International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169
Volume: 3 Issue: 7 4672 - 4676

Improving efficiency and Lifetime of Mobile Devices Using Cloud Environment

Swati Nagpure
Department of Computer Engineering
Alard College of Engineering & Management.
Marunje, Pune-411057, Maharashtra (India)
Email:*swatimohariya@gmail.com*

Sonali Patil
Department of Computer Engineering.
AlardCollege of Engineering & Management.
Marunje, Pune-411057, Maharashtra (India)
Email: *sonali.patil@gmail.com*

Abstract:- Mobile Cloud Computing is process to compute the resources between multiple mobile devices. The mobile users demand a certain level of quality of services (QoS) of their device. If the mobile change the interface gateway in the mobility of device. In this paper we are Identify, Formulate, and address the problem of QoS. The process of Bandwidth sifting and redistribution by interfacing gateway for maximizing their utility. The bandwidth sifting alone is not sufficient for maintaining QoS-guaranteed because of verifying spectral efficiency across the multiple channels.For maximum utility problem we formulate bandwidth redistribution and by using modified descending bid auction solved it. In the AQUM schema as per required amount of bandwidth we generate a big request in each gateway aggregate demand of the entire connecting mobile node. Simulation results establish the correctness of the proposed algorithm. Theoretically, we prove the convergence of AQUM by deduce the maximum and minimum selling prices of bandwidth

Keywords:- Mobile cloud computing, auction theory, bandwidth shifting, and bandwidth redistribution.

*****

I. INTRODUCTION

Today mobile device is the most important part of human life it makes human bean more portable in their daily life. Data exchange feature in modern mobile devices allow users to run powerful web applications such as mobile banking, online gaming, shopping and fitness management. These all web applications are dealing with the real time data stream. We are still improving hardware and software in mobile devices but their limited energy source is the persistent problem. Consequently, executing computationally intensive applications on mobile devices remains a standing issue in mobile networks.

Mobile Cloud Computing is an integration of cloud computing into the mobile environment. In demand of high computational resource and application requirements such as data services, video streaming and audio services along with value added services, the mobile users request services from the cloud servers through an interfacing gateway. To resolve each mobile user request we allocate the shared resources of cloud service provider with gateway communicates.

Thereafter the connections are getting setup in between mobile user and cloud server through the interfacing gateway of cloud. Now the mobile users become ready to use the mobile cloud resources.

II. MOTIVATION

MCC is the cutting edge mobile computing technology that aims to augment a multitude of mobile devices; especially Smartphone's and mitigate themobile resource poverty. Mobile users can have access to their applications,data, and cloud services over the internet by utilizing mobile web.While mobile devices roaming over the network interfacing gateway changes to adapt the connectivity with cloud. Therefore, the aggregated bandwidth requirement for the gateway also get change, which creates the requirement &necessity of bandwidth shifting, Even if the provided previous allocation was ideal, still we require bandwidth redistribution among the interfacing gateways for maximizing utility among the interfacing gateways. So from this we can say that interfacing gateways are accountable forproviding quality of service.

III. REALATED WORK

There are several reasons to use cloud computing with mobile applications which is current area of research. Mobile cloud computing provides some solutions to this barrier which mobile subscribers are usually face up with. Mobile cloud computing reduces some barrier but with higher demand and use of Mobile cloud computing there are certain challenges present at mobile network environment, like Low bandwidth, Network availability, Network Heterogeneity(WCDMA, GPRS, WiMax) and Pricing [2].

Heterogeneity [1] in MCC is the existence of differentiated hardware for each device, different architectures, infrastructure and technologies of mobile devices, clouds environments, and various wireless networks. The current technologies are expected to initiate and facilitate collaboration among these heterogeneous computing devices toward unrestricted mobile computing.

Heterogeneity in Mobile Devices: Software interfaces, hardware and technology variation among mobile devices cause heterogeneity in this domain. In current scenario increasing popularity of Smartphone's creates a dynamic and demanding market that disperse them to different dimensions various examples of this are hardware change, different OS, features, and communication mediums. So the impact of this is device-level collaboration becomes more challenging in MCC.

Heterogeneity in Clouds: Numerous cloud vendors provide different services with custom-built policies, different infrastructures, different platforms and APIs that make the cloud landscape heterogeneous. These differentiation cause interoperability and portability as major challenges in cloud computing. So this becomes a notion that business competition also diversifies cloud providers with their heterogeneous frameworks, exacerbating heterogeneity on the cloud side.

***Heterogeneity in Wireless Networks**:* In Mobile cloud computing the majority of communications take place in the wireless network environment which is a heterogeneous communication medium. Differences in wireless networks and their related technologies impact the delivery of cloud services and affect the mobility and augmentation and also usability of Smartphone's.

Quality of service provision in mobile cloud computing [3] is a challenge to overcome. In mobile cloud computing mobile users need to access the servers located in a cloud when requesting services and resources in the cloud. While accessing these resources from cloud the mobile users may face some problems such as congestion due to the limitation of wireless bandwidths network delay and network disconnection also the signal attenuation due to mobile users' mobility. Du to these problems they cause delays when users want to communicate with the cloud this affects QoS is reduced significantly. There are several research issues in mobile cloud computing, which are related to quality of service to the mobile cloud computing.

Low Bandwidth:Bandwidth is one of the major issues in MCC because the radio resource for wireless networks is much scarce as compared with the traditional wired networks currently present.

Availability: Service availability becomes more important issue or concern in Mobile cloud computing than that in the cloud computing using wired networks. The Mobile customers unable to connect to the cloud to access service because of traffic congestion in the network, network failures, and the out-of reach-signal.

Unreliable Physical Channels: Wireless channels are highly unreliable and also have restricted bandwidth. Some other problems are like wireless channels have high packet loss ratio and also have bit error rate due to fading and multipath effects. As we know the wireless medium has been shared by multiple stations so that the bandwidth allocation to one station will be affected by the neighboring stations.

Node Mobility:Mobile devices or equipment are roaming over the network and switching the wireless networks or interfacing gateways they connect. To provide an uninterrupted service the mobile device must be able to connect to the wireless network that is availableFor example when mobile phone may get switch from one cell covered by one base station or interfacing gateway to another cell covered by another based station.

Auction: Auction is well known model to buy and sell services &commodities.In a Similar manner, auction theory is also useful for exchanging commodities in the network applications [7]. There are various auctions such as Open-Cry, Sealed-Bid, First-Price, and Second-Price are present out of which conventional auction is more popular in the context of exchanging network commodities due to its ease and simplicity. The conventional auction is mainly classified into two segments or category based on the bidding schemes such as ascending or descending bid auction. In our project & proposed scheme we are going to use descending bid auction to solve the problem of bandwidth redistribution.

IV. IMPLEMENTATION DETAILS

Proposed Method

We formulate bandwidth redistribution as a utility maximization problem.To overcome this issue and concern we have presented modified descending bid auction.

In the proposed scheme we are implementing AQUM, where each gateway aggregates the demands of all the connecting mobile nodes and makes a bid for the required amount of bandwidth.

Distributed AQUM (Auction-Based QoS-Guaranteed Utility Maximization)

An auction is a mechanism/process or a set of business rules for exchanging commodities based on the bidding price. In our proposed work, we use the auction theory-based approach for solving the QoS-guaranteed bandwidth redistribution problem in mobile cloud computing, following the methodology similar to the one described in [7]. In this auction each gateway participates as a bidder and the cloud service provider acts as an auctioneer cum-seller. Herewe use descending price auction theory for determining the optimum bandwidth allocation this maximizes the utility vector. At beginning, in descending price auction theory, the Cloud service Provide or seller sets the initial ceiling price for each unit allotment& allocation, It keep on decreases the price over time till the price becomes zero or some other buyer agreed on the price for buying the services or commodity. In this problem statement, we consider a tradeoff between the unit price and the bandwidth request, as in general the requested amount of bandwidth reduces with the increase in price per unit allocation/allotment. For executing the tradeoff condition, we modified the termination classes of the descending price auction. In our modified distributed descending price auction process, price decreases over time until the total bid reaches the total available bandwidth. In the meantime, if the price p becomes less than pmin, the ceiling price is again reset for continuing the auction process. We describe the basic procedure of the modified descending price auction for the present problem/concern. In distributed algorithm we overcome and resolve the issues present in the existing AQUM like now we are allowing all users to view the bidding value for bandwidth of each bidder.

Mathematical formulation

Set B requested bid vectors which are as follows:
Set B= {b1, b2,bi-1,bi,bi+1 … bi)}
Formulae used for calculating the requested bandwidths availability and the efficiency and delay are as follows:
Utility function U $(b_{i,}b_{-i},p)$ =$R^{Q}(b_{i,}b_{-i})$-C$(b_{i,}p)$.
So, these are the following set required for calculating U
Set c = {c1,c2,c3…..Cn}
Which is set of the capacity of each channel where it can be calculated by using the Shannon’s capacity formula which is as follows and it decides the workflow of the existing system.

$$C = B\ log_2(1 + \frac{P}{N_0 B})$$

Mentioned above is the one part of our existing system. Moving further in details considers the sets declared below to enhance the description of our existing system:
G = {G_i | G is set of all the gateways available}.
I = {I_i | I is no. of gateways available}.
U = {U_i | U is utility of gateway G}
N = {N_i set of nodes connected to the CSP}
But in the existing system there is no term of bandwidth redistribution means if one element from the gateway G_i changes the requirements of bandwidth then it will affect the entire flow of the allocation of the bandwidth to various nodes in the set N.

Algorithm:-
Distributed AQUM
Input:-Pmax, β
Output: B
Steps:

For gateways
1. CSP broadcast p(t) to all gateways
2. Gateways calculates b(t) and u(t)
3. Gateways view bids of other bidders
4. For(i=1 ti I do
5. If(Ui (t)) >Ui (t-1)) then
6. Gateway Gi submits bid bi(t)
7. Else
8. Gateway Gi submits bid bi(t-1)
9. End if
10. End for
    For CSP
11. If ($\sum_{i=1}^{I} bi(t) + \beta \geq Btot$) then
12. CSP calculates B and allocates to the gateways
13. CSP confirms the final price p(t) to the gateways
14. Else
15. CSP revise the price
16. p(t+1) = p(t) – Δp
17. if (p(t+1) <Pmin) then
18. CSP reset the price
19. P(t+1) = Pmax
20. End if
21. Go to Step 1 for new Iteration
22. End if

V. RESULTS

A. Input and output

Input: CSP to distributed AQUM algorithm
Pmax and β
Where Pmax- Per unit price allocation
β- Total Bandwidth

Output: Redistributed Bandwidth to each gate ways

B. Software and hardware requirements

Hardware
- Processor - PentiumIV 2.6 ghz
- RAM - 512 mbdd ram
- Monitor - 15” color
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard

Software Configuration
- Operating System - Windows XP/7
- Programming Language – Java
- Database – MySQL5.5
- Tool –NetBeans IDE 8.0

Expected result

Bid request: A Request Page from where users request for bid.

 ISSN: 2321-8169
4672 - 4676

Fig 1: Bid request page

Bid generate: After requesting a bid this page is view to user as the acknowledgment of user's request.

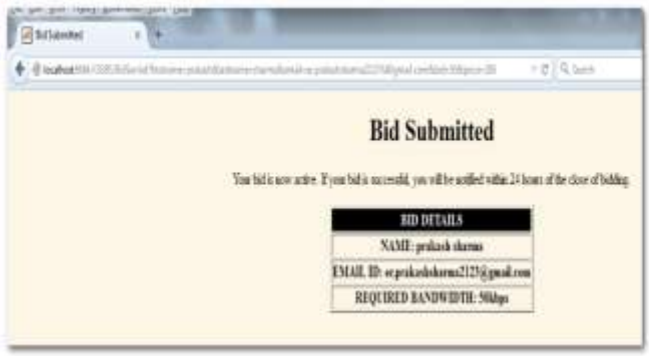
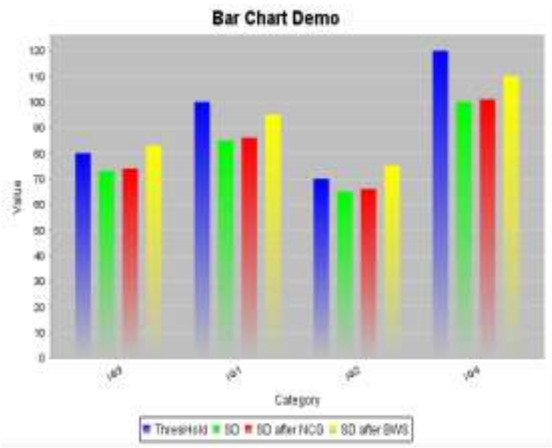


Fig 2: Bid generate page

Result Graph:

- Graph of service delay for bandwidth shifting

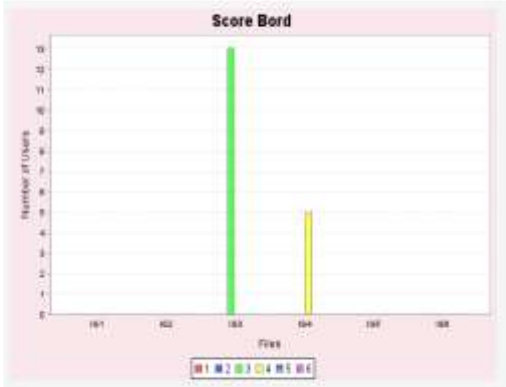


The graph represents the condition of required time in case of normal bandwidth allocation and bandwidth shifting. Here it represents the comparison between SD, SD after NCG and SD after BWS with respect to threshold value.

Here

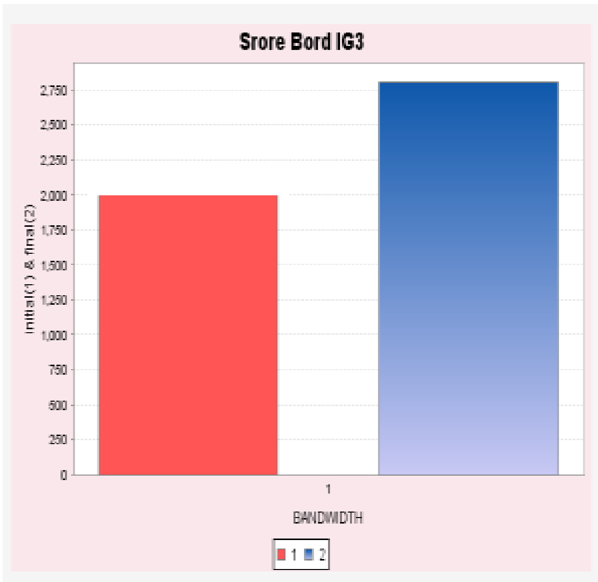
SD→Service Delay
NCG→Node changing Gateway
BWS→Bandwidth shifting

- No of users for every IG(interface gateway)



This graph represents the no of users as according to interface gateway.

- Graph of bandwidth shifting



Here we represent the comparison between initial bandwidth and the final bandwidth. That means the bandwidth is shifting or reallocated by the csp(Cloud Service Provider).

VI. CONCLUSION

Several research works carried out towards the development of quality-of-service provision in Mobile cloud computing has been discussed in the previous part of section. However, And there are still some issues which need to be addressed and improved. In this part of the section possible research directions towards the development of quality-of-service provision in MCC and the future research direction of general MCC issues are discussed.

Some issues like Mobile devices has limited storage and processing capacity so work in direction of to how efficient use of these limited resources can be performed for cloud computing can be done. Various operating systems are available for mobile devices like Android, Symbian, and Chrome etc. So work related to does a general access platform for mobile cloud computing is possible on top of these various operating system platform can be done. In future the research related to security can be done as there are various security threats both inside and outside the cloud. Mobility is one of the general issues because of user mobility and due to the unreliable wireless channel status. In Future, research should be focused on the design of a unique framework that integrates the existing solutions and activates the most suitable services based on the client's requirement, current mobile device, cloud server status and network.

We proposed an auction-based QoS-guaranteed utility maximization algorithm for maximizing the revenue of each gateway, while it maintains QoS of mobile nodes by purchasing bandwidth from the service provider.

VII. FUTURE WORK

Even though the proposed Distributed AQUM algorithm solves the problem of maximum utility of bandwidth redistribution. In future we wish to try some other auction theories for better results.

Or we include more features to make our product more effective, efficiencies and attractive.

Like, store related links to user's previous search, show bandwidth shifting and redistribution to the user by UI.

ACKNOWLEDGMENT

I take this opportunity to express my profound gratitude and deep regards to my guide and internal PG Coordinator Mrs. Rakesh. Rajani for his exemplary guidance, monitoring and constant encouragement throughout the course of this project. I also take this opportunity to express a deep sense of gratitude to my HODProf.Priyadarshani Kalokhe, for her cordial support, valuable information and guidance. Thanks to all those who helped me in completion of this work knowingly or unknowingly like all those researchers, my lecturers and friends.

REFERENCES

"

[1] "Heterogeneity in Mobile Cloud Computing: Taxonomy and Open Challenges"Zohreh Sansei, *Member, IEEE,* Saied Abolfazli, *Member, IEEE,* Abdullah Gani, *Senior Member, IEEE* and Raj Kumar Buyya, *Senior Member, IEEE*

[2] Fatih Ozulu "Mobile Cloud Computing" Information systems, Middle East Technical University,

[3] A. Sheik Ali, Dr. Bhaskaran"A survey on quality of service provision in Mobile cloud computing" Research Scholar, Dept.of.CSE, Karpagam University

[4] A. Amamou, M. Bourguiba, K. Haddadou, and G. Pujolle, "A Dynamic Bandwidth Allocator for Virtual Machines in a Cloud Environment," Proc. IEEE Consumer Comm. and Networking Conf., pp. 99-104, Jan. 2012.

[5] R. Chai, X. Wang, Q. Chen, and T. Svensson, "Utility-Based Bandwidth Allocation Algorithm for Heterogeneous Wireless Networks," Science China Information Sciences, vol. 56, no. 2, pp. 95-107, 2013.

[6] S. Das, S. Mishra, M. Khatua, and J.J.P.C. Rodrigues, "Mapping of Sensor Nodes with Servers in a Mobile Health-Cloud Environment," Proc. IEEE 15th Int'l Conf. E-Health Networking, Applications and Services, Oct. 2013.

[7] Y. Zhang, C. Lee, D. Niyato, and P. Wang, "Auction Approaches for Resource Allocation in Wireless Systems: A Survey," IEEE Comm. Surveys and Tutorials, vol. 15, no. 3, pp. 1020-1041, Third Quarter, 2013.

[8] Lars Lundheim "On Shannon's formula" Department of Telecommunication, Norwegian University of Science and Technology (NTNU)