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An Efficient Pricing Strategy Based on Utilization of the User in GPUACC (GPU-Accelerated Cloud Computing)

S.Siva Thirdha, K.V.V.Satyanarayana, Tabassum.SK, G.Hima Vamsi

Abstract: ***A Graphics Processing Unit (GPU) is a specific electronic circuit proposed to rapidly control and alter memory to quicken the formation of images. GPUs are used as a part of cell phones, PCs, workstations. With upgraded efficiency, the GPU plays crucial part in visual and sound preparing applications, for example, GPU quickened video encoding and image handling. In the meantime, GPU installed cloud suppliers started to give GPU-quickened distributed computing administrations. Hence, as the GPU gadgets bring high cost and vitality utilization, conveying GPU quickened visual and sound handling administrations is a versatile and adaptable arrangement. Due to high upkeep cost and diverse speedups for different applications, GPU-quickened services still need an alternate pricing strategy. Accordingly, here, we propose an ideal GPU-quickened mixed media preparing administration pricing system for increasing the benefits of both cloud suppliers and users. As the distributed computing is an essential business display, the evaluating technique is an imperative issue for both foundations and organizations. The evaluating technique of business cloud administrations is typically considered as delicate insight. With various rebate and differing costs, the last cost isn't totally predictable with the underlying open costs. So here we talk about the mixed media preparing pricing technique in GPU-accelerated cloud computing and investigate the outcomes from the examinations.***

Index Terms: GPU-quickened, Pricing system, Mixed media, Cloud administrations.

I. INTRODUCTION

Cloud Computing alludes to the computations like maintain the hardware and software resources remotely. It has evolved through the grid computing, utility computing, virtualization and service oriented architecture. But the basis for all these computing is distributed computing, where components in networked computers transfer information by passing messages. The main benefits of using cloud computing are: Less hardware and maintenance cost, Availability around the globe, and Flexibility with highly automated process.

These days, with its high performance and efficiency, Graphics Processing Unit (GPU) plays a vital role in visual and sound preparing applications, for example, GPU quickened video encoding and image forming. GPU gadgets will have their effective part in virtual machines related to GPU quickened distributed computing framework.GPU design has been changing in several ways in contrast to CPUs and other different gadgets. GPU technology is more likely to be present in virtual gadgets. GPUs also involve in speeding the transfer of information from service providers with various applications. GPUs help in analyzing the evaluating technique with initial and final costs with respect to cloud suppliers. In this paper, initially we analyse how cloud service provider provides various multimedia based services in GPU-accelerated cloud computing and then state the various issues in pricing strategy that users come across with. Performance of various existing pricing methods is taken into consideration and we also compare our pricing strategy with other pricing methods and then show that our strategy is much better than existing ones. With this, application of profit function to both cloud provider and user is obtained through an optimal strategy. The main aim of this project is to improve the pricing system for various resources in cloud and to acquire an optimal function for the proposed method. Through this we can achieve the goal of increasing the benefits of both cloud suppliers and users.

II. LITERATURE SURVEY

Lin Shi et al. [2] Discussed about vCUDA, which is a general-purpose graphics processing unit (GPGPU) as computational solution for virtual machines (VMs). It provides high hardware acceleration for applications in VMs, which in turn benefits the performance of HPC applications. This paper mainly focused about API design and a RPC system for virtual machines. With this enhanced API design interception and redirection, Compute Unified Device Architecture (CUDA) services in virtual machines will be able to get authorization for a graphics hardware system and can achieve high performance computing performance in a most meaningful way.

The issue of prices in the cloud in terms of relationship between providers and customers is treated by many authors, which have evaluated different strategies and pricing techniques in practical way and examined through different software.

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*Correspondence Author(s)
S.Siva Thirdha, CSE, Koneru Lakshmaiah Education Foundation, Guntur, India.
K.V.V.Satyanarayana, CSE, Koneru Lakshmaiah Education Foundation, Guntur,India.
Tabassum.SK, CSE, Koneru Lakshmaiah Education Foundation, Guntur, India.
G.Hima Vamsi, CSE, Koneru Lakshmaiah Education Foundation, Guntur, India.

C. S. Yeo et al. [3] Analyzed the advantages and limitations of imposing fixed prices when compared to dynamic prices. But fixed prices may not be feasible to all the users because all the users may not have same needs. This paper focused on importance of autonomic pricing mechanism which adjusts the pricing system automatically considering the both application usage and service demand of users. They mentioned about the variable pricing mechanism taking place during the user reservation .With their proposal they proved that autonomic pricing mechanism can earn more profits when compared to other existing pricing techniques.

M. Hadji et al. [4] proposed an optimal pricing strategy which depends upon requirements of cloud providers and user demands. As per the user requests and the updated optimal new price requests, the design grants the variable prices for the user and cloud provider. The strategy of finding the game equilibrium lies within the Stackelberg game theoretical model. However, this pricing strategy is not suitable for multimedia applications because it mainly dealt with Infrastructure as a service environment.

B. Sharma et al. [5] suggested a novel financial economic model which is efficient in providing a high Quality of Service based applications to customers. This paper focused on business level pricing mechanism with various assets. In this model the cloud provider charges the user with optimal cost in order to recover the initial cost that is setup by them. Certain parameters like impact of initial investment, viable period, quality of service, effect of resource price and duration have been analyzed by them. However, this pricing strategy only considers about homogeneous services and resources. In this paper, we focus about on demand pricing strategy based on the user need.

III. THEORETICAL ANALYSIS

A. Existing System:

Existing system proposed an optimal GPU-accelerated multimedia processing services pricing strategy. Here it tells about how costs are varying when users and cloud suppliers uses GPU-accelerated multimedia based services and analyses the profit function benefits for both cloud provider and users. This system dealt with a game-theory based method which initially defines that, the cloud provider fixes the prices of processing method and general services for individual user. And in the next stage, user finds out the game equilibrium by examining the number of tasks performed by him in GPU. Here the drawbacks are: speedup ratios between applications are dissimilar, so it needs an on-demand pricing strategy with different workloads. GPU-accelerated services need a new pricing strategy instead of existing strategies which only consider homogeneous resources such as processors, memories and storage space in the cloud based environment.

B. Proposed System:

On demand pricing strategy is proposed that deals with heterogeneous resource requirement of users with different applications. The key challenge here is making separate evaluating proposition with different pricing strategies according to the utilization of various users in cloud. The aim of this system is to expand the user utilization under certain limitations with increasing the revenue for cloud providers. As the fixed costs are not feasible for various clients with different needs, we proposed a new pricing strategy where user gets a chance to pay the optimal price when he takes the reservation of particular service. This derives an optimal pricing strategy which is very feasible for the user so that he can access the services with dynamically varying price.

The Block Diagram below gives the information about how user and service provider communicates with cloud server with GPU and particular pricing strategy, where the new price calculation takes place and then the updated price is sent back to the user.

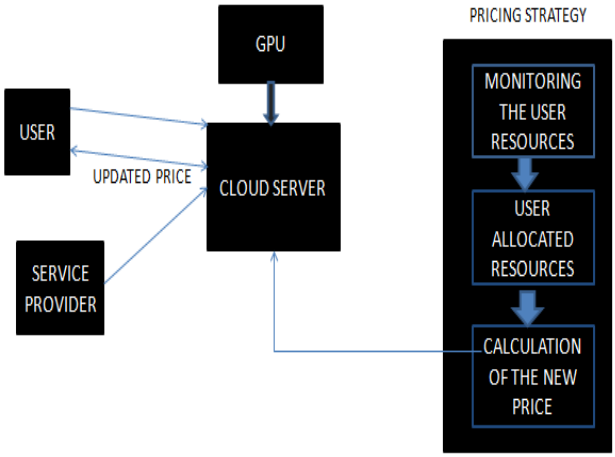

Fig 1: Block Diagram

C. Cloud Computing Pricing Model:

1) **Fixed Pricing:**
In this pricing model each service provider decides the static price for various resources available in cloud. This could be unaffordable by some users, hence leading to decrease in revenue, customer number and profits. Fixed pricing also involves receiving of payments from users in function of time on a particular service.

2) **Dynamic Pricing:**
Any customer will choose a particular service provider based upon three parameters: usage duration, Quality of Service and pricing method. In Dynamic Pricing model, providers can set flexible prices based on current user requests for various services. As the number of cloud users varies from time to time and the demands of users also vary, a dynamic pricing model to manage the revenue is more efficient than the static pricing model.

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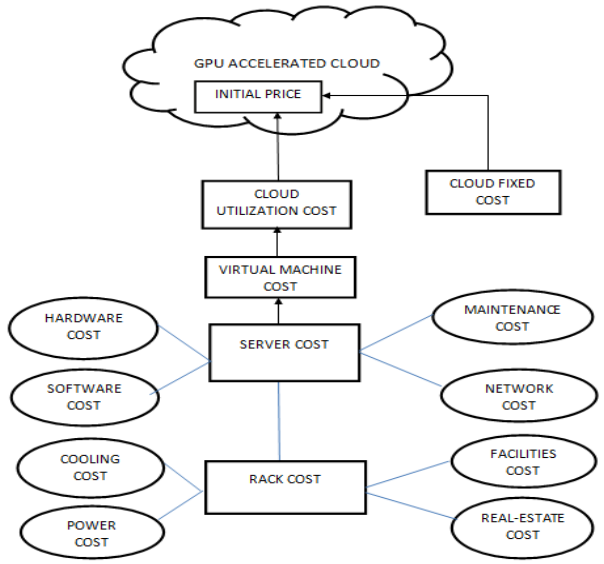

Fig 2: Cloud Computing Pricing Model

D. System Architecture:

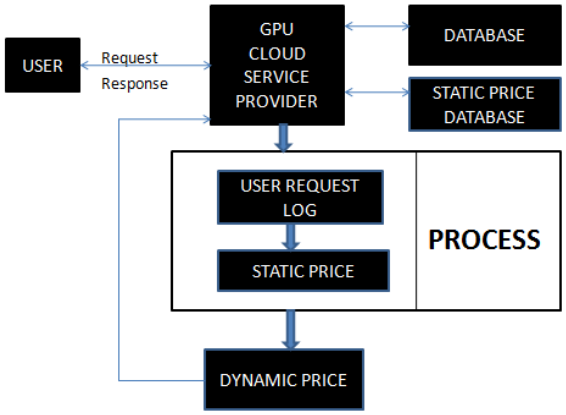

Fig 3: System Architecture

IV. IMPLEMENTATION AND RESULTS

A web application was designed by us, where users can activate certain packs and get access to various movies and here we show how prices are varying dynamically according to the user utilization.

A. Results Screenshots:

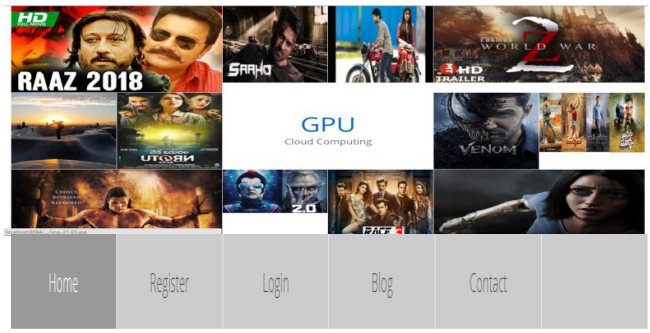

Fig 4: Home Page

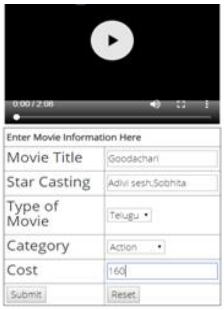

Fig 5: Cloud Provider Uploading movies and other details

Fig 6: User activates a pack

When user wants to watch movies in other packs, he will be offered with optimal price based on his search count for that movie.

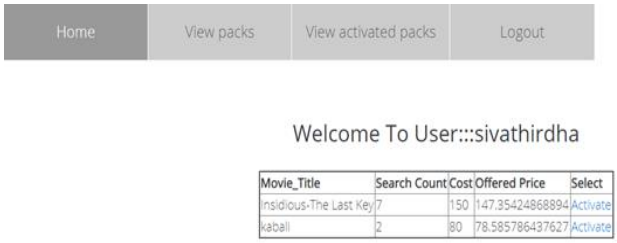

Fig 7: Offered Optimal Price

B. Explanation of Results:

In the initial stage cloud provider gets access by giving his login credentials. After doing so, he will upload movies with all the details like title of the movie, category, cost etc. When user registers, he gets access to activate packs like silver, gold and super based upon his interest and the price mentioned either monthly or annually. Once the user activates any pack, he gets to watch all the movies under that particular pack. But if user wants to watch a movie that is in another pack, there arises a problem with fixed price. So here we proposed an optimal pricing technique where cloud manager sets an equation to automatically optimize the cost based on number of times the user searches the movie. The optimal price is calculated as "cost-sqrt(count(movie_title))". After that the offered optimal price is shown to the user where he can activate that particular movie.

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So it is a benefit for both cloud provider and user by using an efficient pricing strategy like on demand pricing strategy which mainly depends upon user utilization.

V. CONCLUSION AND FUTURE SCOPE

In this paper, we proposed an optimal pricing strategy for visual and sound handling administrations in GPU-accelerated Cloud Computing. We designed a different evaluating technique which is on demand pricing strategy, to increase the profits of both the cloud providers and users where the final cost isn't fixed and it offers users an optimal price. In addition to that we also showed that our pricing system uses a different equation for calculating the new price. This evaluating technique offers users with varying costs regardless of static costs that are fixed by cloud providers depending upon the user requirement. From the examined results, the proposed pricing system brings more profit to the cloud provider compared to the other exiting techniques.

In future, we will intend to structure and implement a cloud framework to support multimedia processing services with GPU-acceleration. More detailed examinations with real time applications and service demands of users will be collected from various cloud providers in the future. In addition to that we need to understand when users are switching between service providers and also check the response of users to new pricing strategy. In order to test the efficiency of GPU-accelerated cloud computing, a detailed survey is to be conducted.

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AUTHORS PROFILE

S.Siva Thirdha, is a student in the Department of Computer Science and Engineering at Koneru Lakshmaiah Education Foundation, Guntur, Andhra Pradesh, India. She is doing her research work in Cloud Computing

K.V.V.Satyanarayana, is a Professor in the Department of Computer Science and Engineering at Koneru Lakshmaiah Education Foundation, since 2012. He received his Ph.D in Computer Science and Engineering from Acharya Nagarjuna University and M.Tech(CSE) from JNTUK. His research areas include Bioinformatics and Cloud Computing. He has published 30+ research papers in peer reviewed journals

Tabassum.SK, is a student in the Department of Computer Science and Engineering at Koneru Lakshmaiah Education Foundation, Guntur, Andhra Pradesh, India. She is doing her research work in Cloud Computing

G.Hima Vamsi, is a student in the Department of Computer Science and Engineering at Koneru Lakshmaiah Education Foundation, Guntur, Andhra Pradesh, India. He is doing his research work in Cloud Computing

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