Load Balancing Of Cloud Computing Platform

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Abstract

Since the launch of this new cloud computing technology, its development momentum is unstoppable, and it has had a huge impact on the application service model: from concept to development to practice, cloud computing framework technicians put forward one by one, covering all aspects, and even strive for perfection. computer development, It has always been a research hotspot for enterprises and scholars. This paper first analyzes the current state of cloud computing, cloud resource planning and management, and then examines existing resource planning strategy and load balancing algorithm, combining the resource planning strategy with the load balancing algorithm, a cloud resource planning strategy based on load balancing is proposed, and the implementation capabilities of this strategy on the cloud platform and cloud simulation platform are analyzed, and finally the research content and shortcomings in the research process of this paper are summarized.Hope to benefit the development of related industries.

Keywords : Cloud computing technology, load balancing , Hadoop technology

Introduction:

With the development of cloud computing technology, user needs tend to be diversified, Application types become more complex. In this paper, resource allocation, load balancing the specific requirements of balance, planning and control are introduced in more detail. Introduction, such as resource grouping and division, selection of task submission methods, resource Source planning strategies and algorithms, etc. The goal of cloud computing resource planning is to Under the premise of the total throughput of the platform system, the optimal planning of system resources is realized. Plan, and balance the load within the system according to user needs. From the quality of service From the perspective of quality of service (QoS) , the implementation of optimal planning, optimal completion time, Economic principles and load balancing are considered in four aspects. Now we can do more things on the Internet, such as online learning, online shopping , check email from anywhere, organize or attend online meetings, and more.It is undeniable that the Internet has brought a lot of convenience to our life and work. Benefits, such as auto-complete keywords or similar products when shopping online recommendation. These services make our selection easier and based on each different personal situations are optimized to achieve the effect of precise push. Exist while working and studying, we quickly and easily generate large Quantitative data. These data need to be stored and processed on the network, and the amount of data is increasing. In addition, an increasing number of smart devices such as the emergence and popularization of iPhone, iPad and smart watch have increased the comfort and efficiency of senders and receivers can be taken anytime, anywhere Video recording and other activities, online social networking and online shopping) load balancing. It is very important in Hadoop cluster system, reasonable load balancing strategy performance and usability can be improved. Task Planning Strategies for Hadoop Clusters and planning mode have a great impact on load balancing, but the current Schadoop set Swarm's Hayulink mode does not favor loads when using digital libraries balance technology. One of the problems is that in a cloud computing environment, cloud computing nodes tasks are more important than their tasks. To achieve different geographic locations due to the heterogeneity of cloud computing platforms, some computing tasks must be performed by other heterogeneous the node is complete. Optimized allocation of computer programs and hardware resources, transferable Input to the heterogeneous cloud node [1].

In the cloud computing environment, every cloud computing provider is in different geographical locations, it is not possible to create a standard cloud computing domain. if cloud the number of users and the load of the computing platform remain unchanged, then the cloud service the demand will change dynamically with the change of time and capacity. When SQL Server cloud adds a large number of new nodes on the server, it will directly lead to the following questions:

(1) Due to a large number of new nodes joining the cloud, some nodes consume a lot of resources, and even some services in the cloud will consume the cloud computing resources of other nodes are inactive or damaged, resulting in overload.

(2) Different cloud service providers provide different cloud computing platforms,, but the applications and data of the entire cloud computing platform are not uniform, and cannot Interoperability and transfer [2-3].

Therefore, this paper not only improves the load balancing mechanism, but also considers the heterogeneity of the cloud computing environment.

1 Research questions and status quo

Load balancing is one of the key issues in the development of cloud computing. Reason as follows: First, the cloud computing platform built on different cloud service providers in Taichung, it is necessary to increase the utilization of hardware and software resources, application resources, and service resources. Utilization, in order to achieve resource advantages, optimize allocation, and improve customer satisfaction. In a heterogeneous cloud computing environment, the load between different cloud computing platforms the balancing mechanism can provide users with better and cheaper cloud resources. Depend on due to the expansion of cloud computing, the cloud computing resource allocation system will be based on the user's resource needs vary. The load balancing mechanism allows dynamic allocation of resources, without specifying additional resources from hardware and software to make the peak seek to minimize.

The load balancing mechanism provided by Hadoop technology can meet the requirements of a small number of cloud service needs. However, when the heterogeneous cloud computing platform when there are a large number of requirements, there are many problems in terms of scalability and flexibility. Many restrictions, unable to solve the resource planning problem of heterogeneous cloud computing platforms, now there is a better heterogeneous cross-load balancing mechanism.

Currently, leading cloud computing providers include Google, Amazon, Eucalyptus and Microsoft. On the cloud computing platform, Google provides a load balancing mechanism for Hadoop technology. Provide application operation interface to confirm determine whether the virtual machine platform provides services for software resources, and promote and develop send software and hardware. The resource downlink scheme [4] is characterized by the fact that users cannot access the bottom layer program and hardware resources, Amazon cloud computing platform load balancer the system mainly includes three aspects: flexible load balancing mechanism, cloud service allocate resources and cloud services. Resource allocation mechanism, cloud service resource allocation process monitoring and unified mechanism, dynamic expansion of cloud resources and user needs management, real-time monitoring of the entire cloud service process, resource allocation and process management. Eucalyptus uses a centralized load balancing controller to achieve cloud computing the load balancing mechanism of the platform. There are three types of controllers: cloud node controller controllers , computer cluster controllers, and cloud controllers. Microsoft use controls the software structure is used to realize the load balancing mechanism, and the load balancing method has a large degree of much depends on the type of cloud service. For different types of cloud services, working with Azure Fabri Controller service and Azure Fabri Controller to complete the load balancing mechanism. The GoGrid cloud computing platform adopts a relatively open load balancing method, which records the load of each server balancing mechanism and provides a load balancing user interface for clients. These the load balancing mechanisms provided by cloud service providers have two common problems:

Problem:

Achieving Centralized Performance, Scalability on Heterogeneous Cloud Computing Platforms and unmanageability.

1.1 Background of Cloud Computing Development

Cloud computing is considered to be the next information technology after the personal computer and the Internet. Another major change in technology. The change is no longer just

technical change, but a change in the way of doing business. Cloud computing is no longer like traditional new technology provides hardware to users, instead, it becomes a service, It does not just use traditional computers as a new technology, but provides a centralized network like the cloud provides users with personalized services.

The development of cloud computing has benefited from the revolution of network applications. traditional meter computer models have many problems that hinder computer technology development, such as the initiation of infrastructure construction, the reduction of potential development costs few. Although ultimately only a few advanced applications will be able to provide services, but users still need to start building infrastructure, which greatly increases construction cost and usage time. After starting to use the Internet, the service the supplier will still be responsible for the next phase of maintenance, so there will be no focus on to develop new projects. In order to expand the service platform, when it is necessary to change the cloud when the scale of platform or service is large, the traditional computing model must be Revise.

On this basis, the development direction of cloud computing technology is proposed. cloud the use of computing is characterized by flexibility, reliability and scalability, Enterprises and even users can quickly use the cloud platform provided by cloud service providers build your own system. Considering the maintenance of the infrastructure, there is no need to consider Considering the specific implementation of the underlying layer, you only need to concentrate on building your own needs on the platform. Just the service or system you want. The scalability of the cloud platform can also be fully the ever-changing needs of users reduce service costs.

1.2 Definition of Cloud Computing

Cloud computing is a new term, and cloud computing technology was officially introduced in 2007 into the budding stage. However, in December 2008, Andy Isherwod Said: Many people start to turn to cloud computing research, but I have never heard two people say the same thing. Larry Ellison mentioned in the Wall Street Journal: When it comes to cloud computing, an interesting phenomenon is that we often do things that redefine cloud computing. As for the definition of cloud computing, there are many different types, and the realization of cloud computing is also very different. wiki definition Cloud computing is an online computing method. In this way, you can provides general-purpose programs, hardware resources, and information to computers and other devices. Cloud computing describes new online IT services, usage and delivery models, through Often involves delivering dynamic, easily scalable, and virtualized resources over the Internet source. The National Institute of Standards and Technology (NIST) defines cloud computing as defined as a pay-per-use model that provides availability, convenience, and required Internet access and access to configurable computing resources (resources include network access to networks, servers, storage, and applications) that can Quickly provisioned with little administrative effort or interaction with service providers interactive.

The basic principle of cloud computing technology is to process a huge application the program is divided into several subroutines across the network layer, and then the server Search for applications in the cluster to find suitable applications to handle user requests request, and finally return the result to the user.

2 The basic principle and process of the load balancing mechanism of the cloud computing platform

The same cloud computing platform is divided into N cloud computing domains by type. Capital the source manager implements load balancing, security authentication, billing services, and capacity Error billing mechanism, fault recovery and other functions. At the same time, the resource manager in the heterogeneous resources are constructed in the virtual resource pool, and the cloud computing platform provides users with Access to heterogeneous cloud computing platforms. Assuming p=1, in each cloud computing zone between the resource managers of the domain and the resource managers of other cloud computing regions Create a virtual connection. It must be emphasized that the number of researchers cannot too much, as the Division of Human Resources Management is

responsible for implementing the intra-regional balancing mechanism and other functions, the management and implementation mechanisms of cloud computing are different, and the differences between regions and the difference is huge. If there are too many researchers, the network gap between researchers communication can become very complex, analyzing account explorer consumes a large amount of computing resources, which is inconsistent with the original design, researchers can disconnect or add the default Internet connection as needed. If the cloud node When an error is encountered, the resource manager can be reset based on fault tolerance and error recovery new explorer. During this process, specific agents are detected to monitors the entire network, constantly detects the virtual connection of the network explorer, By changing the configuration of network connections to adapt to changes in the computing environment, Now automatically load balances heterogeneous cloud computing environments.

3 Simulation experiment and result analysis

The combination of cloud computing technology and mobile technology makes full use of mobile technology the heterogeneity of technology, through cooperation and negotiation with other heterogeneous cloud computing platforms, Encapsulating data from cloud applications or services in cloud computing, mobile generation The study of resource allocation can be done in a reasonable way, which can achieve better Load balancing mechanism. Based on the above theories, the cloud computing environment simulates a load balancing model based on heterogeneous cloud computing platform, in virtual resources 5 cloud computing domains are set up in the pool, and 100 cloud nodes are created for each cloud node a virtual cloud node. Each domain has the same processing power with an EC value of 1, the initial value of the recognition factor is set to 100. In a cloud computing environment, random Select 100 cloud nodes as the identification factors of heterogeneous hierarchical values, and execute step long is set to a fixed value, and the fixed value is set to 10 steps, while randomly assigning500 cloud service tasks to all nodes in the assigned cloud computing region .Specify the unit time t as the load balancing operation, and each cloud node calculates a Element tasks, all factors are checked once, and the detection satisfies the cloud node, Requirements for process load balancing and cloud node detection. Information has been updated with the machine downloads 50 randomly selected cloud nodes, then starts the system, and randomly select 10 overloaded cloud nodes in the heterogeneous cloud computing environment to realize Load balancing method for 10 overloaded cloud nodes. In this article, choose10 randomly running, lightly loaded cloud nodes for low load balancing method. After setting 10 round-robin steps and load-balancing process, randomly re-Newly select cloud nodes to realize a new round of load balancing process.

After the agent is discovered, every 20 load balancing cycles from the resource manager extract real-time load data from . After 50 sessions, based on heterogeneous cloud computing the load balancing model of the computing platform and the virtual load balancing proposed by Hadoop . The simulation results of the mechanism are compared, and the various effects caused by load balancing are calculated. Standard deviation mechanism for load managers in cloud computing regions in the Hadoop rack under the structure, the load balancing mechanism based on the heterogeneous cloud computing platform is better than the general load balancing mechanism. The load balancing mechanism drops faster, and its performance is better than the standard load balancing mechanism.

4 Conclusion:

The problem of load balancing is the application of cloud computing technology in digital library one of the key issues. It refers to the cloud computing environment, a cloud node the calculation task of the node exceeds the calculation task that the node should undertake, and it is necessary to transplant part of the computing tasks of the overloaded nodes to the cloud environment for distribution. Other homogeneous or heterogeneous cloud computing platforms distributed in different geographical locations . It is on the cloud node, so that the computing resources, software and hardware in the cloud computing environment resources, application resources, etc. can achieve optimal configuration.

In the cloud computing environment, each cloud computing service provider is located in different In different geographical locations, there is no unified cloud computing standard among them. The computing resources and cloud computing capabilities provided by each cloud computing platform have different Big difference. When the number of cloud users and the computing load of the cloud computing platform When it reaches a certain level, the cloud service request will increase with time and calculation amount. Change produces dynamic change. When the cloud service provider joins the After a certain number of new nodes, three immediate problems arise:

1. Due to the addition of a large number of new nodes, there is a throttling in the cloud computing environment. The possibility of point failure increases.

2. When processing certain cloud services, there will be some cloud node calculations The resource consumption is too large, and there may even be an overload situation, while some other The computing resource consumption of cloud nodes is idle or under low load.

3. Different cloud service providers provide different cloud computing platforms, They are heterogeneous with each other, and the applications and data of each cloud computing platform have no to achieve interoperability and portability.

As van Persie said, "cloud computing is not far from us" "it can promote the development of librarianship and make librarianship at the forefront of disciplines Summit". Some technical problems in cloud computing also limit the development of cloud, When using library computing, one of them is to study the load balancing mechanism. At present, cloud computing platforms provided by cloud service providers may be more realistic than imagined. The experimental platform is complex, and the theoretical model can be realized in the experiment, but it is different from the actual The situation is different.

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