PROFIT MAXIMIZATION SCHEME WITH GUARANTEED QUALITY OF SERVICE IN CLOUD COMPUTING

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Abstract

Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. In the simplest terms, cloud computing means storing and accessing data and programs over the Internet instead of your computer's hard drive. Along with the development of cloud computing, more and more applications are migrated into the cloud. An important feature of cloud computing is pay-as-you-go. Cloud Computing provides robust computational power to the society at reduced cost that enables customers with least computational resources to outsource their large computation workloads to the cloud, and economically enjoy the massive computational power, bandwidth, storage, and even suitable software that can be shared in a pay per-use manner. Cloud computing being an information technology paradigm enables access to shared pools of configurable system resources and higher-level services often over the Internet. The objective of providers is to maximize profits by their price schemes, while the main purpose of clients is to have quality of services for a reasonable price. Thus the vital aim is to maximize the profit for service providers & get quality of service at best price for the client. Because of cloud computing development, choosing cloud services can be complicated & time-consuming for customers. To facilitate cloud service delivery, the authors propose a cloud service broker, who provides automated selection of suitable cloud services, & assure the best performance, reliability, & cost efficiency.

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

1. Introduction

Data made available in social networks, media and entertainment, electronic commerce, and mobile is exploding. Firms across industries are increasingly focusing on the use of data analytics to generate insightful and actionable insights to improve their profitability and growth, improve customer experience, and design new and better products and services. Profit Maximization trends have led to a significant increase in IT storage and computing requirements across industries, and apart from significant infrastructure investments in computing and data storage clusters, they have led to increased support, management and maintenance costs. The operating loads of these large corporate storage and computing clusters exhibit significant intraday and seasonal variability, and additionally firms want flexibility for rapid growth in resource requirements as their needs evolve and mature. In this environment, cloud computing {a form of outsourcing of the aforementioned physical IT infrastructure resources{ has become a cost effective alternative for these firms. To study the problem of optimal multiserver configuration for profit maximization in a cloud computing environment. Our approach is to treat a multiserver system as an M/M/m queuing model, such that our optimization problem can be formulated and solved analytically. We consider two server speed and power consumption models, namely, the idle-speed model and the constant-speed model. Our main contributions are as follows. We derive the probability density function (pdf) of the waiting time of a newly arrived service request.

The cloud service broker, which simplifies, consults on, and accelerates the adoption of cloud services, represents the middleware between customers and CSPs. As a third party, the cloud service broker needs to purchase cloud services from multiple CSPs and then resell them to customers on the basis of the customers' requirements. Therefore, the cloud service broker assists customers in the selection of cloud services by helping them to evaluate, select, and compare cloud service solutions. With the employment of a cloud service broker, customers no longer need to pick among multiple CSPs. Instead, they just exposure their demand information to the cloud service broker, and the cloud service broker provides the most suitable approach for each customer. Hence,

customers and CSPs do not have to contact each other directly, and the cloud service broker can be used to manage the efficient work of multiple clouds.

2. Literature Review / Related Work

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.[1]

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.[2]

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 theCSB 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. [3]

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. [4]

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.[5]

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.[6]

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. [7]

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). [8]

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.[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 aconstrained 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]

3. Proposed Method

There are three roles in the cloud computing environment: virtual resource supplier (VRS), cloud service provider (CSP), and end user (user). The VRS is responsible for the provision of large-scale virtual resources connected by the network. They offer different types of virtual resources and profit from virtual resource renting services. The CSP purchase the virtual resources from the VRS and process requests from the end-user. The user purchases services from the CSP to meet its needs. The CSPs charge the end-users for the services they provide. 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/queue. This technique provides basis of decision making about the resources needed to provide a service.

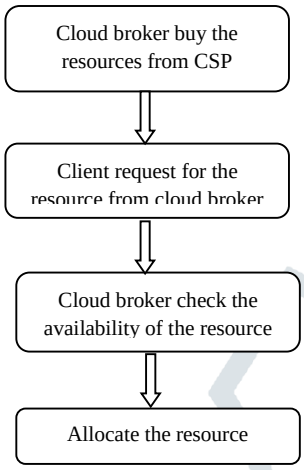

Fig.1 Flow diagram

Architecture

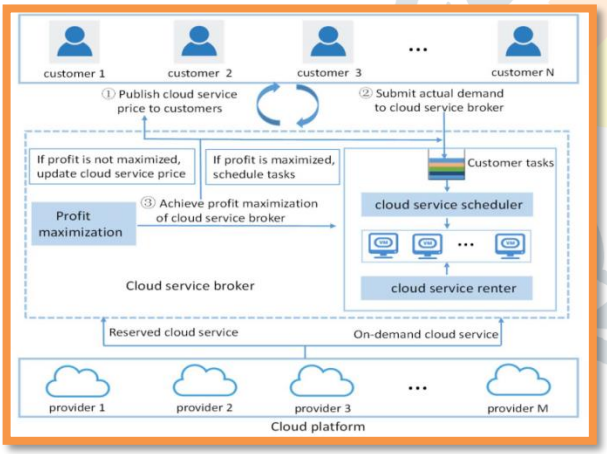

Fig.2 System Architecture

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. Develop a robust track and trace mechanism to help the distributors the retail pharmacist and the patient. This mechanism should be easy to implement by all manufacturers.

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