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Customer Profit Maximization on Mutiserver in Cloud Computing

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ABSTRACT
Many cloud service providers have emerged as a result of the rapid growth of cloud computing, which has resulted in an increase in the number of businesses using cloud services. The configuration of cloud service platforms to maximise profit is becoming the focus of cloud service providers' attention. Customer satisfaction will be taken into account in this article. A cloud service provider's earnings is impacted by customer happiness in two ways. Customer satisfaction is directly influenced by the quality of service provided by a company's cloud configuration. In contrast, a cloud service provider's request arrival rate is influenced by customer satisfaction. In tackling profit maximisation problems, few extant works take customer happiness into account; those that do not provide a proper codified concept of customer satisfaction.

1. INTRODUCTION

When it comes to computing, the cloud is a service rather than a product. It provides access to shared hardware, software, databases, data, and any other resources to customers whenever they need them. In order to use and pay for on-demand services, customers do not take into account the direct infrastructure costs and the subsequent maintenance costs. As a result of these advantages, cloud computing is rapidly gaining popularity and respectability. There are now a number of cloud service providers, including Amazon EC2, Microsoft Azure, Salesforce.com, and so on and so on.

Profit is a major concern for cloud service providers in the current IT industrial paradigm. For the purpose of making money, cloud service providers lease resources from infrastructure providers in order to build up their platforms and provide paid services to clients. Cloud service providers are increasingly concerned with how to best setup their systems to maximise profits. Our prior studies assumed that cloud service demand was predictable and unaffected by external influences, thus we looked at the optimal configuration problem from a profit maximisation perspective for cloud service providers. In reality, a service provider's request arrival rate is influenced by numerous aspects, and customer happiness is the most significant one. In other words, clients have the option of submitting their jobs to a cloud computing platform or running them locally on their own computers.

Customers' actions are influenced by whether or not the cloud service is appealing to them. The cloud service provider must understand how customer satisfaction affects service demand in order to appropriately construct a cloud service platform. As a result, profit maximisation must take consumer pleasure into account. In tackling profit maximisation problems, few extant works take customer happiness into account; those that do not provide a proper codified concept of customer satisfaction. Cloud computing's customer satisfaction level is firstly defined in this research in order to address the issue. Based on the notion of customer satisfaction, we design a profit maximisation model that takes into account the impact of customer satisfaction on service quality (QoS) and service pricing (PoS). QoS and PoS are economic elements that influence customer satisfaction.

Cloud service providers set the PoS. The service capacity of a cloud service provider is mostly influenced by the platform setup, and this has a significant impact on QoS. By customising the cloud platform with a greater service capability, you can improve customer satisfaction under the current price plan. As a result, a cloud service provider will be impacted in two ways. The higher the level of customer happiness, the greater the next market share, and hence the greater the additional revenue for the cloud provider. There is also a spike in prices when additional resources are hired to increase service capacity. Thus, finding the optimal cloud platform configuration theme is the ultimate solution to maximising profits. When it comes to cloud service providers, we've developed an algorithm for finding the finest possible cloud setup that takes into account customer happiness.

2. RELATED WORK

First, we examine the literature on customer satisfaction and then the cloud computing profit maximisation challenge.

It is vital to measure client satisfaction in order to estimate the demand for a service provider. Research on the definition of customer satisfaction has attracted numerous corporate management experts [7,[8],[9][10][11]. Customers who are happy with their purchases are more likely to return, according to Cardozo [7], who first floated the idea of customer satisfaction back in 1965. Customers' satisfaction is then defined in a variety of ways. For the sake of determining the reasonableness of pay and profits, Howard and Sheth [8] looked at how satisfied a client feels. When it comes to customer satisfaction, Churchill and Surprenant [9] defined it as the comparison between the cost of a product or service and the benefit it provides. Customer satisfaction is described by Tes and Wilton [10] as an assessment of the gap between expectations and actual performance. QoS and PoS, according to Parasuraman et al. [11], play a significant role in consumer satisfaction. Even though these definitions are expressed in different ways, their principles are congruent with discrepancy theory, which states that customer happiness is defined by the difference between the customer's before anticipation and the real cognitive after.

Cloud computing has become a huge business in recent years. Cloud service providers face a major challenge when it comes to making money. In order to better understand this problem, numerous studies have been conducted (e.g., 2, 14, 15, 16, 17, 18, 19, 20). Some studies are looking at how service providers can make the most money. A stochastic programming model with two-stage recourse was proposed by Chaisiri et al. [18] to handle the profit maximisation problem for service providers. [2] Cao et al. [2] proposed a multiserver configuration technique that is optimal. A multiserver system's profit can be maximised by determining the ideal design of the server size and speed using the optimal technique. The profit problem is examined in various cloud computing settings in some studies. Another study [19] looked at an energy-efficient, profit-and-cost-conscious

request dispatching and resource allocation algorithm for cloud service providers operating geographically dispersed data centres in a multiple electricity market environment. The authors' goal was to maximise a service provider's net profit. They failed to account for the needs of the end user in the preceding pieces.

Some cloud computing projects take client happiness into account. A complete list of all of the following:,,,,,. Chen et al. [20] utilised economics' utility theory to create a utility model for evaluating cloud-based customer satisfaction. To measure customer satisfaction in the utility model, price and reaction time are important. According to their assumptions, customers are less satisfied when the cost of the service is higher and the response time is longer. In [21], the ratio of the actual to the expected QoS level is used to assess user satisfaction. For SaaS providers, Wu et al. [22] suggested an admission control and scheduling algorithm to optimise profit by minimising costs and increasing customer happiness. There was no specific method for measuring client satisfaction, though. Using the Ant-Colony Optimization (AMP) method, Chao et al. proposed a customer satisfaction-aware approach for geo-distributed data centre's. The customer satisfaction model employed in this research is identical to the one used in [20]. A user's satisfaction can be defined as the amount to which their resource requirements have been met, and the ratio of actual consumption to expectation resources can be used to determine it. [26] The authors of [27] proposed a strategy that uses predictions to determine the best cloud availability zone for a given user's needs.

3. PROPOSE SYSTEM

In this study, we explore how cloud service providers' profits are affected by their customers' contentment, and how that, in turn, influences their profits. Cloud setup has an impact on service quality, which in turn has an impact on customer happiness. Alternatively, a cloud service provider's request arrival rate is influenced by customer happiness. Only a few existing works, or those that consider customer satisfaction but do not provide a precise codified definition, consider the resolution profit maximisation disadvantage from the perspective of customer satisfaction. It follows that the concept of customer satisfaction in politics and economics will be elevated, as will the formula for measuring it in cloud computing. While the profitability of a company is directly related to the level of pleasure of its customers, an Associate in Nursing analysis is provided.

A profit maximisation disadvantage has been designed and addressed to encourage the most efficient configuration, taking into account customer contentment, service level agreement, dealing value, energy usage, and so forth. It's common for us to employ economic science's definition of customer happiness to build a formula for cloud-based customer satisfaction. Finally, how cloud configuration impacts customer satisfaction and how customer satisfaction impacts cloud service providers' profits are examined.

An issue with profit maximisation in light of customer happiness has been identified and the optimal solution has been defined in light of this work. During a service market, such as cloud computing, customer satisfaction is a critical issue that must be taken into consideration, as it directly influences the number of customers and, subsequently, the profit of the company. In general, an organization's level of customer satisfaction is equal to the sum of the satisfaction levels of all of its customers. In the following, we'll go through how an organization's customers feel about it, followed by how each client feels about it. We prefer to focus on the disadvantages of profit maximisation when studying associate degree optimal configurations. A separate algorithmic software solves the most effective answers. Finally, a series of calculations are carried out to examine the dynamic trend of profit. Many calculations are done to match the profit and optimal configuration of two things while

ignoring consumer happiness on demand. This is a major flaw in the business model. The results reveal that our model outperforms the competition in terms of total customer satisfaction. Consequently, profits are boosted.

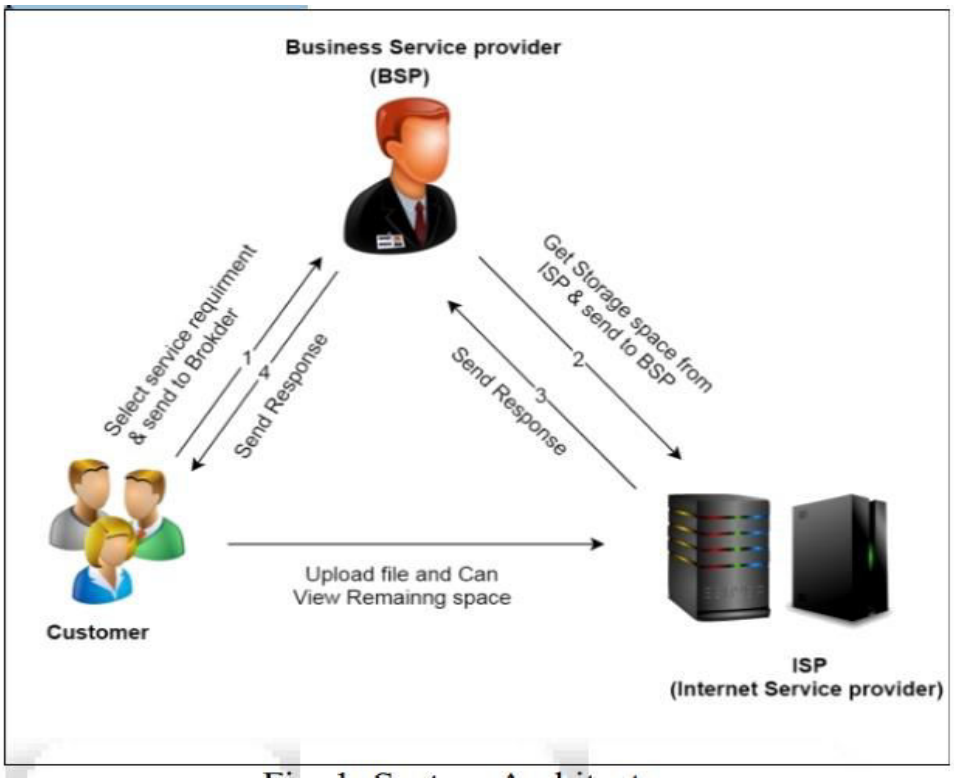

Fig. 1: System Architecture

4. THE CLOUD SERVICE MODEL

Figure 2 shows a multiserver system that may be characterised as an M/M/m queuing model, which is what the cloud service system is. Many cloud computing studies, such as [2], [6], and [33], make use of similar modelling approaches.

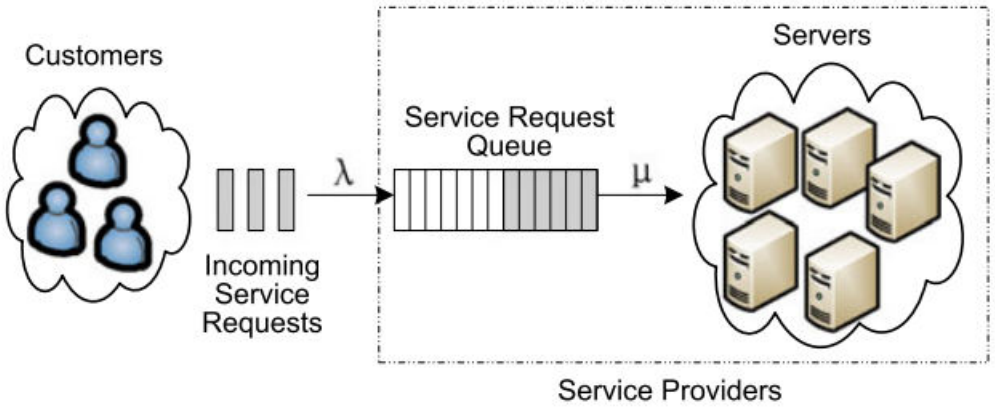

Fig. 2. The M/M/m queuing model.

The M/M/m model assumes that there are m servers, each of which runs at the same speed s. (measured by the number of instructions that can be executed in one unit of time). Service requests are independent and identically distributed exponential random variables (i.i.d.), in other words, the arrival requests follow a Poisson process [2]. The number of instructions needed to complete a task is an i.i.d. exponential random variable r with a mean of r.

The Service-Level Agreement

QoS is affected by a wide range of elements, including the service duration, the number of errors, and so on. Nonetheless, in this study, we use the response time of a request to measure the Quality of Service (QoS). For starters, it's simple to track the service time. The second benefit is that it conveys to clients an intuitive sense of Quality of Service (QoS). Customers aren't concerned about how a breakdown is handled when it occurs. There is no concern for how long it takes or whether the task is accomplished. Due to the fluctuating system workload and restricted service capacity, the response times of requests vary, resulting in varied Quality of Service and Quality of Service satisfaction. According to the execution requirements of its requests, each customer has a "tolerable response time." The allowable response time of a request with an execution requirement r is represented by the formula cr=s0, where s0 represents the server's baseline speed and c represents a constant coefficient. Client discontent with the service provider increases when the response time to a request is longer than what the customer considers tolerable.

CONCLUSION AND FUTURE SCOPE

We propose an optimal setup disadvantage resolution with profit maximising for our clients. That's why we started by providing a social science-based definition of customer satisfaction and a formula for activity-based customer satisfaction in the cloud, as the existing works don't. It is supported by our passion for client satisfaction on employment, therefore we study the market demand and client satisfaction, and provide the calculation of the specific task arrival rate under different configurations. The optimum configuration downside of profit maximisation is also examined.

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