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Implementing the VM Placement Based on Monitoring and Feedback Algorithm in the Cloud Data Service

Ghusoon Idan Arb

Department of Computer Science
Faculty of Computer Science and Information Technology
Sumer University
Rifai, Iraq

email: g.arab@uos.edu.iq

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Abstract

In the cloud data service the VM placement policy becomes essential approach especially with modern algorithms such as feedback and monitoring algorithm, because the feedback policy gives reinforcement to VM placement (VMP). The monitoring algorithm allows redistributing VMs and resources such as memory, bandwidth, storage, network latency and CPU efficiency. The proposed algorithm consist of monitor the resources to predict the next load balancing for redistribute the VMs and avoid the bottleneck occurs in data centers and physical server. The suggested algorithm aims to allocate the VMs to host servers in the data center for scaling up the resources to meet the performance metrics. The results of simulation in cloudsim simulator appear two experiment results for VMP algorithm. Before VMP simulation: decreases the resource usage by maximizing the number of used virtual machines. And After VMP simulation: increases utilization with minimize the number of used virtual machines. We concluded reduced cost and minimized the task completion time. The proposed algorithm is very important because it checks the resources status and reallocates VMs for adjusting servers in cloud environment.

Key words and phrases: Cloud Data Analyst, VM placement, Monitoring and Feedback Algorithm.
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1 Introduction

VM placements algorithms in cloud data service are crucial for reducing hardware requirements, improving performance and satisfying operation agreement. The problem of optimizing resources distribution is becoming essential because implementation of large network infrastructures [1]. In order to improve the resources utilization rate and to reduce the physical servers used, we used the monitoring and feedback algorithm in VM Placement (VMP). Dynamic VMP involves replacing the site of physical machine, converting, whenever needed, for any reason such as migration and allocation, while static VMP is only acceptable when a new active server is needed [2]. VMP distributes the active server to a dynamic node with several limitations and restrictions. VMP method for an effective VM uses the data center and depends on two methods of approach: static and dynamic: static techniques mostly use off line assessment and take the data that is early gathered. Dynamic methods are designed on time frames and use the online VMP, including VMP optimizations [3]. The contrast between static and dynamic VMP methods is the reality that dynamic solutions consider possible VM optimizations and therefore need huge resources in size of data centers than static VMPs, which has an unsuitable effect on the resource allocation of the software program that is run on a remote server [4]. The rest of this research is organized as follows. In Section 2, we discuss some related work. In Section 3, we implement the suggested algorithm. In Section 4, we present experiments and performance evaluation. Finally, in Section 5, we concludes our paper.

2 Literature survey

Arb [3] compared three techniques of cloud data center to enhance the performance in VM placement and increases the efficiency of resource usage with different status. Tyagi and Kumar[6] compared the suggested algorithm with other techniques in cloud data services and used multiple threshold utilities and appeared to be the adjusted one in improving the usage of VMs. Pooja [5] studied techniques for helping the cloud developers to take advantage of a cloud data center by minimizing the resource usage using proactive scheduling methods and reducing VM allocation policies. However, these methods canceled the response time for choosing low performance of a server node. Nguyen [2] proposed VMP methods that widely used issues, variables and execution algorithms to maximize the performance. Zhou [7] suggested a new

VMP technique called varying threshold performance enhancement technique which gets the best using the universal information from resource utilization by VMs. But this technique suffers from local optima troubles for getting optimal result in virtual machine placement. Lee and Zomaya [2] suggested two heuristic techniques to reduce the load balancing consumptio, but these techniques are easy to drop down into global optima and do not abide by the operation agreement. The trouble of utilization of VMP has been discussed in papers like [9-10]. Yang et al. [9] assumed a new model for calculating the least amount of physical servers needed to allow active servers satisfy the VMP problem. Liu et al. [10] assigned VMP as an new model with extension aiming to decreaseconnecting cloud bandwidth while maximizing the utilization of assigned VMs.

3 Implementation of Monitoring and Feedback Algorithms

In the proposed algorithm, we always observe network latency, resource usage, bandwidth and CPU. After observing and analyzing the performance test the cloud data center if the load balancing occurs then the algorithm reallocate the VM in a physical server to meet the optimal performance metrics [11]. The cloud data service can adapt for changing load balancing and VM allocation according to the current status, by constantly observing and adjusting physical servers, resource usage is adjusted, to result in save cost usages, ensuring that VMs are placed in a way that meets optimal execution and SLA requirements. Maximize power efficiency by consolidating overloads and powering off non-active physical servers. Before implementing the monitoring and feedback (MF) policy, we must initialize tasks, VMs, hosts, data center, broker and begin the proposed observation policy [12].

4 Experiments and Results of Simulation

For assessing the VM placement monitoring and feedback algorithm, we connected types of tests that check the current status and determine the optimal solution. we expanded a simulation in clouds that deals with the cloud entities of the policy, consisting of host, physical servers, broker, hosts, and VM [13]. The observing algorithm will automatically test the load balancing and distribute VMs if available. Mapping VM placement based on monitor-

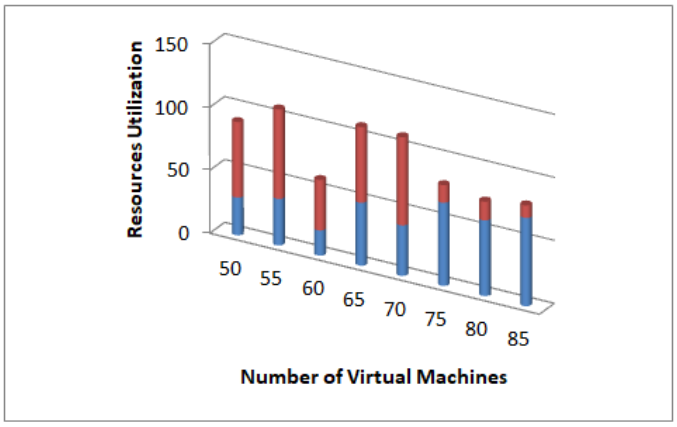

Figure 1: before Optimization

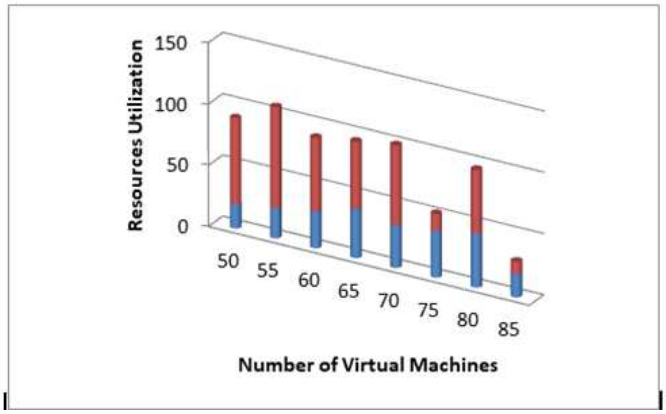

Figure 2: after VMP algorithm

ing and feedback policy can periodically distribute physical servers using the available resources, ensuring maximize performance metrics such as resource allocation, RAM, processor core, and BW.

In Figure 1, we explains the reduction of the resource utilization around (30-60) percentage before applying the VMP algorithm. In Figure 2, we explain the increase in resource utilization around (40-90) percentage when we used the monitor and feedback VMP algorithm. The red color in the two figures refers to resource utilization and the blue color refers to the number of VM.

5 Conclusion

Mapping virtual machine using the feedback and monitoring method to satisfy VMP in cloud data service. It is very important to confirm the maximum performance and increase the resource utilization rate in the cloud data center by cooperating proactive monitor algorithms with observing the available resources. The proposed algorithm studied the optimization before and after using the feedback and monitoring algorithm. As a result, this algorithm can minimize cost, decreasing resource usage rate, and ensure efficiency.

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