Research on Application of Blade Server on Coal Enterprise Based on Cloud Computing

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Abstract. In the era of cloud computing, the blade server is the basis of the poly system. For the blade sever has the features of high calculating density and flexible management, it is especially suitable for the information-intensivetypes coal enterprise. Begins with an overview of application of cloud computing on coal industry, introduces the performance and feature of the blade server, analyzes the blade server application in the coal industry value, blade sever are illustrated in the application of information management and construction in coal enterprise through a case, and finally offers reference to the promotion and application of cloud computing in the coal industry.

Introduction

Cloud computing is a kind of novel revolutionary technology mainly based on network. Various application systems can obtain information services, storage space and computing power according to demand through network resource sharing. Cloud computing technology has been gradually applied to practical production management with development of coal industry economy in China, but the system is not mature with less innovative practice. It is key requiring emphasis and study from current management personnel in coal industry to actually realize cloud computing and bring fundamental change to production management and development of coal industry. Blade server based on cloud computing technology is gradually catered to the market demand of coal industry with relatively intensive information due to its prominent advantages in management and power consumption.

Overview of Applying Cloud Computing Application in Coal Industry

In the Aspect of Data System Management. Currently, science and technology knowledge as well as digital information are rapidly developed. Most coal enterprises encounters problems of larger informationization demand change and heavy data collection processing tasks. Cloud computing can be used for collecting many applications and data through sensor. Massive information is efficiently collected and processed. Useful information is extracted for further integration and reasoning of enterprise information, and decision-making, thereby perfecting data system construction of coal enterprise. Production data management resources are rationally allocated. Cloud computing application is more beneficial for uniform management of coal industry data system compared with traditional computing mode.

In the Aspect of Safety Regulation System. In the cloud platform safety regulatory system, down-hole real-time information transmission, safe monitoring at all working faces, work allocation and error correction treatment of computer at all nodes can be completed by cloud platform software installed in the control center.[1] Enterprises can switch resources to required application. Distributed storage is adopted for cloud computing to ensure down-hole real-time detection information, geological structure, gas concentration and other monitoring information in coal mass information storage. It is economical with high reliability, and information resources stored in down-hole area can be uniformly managed through cloud management software.

Because the cloud computing has hardware virtualization technology with high performance and easy extension, which not only can improve efficiency of resource utilization, but also can promote development of enterprise large-scale distributed computing, 3G communication technology and

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other emerging information technologies.[4] It is also beneficial for promoting current informationization reform work of coal enterprises.

Performance Characteristics of Blade Server

Platform application categories are also increasing with development of cloud computing and increase of enterprise user business. It is required that IT infrastructure has flexible extension ability. Server is a central part of the infrastructure, which carries all user data, application and computing tasks. Namely the server is related to performance of the whole cloud computing architecture. Selection of suitable server is the key to improve enterprise production efficiency. [2]

Currently, servers on the market can be divided into three categories of tower server, rack server and blade server according to case type, wherein blade server is a server which is specially designed for high density computing environment, performance with high density and high availability can be realized through installing many card servers in the knife box. Blade sever has three major advantages of high density virtualization application platform, highly flexible scalable extension dynamic architecture and higher energy efficiency, etc., which are matched with demand of cloud computing basic platform architecture. [8] Blade server has gradually become the first choice platform for deploying virtual servers.

Servers in different types have respective markets because of influence from enterprise scale demand, cost investment and other factors. Rack server has strong flexibility in hardware configuration and high cost performance. It is the best choice for many small and medium-sized enterprise users at present. Price of single blade in the blade server is always higher than rack server with the same configuration. If enterprises only apply a few blades, the cost is higher compared with that of rack. However, since the blade server shares power supply, cooling, heat exchange, management and other module, the cost of single blade is decreased with the increase of blade quantity. [9] Estimates of IBM Company shows that the comprehensive advantages can be embodied when more than six blade servers are required, and its advantages in saving space and labor cost are more prominent in large-scale deployment environment. Large blade server manufacturer, like HP, comprehensively considers two characteristics of high-strength core application and integrated infrastructure in order to meet market and enterprise demand, thereby further improving the flexibility and applicability thereof.

Application Value of Blade Server in the Coal Enterprise

Reduction of Operating Costs for Coal Enterprises. Current macroeconomic situation at home and abroad has become increasingly complex, uncertain factors affecting coal economy operation are increasing, coal enterprises must lower cost for improving competitiveness in order to maintain market and strive for survival. [5]Appearance of each blade is only 1/2 and even 1/3 of 1U rack server in blade server. All modules and parts are concentrated in rack chassis with standard height, which are shared by all blades. Space occupation of the blade server in coal enterprise machine room and data center can be maximally reduced by centralized control management of servers and centralized storage of data information, and power consumption also can be reduced at the same time. Since blade server itself contains switch module and independent management module, which does not need management by more KVM devices, cables and external switch quantity can be greatly reduce, thereby lowering operation management cost of coal enterprises.[10] Currently, users are allowed for selecting different operation systems and servers on the same hardware platform according to own level by blade server technology, namely more selection application space is available for lowering cost in key business application aiming at coal enterprise users.

Promotion of Informatization Management Efficiency of Coal Enterprises. Management of most coal enterprises still belongs to extensive management, especially in the aspect of information construction, which is characterized by low management consciousness and relatively low cost investment. However, informationization has important significance to promote coal enterprises to transform development mode, adjust optimal structure and improve enterprise competitiveness.

Cables are fully distributed in traditional coal enterprise data center, connecting failures are frequent, great management difficulty is brought to working personnel by troubleshooting after failure occurrence. Blade servers are more concentrated. Users can manage further configuration of all networks through virtual mode only through configuring the network setup once, thereby greatly reducing cable quantity, less connection cables can lower possibility of connectivity failure. Deployment time can be shortened synchronously, burden on the administrator can be alleviated, and system reliability is increased during management simplification, thereby improving management efficiency of coal enterprises. In current era of cloud computing and big data, IT infrastructure must have the ability of rapid expanding aiming at some coal enterprises with high information density and large data storage computing quantity. Blade server has high flexibility in the aspect of upward expansion and outward expansion. Only new single processor should be inserted into open bracket of the chassis for adding new blade server, which not only can bring convenience for IT management of coal enterprises, but also can lay foundation for sustainable development of enterprises.

Improvement of the Safety of Coal Enterprise Data System. Coal mines act as resource-based enterprises, and it is very important to ensure the safety of information and data, which not only includes safety in the aspects of enterprise business secret, document data, etc., but also contains safety of information related to coal mine development such as geological survey, relocation, environmental protection work, etc. Distributed storage mode is adopted for blade server to save data and information. Many duplicates can be saved. When hardware equipment of any one set of application system in the coal mine suffers from failure, the virtual server can complete backup restoration within a few minutes, thereby effectively preventing the loss of data and information. FlexNode clever partition technology is also introduced to blade server of IBM Company. Two HX5 blades can be combined into a four-way blade with more flexible configuration.[8] Once a node suffers from failure, another node can carry all applications, thereby guaranteeing that the system will not completely suffer from downtime, and increasing system availability and reliability.

Analysis on Application Case_ Xuchang Coal Mine Applies Server Knife Box for Realizing Centralized Control of Various Application Systems

More than 30 sets of application systems are required under the condition of normal operation in the mine. One set of corresponding hardware equipment must be equipped for installing each set of application system software under traditional mode. A lot of manpower and materials are required from system installation and debugging to subsequent maintenance. It not only requires high power consumption and large occupied space with slow operation efficiency on one hand, once the hardware equipment of the application system is failed, data, material and information can be lost.

Server knife box only occupying space of one power distribution box is installed in the mine on the basis of original information network in order to further improve the work efficiency. Eight blade servers are installed in the knife box, which can meet sharing and storage of data and information of eighty sets of application system software in one time, demands of all application systems in the mine can be completely met. More than 30 sets of application systems are completely moved to the blade server by the mine such as mechanical and electrical monitoring, ventilation and prevention monitoring, financial management, coal marketing management, etc. in order to fully exert the role of virtual management and storage of cloud computing technology.

Xuchang Coal Mine applies cloud computing for realizing production management. In the case, server migration and management work of all application systems in the whole mine can be completed by one worker and one computer, thereby realizing centralized control and management of server as well as centralized storage of data and information. Application of server knife box not only can save space and labor investment, but also can lower power consumption of application system in the whole mine, thereby greatly improving production efficiency and management level.

Conclusion

China development of cloud computing was proposed in the '12th five-year plan', and cloud computing technology is applied in information construction of various industries more and more prominently with economic development and internationalization. Blade server belongs to a low cost service platform based on the cloud computing technology. In recent years, it has been operated in a part of coal mine enterprises. Master of performance, features and development status of blade server as well as comprehension of application value of blade server in coal industry has important significance for exploring concrete application of cloud computing in coal mine industry aiming at technical management personnel of coal enterprises on the basis of information actual demand of own enterprise.

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