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A MECHANISM CONFIGURATION APPROACH OF PHYSICAL MACHINE ASSET MANAGEMENT IN CLOUDS

P.N.Rao[1], C.Vijayakumar[2], P.Senthil Raja[3]
[1]Professor, Department of Computer Science and Engineering, Mahendra Engineering College, Mahendhirapuri, Namakkal District, Mallasamudram, Tamilnadu, India.
[2,3]Assistant Professor, Department of Computer Science and Engineering, Mahendra Engineering College, Mahendhirapuri, Namakkal District, Mallasamudram, Tamilnadu, India

Abstract

Issues of physical machine asset management in clouds considered various types of physical machines and assets. Proposed methods include of a winner determination algorithm (WDA) that chooses the clients, provisions the virtual machines (VMs) to physical machines (PM), and conveys them to the chosen clients; and a payment function that chooses the amount that every chosen client needs to pay to the cloud supplier. Proposed approximate winner determination algorithm (WDA) fulfills the disappointment self-ruling property, making the assessed method vigorous against considered clients who attempt to control the framework by changing other clients' allocations. Strategies are system check; the clients don't have motivations to lie about their requested bundles of VM instances and their valuations. Proposed strategies are in alignment with green cloud computing techniques in which physical machines can be powered on or off to save energy.

Key Words: physical machine (PM), virtual machine (VM), mechanism configuration approach, winner determination algorithm (WDA)

Introduction

The regularly developing interest for cloud assets from associations and people puts the cloud asset management at the center of the cloud suppliers'. Cloud supplier offers infrastructure as a service (IaaS) by offering low level assets of its physical machines (PMs) as virtual machines (VMs). Services are influenced accessible to clients as utilities in a pay-as-you-go model. Cloud auction market follows the pay-as-you-go model and it has proven being helpful for the two clients and cloud suppliers. Cloud suppliers can attract in more clients and better utilize their assets, while clients can get services at a lower cost than in the on-demand market.

The physical machine asset management issue within the presence of different PMs and various types of assets (e.g., cores, memory, and storage) in an auction based setting, where every client bids for a bundle of heterogeneous VM instances. Heterogeneous VM instances are required by a few types of applications, for example, social game applications composed of three layers: front-end web server, load balancing, and back-end information storage. The applications require a bundle of heterogeneous VMs composed of communication-intensive VMs, computation intensive VMs, and capacity concentrated VMs, separately [1].

PM asset management methods comprise of three stages: winner determination, provisioning and assignment, and pricing. Winner determination stage, the cloud supplier chooses which clients get their requested bundles. The provisioning and assignment stage, the cloud suppliers provisions the quantity of assets as VM instances onto the PMs, and after that allocates the requested bundles of

VMs to the winning clients. Pricing stage, the cloud supplier powerfully decides the cost that the winning clients should pay for their requests.

Winner determination approach (WDA) stage of the PM Asset management problem (PMAMP) can be decreased to the multiple multi-dimensional knapsack problems (MMDKP). Every PM is thought to be one multidimensional knapsack. A client request is considered as a thing. Aim is to choose a subset of things for every knapsack maximizing the value. Multiple knapsack problem (MKP) is firmly NP-hard (even on account of two knapsacks) utilizing a diminishment from the Partition issue. MMDKP issue is substantially harder than the MKP issue and is thus additionally strongly NP-hard.

Development of an optimal and an approximation mechanism motivates cloud users to reveal their requests truthfully. Mechanisms take the strategic behavior of individual users into account and simultaneously maximize the global performance objective of the system. In both mechanisms place VMs in as few PMs as possible. Such approach has been recognized as an efficient way of reducing cost. In alignment with green cloud computing objectives [2], where the cloud supplier determines which PMs to power on/off in order to save energy. The mechanisms allow a cloud supplier to choose PMs Configurations that are aligned with its power consumption policies. Approximation mechanism iteratively provisions VMs on each PM. Iterative mechanism allows the cloud supplier to power on/off PMs based on the user demands.

Issue of cloud asset management is within the presence of numerous PMs with various types of assets. System verification greedy mechanism, called G-PMAMP. G-PMAMP not only provisions and designates assets, as well as progressively decides the cost that clients should pay for their requests. Specific goal to ensure strategy proofness of G-PMAMP, design the winner determination algorithm (WDA), to such an extent that it decides failure autonomous allotments on every PM.

Property makes the G-PMAMP method robust against strategic clients who attempt to manipulate the framework by changing the assignments of different clients. G-PMAMP method is a polynomial time 3-approximation method. Design a methodology optimal verification method, OVM-PMAMP utilize as a benchmark when examine the performance of the G-PMAMP method. Perform extensive tests keeping in mind the goal to examine the performance of the G-PMAMP method. G-PMAMP method is quick and finds close optimal solutions, being very reasonable for deployment in genuine cloud settings.

Related Work

Issues of VM placement in clouds considered distinctive objectives and perspectives. Dong et al. [3] described a strategy for VM placement considering numerous asset constraints utilizing hierarchical clustering with best fit. They will probably enhance asset usage and decrease energy utilization by reducing both the quantity of dynamic physical servers and network components. Ghribi et al. [4] discussed an allotment algorithm with a consolidation algorithm for VM placement in clouds keeping in mind the goal to reduce general energy utilization and relocation cost. Maurer et al. [5] developed a dynamic asset configuration to accomplish high asset usage and low service level agreement violation rates utilizing information management: case based thinking and a rule based approach.

Kesavan et al. [6] discussed a set of low-overhead management strategies for dealing with the cloud framework ability to accomplish a scalable capacity allotment for a large number of machines. Hu et al. [7] introduced two time-cost optimization issues for provisioning assets and scheduling separable burdens with held instances in clouds. Tsai et al. [8] described a hyper-heuristic scheduling algorithm with the aim of decreasing the create span of task scheduling for clouds. Approach utilizes two discovery operators to decide when to change the low-level heuristic algorithm and a perturbation operator. Doyle et al. [9] developed an algorithm to decide which data center requests should be routed, based on the relative priorities of the cloud operator. Routing will decrease the latency, carbon outflows, and operational cost.

Srikantaiah et al. [10] designed the mapping of VMs to PMs as a multidimensional bin packing issue in which PMs are represented to by containers. Energy utilization and asset usage and proposed a heuristic algorithm based on the minimization of the total of the Euclidean distances of the present allocations to the optimal point at every PM. Rodriguez and Buyya discussed a meta-heuristic algorithm based on Particle Swarm Optimization for VM provisioning and scheduling systems on IaaS that reduces the general work process execution price while meeting due date imperatives. Consider dynamic provisioning, heterogeneity of unlimited computing assets, and VM performance variety.

Proposed System

Issue of Physical Machine Resource Management (PMAMP) in clouds is to decide the distribution of VM to PM at the same time with the allocation of VM to clients and the costs for the VM bundles to such an extent that the amount of clients' valuations is expanded. Tackling the PMAMP issue to propose Winner Determination Approach (WDA) and it comprises three stages: winner determination, provisioning and allotment, and pricing. Winner determination Approach (WDA), the cloud supplier decides which clients get their requested bundles. Consequences of this stage, the cloud supplier provisions the quantity of assets as VM instances onto the PMs, and after that allots the requested bundles of VMs to the winning clients.

Cloud supplier decides the unique sum of each winning client must pay based on the winner determination outcomes. Payment of a client is not greater than its submitted bid. Major building squares of a PMAMP method include: winner determination function W and a payment function Π. Fig. 1 demonstrates a high-level view of PMAMP. Single type of asset is accessible. Four clients present their bids to the cloud supplier, where two PMs are accessible to satisfy the clients' requests. Client 1 demands two VM1 and one VM2 as her bundle, and she presents a bid of $0.50. Method utilized by the cloud supplier gathers the bids and afterward chooses the clients whose bundle would be provisioned. The VMs on the PMs in view of the chose clients; it allots the bundles to those clients. Selected clients pay the sum determined by the method to the cloud supplier.

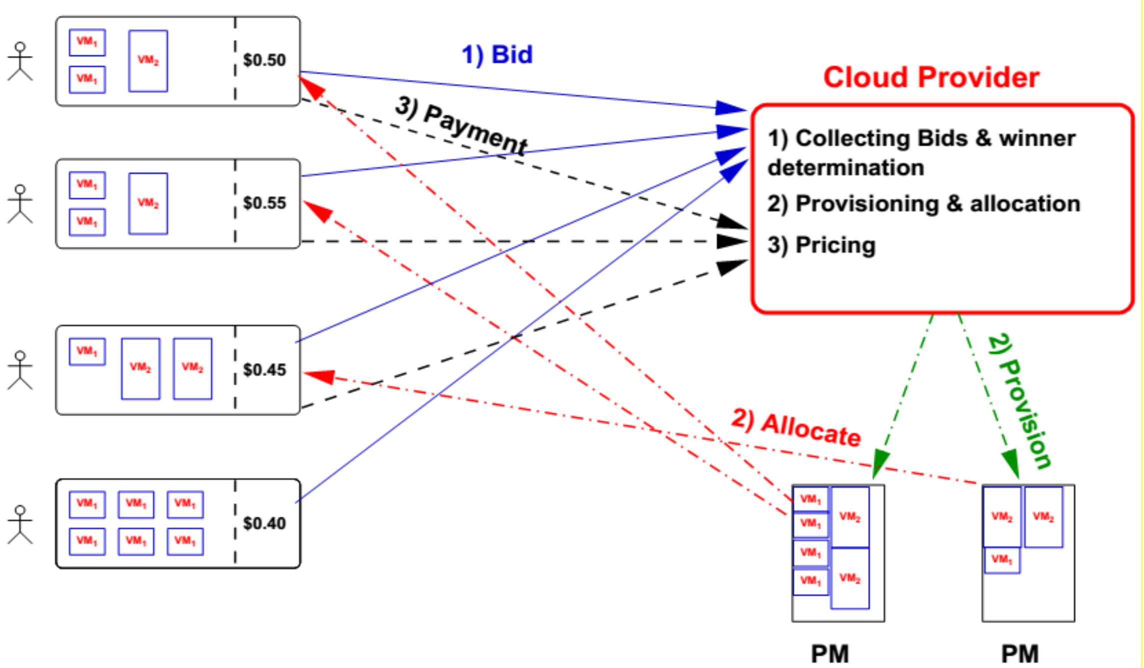

Fig.1 A High-Level View of PMAMP

Client i has a quasi-linear utility capacity characterized as the contrast between her valuation and payment, $u_i = v_i(W_i) - \Pi_i$, where W_i is the allocated bundle to client i, and Π_i is the payment for client i. Clients are self interested; they need to maximize their own utility. It might be beneficial for cloud clients to control the auction results and increase unfair advantages via untruthfully uncovering their requests. Client is a couple of bundle and value, the client can declare a higher value in the hope to improve the probability of acquiring her requested bundle, or declare a different VM bundle from her real demand. Such clients may hinder other qualified clients, prompting decreased income and reputation of the cloud supplier. Goal is to design strategy-proof methods that tackle the PMAMP issue and discourage clients from gaming the framework by untruthful reporting. Method maximizes social welfare, the aggregate of clients' valuations for the requested bundles of VMs.

Approximation Method for PMAMP

Proposed technique is present proof greedy mechanism, G-PMAMP. Greedy algorithms to explain PMAMP don't really fulfill the strategy proofness property. In verification method, the winner determination function W must be monotone, and the payment function Π must be founded on the critical payment. Design an iterative winner determination algorithm (WDA) in the sense in every cycle; it decides the task of winning requests to their related PM. Method uses PMs one by one until all winning requests are assigned. Approach enables the cloud supplier to power off unutilized PMs to save energy. Characterize the properties that our proposed system needs to fulfill keeping in mind the end goal to ensure technique proofness.

Bid of a not-selected client changes but rather her allotment remains a similar then the distributions to every other client don't change. Key property of loser-independent algorithms is that if a client is not a winner, it ensures a similar output regardless of her declaration. Property makes the algorithm robust against strategic clients who attempt to control the framework by changing other client's allocations. Client tries to change the allocation decided by the algorithm, she should announce a demand that will make her a winner. Acquiring procedure proofness requires the plan of a loser-independent (WDA) determination algorithm that dispenses the assets of every PM separately. Winner determination algorithm (WDA) is loser-independent for every PM; at that point when the answers for every individual machine are joined in an iterative fashion it will prompt a monotone general winner determination algorithm (WDA). Winner determination algorithm (WDA) alongside a critical value payment influences the method methodology to proof. Clients are chosen the method provisions the required amount and types of VM instances on the chose PMs, and afterward it decides the payments by calling the G-PMAMP-PAY function. Clients are charged the payment dictated by the method. Winner determination algorithm (WDA) to characterize a capacity, called IS-FEASIBLE (), bring in our proposed winner determination algorithm (WDA). It verifies the achievability of dispensing the requested bundle of VMs of a client on a particular PM, it checks whether PM has enough assets to satisfy a requested bundle of VMs.

Result and Discussion

The proposed WDA determines the estimation variables such as response time, memory utilization, and bandwidth utilization to compute efficiency of the proposed WDA methodology and overcome the earlier techniques in cloud data. In the technique decreases the PM Asset management problem (PMAMP) and multi-dimensional knapsack problems in cloud environment.

Table 1 demonstrates the response time, memory utilization, and bandwidth utilization for input parameters with existing techniques. Table 1 shows the average value of all evaluated aspects with input constraints. The proposed WDA is computed with following previous methodologies such as Round Robin Active monitoring techniques. Along with Table 1, it observed that WDA has the best score on each specify parameters for technique.

Table.1 Comparison of Response Time (RT), Memory Utilization (MU) and Bandwidth utilization (BU)

Applying Method	Response Time (ms)	Memory Utilization (%)	Bandwidth Utilization (Mbps)
RR	1053.14	25	59
AM	965.86	16	54
WDA	883.23	12	41

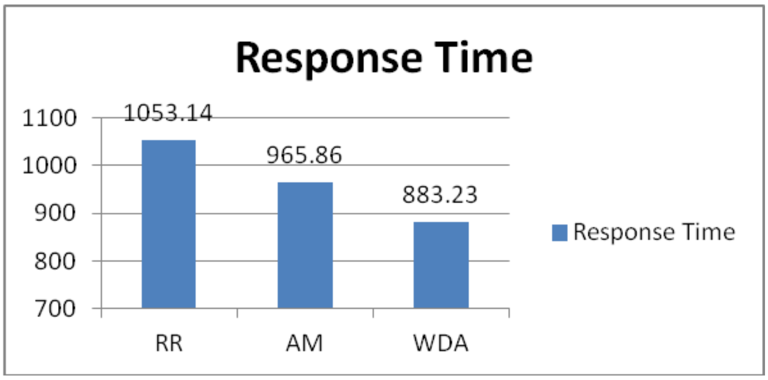

Figure.2 Comparison of Response Time

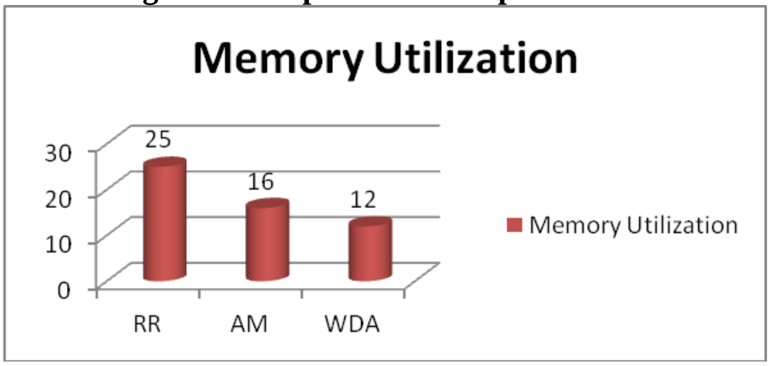

Figure.3 Comparison of Memory Utilization

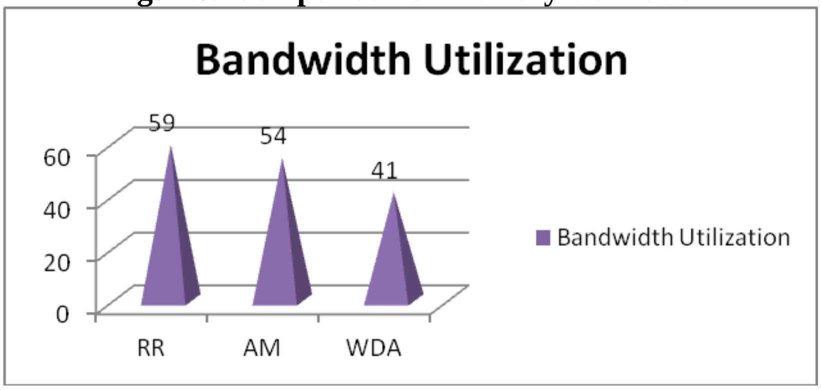

Figure.4 Comparison of Memory Utilization

According to Figure 2 to 4 clarifications, it observed the proposed WDA is computed based on response time, memory utilization and bandwidth utilization. Proposed WDA is evaluated with Round Robin (RR), Active Monitoring (AM) techniques behalf of response time, memory utilization and bandwidth utilization. AM is the nearest challenger. It decreases the multi-dimensional knapsack issues in cloud environment. However, AM is consumes high response time, memory utilization and bandwidth utilization. A WDA reduced the PM Asset management problem (PMAMP) and multi-dimensional knapsack issues with less response time 82.63 milliseconds, memory utilization 4% and bandwidth utilization 13 Mbps. Lastly, the paper announces the proposed WDA is best on all several variables.

Conclusion

An optimal and approximate technique proposed a verification systems for asset management in clouds within the presence of different PMs and various types of assets, offer incentives to the clients to reveal their actual valuations for the requested for bundles of VM instances. The burden on clients to calculate complex techniques of how to best interact with the methods. Properties of proposed methods are performing extensive experiments. Outcomes demonstrated performance of our proposed approximation method scales very well with the number of clients. Method is implemented as a feature of an integrated answer for dynamic resource management in an experimental cloud computing framework.

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