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A HYBRID ALGORITHM FOR REDUCING ENERGY CONSUMPTION IN CLOUD DATA CENTER

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Abstract- Cloud computing is model of computing that use the web for sharing of knowledge, software system and resources to pc and alternative devices upon demand. This allows the end user to access the cloud computing resource anytime from any platform like cellular phone, mobile computing platform or the desktop. The goal of this paper is not always to conserve the energy used to the servers, but instead to reduce the energy needed to operate the data centre cooling systems. In power-aware scheduling jobs are scheduled to nodes in such a way to minimize the server's total power
Keywords: Data Centre, Virtual Machine, Hypervisor.

1. INTRODUCTION

Cloud computing is model of computing that use the internet for sharing of information, software and resources to computer and other devices upon demand. [1]This enable the end user to access the cloud computing resource anytime from any platform such as cell phone, mobile computing platform or the desktop. The current major cloud service provider are Microsoft, Hewlett Packard, IBM, Amazon, Google. The evolution of cloud computing can handle such massive data as per on demand service. In cloud environment the data is not specifically segregated. It is distributed throughout the cloud network ad causes the problems when specific data needs to be segregated Cloud Computing is "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of Configurable computing resources that can be rapidly provisioned and Released with minimal management effort or Service provider interaction [3]

2. GREEN COMPUTING

The data centres consist of thousands of heterogeneous servers that consume lots of power and produce large amounts of heat. Datacentres are heavy consumers of energy, accounting for between 1.1% and 1.5% of the world's total energy Green computing, green IT or ICT Sustainability, is the study and practice of environmentally sustainable computing or IT. There are two competing types of Green scheduling systems for Data centres, power-aware and thermal aware Scheduling.[4] There are a number of underlying technologies, services, and infrastructure-level configurations that make Cloud computing possible. One of the most important technologies is the use of virtualization. Virtualization is a way to abstract the hardware and system resources from an operating system.[12] This is performed in the Cloud environment across a large set of servers using a Hypervisor or Virtual Machine Monitor (VMM) which lies in between the hardware and the Operating System (OS). From here, one or more virtualized OSs can be started concurrently leading to one of the key advantages of Cloud computing. Nowadays with the advent of processors having multiple cores like Intel Dual Core and Core 2 Duo, allows for a consolidation of resources within any datacentre.[11] It is the Cloud provider's job to fully utilize this capability to its maximum potential while still maintaining a given QoS and disadvantages of cloud computing. And section 4 describe the application of cloud computing.

3. RELATED WORK

Qi Zhang et.al [7] in their research paper discussed how cloud computing is attractive to business owners as it eliminates the requirement for users to plan ahead for provisioning, and allows enterprises to start from the small and increase resources only when there is a rise in service demand. However, despite the fact that cloud computing offers huge opportunities to the IT industry, the development of cloud computing technology is currently at its infancy, with many issues still to be addressed. In this paper the author present survey of cloud computing, highlighting its key concepts, architectural principles, state-of-the-art implementation as well as research challenges. The aim of this paper is to provide better understanding of the design challenges of cloud computing and identify important research directions in this increasingly important area.

J E Smith et.al [5] in their paper provides with an in-depth knowledge about concept of virtualization. It discusses the concepts of ISA, API and ABI interfaces in detail. It also discusses the compatibility issues of processors supporting ISA with some Operating systems. It provides with a clear definition about the guest, the Host and Virtual Machine Monitor. It also discusses about the emulation of one instruction set with another, replicating VMs so that multiple OS instances can be run simultaneously and composing VM software to form a more complex flexible system.

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Shengmei Luo et.al [8] Virtualization is a term that refers to the abstraction of computer resources. The purpose of virtual computing environment is to improve resource utilization by providing a unified integrated operating platform for users and applications based on aggregation of heterogeneous and autonomous resources. More recently, virtualization at all levels (system storage, and network) became important again as a way to improve system security, reliability and availability, reduce costs and provide greater flexibility. In this paper, the authors address the requirements and solutions for the security of virtualization in cloud computing environment but this research paper is helpful in getting an insight into the virtual machine.

Rich Lee, et.al [9] in their research paper discussed about Cloud computing and how it enables shared servers to provide resources, software and data for collaborative services on demand with high interoperability and scalability. However, there are a number of technical challenges that need to be tackled before these benefits can be fully realized, which include system reliability, resource provisioning, and efficient resources consuming, etc. Among them, load-balancing is a necessary mechanism to increase the service level agreement (SLA) and better uses of the resources. Unfortunately, servers' capability varies much in practice and is not easy to record in ordered positions in a server farm, which will causes non resource-aware load-balancing algorithms to distribute workloads evenly. The authors discuss this issue and show why such algorithms don't fit the cloud computing environment and then present a feasible resource-aware load balancing mechanism by using existing proven technologies to meet higher SLA and the return of investment as well.

4. PROPOSED METHODOLOGY

To evaluate the energy savings of Algorithm, we consider the following small model Approach pool of just 4 servers. Each server within the pool is a 2.6Ghz Intel Core i7 920 with 12GB of RAM. We assume each server can hold 8 VMs as it has 8 virtual cores. At idle, they consume 105 Watts of power and under 100% loads they consume 170 Watts. If we execute the default model Approach scheduler with greedy forwarding to schedule 8 virtual machines each running CPU-bound tasks, each server would gain 2 VMs and would consume 138 Watts with a total pool power consumption of 552 Watts. However when Algorithm is used, all the VMs are scheduled to all available virtual machines with greedy forwarding and swithoff all the ideal state In order to evaluate the performance of our VM image design, we proposed greedy forwarding algorithm for selecting VM machine for switching task

4.1 Proposed Algorithm HYBRID Algorithm

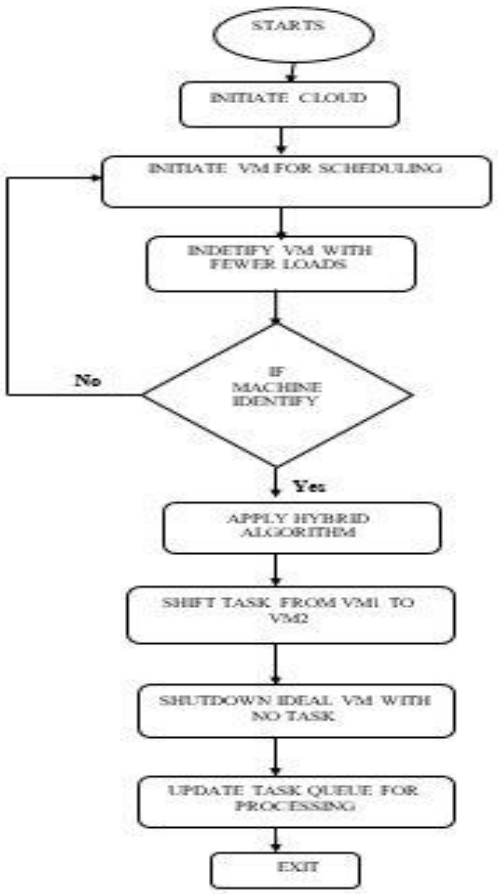
HYBRID algorithm prefers assigning small tasks to fast resources to run so that the total completion time is a HYBRID. HYBRID, firstly, calculates the minimum completion time for each task which is assigned to the related resources, and then chooses a minimum value from minimum completion time. In other words, HYBRID selects minimum Task . The description of HYBRID algorithm is as follows:

1) Calculate the minimum completion time for each task which is assigned to the related resources.
2) Choose a minimum Task from the minimum completion time.
3) Finish task scheduling and update related variables.
4) Repeat the above steps until all tasks are Shifted.

HYBRID can ensure the total completion time of tasks is a minimum. But there is a shortage that HYBRID leads to fast resources with heavy load and slow resources with light load. That is to say HYBRID causes lower utilization rate of the entire system.

4.2 Flowchart

Step 1: First of all initialize cloud, Name of Machine, MIPS,RAM SIZE
Step 2: Initiate VM for Scheduling.
Step 3: Vm With Less Loads Identification Process will be applied
Step 4: If any VM arises Apply HYBRID algorithm.
Step 5: Shift task on VM1 to VM2
Step 6: Shutdown the machine whose task are shifted and are in ideal state
Step 7: update task queue for Processing



Flowchart of Proposed Technique

4.3 Proposed Algorithm Pseudo Code

The proposed algorithm of Hybrid algorithm provides less energy consumption environment in cloud.

Initialize VM: Virtual Machines
VMID=virtual machine in ideal state
Technique: Hybrid Algorithm
Monitors: Ideal and machine with less tasks)
Prevention: Shutdown VM Machine with Ideal state
Step 1: Begin
Step 2: task allocated to available VM
{
Step 3: Identify VM machines with less and Ideal state
Step 4: If (VMID Identified)
Capture VM id and transfer task from ideal machine to another machine with high capacity and load and shutdown machine with ideal state
}
Else
{

Initiate VM machine for scheduling
}
Step 5: Stop

5. CONCLUSION

Cloud computing is the promising paradigm for delivered IT services as computing utilities. Cloud is designed to provide services to external user. In the cloud storage, load balancing is a key issue. It helps in proper utilization of resources and hence in enhancing the performance of the system. A proposed algorithm maintain load balancing and provide better strategies through efficient scheduling and resource allocation and provide better energy consumption .

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