Intelligent Management of Network Resources Based on Net of Things Technology

Naibin Zhai

Tianjin University of Technology and Education, Tianjing, China, 300222

*Corresponding author e-mail: zhainaibin@tute.edu.cn

Abstract. With the high popularity of computer network technology, the value of network resources has been recognized by many scholars. Network resources have become a part of the core value of enterprises. The emergence of intelligent network resource management mechanism also means the rise of information resources [1]. As a new technology of information management, the emergence of Net of things has promoted the management level of network resources. Because of the characteristics of information perception and intelligent information processing, the Net of things technology is in line with the mechanism of network resource management. This paper briefly describes the mechanism of Net of things in all aspects. On this basis, this paper proposes the measures of intelligent management of network resources by using Net of things technology. I hope this article can help readers to study the network resources.

Keywords: Net of Things, Network Resources, Intelligence, Management

1. Introduction

In the early years, people used to use books to record all kinds of data and information. This way can simply record some small amount of data information. However, when a large number of data are collected and recorded, the form of book records is obviously not applicable [2]. Moreover, the management of book records is not convenient. When the book is discarded, the information of the data will disappear forever. With the loss of time, the traces of ink will gradually fade or even completely disappear. Therefore, in the face of the current era of a large number of resource information, scholars use the form of network carrier to integrate these information into computer resources. As long as the computer format is avoided, the data information will not disappear. Therefore, the final problem to be solved is the intelligent management mechanism of network resources.

As a new network technology, the Net of things is widely used in various industries. Its technical basis is the Internet and radio and television networks. It can be called another special form of technology extension of the Internet (see Figure 1). There is no doubt that the use of the Net of things can make information management more intelligent. People have found the convenience of this feature. Therefore, people plan to apply it to the management of network resources. However, the implementation of many plans is theoretical rather than practical. This paper briefly introduces the
theory of Net of things related technology. The strategy of using Net of things to manage network resources is also mentioned in this paper.

2. Analysis of theoretical research on Net of things technology at home and abroad

2.1. Development history of Net of things technology
In the late 1990s, the concept of radio frequency (RF) was proposed by American engineering colleges. They believe that this technology can connect all items to the Internet through RF devices. It can realize the intelligent management of physical objects and virtual objects. This kind of radio frequency technology is the rudiment of the early development of the Net of things. After the international information summit, people formally named this technology as the Net of things.

![Figure 1. Concept map of network resource management supported by Net of things.](image)

2.2. The analysis of key technology
The key technologies of Net of things can be divided into two main parts. The first part is hardware technology. The second part is software technology. The hardware part mainly includes radio frequency identification technology and wireless sensor technology. In the application of virtual information management technology, nanotechnology has also been added to the field of hardware technology. Software technology mainly includes information processing technology and security protection technology. It is mainly responsible for the management of virtual information and the protection of information security.

2.3. Analysis of the main application fields of the Net of things
Generally speaking, it is mainly used in the field of agriculture and logistics transportation. The application in agriculture is the detection of agricultural resources. Wireless sensor technology and remote sensing technology are the main detection methods. The detected data include crop yield and seed screening. The application in the field of logistics transportation is the real-time tracking of logistics. The recipient can find the specific location of logistics goods through the Net of things.

2.4. Establishment of main network control platform
The control platform supported by Net of things mainly includes three parts. They include information processing platform, self-organizing platform and security protection platform. Information processing platform mainly uses software technology to manage the core information of the industry and process the inflow of external information. Self organizing platform is an auxiliary function of information processing platform. The security protection platform mainly protects the system of Net of things from external network virus attack.
3. The basic characteristics of Net of things technology in the field of network

3.1. Information collection in anytime and anywhere
This feature is also known as the comprehensive perception of network information. The prototype of Net of things technology is social frequency identification technology. In addition, two-dimensional code technology and sensor technology are based on RF technology. Net of things technology can use two-dimensional code technology and sensor technology to collect network information anytime and anywhere. This feature makes the Net of things technology play a core role in the logistics transmission system.

3.2. Stable network information transmission
According to the above description, we understand that RF technology can connect physical objects and the Internet interactively [3]. The relationship between Net of things technology and various communication networks is very close. The interactive connection and information sharing with these networks can ensure the stable transmission of network information. This mode of transmission can ensure the real-time monitoring of physical mail. In addition, the control-ability of network information has also been improved.

3.3. Control of intelligent decision making
Cloud computing technology is a kind of technology that is often used in the manufacturing process of smart phones. As an advanced intelligent computing technology, the combination of it and Net of things technology can process a large number of core data intelligently. Moreover, after various problems appear in the process of processing information, the intelligent decision-making system can timely use the function of the Net of things to repair the internal problems.

3.4. Reasonable allocation of network resources
The management of network resources is an important work content of an enterprise. Due to the expansion of information in enterprises, the management of stored information becomes extremely complex and difficult. Net of things technology can not only collect a wide range of network information, more importantly, it can rationalize the distribution of network information resources within the enterprise. The importance of this feature has been quickly discovered. This is also the reason why this paper appears.

4. Intelligent management of functional network resources based on Net of things technology

4.1. Management of network communication power
The sharing of network resources needs the support of communication equipment. The operation of communication equipment needs to improve the transmission power of the system. However, sustained high power output can reduce the battery life of the device. Net of things technology can reduce the transmission power of the system as much as possible under the premise of ensuring the communication equipment working. This way can save unnecessary energy loss. It can also extend the life of computer equipment (see Table 1).

| Functional resource management | Technology required           |
|-------------------------------|-------------------------------|
| Power management              | Energy saving technology      |
| Base station management       | Informational sharing         |
| System resource management    | System optimization           |

4.2. Management of base station service for information sharing
In the process of information sharing between two devices, the service platform of communication terminal will send network information to another service base station [4]. However, this process is
likely to cause the communication service connection to be interrupted. The problem of information loss and sending error can occur. Net of things technology can control the stability of base station service. It can improve the efficiency of information sharing.

4.3. Management of systematic network resources
The sharing of information services mainly depends on the performance support of system equipment. The advantage of network resource management is that it can improve the performance of computer equipment. The use of the Net of things can reasonably integrate the systematic network resources. In order to ensure the normal operation of mobile communication services, the effective management of network resources can maximize the overall performance of the system.

5. Intelligent management of network resources of text information based on Net of things technology

5.1. Collection of various documents and materials
When writing a paper, we need to quote a lot of literature. However, the efficiency of manual access in the library is very low. Most of the traditional management methods of library information resources are carried out manually. The bar code on the book can be used as the information collection work of the Net of things. Users can use the literature collection function of the Net of things to quickly find the corresponding books (see Table 2).

5.2. Data mining of text resources
The Internet can use a variety of ways to search for information in the network. The Net of things can quickly sort out this information. According to the application of data mining technology, the Net of things can mine hidden data in text information. In addition, the Net of things can also use the artificial neural network technology for information reasoning. It can even use the reasoning function of data to judge the real intention of users.

Table 2. The intelligent management of network resources of text information and the technology of Net of things.

| Text resources management          | Technology required          |
|-----------------------------------|------------------------------|
| Literature collection             | Search engines               |
| Data mining                       | Data analysis                |
| The extension of interaction path  | Informational sharing        |
| Text classification               | Resource arrangement         |

5.3. Amplification of interactive approaches of text resources
Book information is generally the core collection in the library. The Internet can store the knowledge of real books in the network [5]. The sharing of E-books has become one of the main ways for people to exchange knowledge. The use of Net of things technology can increase the interactive way of e-books. These include television, telecommunications and satellite communications. Compared with the interactive communication of Internet, the application of Net of things is more effective.

5.4. Classification of resources
The desktop of many people's computers is very messy. The collation of text information in the computer hard disk is also disorderly. We can use the Net of things technology to sort out the text resources. The Net of things can help us remove useless text resources. Moreover, it can also use a variety of classification methods to classify text information into different categories.
6. Differences between other forms of network resource management and Net of things resource management

6.1. Network resource management form of manual record
The traditional work of resource management is mainly done by human. People use manual operation and paper and pen records to record various problems of network resources. However, the accuracy of this form of recording is very low. It is also inefficient. The form of manual records will waste a lot of costs and human resources of enterprises. This form greatly limits the development of enterprises.

6.2. Centralized network resource management form
This form of resource management will generally use intelligent lighting equipment. The optical fiber equipment transmits the network resource task to the same electronic equipment through the terminal [6]. Electronic equipment uses the convenience of optical fiber network to assign different tasks of resource management to various departments. However, the disadvantage of this form of management is that it can not deal with all kinds of emergencies perfectly.

6.3. Advantages of Net of things resource management form
Compared with the above two management forms, the efficiency of resource management of IOT technology is very high. Compared with manual work, the accuracy of Net of things resource management is also very high. Compared with centralized resource management, the cycle of Net of things resource management is very short. Generally speaking, IOT resource management has the advantages of low cost, high efficiency and short cycle.

7. Conclusion
The wide application of Net of things technology provides great convenience for our life. As an innovative technology in the new era, the Net of things technology combined with intelligent management of network resources is a very advanced opportunity for technological exploration. We must firmly grasp the opportunity to achieve a breakthrough in innovative technology.

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References
[1] Rahmani A M, Gia T N, Negash B, et al. Exploiting Smart E-Health Gateways at the Edge of Healthcare Internet-of-Things: A Fog Computing Approach [J]. Future Generation Computer Systems, 2017, 78(Pt.2): 641-658.
[2] Conoscenti M, Antonio Vetrò, Martin J C D. Blockchain for the Net of things: A systematic literature review [C]/ The Third International Symposium on Net of things: Systems, Management and Security (IOTSMS-2016). IEEE, 2017.
[3] Bertino E, Islam N. Botnets and Net of things Security [J]. Computer, 2017, 50(2): 76-79.
[4] Chandra P, Fisher A, Kosak C, et al. Darwin: customizable resource management for value-added network services [C]/ International Conference on Network Protocols. IEEE, 1998.
[5] Martenson D W. System for network resource management [J]. 2001.
[6] Nollet V, Marescaux T, Avasare P, et al. Centralized run-time resource management in a network-on-chip containing reconfigurable hardware tiles [C]/ Design, Automation & Test in Europe. IEEE, 2005.