

# Application and Research of Cloud Computing in Power System Big Data

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**Abstract:** With the continuous improvement of modern people's living standards and people's increasing pursuit of material wealth, electricity, the most commonly used energy of people, has been the most commonly used energy of people this, has been a part of people's daily life and work can not leave. Because of the importance of power system, it is the consistent demand to maintain the security and stability of power system. But the supply of electricity is generally 24 h a day supply, so the aging of power equipment is the inevitable result of use, there will always be some equipment failure to repair and replace. Therefore, in order to maintain the power system lasting and stable power supply, the use of cloud computing in the power system has received more attention.

## 1. Introduction

The development of economy is the process of urbanization, and the energy needed for the operation of the city, electricity accounts for a large part, in the satellite map, the light of the night city is used to measure the urbanization process of a city. The city can not leave the light for almost a moment, so the electric power industry has a broad development space in our country, and people's demand for electricity has promoted the rapid development of the electric power industry. With the economic development and industrial upgrading of our country, enterprises and individuals have higher demand for their own power systems, and are increasingly pursuing the stability, standardization and intelligence of power systems. Therefore, the traditional power systems are no longer suitable for the current needs of social development. The data of each power system is isolated.

## 2. The Concept and Advantages of Cloud Computing

As an Internet technology, the main function of cloud computing is to use the Internet and share resources to realize that the computing equipment in the Internet can be connected with the user's computer through the technology, and realize a mode of computing for the user by using the Internet equipment, and the calculation amount can be divided into individual computing according to the size of the calculation amount.[1]. Therefore, cloud computing is to provide a platform for customers, customers can do computing operations on the platform, computing through the cloud computer, and then the results of the calculation feedback to the user's computer, to achieve a network sharing mode. Therefore, cloud computing technology can realize that users do not need too high-end computer equipment but can get sophisticated results on Xining complex computing, and users can connect with the platform of cloud computing through the entrance to make computing faster and more convenient. It can effectively reduce the user's hardware input and save the user's cost. At the same time, cloud computing does not need the user's computer to have too high configuration, the user's computer hardware demand is low, so the user's computer does not need too powerful hardware, just need to have a stable network can, use the network to achieve cloud computing. At the same time, although the computing method of cloud computing is complex,

but the operation method of computing is simple and easy to use, users only need to learn briefly to know how to use cloud computing technology to calculate. Through the use of cloud computing, can effectively enhance computing power, but also reduce the hardware requirements for devices.

### **3. Frequently Asked Questions Power Systems**

#### **3.1. System Meter Error**

Meter reading is the first step and the most basic step for electric power enterprises to charge for electricity consumption. The data obtained from the meter reading almost play a decisive role in the audit and charge after the meter reading.[2]. With the development of science and technology, China's electric power enterprises have adopted more remote meter reading in recent years, which saves manpower and helps to reduce the working error rate of manual meter reading. But although the accuracy of meter reading is very important and remote meter reading is used, there are still many problems in the actual meter reading work. Electricity statistics are incorrect. In some enterprises, the electricity consumption is large, the remote meter checking is not carried out at the end of each month, and other time meters may need to be inserted in the middle. Therefore, in the routine meter checking, if the number of meters in the normal meter reading date is smaller than that in the end of the month, it is necessary to make up the corresponding electricity quantity, but because the remote meter reading automatically checks the meter at the end of the month and so on, the failure to do so will lead to incorrect electricity meter reading. Remote meter reading can not be normal meter reading, due to equipment failure or poor wireless network signals and other reasons, part of the remote meter reading can not get accurate feedback information, will lead to accurate electricity consumption.



Figure 1 Power transmission system

#### **3.2. System Audit Error**

It is the key to guarantee whether the electricity consumption of the residents is true or not, and whether the enterprises can guarantee the true insurance of electricity charges [3]. Therefore, it is also very important for electric power enterprises to ensure the power audit of good enterprises. Now our country has adopted remote audit to automatically audit electricity consumption, but in the process of power audit, there are still such problems. Such as :1 general audit using computer automatic audit and manual review of the way, in the automatic meter reading to get the number of electricity use and invoices on the electricity use of this month, the auditors do not seriously compare, not enough attention to the audit work, resulting in failure to find the meter reading and published data inconsistent, work left omissions. Computer automatic audit is not perfect, easy to appear wrong ticket and other situations, in the work need to check and compare a variety of bills, the computer in the audit work need to contact a large number of bills, so some of the more complex bills such as non-payment, cancellation of bills are prone to audit omissions, calculation errors and omissions.



Figure 2 Smart grid advocacy map

### 3.3. System Charge Error

The charge of electric power enterprise is the source of income of electric power enterprise, and it is also the guarantee of continuous production of electric power. The electric power enterprise has used the new electricity charge collection system in the work to improve the accuracy of the electricity charge collection, to improve the accuracy of the charge, and to reduce the occurrence of the arrears of electricity charges [4]. However, there are still some problems in the actual use, mainly: electric power enterprises use the system of online payment when charging electricity, that is, residents pay online in advance, no longer pay according to the use of electricity per month, save time between the two sides, can avoid the occurrence of non-payment of users, but also reduce the pressure of electric power enterprises to charge to speed up the recovery of funds. But in the actual use, there is often the use of electricity and the advance conversion of electricity does not match the situation, that is, residents think they still have electricity balance but in fact have used up or even owed or paid electricity and the actual amount of electricity to account does not match, and electricity to account for the amount of delay and so on. This will cause residents to doubt the charging system of electric power enterprises, residents have no trust in the rationality of charging fees and power companies, but increase the difficulty of charging fees.

## 4. Application of Cloud Computing in Power System

### 4.1. Construction of Smart Grid

With the increase of people's demand for electricity, all kinds of data information in the power grid are increasing, including the user's data information and voltage, power, electricity and so on. The traditional power grid can not meet the current people's demand for the power grid.

And it can detect and collect and analyze the data of electric power, realize the integration of data collection and analysis, and improve the efficiency of electric power system.[5]. Therefore, in the intelligent construction of power grid, the internal integration of power system can be realized, the speed of resource allocation of power system can be improved, the calculation speed of power system can be improved, and the power network can be upgraded to smart grid, which can effectively reduce the work burden of power system personnel and facilitate the collection of information in the shared platform.

### 4.2. Reduction in Management Costs

With the development of intelligent power system, the traditional island power system has begun to move towards intelligent power grid, so the dispatching mode of power system has changed accordingly. The traditional dispatching mode is not only inefficient, slow processing, but also weak data collection and analysis ability.



Figure 3 Smart grid systems

### 4.3. Strong Storage and Analysis Capability

The traditional power system, its power system computing and storage capacity is very poor, so it is easy to lead to audit fees and other problems, leading to disputes, and cloud computing built smart grid, can effectively improve this situation, can make timely changes to the mode of operation of the grid, provide power supply capacity of the grid and calculation accuracy.[6]. In view of the poor computing power of the traditional power grid, cloud computing can be networked to compute with computing devices, while storage problems can also be implemented in the cloud, data can be stored in the server, which can significantly alleviate the storage and analysis capabilities of power systems, avoid the problems of storage and analysis of power systems due to the shortage of hardware facilities, and can greatly improve the current status of power scheduling through cloud computing and storage, while the storage and analysis of data can be achieved in a very short time through cloud computing. Not only can effectively reduce the waiting time, but also indirectly improve the power system response and processing speed, improve the efficiency of data processing.

## 5. Conclusion

The electric power industry still has the broad development space in our country, the people's demand to the electric power industry has the rapid development. At the same time, there are some problems in the rapid development of power enterprises, among which the imperfect power system is one of them, the use of cloud computing to the power system is still in the initial stage, so that there is a broad space for development in the future.

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