Research and Design of ERP System for Small and Medium-sized Enterprises under Great Intelligence Mobile Cloud

Yong Wen

Department of finance, GuangDong University of Science & Technology, Dongguan, Guangdong, China

*34235485@qq.com

Abstract. Based on the information management needs of SMEs, the article adopts the rapid prototyping method, designs the overall framework of the cloud ERP system, maps out the functional modules, adopts the B/S architecture, uses Java as the development tool, and SQL Server as the background server. The cloud computing and APP technologies are used to realize instant access between the PC and the mobile terminal, and the cloud ERP system with relatively complete system functions, simple interface and mobile operation is realized. The system incorporates new technologies such as big data analytics, artificial intelligence, machine learning and data mining to enable it to realize intelligent financial analysis, intelligent financial forecasting and intelligent financial decisions.

1. Introduction
At present, the mainstream ERP system in the market is designed and developed based on the management needs of large and medium-sized enterprises. The functions are large and complete, the interface is complex, the business process is cumbersome, the internal control cost is high, and the project implementation is difficult [1]; The system design lacks experienced consultants and business experts to participate deeply, and can not fully meet the business needs; the system is not well integrated into cloud computing and mobile Internet technology, and information transmission is lagging [2-3]. The design of large ERP systems does not quite match the business management processes of SMEs. Therefore, the development of cloud ERP system for small and medium-sized enterprises is a top priority and has broad application prospects. The system complies with relevant regulations such as the Accounting Standards for Business Enterprises, the latest tax law, and the business processes of SMEs, tailored to the needs of customers; The system utilizes technologies such as cloud computing and APP to realize instant communication between the PC and the mobile terminal, realizing real-time management and control of the enterprise; Senior CPAs participate in system development and business process reengineering, optimize management, make the system light and flexible, intuitive interface, simple operation, and meet the needs of enterprise management for related stakeholders and enterprise managers. Under the premise of following internal control, the system will properly post the business review link, which not only ensures the immediate processing of the business, but also protects the enterprise's asset security integrity and the authenticity of accounting information, ensuring the orderly and efficient operation of the business activities.

With the development of cloud computing and mobile Internet technologies, and the continuous improvement of enterprise management information systems, the enterprise management model is
developing towards digitalization and platformization [4]. The core part of enterprise management informationization is still financial management informationization [5]. The finance department must leverage the cloud ERP platform to achieve real-time control of enterprise management. The system realizes the seamless connection between cloud financial management system and cloud ERP, OA and other systems, standardizes the front-end business processing flow, completes automatic data collection and real-time processing through multiple ways, helps SMEs reduce operational risks and improve management efficiency.

2. System analysis
Due to the limited space, the following mainly selects the financial management system in the cloud ERP as the research object, and briefly introduces the process of system analysis, system design, system implementation and testing.

2.1. The goal of the new system
Through the combing and optimization of the company's business, it forms a unified management standard, reconstructs the business management platform, and gradually realizes the interconnection of management data, providing timely and accurate data support for the company's operation and decision-making.

2.1.1. Organizational management architecture using group + branch. Focusing on the company's business, we will build an internal interactive communication platform to form a consistent network working environment. Through the platform, employees of member companies can centrally collect, publish and share internal information and promote cultural integration of enterprises.

2.1.2. Realize the standardized management. Follow scientific management methods and management standards, formulate enterprise management processes, and set up necessary control links to ensure smooth and consistent processes.

2.1.3. Building a holistic learning organization. Improve the reuse efficiency of internal knowledge, and form the knowledge replication ability and innovation ability of enterprises.

2.1.4. Support for large clusters. That is, deployment mode that supports load balancing.

2.1.5. The information flow and the capital flow are effectively combined. The financial comprehensive monitoring of the company's information flow, the pre-judgment of the financial risk management and control, and the realization of standardized management [6].

2.1.6. Using mobile internet technology. Support mobile phone camera, use FRID smart tag and bar code for information control, intelligent entry of accounting vouchers, automatic accounting. Realize electronic invoicing, online auditing, cloud reimbursement, payment, account books, and reports in one go.

2.1.7. Real-time tracking management. Real-time inventory management, intelligent purchasing, and immediate costing. With dynamic price management function, real-time view of cost and gross profit, adjust commodity prices according to local market conditions.

2.1.8. Establish network-based resource sharing and form a resource chain for diversified industries. Realize data docking and interconnection between other systems and financial systems.

2.1.9. Support WeChat function. The system should be able to access the corporate WeChat public number to meet the development of the WeChat public platform.
2.1.10. **Support mobile phone operation function.** Develop an Android-based mobile APP platform, so users can log in to the platform anytime and anywhere as long as they have access to the Internet.

2.2. **System Requirements Analysis**
Identify the specific needs of users, combined with the actual business level of the enterprise, determine the functions that the system should achieve and some characteristics based on it, including the operating environment of the system and evaluate the development potential of the system [7].

2.2.1. **Functional requirements analysis.** After analysis, the system requires the following functions: support e-commerce platform, online and offline inventory integration, financial business integration; realize various functions of cloud financial management, mobile query, modify, delete, add data is convenient, system stability and reliability.

2.2.2. **System performance requirements analysis.** The performance requirements of software products include the following aspects: integrity, adaptability, maintainability, normativeness, security, reliability, and practicability. Good safety, reliability and practicality are the advantages of this system.

2.2.2.1. **Safety.** It includes three aspects. First, network security: Cloud ERP protects data privacy through encryption algorithms, key technologies and other authentication methods, encrypts data transmission, storage and processing, conceals information, and protects data security. The hardware firewall is used to effectively prevent attacks from the network and the destruction of the computer system, so that the information system is stable, efficient, and safe.

The second is the security of the information system: to ensure that the business process and authority are clearly defined; the system uses the authorized use mode to prevent unauthorized users or terminals from accessing; effectively prevents users from entering illegal data to ensure data integrity; establish a system authentication module to block illegal Plug-in and program implantation; use necessary transaction processing technology to prevent abnormal business process data caused by network problems, crashes, etc.; establish system logs, form process data for key business operations, in order to cause operational errors, etc, and recover accordingly[8].

2.2.2.2. **Reliability.** The system should have a certain fault tolerance. When the user enters illegal data, the system must perform necessary automatic updates and error prompts to prevent data loss caused by abnormalities.

2.2.2.3. **Practicability.** System interface development uses the J2EE specification. For the program of the human-computer interaction part, the data operation guiding function is provided to enable the user to quickly complete the instruction and data entry. In principle, the user's common interface and function require the system to give a correct response within 3 seconds after the user issues the corresponding command. The system should provide convenient operation, generalized modules, high practicality and strong scalability, and provide good response for data collection, data verification, report presentation and other aspects. Bringing data quantification and real-time monitoring to project management, providing good financial flow management for financial information, and providing systematic data support for company decision-making.

In addition, the operating and maintenance costs of the system should be fully considered, the dependence on hardware and third parties should be reduced, and the cost of system operation should be reduced.

2.2.3. **Business process analysis.** The system service flow chart is shown in Figure 1.
2.2.4. Hierarchical logic model.

2.2.4.1. First layer logical model. The user inputs the data into the cloud financial management system, and after the system processes, automatically generates financial information feedback to the user.

2.2.4.2. The second layer of logical model. As shown in Figure 2.

3. System design

3.1. Design principles and ideas
System design principles: System coding must follow the design documentation, conform to the design philosophy, and adhere to a uniform coding style. The development language of this system is Java language, and the platform chooses eclipse3.5 SDK. The database selects the SQL Server database.

3.2. Overall architecture design
According to the previous analysis of the overall needs, the overall architecture of the system adopts the B/S structure.
3.3. Functional module architecture design
The main functional modules of the cloud financial management system are: general ledger and report function module, salary management function module, fixed asset management function module, transaction management function module, supply chain management function module, and financial decision function module.

3.4. Key technology solutions
There are several other methods for data backup and restoration in this system data maintenance module: one is SQL Back database automatic backup tool SQLBackupAndFTP; the other is to use SQL program for backup, which is divided into full backup, incremental backup and log Backup; third is to directly copy the data file and related configuration files.

3.5. Functional module design
The following takes the knowledge base management sub-module in the financial decision system as an example to introduce the function, input, output and processing flow of the module.

3.5.1. Functional description
This module is used to enter, edit, and manage company systems, financial systems, accounting standards, tax laws, financial management, production processes, system operations, design drawings, design tools, business data, design standards, competitors, business partner descriptions and more. Help the business staff to solve all kinds of confusion in their work in a question and answer form.

3.5.2. Input Output
Input items: query keywords, time, company rules and regulations, accounting standards, company financial management system, tax regulations, system operations, design drawings, design tools, business data, competitors, business partners, design standards and other related help documents. Output items: query and print various questions and answers.

3.5.3. Process
The knowledge base processing flow is divided into five stages. The first stage is knowledge collection, including: collecting various knowledge from business management systems, office management systems, production management systems, existing knowledge stocks, and external systems. The second stage is knowledge storage, which organizes the collected knowledge. The third stage is knowledge management, including: knowledge encryption, process management, classification management, operation tracking, and system warning. The fourth stage is the use of knowledge, such as: knowledge discovery, knowledge retrieval, knowledge push, knowledge query, knowledge download, and so on. The fifth stage is knowledge innovation, which realizes knowledge innovation and value enhancement through knowledge portal, knowledge attention, expert comment, knowledge conversion, etc., and then forms new knowledge in the knowledge base. Thus, the knowledge base forms a closed loop that is constantly updated and developed.

3.6. Database design
The database adopts cloud deployment methods such as distributed technology, virtual technology, and ESB enterprise service bus. It is the focus of the financial management system. Therefore, a well-designed database is one of the important tasks in the overall design.

3.6.1. Database design
In the requirements phase, you must determine the database structure, such as the database, database table structure, and so on. The data table structure is a prerequisite for the data window. In the design of the database, the database specification is usually designed to achieve a three-paradigm. It mainly includes the determination of the data table fields and the determination of the relationship between the data tables.

3.6.2. Database security design
The security of the system is closely related to the input cost and design structure of the system. Therefore, to develop a technology, security strategy and effective program that meets the actual operational needs must consider a variety of factors.
3.6.2.1. Checking from the database portal. At the time of data entry, a validity check is performed, which often requires control of the entry of the static table to prevent "sickness from entering the mouth."

3.6.2.2. Multiple protection with SQL Server. SQL Server security protection is used to ensure data security. SQL Server servers are divided into four security levels: Microsoft SQL Server object security control, database security control, advanced server platform security control, and user-assisted software control. Each level of security control is a layer of firewall to prevent the destruction of illegal users.

4. System implementation and testing
Follow the system requirements analysis and system design ideas to build a new system platform, design programs and coding, build cloud data warehouse, system testing and debugging, system trial run, system acceptance, and write the documentation of each stage, including: system requirements analysis manual, system design specification, system platform and hardware manual, database source mode list, program flow chart and source program list, system use and maintenance manual, etc. Due to the limited space, these processes are not repeated here.

5. Summary and outlook
In the new era of mass entrepreneurship and innovation, the article is based on the Guangdong-Hong Kong-Macao Greater Bay Area, focusing on the long-term, small ERP system located in the front-end financial information collection of SMEs, seamlessly connected with the OA office system, with professional accountants escorting, its help Enterprises realize informationization. The system uses Java as the front-end development tool and SQL Sever as the back-end database to organize the system development and smooth implementation according to the principles of software engineering. Due to lack of experience and time constraints, only some functions of this ERP system have been put into the cloud, in the future the cloud computing and ERP are better integrated, and the functions of the system are continuously expanded and improved. The graphic design software such as PS, AI, ID, FL is used. The system interface is more beautiful and more intuitive, and the security technology of the cloud platform is improved, and the security design of the cloud storage in the front end, the background and the data transmission is improved, so that the system is more secure and reliable.

Acknowledgement
[Fund Project] Characteristic Innovation Project of “Innovation and Strong School Project” of Higher Education in 2017 in Guangdong Province (Project No.: 2017WTSCX125).

References
[1] Jiang C 2018 China. D. Emotion cognition research based on the analysis of EEG and ERP signals. Taiyuan: Taiyuan University of Technology Library.
[2] Zuxiang X 2018 China. D. The Implementation and Application of SAP System MM Module for Auto Parts Enterprise. Jinan: Shandong University Library.
[3] Hua F 2018 China. J. Enterprise intelligence financial innovation based on intelligent manufacturing environment. Communication of Finance and Accounting. 29(2018) pp 64
[4] Michael O 2004 Pump Up SQL Server 2000. Windows & Net Magazine (New York: Windows & .NET Magazine Press) pp 116-118
[5] Yong W 2013 China. J. Research on the Status Quo and Countermeasures of Financial Management Informationization in Private Enterprises. Communication of Finance and Accounting. 11(2013) pp 61-64
[6] Ivar J, Grady B and Rumbaugh J 2004 USA. M. The Unified Software Development Process (New York: Addison-Wesley Professional Press)
[7] Dhar A 2003 USA. J. Automating SQL Server with SQL DMO. Windows Developer Network. 14(2003) pp 260-261
[8] Yu L 2018 China. D. Research of CL Company Business Process Optimization Based on ERP Application. Lanzhou: Lanzhou University Library.