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Bin Packing Algorithm for Virtual Machine Placement in Cloud Data Centers for Resource Management

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Abstract: Placing the VM is the most challenging part in the cloud data center and most of the VM placement algorithms fail to provide the efficient VM placement algorithms. In order to overcome by this challenge, this paper proposes an algorithm in order to place the virtual machine efficiently in the data center. The proposed classification algorithm gives solution for the utilization of the servers in the data center. The classification algorithm detects the overloaded server and under loaded server and then place the virtual in the respective server efficiently. The paper discusses about how efficiently the resources can be utilized and how effectively the VMs are placed.
Keywords: Virtualization, Migration, Resource Management

I. INTRODUCTION

Cloud computing provides computing services like servers, networking, memory etc. through internet. Virtual machines are placed based on the required capacity of the VM in the data centers. This paper proposes an algorithm in order to overcome the inefficient usage of the VM in the data centers and also explains that how efficiently the resource is utilized by using the placement algorithm. Most of the existing VM placement algorithms fail due to the lack of resources and the inefficient resource management systems in the data centers. The organization of the paper is as follows section 2 discusses on the literature survey, section 3 explains about the classification algorithm, section 4 explained about the placement of the VM, the section 5 describes the results and the last section discusses about the conclusion.

II. LITERATURE SURVEY

Cloud With the fast improvement in the handling, innovations and the accomplishment of the web, computing assets have turned out to be sensible, intense and all inclusive accessible than any time in recent memory. Various research efforts addressing dynamic resource provisioning of cloud computing [8-14]

Staffs in organizations are attempting to discover techniques to cut expenses while keeping up a similar execution benchmarks.[1] Their desires to develop have driven them to attempt new thoughts and techniques even under the associate weight of restricting computing assets. This acknowledgment has empowered the realization of another model for computing called cloud computing, in which the assets (e.g. cpu, organize) are given through the web to client as general utilities in a compensation as-you-go and on-request premise [2].

Virtualization Technology empowers the decoupling of the application payload from the fundamental physical equipment and gives virtualized assets to larger amount applications.[3] .An imperative component of a virtual machine is that product running inside it is constrained to assets given by the virtual machine (VM)[4].The product layer that gives the virtualization is called virtual machine screen (VMM). VMM virtualizes the greater part of the assets of physical machine, along these lines supporting the execution of various virtual machines [5]. Virtualization can give plenty of advantages in the cloud data center by empowering VM placement and VM migration to adjust stack over the server.

The many VM placement algorithms are failed to use the resource properly [6]but the proposed algorithm is succeed to use the resources efficiently compared to all the existing algorithms like best fit , worst fit and the first fit algorithm are the VM placement algorithms are failed to use the resources properly the proposed algorithm used the resources efficiently. Gambosi et al. [7] studied a version of online bin packing where only insertion and deletion are allowed. They introduced an online algorithm with a competitive ratio of at most 4/3.

The paper proposes an algorithm for the identification of the overloaded and under loaded servers in the data centers and based on the demand of the users the VM are placed by using the VM placement algorithm.

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III. ALGORITHM

A. Algorithm 1: classification algorithm

1) *Input:* servers in the list
2) *Output:* detection of overloaded and under loaded
a) for(Servers in the list);
b) Max utilization = M;
c) Min utilization = m;
d) Get max threshold ;
e) Get min threshold ;
f) If(S> T)=M;
g) Overloaded servers;
h) If(S< t)=m;
i) Under loaded servers;
j) for(servers reaches null)
k) break;
l) end;

Max= 80%;
Min = 30%;
Max threshold =C*80= 72 (T_m);
min threshold = C* 30 =27 (t_m);

C = constant value = (0.9); The above algorithm explains the classification of the servers based on the resources utilization of the servers in the list and the input is the servers present in the data and the Max utilization is represented as "M" and the min utilization is represented as "m" and in the 3rdstep max threshold ids are calculated based on the above formula (T_m) and in the 4th step the min threshold is calculated using the above formula(t_m) and based on the T_m & t_m the servers are classified as overloaded and under loaded servers which will continue until it reaches the null after it reaches null, the loop will break and end statement and the classification of the servers in the list as over and under loaded .

B. Algorithm 2

1) input: servers present in the data centers
2) output: VM placement with efficiently
a) for(servers in the list)
b) search for more available capacity size in the server ;
c) if(available capacity == VM capacity)
d) place with respective server ;
e) else
f) leave that block and search further servers in the list ;
g) process continues until it reaches null;
h) if (VM capacity ==T_m)
i) Then that VM is called as best Virtual machine.
j) else
k) join the list ;
l) process continues until its equals to $T_{m;}$

The proposed algorithm explains how efficiently the resources and the how efficiently the VM is placed based on the job request. The input is the overloaded and the under loaded servers which is classified by the algorithm1.

And the servers are passed in the loop and in the 2nd step it searches for the capacity based on the available capacity and in the 3rd step it compares with the required capacity and the available capacity if its matches the resources present in the VM is placed on the respective servers this going to continue until it reaches null in the list , and after placing the VM is compared with the Max threshold values if it matches then it called best virtual machine if not again it will be join the data list once it reaches Tm, then that VM is left out this process is continues until servers list reaches null.

IV. RESULTS

The Infrastructure as a Service IaaS is considered for simulation using cloudsim. This packing framework is a revised form of online bin packing problem where bins represent physical machines and items represent virtual machines subjected to dynamic load. The input to the algorithm is a set of steps that involves insertion, deletion or updating the size of an item. The main objective is to efficiently place the virtual machines in the bins that is the servers .The below figure 1 explains clearly that how the proposed algorithms is better than the other VM placing algorithms and the process is explained in the above algorithm.

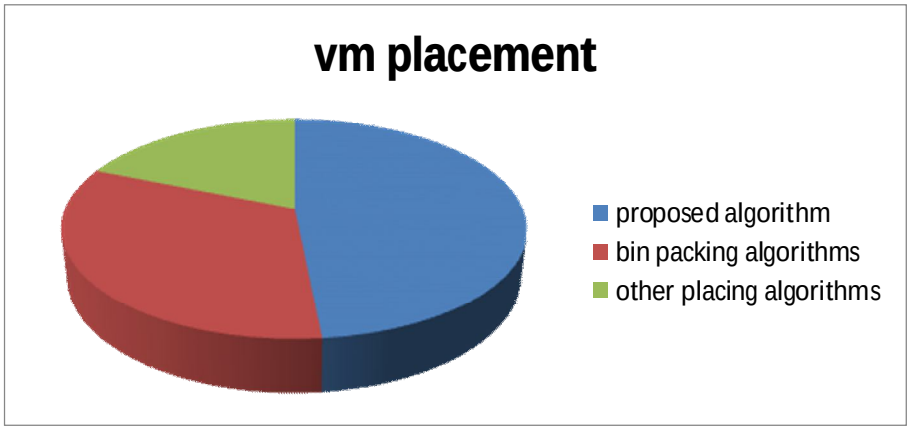


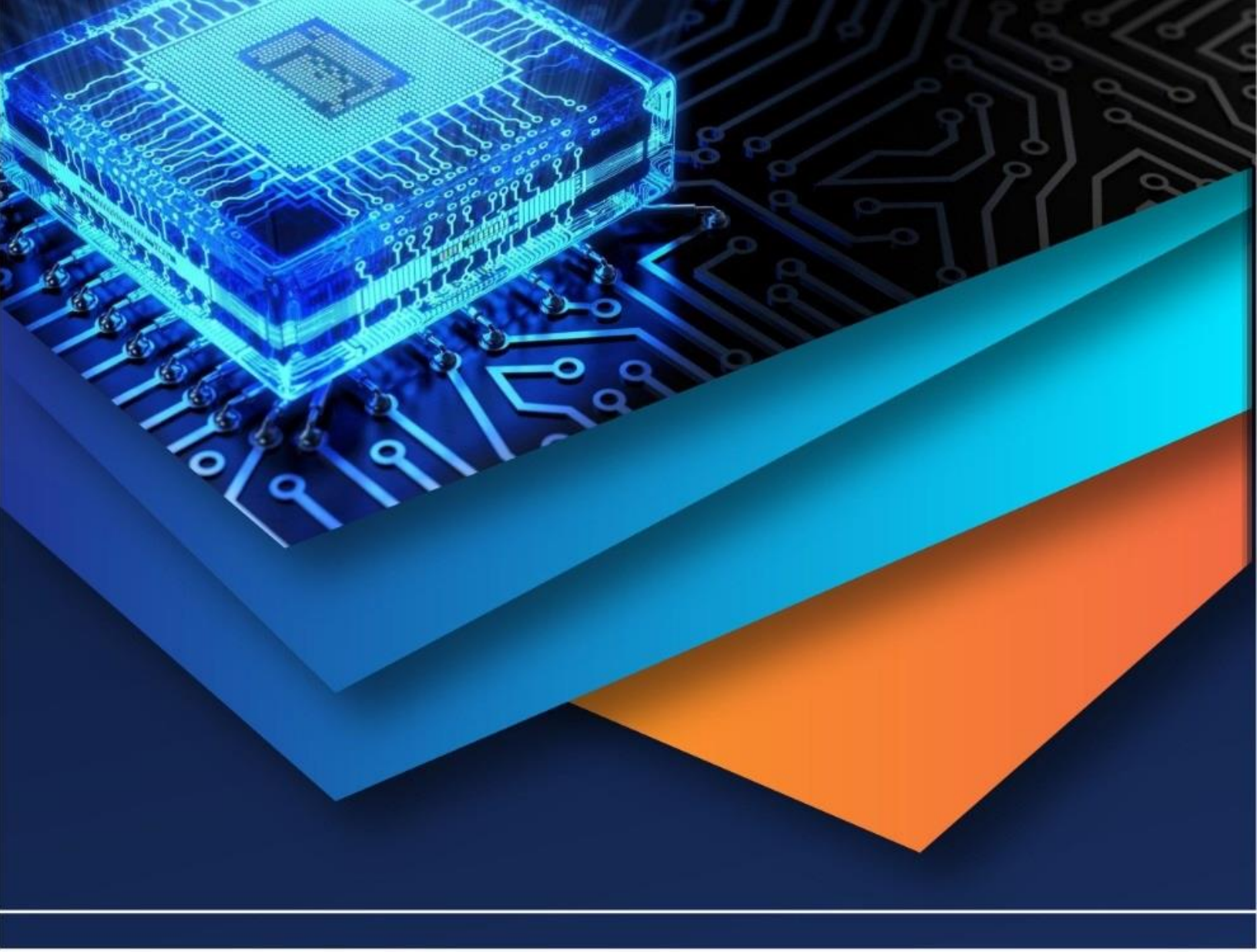
Fig. 1 Virtual machine placement based on the resource utilization.

V. CONCLUSION

This paper proposed a bin packing algorithm that can allocate the resources efficiently by placing the VM efficiently to the physical servers. The result proves that the resources are utilized and the servers are utilized to the maximum. To achieve this, a classification approach is followed. This proposed approach has reduced the number of physical servers and the results are fairly accurate when compared to the existing algorithm.

REFERENCES

[1] Pawar, C. S., &Wagh, R. B. (2012). “Priority Based Dynamic resource allocation in Cloud computing”, International Symposium on Cloud and Services Computing, IEEE, 2012 pp 1-6
[2] RaghavendraAchar_, P. SanthiThilagam, Shwetha D_, Pooja H_, Roshni_ and Andrea “Optimal Scheduling of Computational Task inCloud using Virtual Machine Tree” In Proceeding of Third International Conference on Emerging Applications of Information Technology (EAIT), IEEE Publication , 2012
[3] Jinhua Hu, JianhuaGu, Guofei Sun, Tianhai Zhao, NPU HPC Center Xi’an, China “A Scheduling Strategy on Load Balancing of Virtual Machine Resources in Cloud Computing Environment”, IEEE 2010
[4] SurajPandey, Department of Computer Science and Software Engineering, the University of Melbourne, Australia, “Scheduling and Management of Data Intensive Application Workflows in Grid and Cloud Computing Environments”, Dec 2010
[5] Korte, Bernhard; Vygen, Jens (2006). "Bin-Packing". Combinatorial Optimization: Theory and Algorithms. Algorithms and Combinatorics 21. Springer. pp. 426–441.
[6] R. E. Korf (2003), An improved algorithm for optimal bin packing. Proceedings of the International Joint Conference on Artificial Intelligence, (pp. 1252–1258).
[7] Gambosi, G., Postiglione, A., Talamo, M.: Algorithms for the relaxed online bin-packing model. SIAM J. Comput. 30(5), 1532–1551 (2000)
[8] Chaisiri S, Lee B, Niyato D, ”Optimization of resource provisioning cost in cloud”, IEEE Trans Services Computing, vol. 5, Issue 2, pp. 164–177, January 2012.
[9] Rimal BP, Enunmi Choi, ”A service-oriented taxonomical spectrum, cloudy challenges and opportunities of cloud computing”, International Journal of Communication Systems, vol. 25, pp. 796-819, June 2012.
[10] Randles M, Lamb D, Taleb-Bendiab A, “A comparative study into distributed load balancing algorithms for cloud computing”, In: IEEE International conference on advanced information networking and applications workshops, pp. 551–556, 2010.
[11] Jayasinghe D, Pu C, Eilam T, Steinder M, Whally I, Snible E, “Improving performance and availability of services hosted on IaaSclouds with structural constraint-aware virtual machine placement”, In: Proceedings of the IEEE International conference on services computing, IEEE Press, New York, pp. 72–79, July 2011.
[12] MohdYusoh Z, TangM, “A cooperative co-evolutionary algorithm for the composite SaaS placement problem in the cloud”, In: Proceedings of the neural information processing, theory and algorithms, vol. 1, pp. 618–625, November 2010.
[13] Kwok T, Mohindra A, “Resource calculations with constraints, and placement of tenants and instances for multi-tenant SaaS applications”, In: Sixth International conference on service-oriented computing, Springer, Berlin, pp. 633–648, December 2008.
[14] Endo et al, “Resource Allocation for Distributed Cloud: Concepts and Research Challenges”, IEEE Network, vol. 25, pp. 42-46, August 2011.



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