

Intelligent Community Property Management System Based on J2EE

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Abstract—With the development of information technology, users have higher and higher requirements for intelligent residential property management systems, and the importance of data information exchange between multiple systems. The purpose of this paper is to design and implement an intelligent management system based on J2EE technology research. Based on the research and analysis of the theories and practical achievements of local property management systems at home and abroad, combined with the future development trend of smart communities, an Internet-based local property management system is designed. Based on the property management of smart residential areas, the Internet of Things technology is fully utilized to realize intelligent management functions such as residential security management and remote monitoring of elevators. The implementation status of system services is checked in the form of test cases. The test results show that this intelligent system meets the requirements for official online use.

Keywords—J2EE technology, intelligent system, property management, system design

I. INTRODUCTION

In social life, various communities and communities play an important role in it, and the importance of related administrative work is self-evident. At present, all kinds of mobile media have been gradually applied to all walks. Various problems are raised and dealt with in a timely manner through mobile devices, and a major breakthrough has been made in convenience [1-2]. Smart communities rely on advanced technology to achieve high performance, energy saving and environmental protection of local property services. It is not only a comprehensive symbol of national economic strength and scientific and technological level, but also an inevitable trend of modern housing development. The emergence of smart communities has created a comfortable, convenient, efficient and safe living environment for local residents, and has also put forward higher requirements for property management companies [3-4].

The mobile Internet technology has changed the backward status of traditional property management IT. The intelligent property management system based on mobile Internet is a powerful tool to realize the innovation of property management service model. Some scholars use the mobile communication network as a platform and use ASP. NET and WEB have developed an intelligent property management system to provide property managers and local residents with timely and convenient local property services [5]. Some scholars have designed and developed an Android-based property management system, which can realize the release and display of local notices, property fund management, timely delivery and owner maintenance. After

testing, it can accurately meet the needs, not only control the home management, but also bring great convenience to the owners' lives [6]. In general, the computerized understanding of property management is an important trend, and there is still a broad field for the development of all property management [7-8].

This paper is to use the multi-layer distributed architecture system based on J2EE architecture to build a J2EE-based intelligent community asset management system. All system operations are completed through the interaction between the application server and the user's browser, and the system-related data is maintained and organized by the data server, so that the entire system has good portability, scalability and security, and can be easily exchanged with other subsystems information.

II. RESEARCH ON THE INTELLIGENT PROPERTY MANAGEMENT SYSTEM BASED ON J2EE

A. J2EE Architecture

J2EE is a simplification of JAVA2, and its architecture has the characteristics of deployment and management [9-10]. Through J2EE, JDBC can be used to write operational data storage, and it can well support XML, JSP and Servlet. These features of J2EE make the system cost much lower, and can well meet the reliability, expansibility, practicability, etc. in actual needs [11-12].

The configuration of J2EE mode is simple, but it will bring the consequences of reduced scalability and maintenance after its upgrade [13]. If it is deeply developed based on a special database protocol, it may show difficulties that logical business cannot be carried out [14-15].

Through several improvements, J2EE has basically realized the process of changing the system structure from a two-layer structure to a multi-layer structure, and can provide independent service functions between the multi-layer structures. Generally speaking, J2EE is generally divided into four structures [16].

- (1) Client components on the client machine;
- (2) Components of the Web layer on J2EE;
- (3) Components of the business logic layer on J2EE;
- (4) The software of the enterprise system layer on the EIS.

B. Design Principles

(1) Practicality

The system should take the needs of property managers, community owners, and property system administrators as the overall goal, and provide better services for property

managers, community owners, and property system administrators as the principle [17]. Based on the actual needs of property managers, community owners, and property system administrators, business configuration can be freely performed to meet user needs.

(2) High security

In the design of the property management system, the security measures of network software and hardware should be strengthened, and the design and installation of the system should be implemented according to specific grades to ensure the security of key data and information of property management.

(3) Maintainability

The maintenance of the property management system includes the convenient maintenance of hardware, software, database and network, and the corresponding maintenance requirements should be guaranteed [18].

III. SYSTEM DESIGN AND RESEARCH

A. System Development and Operating Environment

(1) Operating platform: Windows series operating systems are simple to maintain, easy to operate and powerful. For this reason, the server operating system is Windows 2003 Server, and the client operating system is Windows XP Professional.

(2) Database: The database of this project adopts SQLServer2005, which is the main application database at present, and its reliability and expansibility can meet the development requirements of this system. At the same time, SQLServer2005 supports T-SQL language, supports ADO.NET data access technology, and can be well combined with applications developed using ASP.NET language.

(3) Programming language: ASP.NET

(4) Development tool Microsoft Visual Studio 2005 (5) Internet of things equipment: IC identifier, IC card, RFID equipment

B. Overall System Architecture

The residential property system adopts the B/S structure and the MVC design mode. Through the B/S structure, part of the user's transactions are completed on the client side, and the other part of the transaction is implemented on the server side. This B/S structure continuously utilizes the combination of different browsers and different scripting languages, and uses the buffer mechanism to access the database background through the API interface and various resources of the system. The client is not affected by the server for development and maintenance. It realizes the saving of development cost, and the maintenance and expansion of the business quickly and conveniently.

IV. REALIZATION AND RESEARCH OF INTELLIGENT PROPERTY MANAGEMENT SYSTEM BASED ON J2EE

A. Realization of Residential Property Management System

(1) Real estate management module implementation

The real estate management module is mainly responsible for the comprehensive management of community assets such as community real estate information, real estate information and housing information. Property staff with corresponding permissions can log in to the system platform to maintain basic community information, organize real

estate data, register real estate sales or rentals, manage major house information, and basic owner data.

(2) Realization of household management module

Resident management is a property management company that can view, add or cancel the basic information (such as: name, population, ID number, housing area, etc.) customer profile. Including sales registration, occupancy management, occupancy management. Rental management and resident management, etc.

(3) Realization of device management module

After the staff of the community property company logs in to the system, they enter the equipment management module, enter information and define categories for various equipment in the community, and can apply for equipment maintenance, equipment repair, review and record management, and automatically record through the Internet of Things technology. Equipment inspection process, extract equipment operation data, etc.

The core function codes of the equipment maintenance management module are as follows:

```
if(Is Fill) {
    //Create an instance of the equipment maintenance
    record data table operation class
    MaintainMaster    clsMaintainMaster    =    new
    MaintainMaster();
    //Query equipment maintenance record data
    clsMaintainMasterDB =
    clsMaintainMaster.Find( (string)ViewState["PrecinctID"
    ],
    ViewState["DispatchingID"].ToString(),
    Common.CStrToDate(ViewState["BeginDate"].ToString
    ( )) );
    txtBeginDate.Text
    ViewState["BeginDate"].ToString();
    txtBeginDate.ReadOnly = true;
} else {
    clsMaintainMasterDB = new MaintainMasterDB();
    txtBeginDate.Text = "";
    txtBeginDate.ReadOnly = false;
}
```

(4) Realization of elevator management module

The elevator management module regularly collects the running status parameters of each elevator in the community through the Internet of Things technology, monitors the internal monitoring video of the elevator in time, and promptly sends the status parameters of the faulty elevator to the monitoring center or mobile terminal through the network. The program flow of the elevator remote monitoring and management module is shown in Fig. 1.

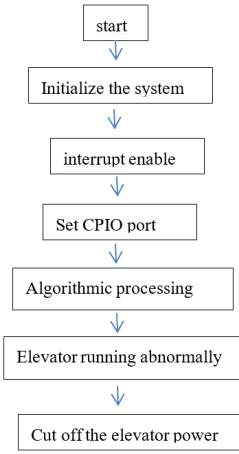


Fig. 1. Program flow chart of elevator remote monitoring module

B. Performance Test

The accuracy test mainly pays attention to the degree of agreement between the execution results of various functions and business requirements. When testing, random execution of functions involves various business levels of division. Basic functions such as bulletin viewing and reporting functions for various repair reports are involved, and the execution results of various functions are analyzed. According to the actual test results, the specified functions can be realized smoothly, and the degree of conformity with the specified business requirements is high, and the established standards are met, and the accuracy is reflected.

The efficiency test mainly focuses on the execution responsiveness of various functions of the system. In the analysis, 3s is used as the established standard. In the testing process, the standard is used as the basic requirement, and the various functions included in the system are sampled and executed, mainly focusing on the functions of positioning, query and information reporting. This type of function involves many background data processing work. In the analysis of functional requirements, the above aspects are paid attention to, and the efficiency of data processing is paid attention to through the test of related functions. According to the test, the above functions can be completed in a relatively short period of time, reaching the set standard of response time, and the efficiency is reflected.

The test uses Poisson distribution theory to verify system events on user access. Poisson distribution is a probability distribution describing discrete variables in statistics and probability, which is suitable for studying the number of random phenomena occurring in a specified time or space interval. Poisson distribution formula:

$$P(X = k) = \frac{\lambda^k e^{-\lambda}}{k!} \quad (k = 0, 1, 2, 3 \dots n) \quad (1)$$

In formula (1), the expected value and variance of Poisson distribution are both λ ; e is the base of natural logarithm; its characteristic function is:

$$\psi(t) = \exp\{\lambda(e^{it} - 1)\} \quad (2)$$

On sufficiently small observation units, X can take at most 1.

When the number of concurrent users is 2000, the response time of the system transaction is tested, as shown in Table I.

TABLE I. SYSTEM TRANSACTION RESPONSE TIMELINE

Serial number	Transaction name	Maximum value	Minimum	Pass
(1)	Visitor View	0.55	0.08	Yes
(2)	Visitor Application	0.36	0.14	Yes
(3)	Visitor authorization	0.56	0.16	Yes
(4)	Property fee payment	0.67	0.18	Yes
(5)	Pay parking fee	0.63	0.22	Yes
(6)	Appointment customer confirmation	0.38	0.05	Yes
(7)	View by appointment	0.43	0.13	Yes

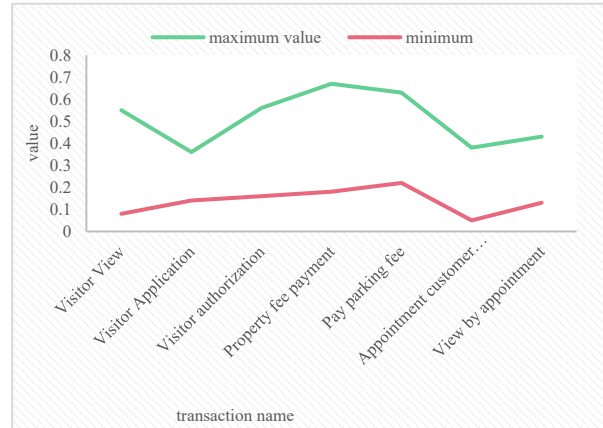


Fig. 2. Response performance test results

After testing, it is finally concluded that the system functional test covers all the use cases in the requirement analysis, the function meets the design requirements, and the system transaction response time meets the delivery standard, as shown in Fig. 2.

V. CONCLUSIONS

The commercialization, large-scale and intensive process of real estate operation has made the management process of real estate enterprises more and more, and cost management, internal communication and management have also become more and more difficult. There is an urgent need to adopt a network information transmission mechanism to improve the efficiency of resource allocation and the efficiency of asset management. Therefore, people's requirements for the property management system are getting higher. Through the research on J2EE process and the development and design of intelligent property management system project, we can see that the intelligent property management system based on J2EE design has high performance and high expansibility. The system also has the characteristics of high security. It separates business computing and display pages, simplifies system development, management and maintenance, improves system development, and demonstrates the outstanding technical advantages of J2EE system. However, with the advancement of Web development technology, design method, Internet, e-commerce, information security and ERP technology, how to use the best Web development technology, choose a more optimized design method, improve system security, and ensure high performance of the system Development will become a problem that needs to be solved in the future.

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