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Title **PROFIT MAXIMIZATION FOR CLOUD BROKER IN CLOUD COMPUTING**

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PROFIT MAXIMIZATION FOR CLOUD BROKER IN CLOUD COMPUTING

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ABSTRACT :

As cloud computing evolves, more and more applications are migrating to the cloud. Pay-as-you-go is an essential aspect of cloud computing. However, owing to the one-hour billing schedule, most customers should always pay more than their actual consumption. Furthermore, most cloud service providers offer a discount to long-term customers, but this discount is not available to short-term users with low computing demands. To help cloud users save money, we've created a new position called cloud broker. A cloud broker acts as a go-between for cloud providers and cloud consumers. It rents a number of reserved VMs at a low cost from cloud providers and makes them available to consumers on an as-needed basis at a lower cost than that given by cloud providers. Furthermore, as compared to cloud providers, the cloud broker has a shorter billing cycle. By doing so, the cloud broker may save the consumer a significant amount of money. In addition to lowering user costs, the cloud broker may profit from the price differential between on-demand and reserved VMs. In this article, we will look at how to set up a cloud broker and how to price its VMs such that its profit may be maximised while saving consumers money. Many factors influence a cloud broker's profit, including user demand, the buy and selling price of VMs, the cloud broker's scalability, and so on. Furthermore, these elements interact with one another, complicating the profit analysis. In this work, we first provide a synthetic analysis of all influencing aspects before defining an optimum multiserver setup and VM pricing problem that is treated as a profit maximisation problem. Second, we offer a heuristic technique to address the optimization issue by combining the partial derivative and bisection search methods. The near-optimal solutions may be utilised to steer the cloud broker's setup and VM price. Furthermore, a number of comparisons are provided, demonstrating that a cloud broker may save consumers a significant amount of money.

Keywords : - Cloud broker, cloud computing, cost reduction, profit maximization, queue model, service demand, VM configuration, VM pricing

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I INTRODUCTION

Cloud computing has grown tremendously in recent years [1]. More and more cloud providers have gotten on the cloud bandwagon, centrally managing a range of resources such as hardware and software and delivering them to clients on demand over the internet [2]. Cloud computing, with its unique features such as elasticity, adaptability, seemingly limitless processing capacity [3], and pay-as-you-go pricing model, can decrease clients' need for substantial capital outlays for hardware required to install service and personnel expenditures to manage it [4]. As a result, a rising number of clients are migrating their operations to the cloud. Pay-as-you-go [5, 6, 7] is an essential aspect of cloud computing that has two meanings. First, physical computers are dynamically divided using virtualization technologies and supplied to customers in the form of virtual machines (VMs) based on customer resource demand such as CPU, memory, and so on, and customers pay based on the amount of resources they actually utilise. Second, the VMs may be dynamically provisioned and deallocated at any moment, and consumers should be charged depending on how much time the resources are really used. Nonetheless, due to the extreme complexity in monitoring and auditing resource usage [8,] the pay-as-you-use pricing model is currently only conceptual, and cloud providers typically use an hourly billing scheme; in other words, the cloud providers' Billing Time Unit (BTU) is one hour, for example, Amazon EC2 [9]. As a result, consumers should pay for resources per the hour even if they do not use all of the assigned resources within the billing period [10]. This wastes resources and, to some extent, boosts the cost of customers. Furthermore, virtually all cloud providers offer two payment options for their instances: On-Demand and Reserved Instances [11, 12]. On-Demand instances charge customers per hour for compute power based on which instances they run, and they are suited for applications with short-term workloads. Reserved Instances offer users a significant discount (up to 75% in Amazon EC2) compared to On-Demand instance pricing, but customers should rent instances for long periods of time, e.g., six months to several years, according to current plans offered by real cloud providers such as Amazon [9] and Microsoft Azure [13]. Obviously, this offer is not available to short-term clients. Because of the two reasons stated above, short-term clients should always pay more than they need to spend. We introduce the cloud broker, an intermediate agent between cloud providers and clients, to lower costs for this segment of customers. The interaction between the cloud broker, cloud providers, and consumers is depicted in Fig. 1. The cloud broker rents the reserved VMs from cloud providers for extended periods at the reserved pricing and outsources the resources to clients as on-demand VMs at a lower price than the cloud providers charge for the identical VMs. Customers' costs can

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be reduced in two ways by using a cloud broker. First, the cloud broker exploits the price difference between reserved and on-demand VMs by renting the reserved VMs at a low cost and outsourcing them as on-demand VMs at a lower cost as compared to the identical VMs offered by cloud providers. Second, the cloud broker uses a shorter billing cycle (BTU) than cloud providers. By combining the two techniques, resource utilisation may be enhanced more efficiently and client requirements can be met at a lower cost. In addition to assisting clients in lowering their costs, the cloud broker may profit from the price differential between reserved and on-demand VMs [14].

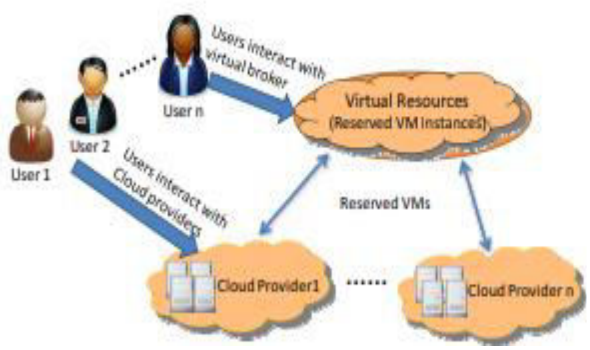

Fig. 1: The Cloud Broker.

II. LITERATURE SURVEY

1) Optimal multiserver configuration for profit maximization in cloud computing

AUTHORS: J. Cao, K. Hwang, K. Li, and A. Y. Zomaya

Understanding the economics of cloud computing is becoming increasingly essential as cloud computing gets more widespread. To optimise profit, a service provider should understand both service charges and business expenses, as well as how they are influenced by application characteristics and multiserver system design. The optimal multiserver setup problem for profit maximisation in a cloud computing environment is investigated. Our pricing model considers factors such as the amount of a service, the workload of an application environment, the configuration of a multiserver system, the service-level agreement, consumer satisfaction, the quality of a service, the penalty for a low-quality service, the cost of renting, the cost of energy consumption, and the margin and profit of a service provider. Our strategy is to describe a multiserver system as an M/M/m queuing model, which allows us to express and solve our optimization issue analytically. The idle-speed model and the constant-speed model are both evaluated for server speed and power usage. The probability density function of a newly incoming service request's waiting time is calculated. A service request's predicted service charge is computed. It is possible to calculate the projected net business gain in one unit of time. Numerical calculations of the ideal server size and server speed are shown.

2) Above the clouds: A berkeley view of cloud computing

AUTHORS: A. Fox, R. Griffith, A. Joseph, R. Katz, A. Konwinski, G. Lee, D. Patterson, A. Rabkin, and I. Stoica

We think that, if certain barriers are solved, Cloud Computing has the potential to change a major portion of the IT sector, making software more appealing as a

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service and changing how IT gear is built and purchased. Developers with creative ideas for new interactive Internet services no longer need huge financial outlays in hardware or human resources to implement their service. They don't have to worry about over-provisioning for a service whose popularity does not reach their expectations, squandering money, or under-provisioning for one that becomes incredibly popular, missing out on prospective customers and income. Furthermore, businesses with big batch-oriented activities can obtain results as soon as their programmes can scale, because utilising 1000 servers for one hour costs the same as using one server for 1000 hours. This level of resource flexibility, without the need to pay a premium for big size, is unique in IT history. The rise of Cloud Computing has been foreshadowed by the economies of scale of very large-scale datacenters mixed with pay-as-you-go resource use. It is increasingly more appealing to launch an innovative new Internet service on a third party's Internet Datacenter rather than your own infrastructure, and to smoothly scale its resources as its popularity and income increase or decrease. Expanding and contracting on a regular basis in response to typical diurnal cycles might reduce expenses even more. The risks of over-provisioning or under-provisioning are transferred to the Cloud Computing provider, who mitigates that risk by statistical multiplexing over a much wider set of customers and provides relatively inexpensive rates owing to greater utilisation and the economics of purchasing on a bigger scale. We explain terminology, present an economic model that quantifies the crucial buy vs. pay-as-you-go choice, provide a spectrum to identify Cloud Computing providers, and provide our perspective on the top 10 barriers and possibilities to Cloud Computing growth.

III PROPOSED SYSTEM

In general, a service provider hires a specific number of servers from infrastructure providers and constructs various multi-server systems for various application domains. Each multiserver system is designed to handle a certain set of service requests and applications. As a result, the cost of renting a multiserver system is proportionate to the number of servers. A multiserver system's power consumption is related to the number of servers and server usage, as well as the square of execution speed. A service provider's income is proportional to the volume and quality of service provided. To conclude, a service provider's profit is mostly influenced by the setup of its service platform.

IV IMPLEMENTATION

SYSTEM ARCHITECTURE

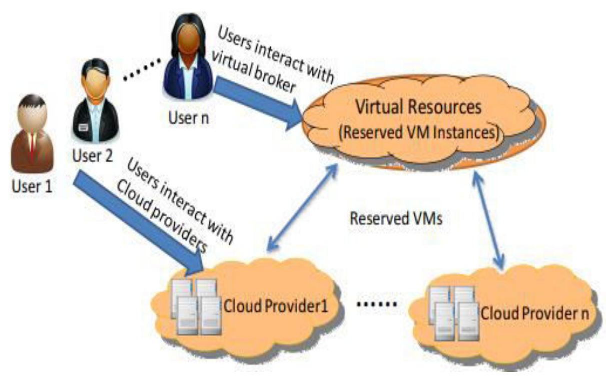

Fig 2: System Architecture

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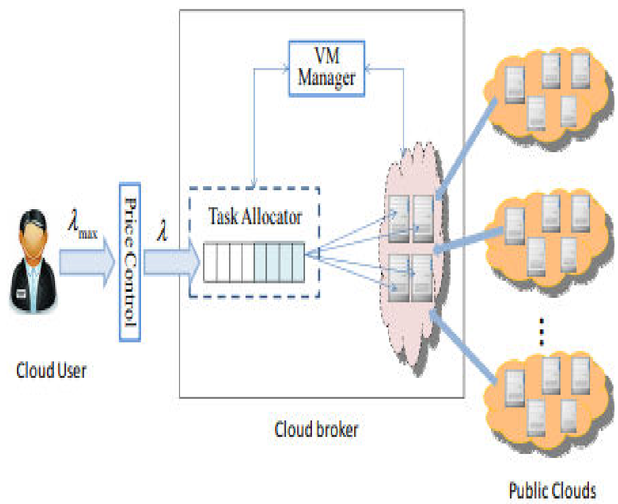

Fig 3: depicts the system architecture.

1. Cloud computing

2. Queueing model

3. Module of Business Services

4. Module for cloud customers.

5. Infrastructure Service Provider Module.

Cloud Computing:

Cloud computing refers to a form of computer service outsourcing that is similar to how energy is supplied. It is simple to utilise for users. They don't have to be concerned with where the power comes from, how it is generated, or how it is carried. They pay for what they consume on a monthly basis. The concept behind cloud computing is similar: the user may simply access storage, processing capacity, or specifically designed development environments without worrying about how they operate inside. Cloud computing is typically defined as Internet-based computing. The cloud is a metaphor for the Internet based on how the internet is depicted in computer network diagrams; it is an abstraction that hides the internet's complicated architecture. It is a computing approach in which IT-related skills are given "as a service," allowing customers to receive technology-enabled services through the Internet ("in the cloud") without knowledge of, or control over, the technologies behind these servers.

Queueing model:

The cloud service platform is modelled as a multiserver system with a service request queue. The clouds supply job resources in the form of virtual machines (VM). Furthermore, users submit their work to the cloud, which employs a job queuing system such as SGE, PBS, or Condor. The job scheduler schedules all jobs and assigns them to different VMs in a centralised manner. As a result, we may think of it as a service request queue. Condor, for example, is a computeintensive workload management system that includes a job queueing mechanism, scheduling strategy, priority scheme, resource monitoring, and resource management. Users submit jobs to Condor, and Condor queues them and decides when and where to run them based on a policy. For our multiserver system with changing system size, an M/M/m+D queueing model is built. Then, an optimal configuration issue of profit maximisation is created, in which various aspects are taken into account, such as market demand, request workload, server-level agreement, server rental cost, energy consumption cost, and so on. The optimum solutions are determined for two distinct situations: ideal optimal solutions and real optimal solutions.

Module of Business Services:

Service providers pay infrastructure providers to rent their physical resources and charge consumers to fulfil their service requests, resulting in cost and income. Profit is produced by the difference between revenue and cost. In this module, service providers are regarded as cloud brokers since they can play an essential role in establishing an indirect link between cloud consumers and infrastructure suppliers.

Infrastructure Service Provider Module: An infrastructure provider provides fundamental hardware and software facilities in the three-tier system. A service provider rents infrastructure resources and creates a collection of services in the form of a virtual machine (VM). Long-term renting and short-term renting are two types of resource rental programmes offered by infrastructure suppliers. Long-term renting is often significantly less expensive than short-term renting.

Module for cloud customers.:

A client makes a service request to a service provider who provides on-demand services. With a specific service-level agreement, the client obtains the desired outcome from the service provider and pays for the service depending on the amount of service and the service quality.

V CONCLUSION

We focus on the profit maximisation challenge of cloud brokers in this research. A cloud broker is a middleman between cloud service providers and clients that buys reserved instances from cloud providers for extended periods of time and outsources them as on-demand VMs for a lower price with finer-grained BTU than the cloud service providers charge for the same VMs. The cloud broker may save customers a lot of money because of the reduced service pricing and finer-grained BTU compared to public clouds. This article attempts to assist cloud brokers on how to setup the virtual resource platform and price their services to maximise profit. To address this challenge, the virtual resource platform is represented as an M/M/n/n queue model, and a profit maximisation problem is created in which various profit-affecting elements, as well as their relationships, are evaluated based on queuing theory. The partial derivative and bisection methods are used to find the best answers. Finally, a series of computations are performed to assess the changing trend of profit and the user cost savings ratio. We choose the linear price-demand price in this study to examine the broker's profit since it is the most frequent function in the real market. Distinct cloud marketplaces, on the other hand, may have a different price-demand relationship.

VI REFERENCES

[1] Buyya Rajkumar, James Broberg, and Andrzej M Goscinski. 8(6-7):1–41, 2011. Cloud computing: Principles and paradigms.

[2] Armando Fox, Rean Griffith, A Joseph, R Katz, A Konwinski, G Lee, D Patterson, A Rabkin, and I Stoica; Armando Fox, Rean Griffith, A Joseph, R Katz, A Konwinski, G Lee, D Patterson, A Rabkin, and I Stoica. Above the clouds: A Berkeley perspective on cloud computing University of California, Berkeley, Dept. of Electrical Engineering and Computer Sciences, Rep. UCB/EECS, 28:13, 2009.

S Nesmachnow, S Iturriaga, and B Dorronsoro are the authors of this work. Efficient heuristics for virtual cloud brokers' profit optimization. IEEE Computational Intelligence Magazine, Vol. 10, No. 1, pp. 33–43, 2015.

[4] Kenli Li, Jing Mei, and Keqin Li are three of the authors. A fund-constrained investment strategy for cloud computing profit maximisation. PP(99):1–1, 1939, IEEE Transactions on Services Computing.

Luis M Vaquero, Luis Rodero-Merino, Juan Caceres, and Maik Lindner are among those who have contributed to this work. A break in the clouds: on the way to defining clouds. Computer Communication Review, ACM SIGCOMM, 39(1):50–55, 2008.

[6] Tim Grance and Peter Mell. The National Institute of Standards and Technology's definition of cloud computing. 53(6):50, National Institute of Standards and Technology, 2009.

Rajkumar Buyya, Chee Shin Yeo, Srikumar Venugopal, James Broberg, and Ivona Brandic are among the seven members. Cloud computing and future IT platforms: Vision, hype, and reality for computing as the fifth utility Future Generation Computer Systems, 2009, 25(6):599–616,

[8] Rui Zhang, Kui Wu, Minming Li, and Jianping Wang are the authors. Online resource scheduling for cloud computing using concave pricing. IEEE Transactions on Parallel and Distributed Systems, vol. 27(4), pp. 1131–1145.

[9] Amazon Elastic Compute Cloud. Amazon Web Services, https://aws.amazon.com/, 2017.

Wei Wang, Di Niu, Baochun Li, and Ben Liang are among those who have contributed to this work. Cloud brokerage enables dynamic cloud resource reservation. IEEE International Conference on Distributed Computing Systems, 2013, pp. 400–409.

Jing Mei, Kenli Li, Aijia Ouyang, and Keqin Li are among those who have contributed to this work. In cloud computing, a profit-maximizing system with assured service quality. IEEE Transactions on Computers, 2015, 64(11):3064–3078.

[12] Dusit Niyato, Sivadon Chaisiri, and Bu-Sung Lee. In cloud computing, the cost of resource supply is optimised. 5(2):164–177, IEEE Transactions on Services Computing, 2012.

[13] Microsoft Azure is a cloud computing platform. Windows Azure, https://www.microsoft.com/windowsazure/, 2017.

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