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A Case Study on Self Adaptive Multimedia Streaming Services of Cloud Based Mobile Streaming: Performance Evaluation

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***Abstract*---Nowadays Cloud Multimedia Services are very popular because they provide an efficient data processing method and it meets the user demands very effectively. Mobile phones and tabs are very popular with emerging technologies. By using these devices we can get the multimedia information efficiently. Now here considering the limited bandwidth available for mobile streaming and different devices this paper presents the issues of self adaptive multimedia streaming services of cloud based mobile streaming. It mainly focuses on quality of service approach for cloud based mobile streaming. To implement this experiment could provide self adaptive multimedia streaming services for varying devices and network speeds.**

Keywords--Self adaptive multimedia streaming, SVC transcoding, Cloud Computing.

I. INTRODUCTION

A. Cloud Computing:

Cloud computing is the emerging technology with growing internet services. Nowadays Cloud services can be utilized by using smart phones and smart books. Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers and other devices as a utility over a network. Cloud computing relies on sharing of resources to achieve coherence and economies of scale, similar to a utility (like the electricity grid) over a network [1]. The cloud also focuses on maximizing the effectiveness of the shared resources. Cloud resources are usually not only shared by multiple users but are also dynamically reallocated per demand. This can work for allocating resources to users. There are mainly three types of clouds those are: Private Cloud, Public Cloud, Hybrid Cloud [2] Private cloud is cloud infrastructure operated

solely for a single organization, whether managed internally or by a third-party, and hosted either internally or externally . A cloud is called a "public cloud" when the services are rendered over a network that is open for public use. Public cloud services may be free or offered on a pay-per-usage

Model [3]. Hybrid cloud is a composition of two or more clouds (private, community or public) that remain distinct entities but are bound together, offering the benefits of multiple deployment models. Hybrid cloud can also mean the ability to connect collocation, managed and/or dedicated services with cloud resources. Gartner, Inc. defines a hybrid cloud service as a cloud computing service that is composed of some combination of private, public and community cloud services, from different service providers .

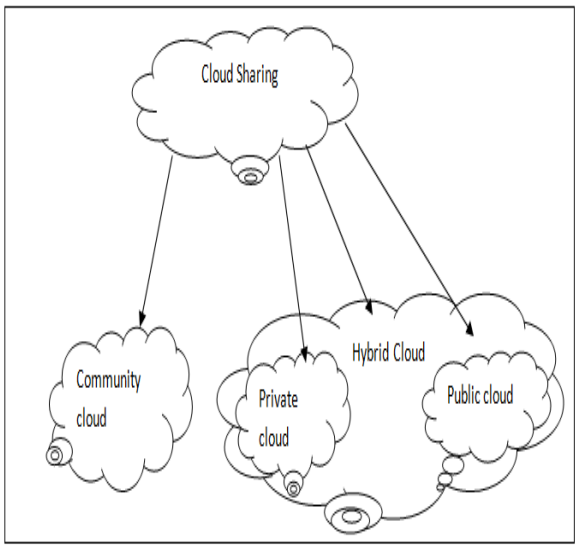

Fig. 1. Cloud Computing Types

There are mainly three types of services they are as follows: IAAS, PAAS, SAAS. IaaS clouds often offer additional resources such as a virtual-machine disk image library, raw block storage, and file or object storage, firewalls, load balancers, IP addresses, virtual local area networks (VLANs), and software bundles. IaaS-cloud

providers supply these resources on-demand from their large pools installed in data centers. For wide-area connectivity, customers can use either the Internet or carrier clouds (dedicated virtual private networks). In the PaaS models, cloud providers deliver a computing platform, typically including operating system, programming language execution environment, database, and web server. SaaS is sometimes referred to as "on-demand software" and is usually priced on a pay-per-use basis. SaaS providers generally price applications using a subscription fee. In the SaaS model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients.

B. Multimedia:

Multimedia is usually recorded and played, displayed, or accessed by information content processing devices, such as computerized and electronic devices, but can also be part of a live performance. Multimedia devices are electronic media devices used to store and experience multimedia content.

C. Streaming Media:

Streaming media is multimedia that is constantly received by and presented to an end-user while being delivered by a provider. Its verb form, "to stream", refers to the process of delivering media in this manner; the term refers to the delivery method of the medium rather than the medium itself [4]. Types of streaming media are Live Streaming, Video Streaming Live Streaming refers to content delivered live over the Internet, requires a camera for the media, an encoder to digitize the content, a media publisher, and a content delivery network to distribute and deliver the content. In streaming video and audio, the traveling information is a stream of data from a server. The decoder is a stand-alone player or a plugin that works as part of a Web browser. The server, information stream and decoder work together to let people watch live or prerecorded broadcasts. Most streaming videos don't fill the whole screen on a computer. Instead, they play in a smaller frame or window. If you stretch many streaming videos to fill your screen, you'll see a drop in quality. For this reason, streaming video and audio use protocols that allow the transfer of data in real time. They break files into very small pieces and send them to a specific location in a specific order. These protocols include:

1. Real-time transfer protocol (RTP)

2. Real-time streaming protocol (RTSP)

3. Real-time transport control protocol (RTCP)

II. EXISTING SYSTEM

Users expect powerful and stable functions for multimedia videos stability is of greatest importance. To provide appropriate multimedia files for diversified terminal units. In the transcoding mode, multimedia files are transcoded dynamically, in order to be applicable to the device side according to the terminal environment. This mode needs to consider the real-time problem, especially for H.264/SVC coding, as the time required for transcoding causes difficulties for real-time streaming. Although SVC is applicable to varying bandwidth networks due to its multilayer architecture, how to provide a multimedia hierarchy that is suitable for dynamic environment variations according to the terminal unit is an interesting research project.

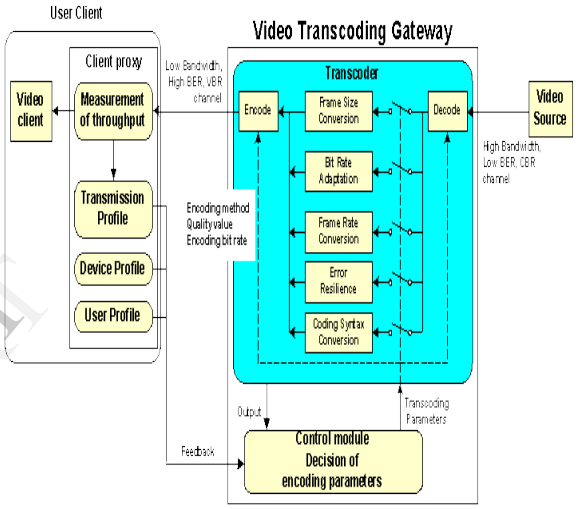

Fig. 2. Basic Modules of the Video Transcoding System

Transmission profile is responsible for monitoring the dynamic condition of the transmission channel, such as effective channel bandwidth, channel error rate, etc. Device profile describes the capability of the device, such as screen size, processing power, etc.

User profile describes the user preference. The previous study proposed an interactive mobile multimedia streaming service over cloud computing[5] Here the svc transcoding controller transcodes the appropriate video file according to the mobile device parameters [6] based on cloud computing this work introduces the new concept that uses map reduce to separate the video content into different clips. The losses in bandwidth can be reduced by this approach. svc plays an important role in this method and also provides the different formats of the video files with the cloud environment to simulate the overall network environment. In this schema user wants to download a particular file from the cloud server first the user should register with cloud server, if already exists the device profile then directly get the appropriate video file according to the parameters of the mobile device[7]. Any mobile

device using this service for the first time the cloud will not provide such a profile. so there should be an additional profile examination to provide the necessary information about the mobile device. Through this functionality the mobile device can generate a schema and send to the profile agent. The profile agent determines the required parameters and then sends to the NDAMM for identification. It determines the user profile of the mobile device and then sends to the svc transcoding controller for increasing the efficiency of the video streaming according to the parameters of the mobile device.

III. PROPOSED WORK

Case Study: Performance Evaluation

This Concept mainly tells about how to provide different renditions of the video file while request being sent by the mobile device for varying bandwidth networks. Here we maintain the multiple renditions of single source file in cloud server according to the network device we send the appropriate video files

The proposed system has the following modules:

- Parameter Calculation
- Cloud Service
- Bandwidth settings
- Transcoding
- Adaptive Streaming

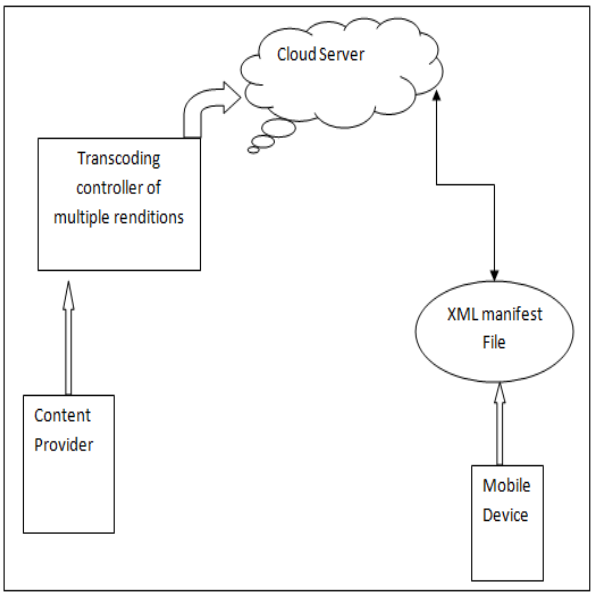

Fig. 3. Structure of Cloud based Mobile Streaming

A. Parameter Calculation

For parameter calculation we can send the mobile device in formation in the form XML manifest file. In this we can set the network parameters according to the device. There are three types of bandwidths namely existing, average and standard deviation values to calculate the current bandwidth. This type of parameter form is maintained then we can send the device parameters to the network estimation module and device aware Bayesian prediction module for relevant prediction. Here in the xml manifest file we can set the mobile network parameters and the send to the Cloud server then it detects by the server and send the appropriate Video file to the mobile device according to the parameters of the mobile device.

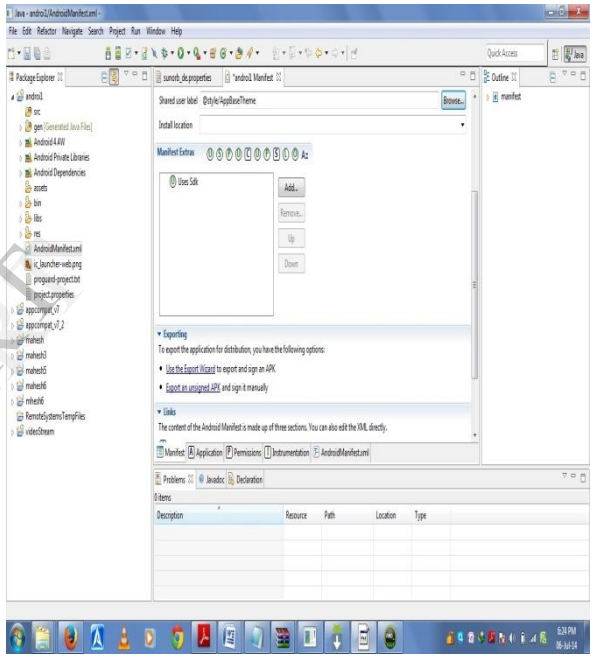

Fig. 3. Android XML Manifest File

B. Cloud Service

In this module we can maintain different video formats of the single video file then we can store on to the cloud database. Whenever the mobile device sends the parameters to the cloud server the server can detect the user profiles of the particular mobile device and can send the required video file to the mobile device. The use highly scalable, reliable, secure, fast and inexpensive infrastructure. This service mainly aims to maximize the benefits of the user. The video file was stored according to the bitrates, resolution and frame rate, bandwidth of the width, height, and standard deviation, decoding and encoding formats.

C. Bandwidth Settings

In this module we can estimate the video process according to the frame rate, bit rate and resolution. To decode or encode the video file according to the parameters of the mobile device. Device feature can find by power consumption, device model, device network in order to conform to the real time requirements of the mobile device. In order to conform to the real time requirements of the mobile multimedia, this study adopted Bayesian theory to infer weather the video features are conformed to the decoding action. the inference module was based on the following two conditions: the LCD brightness does not always change this hypothesis aims at a hardware energy evaluation. The literature states that the TFT LCD energy consumption accounts for about 20%-45% of the total power consumption for different terminal hardware environments. Although the overall power can be reduced effectively by adjusting the LCD, with multimedia services, users are sensitive to brightness; they dislike video brightness that repeatedly changes.

D. Transcoding

In this module the transcoding work can be done by the cloud server efficiently according to the bandwidth and network environment. Scalable video coding is an improvement over traditional H.264/MPEG-4 AVC coding, as it has higher coding flexibility. It is characterized by temporal scalability, spatial scalability and SNR scalability, allowing video transmissions to be more adaptable to heterogeneous network bandwidth. Transcoding can be done by the cloud server instantly in this service and moreover this method is very convenient for users to get more benefits.

E. Adaptive Streaming

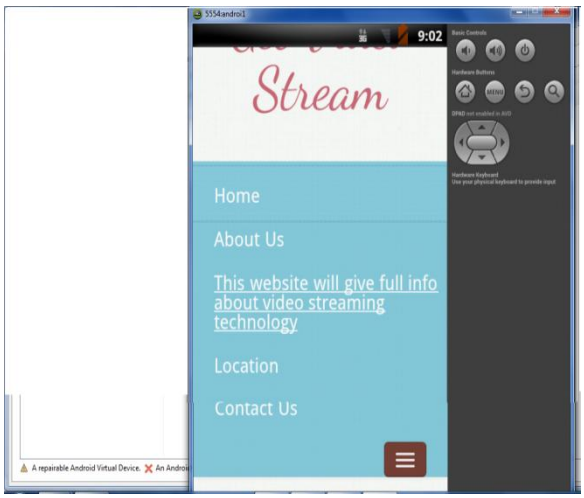

Fig. 4 Adaptive Video Streaming

A good dynamic communication mechanism can reduce the bandwidth needs and the power consumption of the device resulting from excessive packet transmission, and transmission frequency can be determined according to the bandwidth based on such dynamic decision making when the network bandwidth difference exceeds a triple standard deviation, this indicates the present network is unstable. The overall communication frequency shall incline to frequency to avoid errors; however, when the network bandwidth difference is less than a triple standard deviation, the current network is still in a stable state, and the influence on bandwidth difference can be corrected gradually. Ultimately we will get the service very effectively in this method.

IV. CONCLUSION

For mobile multimedia Streaming services, how to provide appropriate video files according to the varying bandwidth networks is an interesting subject. In this study self adaptive multimedia streaming services of cloud based mobile streaming was proposed. The hardware network Device parameter calculation and cloud service were used for the prediction of network and hardware features, and the communication frequency and SVC multimedia streaming files most suitable for the device environment were determined according to these two modules. In the experiment the overall prototype architecture was realized and an experimental analysis was carried out. In the future we will implement the experiment in large-scale. Especially focusing on the power consumption and cost. Cloud services may accelerate research on SVC coding in the future.

Future Work

In future there is need of providing large scale database servers in the cloud environment it very helpful for providing multiple renditions of single video files.

REFERENCES

[1] "The NIST Definition of Cloud Computing". National Institute of Standards and Technology. Retrieved 24 July 2011.
[2] "Cloud and Computing Technology" http://cloudandcompute.com/private cloud/private-cloudmor"Security".Secure/CloudAndCompute.com..http://www.informationweek.com/private-clouds-take-shape.
[3] Voorsluys, William; Broberg, Jams; Buyya, Rajkumar (February 2011). "Introduction to Cloud Computing". In R. Buyya, J. Broberg, A.Goscinski. Cloud Computing: Principles and Paradigms. New York, USA: Wiley Press. pp. 1–44. ISBN 978-0-470-88799-8.
[4] http://computer.howstuffworks.com/internet/basics/streaming-video-and-audio.htm.
[5] C. F. Lai and A. V. Vasilakos, "Mobile multimedia services over cloud computing," *IEEE COMSOC MMTC E-Lett.*, Vol.5 (6), 2010.
[6] S. Y. Chang, C. F. Lai, and Y. M. Huang, "Dynamic adjustable multimedia.
[7] Chin-Feng Lai, Member, "A Network and Device Aware Qos Approach for Cloud based Mobile Streaming", IEEE Transactions on multimedia, Vol.15 (4), JUNE 2013.