Research on the Application of Integrated Technology in Power Dispatching Automation System

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Abstract. In order to improve the effect of power dispatching, staff must constantly explore new technical theory, perfect technical means and improve the effect of power dispatching. It is also of great significance to apply the integrated technology to the electric power dispatching automation system and to explore and extend it continuously, which is also of great significance to the exploration of the application value of the integrated technology.

Keywords: Integrated Technology, Power Dispatching, Automation System

1. Application status of power dispatching automation system

1.1. Analysis of power dispatching and control equipment

Power dispatching equipment is a very important application of modern computational control system. It adopts the popular local area network technology to complete through Siemens PLC and field bus technology with good performance. The whole system is mainly composed of Siemens hardware, its working performance is good, and it is also convenient for maintenance, including instrument actuator, signal processing module and operation station. All the hardware components need pcs7 software to support it, this software can be better, for the completion of power dispatching related tasks, has a very wide range of applications in power plants and other industries, a lot of equipment is through the operation of this system [1-2]. Figure 1 shows a typical PCS 7 system with ES as engineer station, OS as operator station and AS as automation station. The relevant inputs and outputs that can be done are as follows:

1. Analog input: 4 ~ 20 mA signal with a maximum input impedance of 250 Ω. The input board provides a DC 24V power supply for the 4 ~ 20 mA 2-wire converter. For the 1-5 Vdc input, the input impedance is greater than or equal to 500 KΩ. (2) Analog output: 4 ~ 20 mA or 1 ~ 5 Vdc optional, with load capacity with output impedance greater than 600 Ω. (3) Digital input: Digital input modules are optoelectronically isolated with closed contacts as "state 1" and broken contacts as "state 0 ". (4) Digital output: The digital output module adopts the electrical isolation output, the output contact point is the independent passive dry contact, and the specific contact capacity value is proposed. In order to ensure the safety of DCS system, the system provides isolation relay and relay cabinet with sufficient contact capacity, and provides reliable power supply. The DO module should have fast scanning, fast...
output function. (5) Resistance (RTD) input: Type of thermal resistance such as Cu50, Pt100, which can directly accept three-wire or four-wire (no transmitter required). (6) Pulse input: 6,600 pulses per second.

Figure 1. PCS 7 Control system.

1.2. Analysis of Power dispatching power supply equipment

For all electronic equipment cabinets, corresponding electronic equipment cabinets shall be allocated, and the distribution cabinet shall be capable of receiving two AC power. The alternating current shall be 220 V, and the upper and lower floating shall not exceed 10%, the configuration of the power supply of a single cabinet should be in synchronization with its circuit protection device, and it should also be added that the power supply switching device should provide more than two sets of backup dc power supplies, which can make such a power supply sufficient capacity and voltage to process it. The automatic switching of the backup power source enables the backup power supply to power it without affecting the operation of the component when the working power supply fails. If a power failure occurs, an alarm is required, a part of the circuit is automatically switched when a part of the circuit is in fault, and another part of the circuit is involved in the operation, so that the power supply can not be caused to lose power in the electronic device cabinet, The operation of the other input channels is not affected when the input signal of the transmitter can be contacted with the input signal of the transmitter while the short circuit is short-circuited. The alarm shall be made in the open circuit of the fuse, regardless of the signal output, which shall be protected by the load. In the system cabinet, all equipment shall have certain electrical isolation means, and if the power supply is removed, the alarm shall be required. This circuit is operated by means of intelligent control, and it shall be detected and processed within the control range of the whole system and if there is insufficient supply voltage. The solenoid power supply should be provided by the internal circuit, which is the safest, and the system is long-term and reliable.

2. Application of 2 in system platform

The application of integration technology in the system platform can effectively solve the phenomenon of "information island" in the system and improve the interaction efficiency of power dispatching information. The specific applications are as follows: 1 by using middleware in integrated technology, a distributed running intermediate software package can be established between the system platform and different hardware systems, and the underlying system can be isolated from the upper application by using the distributed running intermediate software package. This can provide a more standard and reasonable development and running environment for different kinds of upper applications, and form a middleware application platform. This platform is mainly composed of three layers, one is the application layer, including data acquisition and monitoring, data management system, distribution management system, power grid slow system, dispatcher training simulation system, dispatching automation data platform. The second is the integration platform, which uses CIM/CIS to construct the integration framework and integration facilities, so as to integrate the secondary development package. Third, the basic platform layer, this layer is mainly through the computer operating system to build
relational database, directory database, cross-platform class library, through middleware to serve the integration platform and application layer, which can effectively achieve the integration of the system platform; (2) object middleware is used to guarantee the tightly coupled interactive information between the application layers of the system. The object middleware mainly includes CORBA and DCOM. CORBA and DCOM can provide a more standard interface for the system, so that the client can collect the required information from other systems while working. These services and information exist on different platforms, and customers only need to pass their own requirements to the object middleware, and they can get the corresponding resources.

3. Application of 3 in system drawing module base
In the process of system operation, the transformation of distribution network needs to be re-modeled, but in the process of re-modeling, it is necessary to draw one by one, construct information recording and input information, etc., which consumes a lot of manpower and material resources, and is prone to errors. The application of integration technology in system drawing module library can further integrate the modeling steps, so that it can be called directly in use. The application of integrated technology in system drawing module base is mainly reflected in the following points:

3.1. Integrated drawing modeling
The data graphics library is edited by using the pattern library editor, so that the data graphics library has the functions of editing, execution and so on, and then connects to the real-time database. In this way, two functions can be realized: first, real-time editing; second, convenient information maintenance and query, the implementation of these two functions are carried out in task mode, and all the databases in the system can be modified when they are in the execution state.

3.2. automatic mapping of the whole station
The application of integrated technology in system drawing module base can realize automatic mapping of the whole station. Firstly, the corresponding bus groups are laid out by using different voltage levels, so that the definition between the same level voltage and the same kind of bus can be realized. Secondly, the integrated technology will make the standard rules according to the power equipment numbers in different domains of the power dispatching automation system, so as to reflect the equipment numbers to the computer operating system. Finally, the integrated technology can number and telemetry the components of the power dispatching system, and then adjust the position of the equipment according to the different voltage levels, so as to ensure the coincidence of the equipment ports, so as to achieve automatic mapping.

4. Application of 4 in system function

4.1. Building a distributed information service platform
In the distributed information service platform, different functional modules are established to standardize and simplify the information transmission between each module, such as using CORBA or DCOM and other middleware to transform the application module of unidirectional transmission of information into the application module of bidirectional transmission of information, so as to realize the flexible configuration of redundant modules.

4.2. Integration of interface
The integrated technology realizes the interface integration process, firstly, the power grid model database is used as the center, the information of the power dispatching is delivered to the monitoring control system, the high-level application system and the training simulation system through the middleware of the database. The client information is processed by the communication middleware so as to realize the person opportunity.
5. Application of 5 in system interface

With the continuous development of social economy, power science and technology are also developing. Power grid related systems, such as DCS, DMS, EMSA, TMR and other automation systems, are applied to every link of power dispatching system. However, the interfaces between different systems are different, which has a great impact on the sharing and transmission of information. The application of integration technology in power dispatching system can effectively solve the interface problem, so as to realize the integration of system interface. In the application process, the integration technology can provide the EMS-API interface for the system. The CIM and CISS parts of the interface can seamlessly integrate the information of each functional module, so as to realize the simple and efficient control of the integration and information exchange between different functional application modules.

6. Conclusion

There are still some problems in the power dispatching automation system at this stage. Through the above analysis, the application of the integrated technology in the system platform can effectively solve the "island of information" phenomenon in the system and improve the interaction efficiency of the power dispatching information; the application in the system model library can further integrate the modeling step; and the application in the system function, The operation interface and the database can be effectively integrated; the application in the system interface can effectively solve the interface problem and realize the integration of the system interface. Therefore, the application of the integrated technology in the power dispatching automation system is very important.

References

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