Preeti Chahal et al. International Journal of Recent Research Aspects ISSN: 2349-7688, Vol. 3, Issue 2, June 2016, pp. 139-42

Cloud Computing: A Survey Report

Preeti Chahal[1], Vinod Saroha[2]

[1]M.Tech Scholar, Bhagat Pool Singh Mahila Vishwavidyalaya Khanpur Kalan,Sonipat
[2]A.P, Bhagat Pool Singh Mahila Vishwavidyalaya Khanpur Kalan,Sonipat

Abstract: **Cloud computing infrastructures are designed to supp ort the accessibility and deployment of various service oriented applications by the users. Cloud computing services are made available through the server firms or data centres. These resources are the major source of the power consumption in data centers along with air conditioning and cooling equipment. Moreover the energy consumption in the cloud is proportional to the resource utilization and data centres are almost the world's highest consumers of electricity. The resource allocation problem in a nature of NP-complete, which requiring the development of heuristic techniques to solve the resource allocation problem in a cloud computing environment. In this paper we have presented a review of previously work done by researchers on this issue.**

Keywords: **Cloud, Cloud computing environment, load balancing**

I. INTRODUCTION

Over the past few years, cloud computing has rapidly emerged as a successful paradigm for providing IT infrastructure, resources and services on a pay-per-use basis. The wider adoption of Cloud and virtualization technologies has led to the establishment of large scale data centres that provide cloud services. This evolution induces a tremendous rise of electricity consumption, escalating data centre ownership costs and increasing crab on footprints. For these reasons, energy efficiency is becoming increasingly important for data centres and Cloud. The fact that electricity consumption is set to rise 76% from 2007 to 2030 [2] with data centres contributing an important portion of this increase emphasizes the importance of reducing energy consumption in Clouds. According to the Gartner report [3], the average data centre is estimated to consume as much energy as 25000 households, and according to McKinsey report, "*The total estimated energy bill for data centres in 2010 is* 11.5 *billion and energy costs in a typical data centre double every five years*". Face to this electronic waste and to these huge amount of energy used to power data centres, energy efficient data centre solutions have become one of the greatest challenges. A major cause of energy inefficiency in data centres is the idle power wasted when resources are under used. In addition, this problem of low resources utilization, servers are permanently switched on even if they are not used and still consume up to 70% of their peak power. To address these problems, it is necessary to eliminate

the power waste, to improve efficiency and to change the way resources are used. This can be done by designing energy efficient resource allocation solutions at different Cloud levels.In addition to these challenges, provided solutions should scale in multiple dimensions and Cloud providers must also deal with the users' requirements which arebeing more and more complex. Requested services are more sophisticated and complete since users need to deploy their own applications with the topology they choose and with having the control on both infrastructure and programs. This means combining the flexibility of IaaS and the ease of use of PaaS within a single environment. As a result, the classic three layer model is changing and the convergence of IaaS and PaaS is considered as natural evolutionary step in cloud computing. Cloud resource allocation solutions should be flexible enough to adaptto the evolving Cloud landscape and to deal with users requirements. This key dimension of cloud levels is essential for our research and we address it in depth in this thesis. Another important dimension we consider is the type of the virtualization. In addition to traditional VM based technology, Cloud providers are also adopting new container-based virtualization technologies like LXC and Docker that enable the deployment of applications into containers. Hence, this resource variety aspect should be taken into account when modelling the problem of resource allocation to scale with the Cloud evolution and with new users requirements. One last important dimension at which we are interested in this work is the resource provisioning plan. Cloud providers could offer two types of resource provisioning: on-demand and advance or long-term reservation. Advance reservation concept has many advantages especially for the co-allocation for resources. It provides simple means for resource planning and reservation in the future and offersan increased expectation that resources can be allocated when demanded. Although advance reservation of resources in cloud is very advantageous, the focus has been mostly on the on-demand plan.

II. LITERATURE REVIEW

Resource allocation or scheduling is one of the most important tasks in cloud computing. It consists in identifying and assigning resources to each incoming user request in such a way that the user requirements are met

and specific goalsof the cloud provider are satisfied. These goals could be optimizing energy consumption or cost optimizing, etc. Based on the resource information like resourceusage and monitoring, the requests information and the Cloud provider goal, the resource allocator or scheduler finds out resource allocation solutions, see Figure 1. Schedulers could just ensure the initial and static resource allocation after request arrival or ensure both static and dynamic resource allocation to manageresources in a continuous way and to further optimize and readjust the old requests.

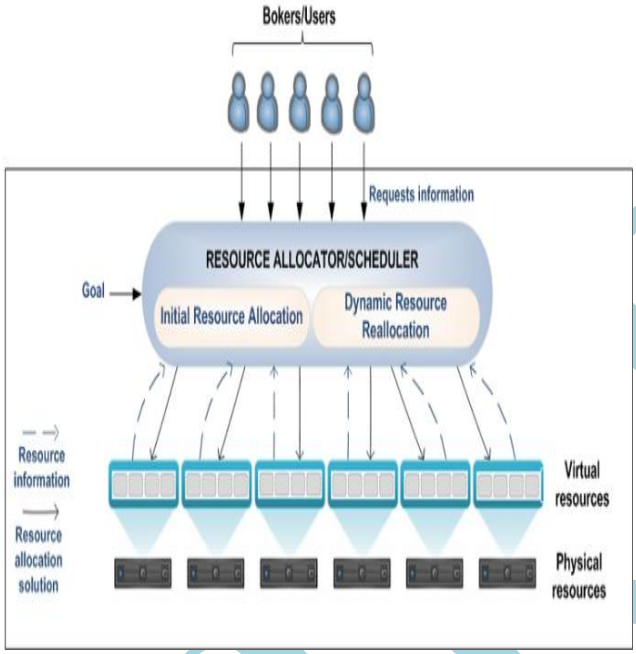

Figure 1: Resource Allocation in Cloud Computing

Bilgaiyan S. [1], proposed a secure energy-aware provisioning of cloud computing resources on consolidated and virtualized platforms. Energy efficiency is achieved through just-right dynamic Round-Robin provisioning mechanism and the ability to power down sub-systems of a host system that are not required by VMs mapped to it. Further solutions are proposed to security challenges faced during VM live migration. Similar work is cited in [3] but the itoffered significant improvement in the aspects of response time and makespan, demonstrates high potential for theimprovement in energy efficiency of the data centre, and can effectively meet the service level agreementrequested by the users. Cloudsim was used by the author to demonstrate the results.

III. RESULTS

In this paper we conduct a survey of research in energy-efficient computing and propose: architectural principles for energy-efficient management of Clouds; energy-efficient resource allocation policies and scheduling algorithms considering QoS expectations and power usage characteristics of the devices. It is validated by conducting a performance evaluation study using CloudSim toolkit. Green Cloud Computing aims at a processing infrastructure that combines flexibility, quality of services, and reduced energy utilization. In order to achieve this objective, the management solution must regulate the internal settings to address the pressing issue of data center over-provisioning related to the need to match the peak demand. In this context, propose an integrated solution for resource management based on VMs placement and VMs allocation policies. This work introduces the system management model, analyzes the system's behavior, describes the operation principles, and presents a use case scenario.

This paper proposes an improved clonal selection algorithm based on timecost and energy consumption models in cloud computing environment. We have analyzed the performance of ourapproach using the CloudSim toolkit. The experimental results show that our approach has immense potential as itoffers significant improvement in the aspects of response time and makespan, demonstrates high potential for theimprovement in energy efficiency of the data center, and can effectively meet the service level agreementrequested by the users. This paper proposes an improved clonal selection algorithm based on time cost and energy consumption models in cloud computing environment. We have analyzed the performance of our approach using the CloudSim toolkit. The experimental results show that our approach has immense potential as it offers significant improvement in the aspects of response time and makespan, demonstrates high potential for the improvement in energy efficiency of the data center, and can effectively meet the service level agreement requested by the users.

In this paper, IARA technique is introduced to sense and predicts the behavior of the adhocsystem for allocating the resources. The IARA technique comprises of a distributed architecture ofresource allocation model developed with special hardware support for localization in resource constrained environment. This technique enhances the resource scheduling process in cloud computing environment and plan to devise a multitasking based resource scheduler to allocate theresources with the optimal energy and bandwidth consumption in cloud environment. IARA techniqueschedules the resources effectively to achieve the sub optimization for the cloud computing problem. This scheduling technique achieves both the allocation of resources and the utilization of systemresource. IARA allocate the resources based on the effective processing capability and consumes the network bandwidth on the basis of process efficacy. Simulation is conducted with set of experiments in terms of resource efficiency, evaluation time and energy utilization rate. The simulation results showsthat the IARA approach is worked efficiently in resource allocation process and achieved the best result compared to the existing congestion control and dynamic resource allocation methods. IARA technique is approximately 10 -25 % lesser utilization of energy when compared with the dynamic resource allocation method using the localization of the hardware in the respective clouds.

In this paper the authors analyze the various evolutionary and swarm-based algorithms that have been used for task scheduling on resources in cloud computing environments. Scheduling is an important activity in multi-tasking systems to efficiently manage resources, minimize idle time and increase performance of systems. Hence there is extreme need of proper scheduling in cloud computing systems as well, because real-time execution and higher throughput are essential requirements for multiple users.

Author proposes, the virtual machine allocation algorithm with multiple resources based on PSO that effectively improves energy efficiency. In cloud data center, the allocation of virtual machines with multiple resources plays an important role in improving theenergy efficiency and performance of cloud computing. It will reduce the energy consumption of the cloud data center. But the methods discussed here only considered the CPU and disk resources not the other resources such as network and memory.

In this paper, author investigates the need of power consumption and energy efficiency in cloud computing model. It has been shown that there are few major components of cloud architecture which are responsible for high amount of power dissipation in cloud. The possible ways to meet each sector for designing an energy efficiency model has also been studied. Finally author shows the future research direction and the continuity of this work for next level implementation.

In this paper, author proposes an optimization technique called Bacterial Foraging that used in order to continuously optimize the allocation of resources thereby improving the energy efficiency of the data center. The results obtained after simulating a cloud computing environment and implementing the proposed algorithm make it clearly evident that cloud computing has great potential and offers significant performance gains as well as cost savings even under dynamic workload conditions.

IV. CONCLUSIONS

In this paper, author introduces a power efficient resource allocation algorithm for cloud computing data centers which is based on genetic heuristics. The proposed approach finds a set of non-dominated solutions in this multi-objective computation minimizing makespan and power consumption of the system.When the execution of the algorithm is completed and optimalPareto solutions are obtained, it becomes is possible to fine tune the trade-off between power consumption and execution time. The proposed algorithm shows quadratic complexity dependency on with the respect to the number of tasks tobe allocated.

V. FUTURE SCOPE

In this paper author presentsthe design, implementation, and evaluation of an efficient resource management system for cloud computing services. Author uses Cloud Booster Algorithm for finding the node's capabilities & joballocation and Adaptive Genetic Algorithm for VM migration. In this system VM allocation is based on node weight [a value indicates capacity of each node]. Based on these weights a VM resource allocation mechanism has proposed, which is considering both Node weight and future prediction. To produce a better approach for solving the problem of VM resource migration in a cloud computing environment, this project demonstrates Adaptive Genetic Algorithm based VM resource migration strategy that focuses on system load balancing.

REFERENCES

[1]. SaurabhBilgaiyan, SantwanaSagnika, Madhabananda Das, " An Analysis of Task Scheduling in Cloud Computing using Evolutionary and Swarm-based Algorithms", International Journal of Computer Applications (0975 – 8887) Volume 89 – No.2, March 2014.

[2]. Korir Sammy, RenShengbing, Cheruiyot Wilson, "Energy Efficient Security Preserving VM Live Migration In Data Centers For Cloud Computing" , IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 2, No 3, March 2012. ISSN (Online): 1694-0814.

[3]. Manasa H.B, AnirbanBasu , "Energy Aware Resource Allocation in Cloud Datacenter", International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-2, Issue-5, June 2013 277 .

[4]. WannengShu, Wei Wang and Yunji Wang, "A novel energy-efficient resource allocation algorithm based on immune clonal optimization for green cloud computing" ,EURASIP Journal on Wireless Communications and Networking 2014, 2014.

[5]. N.R.RamMohan, E.Baburaj, "Resource Allocation Using Interference Aware Technique in Cloud Computing Environment", International Journal of Digital Content Technology and its Applications(JDCTA) Volume8, Number1, February 2014.

[6]. An-ping Xiong and Chun-xiangXu, "Energy Efficient Multiresource Allocation of Virtual Machine Based on PSO in Cloud Data Center" , Hindawi Publishing Corporation Mathematical Problems in Engineering Volume 2014, Article ID 816518.

[7]. Arindam Banerjee, PrateekAgrawal and N. Ch. S. N. Iyengar, "Energy Efficiency Model for Cloud Computing" , International Journal of Energy, Information and Communications Vol.4, Issue 6 (2013), pp.29-42. ISSN: 2093-9655 IJEIC Copyright ⓒ 2013 SERSC.

[8]. AkshatDhingra and Sanchita Paul, "Green Cloud: Heuristic based BFO Technique to Optimize Resource Allocation", Indian Journal of Science and Technology, Vol 7(5), 685–691, May 2014.

[9]. Giuseppe Portaluri, Stefano Giordano, DzmitryKliazovich and Bernab´eDorronsoro, "A Power Efficient Genetic Algorithm for Resource Allocation in

Cloud Computing Data Centers" , 2014 IEEE 3rd International Conference on cloud Networking (Cloud Net).

[10]. S.R.Suraj, R.Natchadalingam, "Adaptive Genetic Algorithm for Efficient Resource Management in Cloud Computing" , International Journal of Emerging Technology and Advanced Engineering (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 4, Issue 2, February 2014).

