ISSN: 2278 – 1323
International Journal of Advanced Research in Computer Engineering & Technology (IJARCET)
Volume 1, Issue 10, December 2012

A Review on Multimedia Cloud Computing, its Advantages and Challenges

P.Bindhu Shamily, S.Durga

***Abstract*--- Cloud computing is a service delivered over the internet for computation, data accessing, and storage by creating scalability, flexibility and minimum cost. It is a next generation platform for computation which offers various services and applications to the user without physically acquiring them. Public clouds are something which is made available for all the general users on the basis of pay per use. On the other hand if the user develops his own application and runs their own infrastructure, then it is called Private cloud. The integration of both public and private cloud is the Hybrid cloud. Managing and processing the multimedia content is one of the major concepts in cloud computing. In this paper we have addressed about Multimedia cloud computing, its services, also the challenges and advantages ofcloud media.**

***Index Terms*---Cloud Computing, Cloud Media, Content Management, Video Streaming, Cloud Services**

I. INTRODUCTION

Cloud computing is one of the emerging IT technologies used in computation nowadays. It is a green technology which allows accessing, computing and storing the resources by offering various services across the internet without physically acquiring them. Cloud computing generally includes Infrastructure as a service(IaaS), Platform as a Service(PaaS), and Software as a Service(SaaS). Inorder to reduce the computation time and to overcome the storage space shortage issues, most of the organizations nowadays shifting to Cloud computing from the traditional process of computation. It manly focuses on distributing data and computations over a scalable data centers of network.

P.Bindhu Shamily, *Department of Information Technology, Karunya University, Coimbatore, India.*

S.Durga, *Department of Information Technology, Karunya University, Coimbatore, India.*

A. Clouding Models

There are three types of clouding models - Public cloud computing, Private cloud computing and Hybrid cloud computing. Public cloud computing mainly depends on third parties to offer services by paying them on monthly basis according to the usage. Public cloud infrastructure is made available to all public users who can subscribe the needed services from the service providers. It will be normally maintained within an organization. Here the security issues will be decided by the service provider and so it is very important to choose the apt provider.

In Private cloud computing, the organization itself has control over the services. Normally organizations go for private cloud only in the case of involvement of sensible data. Scaling can be done very efficiently by adding hardware and thus the infrastructure can be expanded. Here security will be more due to the control of internal architecture and therefore all the data will be protected behind the firewall.

Hybrid cloud computing is the combination of both Public and Private cloud computing. In this, less sensible data will be stored in Public cloud and all others in the Private cloud. This cloud computing is more efficient than the other two in the case of security, computation and storage. Below given table is the comparison of Public and private cloud computing.

Table IComparison on Public and Private Cloud computing

Public Cloud Computing	**Private Cloud Computing**
Can be used by more customers	Only a single customer
Suitable for non-sensible information	Suitable for sensible information
Less security	Highly Secured
Utilizes shared infrastructure.	Won't utilize shared infrastructure.
No control over data	Data can be controlled and monitored
Can easily switch between categories of performance.	It supports mixed higher and lower performance categories.

II. MULTIMEDIA CLOUD COMPUTING

Due to the invention of cloud computing, nowadays users can easily access the multimedia content over the internet at any time. Here the user can efficiently store the multimedia content of any type and of any size in the cloud after subscribing it with no difficulties. Not only storing the media content like Audio, Video and Image, but can process them within the cloud since the computation time for processing media data is more in complex hardware. After processing the processed data can be easily received from the cloud through a client without any need of installing complex hardware. Thus Multimedia cloud computing is the processing, accessing and storing of multimedia contents like audio, video and image using the services and applications available in the cloud without physically acquiring them.

Currently many company's clouds like AmazonEC2, Google Music, DropBox, SkyDrive provides content management system within the cloud network. The users of these clouds can access the multimedia content for example; the user can view a video anywhere in the world at anytime using their Computers, tablets or smartphones.

III. CLOUD MEDIA

Cloud media is, a cloud which has the multimedia content of the owner of that particular cloud. The media content can be accessed through the multimedia signaling protocols in the cloud and can be streamed to clients present in computers, tablets, cars and smartphones. Not only processing, but the media content can be shared between clouds using the streaming protocols like TCP/IP, UDP, RTP, HTTP etc. Streaming of media content involves, loading or buffering media data, coding, mixing, rating and rendering over the service providers. Other profiling, packetizing, tokenizing of media contents will be done by the cloud based on the streaming protocols used and it will be streamed to the client system.

Cloud offers a multiscreen experience and it provides the availability of media contents within it by hiding the details and location of the contents for security issues. It allows users to store, purchase, access and share the user generated or commercially available media contents on pay per use basis. In case of media content nowadays they are concentrating more on music, but rapid expansion will be done on contents like video, image, e-books, games, mails, apps etc. Thus it provides a platform for combining or aggregating the media contents and also serves as an interface for sharing the media contents to other smart devices like computers, smartphones etc.

IV. CLOUD MEDIA SERVICES

Cloud offers an environment which allows transparent access of data, storing it and processing the data in a secured manner. Transferring media contents from a local device to cloud has changed the data distribution model by its efficiency comparing with the previous less secured data distribution models. It gives more benefits by reducing the storage challenges of local client devices like computers, smartphones, tablets etc. The various cloud media services are,

Fig. 1 Cloud Media Services

A. *Cloud gaming*

Smart devices and computers are mainly used to play video games. But due to the power requirement and the computation speed, most of the 3D related games cannot be played in those smart devices. So to overcome this, there is a service for playing games in cloud. Using cloud any kind of video games can be played with complete satisfaction even by using low end devices.

B. *Experiencing Multi-screens*

Nowadays users have more expectation over multi-screens in devices. Users can access the media content of the cloud through multiple devices by supporting wide variety of video, audio codecs, aspect ratio and screen sizes for live or pay per use basis.

C. *Image Processing*

There are various fields in which image processing is required, and most specifically in investigation and medical field. It includes techniques like segmentation, denoising, fusion, compression etc. Normally image processing software size will be more and it will reduce the computation of the local system. Nowadays inorder to overcome that, the media content i.e. images are processed in the cloud itself and the result will be received in our local client.

V. ADVANTAGES

Cloud media technology offers number of key benefits to its service providers as well as the users through increased implementation time, efficient data storage capacity, less computation and cost. It created a striking impact in the multimedia content processing like editing, storing, encrypting and decrypting, gaming, streaming, compressing etc. Some more advantages are described below

A. *Cost*

Cloud media computing offers cost effective services to its service providers through efficient multiplexing of media contents like audio, video, image by providing a common infrastructure, utilizing the server, optimization, virtualization, Mobility and automatic processing. There is no need for physically acquiring a infrastructure or resource in our local system and thus reduces the cost.

B. *Upgradable*

Cloud media is an always connected to the cloud service provider and therefore it is upgraded and maintained without any manual interference. Software and security will be up to date always.

C. *Compatibility*

Cloud media allows the media content to be accessed anywhere through any smart device and it is compatible with all kinds of client service enabled computers, smartphones, cars tablets etc.

D. *Consistent*

Cloud media provides consistency in distributing the specific media contents to the users of other cloud within a cloud community using the streaming protocols like TCP/IP, UDP, RTP etc.

E. *Green Technology*

Cloud media computation uses optimized data centers for processing, distributing or sharing the media content to the users. But the traditional computation requires more energy consumption.

F. *Ubiquitous*

Cloud media offers the users to purchase a media content once and it can be accessed anywhere in multiscreen by providing customization ability depending upon the accessing device.

G. *Storage*

Cloud media technology has many bases for storing the media content in the cloud using the resources. Also it is more secure since the stored media content will be duplicated without manual interference.

VI. CHALLENGES

A. *More confusion*

There are more confusion among the user in choosing the type of cloud since both pay per use and free clouds are launched by some mobile companies, service providers etc. So the users face difficulty in taking a decision.

B. *Inside attacks*

There is a possibility for phishing and stealing of media content by the employee of the service provider itself.

C. *Legal and piracy difficulties*

Since the cloud media computation is very new, the legal standards are not very good. There are more legal difficulties in the case of storing media content in the cloud outside the boundary i.e. servers which are outside the country. Also there are restrictions in getting the media content rights for different platforms and sharing the media content outside the range or limit.

D. *Migration*

Since more and more clouds are launched by the service providers, the user might think to move all

his media content to some other cloud based on his change in requirements. But now the user does not have the freedom of doing that.

E. Challenges over standards

Currently many vendors (person who sells services) developing and launching their own private cloud environments based on their own conditions and security features which leads to issues in interoperability in the near future.

F. QOS

In cloud media computing, since it is a new area, the developers are concentrating more on computation speed and storage issue. Users going for unreliable networks without their knowledge to share the media content even though there are availability of more promising streaming technology and increased broadband speed.

VII. CONCLUSION

In this paper, we have analyzed some concepts about the Cloud computing for Multimedia i.e. Multimedia Cloud computing, which is used to access, store and process the media contents like audio, video, image etc. of any format and any size.Alsowe have addressed some of the emerging cloud media services, its advantages and disadvantages. Cloud media is an area of greater innovation and more competitive so it will offer more benefits to its users in the future. Similarly there are several challenges also in the case of QOS, security, reliable network usage etc. This paper will also help in the further research on security issues of multimedia contents in cloud media.

ACKNOWLEDGEMENT

F.A thanksher Project guide, S.A, for her support in completing this survey.Without her help this work could not have been accomplished. Finally, we thank God formaking all things possible.

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P.Bindhu Shamily, currently doing MTech Multimedia Technology in the Department of Information Technology in Karunya University, Coimbatore, India.
S.Durga. Currently working as Assistant Professor in the Department of Information Technology in Karunya University, Coimbatore, India.