A PROFIT MAXIMIZATION FOR CLOUD USERS USING DOUBLE QUALITY GUARANTEED SCHEME

Ms.Vidya D. Jadhav[1], Dr. Gayati M. Bhandari[2]

[1] *Ms.Vidya D. Jadhav, P.G.Student, Department of Computer Engineering,JSPM'S BSIOTR,Pune,Maharashtra,India.*
[2] *Dr. Gayatri M. Bhandari,HOD & Assistant Professor, Department of Computer Engineering,JSPM'S BSIOTR,Pune,Maharashtra,India.*

ABSTRACT

Today's world cloud computing becoming so popular because of an effective and efficient way to provide computing resources and services to customers on demand. A cloud service providers view point profit is one of the most important considerations and it is mainly determined by the configuration of a cloud service platform under given market demand. But traditional single resource renting scheme cannot guarantee the quality of all requests and also wastes a large amount of resources. To overcome that weakness use Double-Quality-Guaranteed (DQG) resource renting scheme this combines long-term renting with short-term renting. An M/M/m+D queuing model and the performance indicators plays important role for profit maximization. For security purpose we are using attribute based encryption scheme. The result shows guaranteed the service quality of all requests, security also obtain more profit.

Keyword : - *Cloud computing, queuing model, SLA (service-level agreement), multiserver system, profit maximization, waiting time, guaranteed service quality.*

---

1. INTRODUCTION

Now a days cloud computing is rapidly becoming an effective and efficient way of computing resources and computing services. Cloud provides dynamic resource pools, virtualization, and high availability. In the sys-tem every client needs to register initially to get access into the mechanism. Once logged in they can have the functionalities like File distribution request to server and Access re-quest status. BSP (Business Service Provider) can access customer request which may be in distributed and provide approval based on the query, storage capacity and provide job scheduling for customer request on infrastructure storage area. Business Service Provider can assign the Infrastructure to the client which is based on the available renting space and Infrastructure Service Provider can review the request sent from the customer through BSP. Once the request reviewing process completed then it can be approved to provide renting space on Infrastructure cloud.

The cloud systems primarily focus on finding an effective resolution for the resource management. It is web based mostly computing wherever virtual shared servers provide infrastructure, platform, software, devices and other resources and hosting to customers on a pay-as-you-use basis.

In business ideas the profit is that the main issue to be exist within the field of the specific environment. Obviously, the requirement of profit maximization in cloud computing environment is needed. Today's the sixty billion servers are working in this world. Therefore the server required a large amount of power. Normally between the user and server has some agreement i.e., service level agreement. In this service level agreement, defined the Quality of service need to provide for the user and the maximum needed execution time. If the service provider violates this service-level agreement no charge is provided for the specific service. So there will be the loss of the profit. Here valuation of the optimal speed and size of the input the SLA is provided and here a pricing model is developed

consistent with optimal size and speed and service charge is calculated. Therefore the service supplier or provider can maximize the profit.

Problem Definition:
Generally, Service providers want to set a higher price to get a higher profit margin; but doing this would decrease the customer satisfaction. Hence, selecting a reasonable pricing strategy is more important for service providers. Profit maximization is defined to find an optimal combination of the server size and the queue capacity such that the profit is increased. We use an M/M/m queuing model, Double-quality-guaranteed renting scheme, respectively for optimal multiserver configuration, service quality of all requests and reduce the resource wastage.

1.1 Scope and objective

Scope :
In this paper, we have to solely take into account the profit maximization downside in a very homogeneous cloud atmosphere, as a result of the analysis of a heterogeneous atmosphere is far additional difficult than that of the same atmosphere. However, it is aimed to ex-tend our study to a heterogeneous atmosphere within the future.

Objective :
1) To reduce the resource wastage within the on demand resource allocation policy in the cloud.
2) To improve the quality of service with in-creased profit.
3) To avoid potential competition.
4) Maintain customers goodwill.
5) Avoid risk.

2. EXISTING SYSTEM

In Many existing research they only consider the power consumption cost. The resource rental cost is affects the profit of service providers. The traditional single-quality-unguaranteed (SQU) or single resource renting scheme cannot guarantee the quality of all requests but wastes a great amount of resources due to the uncertainty of system workload.

Disadvantages :
- The waiting time of the service request is too long
- Sharp increase of the renting cost or the electricity cost such increased cost may counterweight the gain from penalty reduction. So, the single renting scheme is not a good scheme for service providers.

3. PROPOSED SYSTEM

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. The DQG (double-quality-guaranteed) renting scheme can achieve more profit than the compared SQU (single-quality unguaranteed) renting scheme in the premise of guaranteeing the service quality completely. A multiserver system adopted is modelled as an M/M/m+D queuing model and the performance indicators are analyzed such as the average service charge, the ratio of requests that need temporary servers etc. For security purpose we are using attribute based encryption scheme i.e. security is provided to each content.

Advantages :
- The waiting time of the service request is too short
- Providing unique key of each file due to cloud provides security to database.

3. LITERATURE SURVEY

1) Profit Optimization in SLA-Aware Cloud Services with a Finite Capacity Queuing Model.
Authors:- Yi-Ju Chiang and Yen Chieh Ouyang In this paper, a cloud server farm provided with finite capacity is modelled as an M/M/R/K queuing system[2]. Revenue losses because of system control and impatient customer behaviors. The major three important issues are solved. First, a trade off between meeting system performances and reducing operating costs is conducted. Second, the effects of system capacity control and utilization on various performances of waiting time, loss probability, and final arrival rate are demonstrated. Finally, the proposed optimal profit control policy allows a cloud provider to make the optimal decision in the number of servers and system

capacity so enhance profit and satisfy the SLAs.

2) Cost Aware Cloud Service Request cloud Scheduling for SaaS Providers.
Authors:- Zhipiao Liu, Shangguang Wang, Qibo Sun, Hua Zou and Fangchun Yang.
This paper, SaaS providers are concerned[3], how to process the dynamic user service requests more cost-effectively without any SLA violation is an intractable problem. To deal with this challenge, establish a cloud service request model with service level agreement constraints, and then present a cost aware service request scheduling approach based on genetic algorithm.

3) InterCloud : Utility-Oriented Federation of Cloud Computing Environments for Scaling of Application Services.
Authors:- Rajkumar Buyya , Rajiv Ranjan, R.N. Calheiros.
This paper presents vision, challenges, and architectural elements of InterCloud for utility-oriented federation of Cloud computing environments. This InterCloud environment supports scaling of applications across multiple vendor clouds[4]. The resulting framework facilitates the federated management of system components and protects customers with guaranteed quality of services in large, federated and highly dynamic environments. Also provides enhanced degrees of scalability, flexibility, and simplicity for management.

4)Performance Analysis of Cloud Computing Centers Using M/G/m/m+r Queuing Systems.
Authors:- Hamzeh Khazaei, Jelena Misic, and V.B. Misic.
Performance evaluation of server farms is an important aspect of cloud computing which is of crucial interest for both cloud providers and cloud customers[5]. In this paper, authors proposed an analytical technique based on an approximate Markov chain model for performance evaluation of a cloud computing center. General service time for requests as well as large number of servers which makes model flexible in terms of scalability and diversity of service time.

5) 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.
In this paper investigated the service provisioning problem at business service level in the cloud. A utility model is developed for measuring customer satisfaction using utility theory leveraged from economics. Based on the utility model, authors gave a new type of SLAs between a business service provider and its customers [8]. This paper has two scheduling algorithms for a service provider to make tradeoffs between its profit and customer satisfaction. By using flexible satisfaction targets, algorithms enable service providers to dynamically optimize their profit according to workload changes and resource price fluctuations.

4. METHODOLOGY

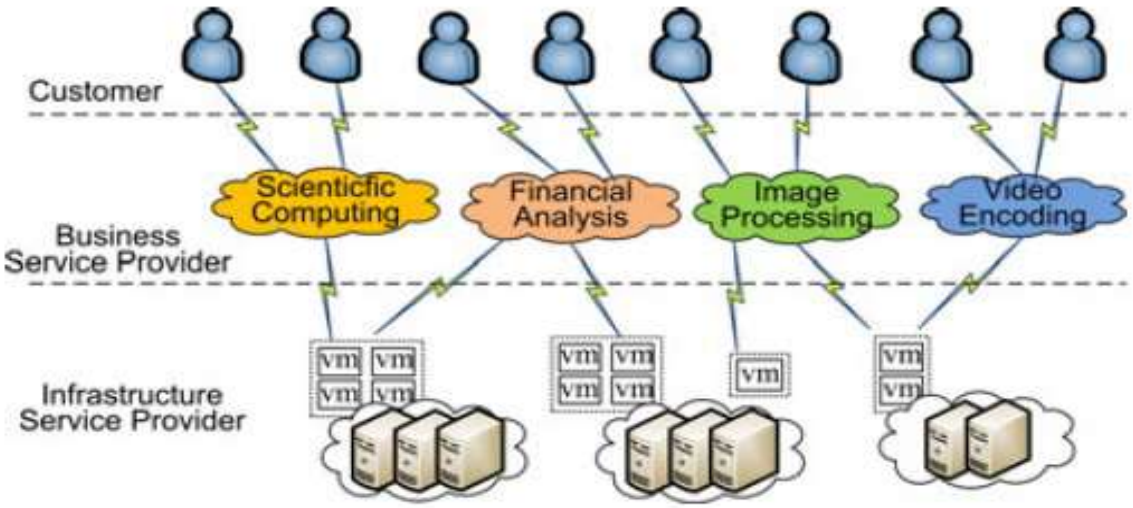

Fig1. The three-tier cloud structure

Implementation of Modules :-
- Cloud customer module
- Business Service Module
- Infrastructure Service Provider Module
- Cloud computing.
- Queuing mode

Cloud customer Module :
A customer requires services so they submit request to service provider and service provider delivers services according to its demand. The customer receives desired result from the service provider along with amount of the service, the service quality and service level agreement(SLA).

Business Service Providers Module :
Service provider pay infrastructure provider for dealing their physical resources is revenue, and business service provider take charges from customers for process of their service request is cost. The gap between revenue and cost is become a profit. During this module the service suppliers thought of as cloud brokers as a result of theyre going to play an important role in between cloud customers and infrastructure suppliers, and he can establish associate degree indirect affiliation between cloud end user and infrastructure suppliers.

Infrastructure Service Provider Module :
In Fig1.three-tier cloud structure, associate degree infrastructure provider the fundamental hardware and software facilities. A business service provider pay rents for resources to infrastructure providers and prepares a group of services in the form of virtual machine (VM). Infrastructure provider gives two ways resource renting schemes that is short-term renting and long-term renting. Generally, the renting of long-term is cheaper than short-term renting.

Queuing model : A customer send requests that is incoming service requests can not immediately processed after they arrived, firstly request placed in the queue then it handled by available server. Queuing model follows first-come-first-serves (FCFS) technique.

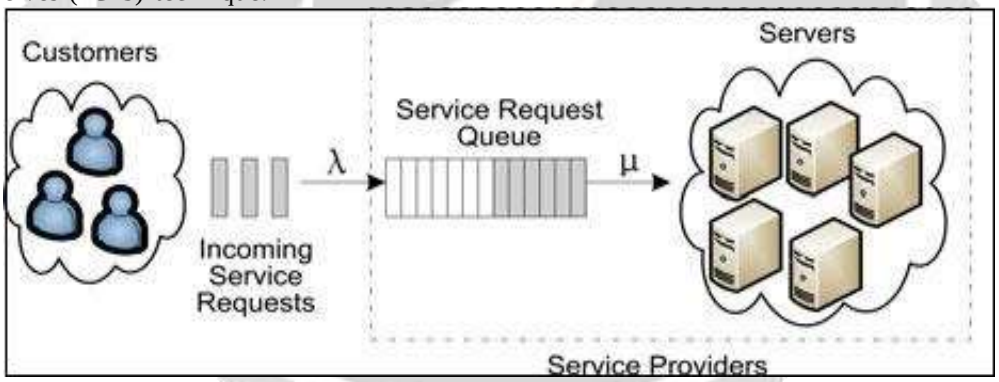

Fig2. The multiserver system model, where service requests are first placed in a queue before they are processed by any servers.

In Fig2 multiserver system consists of long term rented servers and short-term servers. The short term server is modeled as an M/M/m queuing system.

Cloud computing : Cloud computing is Internet-based computing. The user will merely use storage, computing power, or specially crafted development environments, while not having to stress however these work internally. The mode computing at intervals that IT-related capabilities are provided as a service, permitting users to access technology enabled services from the web (in the cloud) without information of, or management over the technologies behind these servers.

5. SYSTEM ARCHITECTURE

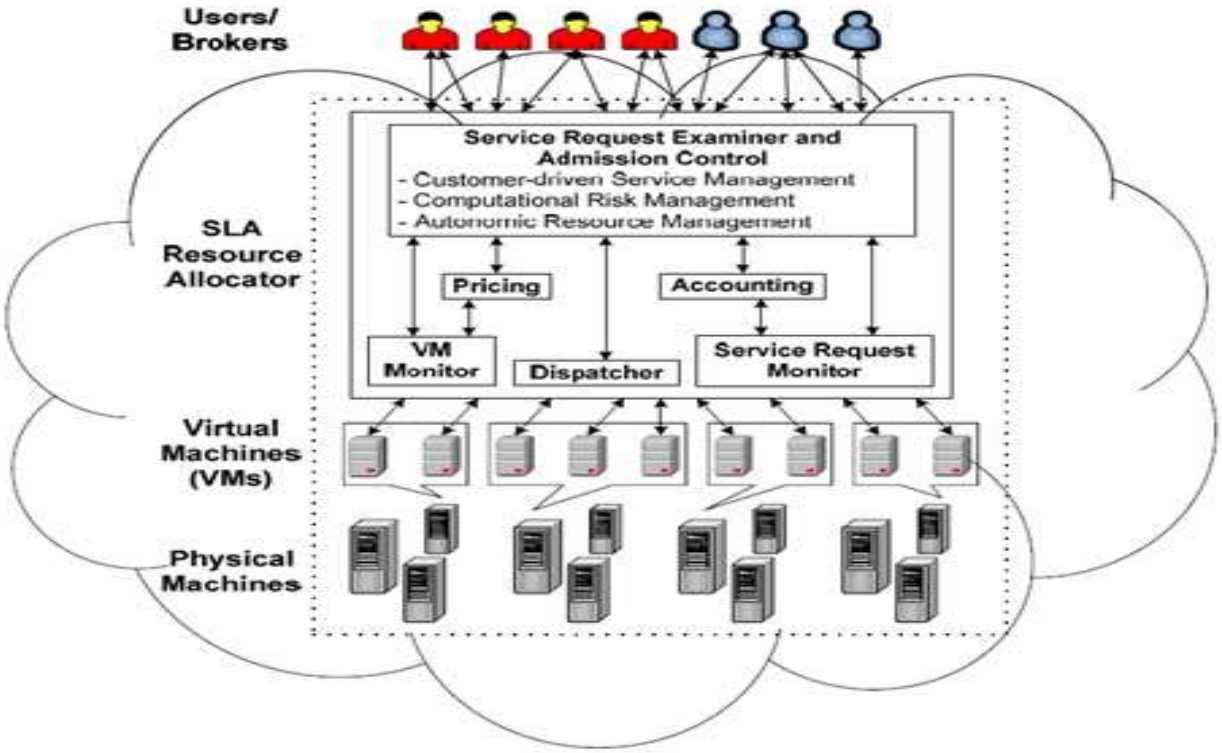

Fig3. System architecture

The above Fig 3 shows the high-level architecture for supporting market-oriented resource allocation in Data Centers and Clouds. There are basically four main entities involved.

Users/Brokers : Users or brokers only submit service requests from anywhere in the world to the info Center and Cloud processed it.

SLA Resource Authority: The Service-Level- Agreement Resource Allocator acts because the interface between the info Center or Cloud service provider and external Users/brokers. It needs the interaction of the subsequent mechanisms to support SLA-oriented resource management.

Service Request Examiner And Admission control : Once a service request is submitted, then the Service Request Examiner and Admission management mechanism interprets the submitted request for QoS necessities before crucial whether or not to simply accept or reject the request. Thus, it ensures that there's no overloading of resources whereby several service requests can't be consummated with success attributable to restricted resources offered. It additionally desires the most recent standing info concerning resource convenience (from the VM Monitor mechanism) and work process (from the Service Request Monitor mechanism) so as to form resource allocation choices effectively. Then, it assigns requests to VMs and determines resource entitlements for allotted VMs.

Virtual Machine : Multiple virtual machines may be started and stopped on demand, physical machine to fulfil accepted service requests, thus providing most flexibility to tack varied partitions of resources on identical physical machine to completely different specific necessities of service requests. Additionally, multiple VMs will at the same time run applications supported completely different operating systems environments on one physical machine since each VM is totally isolated from each other on identical physical machine.

6. ALGORITHM

Double Quality Guaranteed Scheme

Step 1: A multiserver system is running with m servers and waiting for events.
Step 2: queue Q is initialized as empty.

Step 3: Event-when service request arrives and server is available then assign service request to that server.
Step 4: if server is not available then put service request at end of the queue Q and record its waiting time.
Step 5: Event-when server becomes idle and queue is empty then waiting for new service request.
Step 6: if queue is not empty then take first service request and assign to that idle server.
Step 7: Event - deadline of a request is achieved then rent a temporary server to execute the request and release that server when request is completed.

6.1 Mathematical Module

S = (I, F, O, C)
S = System
I = Set of inputs = user requests, package
O = Generated output = Plan granted
F = Set of functions
F1 = Cloud User login, registration, upload file, view policy terms, choose package, cost.
F2 = BSP login, view user requests and accept them, publish infrastructure services and view graph modulations.
F3 = ISP login, provide infrastructure services, view broker requests, maintain users.

Venn Diagram

ISP: Infrastructure service provider
BSP: Business service provider

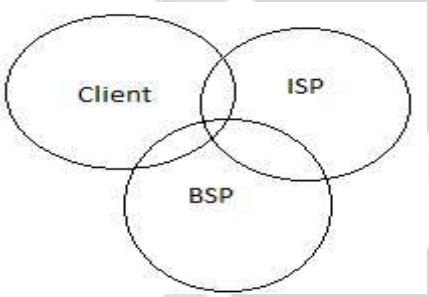

Fig4. simple view of system

7. EXPECTED RESULT

Below fig5. shows performance measurement according to File size, Download speeds in KB/s and download time.

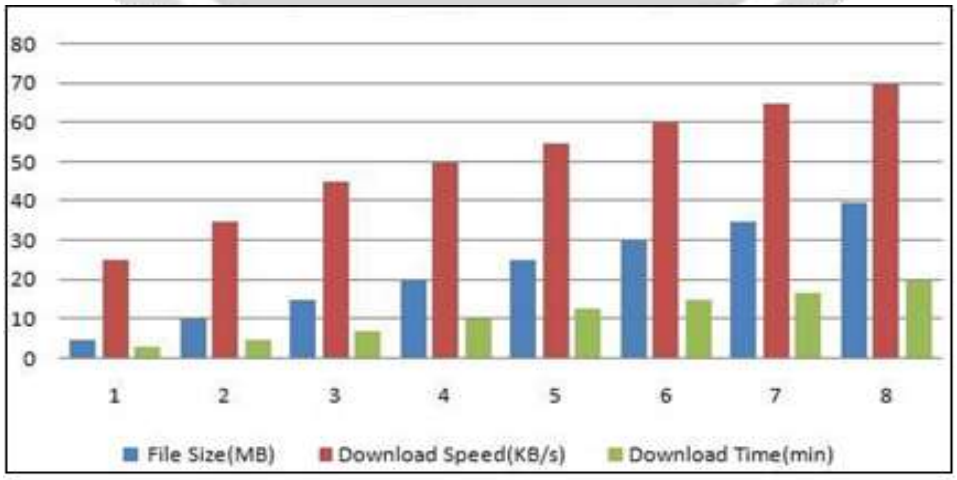

Fig5. Performance measures

As we are using the Double-Quality-Guaranteed (DQG) renting scheme,

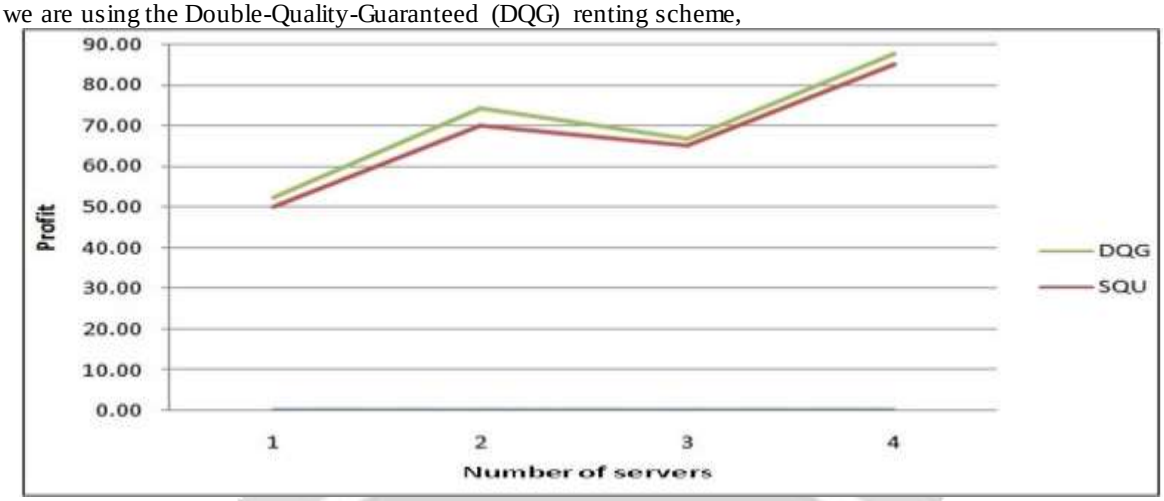

Fig6. Comparison between DQG and SQU scheme we can achieve more profit than the existing.

Single-Quality-Unguaranteed (SQU) renting scheme on the basis of guaranteeing the service quality completely. The main computing capacity is provided by the long-term rented servers due to their low price so as to minimize the price. Above Fig6. depicts that the optimal profit obtained using DQG renting scheme is always greater than that using the SQU renting scheme in terms of both of quality of service.

8. CONCLUSION

A optimal configuration problem of profit maximization is formulated in which many factors are taken into considerations, such as the market demand, the rental cost of servers, the cost of energy consumption, the workload of requests, the server-level agreement etc. A pricing model is developed for cloud computing which takes many factors, such as Double-Quality-Guaranteed renting scheme for service providers. A short-term renting with long-term renting combines in this scheme, which can reduce the resource wastage. An M/M/m+D queuing model is build for multiserver system with varying system size. Cloud provides the security to database by using unique key. A series of comparisons of DQG and SQU the Double-Quality-Guaranteed renting scheme achieve more profit than single quality- unguaranteed renting scheme.

9. ACKNOWLEDGMENT

I take this special opportunity to express my sincere gratitude towards professor and all the people who supported me during my entire project work. I would like to express my gratitude to my guide and also the HOD Dr. G. M. Bhandari for providing special guidance. I would also like to thank our project coordinator Dr. Archana Lomte who always has enough time to solve students' problems at any time. Finally thanks to all teachers who are always supportive at us.

10. REFERENCES

[1] Jing Mei, Kenli Li, Aijia Ouyang, Keqin Li, A Profit Maxi-mization Scheme with Guaranteed Quality of Service in Cloud Computing,IEEE Transactions On Computers, Vol. 64,2015.

[2] Y. J. Chiang and Y.C. Ouyang, Profit optimization in SLA-aware cloud services with a finite capacity queuing model,Math. Probl. Eng., vol. 2014, pp. 111, 2014.

[3] Z.Liu, S. Wang, Q. Sun, H. Zou, and F. Yang Cost-aware cloud service request scheduling for SaaS providers,Comput. J., vol. 57, pp. 291301, 2013

[4] R. Buyya, R. Ranjan, and R. N. Calheiros Intercloud:Utilityoriented federation of cloud computing environments for scaling of application services, in Algorithms and Architectures for Parallel Processing,. New York, NY, USA: Springer,pp. 1331,2010.

[5] H. Khazaei, J.Misic, and V. B.Misic Performance analysis of cloud computing centers using M/G/m/m+ r

queuing sys-tems,IEEE Trans. Parallel Distrib. Syst., vol. 23, no. 5, pp. 936943,May 2012.
[6] J. Cao, K. Hwang, K. Li, and A. Y. ZomayaOptimal multi-server configuration for profit maximization in cloud comput-ing,IEEE Trans. Parallel Distrib. Syst., vol. 24, no. 6, pp. 10871096, Jun. 2013.
[7] R. Buyya, C. S. Yeo, S. Venugopal, J. Broberg, and I. Brandic Cloud computing and emerging it platforms: Vision, hype, and reality for delivering computing as the 5th utility,Future Gener. Comput. Sy., vol. 25, no. 6, pp.599616, 2009.
[8] J. Chen, C. Wang, B. B. Zhou, L. Sun, Y. C. Lee, and A. Y. Zomaya Tradeoffs between profit and customer satisfaction for service provisioning in the cloud,in Proc. 20th Int. Symp. High Perform. Distrib. Comput.,pp.229238,2011.
[9] B. Yang, F. Tan, Y.-S. Dai, and S. Guoou, L. Sun, Y. C. Lee, and A. Y. Zomaya, Performance evaluation of cloud service considering fault recovery,in Proc. 1st Int. Conf. Cloud Comput.,pp. 571576,2009.
[10] M. Mazzucco and D. DyachukOptimizing cloud providers revenues via energy efficient server allocation,Sustainable Com-put.:Inf. Syst., vol. 2, no. 1, pp. 112, 2012.

BIOGRAPHIES

Ms.Vidya D. Jadhav pursuing M.E.degree in computer Engineering from JSPM'S BSIOTR, Savitribai phule pune university. Received B.E. degree in Information Technology from JSPMs BSIOTR (W), Savitribai phule pune university in 2014. Diploma in Information Technology from JSP, Pune university, pune,India. Area of interest is Cloud Computing and Networking.

Dr. Gayatri M. Bhandari received Ph.D degree in computer Engineering from Jjtu Rajasthan, Jjtu University Rajasthan. Received M.Tech degree in computer Engineering from COEP, Pune University. Received B.E (computer) degree From D. Y. Patil Coe pimpri, Savitribai Phule Pune university. Current working as HOD and Asst. Professor at Department Of Computer Engineering in JSPMS, BSIOTR, Pune, India. Area Of Interest is Cloud Computing, Networking, Image and Sound Processing.