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# RESOURCEFUL UTILIZATION OF LATENCY IN VIRTUAL MACHINE ALLOCATION IN CLOUD COMPUTING

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***Abstract***: *Brokering in cloud computing is important in management of requests in cloud computing. Broker as one of the important module which deals with the management of requests from users end. Most of the existing techniques allot the incoming requests as per the nature of requests but the latency of the users-vms' location is totally ignored. In this work we have put the latency matrix of the locations and evaluated the results. Simulation results show the effectiveness of the scheme.*

***Keywords:*** *Scheduling, Latency, Broker.*

## 1. INTRODUCTION

Cloud computing (CC) is currently one of the biggest buzzwords and the amount of cloud computing services (CCSs) is increasing rapidly. Many big players of the software industry, such as Microsoft, as well as other Internet technology heavyweights, including Google and Amazon, are joining the development of cloud services. Several businesses, also those not technically oriented, want to explore the possibilities and benefits of cloud computing. However, there is a lack of standardization of cloud computing services, and each cloud service provider uses different technologies, protocols, and formats. Further, most clouds are very vague about the actual internal workings. All this makes interoperability when working with multiple services or migrating to new services difficult. Additionally, there is a big marketing hype around cloud computing, where providers of online services re-brand their products to be part of the cloud movement. The great amount of different cloud computing services makes it hard to compare the offers and to find the right service. The vast amount of cloud computing services and the lack of universal definitions and standards lead to the question whether cloud computing services can be classified in a taxonomy based on their characteristics to easily compare them. Table-based comparisons of cloud computing services exist, however, they are mainly for commercial use and the degree of detail varies greatly. Taxonomy has been proposed. However, aims to find the strengths, weaknesses, and challenges in current cloud systems, rather than providing a method to categorize and compare existing and future cloud computing services. Moreover, provides a state of the art and research challenges in the area of cloud computing. However, also, does not provide a method to categorize existing and future cloud computing services. Further, also the industry has published white papers describing cloud computing taxonomies, such as. A cloud can be seen as a scalable infrastructure that supports and interconnects several cloud computing services. The cloud itself consists "of a collection of interconnected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resource(s)". The clients that are the users of the cloud computing services, use their home or work computer or any other Internet-enabled device to connect and use the cloud computing services. Generally, service-level agreements guard the provisioning of the cloud services. The key attributes that distinguish cloud computing from traditional computing solutions have been identified in and generally comprise the following:

- Underlying infrastructure and software is abstracted and offered as a service.
- Build on a scalable and flexible infrastructure.
- Offers on-demand service provisioning and quality of service (QoS) guarantees.
- Pay for use of computing resources without up-front commitment by cloud users.
- Shared and multitenant.
- Accessible over the Internet by any device.

Therefore in this work we have tried to put broker scheduling into a new level and further sections explains the background work followed by system model and results.

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## 2. RELATED STUDY

Firstly, Software as a Service (SaaS) offer access to whole applications as a service. Secondly, Platform as a Service (PaaS) provides a platform for developing other applications on top of it, such as the Google App Engine (GAE). Finally, Infrastructure as a Service (IaaS) provides an environment for deploying, running and managing virtual machines and storage. Technically, IaaS offers incremental scalability (scale up and down) of computing resources and on-demand storage [1]. Traditionally, small and medium enterprises (SMEs) had to make high capital investment upfront for procuring IT infrastructure, skilled developers and system administrators, which results in a high cost of ownership [2]. Cloud computing aims to deliver a network of virtual services so that users can access them from anywhere in the world on subscription at competitive costs depending on their Quality of Service (QoS) requirements , Therefore, SMEs have no longer to invest large capital outlays in hardware to deploy their service or human expense to operate it[3]. In other words, Cloud computing offers significant benefits to these businesses and communities by freeing them from the low-level task of setting up IT infrastructure and thus enabling more focus on innovation and creating business value for their services. Due to such business benefits offered by Cloud computing, many organizations have started building applications on the Cloud infrastructure and making their businesses agile by using flexible and elastic Cloud services. But moving applications and/or data into the Cloud is not straightforward. Numerous challenges exist to leverage the full potential that Cloud computing promises. [4] These challenges are often related to the fact that existing applications have specific requirements and characteristics that need to be met by Cloud providers. Other than that, with the growth of public Cloud offerings, for Cloud customers it has become increasingly difficult to decide which provider can fulfill their QoS requirements. Each Cloud provider offers similar services at different prices and performance levels with different sets of features. While one provider might be cheap for storage services, they may be expensive for computation. For example, Amazon EC2 offers IaaS services of the same computing capabilities at different pricing for different regions [5]. Therefore, given the diversity of Cloud service offerings, an important challenge for customers is to discover who are the ‘‘right’’ Cloud providers that can satisfy their requirements. Often, there may be trade-offs between different functional and nonfunctional requirements fulfilled by different Cloud providers. This makes it difficult to evaluate service levels of different Cloud providers in an objective way such that the required quality, reliability and security of an application can be ensured [6]. Therefore, it is not sufficient to just discover multiple Cloud services but it is also important to evaluate which is the most suitable Cloud service.

## 3. SYSTEM MODEL

In this framework we can observe the users are directly connected to broker and the brokers are directly connected to datacenters of CSPs. Each datacenter constitutes of virtual machines which are located in different geographical locations. The user’s requests come to broker and broker in return tries to get virtual machines. The information about virtual machines is stored in cache of broker and broker in return allocates the virtual machines to the users.

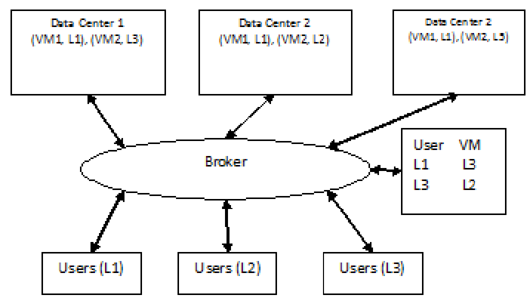


**Figure 1:** Schematic view of system model

| Algorithm: Latency based scheduling |
|---|
| Input: $T_{SLA}$ |
| Input: $T_{matrix}$ |
| For every requests |
| Get_latency(); |
| Get_avail_vms(); |
| alot_vms(); |
| end |
| If ($T_{SLA}$)>=Latency($T_{matrix}$) |
| Get_next(vm); |
| End for |

**Figure 2:** Algorithm for latency based scheduling

## 4. EXPERIMENTAL SETUP AND RESULTS

In the experimental setup we can see that we have used 10 datacenters which constitutes of 2 hosts each and each host consists of 10 virtual machines. Each virtual machine is composed of 1 Ghz processors/ 2 cores each and 1 GB of RAM. We further implemented the proposed framework and latency based framework on CloudSim 3.0 which are based on these setups and obtain the results. In this diagram we can observe that the latency based algorithm uses the information of latency for allocating the virtual machines. For cloudlets up to 100 requests the average difference of latency between FIFO based algorithm and latency is up to 50 ms which is very significant. Also with the increase in the number of cloudlets the average response time remains constant.

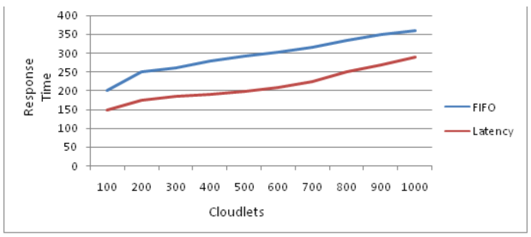


**Figure 3:** Latency vs FIFO

In the figure 4 we can observe that the service level agreements have been reduced dramatically with the introduction of latency in the broker module. The service level violations has reduced the cost of the system

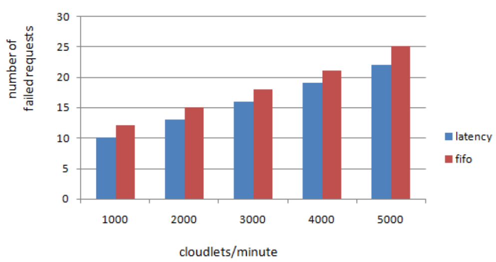


**Figure 4:** SLA violations

## 5. CONCLUSIONS

In this work we have evaluated the effective role of latency on the broker scheduling algorithm. Further we observe that the caching of latency in cloud computing have some serious positive effects in the total response time of the cloud. We also observed that profit of the CSP can be achieved by minimizing SLA violations. In future work we will try to improve the caching of the broker by inputting some more useful information to improve the processing time.

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