Research on Key Technology for the Global Goods Tracing Informational Platform

WANG XIAOYONG, FANG YUEFENG, XIAO SIYOU, JIFANG LI
Zhejiang Wanli University 315000,
P.R.CHINA

Abstract: - The paper focuses on building key technology of high-efficiency logistics on global logistics informational Platform, such as common sharing of global information in the process of production, transportation and storing or withdrawal based on internet technology, collection of real time information about goods and vehicles by ZigBee node, the connection of nodal operation and logistical management platform by the network and common sharing of internet to realize the intelligent management process in the goods production, transportation and delivery center, namely the goods tracing in the global logistics system.

Key-Words: key technology; informational platform; global goods tracing system

1 Introduction

The developing process of logistics abroad has experienced four stages since the 1950s, and currently it is on the fourth stage with its information, networking and intelligentization. In recent years, regional governments and large enterprises with more developed economy in China have been investing a lot to build logistical enterprises which could function well with modern logistics. It is no doubt that the modern logistical service and operation should be realized by modern logistical operation, but its operation should be based on modern high-efficiency logistical system. The general trend of modern logistics is the realization of information, automazation, networking and intelligentization of the logistical system and the satisfaction of growing needs of social production. The research on high-efficiency logistical system is to base on the characteristics of logistics and to provide high-efficiency and fast service to manufacturers, suppliers and clients by building global goods tracing informational system. It is a key technology to be solved in modern logistical field to realize the track of goods production in manufacturing companies, in the process of transportation and the intelligentization of management process in the delivery center by the use of ZigBee wireless communicative technology.

2 The setup of global goods tracing informational Platform that takes the whole situation into account

The development of global logistics is to put manufacturing enterprises, logistical companies and the users in one system to achieve common sharing of resources, improve logistical speed, reduce the cost and enforce global supervision and management to logistics companies, constructing electronicalized logistics network, conforming traditional logistics enterprises and offering opportunities and means for their quality enhancement through the development, research and promotion of the logistics management system. The global logistics informational Platform can enforce the cooperation between logistics enterprises and the up-and-down stream enterprises, making the production enterprises, logistics enterprises and the users have the same pace, share resources and fulfill the highly efficient modern logistics system. Establishing global logistics informational Platform can form and optimize the supplying chain in the logistics process, offering all kinds of logistics service. This is beneficial to improving the proper use of a great deal of unused social logistics resource, adjusting social logistics resource, optimizing social supplying chain, arranging economical chain and creating good economic and social benefits.

This platform mainly includes:

(1) the Third Party Logistics Management System

This system includes three subsystems: client service management subsystem, business management subsystem and union management subsystem. The comprehensive business management of logistics enterprise, the procedure of the electronicalized logistics business and one-station overall client service can be efficiently realized through these three subsystems. The functions of the client service management subsystem mainly includes: public information service, quotation service and agreement price service, comprehensive logistics entrust of clients, the response of client service dictation, document management, bill inquiry, timely tracing, stock report and management, finance inquiry and statistics, matched service etc. Business

management subsystem is a functional module for managing business and operation. Its main functions are: user management, archive management, operation management, client information management, finance management, data analysis, and code management. The function of the union management subsystem mainly includes: information service, receiving and inquiring dictation, tracing information record and management, bill inquiry and data analysis.

(2) Storage Management System

This system has strong storage management functions. It simultaneously supports several kinds of storage, the operation of several companies or storehouses, unique virtual warehouse management, several kinds of charging modes, advanced bar codes technology, several kinds of measuring units, reliable alarm system, overall diary records and simulated pictures of storehouse position. It can integrate with other modules, offer WEB operation interface or making data interface for clients and realize long distance goods management according to the requirement of clients.

(3) The Managing System of the Delivery Center

This system is used for the daily operation and management control of the delivery center. It contains the functions like cross docking management, client and commodity management, delivery management, automatically goods complementation, picking goods, planning order, processing appreciation, controlling storage, adjusting conveyance, optimizing lines and tracing etc.

(4) Transportation Managing System

This system mainly includes functions like vehicle management, transportation vehicle tracing, document management, union vehicle management, goods station management etc. It can connect GPS, GIS systems to inquire the status of vehicles and trace the transportation of vehicles.

(5) Trace Handling Platform

The informational Platform of global goods tracing has a strong function for handling the timely track of comprehensive logistics. It not only can track goods with various transportation modes, but also offer multi-dot operation, the in-store or under-way status of goods with multi-grade delivery and the detailed information about the goods being tracked by customs, commercial examination and so on according to the requirement of users. Through this platform, clients can examine history and the current status anywhere at any time.

3 The Key Technology for Tracing Goods on the Basis of ZigBee

3.1 The Goods Tracing Process of the Global Logistics System

With the fast development of IT technology, a wireless brand-new net correspondence technology with low speed is born-ZigBee. It contains these characteristics: less power needed, shorter time, easy to work, high credibility with large net capacity, low cost for setting, installation and maintenance, simple agreement, audio-collocation, more compatible, highly secure etc. These features are rather suitable for the complex logistics system. Therefore, we realize the goods tracing process in the global logistics system via ZigBee technology here. How does this technology be applied in the three processes of global goods tracing? See the following part:

(1)The design is based on ZigBee reading and writing unit (it is composed of the sensor and the data receiving-dispatching module), and has constituted a ZigBee network. It has established a position network system with reading and writing unit as its network nodes in places which need to confirm the goods positions, such as the cargo fields of cars, containers and large goods, the storehouse of small commodities. Then it uses the concept of pole position to trace goods. Each positioned node can be taken as “the post of coordinates” and supervising point.

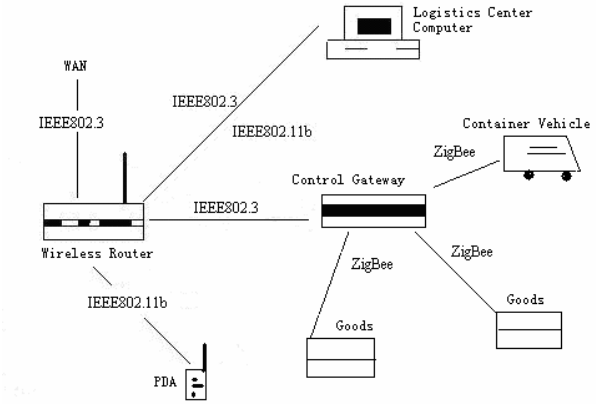
(2)In the production enterprise, by using the node of ZigBee wireless sensor to track the core module of products and according to the production flow of products, users can learn the completion state of goods production plan to timely oversee and urge the producing schedule of the production enterprise to obtain needed products at an early date.

(3)The goods information collected by the delivery center and ZigBee reading and writing unit is transmitted to the management center through ZigBee wireless network. When users fetch goods or the delivery center sends goods, they can conveniently trace and position the place of goods in the cargo field through the logistics managing system according to the indenture number and the information correspondence of ZigBee nodes.

3.2 The Design of Goods Tracing Project in ZigBee Wireless Network System

ZigBee wireless network system conducts design and installation with the storehouse, production

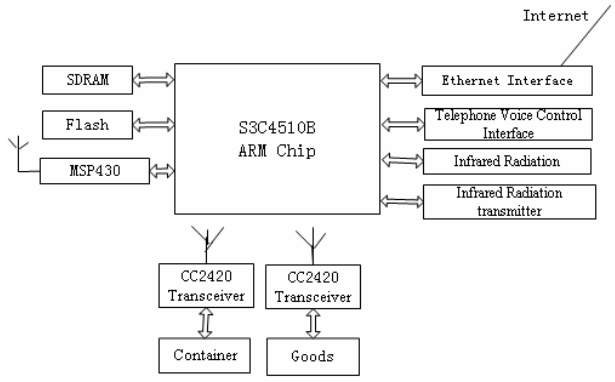
workshop or vehicle as the unit. Each unit establishes a gateway, several wireless read-write node networks based on ZigBee technology. See picture 1. This system adopts the gateway of embedded processor S3C4510B with 32 positions of the ARM framework. Goods and containers are controlled through the expanded control module MSP430 and the receiving-dispatching data module CC2420 of the gateway. See the gateway structure in picture 2. The gateway also communicates with all child nodes of the network via its wireless module.



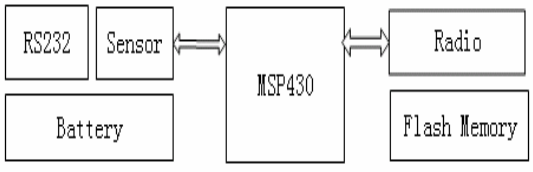
Picture 1. Logistics ZigBee Wireless Network Platform

The sensor node in the system has adopted MSP430 as its core controlling module. The function of the corresponding module of the node of sensors is fulfilled through CC2420 RF transceiver.

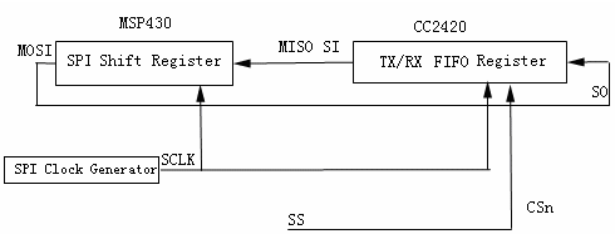
MSP430 and CC2420 correspond with each other through SPI mode. MSP430 uses pricipal mode, CC2420 adopting subordinate mode. The data transmission mode between MSP430 and CC2420 is shown in picture 4.



Picture 2. Structure of Gateway



Picture 3. Structure of MSP430 Hardware



Picture 4. Data Correspondence between CC2420 and MSP430

4 The Key Link of the Global Goods Tracing Informational Platform for Realizing High-efficiency Logistics

The "goods tracing" of the logistics management and the delivery centers in the global logistics are the two key links of the global goods tracing informational Platform for realizing high-efficiency logistics.

4.1 Establishing Position Network System in Logistics Management

ZigBee wireless network system can conveniently position goods and containers. The concrete analysis is as follows:

(1)The system reads data through long distance and all reading and writing units of the system constitutes a ZigBee wireless network. It establishes a position network system with ZigBee reading and writing unit as its network node to read long distance data in places where need to confirm goods positions, such as the cargo field of cars, containers and large goods, and the storehouse of small articles and markets.

(2)When a container or a car with read-write labels goes through any signal domain of the reading and writing unit set in the door of goods transfer station or the city enter-exit transportation crossing and the cargo field, the reading and writing unit will automatically record the identity code of the container or truck and the time when they pass this place and at the same time transmit this information to the logistics controlling center through internet.

(3)One ZigBee read-write node is set every other distance to build a low-cost wireless controlling network in the customs controlling area and the container piling area of the port. Each node can be taken as "a post of coordinates" and a supervising point. It covers a rough position area. With the connecting and transmitting function of this network and by using our software of network controlling management, we are able to supervise packing cupboards and vehicles which have installed our electric labels in real time.

4.2 Goods Tracing Management in the Warehouse of the Delivery Center

Goods can be swiftly found out through the position of articles which can be read by ZigBee reading and writing unit. ZigBee microwave read-write system suits the occasion with large bulk, high read-write flexibility and long read-write distance. In several application occasions of the logistics system where wireless data transmission and position are required, ZigBee system has its unparalleled advantages.

5 Conclusion

Global goods informational Platform has established a shortcut passage for the chink-less platform connection among the production enterprise, the third party logistics enterprise and users. The goods production course of the manufacturing enterprise, the goods advancing journey of the traffic transportation and the goods intelligent access process of the delivery center in the global logistics system can be traced by using ZigBee wireless correspondence technology to construct a wireless network platform and collecting the timely information of goods and trucks in the logistics system through ZigBee nodes, then utilizing the constructed gateway to control nodes, connecting the gateway and the main controlling computer of logistics management to share information with internet. Only through the combination work of the global logistics informational Platform and the wireless network controlling system on the basis of ZigBee technology can the real modern logistics system be successfully established.

6 Acknowledgment

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