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REVIEW ARTICLE

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DYNAMIC RESOURCE ALLOCATION USING VIRTUAL MACHINES FOR CLOUD COMPUTING ENVIRONMENT

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ABSTRACT

With the help of cloud we can utilize the use of cpu through virtualization technique. We have introduced the virtualization technology to dynamically allocate the resources.. The usual goal of virtualization is to centralize administrative tasks while improving scalability and workloads. We have used two algorithms i.e Skewness and green computing algorithms. skewness algorithm is used to measure unevenness utilization of resources and in green computing the use of physical machines is minimized and the physical machines that are idle are turned off.

Keywords— Cloud computing, resource management, virtualization, green computing

I. INTRODUCTION

In computing, virtualization means to create a virtual version of a device or resource, such as a server, storage device, network or even an operating system where the framework divides the resource into one or more execution environments. Cloud computing is defined as a type of computing that relies on *sharing computing resources* rather than having local servers or personal devices to handle applications. There are various benefits of Virtual machines for cloud computing environment. Virtual Machine means creating software version of computer system . It reduces the hardware cost and saves the electricity .Resource management achieves 2 goals:

1. Avoid overload in the system effectively while minimizing the number of servers used.
2. We introduce the concept of "skewness" to measure the uneven utilization of a server.

We aim to achieve two goals in our algorithm:

1. Overload avoidance. The capacity of a PM should be sufficient to satisfy the resource needs of all VMs running on it. Otherwise, the PM is overloaded and can lead to degraded performance of its VMs.

Green computing. The number of PMs used should be minimized as long as they can still satisfy the needs of all VMs. Idle PMs can be turned off to save energy.

II. SYSTEM REVIEW

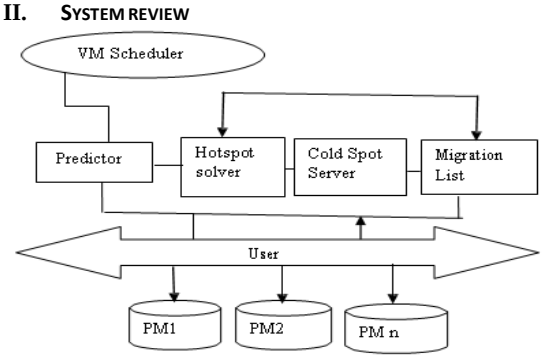

Fig. 1 System Architecture

VM Scheduler:

VM Scheduler run and invoked, receives resource demand history of VMs, the capacity and the load history of PMs (personal machine) from the user, the It schedules the number of thread process running in a system, based on this the state of the process varies like hot state, cold state, warm state.

Then it can forward the request to predictor, Predicts number of process running in future. When multiple systems are connected together it schedules the process that is running on different systems. This will help the user to view which process running in a particular system.

Predictor predicts the number of resources used in future.

Hot and Cold Spot Solver

The hot spot solver in our VM Scheduler detects if the resource utilization of any PM is above the hot threshold

(i.e., a hot spot). If so, some VMs running on them will be migrated away to reduce their load. Then it can give the request to cold spot solver. The Physical Memory does not allow using the server, thus avoiding overload in a server. A server as a hot spot if the utilization of any of its resources is above a hot threshold. This indicates that the server is overloaded and hence some VMs running on it should be migrated away.

The cold spot solver checks if the average utilization of actively used PMs (APMs) is below the green computing threshold. If so, some of those PMs could potentially be turned off to save energy. It identifies the set of PMs whose utilization is below the cold threshold (i.e., cold spots) and then attempts to migrate away all their VMs then it forward request to migration list. A server is actively used if it has at least one VM running. Otherwise, it is inactive.

Migration List

When migration list can receive the request from cold spot solver and it can compiles list of VMs and migration

list can passes it response to the user control for execution. If the minimum number of process is allocated to a particular server, then that process is migrated to a hot state server in a manner that will not cause an overload in an server. Also mitigate if a server allocated to more number of process beyond the hot state, then that process migrated to cold state. By mitigate the process from hot to cold and cold to hot the energy of server is saved and thus will reduce the hardware cost. The list of hot spots is sorted in descending temperature order.

III. ALGORITHM

Algorithm :

1. SKEWNESS ALGORITHM

We introduce a concept skewness which would be useful to measure the a uneven utilization of the server. By minimizing skewness we can find the various utilization of the servers.

Hot spot is a small area in which there is relatively higher temperature than the surroundings.

Cold spot is the area in which there is a decrease in ambient temperature.

Here we use the hot spot and cold spot to just explain the way in which the green computing algorithm has been used .The threshold technology is thus maintained here to make it more clear. We introduce the concept of skewness to quantify the unevenness in the utilization of multiple resources on a server. Let n be the number of resources we consider and be the utilization of the ith resource. We define the resource skewness of a server p as

Skewness(p)= $\sqrt{\sum_{i=1}^{n}\left(\frac{r_i}{\bar{r}}-1\right)^2}$,

where r is the average utilization of all resources for server p. In practice, not all types of resources are performance critical and hence we only need to consider bottleneck resources in the above calculation. By minimizing the skewness, we can combine different types of workloads nicely and improve the overall utilization of server resources. In the following, we describe the details of our algorithm.

Hot-Spot:

The server is defined as a hot spot if the utilization of any of its resources is above a hot threshold which indicates that the server is overload and hence some VMs running on it should be migrated away. We define the temperature of a hot spot p as the square sum of its resource utilization beyond the hot threshold:

Temperature = $\sum_{r \in R} (r - r_t)^2$

p=server, R= set of overloaded resources in server p, rt= hot threshold for resource r

Cold Spots:

The server is defined as a cold spot if the utilizations of all its resources are below a cold threshold. Which indicates that the server is mostly idle and a potential candidate to shut down or turn off to save energy. When the average utilization of resource of all actively used servers in the system is below a green computing threshold we do so. A server is actively used if it has at least one VM running. Otherwise, it is inactive.

2. Green computing algorithm

Green computing aims to attain economic viability and improve the way computing devices are used. It is the environmentally responsible and eco-friendly use of computers and their resources. When the resources utilization of servers are low in such cases they are turned off wherein we use this green computing algorithm. The very important challenge here is to reduce the number of actively participating servers. Thus we have to avoid oscillation in the system. Our algorithm is used when utilization of all active servers are below the green computing threshold. Dynamic resource management has become an active area of research in the Cloud Computing paradigm.

Cost of resource varies significantly depending on configuration for using them. Hence efficient management of resource is of prime interest to both Cloud Provider and Cloud Users. The success of any cloud management software critically depends on the flexibility; scale and efficiency with which it can utilize the underlying hardware resource while providing necessary performance isolation. Successful resource management solution for cloud environments needs to provide a rich set of resource controls for better isolation, while doing initial placement and load balancing for efficient utilization of underlying resource. VM live migration is widely used technique for dynamic resource allocation in a virtualized environment. The process of running two or more logical computer system so on one set of physical hardware.

Conclusion:

We have presented the design, implementation, and evaluation of a resource management system for cloud computing services. Our algorithm achieves both overload avoidance and green computing for systems with multiple resources.

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