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AMES-Cloud: Adaptive and Efficient Mobile Video Streaming Social Networks in the Clouds

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Abstract: *Due to the high demands of video traffics over mobile networks, the wireless link more fails to keep up the pace with the demand. There exits a gap between the request and the link capacity which results in poor service quality of the video streaming over mobile networks which includes disruptions and long buffering time. While demands on video traffic above mobile webs have been float, the wireless link capacity cannot retain up alongside the traffic request. The gap amid the traffic request and the link capacity, alongside time-varying link conditions, by-product in poor ability quality of video streaming above mobile webs such as long buffering period and intermittent confusion. Leveraging the cloud computing knowledge, we advice a new mobile video streaming framework, dubbed AMES-Cloud that has two parts: Adaptive Mobile Video Streaming (AMOV) and Efficient Communal Video Sharing (ESoV). AMoV and ESoV craft a personal agent to furnish video streaming services effectually for every single mobile user. For a given user, AMoV lets her private agent adaptively adjust her streaming flow alongside a scalable video coding method established on the feedback of link quality. In similar, ESoV monitors the common web contact amid mobile users, and their confidential agents attempt to perfects video content in advance. We apply a prototype of the AMES-Cloud structure to clarify its performance.*

Keywords: *Scalable Video Coding, Adaptive Video Streaming, Mobile Networks, Social Video Sharing, Cloud Computing.*

1. INTRODUCTION

Cloud computing is the lease of the resources through which the users can use the resources depending upon the requirement and pay based on the usage. Trough cloud computing the user can decrease the cost and can use the resource at any time.

There are three types of cloud as shown in fig1

- Public cloud
- Private cloud
- Hybrid cloud

Public Cloud: Public cloud or external cloud is one in which the resources are leased on self service basis over the internet, via web applications/web services, from an off-site third-party provider who shares resources and bills on a fine-grained utility computing basis.

Private Cloud: Private cloud is also called internal cloud; it is used to describe the offerings of private network.

Hybrid Cloud: Hybrid cloud is one which contains multiple internal or external clouds. Means N number of internal and external clouds

AMES is based on platform as a service. Platform as a service (PaaS) is a category of cloud computing services that provides a computing platform and a solution stack as a service.[1] Along with software as a service (SaaS) and infrastructure as a service (IaaS), it is a service model of cloud computing. In this model, the consumer creates the software using tools and/or libraries from the provider. The consumer also controls software deployment and configuration settings. PaaS offerings facilitate the deployment of applications without the cost and complexity of buying and managing the underlying hardware and software and provisioning hosting capabilities.

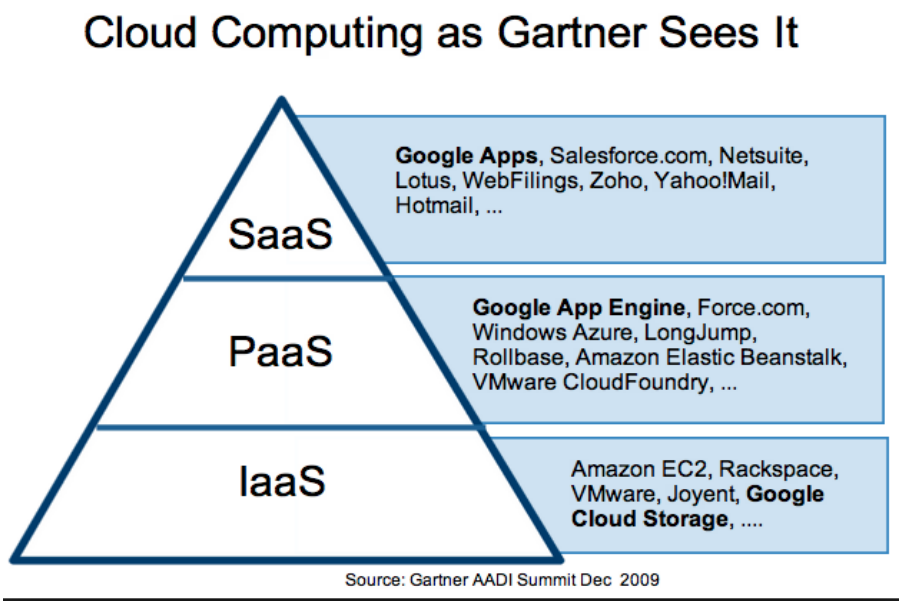

Fig1. *Types of services*

Fig 2 shows the architecture of a typical cloud at a high level. An end user Bob connects to the cloud via a portal from his browser. Alternatively, a user Alice can choose to directly connect to the cloud manager via a command line interface similar to that used in EC2. A cloud provides three types of resources: a collection of (VM) virtual machine images, a set of computer servers on which the VM images can be run, and optionally a storage pool to store persistent user data. The users will make the request and the cloud manager will authenticate the user and he keep track of the users and their request and due to the streaming techniques and AMoV will adjust the streaming flow with a video coding technique will adjust the flow and increase the quality.

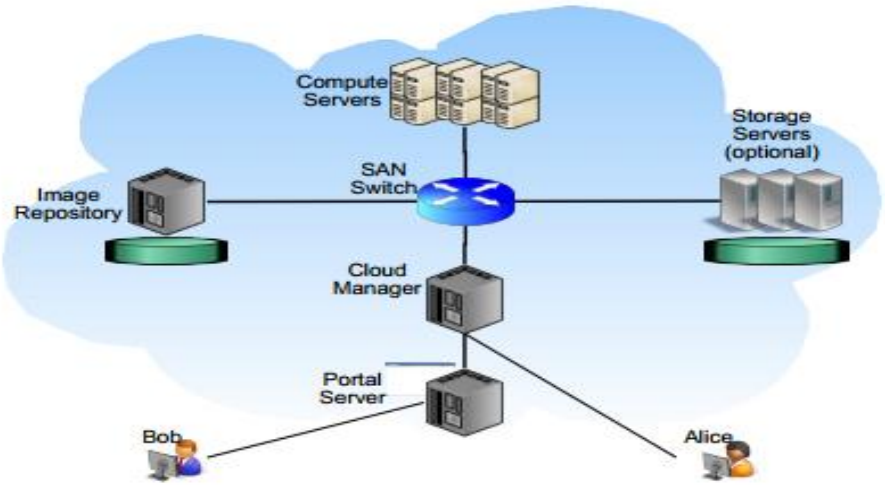

Fig2. *Cloud architecture*

2. LITERATURE REVIEW

Several authors have developed the techniques related to storing the data and also for maintaining the data and for security issues related to the cloud.

The quality of service on mobile video is based on two factors:

2.1. Scalability

Mobile video streaming services should support a wide spectrum of mobile devices; they have different video resolutions, different computing powers, different wireless links (like 3G and LTE) and so on. Also, the available link capacity of a mobile device may vary over time and space

depending on its signal strength, other user's traffic in the same cell, and link condition variation. Storing multiple versions (with different bit rates) of the same video content may incur high overhead in terms of storage and communication.

2.2. Adaptability

Traditional video streaming techniques designed by considering relatively stable traffic links between servers and users perform poorly in mobile environments [11]. Thus the fluctuating wireless link status should be properly dealt with to provide 'tolerable" video streaming services. To address this issue, we have to adjust the video bit rate adapting to the currently time-varying available link bandwidth of each mobile user. Such adaptive streaming techniques can effectively reduce packet losses.

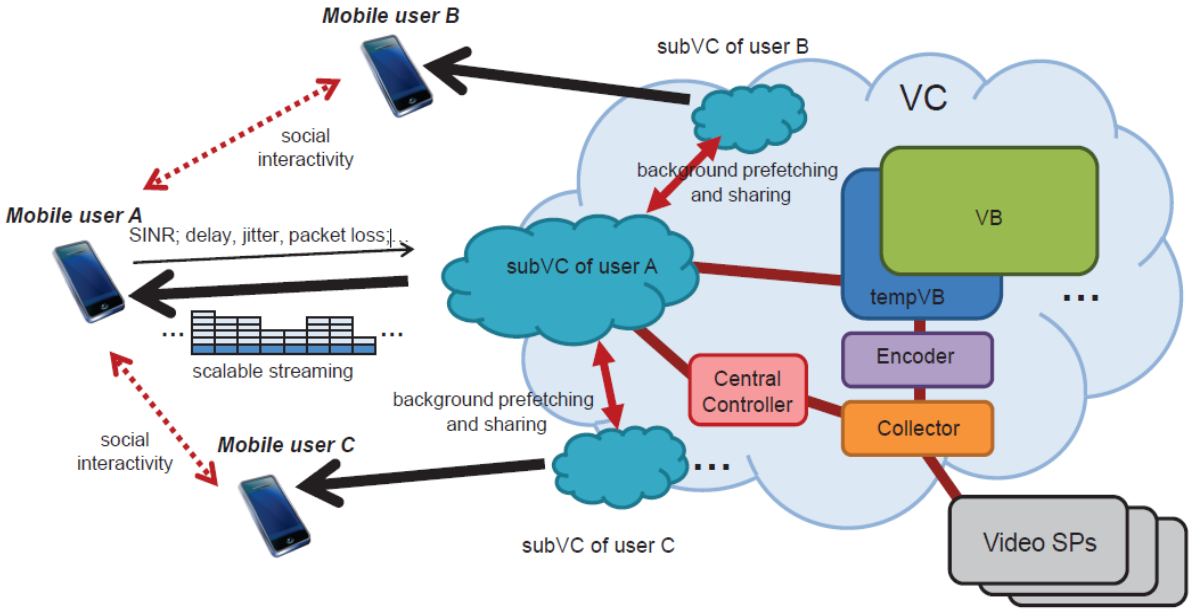

Fig3. *An illustration of the AMES-Cloud framework*

2.2.1. Adaptive Video Streaming Techniques

In the adaptive streaming, the video traffic rate is adjusted on the fly so that a user can experience the maximum possible video quality based on his or her link's time-varying bandwidth capacity. There are mainly two types of adaptive streaming techniques, depending on whether the adaptively is controlled by the client or the server. The Microsoft's Smooth Streaming is a live adaptive streaming service which can switch among different bit rate segments encoded with configurable bit rates and video resolutions at servers, while clients dynamically request videos based on local monitoring of link quality. Adobe and Apple also developed client-side HTTP adaptive live streaming solutions.

2.2.2. Mobile Cloud Computing Techniques

The cloud computing has been well positioned to provide video streaming services, especially in the wired Internet because of its scalability and capability. For example, the quality-assured bandwidth auto-scaling for VoD streaming based on the cloud computing is proposed , and the CALMS framework is a cloud-assisted live media streaming service for globally distributed users. However, extending the cloud computing-based services to mobile environments requires more factors to consider: wireless link dynamics, user mobility, the limited capability of mobile devices. More recently, new designs for users on top of mobile cloud computing environments are proposed, which virtualized private agents that are in charge of satisfying the requirements (e.g.QoS) of individual users such as Cloudlets and Stratus.

The Video usage and images plays a vital role in communication. The usage of traditional networking and service providers lacks to provide the quality centered and reliable service to the mobile users concerning with the media data. The problems that leads to the poor services from the service providers would be low bandwidth which affects the efficient transfer of video to the user, the disruption of video streaming also occurs due to the low bandwidth. The buffer time of the video over mobile devices which moves from place to place affects the smooth streaming and also sharing of

video from one user to another user over social media. Our survey shows the functioning of various methods and architecture which used cloud to provide effective solution for providing better service to the users. AMES is cloud architecture built specially to provide video service to the user. The study has came up with a optimal solution, proposing with video cloud, which collects the video from video service providers and providing the reliable service to the user[1].The network providers YouTube provide video downloads but it provides some delays due to network dynamics so this technique is used to remove jitters and provide video on demand[3]. cloud centered streaming solutions for different mobile which shows my realistic work relevant to streaming methods with RTMP protocols family and solutions for iPhone, Android, Smart mobile phones, Window and Blackberry phones etc.

Due to the fast development of the mobile communication technology, more people are getting addicted to video streaming over phones. Over the few years, video streaming is becoming challenging over wireless links than on wired links. The increasing video traffic demands are overwhelming the wireless link capacity. The mobile users often suffer from disruptions and very long buffering time while receiving video through networks like 3G or 4G due to short bandwidth and link fluctuations. So, it is imperative to improve the services of video streaming over mobile networks. Scalability and adaptability are the two aspects in order to improve the quality of the video streaming over mobile networks.

Scalable video coding (SVC) and adaptive streaming techniques can be combined together to accomplish the best possible quality of the video streaming services. So, that we can adjust the SVC layers which depends on the current link status. The cloud computing technique is ready to provide scalable resources to the service providers and process offloading to the mobile users. So, cloud data centers can provision to large scale real time video services. In cloud more than one agent instances can be maintained dynamically and effectively due to mobile user demands.

The social network services (SNS) on the mobile networks is becoming increasingly popular. In SNS's mobile users might post, comment and share videos which can be viewed and by his/her friends. So, we are inspired to exploit the relationship between the mobile users and their SNS activities in order to perfects the first part of the video during streaming.

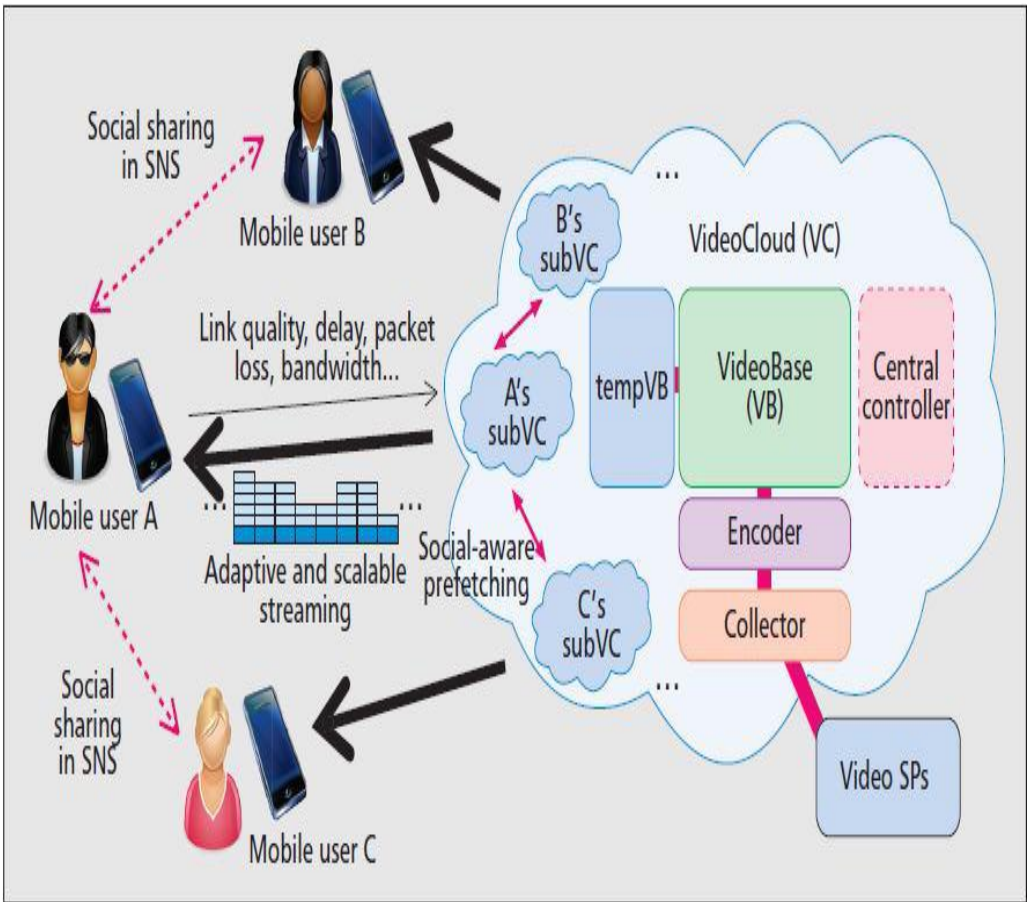

Fig4. *Context architecture*

3. CLOUD FRAMEWORK

As shown in the above figure, the video streaming and storing system in the cloud is called video cloud (VC). Within the video cloud, there is video base (VB), which is responsible to store the popular video clips. tempVB is a video base which is temporary and is utilized to cache new mobile users for popular videos, while it counts the access frequency of each video.VC keeps on executing a collector to look for videos which are popular already in video service provider (VSP), and it will re-encode the videos that are collected into scalable video coding format and will save in tempVB.

A sub video cloud (subVC) is dynamically created if there is any ling of video demand from the mobile user. A sub video base (subVB) is present in subVC and it stores segments of recently fetched video. The subVC contains encoding functions, and if the mobile users request a new video, which is not in the subVB or the VB in VC, the subVC will fetch, encode and move the video. During the time of the streaming of videos, the users of the mobile will report the link conditions to the subVC and it will offer adaptive streams. There is a temporary storage in every mobile device which is known as local video base (localVB), used for perfecting and buffering.

4. SOCIAL AWARE VIDEO PREFETCHING

In social network services, the mobile users can subscribe to their friends and content publishers, and there are numerous types of activities socially. So it is required for us to define different kinds of levels of strengths for those socially oriented activities to indicate many different possibilities so that the videos that are shared by one mobile user can be viewed by the receiver of his/her sharing activities, so the sub video clouds may engage into pre fetching at subVB done in background and may transfer to mobile user's local VB. Because after one shares a video, there can be a bit of delay that the receiver will know the sharing, and starts to watch. So, advance pre fetching will not affect the mobile users in most of the cases. But a mobile user may play the videos to view without any delay due to buffering as the first part or May even the entire video is locally pre fetched already.

5. IMPLEMENTATION

Cloud computing promises lower costs, rapid scaling, easier maintenance, and service availability anywhere, anytime, a key challenge is how to ensure and build confidence that the cloud can handle user data securely. A recent Microsoft survey found that "58 percent of the public and 86 percent of business leaders are excited about the possibilities of cloud computing. But more than 90 percent of them are worried about security, availability, and privacy of their data as it rest sin the cloud.

In this technique we propose an adaptive mobile video streaming and sharing framework, called AMES-Cloud, which efficiently stores videos in the clouds (VC), and utilizes cloud computing to construct private agent (subVC) for each mobile user to try to offer "non-terminating" video streaming adapting to the fluctuation of link quality based on the Scalable Video Coding ability. Also AMES-Cloud can further seek to issue "none buffering "experience of video streaming by background pushing functions among the VB, subVBs and localVB of mobile users. We assess the AMES-Cloud by prototype implementation and shows that the cloud computing technique brings significant improvement on the adaptively of the mobile streaming. We disregard the cost of encoding workload in the cloud while implementing the prototype.

This method require three different steps

- Uploading and Rating videos:
- User details
- Rate videos

Uploading and Rating Video: Here we can upload the videos and also we can give rating to the videos depending upon the priorities or the usage.

User Details: In this we will maintain the details of the users and also determine the usage of each user. And keep track of the videos the user is requesting and account them.

Rate Videos: This wills avoiding unexpected videos from users. After accept/reject videos then only users can/cannot view their own videos.

6. CONCLUSION

In this paper we have discussed our proposal of the cloud assisted adaptive mobile video streaming and social websites are fetching, which stores the videos efficiently in the clouds and constructs private agent (subVC) for active mobile users in order to try to give "non terminating" streaming of videos by adapting to the changes of quality of links which depends on scalable video coding technique, and to try to provide "non buffering" video streaming experience by background pre fetching based on the tracking of the interactions of mobile users in their SNSs. We evaluated the framework by prototype implementation, and showed successfully that the cloud computing method brings improvement to the adaptability and scalability of the mobile streaming, and the efficiency of intelligent pre fetching.

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