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A Multiple QOS Constraints Based Trustworthy Resource Sharing In Cloud Computing Using Fuzzy Neural Network Harmony Platform

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Abstract: Cloud computing has become a popular computing paradigm, in which cloud providers offer scalable resources over the Internet to customers. Advancements in cloud computing are inevitably leading to a promising future for collaborative cloud computing (CCC), where globally - scattered distributed cloud resources belonging to different organizations or individuals (i.e., entities) are collectively pooled and used in a cooperative manner to provide services. In the existing work, harmony platform is introduced to handle both reputation management and resource management in the CCC. The harmony platform makes use of neural network to learn and derive the meaning from complicated or imprecise data and extract patterns and detect trends. It uses adaptive learning to learn how to do tasks based on the data given for training, and then functions as an expert on the data it has been given to analyze. (Ever the existing works more time to build the harmony which reduced the accuracy of QoS prediction. This problem can be overcome by considering the time period for the neural network model training and the load factor calculation. This is achieved in our work by introducing the fuzzy neural network arises from the need to overcome the lengthy learning process and poor convergence of traditional neural network. The experimental results prove that our proposed algorithm is better than the existing method.

Keywords: Distributed systems, reputation management, resource management, distributed hash tables, collaborative cloud computing

Introduction

Cloud computing is considered as the future model for computing. Cloud computing gives the user the ability to store and access data using internet. In the local computing and storage, all the things that a user needs are present locally. Cloud computing offer various services more than storage services. Cloud computing includes services like software as a service (SaaS), infrastructure as a service (IaaS) and platform as a service (PaaS). Companies like Amazon, Microsoft Google etc are providing cloud computing services. Amazon provides its services to web site developers and companies.

Microsoftis Azure also provides similar services. Google provides services like search engine, Google Apps, Google Drive Google Docs etc. Since there is an increased demand in cloud computing, there is a need to construct large data centers. Construction of large data centers costs

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millions of dollars. The centers consist of thousands of servers interconnected together to form grids or parallel processing computing systems. These centers often implement virtualization techniques which allow the system to be partitioned into many virtual machines. These machines can be rented by the customers. In case the customer needs more resources than the allocated amount, the additional requirements can be dynamically allocated. Sometimes a single cloud won't be able to provide the requested services. So to meet these needs a concept was introduced called Collaborative Computing.

In CCC the resources may be scattered globally. The resources may belong to different organizations. In order for CCC to work successfully, proper resource management is needed. Many researches are being conducted in order to achieve a proper resources management. With cloud computing there are many issues like Security, Availability, Maintenance and so on. Security is one of the main concerns here. The cloud may contain data business sensitive and confidential data belonging to certain individuals, organizations and Enterprises. When cloud computing is used the enterprises will have to trust the third party as they will be handling the stored data. Also the data owner will lose the ability to physical access the data. When collaborative clouds are used then there is greater risk involved. This is because the resources are dynamically allocated and there so no knowledge if the resource provider can be trusted. Many researches are done to achieve this.

The harmony platform makes use of neural network to learn and derive the meaning from complicated or imprecise data and extract patterns and detect trends. It uses adaptive learning to learn how to do tasks based on the data given for training, and then functions as an expert on the data it has been given to analyze. However the existing works more time to build the harmony which reduced the accuracy of QoS prediction. This problem can be overcome by considering the time period for the neural network model training and the load factor calculation. This is achieved in our work by introducing the fuzzy neural network arises from the need to overcome the lengthy learning process and poor convergence of traditional neural network. The experimental results prove that our proposed algorithm is better than the existing method.

Literature Survey

P2P based Internet-Sharing System

In the year 2013, Seyong Lee, Xiaojuan Ren, and Rudolf Eigenemann proposed a theory Efficient Content Search in iShare, a P2P based Internet-Sharing System. The proliferation of the Internet and related advances in networking technologies provides us with tremendous opportunities for utilizing the free resources available in Internet environments. One of the most promising but demanding topics in this area are to integrate computational and information resources scattered over the Internet into large-scale cohesive computing systems. iShare is a distributed peer-to-peer (P2P) Internet-sharing system that facilitates the sharing of diverse resources located in different administrative domains over the Internet.

For efficient resource management, organizes resources into a hierarchical name space, which is broadcast over the underlying structured P2P network. iShare uses Pastry as underlying overlay network to exploit the efficiency, scalability, fault-tolerance, and autonomy. However, the underlying P2P network also sets a fundamental limit on iSharesearch capability. In distributed P2P systems, advanced search functionality, such as content search and result-

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ranking, is difficult to build, because information about resources is also distributed. We propose an efficient search system, built on structured P2P overlay networks. This system addresses both issues of content search and semantic ranking.

To provide high search efficiency and accuracy, they extend a path-name-based hierarchy system, which was proposed in iShare, to build a summary hierarchy on top of general structured P2P systems. A summary hierarchy is a tree-like structure, where an intermediate node contains the union set of keywords maintained by its child nodes. Each leaf node in the hierarchy contains the keywords for describing an individual resource. The proposed mechanism also allows semantic ranking when there is a semantic hierarchy (i.e., classification hierarchy), as in iShare. This work deploys a Bloom Filter as a space-efficient summary structure, so that the summary hierarchy scales well(Vasanthy and Jeganathan 2007, Vasanthy et.al., 2008,Raajasubramanian et.al., 2011, Jeganathan et.al., 2012, 2014,Sridhar et.al., 2012, Gunaselvi et.al., 2014, Premalatha et.al., 2015, Seshadri et.al., 2015, Shakila et.al., 2015, Ashok et.al., 2016, Satheesh Kumar et.al., 2016).

The probabilistic property of a Bloom Filter allows their content search system to find all relevant results regardless of summary scale with an acceptable increase of search overhead. This work implemented a prototype for the proposed content search system in the iShare system. Then evaluated our content search system in terms of search accuracy, search efficiency and the effect of search result caching using iShareis built-in simulator. The disadvantages are we need to examine various ranking methods to explore their interaction with this content search system and the complexity of LSI generation and update, and the space requirement for VSM set limits on the systemis scalability.

Dynamic Optimization of Multi-Attribute Resource Allocation

In the year 2015, Sheng Di and Cho-Li Wang proposed a theory Dynamic Optimization of Multi-Attribute Resource Allocation in Self-Organizing Clouds. Cloud computing has emerged as a compelling paradigm for deploying distributed resource sharing services. The problem of Resource allocation in Cloud systems emphasizes how to harness the multi-attribute resources by multiplexing operating systems. With virtual machine (VM) technology, this work able to multiplex several operating systems on the same hardware and allow task execution over its VM substrates without performance variation.

Resource sharing can be achieved as each VM substrate can be configured with proper shares of resources (such as CPU, memory, storage, network bandwidth) dynamically. Todayis Cloud architectures are having problems. Cloud services may suffer various types of denial-of-service (DoS) attacks and limitation of computational resources. On the contrary computing systems (or Desktop Grids) can easily aggregate huge potential computing power to tackle grand challenge science problems. This work propose a novel Cloud architecture, called as self-organizing cloud (SOC), which can connect a large number of desktop computers on the Internet by a Peer to Peer network. In SOC, each participating computer acts as both a resource provider and consumer.

They operate autonomously for locating nodes with a more abundant resource or unique services in the network to offload some of their tasks. They construct multiple VM instances for executing tasks submitted from others whenever they have idle resources. The disadvantages are

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it has poor scalability due to the central management of VM-correlation matrix; Restrictive constraints on implementation since them only identify the compatibility of VM-pairs and more complex.

Optimal Service Pricing for a Cloud Cache

In the year 2014, Sofia Kyriakopoulou, Debabrata Dash, Gregory Francois, Verena Kantere and Anastasia Ailamaki proposed a theory regarding Optimal Service Pricing for a Cloud Cache. The going style for service infrastructures in the IT field is called cloud computing, a way of computing that lets users to access data services. The aim of cloud providers to make money by offering cloud services. The quality of services that the users receive depends on the usage of the resources. Cloud resources can be CPU, storage, bandwidth, network and applications deployed in the infrastructure. The goal of cloud provider is to optimize user satisfaction and profit. While the success depends on the optimization of both objectives and businesses. To maximize cloud profit we need a pricing scheme that guarantees user satisfaction while adapting to demand changes. Recently, cloud computing has found its way into the provision of web services.

Information, as well as software is permanently stored in Internet servers and probably cached temporarily on the user side. Businesses organization on cloud computing, such as Amazon Web Services and Microsoft Azure have begun to offer data management services: the cloud enables the users to manage the data of back-end databases. Applications that collect and query massive data, like those supported by CERN, need a caching service, which can be provided by the cloud. The goal of such a cloud is to provide efficient querying on the back-end data at a low cost. Users pose queries to the cloud through a coordinator module and are to be charged for base services that they received. The data are cached and builds data structures in order to accelerate query execution. The query execution is performed by executing them either in the cloud cache (if the necessary data are already cached) or in a backend database. Each cache structure (data or data structures) has an operating (i.e., a building and a maintenance) cost. A monetary value over the operating cost for each structure can ensure profit. In this paper propose a scheme for optimal pricing of cloud cache. The disadvantages of this scheme are the optimization procedure works under the assumption that data structures do not have to be evicted and rebuilt due to data updates(Manikandan et.al., 2016, Sethuraman et.al., 2016, Senthil Thambi et.al., 2016).

Resource Allocation Strategies for Computational Economies

In the year 2014, Kyle Chard and Kris and Bubendorfer proposed High Performance Resource Allocation Strategies for Computational Economies. Cloud computing has managed to achieve what was once considered by many to be a pipe dream. Consumers can outsource resources to third party cloud providers and pay only for the resources they used. A global computation market realized by a high-performance federated architecture that spans both Grid and cloud computing providers; this type of architecture necessitates the use of economic aware allocation mechanisms driven by the underlying allocation requirements of cloud providers. Computational economies have long been touted as means of allocating resources in both centralized and decentralized computing systems. Moreover, there is an opportunity cost to reserving resources during a negotiation. The resources will not be available for other negotiations that begin during the interval of the first negotiation. In any case, this wasteful

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negotiation process is expensive in both time and cost and therefore reduces the overall utilization of the system. In this paper, they suggest the application of two general principles to largely address these inefficiencies: first, avoid repeating negotiation and allocation processes, and second, avoid commitment of resources.

This work have distilled these principles into five high-performance resource utilization strategies: advanced reservation, progressive contracts, just-in-time (JIT) bidding, overbooking, and using substitute providers to compensate for encouraging oversubscription. The disadvantages of this strategy are short job duration workloads in which auction mechanisms typically perform poorly.

Existing System

Collaborative Cloud Computing operates in a large-scale environment involving thousands or millions of resources across disparate geographically distributed areas, and it is also inherently dynamic as entities may enter or leave the system and resource utilization and availability are continuously changing. This environment makes efficient resource management (resMgt) (i.e., resource location and resource utilization) a non-trivial task. Further, due to the autonomous and individual characteristics of entities in CCC, different nodes provide different quality of service (QoS) in resource provision.

A node may provide low QoS because of system problems (e.g., machines break down due to insufficient cooling) or because it is not willing to provide high QoS in order to save costs. Also, nodes may be attacked by viruses and Trojan horse programs. To ensure the successful deployment of CCC, the issues of resMgt and repMgt must be jointly addressed for both efficient and trustworthy resource sharing in three tasks such as efficiently locating required trustworthy resources, choosing resources from the located options and fully utilizing the resources in the system while avoiding overloading any node. The disadvantages of existing system are with the highest-reputed server selection policy, a high reputed server easily becomes overloaded and resMgt has a higher failure rate due to provider unwillingness than Power Trust because resMgt only considers node load but neglects reputation.

Problem Statement

If a node is reputation for a resource is decreased, it has a lower probability of being selected as a resource provider. Then, it has fewer opportunities to earn credits and may not have enough credits to buy its desired resources. As a result, nodes are motivated to increase their reputation by providing high QoS. The time period for the neural network model training and load factor calculation should be determined with consideration of several factors, including the performance requirement, the frequency of transactions, and the overhead in the system, etc. A shorter time period leads to higher effectiveness in QoS predication accuracy and load controlling but generates higher overhead.

Proposed System

In our proposed work, the harmony platform is build by using the fuzzy neural network whereas in existing work traditional neural network is used. The fuzzy neural network arises from the need to overcome the lengthy learning process and poor convergence of traditional neural networks and urgent needs to extract fine knowledge from a large amount of original data. Its basic idea come from fuzzy membership function, a fuzzy decision and the distributed and

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parallel structure of neural networks. Association is realized by not only integrating the capacity of the network but also fuzzy generalization of the knowledge element.

In this the result of combining the neural network and fuzzy logic are used. We assume that resource types (e.g., CPU, bandwidth and memory) are globally defined and known by every node. We assume that the directory nodes are trustable. The algorithm has two stages: the learning stage and the test stage. In the learning stage, samples are chosen one by one. In the test stage the trained FNN is checked to confirm that it can cover all samples with acceptable learning error. This process guarantees the trained network can cover the sample. Then we say this sample has been trained.

Conclusion

In this paper, we propose a collaborative cloud computing platform for campus cloud and education sector applications. In CCC, the resource management and reputation management are done for mutual interactions for efficient resource sharing among clouds. Harmony platform is used to handle the multi QoS oriented resource selection and resource reputation management processes. This harmony platform is built by using the fuzzy neural network concept which reduces the time complexity which leads to the accuracy in Qos Selection. The multi-QoS-oriented resource selection module helps users to choose resource providers that offer the highest QoS attributes. The resource overload control module gives preferences for low priced resources. Also, feedback system helps providers keep their reputations high by getting feedback from users to know its performance from time to time and keep updated.

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