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Authorized Priority Mechanism with Guaranteed Quality of Service Orientation on Cloud Computing

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ABSTRACT: Profit Maximization of cloud service providers is the main thing considered in this paper. There are many cloud service providers, but at present only long-term renting scheme is in use, whose service is not upto the mark. There are disadvantages in this long-term renting scheme as it doesn't guarantee the service quality and leads to wastage of resources. To overcome this we introduced a double renting scheme with a priority tag in place of long-term scheme. Double renting scheme featured with both long and short term schemes. This double renting scheme with a priority tag guarantee's the minimization of waiting period. In this there is a queuing (first-come-first-serve) model. Priority requests are placed in P-queue and non priority requests are placed in Q-queue and they are served according to their concerned SLA'S.

KEYWORDS: Cloud computing, multi-server framework, valuing model, benefit, queuing model, server arrangement administration charge, administration level assertion, holding up time.

I. INTRODUCTION

Cloud computing refers to both the applications delivered as services over the internet, hardware and system software in the datacenters that provide those services. [2]Cloud service provider provides computing resources and services to the users on demand in pay per used manner anywhere and anytime, but for that, user must be connected to the high speed internet to use these services. Due to the advantages cloud has been more and more adopted in many areas such as e-banking, e-commerce etc. It provides secure, fast and convenient data storage. Cloud computing delivers three types of services: Infrastructure as a Service, Platform as a Service, Software as a Service. A service provider can build different multi server systems for different application domains, such that service requests of different nature are sent to different servers in multi server systems. In cloud computing security is tremendously improved because of a superior technology security system, which is now easily available and affordable. Applications which cannot run on the desktop, Personal Computer can run in the cloud. This means that the PC does not need the processing power or hard disk space as demanded by traditional desktop software. Powerful servers are no longer required. The computing power of the cloud can be used to replace or supplement internal computing resources. Organizations no longer have to purchase computing resources to handle the capacity peaks. In the cloud computing for maximizing the profit first we should understand the cost and revenue. Profit maximization must consider the user satisfaction also, the cost of the cloud includes the renting cost and power consumption cost. For maximizing profit, cost of power consumption must be reduced.

[3], [4] Cloud computing is quickly turning into a successful and also effective method for figuring assets. By combining administration of assets and administrations together, Cloud computing will convey facilitated administrations across the Internet. Cloud computing is capable of giving the most practical and vitality effective methods for processing administration assets. Cloud computing will transform data innovation into common wares and utilities with the utilization of pay-per-use evaluating model. An administration supplier rents the assets from the foundation sellers and constructs suitable multi server frameworks and then gives various administrations to clients. A buyer will present an administration solicitation for an administration supplier and gets the sought result taken from the

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administration supplier with certain administration level assertion. In that point buyer pays for the administration in view of their measure of the administration and their nature of the administration. An administration supplier is capable of assembling distinctive multi server frameworks for several application areas, so that the administration solicitations of various natures were sent to different multi server frameworks. Attributable for repetition of PC framework systems and also capacity framework cloud may not be solid for information as per the security score is concerned. In case of Cloud computing security is enormously enhanced because of prevalent innovation security framework that is currently effortlessly accessible and reasonable. [6]Cloud computing provides the following services.

A. SOFTWARE AS A SERVICE (SAAS):

SaaS provides an application on the basis of users requirement. It is a type of model for deploying software in which an application is hosted as a service provided to the user across the network. There is no need to install and run the application on the user's own computer. CRM, E-mail, Games, Virtual Desktops are the examples of SaaS.

B. PLATFORM AS A SERVICE (PAAS):

The idea of PaaS is that some users can provide the specific hardware and a certain amount of application.

C. INFRASTRUCTURE AS A SERVICE (IAAS):

It includes computing control and storage. Cloud infrastructure is a cost-effective model for distributing distinguished services like reducing hardware maintenance complexity, real-time workload balancing, etc. A virtual machine, Servers Storage, Networks are the examples of IaaS. In Cloud service provider's point of view, profit is one of the most important considerations, and it is mainly determined by the configuration of a cloud service platform beneath given market demand. However, a single long-term renting scheme is usually adapted to configure a cloud platform, which cannot guarantee the service quality but leads to serious resource loss. In this paper, a double resource renting scheme with priority tag is designed firstly in which short-term renting, long-term renting, and these schemes with priority tags are united aiming at the existing issues. This double renting scheme with priority tags can effectively guarantee the quality of service of all requests and decrease the resource waste greatly. Secondly, a service system is considered as a queuing model which follows First-come-first-serve scheduling and the execution indicators that affect the profit of our double renting scheme with priority tags are analyzed. In this paper we mainly concentrate on how to maximize our profit by renting the software and hardware from services.

II. LITERATURE SURVEY

Optimal multiserver configuration for profit maximization in cloud computing

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

[3]As cloud computing becomes more and more popular, understanding the economics of cloud computing became critically important. To maximize the profit, a service provider should understand both service charges and business costs, and how they are determined by the characteristics of the applications and the configuration of a multiserver system. The problem of optimal multiserver configuration for profit maximization in a cloud computing environment is studied. Our pricing model takes such factors into considerations as the amount of a service, the workload of an application environment, the configuration of a multiserver system, the service-level agreement, the satisfaction of a consumer, the quality of a service, the penalty of a low-quality service, the cost of renting, the cost of energy consumption, and a service provider's margin and profit. Our approach is to treat a multi-server system as a queuing model, such that our optimization problem can be formulated and solved analytically. Two server speed and power consumption models are considered, namely, the idle-speed model and the constant-speed model. The probability density function of the waiting time of a newly arrived service request is derived. The expected service charge to a service request is calculated. The expected net business gain in one unit of time is obtained. Numerical calculations of the optimal server size and the optimal server speed are demonstrated.

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

[4]Provided certain obstacles are overcome, we believe Cloud Computing has the potential to transform a large part of the IT industry, making software even more attractive as a service and shaping the way IT hardware is designed and

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purchased. Developers with innovative ideas for new interactive Internet services no longer require the large capital outlays in hardware to deploy their service or the human expense to operate it. They need not be concerned about over-provisioning for a service whose popularity does not meet their predictions, thus wasting costly resources, or under-provisioning for one that becomes widely popular, thus missing potential customers and revenue. Moreover, companies with large batch-oriented tasks can get their results as quickly as their programs can scale, since using 1000 servers for one hour costs no more than using one server for 1000 hours. This elasticity of resources, without paying a premium for large scale, is unprecedented in the history of IT. The economies of scale of very large-scale datacenters combined with ``pay-as-you-go'' resource usage has heralded the rise of Cloud Computing. It is now attractive to deploy an innovative new Internet service on a third party's Internet Datacenter rather than your own infrastructure, and to gracefully scale its resources as it grows or declines in popularity and revenue. Expanding and shrinking daily in response to normal diurnal patterns could lower cost even further. Cloud Computing transfers the risks of over-provisioning or under-provisioning to the Cloud Computing provider, who mitigates that risk by statistical multiplexing over a much larger set of users and who offers relatively low prices due to better utilization and from the economy of purchasing at a larger scale. We define terms, present an economic model that quantifies the key buy vs pay-as-you-go decision, offer a spectrum to classify Cloud Computing providers, and give our view of the top 10 obstacles and opportunities to the growth of Cloud Computing.

Cloud computing and emerging it platforms: Vision, hype, and reality for delivering computing as the 5th utility
Authors: R. Buyya, C. S. Yeo, S. Venugopal, J. Broberg, and I. Brandic
[5]With the significant advances in Information and Communications Technology (ICT) over the last half century, there is an increasingly perceived vision that computing will one day be the 5th utility (after water, electricity, gas, and telephony). This computing utility, like all other four existing utilities, will provide the basic level of computing service that is considered essential to meet the everyday needs of the general community. To deliver this vision, a number of computing paradigms have been proposed, of which the latest one is known as Cloud computing. Hence, in this paper, we define Cloud computing and provide the architecture for creating Clouds with market-oriented resource allocation by leveraging technologies such as Virtual Machines (VMs). We also provide insights on market-based resource management strategies that encompass both customer-driven service management and computational risk management to sustain Service Level Agreement (SLA)-oriented resource allocation. In addition, we reveal our early thoughts on interconnecting Clouds for dynamically creating global Cloud exchanges and markets. Then, we present some representative Cloud platforms, especially those developed in industries, along with our current work towards realizing market-oriented resource allocation of Clouds as realized in Aneka enterprise Cloud technology. Furthermore, we highlight the difference between High Performance Computing (HPC) workload and Internet-based services workload. We also describe a meta-negotiation infrastructure to establish global Cloud exchanges and markets, and illustrate a case study of harnessing 'Storage Clouds' for high performance content delivery. Finally, we conclude with the need for convergence of competing IT paradigms to deliver our 21st century vision.

Tradeoffs between profit and customer satisfaction for service provisioning in the cloud
Authors: J. Chen, C. Wang, B. B. Zhou, L. Sun, Y. C. Lee, and A. Y. Zomaya
[7]The recent cloud computing paradigm represents a trend of moving business applications to platforms run by parties located in different administrative domains. A cloud platform is often highly scalable and cost-effective through its pay-as-you-go pricing model. However, being shared by a large number of users, the running of applications in the platform faces higher performance uncertainty compared to a dedicated platform. Existing Service Level Agreements (SLAs) cannot sufficiently address the performance variation issue. In this paper, we use utility theory leveraged from economics and develop a new utility model for measuring customer satisfaction in the cloud. Based on the utility model, we design a mechanism to support utility-based SLAs in order to balance the performance of applications and the cost of running them. We consider an infrastructure-as-a-service type cloud platform (e.g., Amazon EC2), where a business service provider leases virtual machine (VM) instances with spot prices from the cloud and gains revenue by serving its customers. Particularly, we investigate the interaction of service profit and customer satisfaction. In addition, we present two scheduling algorithms that can effectively bid for different types of VM instances to make tradeoffs between profit and customer satisfaction. We conduct extensive simulations based on the performance data of different types of Amazon EC2 instances and their price history. Our experimental results demonstrate that the algorithms perform well across the metrics of profit, customer satisfaction and instance utilization.

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III. PROBLEM STATEMENT

Cloud Computing provides different types of services, Users can use those services on rental basis. Currently long-term renting scheme is in use due to this scheme there is high wastage of resources and power consumption because though the user wants the service for less time the renting scheme offered is for more time so even after the completion of user's work he still holds the service so there will be high resource wastage and power consumption.

PRICING APPROACH

[2]We have worked on aspects and different types of pricing models such as pay-as-you go model, genetic model for pricing in cloud computing markets etc. Pricing in cloud Service provider provides requested services to the customer. Customer pays to the service provider based on the amount and the quality of the provided service. Pricing process can be of two types: Fixed and Dynamic In Fixed pricing mechanism same amount is charged to the customer all the time. Fixed pricing mechanism include pay-per-use pricing model in which customers are charged based on their usage and consumption of a service. Subscription is another type of fixed pricing, in which the customer pays a fixed amount of money to use the service for longer periods at any convenient time or amount. In dynamic pricing mechanism customer is charged based on real time market conditions and the price of service is market dependent. 'spot pricing' is a dynamic pricing mechanism. Factors such as initial cost, lease period, quality of service, age of resources, maintenance cost which influence pricing in cloud computing are also discussed. In the aspects of pricing models of cloud there are three main parameters: Quality of Service, utilization period, pricing approach. The pricing approach describes the process by which the price is determined.

TYPES OF THE PRICING APPROACH S:

The fixed price regardless of volume: In this fixed price is charged to the customer regardless of product utilization or volume of service.
The Fixed Price plus per-unit: In this fixed price plus a unit rate is charged to the customer.
Assured purchase volume plus per-unit price rate: In this customer pays fixed charge for certain quantity.
Per-unit rate with a ceiling: In this approach customer pays per unit rate up to a certain limit. The service provider will not charge the customer beyond that limit.
Price per-unit approach: In this approach different price per unit is charged to the customer.

QUALITY OF SERVICE (QOS)

Quality of service is the ability to provide different priority to different applications, users, or data flows, or to guarantee a certain level of performance. Quality of service includes on-time delivery of service, providing security and privacy, scalability and integrity. If service provider maintains all these requirements at high level, no. of customers as well as customers loyalty towards service provider will increase.

THE UTILIZATION PERIOD

[6]In the utilization period customer has the right to use the provider services based on service Level Agreements. It could change, based on the subscription period, or a pay-pay-per-use model. Cloud computing is a next generation technology. Cloud computing is on demand service because it provides flexible dynamic resource allocation for guaranteed and reliable services on pay-as-use manner to the customers. IaaS is a very important layer in the cloud computing because all the resource allocation is done through IaaS providers. For achieving user satisfaction and maximizing the profit of cloud service providers an efficient strategy should be required. This paper focuses only on quality of service parameter and service level agreement of services in cloud computing. Pricing model proposed for cloud computing includes the factors , such as the service requirements, application environments workload, the configuration of a multi-server system, SLA, consumer satisfaction, Qos, the penalty of a low-quality service, renting cost, energy consumption cost, and margin of a service provider and profit. Queuing model is used to formulate and solve problem of the optimal multi-server configuration for profit maximization in a cloud computing environment.

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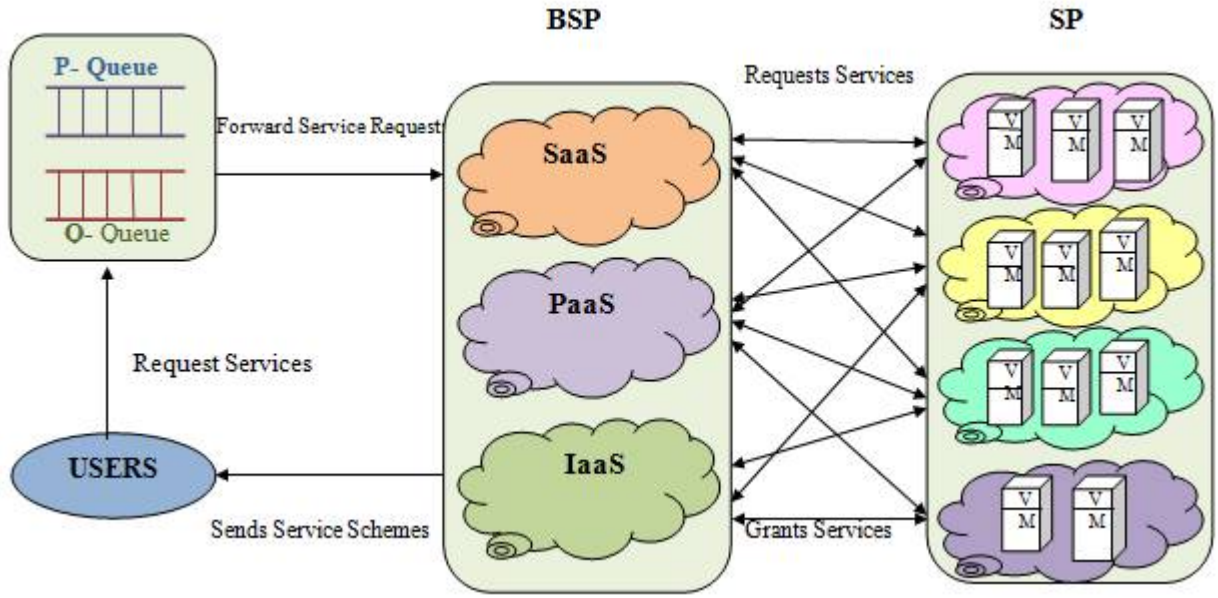
This system provides a new cloud brokering mechanism with cloud service discovery using this optimization technique. This paper mainly focus the IaaS layer of the cloud computing. In this system user submits job to the business service provider and business service provider provides services to the user. Here the user requirement is to obtain services within deadline and within optimum cost. At the same time service providers aim is to increase the income and for that he should give the quality of service to the user by minimizing customers cost, customers waiting time and provider's idle time.

ARCHITECTURE



IV. IMPLEMENTATION OF MODULES

QUEUE

We consider the cloud service platform as a multi-server system with service request queues. The cloud provides resources for jobs in the form of virtual machine (VM). In addition, the users submit their jobs to the cloud in which a job queuing system such as SGE, PBS, or Condor is used. All jobs are scheduled by the job scheduler and assigned to different VMs in a centralized way. Hence, we can consider it as a service request queue. For example, Condor is a specialized workload management system to compute intensive jobs and it provides a job queuing mechanism, scheduling policy, priority scheme, resource monitoring, and resource management. Users submit their jobs to Condor, and Condor places them into a queue, chooses when and where to run those jobs based upon a policy. Here we use First-come-first-serve scheduling among the queues. There are two queues P-queue and Q-queue, requests with priority tag are placed in P-queue and requests with non priority tags are placed in Q-queue.

BUSINESS SERVICE PROVIDER

Business Service providers pay ServiceProvider for renting their physical resources, and charge customers for processing their service requests, which generates cost and revenue, respectively. The profit is generated from the gap between the revenue and the cost. In this module the Business service providers are considered as cloud brokers because they plays an important role in between cloud customers and Services and BSP can establish an indirect connection between cloud customer and infrastructure providers.

SERVICEPROVIDER

In the three-tier structure, The ServiceProvider provides the basic hardware and software facilities. A Business service provider rents resources from Services and prepare a set of service schemes in the form of virtual machine (VM).

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USERS

User requests business service provider for service schemes when BSP sends schemes, user selects the service scheme that matches best for the user.

ALGORITHM

Multi-server system with 'm' P-servers and 'n' Q-servers are waiting for the events

Step 1: Event: A service request arrives
Step 2: Check for priority tag
Step 3: if (true)
Step 4: Then place in P-queue
Step 5: End if
Step 6: Else
Step 7: Place in Q- queue
Step 8: Search for a available server
Step 9: if (true)
Step 10: check for P-server or Q-server
Step 11: if (P-server)
Step 12: Assign the first request in P-queue to the server
Step 13: Else
Step 14: Assign the first request in Q-queue to the server
Step 15: End if
Step 16: End if
Step 17: Else
Step-18: Put the request at the end of the queue
Step 19: End event
Step 20: Event: A server becomes idle
Step 21: If (queues are not empty)
Step 22: Check for P-server or Q-server
Step 23: Else if (P-server)
Step 24: Assign first request in P-queue to server
Step 25: Else if (Q-server)
Step 26: Assign first request in Q-queue to server
Step 27: Else
Step 28: Wait for new request
Step 29: End event
Step 30: Event: The deadline of a request is arrived
Step 31: Rent a temporary server to service the request and release the temporary server when the service is completed
Step 32: End event

A FEW MAJOR GOALS OF LOAD BALANCING ALGORITHMS

1. **Cost effectiveness:** primary aim is to achieve an overall improvement in system performance at a reasonable cost.
2. **Scalability and flexibility:** the distributed system in which the algorithm is implemented may change in size or topology. So the algorithm must be scalable and flexible enough to allow such changes to be handled easily.
3. **Priority:** prioritization of the resources or jobs need to be done on beforehand through the algorithm itself for better service to the important or high prioritized jobs in spite of equal service provision for all the jobs regardless of their origin.

V. PARAMETERS FOR PROFIT MAXIMIZATION

PROFIT MAXIMIZATION

Profit maximization is the one of the important concept which need to be considered when we deal with cloud. Here we are going to maximize the profit of cloud service provider. There are number of ways to maximize the profit of cloud service providers as assigning high pay per use facility is one of them but we are going to concentrate on space which

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are requested by customers to the cloud service providers. For example, consider if there is one cloud service provider he has 10GB of space and at the same time that space is requested by ten customers 1GB each . At this condition he is not able to take request of eleventh customer now we are going to overcome this condition we calculate the space of all ten customers which are used as well as remaining space and according to the remaining space we can assign space to eleventh customer for this space calculation we are going to use fuzzy logic concept. In this way we are maximizing the profit of cloud service provider by allocation and calculation of space at run time.

QUALITY OF SERVICE

Now-a-days cloud computing is growing as well as new technology which is used frequently by many of you. So there are number of cloud service providers who provide services in cloud but customers focus on quality of service and according to that they are going to use same service. In our project we concentrate on three main parameters of quality of service as

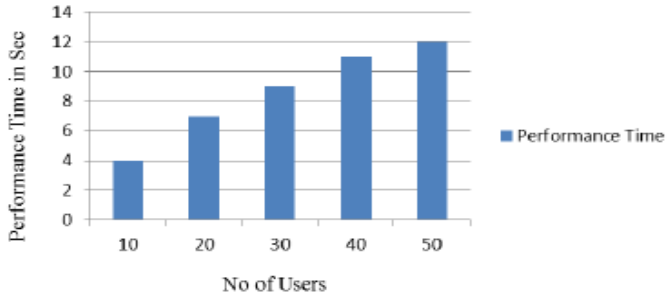
1. Availability: As we describe in the previous example, in profit maximization when a eleventh user is came for space requirement we are going to avail him the space by calculating the space on runtime. In this way availability parameter of the quality of service is covered.

2. Performance: we are going to provide service to clients at runtime with minimum resources and when there are more requests of clients at that time they need not to wait in queue for long time.

3. Security: It is most important to maintain data safety in cloud computing the data safety can be ensured by using high level of encryption. For this we use AES encryption algorithm for a secure and reliable transmission media.

VI. RESULTS AND DISCUSSIONS

To show the effectiveness of the proposed system some experiments are conducted on machine using Apache tomcat as the server and Net Beans as IDE. To measure the performance of the system we set the bench mark on different number of users in the web application in cloud for data storage service system. And then we allow the number of users to seek the service of the CSP for availability of the storage space on uploading the storage data to the cloud environment. To evaluate the performance of the system WAPT 8.0 web load testing tool is used. And then experiment is plotted in the below figure.



The above plot expresses result of data storage service of CSP at cloud end with the measuring parameter as time which is not directly proportional to number of users. So this indicates that the system over performs the optimization of storage facility at cloud in matter of time.

VII. CONCLUSION AND FUTUREWORK

To maximize the profit of service providers, this paper has proposed a Double Quality-Guaranteed renting scheme with priority tags. This scheme merges short-term renting, long-term renting and short, long-term renting with priority tags which can reduce the resource wastage greatly and prepare to the dynamical demand of computing capacity. A queuing model is build for our multi server system with fluctuating system size. And then, an optimal configuration problem of profit maximization is formulated in which many circumstances are taken into considerations, such as the market demand, the workload of requests, the server-level agreement, the rental price of servers, the price of energy

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consumption, and so forth. The optimal solutions are solved for two different conditions, which are the ideal optimal explanations and the actual optimal solutions. In addition, a series of calculations are supervised to compare the profit obtained by the Double quality guaranteed renting scheme with priority tags with the single Quality-Unguaranteed renting scheme. The results presents that our scheme outperforms the SQU scheme in terms of both of service quality and profit.

In this paper, we only consider the profit maximization problem in a homogeneous cloud environment, because the analysis of a heterogeneous environment is much more complicated than that of a homogenous environment. However, we will extend our study to a heterogeneous environment in the future.

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