

STUDY OF LOGISTICS MANAGEMENT ON INTERNET OF THINGS

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Abstract: Along with electronic commerce's rapid development, the physical distribution the role which plays in the electronic commerce development is getting bigger and bigger. Typical logistics processes became significantly more complex and dynamic during the last decades. RFID technology is particularly promising. At present our country electronic commerce still occupied the stage which needs to consummate and to improve, the present physical distribution system has restricted the electronic commerce development to a great extent. If wants to break through our country electronic commerce development the physical distribution bottleneck, the urgent matter is establishes socialized, the industrial production and the modernized highly effective reasonable physical distribution allocation system on Internet of Thing as soon as possible.

1 INTRODUCTION

Electronic commerce was the 20th century information, the network product. Along with electronic commerce's rapid development, the physical distribution the role which plays in the electronic commerce development is getting bigger and bigger, the physical distribution is regarded as is the electronic commerce development cornerstone. Electronic commerce involves the information flow, the commercial interchange, the fund class and in the physical distribution four base elements, first third-class may realizes through the computer and the network service equipment. But takes in four class the most special physical distribution, besides some information product, the majority commodities and the service must with the aid of a series of mechanized, the automated tool transmission. Obviously, the physical distribution is the electronic commerce important component.

Our country's physical distribution horizontal and the developed country compares also has the beginning evening, the level is low, when introduces the electronic commerce, does not have can support the electronic commerce the physical distribution pattern, therefore the present physical distribution system is restricting our country electronic commerce development to a great extent. Looked

from present's trend of development that will develop the modernized physical distribution system vigorously to our country electronic commerce development the important promotion effect, also only will then solve the physical distribution bottleneck problem, can through the electronic commerce develop economy, create a bigger economic interest truly.

If wants to break through electronic commerce development the physical distribution bottleneck, the urgent matter is establishes socialized, the industrial production and the modernized highly effective reasonable physical distribution allocation system on Internet of Thing as soon as possible.

2 WHAT IS THE INTERNET OF THINGS?

Since Premier Jiabao Wen visited the engineering and technology center of Gaoxinweina sensor networks in China Scientific Academy in Wuxi in Aug, 2009, the concept of Internet of things (IOT, Internet of Things) has spread all over our country. As a fact, IOT is not a new and fresh word.

In the early 1990s, a small news item in Wired magazine described an obscure software product developed out of the University of Illinois. The

application was called Mosaic, and it soon proved to be the "killer app" of the Internet. Within a matter of several years, an entire industry had been built around it and its successors. Mosaic was not the first application of its type, but it delivered a new paradigm of usability to the previously arcane task of "browsing" hypertext links.

The EPC network, using tiny RFID (Radio Frequency ID) tags, will enable computers to automatically recognize and identify everyday objects, and then track, trace, monitor, trigger events, and perform actions on those objects. The technology will effectively create an "Internet of things." RFID will fundamentally impact the industries of manufacturing, retail, transportation, health care, life sciences, pharmaceuticals, and government, offering an unprecedented real-time view of assets and inventories throughout the global supply chain. And in the process, whole new vistas (and challenges) will open up to software developers.

With the official release of the Electronic Product Code Network, we are about to see the "Internet of things" paradigm enter the big time -- the world of mainstream commerce. The term Auto-ID refers to any broad class of identification technologies used in the world of commerce to automate, reduce errors, and increase efficiency. These technologies include bar codes, smart cards, sensors, voice recognition, and biometrics. But the Auto-ID technology currently on center stage is Radio Frequency Identification (RFID). RFID is a generic technology that entails using tiny wireless transmitters to tag individual objects, uniquely identifying them. Such RFID tags allow companies to automatically track objects, trigger events, and perform actions upon the objects. RFID chips have now been made as small as 0.3 millimeters (about the size of a pencil tip). There are a variety of different types -- active (battery-driven), semi-passive (also battery-driven), and passive (driven by the inductive energy of a tag reader).

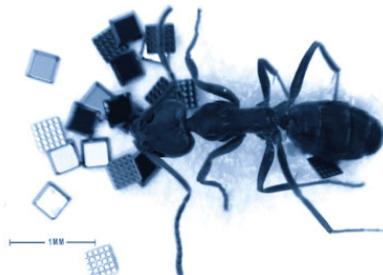


Figure 1: An Ant Playing with RFID Chips.

It is put forward that sensor networks is a development opportunity in the next century on an international conference on mobile computing and networks in 1999. In 2003, American Journal, Technology Comments, proposed that the technology of sensor networks would be the first technology that changes human's life. International Telecommunication Union released the ITU report on Internet 2005: Internet of Things on the world peak conference on information society held in Tunis in 2005, thus the concept of IOT was proposed.

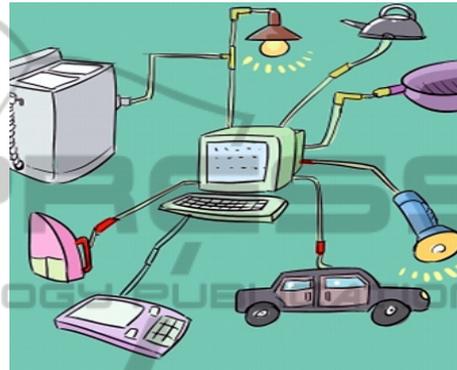


Figure 2: Diagram of IOT.

The Internet of Things is a network of Internet-enabled objects, together with web services that interact with these objects. Underlying the Internet of Things are technologies such as RFID (radio frequency identification), sensors, and smart phones.

3 WORK PRINCIPLE OF THE INTERNET OF THING

The product sticks while producing completion up or inside the saving Qian has the electronics of EPC code of label, henceforth in the whole life cycle of product, the EPC code will become the only marking of product. With this EPC code for the key is worth an ability solid of unite in the thing on-line the related information of search and renewal product. Can also take it as clues, each circulate link to carry on a fixed position to track to the product in the supply chain .In any links, such as conveyance, sale and use, recall...etc., be a certain read and write the existence that the machine reads to monitor label inside the scope at it, will know to read(can also to write in the information needed in the label) the electronics coding information that label contains, and the information spread to arrive to connect with

each other with it of Savant in the center piece, take the EPC data as key to be worth, send out claim to obtain the network address(IP address) of the EPC information server of including the product's information toward the local ONS server(or Internet ONS server), then Savant search an information server according to the address and read PML data, acquire the related information of product combine from Savant replication the PML document , after carrying on a necessary processing, make the information carrying the business enterprise application after delivering to procedure to do the calculation processing of deeper time. At the same time, local EPC information server and source EPC information the server read and write a machine to read to carry on record and modification to correspond a data to this. Filter, collect, compute, check, solve to adjust after savant the EPC data, data transmission, data saving manage with task etc. system processing after, deliver to Internet, can apply to manage a system use for upper level.

Table 1: The composing of IOT.

System	Main contents	Exegetics
EPC codes system	EPC codes standard	Identify the particular code of target
The radio frequency identifies system	EPC label	Stick at the product on
	Read and write a machine	Know to read EPC label
Information network system	Savant(EPC in the center piece)	the software of IOT to support system
	ONS(the object name analyzes service)	EPC label with save the network address of the information server of having the product information to carry on matching
	PML (entity marking language)	Describe the language of product information

4 THE ADVANTAGE OF RFID IN LOGISTICS MANAGEMENT

The emergence of RFID (Radio Frequency Identification) technology has been greatly increased efficiency in the production process management, material flow management, logistics and transport, retail and distribution and other fields of the national economy industries, including electronic information industry. RFID may eventually replace the ubiquitous bar code in the future and become the main technology in logistics and supply chain management field .

Compared with the popular bar code technology, electronic tag has many advantages: omitting the manual control, waterproofing, antimagnetic, bearing the high temperature, a long service life and wide reading distance. Moreover, on the electronic label, data may encrypt, the storage capacity is big and the canned data can be changed. Thus, it has wider and more convenient application than the bar code. The popularization and the application of RFID will bring revolutionary changes to the retail and logistics industry.

The advantages of RFID technology make it have extensive application. In logistics management field, the RFID system can be applied to the cargo management of intelligent warehouse. It not only can process the cargo to go into storage, leave the storehouse and the stock management, moreover also can supervise and manage all the information about the cargo. At the same time, to introduce the RFID technology to the logistics management field, it can effectively save the artificial cost, enhance the work's accuracy, guarantee the product quality, accelerate the processing speed. Moreover, the cargo with tags on them can effectively avoid being stolen, damaged or lost by using the read-write equipment in logistics management center.

The RFID technology is a flow control technology. It can provide the strategic significant incremental benefit to the supply chain of manufacture, logistics, wholesale and retail industry. RFID industry can help enterprises increase the exchange quantity and accelerate the flowing speed of information to promote the efficiency and save the cost. In recent years, the RFID technology attracts so much attention. Experts in the industry analyzed reasons.

Reduce stock and the sales personnel aspect cost: Generally speaking, for retailers, the stock and retailer cost will occupy 2-4% of their operation expense. The bar code recognition process which consumes much manpower can be replaced by using

the read-write equipment to recognize the goods plate, the vessel, the box and the products. The RFID technology can reduce the number of sales person for >30%.

Reduce labor cost of reading the code: The use of RFID product can help retailer reduce labor cost as well as regular cargo management and service fee of goods shelf. Through enhancing the self-service, reducing inspection time and mistake, the RFID product can greatly improve present inspection method of automatic scan.

Reduce the goods in stock: The accurate stock list can reduce the occurrence of decreasing the book value intentionally. RFID can effectively reduce the stock mistake; highly promote the validity of stock report. Through, the use of RFID to track commodity accurately, the company can clearly grasp the sales historical record and enhance the accuracy of forecast of stock in need.

Reduce the occurrence of larceny: For retailers, the loss of larceny reaches as high as 30 billion dollars, occupying at least 1.5% of total sales by conservatively estimation. By RFID technology, we can reduce loss of stock by tracking the commodity in supply system and finding the concrete position of commodity at anytime. The RFID technology has been applied successful in some stores, especially for the high profit or expensive goods.

Reduce the occurrence of out of stock situation: For retailers, the out of stock means making customers disappointed, or going to their competitors. Until now, the loss of out of stock is up to 4% of total sales, for food grocery. RFID technology can track the products, make clear stock list and forecast the supply-demand situation accurately. By this way, RFID can make stock volume reasonable. If retailers improve customers service and satisfaction degree, the sales volume will certainly largely increase.

Suppliers can write commodity style, origin, producer, product batch and other detailed information into the tag. When the cargo box with tag passes through the read-write equipment, the tag transmits the product data to the read-write equipment. Then equipment downloads the data to the central processor to generate the management database of product list. Thus, the total process from production, stock to sale can be clearly handled. The purchase, stock and delivery process will be more convenient. With RFID technology, the company also may realize the real-time monitoring on raw material, half finished product, end-product, transportation, stock, delivery, putting on the shelf and sales even returning the goods (Ames, 2004).

By this way, the company can control the stock reasonably, realizing the intelligent management of logistics.

5 PROBLEMS IN THE DEVELOPMENT

Generally speaking, China's sensor industry is still in initial stage, within, if it could use existing experiences and efficient modes as reference, China's logistics information construction and the development in Internet of Things field could achieve rapid development in short time, but the development still has many problems, which mainly reflects at enterprises sizes different levels, the absence of technological standards, imperfect innovation system, narrow application fields, low level and immature operation mode, so we must pay attentions to the following aspects:

Sensor industry has the characteristics of strong explosive force, great correlation degree, high penetration and wide application scope. Sensor network could promote the development of modern logistics industry belongs, so in modern logistics industrial development process, it could give attentions to sensor, sensor network chip, sensor node, operation system, database software, middleware, application software, system integration, network and content services, intelligent control system core industries, IC, network and communications, and software support industrial development.

Meanwhile, it also should accelerate innovation platform and qualified personnel construction, pay more attentions to improve independent innovation ability, especially develop logistics industrial parks, adopt introduction, cooperation and cultivation mode, rapidly gather a passel of high-level R&D strength and institutions in sensor field, establish sound technology and intermediary service system, strengthen talents introduction and cultivation and master core technology through independent innovations.

6 CONCLUSIONS

Logistics industry is not only one of National Top Ten Industrial Revitalization Plans, but also the important field of information and Internet of Things applications. Its intelligent and comprehensive logistics management and process monitoring could

bring logistics efficiency improvement and logistics cost control to enterprises, improve enterprises and related fields information level so as to achieve the purpose of promoting the whole industrial development.

Judging from China domestic market, the core of logistics information is integration, and it covers IT solutions design and configuration, host management, trading partners development and operations management services.

RFID-based Asset tracking and trace solutions. supply chain solution department will use RFID technology, wireless technology and sensor technology to provide real-time supply chain with good scalability and improved functions, assets and operation visibility solutions. Through this cooperation, RFID, UWB, Wi-Fi RTLS, mobile handset, PLC and sensor have unified convergence, which could significantly reduce cost and provide powerful services.

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