development, network environment awareness, etc. The application layer key technologies including software architecture, middleware, resource virtualization, data storage, data sharing, sea state, data mining, intelligent computing etc.. Internet of things also involves identification, analysis, security, network management and other important common technology.

2.1 Sensing layer key technologies

Sensing layer technology has a unified identification technology, RFID technology, sensor technology, sensor network technology, etc. Uniform identification technology to solve the problem of uniform identification of objects. RFID technology needs to solve the ultra high frequency and microwave band RFID chip, antenna, RFID middleware, tag anti

collision algorithm, security authentication protocol and other issues. Sensor technology is the development of small size, low power consumption, self powered integrated central processing unit, micro processing system and other new types of chips. Since the sensor set foot technology mainly solve the multi-level network technology, wired and wireless mobile

2.2 Key technologies of network layer

Internet of things required to make full use of telecommunications networks, radio and television networks and other types of network. The Tao is actively promoting the integration of three networks, through the broadcast television network and Internet integration of telecommunications networks, development, realize the network interconnection, providing voice, data and broadcast television service for users. Triple play is the core of mechanism innovation and technological innovation, and secondly, the Internet of things need to carry the information of the sea, so new materials need to be used to research and development of new transmission network. Once again, only to achieve a variety of sensor networks, wide area of data sharing and multi shared, as well as the scale of the application, in order to really build it a valid Internet of things.

2.3 Application layer key technologies

Mainly includes the application processing center and system integration technology based on cloud computing. In the data networking and application of juvenile order asked quite nervous system networking throughout the network. It needs to solve data filtering, data aggregation and information transfer of 3 key issues. To achieve accurate interoperability, in order to meet the Internet of things in a hybrid network, the efficient operation of heterogeneous environment. Because there is a large amount of redundant information in the data collected by the perception layer, the data filtering technique and the data aggregation technique are very important. After filtering and aggregation processed data need to transfer technical support.

2.4 Safety problem

The network layer and service layer security is independent of each other, and a large part of the network security problem is special because the Internet is based on the existing mobile network integrated perception network and application platform to bring. There are three issues to consider. First, because the Internet of things in many places need wireless transmission, if there is no protection, it is easy to be disturbed and stolen. Two is due to the large number of nodes in the Internet of things. In order to cluster the existence of a large number of machine data will be sent to the network congestion. Three is the RFID system security issues. A RFID chip is designed to be bad and not protected. There are many ways to get the chip's structure and data. Therefore, in the study of Internet of things application, at the same time, to strengthen the research of Internet of things, the Internet of things to become an open, secure, trusted network.

3 The development of the Internet of things industry in Zhengzhou Airport

3.1 Development advantages

Zhengzhou air port is an important part of the Zhengzhou comprehensive experimentation area and Zhengzhou New District, is the first national strategy for the development of China's aviation port economic development zone. As an important part of the overall planning of Zhengzhou New District, the air port is the core growth zone of the Central Plains Economic Zone. It is also an important window and base in Henan province.

3.1.1 Outstanding traffic advantages

Zhengzhou airport is located in the hinterland, the spatial condition is better, the main city and 3/5 in 1.5 hours covering Chinese 2/3 population, Zhengzhou airport planning and construction of more than 4 runway, cargo throughput growth in China, large airport first week full cargo flights in the Midwest second major airports. The province's railway mileage 4822 km, with Zhengzhou as the center of the M shaped high-speed rail network layout is speeding up the construction, the highway traffic mileage of 5830 kilometers, all the county can be 20 minutes on a highway, a modern integrated transport system and air docking, multimodal transport of goods is becoming more and more perfect, the logistics cost and time cost advantage obviously thinning.

3.1.2 Things industry foundation is abundant

Zhengzhou airport networking industry has a good industrial base, driven by the convergence effect of Foxconn, there are more than and 100 industries, more than and 400 supporting enterprises located in its periphery. These enterprises mainly engaged in many fields of electronic information, communication network, transmission sensor and microelectronics, covering the Internet of things, and in the downstream industry chain, has great practical significance to the Zhengzhou air port to seize the future development of the networking industry of high-end areas.

3.1.3 Possess relevant advanced technology

At present, Zhengzhou air port has formed gas sensor, track monitoring, power sensor and other features of the networking industry chain, the emergence of Hanwei electronics, ANN, Wulian purple letter victory and a number of influential in the domestic enterprises, the networking industry development system initially formed. A number of electronic information, biological medicine, aviation transportation enterprises to speed up the gathering to the Zhengzhou airport, Zhengzhou airport with the enhancement of industrial agglomeration agglomeration effect, attracting Foxconn, the Russian air bridge, China Southern Airlines, SF express, aviation, electric Huadian Jin Yuan and other famous enterprises.

3.2 Existing problems

3.2.1 Understanding is not clear

Zhengzhou airport economic zone to promote urban modernization management and intelligent level of public service, using advanced information technology such as the Internet of things, to accelerate the "wireless city", "digital city", "wisdom city", "city" perception of construction. But due to consider their own conditions for application requirements and industrial reality, together with the Internet of things, cloud computing is the development of emerging industries such as law, stage, understanding unclear positioning concept lead to blind investment, speculation and repeated construction unreasonable phenomena occur frequently.

3.2.2 Industry chain is not perfect

At present, the Internet of things application or low levels of demand, is more of a stay in individual project pilot, is just a fragment application. At the same time, the industry application of parallel present a decentralized information island. Many enterprise application is a separate build your own business, communication is insufficient, can't form effective resource sharing. At the same time, the industry chain is relatively fragmented, the lack of dominant power, has not yet found a clear business model, and the Internet of things applications demand motivation is seriously insufficient, enterprise information alone obviously unable to support the whole industrial chain.

3.2.3 Industry achievement outflow phenomenon is serious

Zhengzhou air port iot industry and technological achievements is rich, but most of the industry results failed to form in the region economic benefit, but for other regions. This situation led to the zhengzhou air port iot industry although strong research and development, technological achievements more comprehensive results but less, the situation of application level is low, not conducive to the long-term development of the industry.

3.3 Suggestions for the development of the Internet of things

3.3.1 Increase research and development of industry standards

Zhengzhou air port should be independent innovation and merger fusion combined with industry standard to increase investment, and ensure that the networking industry related technology research and development status in the policy, actively seek independent intellectual property rights of the core technology, and actively participate in the work for the national standard of. On the basis of referring to national standards, the introduction of Zhengzhou air port networking industry standards as soon as possible, so that the development of enterprises to define the direction of the industry, the development and application of better working on networking technology, development of the networking industry regularly; encourage technological progress, how to set up a special project of national technology, breakthroughs in core technology research and development from the technical standard, independent to independent, so as to truly dominate the networking industry the right to speak.

3.3.2 Promote the integration of existing industries

Zhengzhou air port to exert the development of the Internet of things industry advantages and the existing industrial foundation, promote industrial integration. To strengthen the coordinated development of the overall coordination, the formation of resource sharing, collaborative work pattern and the various aspects of mutual support, mutual promotion of coordinated development effect. To strengthen the coordination of things related to planning, science and technology major projects, industrial projects such as the reasonable layout of things major demonstration and industrialization projects, strengthen the industrial chain and regional division of labor.

3.3.3 Government departments to actively guide and support

Establish and improve the beneficial iot application promotion, innovation motivation, orderly competition policy system, to promote to establish perfect information security and privacy protection laws and regulations. Encourage capital fair into the market access mechanism. To speed up the iot related standards, testing, certification and other public service platform construction, improve the supporting service system. Strengthen the protection of intellectual property rights, actively carry out Internet related technical analysis of the intellectual property review, accelerate the iot related patent layout.

4 Summary and outlook

The Internet of things technology application market is rapid growth, the world as the communication equipment, the deepening of management software and relevant technology, the Internet of things technology as a decline in the cost of related products, Internet business will gradually towards a comprehensive application. The Internet of things industry value brought by the dozens of times larger than the Internet, the huge economic interests will inevitably drive competition in the technology. Global technology powerhouse successively put forward the development strategy of the Internet of things, set off a new wave of Internet of things. The domestic famous universities and research institutions compete to itching, gaining momentum. Many provinces are also put forward the corresponding development strategies, and building demonstration project in succession. Looking to the future, the state and the government has clearly put

forward the development of the Internet of things "experience China" the grand strategic objectives. It will next to the terminal standardization and intelligent development.

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