

Design and Research of Equipment Asset Life Cycle Management System Based on ERP

Delv Zhu, Xiao Tian, Huichuan Liu and Xi Cheng

Economic and Technological Research Institute of State Grid Jiangsu Electric Power Co., LTD, Nanjing, China

Keywords: Asset Management ERP, Life Cycle Management System, Design.

Abstract: In recent years, the government has paid more and more attention to energy saving. Energy consumption is not only embodied in energy saving, but also needs to make full use of existing resources to bring good economic benefits to enterprises. As an important factor of enterprise production, fixed assets are easy to influence the future development of asset-intensive enterprises, therefore, the relevant enterprises should pay attention to the analysis of fixed asset management. Based on this, this paper analyzes the electric power enterprise ERP system, comprehensively considers the whole process information management of the equipment assets, and realizes the optimal life cycle cost of the equipment assets on the basis of satisfying the security, so as to achieve the whole process of system optimization management level.

1 INTRODUCTION

With the rapid development of science and technology, many large enterprises through the construction of information systems to improve internal control management, determine the basic framework of enterprises, standardize standard business processes. However, from the current equipment assets management of enterprises, power grid investment is increasing year by year in the form of the traditional completion of the decision-making method can not meet the actual requirements, it is necessary to construct the whole life cycle management system of equipment assets based on ERP, and realize the decision-making of project completion and the automation of Project Capital Transfer. At present, the whole process of project management mainly includes equipment assets, materials, contracts, project planning, financial and other links, management requirements and information can not be shared between the various professional, all kinds of new problems and contradictions among the professional management can not give full play to the project management service ability, which severely limits the level of power grid project management. In view of this situation, relevant enterprises should break through the information limitation of engineering specialty, further analyze the problems existing in the sharing of engineering management information, and

explore the control points of different specialties in project construction, overall optimization of information integration and sharing, improve the information system functions, to achieve business integration and collaborative control (Mao Linlin, 2022).

2 THE DESIGN OF EQUIPMENT ASSET LIFE CYCLE MANAGEMENT SYSTEM BASED ON ERP

2.1 System Architecture Design

By determining the system requirements and development patterns, the system architecture is designed as a four-tier C/s architecture, namely, presentation layer, database layer, data access layer, business logic layer. The presentation layer is used to receive user access, after receiving user input, the object of this layer applies business logic layer for business processing, to read related data through the connection data access layer, the data storage is all controlled through the database layer. When all the business processing is finished, the system automatically transmits the processing results to the presentation layer and presents them to the user in the form of tables, text, and so on (Figure 1 shows).

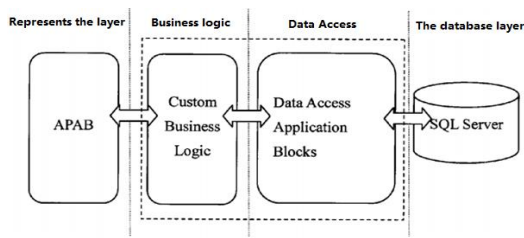


Figure 1: System architecture design.

From a holistic perspective, the system can be divided into the following components:

Client. The system client based on C/S architecture uses the relevant business of ERP system through the form of client login.

Web server. The server is usually used to store the management program of the whole management system, realize the user request processing, realize the interaction with the intranet database, and transmit the result to the front client in time. It is worth noting, however, that before the results are transmitted to the client, the staff reorganizes the data structures according to the client data requirements to make them more client-friendly (shown in Figure 2). At the same time, the Web server must be connected with the intranet server through special processing program, and the more complex data processing should be given to the intranet server for unified processing. In addition, as the Web server and intranet data server to connect, so pay attention to analyze the security of the entire network, in the intranet server and Web Server Building Gateway, and install software firewall on each server to avoid the phenomenon of malicious attacks (Shih Ping-wang, 2022).

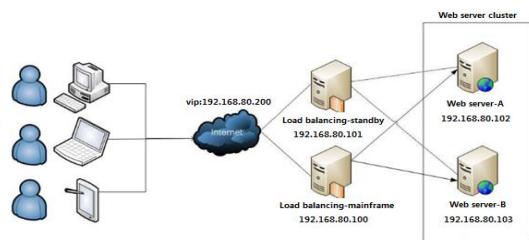


Figure 2: Web server.

Network gates. In order to ensure the security of the system data, the staff should separate the internal network from the external network, and the intermediate position should be isolated by the network gate.

Intrusion detection system. The main function of intrusion detection system is to monitor and control the running status of the system and the network in

real time, it can predict the attack result in advance and guarantee the data security. At the same time, intrusion detection system and firewall can be used simultaneously to achieve the interaction between the two.

Hardware firewall. The firewall is usually installed behind the external network router, according to the pre-set security measures to solve special access and services, enhance network security, reasonable control security risks.

Unified standard interface. In order to realize the data sharing between the system and the external system, the system design many unified standard interfaces, the internal manager can control directly through the client, the system can access the related data through the interface form, thus realizes the system data sharing function, strengthens the system data consistency. (7) intranet application server. The server is used to handle client and server transfers to data and transfer the results of processing to the system database (Ted Wong, 2022).

2.2 Functional Module Structure Design

(1). Project Material Planning Module

The project material planning module mainly includes three-code corresponding update mechanism workflow, three-code automatic matching function enhancement, three-code corresponding batch import and report query sub-modules. Three-code corresponding batch import and report query can apply asset classification, material coding and equipment classification to ERP system by batch import template, and can select field query report. At present, the concrete fields of the report form are composed of asset subcategory, equipment classification, material code, material description, etc., according to the ERP project network related material requirements, according to the three code corresponding standards, the system automatically enhances the relationship between equipment classification and matching material code; The work flow of the three-yard corresponding renewal mechanism mainly aims at the material requirements of the first project, and notifies the Financial Department of the company in time through this mechanism, including the material subcategory, the reporter, the Improvement Unit, the reporting time and other information (Ndeles, 2022).

(2). Project Construction Module Project Construction Module has four sub-modules, that is, legal contract verification function, sub-project contract implementation table, project image progress and financial progress statements, key

business node early warning function. 1) early warning function of key service node. By building this function, the system can automatically trigger the work flow to the early warning when the business node reaches the early warning value set in advance, send an early warning message to the recipient of the message. According to the receiver, business type and item definition elements, the report can select query to monitor the early warning situation and issue the corresponding early warning information. 2) project contract performance statement. It is mainly divided into other engineering cost, project service procurement contract implementation, project material procurement contract implementation and so on. It is necessary to centralize the data and information of material requirements submitted to the final accounts of the completed project, such as the amount, quantity, time and other data, a comprehensive presentation of the project management process; 3) project image progress and financial progress statements. The white label can query the total investment of the project, the amount completed this year, the cumulative plan and other contents, involving construction projects, installation equipment, other costs and other links, analyze the difference between actual and financial progress; 4) enhance the function of contract verification by law. The procedure automatically checks that the purchase order for a construction project is essentially the same as a legal system contract and prohibits the creation of purchase orders that are not subject to a legal system contract (as shown in Figure 3) . For such purchase orders, which can not be obtained through system integration, staff members are required to manually fill in the legal contract number, which is manually entered by the user. For supermarket purchase order and Framework Agreement release order, we should replace contract number by Supermarket + Purchase Order Number and framework agreement contract number + purchase order number [5].

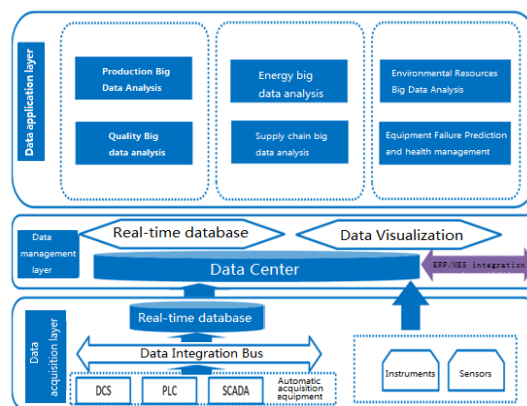


Figure 3: Project construction module.

3 CONCLUSION

To sum up, this paper through the analysis of ERP equipment asset management system development, through the analysis of system architecture design, master the basic structure of system design, improve the integrity of the system. At the same time, further detailed system functional structure design, such as Project Construction Module, engineering materials module, ERP equipment asset management system to lay a solid foundation for the application of related enterprises to achieve sustainable development.

ACKNOWLEDGMENT

This paper is one of the achievements of “Research service of Jiangsu Economic Research Institute of State Grid on the explicit method of power grid equipment assets life-cycle investment based on multi-dimensional management hierarchy”. The project is supported by Jiangsu Electric Power Co., LTD. The project number is B110K0224TUI.

REFERENCES

- Mao Linlin, Zheng Kun, Shen Yunming, et al. Medical Equipment Life Cycle Asset Tracking and management system based on RFID [J]. *Chinese medical equipment*, 2022, 37(1): 9-11,32.
- Shih Ping-wang. Research on the application of the whole process management of urban rail transit equipment assets based on BIM [J]. *Building Technology*, 2022, 6(1) : 70-73.

Ted Wong, Liu Jieyun, Ho wai-kit, etc. The construction of equipment asset management system in intelligent hospital [J]. *China new communications*, 2022, 24(20): 50-52.

Method for verifying the on-site equipment inventory entered into the asset management system: CN202080049655.1 [P], *Ndeles and Hauser Process Solutions*, Inc. 2022-02-25

Equipment Management System and method based on pipeline asset integrity management evaluation: CN202210282250.3 [P], *State oil and Gas Pipeline Network Group Co. , Ltd.* 2022-07-29

