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Peripatetic Shared TV Using Cloud

Kotari Tabitha#1, Sk Mubeena Sultana #2

#1 Student OfM.Tech Department Of Computer Science Engineering G.V.R&S College Of Engineering & Technology,

#2 Department Of Computer Science Engineering G.V.R&S College Of Engineering & Technology, GUNTUR

ABSTRACT

While demands on video traffic over Portable networks have been souring, the wireless link capacity cannot keep up with the traffic demand. The gap between the traffic demand and the link capacity, along with time-varying link conditions, results in poor service quality of video streaming over Portable networks such as long buffering time and intermittent disruptions. Leveraging the cloud computing technology, we propose a new Portable video streaming Structure, dubbed AMES-Cloud, which has two main parts: AMoV(adaptive Portable video streaming) and ESoV(efficient social video Distribution). AMoV and ESoV construct a private agent to provide video streaming services efficiently for each Portable user. For a given user, AMoV lets her private agent adaptively adjust her streaming flow with a scalable video coding technique based on the feedback of link quality. Likewise, ESoV monitors the social network interactions among Portable users, and their private agents try to prefetch video content in advance. We implement a prototype of the AMES-Cloud Structure to demonstrate its performance. It is shown that the private.

Index Terms Scalable Video Coding, Adaptive Video Streaming, Computing.

I. INTRODUCTION

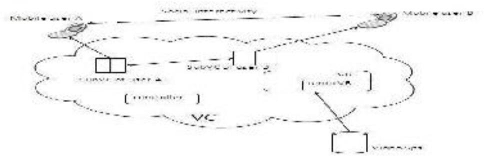
Over the past decade, increasingly more traffic is accounted by video streaming and downloading. In particular, video streaming services over Portable networks have become prevalent over the past few years [1]. While the video streaming is not so Portable Networks, Social Video Distribution, Cloud challenging in wired networks, Portable networks have been suffering from video traffic transmissions over scarce bandwidth of wireless links. Despite network operators' desperate efforts to enhance the wireless link bandwidth (e.g., 3G and LTE), soaring video traffic demands from Portable users are rapidly overwhelming the wireless link capacity.

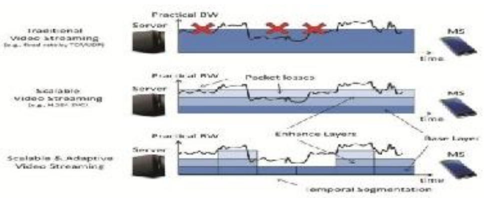
While receiving video streaming traffic via 3G/4G Portable networks, Portable users often suffer from long buffering time and intermittent disruptions due to the limited bandwidth and link condition fluctuation caused by multi-path fading and user mobility [2] [3] [4]. Thus, it is crucial to improve the service quality of Portable video streaming while using the networking and computing resources efficiently [5] [6] [7] [8]. Recently there have been many studies on how to improve the service quality of Portable video streaming on two aspects:

Scalability: Portable video streaming services should support a wide spectrum of Portable 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 Portable device may vary over time and space depending on its signal strength, other users 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. To address this issue, the Scalable Video Coding (SVC) technique (Annex G extension) of the H.264 AVC video compression standard [9] [10] [11] defines a base layer (BL) with multiple enhance layers (ELs). These substreams can be encoded by exploiting three scalability features: (i) spatial scalability by layering image resolution (screen pixels), (ii) temporal scalability by layering the frame rate, and (iii) quality scalability by layering the image compression. By the SVC, a video can be decoded/played at the lowest quality if only the BL is delivered. However, the more ELs can be delivered, the better quality of the video stream is achieved.

Adaptability: Traditional video streaming techniques designed by considering relatively stable traffic links between servers and users, perform poorly in Portable environments [2]. 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 Portable user. Such adaptive streaming techniques can effectively reduce packet losses and bandwidth waste.

RELATED WORK





AMOV: AdaptivePortablevideo Streaming

A. SVC

As shown in Fig. 2, traditional video streams with fixed bit rates cannot adapt to the fluctuation of the link quality. For a particular bit rate, if the sustainable link bandwidth varies much, the video streaming can be frequently terminated due to the packet loss.

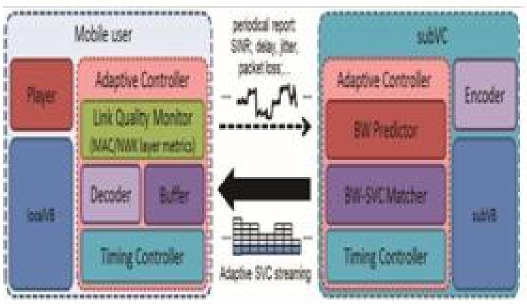


Fig. 3. Functional structure of the client and the subVC

In SVC, a combination of the three lowest scalability is called the Base Layer (BL) while the enhanced combinations are called Enhancement Layers (ELs). To this regard, if BL is guaranteed to be delivered, while more ELs can be also obtained when the link can afford, a better video quality can be expected.

By using SVC encoding techniques, the server doesn't need to concern the client side or the link quality. Even some packets are lost, the client still can decode the video and display. But this is still not bandwidth-efficient due to the unnecessary packet loss. So it is necessary to control the SVC-based video streaming at the server side with the rate adaptation method to efficiently utilize the bandwidth.

CONCLUSION:

In this paper, we discussed our proposal of an adaptive Portable video streaming and Distribution Structure, called AMES-Cloud, which efficiently stores videos in the clouds (VC), and utilizes cloud computing to construct private agent (subVC) for each Portable user to try to offer "non-terminating" video streaming adapting to the fluctuation of link quality based on the Scalable Video Coding technique. Also AMES-Cloud can further seek to provide"nonbuffering" experience of video streaming by background pushing functions among the VB, subVBs and localVB of Portable users. We evaluated the AMES-Cloud by prototype implementation and shows that the cloud computing technique brings significant improvement on the adaptivity of the Portable streaming.

The focus of this paper is to verify how cloud computing can improve the transmission adaptability and prefetching for Portable users. We ignored the cost of encoding workload in the cloud while implementing the prototype. As one important future work, we will carry out large-scale implementation and with serious consideration on energy and price cost. In the future, we will also try to improve the SNS-based prefetching, and security issues in the AMES-Cloud.

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AUTHORS PROFILE:

KOTARI TABITHA is a student of Computer Science Engineering from G.V.R&S college of Engineering & Technology Presently pursuing M.Tech (CSE) from this college. She received B.Tech from JNTUK in the year of 2012.

SK MUBEENA SULTANA is a Assistant Professor from G.V.R&S College of Engineering & Technology. She received M.Tech from JNTU Kakinada University. She gained a teaching experience of 3 Years. She is good researcher in Networking.