

Efficient Social Video Sharing in Mobile Traffic on WWW by using Clouds

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ABSTRACT

Over the past decade, increasingly more traffic is accounted by video streaming and downloading. While the video streaming is not so challenging in wired networks, mobile 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 mobile users are rapidly overwhelming the wireless link capacity. While receiving video streaming traffic via 3G/4G mobile networks, mobile 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. Thus, it is crucial to improve the service quality of mobile video streaming while using the networking and computing resources efficiently.

Keywords— Adaptive video streaming, cloud computing, mobile networks, scalable video coding, social video sharing.

1.INTRODUCTION

RECENT studies have shown that users while the video streaming is not so challenging in wired networks, mobile networks have been suffering from video traffic transmissions over scarce bandwidth there have been many studies on how to improve the service quality of mobile video streaming on two aspects: [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 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 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 mobile environments. Thus the fluctuating wireless link status should be properly dealt with to provide tolerable video streaming services. To address this issue, 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 and bandwidth waste. [2]

Scalable video coding and adaptive streaming techniques can be jointly combined to accomplish effectively the best possible quality of video streaming services. This can dynamically adjust the number of SVC layers depending on the current link status. [2]–[4]

Recently social network services (SNSs) have been increasingly popular. There have been proposals to improve the quality of content delivery using SNSs. In SNSs, users may share, comment or re-post videos among friends and members in the same group, which implies a user, may watch a video that her

friends have recommended. Users in SNSs can also follow famous and popular users based on their interests (e.g., an official facebook or twitter account that shares the newest pop music videos), which is likely to be watched by its followers.

2. RELATED WORK

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 adaptivity 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. [28], [29],

Regarding rate adaptation controlling techniques, TCP friendly rate control methods for streaming services over mobile networks are proposed, where TCP throughput of a flow is predicted as a function of packet loss rate, round trip time, and packet size. Considering the estimated throughput, the bit rate of the streaming traffic can be adjusted. A rate adaptation algorithm for conversational 3G video streaming is introduced by. Then, a few cross-layer adaptation techniques are discussed, which can acquire more accurate information of link quality so that the rate adaptation can be more accurately made. However, the servers have to always control and thus suffer from large workload. Recently the H.264 Scalable Video Coding (SVC) technique has gained a momentum. An adaptive video streaming system based on SVC is deployed in , which studies the Real-time SVC decoding and encoding at PC servers. [9], [12].

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[13]. For example, the quality-assured bandwidth auto-scaling for VoD streaming based on the cloud computing is proposed , and the CALMS [33]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, and the limited capability of mobile devices.

3. EXISTING SYSTEM

In the existing system when we type a url in our mobile browsers, it lets you to navigate to the respective page and if that page has an embedded video in the url it starts streaming using the mobile network whether (WI-FI, GPRS) and based on the strength of the signal it keep on streaming as well as playing .If the resolution is HD or high it will take time to stream and play in that case user gets paused till it stream and play. In the mentioned situation It has time delay to watch the video which user has requested This technology has several advantages and disadvantages

Advantages of Existing system

- (I) User will see the same quality always which is available on server.
- (II) Server monitors the constant bandwidth throughout the stream.

Disadvantages of Existing system

- (I) It always uses the maximum link capacity for video streaming.
- (II) Cannot control the resolution.
- (III) In case of weak signal user gets paused on the screen till video streams.
- (IV) Unnecessary traffic increase for the bandwidth.
- (V) Cannot maintain constancy of the video streaming.

4. PROPOSED SYSTEM

We have proposed a system in that will reduce the traffic and will provide the maximum utilization of the bandwidth capacity. As per the design we have proposed an algorithmic approach for video format conversion from one format to other depending upon the strength of the signal received from mobile.

4.1 AMES-Cloud Framework

The AMES-Cloud framework includes the Adaptive Mobile Video streaming (AMoV) and the Efficient Social(ESoV).Videosharing

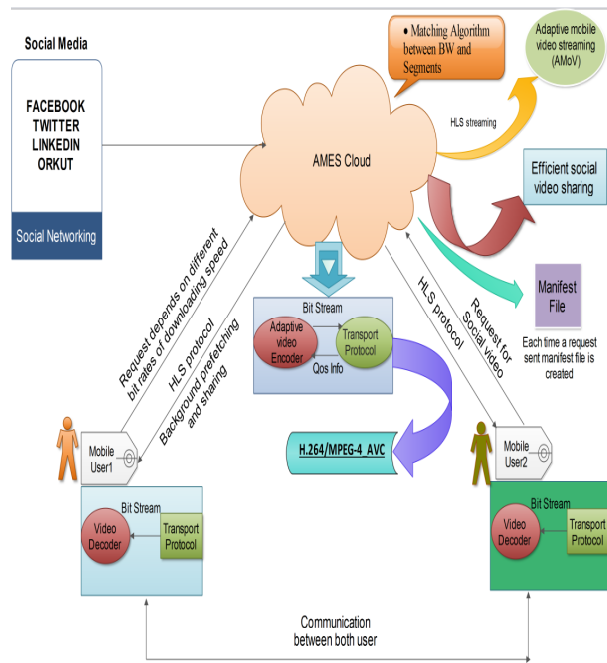


Illustration of the AMES-Cloud framework with the Video Cloud (VC), subVCs for mobile users, the Video Base (VB), and the Video Service Providers (SPs).

the whole video storing and streaming system in the cloud is called the Video Cloud (VC). In the VC, there is a large-scale video base (VB), which stores the most of the popular video clips for the video service providers (VSPs). A temporal video base (tempVB) is used to cache new candidates for the popular videos, while tempVB counts the access frequency of each video. The VC keeps running a collector to seek videos which are already popular in VSPs, and will re-encode the collected videos into SVC format and store into tempVB first. By this 2-tier storage, the AMES-Cloud can keep serving most of popular videos eternally. Note that management work will be handled by the controller in the VC. Specialized for each mobile user, a sub-video cloud (subVC) is created dynamically if there is any video streaming demand from the user. The sub-VC has a sub video base (subVB), which stores the recently fetched video segments. Note that the video deliveries among the subVCs and the VC in most cases are actually not 'copy', but just 'link' operations on the same file eternally within the cloud data center. There is also encoding function in subVC (actually a smaller-scale encoder instance of the encoder in VC), and if the mobile user demands a new video, which is not in the subVB or the VB in VC, the subVC will fetch, encode and transfer the

video. During video streaming, mobile users will always report link conditions to their corresponding subVCs, and then the subVCs offer adaptive video streams. Note that each mobile device also has a temporary caching storage, which is called local video base (localVB), and is used for buffering and prefetching.

Note that as the cloud service may across different places, or even continents, so in the case of a video delivery and prefetching between different data centers, an transmission will be carried out, which can be then called 'copy'. And because of the optimal deployment of data centers, as well as the capable links among the data centers, the 'copy' of a large video file takes tiny delay.

.4.2 ESOV: Efficient Social Video Sharing Social Content Sharing

In SNSs, users subscribe to known friends, famous people, and particular interested content publishers as well; also there are various types of social activities among users in SNSs, such as direct message and public posting. For spreading videos in SNSs, one can post a video in the public, and his/her subscribers can quickly see it; one can also directly recommend a video to specified friends; furthermore one can periodically get noticed by subscribed content publisher for new or popular videos.

Here different strength levels for those social activities to indicate the probability that the video shared by one user may be watched by the receivers of the one's sharing activities, which is called a 'hitting probability', so that subVCs can carry out effective background prefetching at subVB and even localVB. prefetching from VC to subVC only refers to the 'linking' action, so there is only file locating and linking operations with tiny delays; the prefetching from subVC to localVB also depends on the strength of the social activities, but will also consider the wireless link status.

Here Classification of the social activities in current popular SNSs into three kinds, regarding the impact of the activities and the potential reacting priority from the point of view of the recipient:

- **Subscription:** Like the popular RSS services, a user can subscribe to a particular video publisher or a special video collection service based on his/her interests. This interest-driven connectivity between the subscriber and the video publisher is considered as 'median', because the subscriber may not always watch all subscribed videos.

- **Direct recommendation:** In SNSs, a user directly recommends a video to particular friends with a short message. The recipients of the message may watch it with very high probability. This is considered as ‘strong’
- **Public sharing:** Each user in SNSs has a timeline-based of activity stream, which shows his/her recent activities. The activity of a user watching or sharing a video can be seen by his/her friends (or followers). The public sharing with the ‘weak’ connectivity among users, because not many people may watch the video that one has seen without direct recommendations.

4.3 Prefetching Levels

Different strengths of the social activities indicate different levels of probability that a video will be soon watched by the recipient. Correspondingly define three prefetching levels regarding the social activities of mobile users:

- **‘Parts’:** Because the videos that published by **subscriptions** may be watched by the subscribers with a not high probability, Here propose to only push a part of BL and ELs segments, for example, the first 10% segments.
- **‘All’:** The video shared by the **direct recommendations** will be watched with a high probability, Here propose to prefetch the BL and all ELs, in order to let the recipients directly watch the video with a good quality, without any buffering.
- **‘Little’:** The **public sharing** has a weak connectivity among users, so the probability that a user’s friends (followers) watch the video that the user has watched or shared is low. Here propose to only prefetch the BL segment of the first time window in the beginning to those who have seen his/her activity in the stream.

The prefetching happens among subVBs and the VB, also more importantly, will be performed from the subVB to localVB of the mobile device depending on the link quality. If a mobile user is covered by Wi-Fi access, due to Wi-Fi’s capable link and low price (or mostly for free), subVC can push as much as possible in most cases. However if it is with a 3G/4G connection, which charges a lot and suffers limited bandwidth, It propose to downgrade the prefetching level to save energy and cost as listed in Table I, but users can still benefit from the prefetching effectively . This approach for video format conversion from one format to other depending upon the strength of the signal received from mobile, delay is reduced and increases the performance of streaming so user can

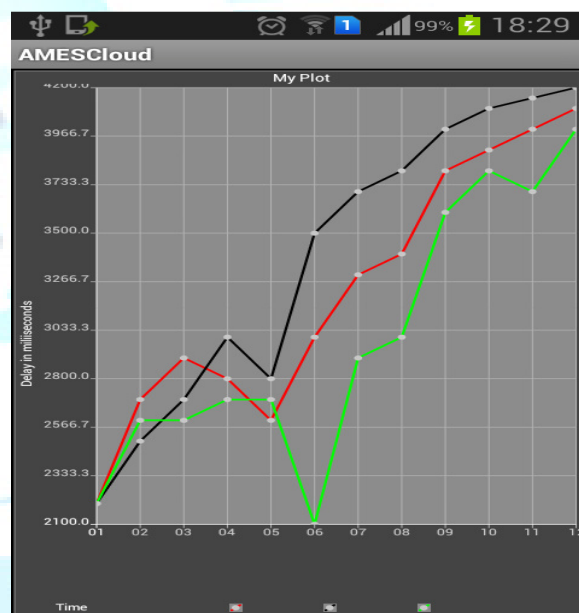
seamlessly enjoy the video streaming over weak or strong signal of (WI-FI/GPRS). Thus this proposed system is named as “adaptive mobile video streaming

Advantages of Proposed system

- The proposed system takes care of maximum utilization of bandwidth.
- User never gets paused while watching video.
- User can watch multiple videos together and framework will take care of resolution conversion.
- Streaming constancy is always maintained.

Disadvantages of the proposed system

- Resolution of the same video will keep on changing throughout the streaming.



5. CONCLUSION

Scalable video coding and adaptive streaming techniques can be jointly combined to accomplish effectively the best possible quality of video streaming services. This can dynamically adjust the number of SVC layers depending on the current link status.

This Proposed System will reduce the traffic and it will provide the maximum utilization of the bandwidth capacity thus User can seamlessly enjoy the video streaming over weak or strong signal of (WI-FI/GPRS). Server will automatically detect the

signal and it will subsequently convert the video in the most optimal streams

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