

# INTELLIGENT REDIRECTION OF VIRTUAL MACHINE AND EFFICIENT LOAD BALANCING IN PRIVATE CLOUD

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**Abstract-** Cloud computing is on demand as it provides flexible usage for reliable and efficient services for cloud consumers. In cloud computing, virtual machines are used for efficient utilization of physical machines which reduces LAN cabling, man power and concurrently supports green computing. The physical machine gets overloaded, during the utilization of resources limit exceeded. The Overloading of physical machines results in low performance of system which cannot satisfy the consumer's requirements. A proper scheduling method is used to overcome this problem. Through scheduling method, the virtual machine will dynamically migrate to the available node if the utilization of virtual machine exceeds limit of the resources. Thus the proposed system is used to minimize the overloading of physical machines, satisfy consumer's requirement and achieves load balancing in private cloud.

**Keywords:** cloud computing, green computing, load balancing, virtualization

## I.INTRODUCTION

Cloud is a model for delivering information technology services in which resources are retrieved from the internet through web-based tools and applications, rather than direct connection to a server. Cloud is a rising technology which is built with a key

term “virtualization”. Virtual machines are developed under virtualization layer using virtualization technology. Virtual machine is the one, where the resources of physical machine such as memory, CPU, network and hard disk are virtually configured to support the green computing. By developing virtual machines, we can avoid LAN cabling, man power and more space for physical machines. In this VM, operating system can be installed and run in computing environment. The architecture of cloud computing is shown below in Figure 1.

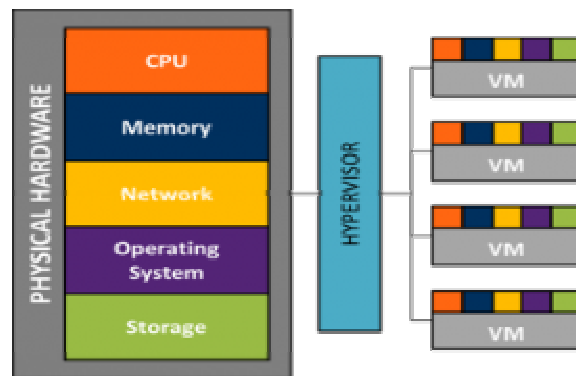


Figure.1 Cloud Architecture

Based on their use, virtual machines are classified into two types such as system virtual machine and process virtual machine. A system virtual machine provides a complete system platform which supports the execution of a complete Operating System (OS). A process virtual machine is designed to run a single program, which means that it supports a single process. When 'n' number of virtual machines is concurrently running on the same physical machine, it will result in unstable performance. To resolve this issue, migration and live migration of VM is introduced.

## II. RELATED WORK

The Skewness algorithm is used to quantify unevenness in the utilization of multiple resources on a server. The load in a server is categorized as hot spot, warm spot and cold spot. The Virtual machine load is monitored in a server. Hot spot VMs are eliminated by migrating the VM to warm spot or cold spot and achieve green computing. The capacities of servers are well utilized [1]. Hot spot virtual machines are selected and migrated to selected nodes when the resource utilization of the host exceeds a certain threshold value [5]. Energy consumption and migration downtime of VM has been analyzed. The amount of necessary energy during migration is reduced using dynamic adaptation of computing resources and more migration criteria has been compared using clustering algorithm [7]. The VM migration downtime is reduced using a novel approach: checkpointing / recovery and trace / replay (CR/TR). Better performance compared with pre-copy approaches in a LAN up to 72.4 percent is achieved on migration downtime and 31.5 percent on total migration time which results in better performance than the pre-copy approach [6].

## II. PROPOSED WORK

Load balancing is achieved by migrating virtual machines, when there is exceeding utilization of resources in private cloud. In this paper, under the host, multiple virtual machines are created with resources such as memory, CPU, network and hard disk. These resources are managed by a virtualization layer which translates the request to the underlying physical hardware.

### A. Automatic redirection of Virtual machine :

Virtual machines are dynamically migrated to another host which has sufficient space, when utilization of resources exceeds the limit. Physical machines (nodes) are registered under a clustering environment. The model of an invasion system is shown in Figure 2. It describes the system client and server part. The request from the client is sent to the server through a private network. In the server side, requested resources such as memory, CPU, hard disk and bandwidth are provided to consumers.

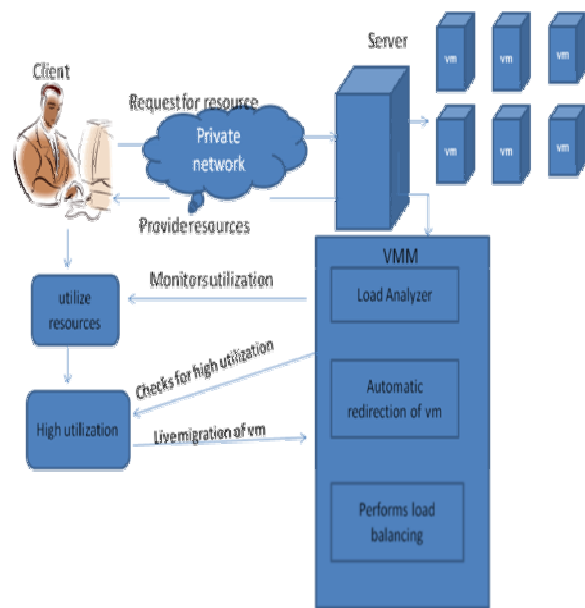


Figure. 2 Proposed System Model

When the client starts utilizing the resources, the server will monitor for over utilization of resources. If the resource utilization exceeds the limit, then the virtual machine will dynamically migrate to another node. The virtual machine will migrate dynamically to another host which has available space. This achieves load balancing and satisfies the consumer's requirement.

In this paper, the main objective of proposed idea are:

- To achieve load balancing.
- To minimize overloading of physical machine.
- To maximize performance of the system.
- To maximize customer satisfaction level.

#### IV.IMPLEMENTATION

Initial stage of this paper is private cloud setup . Virtual machines are configured with specific resources such as memory and CPU. In the virtualization (VT) enabled machine, the private cloud was created by using a tool OpenNebula 3.8.1.Ubuntu 12.04 LTS is used as operating system. OpenNebula act as a cloud controller which controls various host machine. For our implementation, we need to configure two hosts to migrate the virtual machine from one node to another node. For a single host, 2 GB RAM and 50 GB hard disk is the minimum requirement. A server is needed for each host to connect with other host under clustering environment.Data storage is used here to store disk image for VMs. Using a single image, multiple virtual machines are created using virtualization technology. Virtual machines are configured with resources such as CPU, 64 Mb MEMORY and

BANDWIDTH. This process implementation is shown in the Figure 3.

ID	USER	GROUP	NAME	STAT	CPU	USER	HOST	TIME
6	oscar@et	oscar@et	prc1	stop	0	64k	endhost1	04 13:21
7	oscar@et	oscar@et	l1y1linux	stop	0	64k	end	04 13:27
8	oscar@et	oscar@et	l1y2 ip	stop	0	64k	end	04 13:16
9	oscar@et	oscar@et	l1y3 ip	stop	0	64k	end	04 13:16
10	oscar@et	oscar@et	l1y4 ip	stop	0	64k	end	04 13:16
11	oscar@et	oscar@et	l1y5 ip	stop	0	64k	end	04 13:16
12	oscar@et	oscar@et	l1y6 ip	stop	0	64k	end	04 13:16
13	oscar@et	oscar@et	l1y7 ip	stop	0	64k	end	04 13:16
14	oscar@et	oscar@et	l1y8 ip	stop	0	64k	end	04 13:16
15	oscar@et	oscar@et	l1y9 ip	stop	0	64k	end	04 13:16
16	oscar@et	oscar@et	l1y10 ip	stop	0	64k	end	04 13:16
17	oscar@et	oscar@et	l1y11 ip	stop	0	64k	end	04 13:16
18	oscar@et	oscar@et	l1y12 ip	stop	0	64k	end	04 13:16
19	oscar@et	oscar@et	l1y13 ip	stop	0	64k	end	04 13:16
20	oscar@et	oscar@et	l1y14 ip	stop	0	64k	end	04 13:16
21	oscar@et	oscar@et	l1y15 ip	stop	0	64k	end	04 13:16
22	oscar@et	oscar@et	l1y16 ip	stop	0	64k	end	04 13:16
23	oscar@et	oscar@et	l1y17 ip	stop	0	64k	end	04 13:16
24	oscar@et	oscar@et	l1y18 ip	stop	0	64k	end	04 13:16
25	oscar@et	oscar@et	l1y19 ip	stop	0	64k	end	04 13:16
26	oscar@et	oscar@et	l1y20 ip	stop	0	64k	end	04 13:16
27	oscar@et	oscar@et	l1y21 ip	stop	0	64k	end	04 13:16
28	oscar@et	oscar@et	l1y22 ip	stop	0	64k	end	04 13:16
29	oscar@et	oscar@et	l1y23 ip	stop	0	64k	end	04 13:16
30	oscar@et	oscar@et	l1y24 ip	stop	0	64k	end	04 13:16
31	oscar@et	oscar@et	l1y25 ip	stop	0	64k	end	04 13:16
32	oscar@et	oscar@et	l1y26 ip	stop	0	64k	end	04 13:16
33	oscar@et	oscar@et	l1y27 ip	stop	0	64k	end	04 13:16
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82	oscar@et	oscar@et	l1y76 ip	stop	0	64k	end	04 13:16
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85	oscar@et	oscar@et	l1y79 ip	stop	0	64k	end	04 13:16
86	oscar@et	oscar@et	l1y80 ip	stop	0	64k	end	04 13:16
87	oscar@et	oscar@et	l1y81 ip	stop	0	64k	end	04 13:16
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100	oscar@et	oscar@et	l1y94 ip	stop	0	64k	end	04 13:16

Figure. 3 List Of VM

With running virtual machine in a private cloud, consumers can utilize the resources which are provided. When the client exceeds the resource utilization, manually we can migrate virtual machine from one host to another host. Migration process of virtual machine can be monitored using Virtual Network Computing (VNC). OpenNebula Sunstone is the OpenNebula cloud operation center, a GUI for regular users and administrator that simplifies the typical management operations in private cloud.

#### V.CONCLUSION

Load balancing is achieved by dynamic migration of the overloaded virtual machines. Through migrating virtual machines to available nodes dynamically, overloading of physical machines can be avoided. This can be achieved through a scheduling method. Thus overloaded virtual machine under the host is migrated to available node using our proposed algorithm. By migrating overloaded virtual machine dynamically, performance of the system is maximized and results in high customer satisfaction at data centers.

## VI.FUTURE WORK

In future, we will develop a scheduling algorithm. This algorithm should have criteria for selecting a VM, selecting a node which has sufficient space for overloaded virtual machines. Also, a module is developed to identify average resource load in a node and based on which schedule, the VM's will migrate dynamically to the available node. This ensures Load Balancing in private cloud.

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