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Peer to Peer sharing using Cloud Based Mobile Social TV (Cloud MoV)

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Abstract
The fast increasing power of personal mobile devices (Smartphone, tablets, etc.) provides more advanced features like news, game app, health tips etc and social interactions to users in day to day life. This development however is suppressed by the limited battery lifetime of mobile devices and very much variable wireless connectivity, which makes the highest possible quality of service experienced by mobile users not viable. The current cloud computing technology, with its rich resources to offset for the limitations of mobile devices and using these connections the technology can potentially provide an ideal platform for the support the desired mobile services. In this paper we discuss the design of a Cloud-based novel Mobile social TV system (Cloud MoV) which utilizes both PaaS (Platform-as-a-Service) and IaaS (Infrastructure -as-a-Service) cloud services to offer the living-room experience of video watching to a group of mobile users. In CloudMoV, mobile users can import a live or on-demand video to watch from any video streaming site like YouTube, Vimeo, Ustream etc and invite their friends and family for watching the video concurrently. They can also chat with each other while enjoying the video.

Keywords
Cloud MoV, Smart Phone, IaaS

I. Introduction

Cloud computing is a concept used to describe a variety of computing concepts that involve a large number of computers connected through a real-time communication network such as the Internet. Every Smartphone users need the fastest technologies like 3G, Wi-Fi for fast web access & chatting. These technologies focus more on the challenging scenarios such as real-time video streaming and online gaming, for social apps, and emails .Many mobile social or media applications have been launched recently, but most popular app like Face book, Twitter, have large demand among users. But there are some limitations in the current mobile and wireless technologies, in which battery lifetime and unstable connection bandwidth are some of the problems. Cloud computing provides low-cost, agile scalable resource supply and power efficient mobile communication. Cloud can reduce load of computation and other tasks which is involved in a mobile application. This significantly reduces battery consumption of the mobile devices. Cloud MoV effectively utilizes the cloud computing paradigm to offer a living-room experience of video watching just as users are watching TV at their homes. In CloudMoV, mobile users can import a live or on-demand video to watch from any video streaming site like YouTube, Vimeo, Upstream etc and invite their friends and family for watching the video concurrently. They can also chat with each other while enjoying the video. In traditional system each users uses dish TV, set boxes for digital broadcasting of channels. The CloudMoV utilizes agile resource support and the functionalities which are provided by both an IaaS (Infrastructure-as-a-Service) cloud and a PaaS (Platform-as-a-Service) cloud. The design achieves the following goals.

A. Encoding Flexibility

There are various mobile devices which have large screen size and small screen displays, also they have various screen resolutions. The mobile phones support for customized media playback hardware, video playback and also support for various codec. Cloud MoV unloads the transcoding streams of different devices at real time in an IaaS cloud.A surrogate is employed for each user, which is a virtual machine (VM) in the IaaS cloud. The surrogate downloads the video and transcodes it into the proper formats, while considering particular configurations of the mobile device as well as the current connectivity quality.

B. Battery Efficiency

A breakdown analysis indicates that the network modules (both Wi -Fi and 3G) and the display consume maximum power in a mobile device. To save energy coming from the network module of Smartphone through an efficient data transmission mechanism design is the main goal. The focus on 3G wireless networking as it is getting more widely used and challenging in design than Wi-Fi based transmissions.

C. Spontaneous Social Interactivity

Multiple mechanisms are included in the design of CloudMoV for concurrent viewing and social chatting with each other. First factor is efficient synchronization mechanisms in which friends joining in a video program may watch the same portion and share their views and comments about video with each other.Second factor is an efficient message communication mechanism which is designed for social interactions among friends. PaaS cloud provides these mechanisms through data storage of Bitable. PaaS is proven model for running applications without hassle of maintaining hardware and software infrastructure at the company salesforce.com for the simplicity, scalability and reliability. PaaS cloud can be used for social interaction support due to its provision of robust underlying platforms. IaaS is the foundation of cloud computing. Some space can be taken on rent in data centers from IaaS provider to maintain and deploy computer servers, cloud networks and storage.

D. Portability

A prototype Cloud MoV system is implemented following the philosophy of "Write Once, Run Anywhere" (WORA): both the front-end mobile modules and the back-end server modules are implemented in Java, Android, PHP and MySql database is used for storing user data. The client module can run on any mobile devices supporting HTML5, including Android phones. In Peer to Peer Sharing of Cloud Based Mobile Social TV the videos are shared between two users using Peer to Peer technology. Real

Time Streaming Protocol (RTSP) is used for online streaming of videos in the mobile phones and Open Fire Chat Server for chatting with each other.

II. Literature Review

A number of mobile TV systems have been launched with more advanced features in the hardware and software modules in the mobile phones. Yu Wu et al in
[1] Proposed the design of a Cloud-based, novel Mobile sOcial tV system (CloudMoV). The system effectively utilizes both PaaS (Platform-as-a-Service) and IaaS (Infrastructure -as-a-Service) cloud services to offer the living-room experience of video watching to a group of disparate mobile users who can interact socially while sharing the video. For, getting good streaming quality as experienced by the mobile users with time-varying wireless connectivity, a surrogate is employed for each user in the IaaS cloud for video downloading and social exchanges on behalf of the user.
[2] Proposed a new system architecture in which, a mobile user can exploits virtual machine (VM) technology to rapidly instantiate customized service software on a nearby cloudlet. The mobile device typically functions as a thin client with respect to the service. A key point to exploit the potentialities of Wi-Fi hotspots is managing the scarce energetic resources of mobile devices.
[3] Sokol Kosta et al propose a Smartphone that have been launched with most advanced features in hardware due to which they are more complex. In this paper Think Air, a framework is proposed due to which developers can migrate their Smartphone applications to the cloud. Think Air provides method-level computation offloading in the cloud. It focuses on the elasticity and scalability of the cloud and enhances the power of mobile cloud computing by parallelizing method execution using multiple virtual machine (VM) images. It shows that a parallelizable application can invoke multiple VMs to execute in the cloud in a seamless and on-demand manner such as to achieve greater reduction on execution time and energy consumption. It finally uses a memory hungry image combiner tool to demonstrate that applications can dynamically request VMs with more computational power in order to meet their computational requirements .Existing media providers such as YouTube and Hulu deliver videos by turning it into a progressive download is proposed.
[4]. the paper presents Cloud Stream: a cloud-based video proxy that can deliver high -quality streaming video. This is done by transcending the original video in real time to a scalable codec format. The multi-level transcending parallelization framework have two mapping options (Hallsh-based Mapping and Lateness-first Mapping) that optimize transcending speed and reduce the transcending jitters while preserving the encoded video quality.
[5] propose Amigo TV is a prototype implementation that combines broadcast television with rich communication and community support. Nicolas Ducheneaut et al
[6] discuss Media research has shown that people enjoy watching television as a part of socializing in groups. This paper describes the initial results from a series of studies illustrating how people interact in front of a television set. Mobile phones batteries are limited in size and capacity is also limited is discussed .
[7]. A detailed analysis of the power consumption of a recent mobile phone, the Openmoko Neo Freerunner is done. The overall system power is measured, and the exact breakdown of power consumption by the device is also measured. It develops a power model of the Freerunner device and analyse the energy usage and battery lifetime under a number of usage patterns.3GPP Multimedia Broadcast Multicast Service (MBMS) group communications is launched into the 3G networks is discussed in
[8]. Authors in discussed the implementation guidelines on the use of the electronic service to guide in IP Datacast over DVB-H system for the announcement of services to the terminal. This intends in particular to guide implementers of IP Datacast over DVB -H Services, Servers and Terminals to make best use of the specification IP Datacast over DVB-H.K. Chorianopoulos et al in
[9] discuss the social impact of communication technologies that has followed two distinct directions and has considered independently either in the interpersonal communication or the mass communication. The Social TV supports interpersonal communication is explored which is gained from mass media consumption.Mei Chuah et
[10] proposed the online chat technologies such as instant messaging and SMS have become extremely popular. The Reality Instant Messaging project injects these reality events back into online chat. Raimund Schatz et al in
[11] proposed Mobile TV that is a class of pervasive multimedia services which currently enjoys considerable scientific and commercial attention. It is proposed that the integration of peer-to-peer interactivity as one likely Mobile TV evolution path. Authors Raimund Schatz et al in
[12] explores social interaction features for Mobile Broadcast TV services. It discusses their impact on the Mobile TV user experience and provides guidance on the design of Social Mobile TV services.In
[13] Authors demonstrate a collaborative relationship between the operating system and applications that can be used to meet user-specified goals for battery duration. By monitoring energy supply and demand, it is able to select the correct tradeoff between energy conservation and application quality.Wanghong Yuan et al in
[14] proposed GRACE- OS, an energy-efficient soft real-time CPU scheduler for mobile devices that primarily run multimedia applications. GRACE -OS makes scheduling decisions based on the probability distribution of application. This stability implies that it is feasible to perform stochastic scheduling and voltage scaling with low overhead.

III. Architecture of Cloudmov

In this paper, we describe the design of a novel mobile social TV system and peer to peer sharing of multimedia data using Cloud MoV. CloudMoV can effectively utilize the cloud computing paradigm to offer a living-room experience of video watching to disparate mobile users with spontaneous social interactions. Fig. 1 gives an overview of the architecture of CloudMoV. The modules used in the architecture of Cloud MoV are-:

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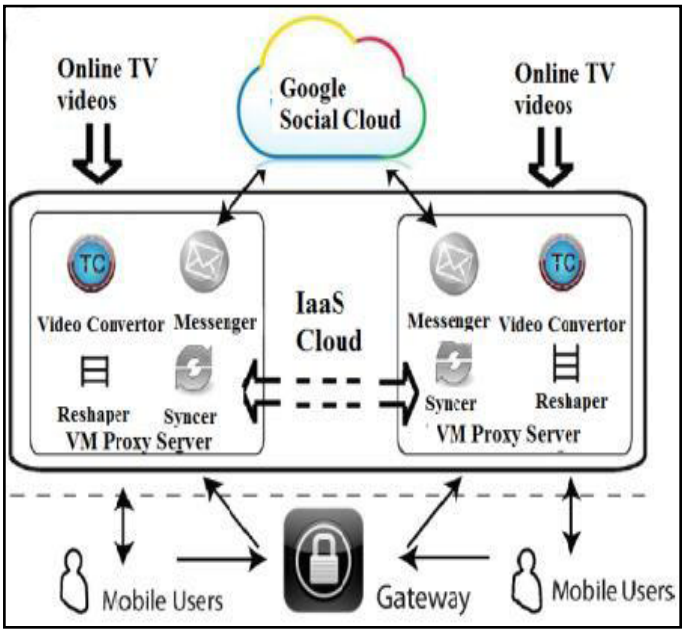

Fig. 1: Architecture of CloudMoV

A VM Proxy Server: It is a proxy server which acts between online video streaming sites like YouTube sites and mobile devices which provides transcoding services to the user. The proxy server handles social messages between users in proper efficient way. In CloudMoV we have gateway server which tracks participating users and their VM surrogates. CloudMov has following major functional modules which are as follows:Video Convertor: Online video convertor which is trancoder is part of suurogate i.e proxy server. The transcoder transforms video from video streaming sites like YouTube into proper format which can be used on mobile devices.

Reshape

It receives the encoded stream which divides it into segments and sends each converted stream in to mobile devices Google Social PaaS Cloud: Google Social cloud stores all the social data in the system, including the online statuses of all users, records of the existing sessions, user login details and messages.

Messenger:

It is the client side component of mobile user which can be used for chatting and exchanges of messages between users. The user can share his views and opinions, photos and videos with his friends and family using this messenger.

Syncer:

It is component of surrogate which can be used to retrieve user viewing status within certain time limit.

Mobile Client:

It is user which can access Messenger, and can watch videos on to his Mobile using HTML5 compatible browser which are Google Chorme.

Gateway:

It verifies the user's login details and stores user's login details into MySQL database. It can also store pool of videos into database

IV. Conclusion

This WORK presents about details of mobile TV and features which are provided by the mobile TV. Mobile social TV supports rich functionalities which are provided by cloud computing services. This paper also focuses on the Virtual Machine (VM) technology which detects the use of customized services on the cloudlet using Wireless LAN. This paper also discusses generic and portable mobile social Tv which uses both IaaS and PaaS cloud. The framework provides users with transcending of video services which also support for at concurrent video watching and chatting with his friends. Cloud MoV can be implemented on Amazon EC2 and Google Cloud Messaging. Open Fire Chat Server is used for enabling instant messaging among users. The sharing of Cloud based Mobile TV (Cloud MoV) can be done in Peer to Peer fashion between two or more users and focus would be on increasing battery lifetime of mobile phones.

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