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A Survey on Fitness and performance focus based Cloud Resource Allocation

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ABSTRACT: Cloud is a group of computers or servers which are interconnected together to provide resources to the clients.The main problems related to cloud computing are the networkbandwidth, response time, minimum delay in data transfer and minimum transfer cost fordata. In cloud computing the resource allocation plays an important role in the performanceof the entire system and the level of customer satisfaction provided by the system.However, while providing the utmost customer satisfaction, the service provider ought tomake sure of the profits to him also. So the resource allocation should be economical onboth views i.e. on the end user and the service provider perspective. So as to get such a newsystem that guarantees the fitness of performance traits between cloud resources (service providers)and cloud services (buyers).

KEYWORDS: Cloud Computing, cloud resource allocation, fitness-enabled auction

I. INTRODUCTION

Cloud computing is an on-demand service because it offers dynamic flexible resource allocationfor reliable and guaranteed services in pay as-you-use manner. Due to the ever-increasing demands of the users for services or resources, it becomes difficult to allocateresources accurately to the user demands in order to satisfy their requests.In cloud computing,an effective resource allocation strategy is required for achieving user satisfaction andmaximizing the profit for cloud service providers. Resource Allocation Strategy (RAS) asan integrating cloud provider activity for utilizing and allocating scarce resources within thelimit of cloud environment so as to meet the needs of the cloud application.

Cloud computing has become a new age technology that has got huge potentials in enterprisesand markets. Clouds can make it possible to access applications and associated datafrom anywhere. Companies are able to rent resources from cloud for storage and othercomputational purposes so that their infrastructure cost can be reduced significantly. Further they can make use of company-wide access to applications, based on pay-as-you-gomodel. Hence there is no need for getting licenses for individual products. However, one ofthe major pitfalls in cloud computing is related to optimizing the resources being allocated.Because of the uniqueness of the model, resource allocation is performed with the objectiveof minimizing the costs associated with it. The other challenges of resource allocation aremeeting customer demands and application requirements.

Resource management is a topic worthy of investigation, andis a key issue to decide whether the new computing paradigm can be adopted more and obtaingreat business success. It requires the type and amount of resources needed by each application in orderto complete a user job. The order and time of allocation of resources are also an input for anoptimal RAS. New challenges of resource allocation in cloud computing lie in the fact thatthe cloud platform is built for commercial uses, which demands that all the resources in thecloud platform be paid for uses. In such cases, there are at least two new requirements to beconsidered: one is the trade-offs between prices and profits for cloud resource providers (resourceagents), or prices and the required level of QoS for resource renters.

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II. RELATED WORK

A comprehensive literature survey was performed in the support of cloud resource allocationstrategy. Cloud computing is an essential ingredient of modern computing systems, Cloudcomputing provides an on-demand service because it offers dynamic resource allocation forreliable and highly available services in pay as-you-consume manner to public. In Cloudcomputing environment, multiple cloud users can request number of cloud services in parallel.So, there must be a provision that all resources which are made available to requestinguser in efficient manner to satisfy their need.Cloud Computing is a computing technology that is rapidly consolidating itself as the nextstep in the development and deployment of increasing number of distributed application.Cloud computing is nothing but a specific style of computing where everything from computingpower to infrastructure, business apps are provided as a service. It's a computingservice rather than a product. In cloud, shared resources, software, and information is providedas s metered service over the network. When the end user accesses some service iscloud, he is not aware of where that service is coming from or what is platform being usedor where it is being stored.
In cloud computing, an effective resource allocation strategy is required for achieving usersatisfaction and maximizing the profit for cloud service providers. In [1], Vinothina et. al.discusses Resource Allocation Strategy (RAS) as an integrating cloud provider activity for utilizingand allocating scarce resources within the limit of cloud environment so as to meet theneeds of the cloud application. Also, a summary of the classification of RAS and its impactsin cloud system is given. In [7], Sowmya Koneru et. al. Focus on increasing the efficacy ofthe scheduling algorithm for the real-time Cloud Computing services. The RR schedulingAlgorithm utilizes the Turnaround Time Utility efficiently by differentiating it into a gainfunction and a loss function for a single task and also used to maximize the efficiency gain.
An overall improvement in the resource utilization and reduction in the processing cost is shown in [11]. In [8] authors have explained the algorithm for negotiation protocol for resourceprovisioning in detail. In [1], authors have made a comparison of many resourceallocation strategies. In [9] authors propose a model and a utility function for locationawaredynamic resource allocation. Comparison of number of available resource allocationpolicies is covered in [10]. In [11] author has used a Genetic Algorithm for scheduling oftasks in cloud computing systems.

III. PROPOSED ALGORITHM

A. *DESCRIPTION SYSTEM ARCHITECTURE:*

Clouds are usually referred to as a large pool of computing and storage resources, whichcan be accessed via standard protocols with an abstract interface [6]. A four-layer architecturefor cloud computing is shown in Figure 1.1
The fabric layer contains the raw hardware level resources, such as compute resources,storage resources, and network resources. On the unified resource layer, resources have beenvirtualized so that they can be exposed to upper layer and end users as integrated resources.The platform layer adds on a collection of specialized tools, middleware and services on topof the unified resources to provide a development and deployment platform. The applicationlayer includes the applications that would run in the clouds.

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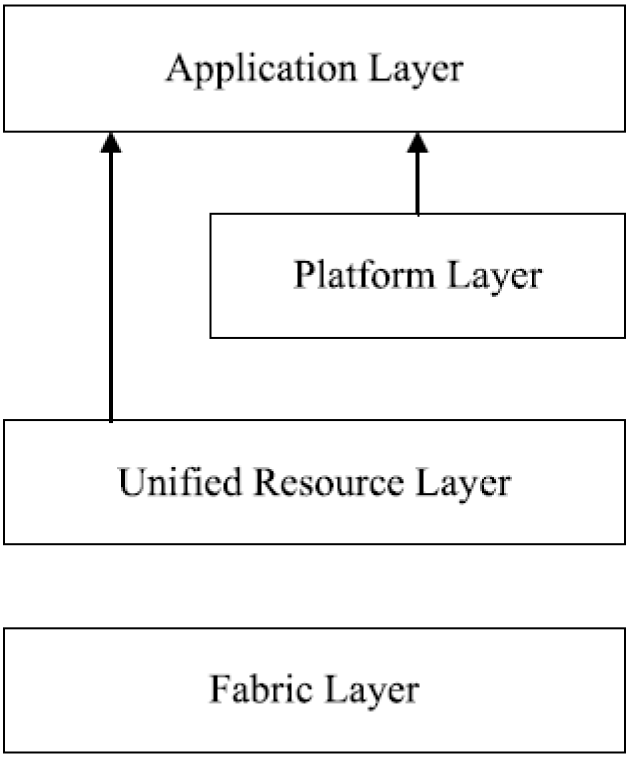

1.1 System Architecture

Step 2: Selection Criteria:

In a cloud market, there are N users asking for services, each having a sequence of tasksto complete. The maximum number of tasks is K. Cloud provider entirely virtualizes Kresources, each of which can render a specific service with a fixed finite capacity C.

$$C = [C1, C2, \ldots, CK] \qquad \text{(eq. 1)}$$

One task is characterized by its size, which means the amount of computing capabilityrequired to complete the task.

In the real commodity market, consumers needing the same commodity are competitors,and are reluctant to cooperate with each other. Thus, resource allocation in clouds is a noncooperativeallocation problem.Every user has a bidding function, which decides the bid in any round considering task size,priority, QoS requirement, budget and deadline. The repeated bidding behavior is consideredas a stochastic process indexed by a discrete time set. The outputs are random variables thathave certain distributions, when these above deterministic arguments and time are fixed.

$$\{ B^i (k) , k \in (1,2,3\ldots K) \qquad \text{(eq. 2)}$$

Where B^i is the money that a user is willing to pay for one unit of resource per second.User i bids for task k at price $B^i k$, which can be treated as a sample for B^i.In each auction stage, users ask the auctioneer individually about configuration informationsuch as virtual machine provision policy, time zone, bandwidth, residual computing processors,and bid according to their asset valuations. Auctioneer collects all bids then informsusers of the sum of bids. Under the game of incomplete information, cloud users only knowtheir own price functions as well as the incurred sum of bids.

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IV. PSEUDO CODE

Biding Algorithm

From an users point of view, after task submission, observer focuses on analyzing the receivedmessages that prescribe users next move. If auctioneer announces a new auction, useradds it to the auction list. If bids are called, an appropriate bid is calculated and reported toauctioneer. If user receives the message calling for parameters, he examines the historicalprices and estimates the future bid sum by Bayesian learning mechanism, then sends informationback. Finally, if user receives resource price and proportion, he immediately updateshis price list and begins to execute the task.

submit tasks to auctioneer
if observer receives message of inform start **then**
add current auction
end if
if observer receives message of call for bids **then**
set $\{b_1^i, | \ldots, b_{k-1}^i\} \leftarrow b_k^i$

send message of proposal to auctioneer
end if
if observer receives message of call for parameters **then**
inquiry historical price
forecast future price
send message of competitors information to auctioneer
end if
if observer receives message of resource price **then**
$\{\Theta_1, \cdots, \Theta_{k-1}\} \leftarrow \Theta_k$
send message of task execution to resource
delete current auction

From an auctioneer's perspective, a new auction is triggered off whenever a new type of task arrives. Once an auction begins, auctioneer broadcasts the bid calling message to current users. As soon as all proposals arrive, auctioneer informs users. Similarly, auctioneer collects bidding function parameters from all the bidders, and then decides a reasonable bound.If the bound is too narrow, poor users quit gambling.

V. MERITS AND APPLICATIONS

Response Time Management

Response time management is an important concept related to how the resource allocation mechanism will treat the response time of the tasks to achieve good system performance.

Resource Optimization

Given this model, an algorithm that allocates the resources in cloud, which selects and optimizes resources

Resource Management and Control

Resource management in cloud is related to the allocation and deallocation of based on therequirement of the user.

Performance Prediction

Given method is used to predict the distribution fairly well and to make sophisticated tradeoffdecisions that are difficult when this algorithm is not used.

Other Applications

- The biggest benefit of resource allocation is that user neither has to install softwarenor hardware to access the applications, to develop the application and to host theapplication over the Internet.
- The next major benefit is that there is no limitation of place and medium. We canreach our applications and data anywhere in the world, on any system.

- The user does not need to expend on hardware and software systems.
- Cloud providers can share their resources over the Internet during resource scarcity.

VI. Conclusion and Future Work

Cloud computing is a research hotspot in IT fields, which utilizes virtualization technology, integrates distributed computing, storage, data, applications and other resources, provides collaborative computing model and strong information processing capabilities. A new idea which is applying cloud computing to the resource management in universities is presented in this project, for solving shortcomings in the current inefficiency resource management,lack of resource information timely communication and resource sharing. Algorithm dealt with the resource allocation and scheduling problems in cloud computing. In this paper, this paper introduces a new auction method, deal with the special challenges in the cloud computing to distribute the resources to the proper cloud services so that services can get their suitable resources, and services with higher service level are easier to get high quality resources. This methodfeatures the fitness concept, and the redesigned bargaining process and function to calculate the final dealing price. In this way, the overall market efficiency is fully improved. Experiments validate the CRAA/FA algorithm, and show that it is more efficient than the allocating methods without the introduction of fitness.

VII. Future Work

The future work is going to be carried out regarding to the scale problem of this allocation algorithm. Since cloud is usually serving thousands of users, a cloud composed of thousands of, or even tens of thousands of, servers are quite common. To investigate the scalability of this allocation algorithm and compare with decentralized auction-based cloud resource allocation approaches, e.g., catallaxy-based approach, I am planning to write some software modules so that it will be adapted to the environment with some VMs deployed in our own servers and others in a public IaaS cloud like Amazon EC2. By this means, I could setup an experimental environment with around 10 virtual machines. Another aspectthat is worth investigating is the oligopoly or even monopoly problem in our cloud resourcemarket. In fact, I acnsimply consume that cloud resources are located in a competitive resource market in our work. An oligopoly cloud resource market is the one in which allcloud resources, or a special type of cloud resource, like the one with high I/O throughput,are controlled by only a few providers. Can the CRAA/FA algorithm be used in such a cloudresource market? Are there more efficient resource allocation methods? I will continue to investigate that in our future work.

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References

[1] Y. Lan, W. Tong, Z. Liu, and Y. Hou, "Multi-unit continuous doubleauction based resource allocation method," in Proc. 3rd Int.Conf. Intell. Control Inf. Process., 2012, pp. 773–777.

[2] P. Pillai and S. Rao, "Resource allocation in cloud computing using the uncertaintyprinciple of game theory", IEEE Syst. J., vol. PP, no. 99, pp. 112, 2014, Doi:10.1109/JSYST.2014.2314861.

[3] S. A.H., E. A.S., and R. H. V., "Security-aware resource allocation in clouds", in Proc. IEEE Int. Conf. Services Comput., 2013, pp. 400407.

[4] R. Buyya, D. Abramson, J. Giddy, and H. Stockinger, "Economic models for resourcemanagement and scheduling in grid computing", Concurrency Computation: PracticeExperience, vol. 14, nos. 13-15, pp. 15071542, 2002.

[5] Z. Kang and H. Wang, "A novel approach to allocate cloud resource with differentperformance traits ", in Proc. IEEE Int. Conf. Services Computer., 2013, pp. 128135.

[6] S. Chaisiri, L. B.S., and D. Niyato," Optimization of resource provisioning cost incloud computing", IEEE Trans. Services Comput., vol. 5, no. 2, pp. 164177, Apr.Jun.2012.

[7] D. Grosu and A. Das, "Auction-based resource allocation protocols in grids ", in Proc.16th Int. Conf. Parallel Distrib. Comput. Syst., 2004, pp. 2027.

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[8] S. K. Fayazbakhsh, Y. Lin, A. Tootoonchian, A. Ghodsi, T. Koponen, B. Maggs, K.Ng, V. Sekar, and S. Shenker. " Less pain, most of the gain: Incrementally deployable" ICN. SIGCOMM Comput. Commun. Rev., 43(4), Aug. 2013.

[9] K. Prasad, T. Faruquie, L. Subramaniam, and M. Mohania, " Resource allocation andSLA determination for large data processing services over cloud ", in Proc. IEEE Int.Conf. Services Comput., 2010, pp. 522529.

[10] H. Ma, "Bidding Strategies in Agent-Based Continuous Double Auctions" ,New York,NY, USA: Springer Science Business Media, 2008.

[11]J. Li, M. Qiu, and J. Niu, "Adaptive resource allocation for preemptablejobs in cloud systems," in Proc. 10th Int. Conf. Intell. Syst.Des. Appl., 2010, pp. 31–36.

BIOGRAPHY

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