Comprehensive Study on Internet of Things Architecture

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January 2023

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1 Abstract

The Internet of Things is a technological revolution that represents the future of computing and communications. It is not the simple extension of the Internet or the Telecommunications Network. It has the features of both the Internet and the Telecommunications Network, and also has its own distinguishing feature. Through analysing the current accepted three-layer structure of the Internet of things, it is suggested that the three-layer structure can't express the whole features and connotation of the Internet of Things. After reanalysing the technical framework of the Internet.

2   Introduction

There is no generally accepted definition about the Internet of Things.The term IoT, first used by Kevin Ashton in a presentation in 1998, describes an emerging global, Internet-based information service architecture. Over a decade ago, the late Mark Weiser developed a seminal vision of future technological ubiquity - one in which the increasing "availability" of process in power would be accompanied by its decreasing "visibility". As he observed, "the most profound technologies are those that disappear. .. they weave themselves into the fabric of everyday life until they are indistinguishable from it". There is no generally accepted definition about the Internet of Things. The term IoT, first used by Kevin Ashton in a presentation in 1998, describes an emerging global, Internet-based information service architecture. The Internet of Things is a technological revolution that represents the future of computing and communications, and its development depends on dynamic technical innovation in a number of important fields, from wireless sensors to nanotechnology. The purpose of the IoT consists in the facilitation of information exchanges about, among other things, goods in global supply chain networks, i.e. the IT-infrastructure should provide information about "things" in a secure and reliable manner. Extending the initial application scope, the IoT might serve as backbone for ubiquitous computing, enabling smart environments to recognize and identify objects, and retrieve information from the Internet to facilitate their adaptive functionality.

3   3 - Layer Architecture

3.1

sectionThe Perception Layer The Perception Layer is like the facial skin and the five sense organs of IoT, which is mainly identifying objects, gathering information. The Perception Layer includes 2-D bar code labels and readers, RFID tags and reader-writers, camera, GPS, sensors, terminals, and sensor network. Its main task is to identify the object and gathering information.

3.2   The Network Layer

The network layer is like the neural network and brain of IoT, its main function is transmitting and processing information. The network layer includes a convergence network of communication and Internet network, network management center, information center and intelligent processing center, etc. The network layer will transmit and process the information obtained from perception layer.

3.3   The Application Layer

The task of the Application Layer is based on the data processed in the Process Layer, and develops diverse applications of the Internet of Things, such as intelligent transportation, logistics management, identity authentication, location

based service (LBS), and safety, etc. Because the various applications promote the development of the Internet of Things, this layer plays an important role in pushing the Internet of Things to a large scale development.

4 A New Architecture of IoT

As the Internet of Things is different from Internet and Telecommunications Network, the above model is not suitable for IoT directly. They have some similar feature in common. Through the technology architecture of the Internet and the logical structure of Telecommunications Management Network, and combined with the specific features of the Internet of Things, new architecture of IoT was established. The main task of the Perception Layer is to perceive the physical properties of objects by various sensors, and convert the information to digital signals which is more convenient for network transmission. Many objects can not be perceived directly, so we need implant microchip into their bodies. These chips can sense the temperature, speed and so on, and even process the information. The nanotechnology and embedded intelligence technology are key technology in the Perception Layer.

4.1 The Transport Layer

The Transport Layer, or called the Network Layer, is responsible for transmitting data received from the Perception Layer to the processing center through various network, such as wireless or cable network, even the enterprise Local Area Network (LAN). The main techniques in this layer include FTTx, 3G, Wifi, bluetooth, Zigbee, UMB, infrared technology and so on. The main function of transport layer is transport. At this layer, we can find many protocols, like IPv6 (Internet Protocol version 6), which is necessary for addressing billions of things. The Internet of Things will be an immense network, which connects billions of things, and encompass huge amounts of various networks. The communication between different networks and entities is very crucial

4.2 The Processing Layer

The Processing Layer mainly store, analyse and process the information of objects received from the transport layer. This new layer is specifically extracted from others, due to the large quantities of things and the huge information they carried, it is very important and difficulty to store and process these mass data. Cloud computing and ubiquitous computing is the primary technology in this layer; in future there even may appear new computing technology which is more suitable for the Internet of Things. For the research and development on the Processing Layer is significant for the future development of Internet of Things.

4.3   The Business Layer

The Business Layer is like a manager of the Internet of Things, including managing the applications, the relevant business model and other business. The Business Layer manages the release and charging of various applications, and the research on business model and profit model. Success of a technology depends on the priority on technology, and the innovation and reasonable of business model. Based on this point, the Internet of Things can not have effective and long term development without the research on business model. The Internet of Things can not have effective and long term development without the research on business model. This layer should manage the users' privacy which is important in the Internet of Things.

5   Summary

The future of the Internet of Things, a new technology that combines the functions of the Telecommunications Network and the Internet. The architecture is based on data communication tools, primarily RFIO-tagged items. At this layer they find the Internet Protocol, arguably the heart of TCP/IP. Cloud computing and ubiquitous computing is the primary technology in this layer. The term IoT describes an emerging global, Internet-based information service architecture. The Internet of Things is a technological revolution that represents the future of computing and communications. Its development depends on dynamic technical innovation in a number of important fields. 5 sense organs were involved in the study.

6   Highlights

● The Internet of Things is a technological revolution that represents the future of computing and communications, and its development depends on dynamic technical innovation in a number of important fields, from wireless sensors to nanotechnology. [ ] Technically, the architecture is based on data communication tools, primarily RFIO-tagged items (Radio Frequency Identification) ● Network layer even in Transmission Control Protocol (TCP)/IP model discussions). It is responsible for typical layer three jobs, such as logical device addressing, data packaging, manipulation and delivery, and last but not least, routing. At this layer we find the Internet Protocol (IP), arguably the heart of TCP/IP, as well as support protocols such as Internet Control Message Protocol (ICMP) and the routing protocols (RIP, OSFP, BOP, etc.) The new version of IP, called IP version 6, will be used for the Internet of the future and is at this layer ● As the Internet of Things is different from Internet and Telecommunications Network, the above two models is not suitable for IoT directly ● The Transport Layer, or called the Network Layer, is responsible for transmitting data received from the Perception Layer to the processing center through various network, such as wireless or cable network, even the enterprise Local Area Network (LAN) ●

Cloud computing and ubiquitous computing is the primary technology in this layer; in future there even may appear new computing technology which is more suitable for the Internet of Things

7   Conclusion

The existing three-layer structure has certain significance to understand technical architecture of the Internet of Things at the initial stage of its development, but it cannot completely explain its structure and the connotation. Many scholars have different opinions on the definition and scope of the Internet of Things.