Volume 4, Issue 10, October 2014 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

Customized Cloud Resources Using OVMP Based on SIP Servers

Nageswararao Angadala
Department of Computer Science
Nova College of Engineering & Technology
India

G. Satyanarayana
Department of Computer Science
Sir C.Ramalinga Reddy College of Engineering
India

Abstract: Cloud computing is a professional technology for storing and using services in the form of resources. Resource provisioning of cloud computing achieves systematic services on client registration using services present in cloud computing. In resources provisioning there is tremendous query formation for each client for utilizing their resources i.e. memory utilization, CPU utilization, and other resources are utilizing capabilities in cloud computing. For doing these services efficiently cloud service providers provide and offers two plans i.e. reservation and on-demand plan services. According to the cost estimation process of the cloud services there is challenging task in optimization of capacity utilization in deploying virtual machine placement. In this paper we propose an optimal virtual machine placement algorithm after this algorithm can be extends to implement optimized resource provisioning operations. The proposed OVMP algorithm specifies makes a decision process on cloud service provider with consistent with stochastic integer programming to rent resources from cloud providers. These service professional accepts the cloud computing services with resource provisioning with suitable services. Our experimental results show the minimized budgets with provisioning resources in emerging cloud computing environments.

Index Terms: Management, Measurement, Stochastic integer programming, Virtual Machine, Quality-of-Service.

I. INTRODUCTION

Cloud computing is a phrase used to describe a variety of computing concepts that involve a large number of computers connected through a real-time communication network such as the Internet. [1] [2] In science, cloud computing is a synonym for distributed computing over a network, and means the ability to run a program or application on many connected computers at the same time.

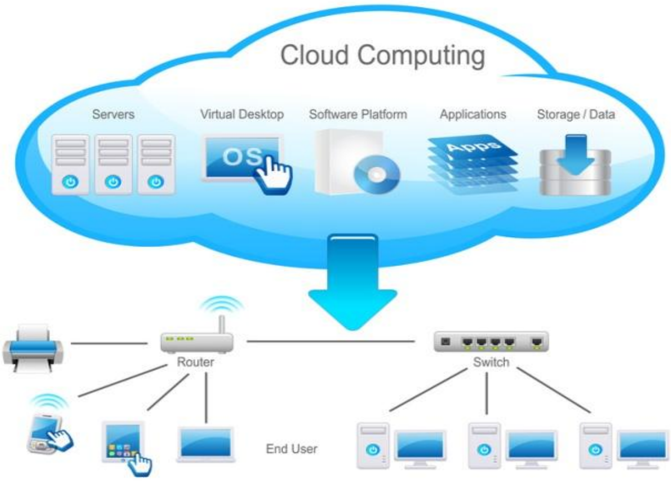

Figure 1: Cloud computing architecture process.

The network based services are appeared in the cloud service providers with hardware and software dependency with virtual machine placement in server side simulated with software running on one or more real time operating and processing devices with resource provisioning running on more number of servers. Such types of virtual servers do not physically exit and therefore be moved on one or more real time machineries with effective user navigation.

Resource Provisioning in Cloud Computing: In resource provisioning for cloud computing, an important issue is how resources may be allocated to an application mix such that the service level agreements (SLAs) of all applications are met [2] [3].

Resource provisioning based on FCFS scheduling algorithm analyzes response time distribution are used to develop a heuristic algorithm, it determines an allocation strategy and it requires small number of servers. In responding to the effectiveness of the algorithm specification was evaluated in range of operating conditions. And consider the performance of SA with non FCFS scheduling has been investigated. A new discipline called randomly dependent priority is found to have the best performance in terms of required number of servers.

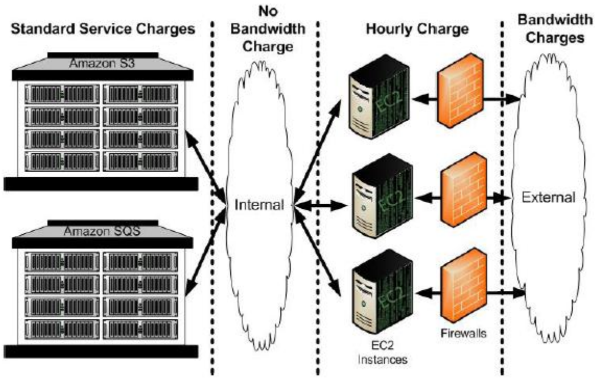

Figure 2: Amazon EC2 pricing model for accessing services.

Amazon EC2 provides 5 types of virtual instances, each of which has different capacities in terms of CPU capacity, RAM size and I/O bandwidth. [6] [7] the announced capacity details of virtual instances on EC2. To provide fault- tolerance, EC2 provides its virtual instances across multiple data centers organized in so-called availability zones1. [5][8] Two virtual instances running in different availability zones are guaranteed to be executed in different data centers. Of the six availability zones, four are located in the U.S. and the other two are in Europe. To demonstrate that the same performance features appear on different types of virtual instances as well, we also partially benchmark medium instances with high CPU.

Implications of resource provisioning: As we observed that different small instances behave differently when serving CPU- intensive and disk I/O intensive workloads, we further explore this phenomenon and run the third group of experiment to check if the CPU and disk I/O performances are correlated on supposedly identical small instances. Each point depicts the CPU and I/O performances of a single virtual instance. We do not observe any obvious correlation between the respective CPU and I/O performances. These results suggest that different small instances on Amazon EC2 may be suitable to process different types of workload. **[9] [10]** among the literature provided in the above discussion we describe the efficiency in the resource provisioning of the cloud computing. An optimal virtual machine placement (OVMP) algorithm was proposed to provision the resources for VMs based on two provisioning plans: reservation and on-demand. The OVMP algorithm can optimally adjust the tradeoff between the advance reservation of resources and the allocation of on-demand resources. In addition, the algorithm also takes the demand and price uncertainties into the resource provisioning. To further improve the OVMP algorithm, the same authors proposed another optimal cloud resource provisioning algorithm in, called the OCRP algorithm. [6] The OCRP algorithm extends the OVMP algorithm to provision resources for VMs in multiple provisioning stages. To solve the optimal resource provisioning in an efficient way, two different approaches Benders decomposition and sample-average approximation are applied in the OCRP algorithm instead of the SIP model. For each VM, the placement information only indicates which cloud provider hosts the VM, not the information about the located PM.

II. RELATED WORK

In this section, we describe the system mode used in this paper. Furthermore, we also review the previous studies related to our investigated Resource provisioning problem. For the VM placement issue, it has been discussed in a lot of literature. In the literature, the VM placement problem is usually transformed to the 0-1 knapsack (bin packing) problem. With the problem transformation, the ILP model corresponding to the VM placement can be easily formulated. Based on the derived ILP model, the optimal solution of the VM placement problem can be obtained. [8] [10] However, the previous VM placement literature focused on how to maximize the resource utilizations of PMs in the creation of VMs.

The amount of VM interference cost depends on various factors, such as the types of applications running in VMs, the number of VMs placed at the same PM, the choice of the VM scheduling algorithm.

ILP Model

The ILP is a known mathematical method for solving the optimal problems with following characteristics: a linear objective function, a number of linear constraints, and an integer solution set. This model could be follow following assumptions. The cloud provider would like to create a number of new VMs in PMs concurrently. [4] [5] If the rent VM of a user cannot provide the computing environment to meet the QoS requirement of the user application, the cloud provider will return an amount of money to the user. Before placing the new VMs, each PM already has held a certain number of existing VMs. In the ILP model, the objective function is to maximize the profit of the cloud provider after placing the new VMs in PMs.

According to the process of the virtual machine placement in commercial cloud computing. And consider the cost approach for resource provisioning introduce OVMP algorithm. Finally, VMs will be hosted in a computing environment operated by third party sites that we call cloud providers. Cloud providers can offer customers into two plans they are reservation and on-demand plan. Those services can be offered by the environment assurance in commercial cloud websites EC2, GoGrid are instance services and offer reservation and on-demand plans to the customers. Generally, price of resources in reservation plan is cheaper than in on-demand.

III. BACKGROUND WORK

Our problem statement can be briefly described as follows: 'M' physical machines are available and their resource capacities given along memory, CPU and Network bandwidth dimensions. There are 'N' virtual machines to be placed. [9] [11] The requirements of these virtual machines are given along the dimensions of memory, CPU and network bandwidth. We have to find a mapping between VMs and PMs that satisfies the VMs' resource requirements while minimizing the number of physical machines used.

Resource demands are predicted at regular intervals using resource demand data. These predicted values are used by a placement module to compute VM to PM mappings. This module uses first fit approximation.

Extracting each individual physical machines can be considered as bins having different dimensions in virtual machine placement. These dimensions are accessed in real time data processing with virtual machine object representation and other data elements with considering among client requirement specification in different dimensions. We have to define behavior of the each virtual machine placement with accurate resource generation. Resource allocation is the main achievement in optimized data delivery to clients according their requirements. Hence, due to the similarities of our problem with the bin-packing problem, we have adopted techniques like Linear Programming and First Fit which are typically used to solve traditional bin-packing problems, to solve our problem of VM Placement.

IV. ALGORITHM ANALYSIS

The main inputs to our algorithms are the resource requirements of each virtual machine to be placed. To capture these requirements along various placements with virtual organizations, we define a requirements matrix as follows:

Requirements Matrix: {r11, r12 …r1d}.

Consider the above representation where each Rij indicates the requirement of VM i long as the dimension j.

Currently, we consider three dimensions for our purposes: CPU, Memory and Network bandwidth used. [4] [5] [6] Requirements along these dimensions are expressed as fractions of the total capacity of a PM.

Integer Linear Programming: While we believe that this prototype is valuable, there are three important limitations: the list of storage options for each dataset is not ordered, that is, we do not present a preferred storage option; each dataset is analyzed in isolation so it is not obvious what the best global solution is; and the computational side (number of application runs, cost per hour, machine speed, etc.) is not taken into account.

Insert equation $(x+a)^n = \sum_{j \in P}^{i \in E} Xij$

Basically, the cloud provider would like to make PMs hold VMs as many as possible to generate more revenue. As increasing the number of VMs in a PM, it may introduce more interference among the VMs in the same PM. This will possibly increase the penalty payment of the cloud provider in the VM provisioning.

We seek to address these limitations so we can produce a global data allocation solution that balances cost and performance of both storage and computation. [11] If the best storage service for a single dataset resides in a cloud that does not have good choices for the rest of the application data, then we may arrive to a sub-optimal allocation of data. As we will show, trying to find an optimal solution increases the complexity of the problem to NP hard. We provide a model for this data allocation problem and a software implementation that is both fast and scalable.

V. PERFORMATION EVALUATION

The Optimized Virtual Machine Provisioning performed over the following parameter settings. In each PM, there have been a number of existing VMs in it. The number of the existing VM is randomly determined from 0 to 10. [5] [7] With holding different existing VMs, the amount of available resources in each PM is also different. The amount of available resources is represented as a triple-tuple (available CPU GHz, available memory space in GB, available storage space in GB). The resource interval [(12, 129, 200), (96, 3000, 9600)] is used to randomly decide the available resources of each PM. In each PM, it uses a 40Gbps transmission line to connect with the corresponding switch. Next, a number of new VMs is assumed to be created within 250 PMs. The number of new VMs is set from 100 to 500 in each simulation run, respectively. The amount of the resources required for a new VM was set by referring to the Amazon EC2 with 12 different resource demands. [7] [8] [9] In simulation experiments, we also refer to Amazon EC2 to set the price of each VM type and the QoS requirement of an application running in a VM. If the QoS violation is decided, the penalty payment is set using the violation ratio × the price of the VM.

For the number of VMs created in the PMs, all the four algorithms have similar simulation results. Basically, the least fit algorithm can fully exploit the resources of PMs since it attempts to place the VM at the PM with few resources. Therefore, the least-fit algorithm should have better performance in the number of VMs created than the other two intuitive algorithms and our proposed heuristic algorithm. In the proposed OVMP algorithm, it also attempts to place many VMs for maximizing the profit of the cloud provider in addition to reducing the VM interference.

VI. EXPERIMENTAL RESULTS

In this section we describe the resource provisioning in cloud with description of all the resources. Compute or design all the relations of cloud computing.

Evaluation of Resource Provisioning: In this evaluation process of extraction of various applications in cloud resource provisioning operations.

Balance of Cost: We describe the cloud service provider by analyzing the OVMP algorithm with suitable consideration on reservation and on-demand cost estimation in real time virtual machine placement in real time cloud environment.

Based on the various operations present in the cloud computing environment. However, reserving too many VMs may not be optimal. Therefore, the tradeoff between on-demand and oversubscribed costs needs to be adjusted in which OVMP can optimally perform.

Implementation: the OVMP algorithm can be applied to multiple provisioning stages representing long-term planning. Optimal solution of the first provisioning stage depends on multiple probability and randomly distribution with consideration of occurring in sequential time operations. Multiple stages with planned and achievement releases with suitable examples. For example consider the systematic data events dynamically high efficiency. Many time periods in a year (e.g., Christmas Day, Valentine's Day, etc.). [2][9] The use of decomposition method for OVMP has to be carefully considered, since the formulation of the OVMP algorithm is a pure integer program which is the NP-hard problem. Although the sub problems can be solved in parallel, the master problem with the additional Benders cuts requires considerable computational time.

We propose an optimal virtual machine placement (OVMP) algorithm to minimize the total cost due to buying reservation and on-demand plans of resource provisioning. With IaaS model, OVMP algorithm makes a decision to host a certain number of VMs on appropriate cloud providers. Uncertainty of future demands and prices of resources is taken into account to optimally adjust the tradeoff between on-demand and oversubscribed costs. [10] [11] The decision made by OVMP algorithm is obtained as the optimal solution from stochastic integer programming (SIP) formulation with two- stage recourse. Extensive numerical studies and simulation in cloud computing environment are performed to evaluate the effectiveness of OVMP algorithm. The results show that OVMP algorithm can minimize the total cost, while requirements of both providers and customers are met.

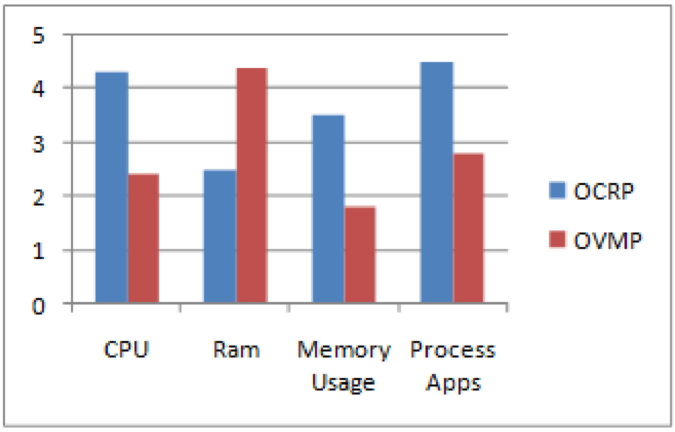

Figure 4: Performance results of Comparison with OCRP & OVMP.

The OCRP formulates the significance of the other processors and other data management services take same environmental situation. [7] [8] The loading time other institutions are achieved in real time data passing between operating services present in cloud computing. The OVMP procedure gives efficient and excellent improvement of the resource provisioning processing of resource like CPU and other devices present in cloud computing operations.

VII. CONCLUSION

The optimal solution obtained from OCRP is obtained by formulating and solving stochastic integer programming with multistage recourse. We have also applied Benders decomposition approach to divide an OCRP problem into sub problems which can be solved parallelly. we propose an optimal virtual machine placement (OVMP) algorithm after this algorithm can be extends to implement optimized resource provisioning operations. This algorithm can minimize the cost spending in each plan for hosting virtual machines in a multiple cloud provider environment under future demand and price uncertainty. OVMP algorithm makes a decision based on the optimal solution of stochastic integer programming (SIP) to rent resources from cloud providers.

REFERENCES

[1] http://en.wikipedia.org/wiki/Cloud_computing.

[2] Ye Hu1, Johnny Wong, , Gabriel Iszlai, and Marin Litoiu, "Resource Provisioning for Cloud Computing ", IEEE International Conference on Autonomic Systems, Barcelona, 2009.

[3] Xiaoqiao Meng, Canturk Isci, Jeffrey Kephart, Li Zhang, Eric Bouillet, "Efficient Resource Provisioning in Compute Clouds via VM Multiplexing ", ICAC'10, June 7–11, 2010, Washington, DC, USA. Copyright 2010 ACM 978-1-4503-0074-2/10/06 ...$10.00.

[4] Rajkumar Buyya, Saurabh Kumar Garg, and Rodrigo N. Calheiros, "SLA-Oriented Resource Provisioning for Cloud Computing: Challenges, Architecture, and Solutions ", 2011 International Conference on Cloud and Service Computing, 978-1-4577-1637-9/11/$26.00 ©2011 IEEE.

[5] Sivadon Chaisiri, Bu-Sung Lee, "Optimization of Resource Provisioning Cost in Cloud Computing", IEEE Transactions On Services Computing, Vol. 5, No. 2, April-June 2012.

[6] S. Chaisiri, B.S. Lee, and D. Niyato, "Optimal Virtual Machine Placement across Multiple Cloud Providers," Proc. IEEE Asia- Pacific Services Computing Conf. (APSCC), 2009.

[7] R. Chheda, D. Stokowski, S. Stefanovich and J. Toscano, "Profiling Energy Usage for Efficient Consumption," Architecture J., no. 18, 2008.

[8] H.N. Van, F.D. Tran, and J.-M. Menaud, "SLA-Aware Virtual Resource Management for Cloud Infrastructures," Proc. IEEE Ninth Int'l Conf. Computer and Information Technology, 2009.

[9] M. Cardosa, M.R. Korupolu, and A. Singh, "Shares and Utilities Based Power Consolidation in Virtualized Server Environments," Proc. IFIP/IEEE 11th Int'l Conf. Symp. Integrated Network Management (IM '09), 2009.

[9] F. Hermenier, X. Lorca, and J.-M. Menaud, "Entropy: A Consolidation Manager for Clusters," Proc. ACM SIGPLAN/ SIGOPS Int'l Conf. Virtual Execution Environments (VEE '09), 2009.

[10] N. Bobroff, A. Kochut, and K. Beaty, "Dynamic Placement of Virtual Machines for Managing SLA Violations," Proc. IFIP/IEEE Int'l Symp. Integrated Network Management (IM '07), pp. 119-128, May 2007.

[11] P. Jirutitijaroen and C. Singh, "Reliability Constrained Multi-Area Adequacy Planning Using Stochastic Programming with Sample- Average Approximations," IEEE Trans. Power Systems, vol. 23, no. 2, pp. 504-513, May 2008.

