Dynamic Resource Allocation using Virtualization Technology in Cloud Computing

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Abstract

Cloud computing is ubiquitous and promise a cost-effective realization of the utility computing principle, allowing users and providers easy access to resources in a self-service, pay-as-you-go fashion, thus decreasing cost for system administration and improving resource utilization and accounting. This system present the virtualization technology to allocate data center resources dynamically based on application demands and support green computing by optimizing the number of servers in use. The concept of skewness to measure the unevenness in the multi-dimensional resource utilization of server. In this paper we give the dynamic resource allocation strategies and green computing technology to improve the performance.

Keywords: Cloud Computing, Green Computing, Load Avoidance, Resource Allocation, Skewness, Virtualization

I. INTRODUCTION

The cloud computing technology is rapidly developing now days because of its fantastic features of automatic configuring, freely expanding, on-demand resource allocation and power saving, which just hits the goal of various organizations on IT infrastructure construction. These are dynamic environment that guarantee availability, reliability and related quality aspects through automated, elastic management of the hosted services. The services provided by the cloud are- Infrastructure as a Service (IaaS), Platform as a Service (PaaS) or Software as a Service (SaaS). It consists of the distributed processing, parallel processing and grid computing [3]. The basic principle of cloud computing is that user data is not stored locally but is stored in the data center of internet.

Cloud computing is a type of Internet-based computing that provides shared computing processing resources and data to computers and other devices on demand. It is a model for enabling ubiquitous, on demand access to a shared pool of configurable computing resources (e.g.: computer network, servers, storage, applications and services), which can be rapidly provisioned and released with minimal management effort. Cloud computing and storage solutions provide users and enterprises with various capabilities to store and process their data in either privately owned, or third-party data centers that may be located far from the user-ranging in distance from across a city to across the world. Cloud computing relies on sharing of resources to achieve coherence and economy of scale, similar to a utility (like the electricity grid) over an electricity network. Cloud computing builds upon advances of virtualization and distributed computing to support cost efficient usage of computing resources, emphasizing on resource scalability and on-demand services. Cloud computing allows business outcomes to scale up and down their resources based on needs. Managing the needs of the customer creates the challenges of on-demand resource allocation.

Virtualization is causing a disruptive change in enterprise data centers and giving rise to a new paradigm: shared virtualized infrastructure [4]. When the data centers and technicians had problems with traditional data centers (static data centers), the dynamic solution was the solution to their problems. The major problem was very simple, if they had high load on their data centers occasionally, they could not manage it easily, hence the greatest achievement was the new technology called as server virtualization [5]. They designed the software which creates different isolated boxes and shares all of the hardware resources between them and give them resources as they need. These boxes as they called virtual machines (VM), acts and services the

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clients like real servers with their strength and their weakness. The server virtualization conceptually designed for data centers that they can dynamically control and share all available resources over their data centers and it could be increased or decreased on-demand. Virtual machine technology has been employed for resource provisioning. Benefits of using virtual machine like rapid scalability, Live migration is feasible, consolidation in a Data Center is possible, Low downtime of maintenance, Virtual hardware supports inheritance operating systems efficiently, Security and fault isolation. In this paper we are trying to achieve two goals-Overload avoidance and Green computing.

II. LITERATURE SURVEY

1) The author proposes a load balancing scheme (VMCTune) based on dynamic resource allocation policy for virtual machine cluster. It divides resources into 4 types: CPU, memory, disk I/O and network bandwidth. VMCTune solves three of them except disk I/O.It absorbs both advantages of local scheduling and global scheduling, electively optimizes resource allocation for virtual machines. The resource utilization of physical machines will be improved as well. Compared to traditional load balancing schemes based on task scheduling, it is application independent and works seamless on VMs hosting different kinds of application. A drawback of this system is disk I/O intensive application is not considered because of infrastructure. So it is hard to balancing Disk I/O.Auther plan to use distributed system in next solution to get better scalability and disk I/O balancing.
2) It gives the strategy for dynamic resource allocation with Skewness and load prediction algorithm.auther uses Xen hypervisor Usher controller. The merits in this system are no overheads, high performance. It requires less number of migrations and residual resource is friendly to virtual machines. It improves the scheduling effectiveness. The demerit of the system is it is not cost effective.
3) It gives the Black and Grey box strategies with BG algorithm. They used hypervisor and finds with Nucleous and monitoring engine, Grey-box enables proactive decision making. While it has the limitations as, Black-box is limited to reactive decision making and BG algo requires more number of migrations.
4) It gives a dynamic server provisioning technique for energy consumption in hosting internet services. This technique is effective in turning of unnecessary servers to save energy. Internet services such as search, web-mail, online chatting and online gaming have become part of people's everyday life. Such services are expected to scale well, to guarantee performance and to be highly available. To achieve these goals these services are expected to scale well to guarantee performance and to be highly available. To achieve these goals these services are typically deployed in clusters of massive number of servers hosted in dedicated data centers. Each data houses a large number of heterogeneous components for computing. Storage and networking together with an infrastructure to distribute power and provide cooling. Data center energy savings can come from a number of places on the hardware and facility side.e.g-Through resource management. In this, they take software based approach consisting of two inter dependent techniques such as dynamic provisioning and load dispatching.
5) It proposes xen, an X86 VMM which allows multiple commodity operating systems to share conventional hardware in a safe and resource managed fashion, but without sacrificing either performance or functionality. This is achieved by providing and idealized virtual machine abstraction to which operating system such as Linux,BSD,and WindowsXP can be ported with minimum effort .Full virtualization was never part of the X86 architecture designs.This problem can be solved, but only at the cost of increased complexity and reduce performance. In order to overcome these problems to introduce the para virtualization. Para virtualization is necessary to obtain high performance and strong resource isolation on uncooperative machine architectures such as X86.Xen currently uses an algorithm called the Borrowed Virtual Time algorithm to schedule domains. It also improves the performance because para virtualization allows many OS instances to run concurrently on single physical machine.

III. PROPOSED SYSTEM

This system presents an automated system resource management system that achieves a good balance between two goals:

- Overload avoidance: the capacity of 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.

A. Advantages of proposed System

- Resource allocation system that can avoid overload in the system efficiently while minimizing the number of servers used.
- The concept of "Skewness" to measure the uneven utilization of servers in the face of multidimensional resource constraints.
- The resource allocation of servers in the face of multidimensional resource constraints.
- The resource allocation in that user neither has to install software nor hardware to access the application and host the application over the internet.

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– There is no limitations of place and medium and reach our application and data anywhere in the world on any system.

IV. SYSTEM ARCHITECTURE

The system architecture is described in the following figure.VM scheduler consists of four components- predictor, Host spot solver, cold spot solver and migration list[1].

A. Predictor

It collects the historical statistic and predicts current and future resource needs of VMs and ultimately load on VMs.

B. Hotspot solver

This observes the VMs and compares its utilization with the hot threshold temprature. If it is above the hot threshold the it migrate it away by sending this case to migration list otherwise to the cold spot solver for further observation.

C. Cold spot solver

It does the same with PM resource utilization by comparing it with cold spot threshold or green computing threshold and if it found to be less then it that PM is migrated to the efficient one PM and original PM is potentially turns off to achieve green computing.

D. Migration list

This compiles and result is send to usher CTRL for further execution.

E. Physical Machine (PM)

Each PM run xen hypervisor which is VMM.It has privileged domain 0 and more than one domain U.Domain U can run more applications like web server, remote desktop, mail and DNS etc.This statistics is then sent to the Usher CTRL (Usher Central controller) where scheduler is running. The scheduler is invoked after some period of time and observed statistics are compared and further managed by several Scheduling components.

Our system consist of following modules

1) Cloud server
2) Cloud Computing
3) Authentication
4) Resource management
5) Virtualization
6) Green Computing

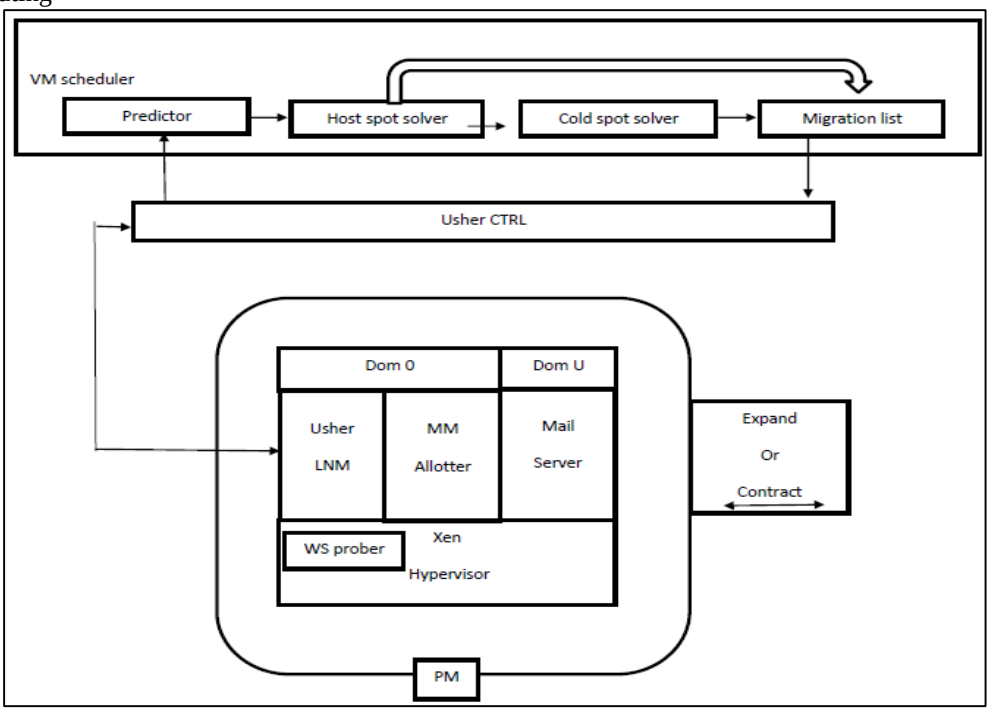

Fig. 1: System Architecture

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Cloud Server is the entity which provides the services to the users. It manages the resource so as to fulfill the needs of the user requests. cloud computing refers to the application offered over the internet. This is the technology which provides the services to the users on the pay as u go basis. Various services like Software Platform and Application are provided by the Cold Authentication gives the Access restrictions for the user as well as to the colud service Administator[6].

Resource allocation is the technology where we are allocate the resources to the users dynamically. User is not using all reserve memory for the current use so we are allocating that unused memory storage for the another user and return it to the original user when he require it.In Virtualization [4] we are using the Virtual machines to Increase the efficiency of the system. Green computing is the technology we are adapting to save electricity as well as increase system performance.

V. RESULT AND DISCUSSION

Skewness algorithm is use to mix workloads with different resource requirements together so that the overall utilization of server capacity is improved. Cloud computing environment consists of multiple customers requesting for resources in a dynamic environment with their many possible constraints. The virtualization can be the solution for it. It can be used to reduce power consumption by data centers. The main purpose of the virtualization is that to make the most efficient use of available system resources, including energy. A data center, installing virtual infrastructure allows several operating systems and applications to run on a lesser number of servers, it can help to reduce the overall energy used for the data center and the energy consumed for its cooling. The results having good contribution:

- Resource allocation is done dynamically.
- Saves the energy using the green computing concept by minimizing physical machines in use.
- Proper utilization of servers and memory utilization is taken care using skewness.
- Minimize the total cost of both the cloud computing infrastructure and running application.

VI. CONCLUSION

System presents evaluation of a resource management for cloud computing services. System multiplexes virtual to physical resources adaptively based on the changing demand. It uses the Skewness metric to combine VMs with different resource charactertics appropriately so that the capacities of servers are well utilized. Algorithm achieves both overload avoidance and green computing for systems with multi-resource constraints.

REFERENCES

[1] Miss. Gawali Anita D. Prof. S. K. Sonkar, Dynamic Resource Allocation using Virtualization Technology in Cloud Computing, International Journal of Advanced Research in Computer Engineering Technology (IJARCET) Volume 4 Issue 5, May 2015

[2] Zhen Xiao, Senior Member, IEEE, Weijia Song, and Qi Chen, Dynamic Resource Alloaction using Virual Machine for Clod Computing, IEEE Transactions on Parallel and Distributed Systems, (Volume:24 , Issue:6)June 2013,2013

[3] Wenyu Zhou1, Shoubao Yang, Jun Fang3, Xianlong Niu4 and Hu Song5 VMCTune: A Load Balancing Scheme for Virtual Machine Cluster Based on Dynamic Resource Allocation, School of Computer Science and Technology University of Science and Technology of China.

[4] Priyanka Mod, Professor Mayank Bhatt, A Survey on Dynamic Resource Allocation technique in cloud Environment, Computer Science, Rishiraj Institute of Technology, Indore, India Professor, Computer Science Rishiraj Institute of Technology, Indore, India.

[5] Jones, C.D., A.B. Smith, and E.F. Roberts, Black-box and gray-box strategies for virtual machine migration, in Proc. of the Symposium on Networked Systems Design and Implementation (NSDI07), Apr 2007...

[6] Saraswathi AT a, Kalaashri.Y.RA b, Dr.S.Padmavathi c1, Dynamic Resource Allocation Scheme in Cloud Computingl, a UG Student,Thiagarajar College of Engineering,Madurai,625015, India. b UG Student,Thiagarajar College of Engineering,Madurai,625015, India. c Associate Professor, Thiagarajar College of Engineering,Madurai,625015, India...

[7] Vinayak Awasare, PG Student of PCCOE, University of Pune Maharashtra India, Sudarshan Deshmukh, Assistant Professor, PCCOE, University of Pune, Maharashtra, India, Survey and Comparative Study on Resource Allocation Strategies in Cloud Computing Environment, University of Pune Maharashtra India,.

[8] Kaleeswari.P,Guru Rani.G, Survey on E_cient dynamic Resource Allocation in Cloud, International Journal of Computer Science and Cloud Computing,2013

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