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RESOURCE ALLOCATION IN COLLABORATIVE CLOUD BASED ON MULTI-QoS

NITHYA G REDDY[1], VIJAY SWAROOP[2]

[1]*M.Tech (CSE) Student, VTU, Atria Institute of Technology, India*

[2]*Assistant Professor, Dept. of CSE, VTU, Atria Institute of Technology, India*

Abstract-*High increase in the demand and advancements in cloud computing is giving rise to a promising future for collaborative cloud computing (CCC).In CCC, cloud resources which are generally scattered globally, distributed and belonging to different organizations or individuals are grouped together in a cooperative manner to provide services. Each and every individual or entity in CCC have their own autonomous features. So for a successful deployment of CCC, resource management and reputation management issues have to be addressed jointly. In previous researches these 2 issues have been addressed separately and simply combining the two systems would lead to double overhead. Also, the previously addressed methods for these issues are not much effective and efficient. In previous research method single reputation value of each node was provided and it could not reflect the reputation of a node in providing different types of resources. By always recommending the highest reputed nodes, the methods are failing in selecting a suitable node for resource selection to satisfy the user's diverse QoS demands. Hence a CCC platform is proposed known as Harmony which integrates both reputation and resource management in a harmonious manner. Harmony incorporates three key innovations:integrated multi-faceted resource/reputation management, multi-QoS-oriented resource selection, and price-assisted resource/reputation control. Trace-driven experiments on the real world Planet Lab test bed show that Harmony outperforms the previous resource platforms in terms of QoS, efficiency and effectiveness.*

Keywords:*Cloud Computing, Distributed Systems, Resource Management, Reputation Management*

Introduction:Cloud computing mainly focuses on maximizing the effectiveness on the shared resources which are shared by multiple users and sometimes dynamically reallocated as per the demand. It has become a popular computing paradigm, in which the cloud providers offer scalable resources over the internet to customers. Some of the clouds providing various services currently are Amazon's EC2, Google's App Engine, IBM's Blue Cloud and Microsoft's Azure. For Example, Amazon [1] provides Dropbox [2], the simple storage service. Cloud's one of the benefits is pay per use i.e. customers are charged by the actual usage of computing resources, storage and bandwidth.

Now a days the demand for scalable resources has been increasing rapidly. For Example, Dropbox currently has five million users, three times the number last year. So a single provider will not be able to provide sufficient resources for an application especially when the demand is too high i.e. during the peak time. The only way to provide sufficient resources by utilizing all the all the idle and underutilized resources in most organizations is by building a virtual lab environment connecting multiple clouds for petascale supercomputing capabilities. So this increase in demand and advancements in cloud computing led to a promising future for Collaborative Cloud Computing (CCC). In CCC, cloud resources which are generally scattered globally, distributed and belonging to different organizations or individuals are grouped together in a cooperative manner to provide services.[3] , [4]

A CCC platform interconnects physical resources to enable resource sharing between clouds and provides a virtual view of tremendous amount of resources to customers which is shown in the Fig1.1 below. This platform is a virtual organization that is transparent to cloud customers. It starts utilizing the resources in the clouds when resources are insufficient due to high demand of resources by the customers.

RELATED WORKS

PowerTrust: A Robust and Scalable Reputation System for Trusted Peer-to-Peer Computing

Peer-to-Peer (P2P) reputation systems are essential in the evaluation of trustworthiness to combat the selfishness, dishonesty and malicious peer behaviors. In the previous works, the feedback provided by peer were not true facts but now in this method a trust overlay network is used to model the trust relationships among peers. In this case the reputation system i.e. PowerTrust is used which is scalable and robust. This reputation system selects a small number of node dynamically which are most reputable using distributed ranking mechanism. Power Trust also improves in global reputation accuracy and aggregation speed by using a look-ahead random walk strategy and leveraging the power nodes. It is also responsible for adapting itself to dynamic peer joining and leaving and robust to disturbance by malicious peers. [5]

Harmony: Integrated Resource and Reputation Management for Large-Scale Distributed Systems

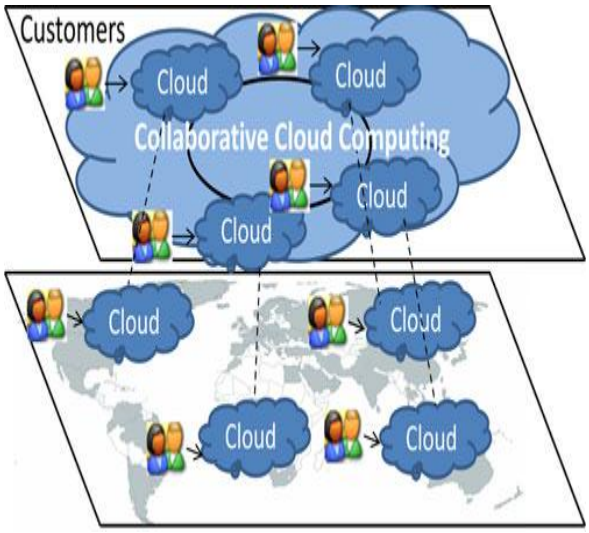

Fig.1.1. An Example of Collaborative Cloud

High increase in the demand and advancements in cloud computing is giving rise to a promising future for collaborativeCloud computing (CCC).In CCC, cloud resources which are generally scattered globally, distributed and belonging to different organizations or individuals are grouped together in a cooperative manner to provide services. So for a successful deployment of CCC, resource management and reputation management issues have to be addressed jointly. In previous researches the above two issues have been addressed separately and simply combining these two systems may lead to dependency between the two i.e. resMgt needs repMgt for a cooperative environment for resource sharing and repMgt is required for multi-faceted node reputations for providing resources. In current methods, always a highest reputed node is selected which would lead to overloading of these nodes. . By always recommending the highest reputed nodes, the methods are failing in selecting a suitable node for resource selection to satisfy the user's diverse QoS demands. Hence a CCC platform is proposed known as Harmony which integrates both reputation and resource management in a harmonious manner. Harmony incorporates three key innovations:integrated multi-facetedresource/reputation management, multi-QoS-

oriented resource selection. Experiments are conducted to prove that Harmony outperforms the previous methods. [6]

PROPOSED SYSTEM

After understanding the difficulties in allocation and availability of resources, it was understood and identified the interdependencies between resMgt and repMgt. The harmonious integration of resMgt and repMgt called the CCC platform, a harmony which was introduced to achieve enhanced and joint management of resource and reputation across geographically distributed resources. In previous methods, resource heterogeneity was neglected by assigning each node one reputation value for providing all of its resources. So the previous problem has been overcome by Harmony which enables a node to locate the desired resources and also find the reputation of the located resources, so that a client can choose resource providers not only by its availability but also by the provider's reputation of providing the resource. It is also responsible to deal with the challenges of large scale and dynamism in the complex environment of CCC.

The following are the developments made in the proposed system

1. Preliminary study on real trace and experimental results-After analyzing the transaction and feedback rating data that was collected from online trading platform. The analysis showed that some providers have high QoS in providing certain services, sometimes providing low QoS in others and users start utilizing services from high reputed sellers. Now the findings are verified that the importance of multi-faceted reputation and the drawback of the highest-reputed node selection policy.
2. Integrated multi-faceted resource/reputation management-Harmony offers multi-faceted reputation evaluation across multiple resources by indexing the resource information and the reputation of each type of resource to the same directory node. In this way, it allows nodes to simultaneously access information and reputation of individual resources.
3. Multi-QoS oriented resource section-In Previous resMgt approaches, only single QoS was taken into consideration and the resources were allocated. Now Harmony enables client to perform calculation of overall QoS taking into consideration more QoS i.e. Multi-QoS requirements like reputation, efficiency, distance and price of individual resources
4. Price assisted resource/reputation control- The customers have to pay for the resource transaction provided by the providers. The transactions are conducted in a distributed manner in Harmony. Harmony employs a trading model for resource transactions in resource sharing and leverages the resource price to control the node's resource and reputation. It enables a node to adaptively adjust its resource price to maximize its profit and maintain a high reputation while avoiding being overloaded, in order to fully and fairly utilize resources in the system.

After the development of Harmony platform, extensive trace-driven experiments with Planet lab is conducted. The experimental results prove that Harmony is better in comparison with previous resMgt and repMgt. This is the first platform to integrate repMgt and resMgt for multi-faceted node reputation evaluation to provide precise guidance for individual resource selection. Harmony platform can also be applied to otherareas such as large-scale distributed systems, grid and P2P systems.

So here an integrated platform called Harmony is implemented which is an efficient and locality-aware resource management system. Here the two systems are combined and identified CCC as an example of large-scale distributed systems for the application area of this combined system. Also a new trace analysis results are gathered to prove that the algorithm is more efficient than the previous methods and also performance is evaluated.

CONCLUSION

This system has an integrated resource/reputation management platform called Harmony for CCC. Due to the interdependencies between resMgt and repMgt, Harmony incorporates three innovative components to enhance mutual interactions for efficient and trustworthy resource sharing among clouds. The information about available resources and reputation of providers for providing types of resources is available due to integrated resource/reputation management component. To choose resource providers that offer the highest QoS measured by the requester's priority based on Multi-QoS attributes which is done by multi-QoS-oriented resource selection. The incentives for nodes to offer high QoS in providing resources is available by price assisted resource/reputation cloud. So this helps the providers keep high reputations and avoid being overloaded by maximizing incomes. This leads to efficient and reliable of sharing globally scattered distributed resources in CCC. Simulations and trace driven experiments prove that Harmony is more efficient and trustworthy than the previous methods. Harmony achieves high scalability, locality awareness and balanced load distribution in large scale distributed CCC.

FUTURE ENHANCEMENT

In future, if any third party would be ready to take up the role of CC Broker by integrating many clouds to provide services to the clients. And many clouds come up to register themselves with the CC broker so that they provide services more efficiently and by loading themselves with many services. So, in
future this system can be implemented in practical to provide high scalability, locality awareness and balanced load distribution in large scale distributed CCC.

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