

An Analysis of Different Existing Virtual Machine Scheduling Approach in Cloud

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Abstract— Cloud is the one of the fastest growing technology in era of computer science. It is a trade oriented model where the cloud providers want more and more income from their cloud services. For this purpose its serve maximum number of users. As increasing the number of cloud users, large data center is used to complete the user demands. These data center consume large amount of energy which increase the amount of light bill. Energy consumption is depends on the number of active server. As the number of active server increases, energy consumption is also increase. After reading the theory of cloud it is found that number of active server is depend on the resource utilization. Virtualization is use to increase the resource utilization. Virtualization is the core technology in the cloud and allows the sharing of the physical resources. It's enabled the service provider to create multiple virtual machines in a single physical machine. One of the important features of the virtualization is the VM migration, which transfer the VM from one PM to another PM. When the PM is not balance some VM is migrated to other PM to balance the PM. Hug amount of work has been done in the field of load balancing. This paper explains various existing load balancing approach with their anomalies.

Index Terms— Cloud Computing, Virtualization, Energy Aware, Virtual Machine, Physical Machine, Migrations.

I. INTRODUCTION

Cloud is the one of the fastest growing technology in era of computer science. It is a trade oriented model where the cloud providers want more and more income from their cloud services [1]. According to NIST cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources. The computing resources include networks, servers, storage, applications, and services. In cloud computing, the shared pool of computing resources can be rapidly provisioned and released [2].

In cloud resources are supply in the form of services named Software-as-a-Services (SaaS), Infrastructure-as-a-Services (IaaS) and Platform-as-a-Services (PaaS) [2]. SaaS gives only software to user for the use. It does not gives hard and network for the user. Orkut, fackbook are the example of the SaaS.

In the SaaS, software is not installed. PaaS is different from the SaaS it provide the hardware as well as software. User uses these hardware and software to design new application. Its costly in contrast to the SaaS. B using PaaS user can built new application that can be used in cloud. IaaS is the mainly used services as compare to the SaaS and PaaS. In IaaS use can only use the resources. It controlled by the third party. Figure 1 shows the description of the cloud model.

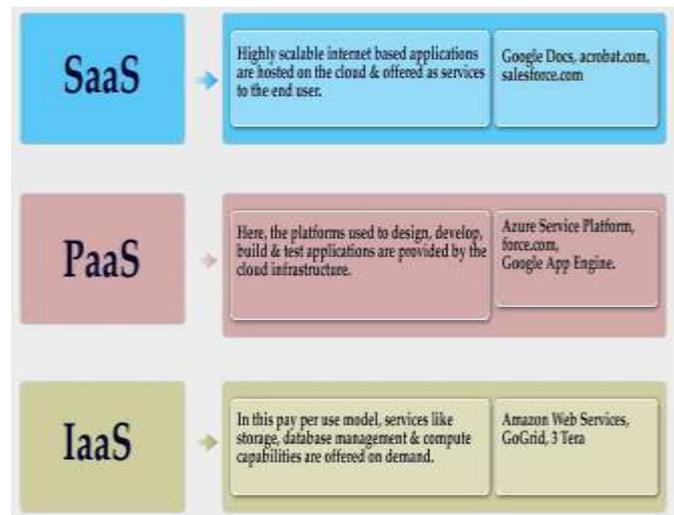


Figure 1: Description of the Cloud Services

There are four types of cloud deployment model [3] in the cloud computing known as public, private, community and hybrid cloud. In private cloud all computer are connected locally. Service running in private cloud cannot be access from outside the network. It is more secure and less scalable as compare to the other cloud. Public cloud is model of cloud where all users are allowed to access the services using internet.

The user need only internet connection and web browser to access with pay per use scheme. All the services with infrastructure of cloud provider are available on the internet. User need to subscribe the application and make enable to use it. Community cloud includes number of organization to share their services to increase resource utilization of cloud infrastructure.

The cloud infrastructure is not limited to only one organization. Hybrid cloud combines both public and private cloud with their advantages. Hybrid cloud offers the benefits of both the public and private cloud. The hybrid cloud is the good solution for purely business oriented

concept because many modern businesses have a wide range of concerns to support users demand.

Virtualization [4] is the core technique in the cloud and without virtualization there is no existence of cloud. It is created with the help of hypervisor. Virtualization is use to increase the resource utilization. Virtualization is the core technology in the cloud and allows the sharing of the physical resources. It's enabled the service provider to create multiple virtual machines in a single physical machine. Since cloud provider want to sell the resources, so provider divide their physical resources into the multiple type using the virtualization technology. Basic concept use in the virtualization is given in Figure 2.

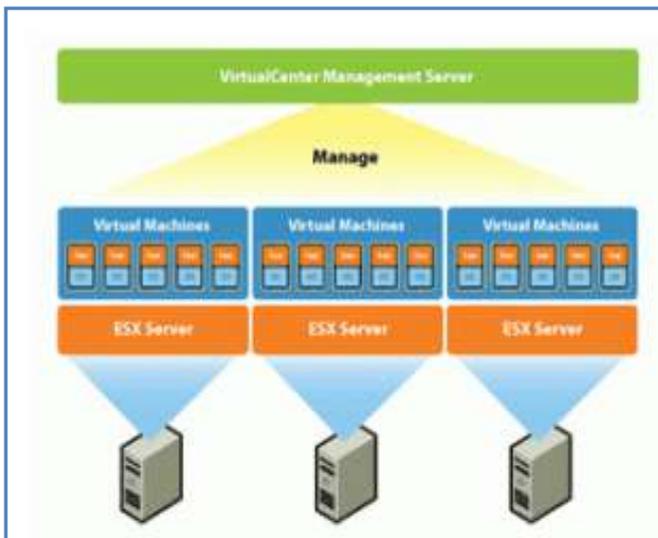


Figure 2: Virtualization

Main advantage of the virtualization is it increased the utilization of the resources. One of the chief attribute of the virtualization is the migration [5, 6] VM, which transfer the VM from one PM to another PM. When the PM is not balance some VM is migrated to other PM to balance the PM.

Hug amount of work has been done in the field of load balancing. Load balancing is the very critical problem in the cloud because resource requisite by the user is change at any time which increases the complexity of the load balancing approach. Number of load balancing approach has been proposed in the last few years.

VM placement is the key step in the load balancing approach. The performance of balancing approach is depends on the VM placement. Number of server can also be minimizing by using the proper load balancing approach. This paper explains various existing VM scheduling approach with their anomalies.

II. RELATED WORK

A. Awad et al. [7], proposed an Enhanced version of Particle Swarm Optimization to schedule the task in the in the cloud environment. This approach focuses on the task instead of the VM and migrate the task when the system is unbalance.

Author proposed Load Balancing Mutation (balancing) a particle swarm optimization (LBMPSO) approach for scheduling the task which is based on the mathematical concept.

Mathematical model is design for placing the task. LBMPSO can participate an important role in accomplish reliability of cloud computing services resources available and reschedule task that failure to allocate. LBMPSO contrast with standard PSO, random method and Longest Cloudlet to Fastest Processor (LCFP) algorithm to show that LBMPSO can save in make span, execution time, round trip time, transmission cost.

J. Song et al. [8] proposed TSMC approach for migrating the VM in cloud. This approach proposed solution to minimize the total migration and down time. The says that pre copy send redundant memory pages whereas post copy live migration approach will increasing the number of page faults which degrade the application performance. In this paper, we present a novel approach called TSMC (three-stage memory copy) for live virtual machine migration. In TSMC, memory pages only need to be transmitted twice at most and page fault just occurred in small part of dirty pages.

Y. Song [9] et al. describes about the allocation policy. The paper has introduced a RAINBOW prototype through which multi tier resource scheduling is done. The allocation of resource based of priority. The evaluation result says that paper is capable of improving resource allocation for both critical and less priority jobs. Problem with method is that it does not apply virtual machine migration policy for the optimization.

T. Wood et al. [10], present Sandpiper, a system that automates the task of monitoring and detecting hotspots, determining a new mapping of physical to virtual resources and initiating the necessary migrations. Sandpiper implements a black-box approach that is fully OS and application-agnostic and a gray-box approach that exploits OS and application-level statistics.

III. CONCLUSION

Virtualization is the main technology in cloud which is used to increase the resource utilization. Virtualization is the core technology in the cloud and allows the sharing of the physical resources. It's enabled the service provider to create multiple virtual machines in a single physical machine.

One of the important features of the virtualization is the VM migration, which transfer the VM from one PM to another PM. When the PM is not balance some VM is migrated to other PM to balance the PM.

Huge amount of work has been done in the field of load balancing. Hence, power consumption is the one of the core issue in the cloud and it should be minimized. Previous research says that VM scheduling can minimize the energy consumption.

Table 1: Research Papers and Proposed VM Selection and VM Placement Techniques

Paper	Type	VM Selection	VM Placement
Mohammad et al. [11]	VM	Largest Utilize	First Fit
G.Shobana et al. [12]	Task	Larger task from Overloaded PM	Place any under loaded VM
A. Rabiatalul et al. [13]	VM	Least Utilize	PM load < 50
G. Xu et al., [14]	VM	No Migration	Neighbor PM
Y. Fang et al., [15]	VM	Small	Largest Utilize

Energy consumption is mainly depends on the running PM. So energy consumption can be reducing by reducing the PM running. Hence, proper VM scheduling is the main function of any load balancing approach. This paper discussed various exiting VM scheduling approached in the cloud.

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