iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** VII **Month of publication:** July 2021

DOI: https://doi.org/10.22214/ijraset.2021.36278

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VII July 2021- Available at www.ijraset.com

Profit Maximization for Cloud Broker in Cloud Computing

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Abstract: ***As cloud computing evolves, more and more applications are moving to the cloud. Cloud brokers are are like Middlemen between cloud service providers and cloud users. Thus, cloud brokers can significantly reduce the cost of consumers. In addition to reducing the cost per user, the cloud broker can also accommodate the price difference between on-demand virtual machines and dedicated virtual machines. The problem with the current system is that if many customers request a large amount of cloud services at once, the cloud service broker cannot purchase enough cloud services from CSP to meet the needs of all customers. Then there is a peak demand problem where the customer cannot complete the job. As a result, dynamic conditions not only lead to financial problems, but can also negatively impact the customer experience. To solve this problem, the system focuses on guaranteed quality of service for all requests, reduces waste of resources, increases security and maximizes revenue. All jobs are scheduled by the job scheduler and assigned to different VMs in a centralized way. Many factors such as market demand, application volume, SLA, service rental cost, etc. are taken into account to formulate an optimal configuration problem of profit maximization.***

Keywords: Cloud Computing, Cloud Broker, Quality of Service, Efficiency, Reliability, Profit Maximization.

I. INTRODUCTION

There is no universal definition of cloud computing. However as far as our research is concerned, the most apt definition of cloud computing can be quoted as: “computing as a utility”. In our day-to-day life the most common utilities are electricity, water, gas, heat, postpaid mobile services etc. Similarly in cloud computing, computing resources (like CPU, memory, storage, network domains, virtual desktop) are rented to users based on their demand. From user's viewpoint, it eliminates the need of an upfront investment as an user can pay based on the amount of resources it has used. This is termed as “pay-per-use” or “pay-as-you-go” model. Therefore, resource scaling is the most fundamental aspect of cloud.

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II. RELATED WORK

In this paper, the author presented a revenue management framework to tackle the problem of optimal capacity control for allocating resources to customers. The main challenge is that the provider must find an optimal capacity to admit demands from the reservation market such that the expected revenue is maximized. The future direction of this work involves the extension of the revenue management framework with overbooking strategies.[1]

Literature survey is the most important step in any kind of research. Before start developing we need to study the previous papers of our domain which we are working and on the basis of study we can predict or generate the drawback and start working with the reference of previous papers.

In this section, we briefly review the related work on Profit maximization of cloud broker and their different techniques.

This paper shows what cloud computing is, the various cloud models, and the architecture of cloud computing. This research will define the security risk and challenges occurred in these technologies. Various issues defined in this projects like: Platform Management, Data Encryption, Interoperability, Cloud Data Management and security, SLA (Service Level Agreement) and so on. Limitation: Security is one of the major issues which hamper the growth of cloud. [2]

This paper presents a review on the cloud computing concepts as well as security issues inherent within the context of cloud computing and cloud infrastructure. Location transparency is one of the prominent flexibilities for cloud computing, which is a security threat at the same time – without knowing the specific location of data storage, the provision of data protection act for some region might be severely affected and violated. Trust is another problem which raises security concerns to use cloud service for the reason that it is directly related to the credibility and authenticity of the cloud service providers. [3]

The paper aims to provide an overview of CSB research status, and give suggestions on how CSB research should proceed. This paper provides two key contributions to the research community. First, it provides an overview of the CSB research community on how they are evolving. Second, it highlights areas that future research contributions in the CSB are required. CSB is complex software system, in Computer Science and Information Systems, such as economics (e.g. profit maximization), and law (e.g., service level agreement are required. [4]

This paper presents that, various users shift their sensitive data on the cloud. To get a cloud service, they have to contact cloud service provider. Now, huge number of providers are available in the market. To locate a perfect provider who can fulfill their need is a skillful job. This job can be accomplished by cloud service broker. The selection of Quality based Cloud service provider is a complicated task in this paper. [5]

This paper has proposed a novel Double Quality Guaranteed renting scheme for service providers. This scheme combines both short term renting and long term renting, which can reduce the resource waste greatly and adapt to the dynamical demand of computing capacity. Further, we improving the user interface, by having graphs for profit and time taken for handling service request. Profit maximization problem is a heterogeneous cloud environment. [6]

In this paper, cloud computing allowed multiple providers to offer basic computational resources to consumers as a digital service with the benefits of “on-demand” and “pay-per-use” characteristics of cloud. Cloud services offer a range of economic benefits to their users and to the economy as a whole. This paper summarizes how the cost estimation occurs in the cloud computing environment. Here estimating cost is a biggest challenge for software developers, when the application has quality of service requirements. [7]

This paper, aims to achieve the minimum response time through considering the communication channel bandwidth, latency and the size of the job. The proposed service broker policy can also reduce the overloading of the data centers by redirecting the user requests to the next data center that yields better response and processing time. Improving the financial cost and power consumption is still to be researched and improved if possible. [8]

In this paper, the authors suggests & propose a Cloud Brokering Framework that supports all the brokering steps along with proposed profit optimization consideration. The simulation scenario is carefully generated to show the effectiveness of algorithm. As a future scope of work, the framework can be extended with more effective policies at each level of lifecycle. The work can be extended for evaluation of Service Level Agreements (SLAs). [9]

In this paper, the author consider the case of a single cloud provider & address the question how to best match customer demand in terms of both supply and price in order to maximize the providers revenue and customer satisfactions while minimizing energy cost. To model this problem as a constrained discrete-time optimal control problem, used Model Predictive Control to find its solution, proposed solution achieves better net income and minimizes the average request waiting time. Further, we are also interested in conducting more extensive experiments using workload datasets that contain price information. [10]

III. METHODOLOGY

A. Problem Statement

In the existing system, the problem is that if many customers request a large number of cloud services simultaneously, the cloud service broker cannot purchase sufficient cloud services from CSPs to satisfy the demand of all the customers. Then, a peak-demand problem arises in which customers cannot complete their work. Hence, dynamic conditions not only could result in economic problems but also could have a negative impact on the work of customers.

B. Proposed Method

In the proposed system main focus on guaranteed the service quality of all requests, reduce the resource wastage, provide more security and optimize profit maximization. All jobs are scheduled by the job scheduler and assigned to different VMs in a centralized way. An optimal configuration problem of profit maximization is formulated in which many factors are taken into considerations, such as the market demand, the workload of request, the SLA, the rental cost of services, and so forth. In the proposed work we are going to use Queuing theory. Queuing theory is the mathematical study of waiting lines or queue. This technique provides basis of decision making about the resources needed to provide a service.

C. Algorithms: AES Algoritm for Encryption

AES (advanced encryption standard).It is symmetric algorithm. It used to convert plain text into cipher text .The need for coming with this algorithm is weakness in DES. The 56 bit key of des is no longer safe against attacks based on exhaustive key searches and 64-bit block also consider asweak.AES was to be used128-bit block with128-bit keys.
Vincent Rijmen and Joan Daemen was founder. In this drop we are using it to encrypt the data owner file.

1) Input

128_bit /192 bit/256 bit input (0,1)
Secret key (128_bit) + plain text (128_bit).

2) Process

10/12/14-rounds for-128_bit /192 bit/256 bit input
Xor state block (i/p)
Final round: 10, 12, 14
Each round consists: sub byte, shift byte, mix columns, add round key.

3) Output

Ciphertext (128 bit) .

IV. ARCHITECTURE

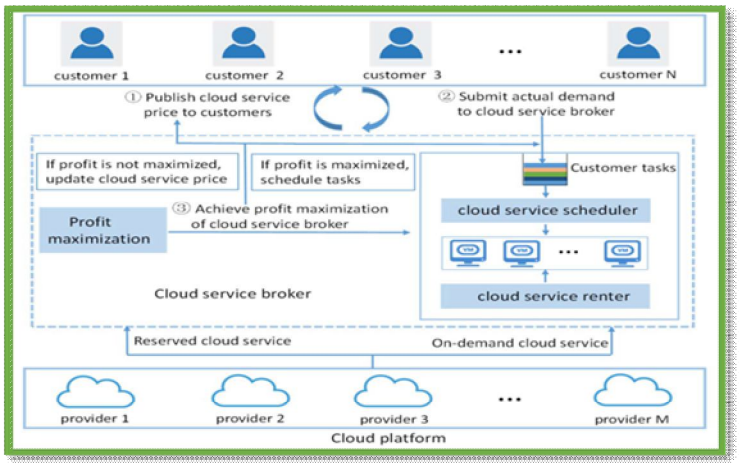

Fig. 1 System Architecture-1

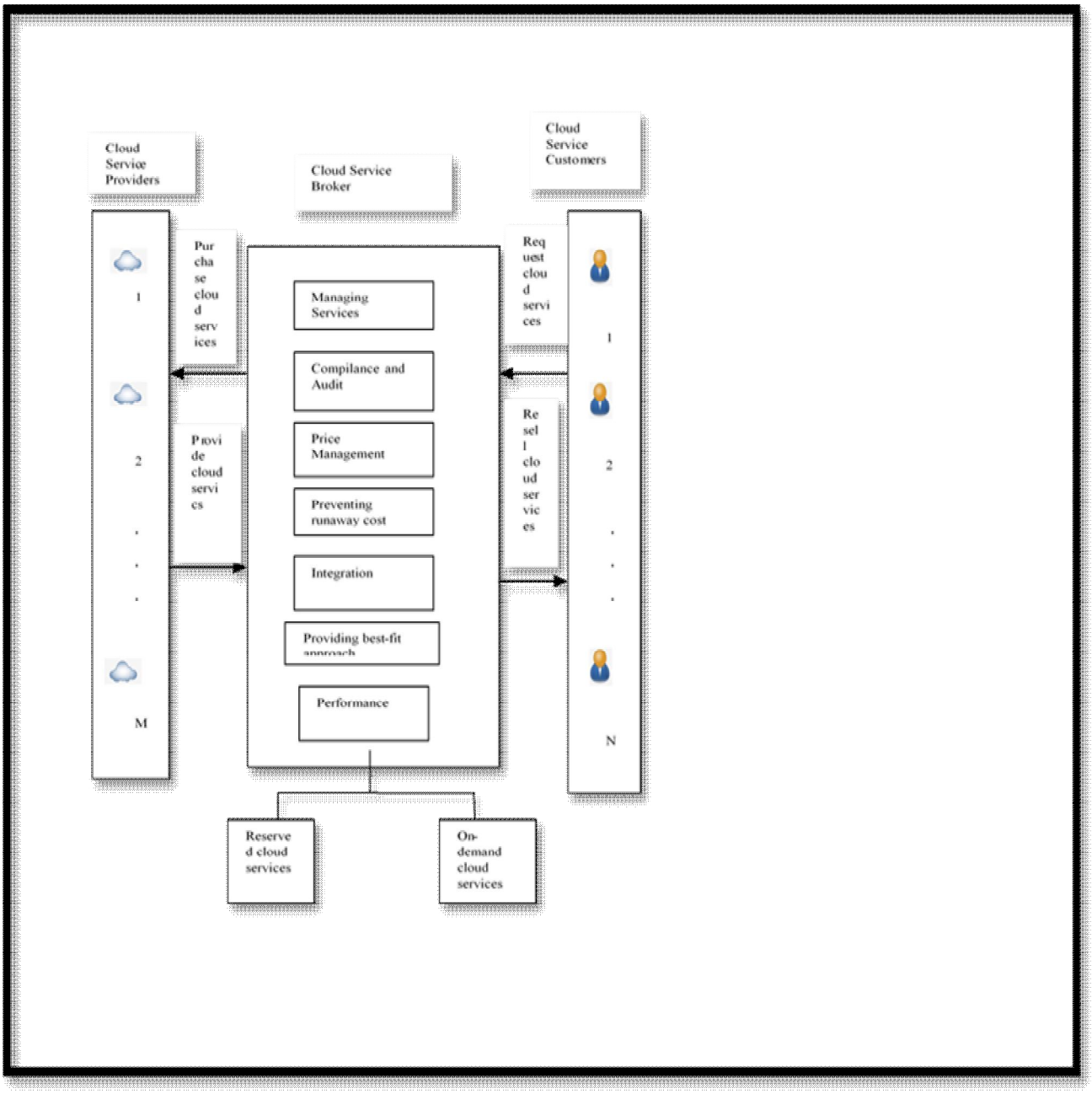

Fig. 2 System Architecture-2

There are two modules in our system one is User another is Cloud Broker. User module contains Register, Login, Cloud Request for requesting resources from Cloud Broker and Rent Request and View Request to rent resources from another user in system which will reduce resource wastage. Cloud Broker module consist of authorize users in system and share resources upon request and view details of users in system.

In proposed system, client after login, requests for resources to Cloud Broker. Cloud broker responds to client by displaying list of scheme data to client. Then client sends their requirements to cloud broker. According to client's requirement Cloud broker checks for resources, if resources are available Cloud broker send client contract details as well as allocate resources. In proposed system to reduce the wastage of resources, the user can rent their unused resources to another user on request. In proposed system, we have used queuing theory to provide basis of decision making about the resources needed to provide a service and we have also used AES algorithm to provide security and data privacy to users.

V. EXPERIMENTAL SETUP AND RESULTS

For proposed system jdk 8 used and IDE is Netbeans. Server is Apache tomcat 7 .The cloud used is Drive HQ. The fragmented block will store on cloud.

Graph

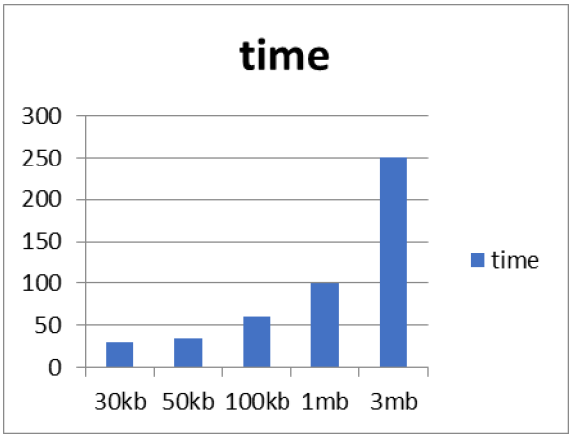

Fig. 3 Shows file size on x axis and time (ms) to upload on Y-axis

Explanation: Graph shows size of file and time to upload that file after performing fragment and t-coloring .As size of file increases the time will increase.

TABLE I
TIME TO UPLOAD FILE

ID	File size	Time to upload (ms)
1	30kb	30
2	50kb	35
3	100kb	60
4	1mb	100
5	3mb	250

Above table 01 gives the information of uploading time for 30kb, 50kb, 100kb, 1mb and 3mb file size.

VI. CONCLUSION

In this paper, we focus on the profit maximization problem of cloud brokers. A cloud broker is an intermediary entity between cloud service providers and customers, which buys reserved instances from cloud providers for long periods of time and outsources them as on-demand VMs for a lower price with respect to what the cloud service providers charge for the same VMs. Due to the lower service price compared with the public clouds, the cloud broker can save much cost for customers. This paper tries to guide cloud brokers on how to configure the virtual resource platform and how to price their service such that they can obtain the maximal profit.

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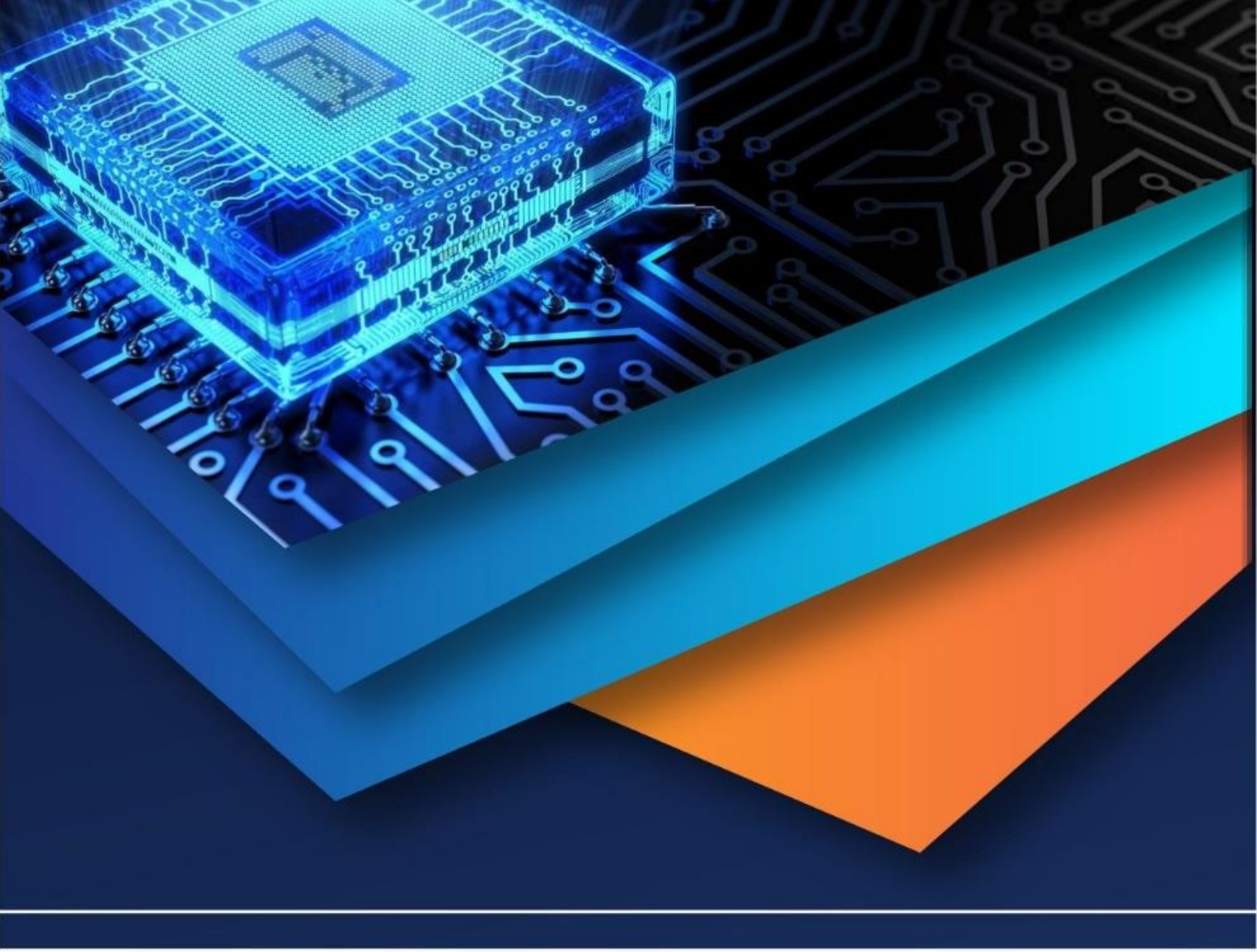

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