Outlook of Cloud Computing in Electric Automation Control System

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Abstract. Cloud computing technology is developing rapidly, its application in the electrical industry has become more and more extensive. Using cloud computing technology in the electrical automation control system can improve the management and automation performance of the system. This not only improves the energy utilization rate, but also makes the automation system safer and more reliable.

Keywords: Cloud Computing, Electrical Automation, Control System

1. Introduction

In our country, the application of electrical automation control system is still in the preliminary stage of development. Introducing cloud computing technology into the electrical automation control system ensures the safety and reliability of substations or construction projects. It improves the utilization rate of energy, at the same time, it also promotes the healthy and stable development of our country's power industry.

2. Design method of electrical automation control system

At present, our country mainly uses centralized monitoring, remote monitoring and field bus monitoring in the process of implementing electrical automation system design. First, centralized control. The method of collecting centralized monitoring design in the electrical automation control system can facilitate inspection and maintenance in the later work process. Figure 1 shows the circuit structure of centralized control of electrical automation [1,2]. Generally, this kind of control method has relatively low requirements for the equipment.
Second, remote control. Remote monitoring requires both parties to be able to realize remote dial-up of the computer network, and it can use the monitored computer to connect to each other. Remote monitoring can fully display the controlled computer interface through the computer page. This method has many advantages, it has a certain degree of safety, low cost, etc., which can promote the protection of the system. Figure 2 shows the equipment structure of electrical automation remote control [3].

Third, fieldbus monitoring. Now, computer network technology based on fieldbus and Ethernet is widely used, which effectively promotes its use in substations. In addition, electrical intelligent equipment is also widely used in substations. Computer-based control is particularly important in the electrical system of substations. Fieldbus control has a higher pertinence, and it can improve the reliability and safety during operation [4]. Figure 3 shows the fieldbus control structure.
3. Design of electrical automation system based on cloud computing

In the process of realizing computer technology-based electrical automation system design, its main design principles are simplicity, stability and reliability, and it also requires good scalability and strong compatibility.

3.1. Design of computer monitoring system

The monitoring mode and system configuration should be designed according to the actual system type and total installed capacity. Figure 4 shows the design structure of the computer monitoring system [5].
This paper uses a hierarchical distributed computer monitoring system to realize the design, which mainly includes the main heating control layer, the lower equipment control layer, and the microcomputer relay protection device.

3.2. Design of communication network system

A good communication network system can ensure the reliability, stability and safety during operation. The system designed in this article must have a smooth network, and it must have strong data transmission capabilities, security, stability and integration, so that the system can communicate and exchange information. Figure 5 shows the design structure of the communication network system [7].

![Diagram of communication network system]

**Figure 5.** Design structure of communication network system

The communication function of the heating system is mainly connected through Ethernet, the grounding layer realizes the installation of integrated control, and the internal intelligent module realizes the collection of various signals. The heating system and dispatching system mainly use modems and emergency protection equipment to realize communication, and use communication channels to transmit information in each substation.

3.3. Design of automation system

The automatic control system mainly includes monitoring system, operating system, tool software and application software, which can realize the common management of system resources, and realize data collection and management. The operating system requires good stability, good human-computer interface interaction, and can realize the openness, versatility and portability of the system. It can be realized by Windows NT software, which has good practicability and stability, and can also realize data confidentiality [8]. Figure 6 shows the operating system design of the automation system.
Figure 6. Operating system design of automation system

Monitoring system software can realize automatic monitoring of computer systems, generally with data collection, database management, processing software and application software. The tool software mainly includes 3D graphics, FIX development, PLC programming, etc., so that the program can be edited and compiled, so that the monitoring system can be opened to the customer, and the user can fully grasp the computer monitoring technology.

4. The realization of the system

The system circuit studied in this article is realized in a certain project. Figure 7 shows the wiring diagram of the electrical automation control system.

Figure 7. Wiring diagram of electrical automation control system

In order to facilitate the pre-debugging and post-maintenance of the system, the system must be listed at the same time during the installation process, and the system must be connected to the equipment side during the system setup process. Through the use of the system, the system studied in this paper can meet the actual needs of users, it is safer in the process of use, and can realize the automation of equipment control [9,10].

5. Conclusion
Our country's social economy is constantly developing, including enterprise intelligent production. It can not only improve the production efficiency of enterprises, but also save costs. It realizes the centralized production of enterprise equipment, and it expands the economic efficiency and reproduction of enterprises. This promotes the sustainable development of the company.

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