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Multimedia Storage System Providing QoS in Cloud Based Environment

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***Abstract*—** Cloud computing and mobile computing are moderately new trend in Information Technology which are growing rapidly. Mobile devices are replacing personal computers by joining large mobile networks and are effortlessly switching between different network providers. Currently, to maintain network connectivity all the time different service handover mechanisms is used so that cloud services can be accessed by user without any interruption. In this scenario, if user mobility is considered, then he is connected to its local cloud to access the different cloud services. As user is moving from one geographical location to another because of this mobility factor network congestion increases which causes degradation in QoS. For this reason a framework is introduced which will deliver services to the users to improve QoS in order to provide better QoE to the clients. In this paper, we are further developing this framework in which an algorithm is designed in service delivery layer which will help for better solution to the efficient management of network resources while providing a high QoE for the clients. And as the demand for specific services increases in a location, using this framework it will be more efficient to move those services closer to that location. This framework will help to reduce high traffic loads due to multimedia streams and will offer service providers an automated resource allocation and management mechanism for their services.

Keywords- *Mobile computing; Web services; Traffic control*

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I. INTRODUCTION

Cloud Computing alludes to the conveyance of figuring resources over the Internet in which vast gatherings of remote servers are arranged to permit the unified information storage, and online access to the computer resources or services. Cloud services are made accessible to clients on interest by means of web from cloud provider's machines which we call them as servers. These servers are intended to give simple, adaptable access to applications, services and resources and are completely overseen by cloud service suppliers. A cloud service provider offers some segment of cloud computing normally Infrastructure as a Service (Iaas), Software as a Service (Saas) or Platform as a Service (Paas) as illustrated in fig 1. SaaS delivers software applications, PaaS delivers a host operating system and development tools and IaaS offers raw resources.

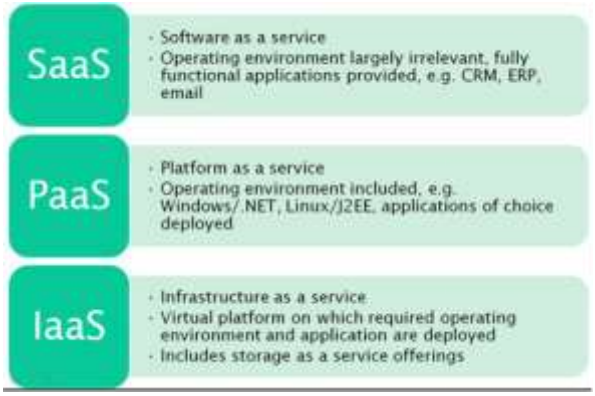


Figure 1. Cloud Infrastructure

- **Office 365:** Microsoft is also offering a wide variety of Cloud-based services. Their implementation of Cloud services apart from offering SaaS in the form of Office 365 is also offering PaaS in the form of Azure and also IaaS in the form of their Private Cloud implementation. Microsoft also offers a Cloud solution that acts as a central management point for the clients.

- **Amazon's Elastic Compute Cloud (Ec2):** is a web benefit that gives resizable process limit in the cloud. Amazon Ec2 diminishes the time needed to acquire and boot new server cases to minutes, permitting you to rapidly scale limit, both here and there, as your registering necessities change. It changes the financial matters of processing by permitting you to pay just for limit that you really use.

- **icloud:** is a distributed storage and distributed computing administration from which permits clients to store information, for example, music and ios applications on remote machine servers for download to numerous gadgets. It likewise goes about as information matching up community for email, contacts, timetables, bookmarks, notes, updates, iwork archives, photographs and other information. The administration likewise permits clients to remotely move down their ios gadgets to icloud rather than physically doing so utilizing itunes.

Mobile phones (e.g., cell phone, tablet pcs, and so on) are progressively turning into a fundamental piece of human life as the best and helpful specialized apparatuses not limited by time and put and can get to services through remote servers. Mobile Cloud Computing is a swearing up and down to solution to extension the augmenting crevice between the versatile sight and sound interest and the capacity of cell phones [2]. Thus, when it comes for data available in the form of videos Cloud allows its customer not only to access videos

that are on demand but also application in the form of services to view and manipulate it [5].

This paper is based on Cloud Based Mobile Media Service delivery. In this, services are mainly populated on local clouds. And devices users are using are also mobile. As per the user's demand media services on local cloud have the capability of moving these services to the nearby clouds. Hence when we consider mobility factor in this scenario a framework is developed in this paper. This framework will consider user mobility and move cloud services to nearby cloud so that user can get better QoE while accessing network services. In service delivery layer of this framework an algorithm is merged. This may result in less traffic congestion on network which results in improving QoS on the network and also providing better QoE to the clients.

II. LITERATURE SURVEY

Media-Edge Cloud (MEC) is as of late proposed architecture which enhances the execution of cloud performance. This architecture plans to enhance the QoS and Quality of Experience (QoE) for interactive media applications. This is attained to by a "Cloudlet" of servers running at the edge of a greater Cloud. This architecture fundamentally handles asks for closer to the edge of the cloud and consequently serves to decrease distance. In the event that further transforming is required, then demands are sent to the inward Cloud, so the "Cloudlets" are held for Qos delicate media applications. This expects to separation the system chain of importance inside the Cloud, in such a way, to the point that physical machines that are closer to the Cloud's external limits will handle Qos for services. Since these machines dwell on the border of the Cloud, the information needs to travel less separation inside the cloud before it is delivered to the customers. This enhances QoE for customers as well as lessens system blockage inside the Cloud.

Yet, this idea of MEC does not consider client mobility, for enhancing cloud execution. Besides, all the exploration at present expects that stand out element (the supplier) is in control of a Cloud and subsequently distinctive suppliers can't "impart" assets in a way that can enhance the usage effectiveness of their equipment. This can possibly prompt issues later on as mobility and media rich substance gets to be more prominent and high transmission capacity information streams will need to travel incredible separations and achieve moving targets. Cloud providers may end up in circumstances where their resources are not satisfactory and they may need to make more clouds to handle the heap and diminish system blockage.

III. EXISTING SYSTEM

Figure 2 shows the existing system architecture. Few layers of the above framework resemble with the OSI layers. First four layers of the above framework resemble with the application layer of OSI and service connection layer (SCL) resemble with presentation, transport and session layer. They are briefly explained as following:

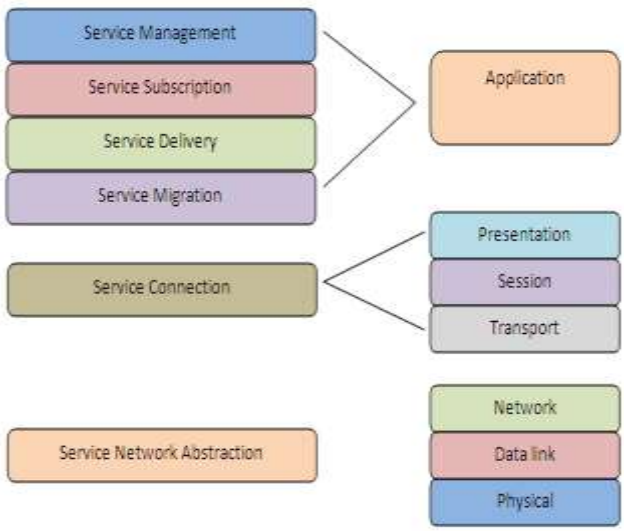


Figure 2. Service Delivery Framework

- **The Service Management Layer (SML):** Deals with how services are enrolled in a Cloud. This likewise incorporates the general Service and Security Level Agreement (SSLA) between the Cloud providers and the service providers and the unique Service ID.
- **The Service Subscription Layer (SSL):** Deals with the subscription of clients to the service and holds information that handles the subscriptions such as User IDs, the list of services subscribed to by individual client and the associated client SLAs between clients and services.
- **The Service Delivery Layer (SDL):** Is in charge of the conveyance of services to individual customers. The layers beneath this layer get guidelines from this layer with respect to joining with individual customers and in addition populating Clouds.
- **The Service Migration Layer (SMiL):** Is in charge of the Migration of services between Clouds. It manages resource allocation crosswise over clouds to encourage service populace. It also holds the mechanism that performs the handover of client connections between services.
- **The Service Connection Layer (SCL):** Monitors associations in the middle of customers and services. Some of this layer's functions map directly to the Session Layer in the OSI model.
- **Administration Network Abstraction Layer (SNAL):** Makes the network technology transparent to the upper layers in order to simplify and unify the process of migration. The function of this layer is to act as a common interface between the service delivery framework and the underlying network architecture such as IP overlay network or new technologies which divide the Internet into a Core network surrounded by Peripheral wireless networks.

IV. PROPOSED SYSTEM

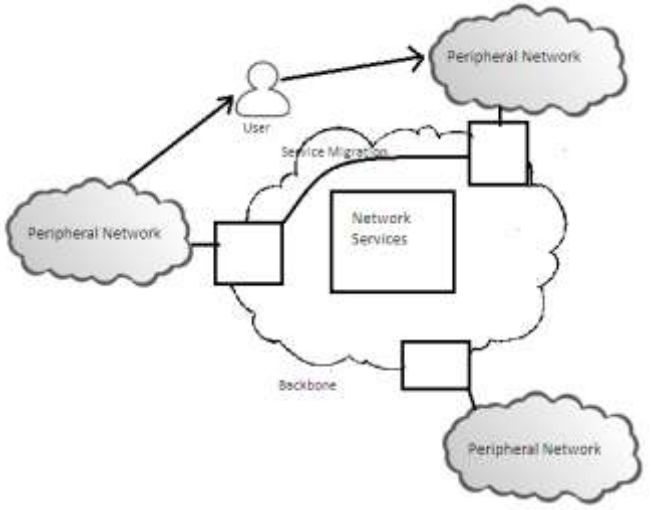


Figure 3. Service Migration

QoS aware service delivery model is important to deliver the services. The system architecture is utilized to choose the system status between the client and service. Service providers furnish services with best QoS and QoE parameters to their customers. In this model customer of cloud services will remain associated with the same cloud without pondering its physical area and system status. On the other hand the system condition agreeable and there is no repetitive way the services will be out of compass of system. So providers are not ready to achieve their SLA guidelines and customers are not getting the best QoE at record-breaking. Something else is that the cloud from any area has associated with the same cloud to get services without contemplating the separation of cloud from itself. It brings about making additionally preparing burden on cloud which debases the QoS of administrations. It is most certainly not feasible for cloud providers to assemble different mists to give services to the distinctive geological ranges. So there is the need of new strategy for service delivery which gives different administrations to customers with fitting QoS also QoE parameter, it is additionally give better cloud services to the providers, it additionally decreases the system clogging. In this service delivery model we will have customers who demand the services and their solicitations will be administered to physical area at which the administration is running by satisfying QoS and QoE parameters. On account of versatility it is hard to direct customer to a particular occurrence of services. We can associate customer to the service instance in view of their present area and system conditions, yet in the event that customer move to an alternate area with distinctive system zone then it is hard to get this. In the event that the client moves far from the cloud then it makes congestion on system so it affects on the QoS of all services on the system. To take care of this issue we could interface with the customer at distinctive occasion of services each one time the QoS parameter corrupts, around then not anticipated that will make various mists by cloud suppliers. Single cloud providers may not own multiple clouds at different physical location so it is possible that many cloud providers have their cloud far apart or down to regional scale within a country. So we able to address the issue of service population across the different boundaries of cloud providers. It introduces a concept where service providers will register their services globally and not bound to specific cloud providers.

Services which are comprehensively enrolled and not bound with particular cloud providers will allowed to populate or relocate to diverse cloud relying upon QoS and wellspring of service demand parameters. This will just possible when cloud providers open their limits, so services can move in also out of their cloud. It will change the model of service providers. Service providers will enlist their services with SLA which characterizes the normal QoS parameters. Cloud providers give best QoS so it will populate their services and it gives salary for them. It is unrealistic to any huge cloud to take all the services because of the system clogging issue. So the services may populate from greater cloud to little cloud to keep up system blockage free and minimize the separation of itself from customer. In the wake of populating services starting with one cloud then onto the next the getting cloud can likewise reject the populating service, on the off chance that it is as of now under the substantial load. This populace of services procedure is totally straightforward to the client. To accomplish every one of those things there is the need of new service delivery system and it ought to be QoS mindful and help service populace. At the time of relocation of any service from one cloud there may be the risk that an alternate client is getting to the same service so after relocation of service from current cloud prompts blockage of second customer. So to take care of this issue we include separate resource pool to each one cloud which is utilized to keep references or object of all populated and non-populated services. An alternate customer can get to the populating service without any intrusion.

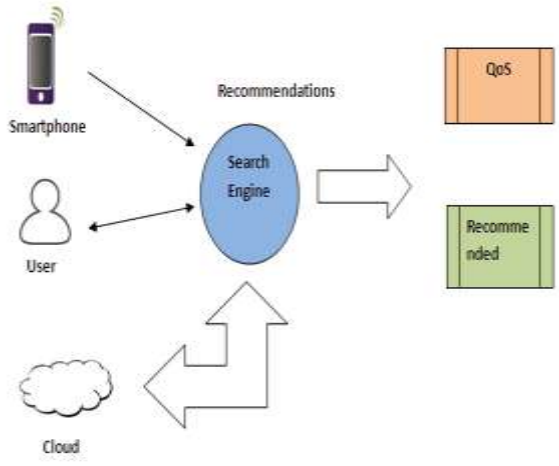


Figure 4. System Architecture

Figure 4 shows the architecture of a proposed system. In this architecture users are the clients who accessed the services of cloud. Those are mobile clients so if they move from one location to another then there is the need to populate the services to another location. So the engine gives the recommendations depending on the QoS parameters. Another cloud decides whether to add the service or not.

V. IMPLEMENTATION

The proposed architecture includes an algorithm in service delivery layer of the framework which is as follows:

Algorithm:

- Create and start node.
- Start QoS manager which checks the QoS of various services.
- Then next step is user authentication which is used to authenticate the users.
- Authenticated user is connected to the service.
- Suppose user access video, video streaming is going on.
- At the time of streaming system tracks the QoS with the help of QoS manager.
- QoS manager gives some recommendations those are track by system.
- On the basis of recommendation system takes migration decision.
- Service is migrated to another cloud or keeps as it is.
- If service is migrated to another cloud system will again check the QoS.

VI. MATHEMATICAL MODEL

In this, we apply set theory to our project. Our main motive is to migrate services to improve QoS. Hence here we took three sets cloud, service population and QoS respectively. Cloud set is union of QoS and Service population sets.

Here there are few QoS requirements and services are populated an cloud. We are intersecting these two sets and we are getting solution to our project i.e. traffic control which is shown in following figure 5.

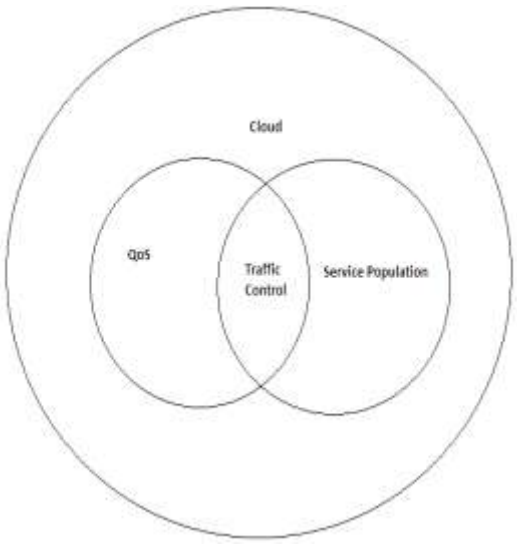


Figure 5. Venn Diagram

VII. RESULTS AND DISSCUSSION

As user moves from one geographical area to another this system is used to migrate the services from one cloud to another. This reduces the congestion on the network and also it decreases the load on network. Cloud providers can share the resources which increases the efficiency of cloud services.
Factors which can affect QoS are as follows:

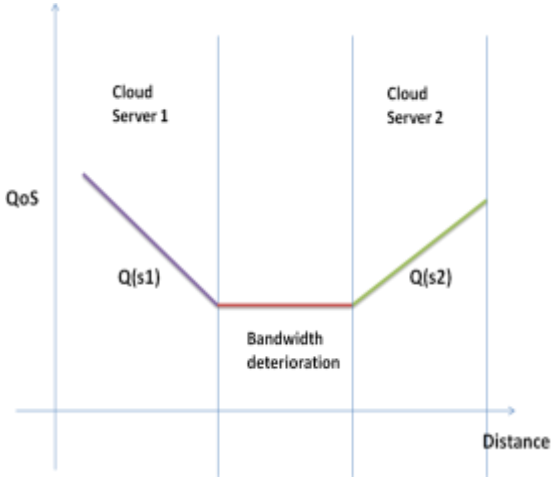
L: Network latency
p: No. of blocks of data to be fetched
T_p: Time to prefetch data

Hence, $T_p = L + C*p$

Where C= Per block copying of data
T_c: Time for device to fetch data

$$T_p \leq T_c * p$$

And the expected graph is as follows:



VIII. CONCLUSION AND FUTURE SCOPE

This paper gives solutions to the challenges which are faced by the mobile user in future networks. Considering this a framework is developed and modified by merging an algorithm in service delivery layer. In the meantime, the system also needs to provide quality of service (QoS) provision for multimedia applications and services. The proposed system achieves the QoS in distributed environment which make the proposed system especially suitable to the video on demand service. It often provides different service quality to users with various types of devices and network bandwidth. We believe that our implementation will provide the better quality of service (QoS) as well as better quality of experience (QoE) to the user. And in near future if number of clients will increase then how this factor can influence the decision making at the service delivery layer.

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