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Comparing Resources Distribution Techniques in Cloud Computing to Improve Quality of Service

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Abstract

The Resources Distribution Approach is considered a major issue for enhancing quality of service (QoS) in data centers. It helps in achieving the goals for resources cost by getting a proper balance of conflicting requests. Resources distribution should also be performed among various data centers to get the shortest acceptable time required to honor requests from clients. In this paper, we compare distribution resources techniques that aim to enhance QoS parameters like the average reply time (ART), average server processing time (ASPT) and cost of virtual machine (VM). We use three of resources distribution techniques: Closest Data Center (CDC), Optimal Replay Time (ORT), and Reconfigure Dynamically (RD). We study the activity of resource distribution techniques based on acceptable metrics and examined their drawbacks. Our main goal is to analyze broker policies that help cloud customers to improve QoS and reduce the load of requests for the tasks in the network.

Key words and phrases: Cloud Computing, Cloud Broker Polices, Cloud Data Analytics, QoS.
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1 Introduction

Resources distribution in cloud data analytics assign multiple clients to share resources such as servers and storage [1]. There is a large number of resource distribution approaches proposed by researchers where most attention on resource scheduling and resource distribution. In this paper, we deal with servers distribution to improve quality of service. Resource distribution methods in cloud data analytics involve the host method (selecting hosts to VMs) and the VM method (a policy for selecting resources from host to VMs for jobs operating on them). The experimental results show that the used techniques in this paper improved QoS in terms of replay time, data transfer expensive and cost of VM. Also, it turns out that the closet data center method is better when we exceed the number of user bases whereas the optimal replay time methods is best when we exceed the numeral of cloud data servers [2]. The rest of this article is organized as follows: In Section 2 we explain the main idea and the goal of this paper. In Section 3, we give a literature survey related to QoS. In Section 4, we explain the methods of resources distribution based on cloud data analysis. In Section 5, we compare an experiment result and implementation for the existing methods. In Section 6, we present some results. Finally, in Section 7, we conclude our paper and provide directions for future research.

2 Literature survey

The literature reviews indicate that existing research primarily focuses on the approach in cloud environment for improving performance of cloud [3]. However, a dedicated issue is to study broker polices that help the cloud customers to improve QoS in the server. Shekhar et al. [4] studied the result on increasing QoS through cloud computing and used the ecosystem infrastructure such servers, data center and VM for enhancing cloud efficiency but this study needs to use the resource distribution techniques to attain high quality. Shetty [5] suggested balancing load among the different virtual machines to enhance performance and examined all virtual machines when busy; the reached job is allocated to the first ready to use virtual machine without testing the greater importance of the virtual machine which leads to the series of the methods being irrelevant. Aishwa et al. [6] suggested low cloud infrastructures for cloud relation and the implementation of lower infrastructure by enabling cloud analytics for expending the smallest in size infrastructure but this lacks resource allocation methods to improve the performance of cloud computing.

3 Method

A broker is one of the layers in cloud environment. A broker coordinates user request between data centers including their services and cloud users [5]. To be more specific, it gets tasks and VMs from users, then creates and sends them to data centers to be executed, address the critical approach for enhancing QoS in data centers and VMs. This work shows the simulation of controller methods for the various variables such as replay time, processing time, cost of available VM and server transfer cost [6]. Replay time is the time taken by network defined as follows: the time interval between sending the task and delivering a response. Broker techniques perform an important role in satisfying quality of service. Below are many broker techniques based on improved quality of service in a cloud environment:

- Dynamic Resource Distribution Methods; Minimizes response time, enhances server usage and avoiding data center bottlenecks.
- Load Balancing Methods; Enhance resource utilization and improve QoS parameters and decreasing latency.
- Bandwidth Optimization Techniques; Reduced BW based on maintenance client request nearby the data center.

In the suggested system, we used dynamic resource distribution methods. A Cloud Analyst simulator is used for creating servers, client bases and VM's can be created for the data centers. Service broker's methods are analyzed for selecting resources effectively. This study emphasizes the following three different resource distribution methods [8]:

1) Closest data center (CDC) method: The shortest link to the server from the client base, based on the network latency, is elected.

2) Optimized Replay time (ORT) method: The service controller actively observes the activity of all servers and, based on that, directs load to the server with best replay time.

3) Reconfigure dynamically (RD) method: In this method, usually different numbers of VMs are assigned in the data services.

4 Experimental Results and Discussion

Cloud data analytics enhance performance based on many policies like management data centers, physical servers, and network connectivity. In dealing

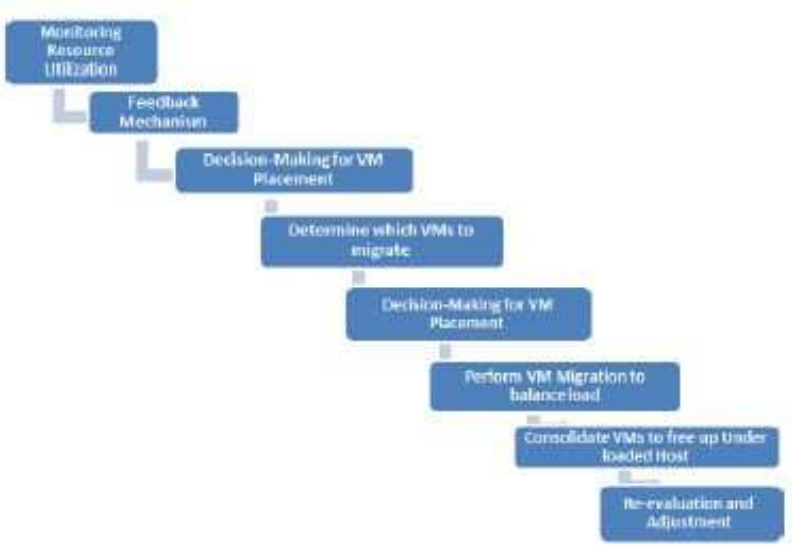

Figure 1: Data Center Operating Time for Three Techniques

with cloud connectivity polices, three methods are estimated using a cloud simulator which assigns customized methods for resource distribution over the primary server to enhance QoS. To perform the different scenarios, we have proposed the simulation using six user bases and five servers; each server has ten VM's. Each scenario is implemented for sixty hours. We have examined average peak clients as ten thousand and average off-peak clients to be one hundred in each client base. Service broker methods used for simulation are CDC, ORT and RD. The target is the one that has the least replay time, least data center processing time, and the least VM cost to avoid server overflow and achieve the optimal activity in cloud data analytics and improving QoS. CDC, ORT and RD techniques are described below. The activity of the server center proceeding time obviously showing in Figure 1 that RD with resource distribution takes more time as 0.53 ms for implementing as comparing to other two techniques and takes just 0.41 ms in CDC and 0.43 in ORT because it has to implement along with the idea of resource distribution.

Figure 2 shows the VM cost and data transfer cost of different scenarios; it can be adjusted that the reconfigurable dynamically with resource distribution needs more cost than CDC method and reduced replays time service controller policy.

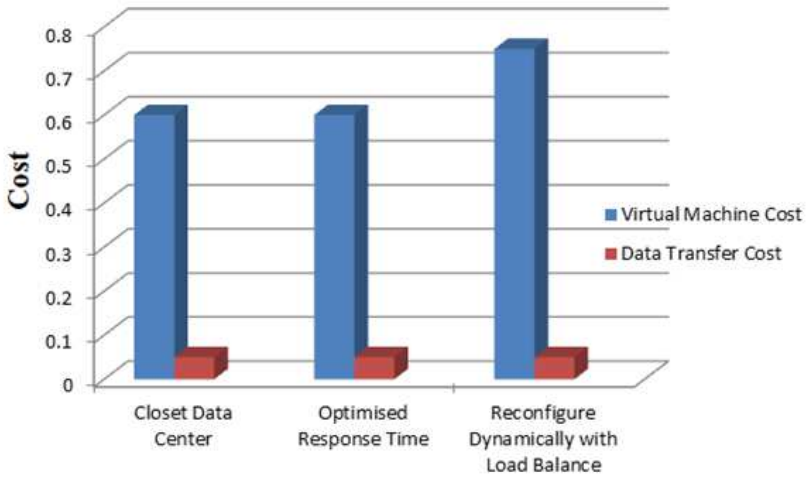

Figure 2: VM cost and Data transfer expensive of three Methods (CDC,ORT,RD)

5 Conclusion

In this paper, we examined coordinated solutions for QoS in cloud data centers. By analyzing the suggested three methods of cloud broker methods, we concluded that the whole perfect value such as cost of VMs and packet carry estimate are almost the same in CDC and ORT method but they are higher in the RD method. So, the total replay time and data center processing time were different. Out of all three cloud broker methods, the variables studied replay time and server operating time were lowest in the CDC method. So, these variables presented a challenge to each cloud developer to build the cloud environment with high activity. The CDC technique was the best in selecting resources in server database centers. Also, if the number of user bases increase, then CDC method was the best technique, while increasing the number of server data centers makes the ORT technique the best technique. For future research, we plan to increase the number of data centers for a large scale environment and to overcome the problem of deadlocks and server overflow to improve QoS activity.

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