Research on Electric Power Design Information Platform System Design and Benefit Evaluation

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ABSTRACT

In the rapid development of science and technology, the industry scale and development scale of China's power supply enterprises are getting larger and larger. Although it can better meet the demand for electricity in all fields, but a lot of problems have emerged in practice development. Under the background of the new era, electric power enterprises should not only consider the current market development status in their operation and development, but also put forward targeted and effective marketing strategies. Only in this way can electric power enterprises achieve stable development goals in a new environment. In order to deepen the reform of the electric power system, change the traditional monopoly market position, and solve the contradictions and conflicts brought by technological development, some scholars proposed to design and apply the electric power information platform to deeply explore the problems existing in the electric power marketing system. Therefore, after understanding the practical significance of the construction and application of power information platform in the era of big data, this paper combined with the intelligent power grid operation and maintenance management platform and real-time power quality monitoring system with big data as the core, to clarify the system design and benefit evaluation results, in order to provide technical support for the reform and development of power enterprises in the new era.

Key words: big data platform; Intelligent; Informatization; Benefit evaluation

1. INTRODUCTION

Nowadays, the development of various industries in China has entered the stage of automation and information reform, the power industry including the State grid and the Southern Power Grid also realized automation and information during the distribution period, and each region independently built the distribution operation and maintenance management platform, which basically realized the comprehensive supervision and effective maintenance of the operation state of technical equipment. Some power enterprises have also launched their own management platform system, which truly realizes the operation and maintenance control of information technology, but the design of these platforms has not fully utilized the power big data. From the perspective of long-term development, the theory of big data technology has the following values for the development of the power industry: First, access to core data information. The core value of power enterprises is to realize power production and resource application, but under the influence of traditional concepts, enterprise management and leadership pay more attention to construction management, ignoring market feedback, and ultimately lead to less and less communication between power units and the power industry. Big data analysis will collect a large number of end-user data information, mining the real needs of market development, in order to accelerate the pace of enterprise reform and development, effectively drive the steady development of power enterprises, gradually form a user-centered management system, and ultimately form a win-win development goal; Generally speaking, big data analysis can help power enterprises optimize the existing management mode, truly realize intelligent management and control, the system records the data of the operating state of the equipment, analyzes the possible failure of the equipment according to the previous data records, and provides the corresponding treatment measures. At the same time, the application of power big data has a positive impact on enterprise reform. Data analysis and data utilization can enable enterprises and users to achieve effective communication, improve the application efficiency of social natural resources, and provide a new solution decision for enterprise reform. Finally, improve the informatization level of electric power marketing. In the big data environment, the marketing of

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electric power enterprises can use modern information technology means to make full use of various resources on the basis of scientific allocation of information data, which can not only improve the level of electric power marketing information construction, but also achieve the expected long-term development goals. Therefore, electric power enterprises should gradually improve information storage and information configuration, ensure that the power marketing service process is more complete and effective, solve the problems encountered in the construction and management of traditional electric power enterprises from the root, and actively cultivate more excellent technical talents. On the basis of understanding the current situation of informatization reform and development of electric power enterprises in the era of big data, this paper puts forward effective countermeasures from the perspective of long-term development of enterprises according to the results of the system design and benefit evaluation of electric power design informatization platform.

2. METHOD

2.1 Overall Architecture

The electric power design information platform should follow the basic principles of all-service unified data center construction, regard the big data platform as the core content, build an open application platform, rationally use the distributed storage and computing technology of big data, and build the system architecture as shown in Figure 1 below:

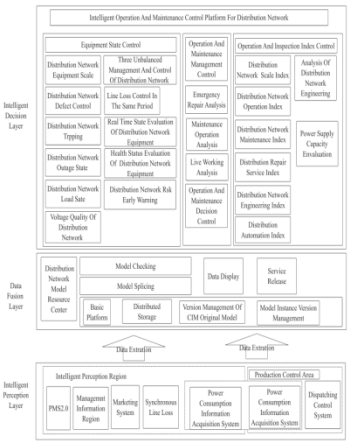

Figure 1 System architecture diagram

According to the above analysis, the overall architecture is divided into three levels: First, intelligent perception layer. Integrate basic data systems such as scheduling automation, distribution automation, power acquisition, scheduling management, etc., and directly connect to the big data cloud platform by means of data extraction, data bus, and message push. Secondly, the relevant system data of the data fusion layer will be cleaned according to the unified data model after entering the computer model resource center. From the perspective of the overall system operation, the computer model resource center is an important basis for the realization of the platform, the construction of application basic data services and micro-application services, can provide data support for various businesses; Finally, the intelligent decision layer. With the support of cloud computing application services, the system will build an intelligent operation and maintenance management platform according to the needs of various business management and control, and truly achieve the management objectives of equipment status, operation and maintenance management, and operation and inspection indicators.

2.2 Packet Application Management

At present, the hierarchical design of power automation master station system has been widely used. The research system in this paper implements group management on the basis of hierarchical management. The specific architecture is shown in Figure 2 below:

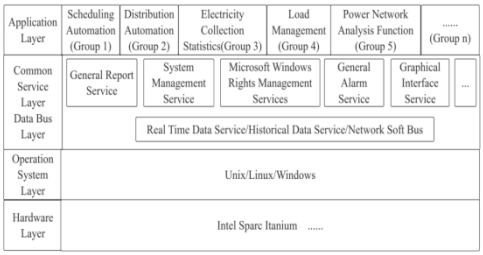

Figure 2 Structure diagram of hierarchical grouping

The information platform includes the public service layer and the data bus layer provided in Figure 1. The design of various power real-time monitoring master station systems is proposed based on the military mechanism. By using the generalized soft bus, the system nodes can realize the real-time data sharing application. According to the structural design as shown in the following figure, the information interaction between different systems can be forwarded to each other in accordance with the protocol to meet the requirements of information sharing service. The integrated application information platform will be designed in accordance with application stratification, break through the traditional master station system design mode, and integrate the design of distribution automation, mobilization automation and electric energy collection super on the basis of a unified platform, and finally realize the integrated design requirements supported by the information platform. The information interaction between various systems will proceed in an orderly manner, forming a unified platform for power system application. The details are shown in Figure 3 below:

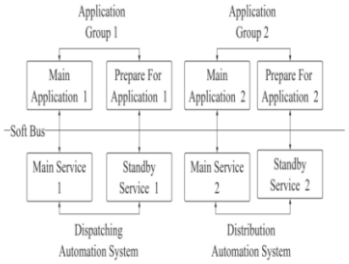

Figure 3 Structure diagram of the master station system

2.3 Image Agent

According to the national regulations on the security protection of power grid and power plant computer monitoring system and dispatching data network and the overall design requirements of the national power secondary system security protection scheme, although some areas cannot be directly connected to each other, the one-way transmission of data must be guaranteed with safety and effectiveness, so the platform will design a mirror agent system, the system logic is shown in Figure 4 below:

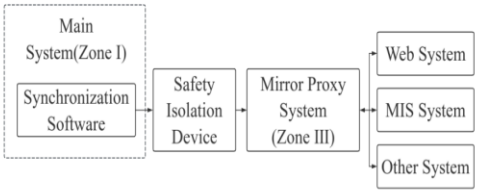

Figure 4 Logical structure diagram of the mirror agent

The mirror agent system, including the database server, is placed in the security zone to ensure that it can install a security isolation device in the regional system according to the secondary security protection requirements of the power

system, and use the synchronization software in the region to send information through the security isolation device to the mirror agent system. From the perspective of system operation, the mirror agent system runs in the mirror node of the system, can receive data parameters and various items in real time, and will provide the received information to each application system.

2.4 Real-time Monitoring

To design a power quality monitoring system in the era of big data, the application hardware includes data acquisition card, information conditioning, transformer, industrial computer and other components, among which the data acquisition card will convert the data into signals that can be processed. When the transformer collects the signal, it will undergo the operation of noise reduction, reduction and linear modification through the signal conditioning circuit. The industrial controller will complete the final data processing, and finally realize the basic functions of system detection, fault location and other specific design structure, as shown in Figure 5 below:

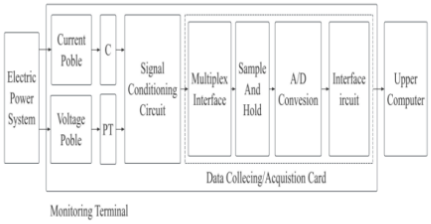

Figure 5 Structure diagram of real-time power quality monitoring system

3. RESULTS

The above system design is applied into practice, two centralized control station systems are used as backup, and the hardware of each centralized control station system is configured in accordance with normal conditions, that is, dual server and dual network redundancy configuration, and the CDC station runs independently under daily conditions. If the function of one of the CDC station systems loses its function, the other CDC station fully assumes all functions. Ensure that the overall system does not lose its monitoring role. The comprehensive evaluation of the application benefits of the system found that the power information platform system, as the basic support for the automation business development of power enterprises, uses the group application management mode to achieve seamless application integration of the automation system, and the mirror agent system realizes the transparent transmission and information sharing of the physical isolation equipment, which meets the basic requirements of system security protection. The problems faced by the traditional system are solved. From the perspective of long-term development of electric power enterprises, the design and application of electric power information platform system should start from the following aspects: First, pay attention to the safety management of system data. The power information platform system should have higher security and effectiveness, so as to ensure that the data stored in the system plays an important role during the business development. Since most platform systems contain three parts: application layer, network layer and user layer, enterprises should start from these three aspects, put forward effective management measures, and integrate them into the construction of power safety system. During the construction and use of the platform, computer technology is essential. In the working state, it is necessary to focus on risks such as hacker attacks and network viruses, arrange professionals to build firewalls and install anti-virus software, so as to fundamentally protect the integrity of data information. At the same time, power enterprises should arrange operators to regularly participate in safety education and skills training, continue to strengthen their safety awareness, and actively cultivate basic safety operation and management awareness; Secondly, organize information resources efficiently. The effective combination of information technology and power information can help power enterprises to understand the market development trend in time and sort out and analyze more data information. In the context of the rapid popularization of Internet technology, the cost of obtaining value information is getting lower and lower. Information technology should be regarded as auxiliary materials for data analysis, and the processing should be efficient and accurate, so as to reduce unnecessary cost expenditures and improve the economic benefits of power enterprises. In this process, the efficient summary of excessive information resources can increase the enterprise infrastructure and lay a solid foundation for the enterprise resource summary;

Thirdly, effective integration of information data and advanced technology. In the context of the rapid popularization of Internet technology, the way and cost of enterprises to obtain information are getting lower and lower. Information technology is regarded as auxiliary materials for data analysis, which can ensure the efficiency and accuracy of data during processing, further improve the economic benefits of electric power enterprises, gradually improve the basic measures of enterprises, and lay a solid foundation for resource summary. Finally, design and promote electric power App. Traditional electricity payment requires users to queue up independently, but this way will increase the pressure of users and staff, so in the development of modern technology, researchers began to design and apply professional equipment software, on the one hand, can narrow the distance between users, relieve the pressure of staff, on the other hand, can reduce more human costs, improve the benefit space, Promote the pace of design informatization reform and development of electric power enterprises, and fully demonstrate the design advantages of information platform system.

4. CONCLUSION

In summary, in the steady development of China's social economy, the development speed of electric power enterprises is getting faster and faster, and the design reform requirements of enterprise information platform system are getting more and more. In the face of the increasing demand for power energy, China's modern power enterprises should penetrate the people-oriented work concept according to business needs, increase the training of professional and technical personnel, and pay attention to providing a better service system for the public, so as to lay a solid foundation for the reform and development of power enterprises.

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