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Research on the application framework design and realization technology of power Marketing management information system

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Abstract: In the development of modern economic construction, power production and marketing as a huge and complex system engineering, to promote the innovation and development of the power industry has a positive impact. Especially after entering the development trend of economic globalization, the pressure of market competition of Chinese power grid enterprises is increasing and the market share is expanding. As a basic component of system engineering operation, power marketing link should be done well according to the brand new changes and specific questions of industry development. Therefore, on the basis of understanding the current situation of information construction and development of power marketing system, this paper deeply discusses the application architecture and implementation technology of power marketing management information system. The final experimental results show that this system design has a positive impact on the development of the electric power industry in the new era.

Keywords: Electric power marketing; Information system; Application architecture; Implementation technology

1. Introduction

Nowadays, when the electric power industry follows the market pace and accelerates the system reform, the management system of the electric power enterprises gradually transforms from the planned economy to the market economy, which leads to the new opportunities and challenges for all levels of power supply enterprises. In this background, the power industry focus has shifted from traditional safety in production is based on the overall development of the economic benefit of comprehensive, so the electric power enterprise to put forward standard sound management system, improve the comprehensive management level, increase the labor productivity, attaches great importance to the information feedback system, enhance the comprehensive competitiveness of enterprise development. However, the traditional electricity management information system, because of the limitations of the design concept, can not meet the new needs brought by the enterprise reform in the new era. It is necessary to combine the advanced technology concept to build a new electricity marketing management information system. In the building of the promotion of electric power marketing management information system, have to the social benefit and economic benefit as the core concept of development, from the two aspects of the market and customer service, business process optimization to form a power supply and the way of service, strengthen the supervision of the system is overall, improve the comprehensive level of enterprise decision management, and use a variety of ways to expand electric power consumer market, Increase revenue recovery from electricity sales. Nowadays, according to state grid enterprise marketing the refinement, specialization, intensification and standardization of management requirements, such as regional electric power company began to set up electricity management center, mainly as a technical support, marketing information system of capital arrangement, accounting accounting treatment, electricity and other business for centralized management, truly achieve electricity over the whole process of acceptance check monitoring, Reduce marketing costs and operational risks, and comprehensively optimize the intensive management level of power grid enterprises.[1.2]

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From the development status quo of Chinese power enterprise information mode, the power industry, as a basic industry in the development of Chinese economic construction, the long-term planned operation mode is no longer in line with the current industry innovation needs, the power enterprises should carry out management system reform, readjust the project business, and actively introduce the information technology sharing support. Under the trend of economic globalization, some enterprises in developed countries as early as the 1980s have basically realized the sharing of information management, and now they are moving towards the direction of network and intelligence. Compared with developed countries, there is a big gap between the information level of Chinese electric power enterprise and the development potential of power enterprise information network construction. The overall information construction level is in the lower position. As power enterprise informatization is a complex process, from system design, demand analysis, system operation, system maintenance and other processes, all have extremely high functional requirements, so in the information technology and market environment is constantly changing, according to the new operation mode, the information system should be gradually optimized or rebuilt. Electric power marketing management information system, based on modern computer and network communication technology as the core, will implement electronic power marketing management information system, decision support, quality supervision, the basic function such as marketing, customer service, help to promote the electric power marketing service innovation, technological innovation, management innovation. Therefore, this paper mainly studies the application architecture and implementation technology of power marketing management information system.[3.4]

2. Method

2.1 System Architecture

The architecture of power marketing management information system studied in this paper is designed by J2EE enterprise platform architecture, which integrates advanced software architecture ideas, has multi-layer distributed application model, and has the advantages of flexible operation, unified security and reuse components in practice.

Based on the analysis of the system architecture diagram shown in Figure 1 below, it can be seen that the power marketing management information system is divided into four levels: first, customer level. This layer of design is mainly responsible for human-computer interaction; Second, the Web layer. The design of this layer is mainly used to access all clients of the system presentation layer logic; Third, the business layer. Mainly to provide business services, including most of the system business processing; Finally, the resource layer. This layer is responsible for the storage of organizational data information, distributed management of the database and so on. In this architecture, power enterprise staff can effectively deal with different business needs, which is helpful to improve the efficiency and quality of time work.[5]

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<table>
<tr><td>The application system</td><td colspan="6">Industry expansion, metering, electricity, electricity, charge, inspection and other power modules</td></tr>
<tr><td rowspan="2">Application framework layer</td><td>Web Application Framework</td><td>Data persistence framework</td><td>Process management</td><td>Graphics management</td><td>The safety management</td><td>Report management</td></tr>
<tr><td colspan="6">Enterprise application server, state management service, persistence service, security management, transaction management and other J2EE apis (such as JNDI,JDBC,JTA,JMS, etc.)</td></tr>
<tr><td>J2EE base framework layer</td><td colspan="6">JVM</td></tr>
<tr><td>The system software</td><td colspan="6">Networks, protocols, operating systems</td></tr>
</table>

Figure 1 System architecture diagram

Based on the above analysis, the specific design and application functions are shown as follows: First, the system software is at the bottom of the overall architecture, including the operating system, network protocol, network platform, etc. Secondly, the basic framework of J2EE is the technical conditions of the development, deployment and operation management of the whole application system, in which the specification and technology of J2EE public standard are selected, and the server does not have the relevance of the professional field. Thirdly, the application framework is based on the application server, which abstracts the public design and partial implementation of the system, and simplifies the development steps of the whole application system after constituting the application framework. Finally, the application system at the top, is based on the framework of the application system development.[6]

2.2 Key Technologies

On the one hand, the Web framework. The open source framework is regarded as the basic content, and the overall framework meets the application requirements of model, view, and control model. The specific structure is shown in Figure 2 below:

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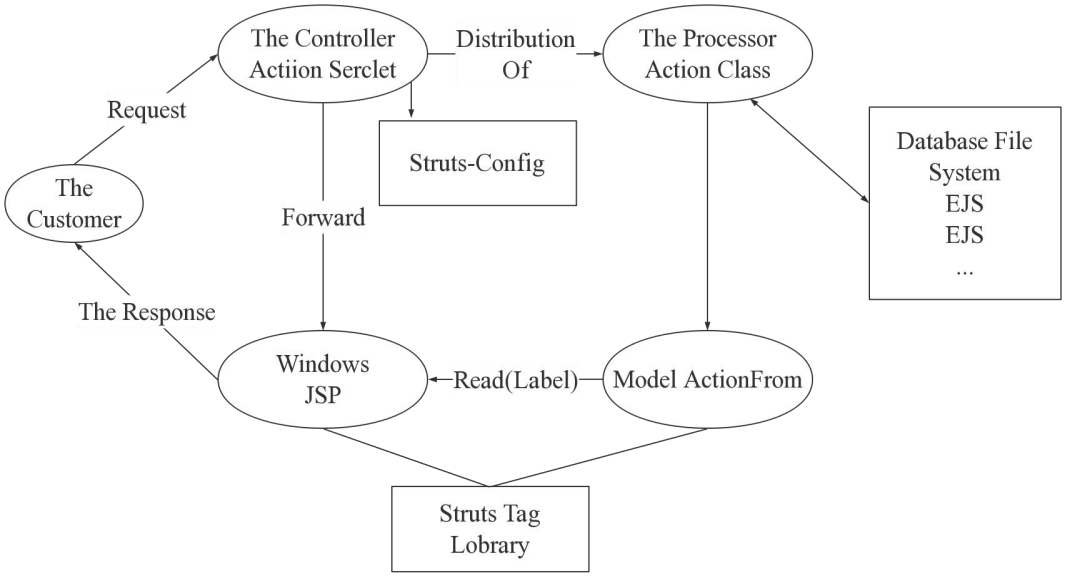

Figure 2 Structure diagram of Struts framework

Thinking of JSPS as the view layer of MVC can make up the look and feel of the model. Each view takes the JSP side of a page with a custom tag library, gets data from the model layer, and specifies how that data is displayed, specifying a specific entry point to the controller by mapping it to a request from the Servlet. In the control layer, Java Servlet is used to complete the command design model, and the Struts framework is used to provide the Action Servlet class, which is responsible for the interaction between the view and the model. All entry points to the controller are given to the struts-config.xml configuration file for processing, which maps requests for word graphs to specific ones. The controller can also specify the location of the next view. The model layer represents the state of the application and is mainly used to express and access business data and perform relevant logical operations.[7]

On the other hand, the data persistence framework. The above framework does not provide a standard implementation of the data persistence layer, while the XML-centered data persistence framework used in the application framework layer can be effectively integrated with the application framework. In essence, a data persistence framework is a set of software services that separate applications from their corresponding data sets, providing services that fully abstract the details of access to data. The overall framework consists of three components, the first is the definition component of the exponential data set, the second is the loading component of the exponential data set, and the last is the operation component of the exponential data set.

2.3 System Management

First, process management. In the market development of electric power marketing management, in order to provide the optimal service function for users, it is necessary to respond to the changing needs of users timely and accurately. In the whole system architecture, the reference model with workflow alliance as the core is used to control the information transmission and process scheduling of the whole system after clarifying the modeling tool, system monitoring tool, system interface and other contents. At the same time, the process management should be abstracted to ensure that each step of the business can reasonably use the resources, comprehensively monitor the flow of business, timely understand the possible problems, so as to improve the quality management level of the system.[8.9]

Secondly, graphics management. The electric intermediary relationship of electric power enterprise customers will use tables to relate reactions in the relational database, and will use records to present in the interface GUI surface, which is not very intuitive display effect. In the system architecture studied in this paper, CORBA communication will be used to connect the

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graphics application server and client controls, which can not only provide users with functions such as data browsing and image collection, but also carry out advanced analysis such as graphics drawing, information modification and device association.

Finally, safety management. The electric power marketing management information system will choose a unified security management system to provide security access control for different management information systems. In the rights management module, the association between project rights, roles, users, and departments should be effectively maintained to complete authorization. It provides an interface for the service system to verify user identity and query user rights.

3. Result analysis

After clarifying the power marketing management information system as shown in the figure above, it is necessary to simulate the system users for multi-user test analysis, mainly to judge whether the system function is stable or not. The test model shall be tested and analyzed by means of the test machine. The specific model is shown in Figure 3 below:

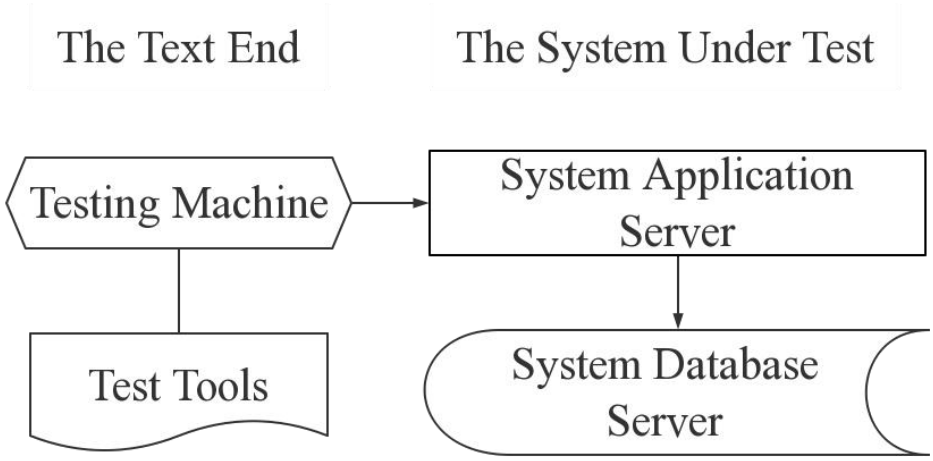

Figure 3 Test model diagram

According to the actual situation predicted by the system, the simulated login users are 180, 260 and 520 respectively. The specific test scenarios are shown in Table 1 below:

Table 1 Test scenario analysis

The scene name	Proportion of system access services and users	Test indicators
The user login	The total number of users is expected to be 180, 260 and 520	Response time < 4S
Electricity service processing	The total number of users is expected to be 180, 260 and 520	Response time < 5S
Electricity audit	The total number of users is expected to be 180, 260 and 520	Response time < 7S
Comprehensive Statistical query	The total number of users is expected to be 180, 260 and 520	Response time < 8S

The performance goals to be achieved in the detection and analysis are as follows: the system page response time is less than 4 seconds; The number of concurrent users can be at least 160 and the maximum number of concurrent users can be 200. In the case of 80 concurrent users, the

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average CPU usage and memory usage of background applications accessing the server are lower than 65% and 70%, respectively. At 110 concurrent users, the average server C P U usage is less than 80%, and the memory usage is less than 75%. The login status of the test user is shown in Table 2 below:

Table 2 tests the login status of the user

Test duration; 7 hours										
Business name	Concurrency	Average response time (seconds)	Number of successful	Number of failures	The success rate	Processing capacity (times/second)	Application server CPU usage (%)		Database server CPU usage (%)	
							On average	The biggest	On average	The biggest
The user login	30	2.143	110	0	10	65	71.1	88.1	79.5	76.1
Electricity service processing	30	2.928	19413	1	99	68				
Electricity audit	30	3.212	8749	1	99	65				
Comprehensive Statistical query	30	5.126	8837	0		61				
The user login	30	1,975	1283	0	10	64	65.3	85.2	69.4	76.6
Electricity service processing	30	2.858	14120	0	100	67				
Electricity audit	30	3.183	9092	2	98	65				
Comprehensive Statistical query	30	4.974	9867	1	99	61				
The user login	60	2.106	1431	0	100	68	68.4	88.2	72.1	81.3
Electricity service processing	56	2.894	17181	0	100	68				
Electricity audit	60	4.145	9876	1	99	67				
Comprehensive Statistical query	50	4.424	8346	2	98	63				

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According to the above analysis, under the pressure of long-term user access, if the number of users logging in the system reaches 180, 260, and 520, the average response time will be less than 5 seconds, and the C P U utilization rate of the background application server and database server can also reach the target, and the overall system application is very stable. From this analysis, we can see that the system studied in this paper is more consistent with the actual user needs. Even when multiple users process services online, the system page response time can reach 3 seconds each time. The system software can still run smoothly under long-term pressure test environment, and the error probability is less than 0.28%. At the same time, the functions of the whole system have the characteristics of safety, application, reliability, stability and so on, so it can be popularized and applied in the future power industry.[10]

4. Conclusion

To sum up, the power marketing management information system, as the core content of the construction and management of power enterprises, can guarantee the marketing data, migrate from the county-level power supply bureau to the data center of the prefecture-level power supply unit, effectively maintain and manage the corresponding data set, and provide an effective basis for the unified and digital management of marketing business. Therefore, Chinese scholars of scientific research and the electric power enterprise to deeply explore the power marketing management information system architecture and application technology at the same time, from the performance of the system, application scenarios, marketing objectives, and other aspects to obtain, gradually optimize the internal structure and applied technology, to create high quality information system for the electric power industry development, reduce unnecessary costs and security issues.

Reference

[1] Hao Yin, Du Wang, Tengxiao Zheng, et al. Architecture design of power Marketing management Information System based on Internet of Things [J]. Automation Technology and Application, 2020, 39(12):5.

[2] Zheng Li. Analysis on the optimization practice of power marketing management information system [J]. Digital Design (Part I), 2020, 009(001):172.

[3] Gang Zhou, Jinzhi Wang, Daoqiang Xu, et al. Research on Design method and Support system of power marketing service business platform [J]. China Management Informatization, 2020, 23(1):7.

[4] Tao Li. Analysis of the Application of Metering Automation System in Electric power Marketing Management [J]. Science and Technology Economic Guide, 2020, V.28; No.704(06):86-86.

[5] Jingyi Song. The important role of load management system in electric power marketing [J]. Public Electricity Consumption, 2020(9):2.

[6] Kai Lei. Research on Power Marketing Management Mechanism of Power Enterprises under Internet Environment [J]. Power System Equipment, 2021(19):2.

[7] Jun Yang, Muqing Wang. Construction of lean management system of marketing safety [J]. China Power Enterprise Management, 2022(5):3.

[8] Weili Wang. Research on problems and treatment measures in electric power marketing audit management [J]. Economic and Technological Cooperation Information, 2022(3):3.

[9] Jingming Wang. Strategies to improve electricity charge management in power marketing [J]. Market Research Information: Comprehensive Edition, 2021(5):1.

[10] Lijuan Long, Haoshuai Li. Fine allocation of power marketing service resources based on big data analysis [J]. Agricultural Power Management, 2020(1):2.