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# The Role of Cloud Computing Technology in Environmental Protection

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**Abstract:** ***In recent years, the level of informatization in various industries has been increasing with the continuous improvement of information technology. While developing, natural environment protection also faces many challenges, and the timeliness and predictability of information transmission test environmental monitoring workers. In traditional environmental protection work, optimizing existing technologies and utilizing cloud computing technology to quickly and accurately transmit information to the work platform, and then utilizing existing protection measures to timely detect and handle problems, in order to reduce environmental damage. On this basis, it is possible to analyze and provide reference suggestions.***

**Keywords:** Cloud computing; environmental protection; effect.

## 1. INTRODUCTION

In the context of the "Internet plus" era, where mobile big data, cloud computing and Internet technology are deeply penetrating into various industries, the government has an increasingly strong demand for government affairs mobility [1-3]. Through e-government, various departments of the country can strengthen information exchange, make more scientific decision-making and deployment, and quickly understand the real-time situation in different regions, reduce the limitations of personnel mobility, and achieve more information flow and less office staff flow. For environmental regulatory protectors, it is particularly important. In recent years, the country's high attention to environmental protection has promoted the development of network technology regulation. Every year, economic losses and casualties caused by natural disasters occur in China. By utilizing cloud computing technology, relevant personnel can promptly understand and communicate extensively with relevant departments to minimize the losses caused by natural disasters. The 15th Five Year Plan of the country also puts forward important requirements for cloud computing technology: e-government should go to the cloud, and Internet plus technology must be accelerated. This article will analyze the current problems in environmental protection and combine them with the advantages of existing cloud computing technologies.

## 2. THE DEVELOPMENT OF CLOUD COMPUTING

Cloud computing fully reflects the "fast iteration" characteristics of the Internet, and is one of the most active areas of ICT industry technology and application innovation [4-6]. Although cloud computing technology emerged relatively late, it has developed rapidly and is a new revolution in the information age. It provides support for solving data redundancy in e-government, reducing e-government costs, and improving feedback speed. Internationally speaking, cloud computing technology is widely used in European and American countries, especially the United States, which has a wide range of applications for cloud computing, high product maturity, and rich experience in enterprise application, and is in a leading position. From the domestic perspective, although it started late, Alibaba Cloud, Baidu Cloud, Tencent Cloud and other major Internet companies have laid out one after another, and major telecom companies have also accelerated the construction of cloud service centers, paying attention to the development of cloud computing in the application of their digital platforms, followed by China. With the continuous improvement of cloud service providers' services, the cloud computing market is showing a trend of fragmentation, and price wars have become an important means of competition for cloud computing giants [7-9]. The development of cloud computing is shifting from a service war to a price war. Of course, with the continuous development of cloud computing technology and the improvement of relevant laws and regulations, as well as the guarantee of secure information, fair competition keeps the market healthy and dynamic. Increase the innovation enthusiasm of various enterprises.

## 3. THE CONCEPT OF CLOUD COMPUTING

### 3.1 Definition of Cloud Computing

Cloud computing is a type of distributed computing technology, whose most basic concept is to automatically split a large computing processing program into countless smaller subroutines through a network, and then send the processing results back to the user through a large system composed of multiple servers for search, calculation and analysis. There are differences in the international definition of cloud computing. IBM's cloud platform defines it as a network-based model that transfers service resources from service providers to customers, while the American standards represented by Google and Microsoft are a paid model that can quickly respond and provide resource allocation. Currently, China's definition of cloud computing is distributed computing.

### 3.2 Types of Cloud Computing Services

Infrastructure as a Service: It refers to providing customers with the most basic computing resources, storage resources, and network resources through virtualization and leasing. Platform as a Service: Providing development and deployment of application environments as services. Software as a service: provide users with software and application services through the Internet [10-13].

(1) Infrastructure as a Service (LaaS): Infrastructure as a Service differs greatly from previous models in that it rents out the storage and computing power of servers instead of renting out specific servers. This model is generally aimed at enterprises. By purchasing cloud computing service resources, it is more cost-effective and efficient to buy as much as you need [14].

(2) Platform as a Service (PaaS): This model is significantly different from Infrastructure as a Service, where Infrastructure as a Service only provides storage and computing capabilities, while PaaS also provides supporting development environments and complete development tools. Developers can directly develop when using Platform-as-a-Service. Platform as a service and software and services can be converted into each other, but there are some differences between them. If a user purchases a certain service, it is software as a service. If developers use this service to provide assistance for their own development, it is even software and services. Nowadays, developers can directly purchase Platform-as-a-Service cloud computing for development, saving a lot of preparation work for environment setup and even purchasing service areas [15].

(3) Software as a Service (SaaS): This type of cloud is more familiar to domestic users, such as Alibaba Cloud, Baidu Cloud, etc. The biggest feature of this type of cloud is that users purchase virtual functional services rather than physical products. This type of cloud service. The difference from the services we usually purchase is that we buy space storage services instead of space storage. When we store the data we use, it is stored through various servers. When we are not using it, this space does not belong to us. Infrastructure as a service is like the foundation of a house, where software as a service and platform as a service are built to provide convenience for users [16-17].

## 4. APPLICATION OF CLOUD COMPUTING IN ENVIRONMENTAL PROTECTION SYSTEM

Green mountains and clear waters are not only natural wealth, but also economic wealth. We must firmly establish the concept that green mountains and clear waters are invaluable assets, and steadfastly pursue the path of ecological priority and green development. China has always adhered to the path of sustainable development, attached great importance to environmental protection, placed environmental governance in an important position, and persistently solved environmental problems, achieving significant results. However, due to rapid economic development and incomplete environmental governance system, the situation is still very severe. In recent years, China has also made efforts to promote economic transformation and improve the level of ecological construction. Established a government platform connected to an environmental monitoring and protection system, making environmental monitoring more scientific and efficient. This has laid a firm foundation for the implementation of "digital environmental protection" in the environmental protection system. However, with the continuous increase of information technology data, the environmental protection system has gradually become larger, involving different departments, locations, and situations, and the shortcomings of this model have also become apparent. Cloud computing can optimize the platform based on its characteristics.

(1) Dynamic Scalability: The allocation of information resources is unbalanced, sharing capabilities are limited, devices in each region are different, and they occupy physical space and infrastructure resources. However, except for peak periods, some devices have a large amount of redundancy during normal times, and the difference between peak and idle periods is huge, resulting in resource waste. These systems lack elastic operational measures. The dynamic scalability of cloud computing increases computing speed on the basis of existing services, realizes

dynamic expansion virtualization, and achieves the purpose of expanding applications, solving the problem of redundant backup during low periods; The flexibility and high reliability of cloud computing also reduce construction and maintenance costs, and most software and hardware in the market support virtualization.

(2) Virtualization technology: The virtualization technology of cloud computing puts various elements into cloud resource virtual pool management, which improves the compatibility between manufacturers and models. The construction of environmental protection systems puts high demands on the linkage response between regions. Once the equipment cannot operate under the debugging of staff, it will inevitably challenge the management mechanism. Cloud computing technology utilizes its virtualization technology to enable computing functions to be achieved through other functioning servers even if a few servers have issues.

(3) Platform-as-a-Service (PaaS) model: PaaS is the environmental protection platform for the entire cloud computing industry. By constructing it, we can provide assistance to environmental protection business. It mainly includes environmental development application cloud and environmental public resource cloud. Environmental Development Application Cloud: Developing and operating the platform through distributed and network storage technology of cloud computing, building a universal identity authentication, permission management, and information processing model for all levels of departments to integrate the system and achieve unified standardization and operation; Environmental Public Resource Cloud: It can establish a cloud platform supported by data standards through the establishment of sewage treatment, air pollution, and noise monitoring information, in accordance with national regulations. Based on the platform information, it can monitor and manage key environmental basic resources and pay attention to industrial changes. This includes monitoring the total amount of major pollutants, water environment governance, environmental supervision and management of construction projects, and urban environmental governance.

Monitoring and verification of total emissions of major pollutants, utilizing monitoring data to calculate changes in emissions intensity, sulfur dioxide, nitrogen oxides, suspended particulate matter, and other major pollutants using cloud computing utility computing technology. The results are compared with data stored in the network to provide data support for scientific governance; Water environment governance and urban environment governance, including providing monitoring services for drinking water, key river basins, lakes, reservoirs, etc. nationwide, and providing support for drinking water health and water environment investigation and governance through cloud platform technology. The relevant departments are responsible for the management of pollution sources and centralized treatment of pollutants in construction projects, such as the dust generated by construction sites, which is one of the causes of urban haze. By using local monitoring data and parallel computing technology of cloud computing, it is possible to effectively determine whether the construction site has seriously dealt with the dust generated. Utilize parallel computing to estimate water flow and scientifically allocate water flow in key watersheds to avoid floods or droughts.

(4) On demand deployment: In the environmental protection industry, cloud computing can be divided into public cloud services and private cloud services. The public can obtain environmental information and understand the environmental situation through public cloud services. By collecting feedback, the platform can be further improved. The internal services provided for environmental maintenance workers, which are easy to manage and maintain, are private clouds built to meet the specific needs of specific organizations. Relying on the national government system to build a private cloud platform for standardized management of relevant information and implementing data exchange with various levels of departments. Realize rapid deployment and response between superiors and subordinates.

## 5. CONCLUSION

This article analyzes and conceptualizes the role of cloud computing technology in environmental protection. Through the above analysis and introduction, it shows that cloud computing technology can provide assistance for the construction of national electronic information government platforms. Nowadays, cloud computing technology is becoming increasingly mature and can solve some problems in the construction of information platforms, providing help for the further development of platforms. We should also actively promote the development of cloud computing to make it healthier and more comprehensive.

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