A Framework of Adaptive Mobile Video Streaming and Efficient Social Video Sharing In the Cloud

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Abstract: ***For the reasons of high data flow of video traffics over mobile networks, the wireless link capacity fails to keep up the pace with the demand. There exists a gap between the demand and the link capacity which results in poor service quality of the video streaming over mobile networks which includes disruptions and long buffering time. Following the cloud computing technology, we suggest two solutions: AMoV (adaptive mobile video streaming) and ESoV (efficient social video sharing). A private agent is constructed for each mobile user in the cloud which adjusts the video bit rate using scalable video coding technique based on the return value of the wireless link condition. ESoV and AMoV create a private mediator to give video streaming services capably for every mobile client. For a particular client, AMoV lets her secret agent/mediator adaptively alter her/his streaming pour with a scalable video coding procedure depended on the response of link superiority. As well, efficient social video sharing observes the social network acquaintances among mobile clients and their personal mediators try to share video pleased in advance. We realize the AMES-Cloud framework prototype to reveal its presentation. It is shown that the confidential agents in the clouds can efficiently provide the adaptive streaming, and based on the social network learning achieve video sharing.***

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

1. Introduction

Cloud computing provides various services to the human„s need and also it urges the more necessity for the emerging technology. It provides a platform for other advanced technologies like big data, mobile computing to inculcate its service and provide the QoS to the customers. All the services that are provided to the customer are done using could as their backbone, it gives vast amount of resources and infrastructure to consumer who acts as vendors to small scale business and cloud could provide services to fully fledged organization with less cost. Organizing the service and extending the service depending upon the growing needs of the customer could be achieved.

The usage of data has grown to very large extent in recent years. The studies shows us that, amount of data generate over the last decade is three times lesser than the amount of data generated in last one year. In early days we cannot store large amount of data, that problem is solved by introducing the hardware where limitation are not considered but the situation turns out that, if the hardware resources are not utilized effectively, maintain the resources becomes very serious problem. The data that is being used among the computing world has faced drastic change. These data occupies large amount of data, need very heavy processing powers. All the needed resources such as storage space and processing power are provided by the cloud and can be extended depending upon the service. The problem doesn„t rise until these data are transferred on the internet. The data created on the host, should be sent to the cloud for storage, the problem of data transfer with these high ended multimedia data starts. In this paper we are focus on the videos, video – data. The processing and transferring of video to the service provider and between hosts became an issue.

In excess of the past decade, more and more traffic is accounted by video streaming and downloading. In exacting, video tributary services over mobile networks have turn out to be widespread over the last few years. Whereas the streaming of video is not so demanding in wired networks, mobile networks have been affliction from video traffic communication over inadequate bandwidth of wireless links. Regardless of network operators anxious efforts to improve the wireless connection bandwidth (e.g., 3G and LTE), soaring video traffic burden from mobile customers quickly devastating the wireless link capability. While receiving video streaming traffic through 3G/4G mobile networks, mobile customer often put up with from long buffering time and irregular disruptions due to the partial bandwidth and link circumstance fluctuation caused by multi-path loss and user mobility. Thus, it is vital to pick up the service quality of mobile video streaming while via the networking and computing assets competently.

Recently there have been numerous lessons on how to improve the service excellence of mobile video streaming on two aspects:

1. Scalability: Mobile video streaming services should support a different variety of mobile devices. The mobile devices have different video resolutions, different computing powers, different wireless links like 2G,3G,4G and so on. The strength of signal of mobile devices may vary over time and space. For different mobile devices facing the problem of traffic in same or different cell and link of difference condition. For storing various versions of similar video having different bit rates may obtain high transparency of storing and communication. Scalability refers to different mobile devices have support different wide range of transforming video.

2. Adaptability: Established video streaming method planed by considering comparatively constant traffic links between client-server models. In client-server model or links between servers and users uses wire connection are good .but In the mobile environment carry out irregular. Thus the irregular wireless link condition should be properly contract with available supportable video streaming services. To perform this task, we have to regulate 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 properly adaptive video streaming remove the variation in the video having time-varying link bandwidth for mobile users.

While streaming the video in the mobile devices it is hectic to the user that is accounted as the traffic criteria. They evolve in the cloud environment while the user tries to stream and buffer the video with the traffic problems. The traffic is accounted on the one end and also the loss of packets and also the clarity is also accounted on another end. The user really faces problems with the mobile and mobile devices which he considers to be so compact. Though they are compact they do not deliver the user with the desired requirements. When we consider the wired networks they are much compatible with two factors they are the compatibility and the scalability factors. Though the mobile user are provided with the 3g and LTE connection in the fast access and transmission rate they are not in a mode to provide the user with the sufficient quality in the video in which the user expects.

The main reason is the traffic and the traffic is concerned in this paper with the new way for the uplink and downlink which means with the upload and downloads. In this area the video is presented in the cloud environment which is a part advantage to the user still the traffic is a prone. While receiving video via the fast transmission channels that is by 3g networks the user takes long time buffering in the video. At times the grey scaled video that is the very poor quality of video is also been delivered which makes the user very unlucky. Here we have an algorithm namely Adaptive Mobile video streaming which automatically adjusts the video and another algorithm namely Efficient social video sharing which pre fetches the interacts among the connected mobile users. The combined theory is used here to have to provide the user with the high quality video and deliver with the proper resolution capabilities. Further to strengthen the concept of congestion control we also provide with the shortest path tracker and provide them to travel and choose alternative path in terms of traffic. The security behaviors are been invoked to reasonably provide and deliver the user with the quality and to the server with the authenticated user.

2. Organization

This paper is organized as follows, section 1 discusses the introduction, and section 3 describes related work. Section 4 describes the methodology. Section 5, describes the result. Finally, section 6 presents some concluding remark.

3. Related Work

The requirement of traffic demand and provided link capacity is not sufficient for the need of mobile devices. Also the time-varying links like time and space results in reduced service quality of video streaming over mobile devices like as extended buffering time and irregular disturbance. In the cloud compute technology, this paper suggests a new video streaming structure of mobile, AMES-Cloud which consists of two parts: AMoV (adaptive mobile video streaming) and ESoV (efficient social video sharing). ESoV and AMoV create a private agent to give video streaming services capably for every mobile client. For a particular client, AMoV lets her secret agent/mediator adaptively alter her/his streaming pour with a scalable video coding procedure depended on the response of link superiority video of an adaptive mobile pour out and allocation framework. In this paper Author use framework for identify AMES-Cloud in which the creation of personal agents which take care of streaming video in mobile users.

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 [1]. 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 [2] 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 operating in the similar manner. There are also some similar adaptive streaming services where servers control the adaptive transmission of video segments, for example, the Qualitative Adaptive Streaming.

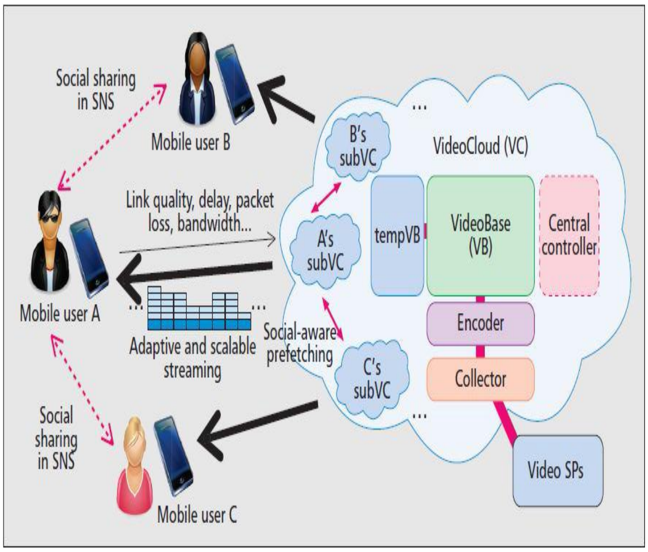

Figure 1: Cloud Frame work

However, most of these solutions maintain multiple copies of the video content with different bit rates, which brings huge burden of storage on the server. Regarding rate adaptation controlling techniques, TCP-friendly rate control methods for streaming services over mobile networks are proposed[3,4] 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 [5]. Then, a few cross-layer adaptation techniques are discussed [6,7], 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 [8] An adaptive video streaming system based on SVC is deployed in[9], which studies the real-time SVC decoding and encoding at PC servers. The work in[10] proposes a quality-oriented scalable video delivery using SVC, but it is only tested in a simulated LTE Network. Regarding the encoding performance of SVC, Cloud Stream mainly proposes to deliver high-quality streaming videos through a cloud-based SVC proxy[11], which discovered that the cloud computing can significantly improve the performance of SVC coding. The above studies motivate us to use SVC for video streaming on top of cloud computing.

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 [12]. For example, the quality-assured bandwidth auto-scaling for VoD streaming based on the cloud computing is proposed [13], and the CALMS framework [14] 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 [15, 16]. More recently, new designs for users on top of mobile cloud computing environments are proposed, which virtualizes private agents that are in charge of satisfying the requirements (e.g. QoS) of individual users such as Cloudlets [17] and Stratus [18]. Thus, we are motivated to design the AMES-Cloud framework by using virtual a gents in the cloud to provide adaptive video streaming services.

4. Methodology

4.1 Proposed System

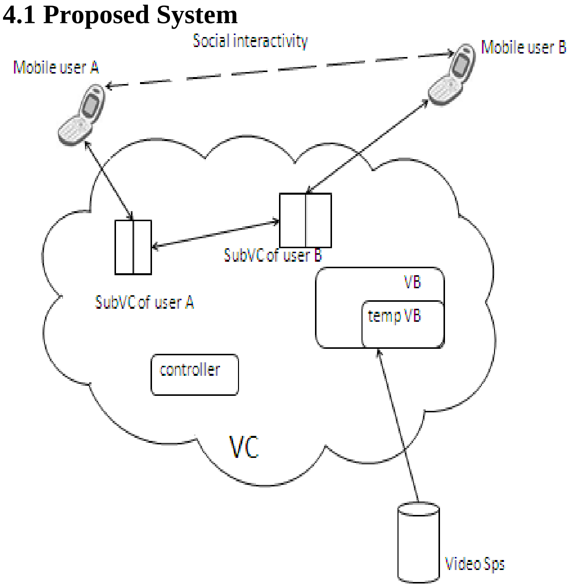

Figure 2: The architecture of the adaptive and efficient way of enhancing the video streaming and sharing of video to the mobile users.

AMOV: Adaptive Mobile Video Streaming

1. Scalable Video Coding (SVC):

For a particular bit rate, if the link"s bandwidth differs much, the video streaming terminates frequently. In SVC, the three lowest scalability is combinable called as Base Layer (BL) and enhanced are called Enhanced Layers (EL).Hence if BL is guaranteed to deliver, a better video quality can be obtained. Using SVC encoding techniques, the server need not to check the link quality or client. The client can decode the video and watch though some packets are lost. Yet this is not bandwidth-efficient because of packet loss. So, SVC based video streaming must be controlled at the server side to use bandwidth efficiently.

ESOV: Efficient Social Video Sharing:

1. Social Content Sharing:

In Social Network Services, one can post the videos in the public to his/her subscribers to watch it, one can directly recommend the video to his/her friends or one can get noticed by publisher for new or popular videos. The probability of watching a video by recipients shared by one user is called "Hitting Probability" which will help in pre fetching the video to avoid the delay. The amount of pre fetched segments is determined by strength of social activities.

The social activities in social networks can be categorized into three types from view of recipient:

- **Subscription:** User can subscribe to a video publisher according to his interest. Since the subscriber may not watch all the subscribed videos, this can be considered as "Median".
- **Direct Recommendation:** User can directly recommend a video to his friend in particular so the watching of video will have high probability. This is considered as "Strong".
- **Public Sharing:** Each user has a timeline which shows all recent activities performed by user. The videos watched by the user will be known to his/her friends. Since not many people show the interest to watch video without direct recommendation, this is considered as "Weak".

Adaptive and Efficient Video Streaming and Sharing in Cloud:

Figure 2 shows the architecture of the adaptive and efficient way of enhancing the video streaming and sharing of video to the mobile users. The architecture was constructed based on the video service provided in cloud called as AMES The architecture contains

1) **Video service provider (VSP):** the originated place of actual video data. It used the traditional video service provider. VSP can handle multiple requests at the same time, while coming to the QoS with the mobile users, the VSP does not provide service up to the mark.
2) **Video cloud (VC):** the cloud step up has been established with many components working together, virtually to get the original video data from the VSP and provide the reliable service to the mobile user and it also provides availability of video and makes the sharing of those videos among the users much easier.
3) **Video base (VB):** Video base consists of the video data that are provided as the service to the mobile users in cloud.

4) **Temp video base (TVB):** it contains the most recently accessed video data and it also contains most frequently accessed video data.
5) **Vagent:** it is an agent created for every mobile user who requests for the video service to the video cloud.
6) **Mobile users:** the users who are mobile and providing the availability of the service to their location is difficult.

5. Result

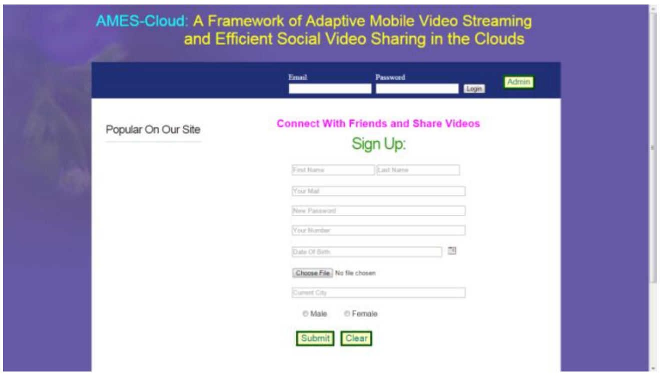

Figure 3: Registering user page.

The user must have to register name, gender, DOB and etc before user has to login.

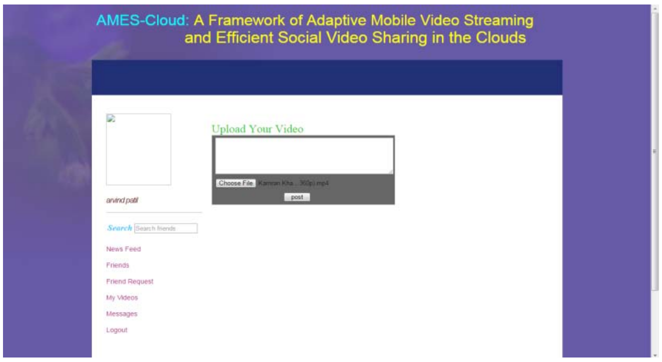

Figure 4: Uploading video page

User can login the account, User can upload the videos , then that videos can only seen by other users when that videos can accept by the admin, and the user provide private key to that user.

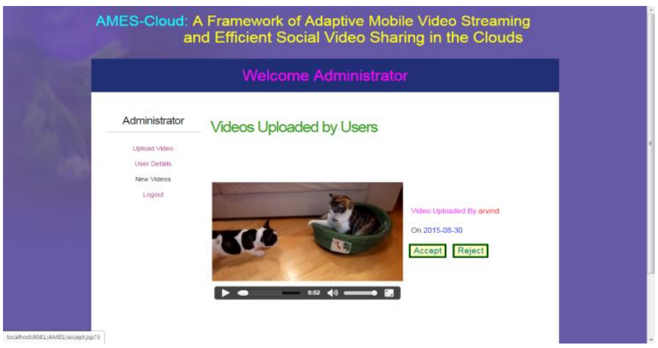

Figure 5: Admin acceptance page

After uploading video on this account, Here the videos are accepted by the admin, only when the user is authorized person.

Figure 6: Video downloading page.

After accepting the video on the admin, the video will be play only the other user got the secret key and see the video.

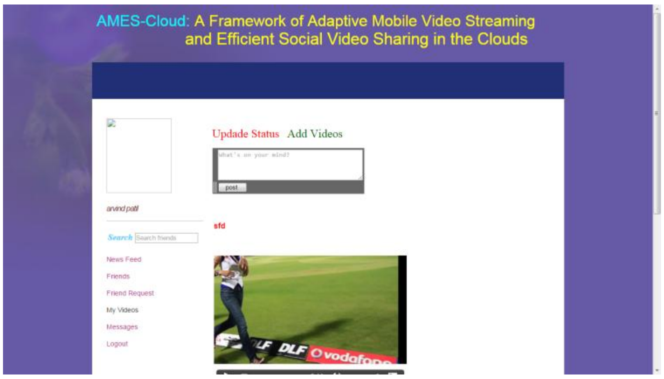

Figure 7: The video playing page.

Finally the video will be played without any buffering time.

6. Conclusion and Future Work

The cloud environment default provides adaptable and optimal infrastructure to any cloud user. The video service provider is added as one of the resource in video cloud. The cloud base and Vagents plays vital role in keep track of videos and updating the link so as to provide undisrupted service to the customer. It also provides better video sharing in social media, where the transmissions of videos are highly carried out. This paper gives the overview of the social video streaming and sharing used by various techniques and video cloud provides adaptive measure for video streaming using Vagent and also it provides video sharing among mobile users. In the future, we will also try to improve the SNS-based prefetching and security issues in the AMES-Cloud.

References

[1] [1] Y. Li, Y. Zhang, and R. Yuan, "Measurement and analysis of a large scale commercial mobile Internet TV system," in Proc. ACM Internet Meas. conf., 2011, pp. 209–224.
[2] A.Zambelli, "IIS smooth streaming technical overview," Microsoft Corp., 2009.
[3] Y. Fu, R. Hu, G. Tian, and Z. Wang, "TCP-friendly rate control for streaming service over 3G network," in Proc. WiCOM, 2006, pp. 1–4.
[4] K. Tappayuthpijarn, G. Liebl, T. Stockhammer, and E. Steinbach, "Adaptive video streaming over a mobile

network with TCP-friendly rate control," in Proc. IWCMC, 2009, pp. 1325–1329.
[5] V. Singh and I. D. D. Curcio, "Rate adaptation for conversational 3G video," in Proc. IEEE INFOCOM Workshop, 2009, pp. 205–211.
[6] S.Akhshabi, A.C.Begen, and C.Dovrolis, "An experimental evaluation of rate-adaptation algorithms in adaptive streaming over HTTP," in Proc. ACM MMSys, 2011, pp. 157–168.
[7] E. Piri, M. Uitto, J. Vehkaper, and T. Sutinen, "Dynamic cross-layer adaptation of scalable video in wireless networking," in Proc. IEEE GLOBECOM, 2010, pp. 1–5.
[8] H. Schwarz, D. Marpe, and T. Wiegand, "Overview of the scalable video coding extension of the H.264/AVC standard," IEEE Trans. Circuits Syst. Video Technol., vol. 17, no. 9, pp.1103–1120, Sep. 2007.
[9] M. Wien, R. Cazoulat, A. Graffunder, A. Hutter, and P. Amon, "Real-time system for adaptive video streaming based on SVC," IEEE Trans. Circuits Syst. Video Technol., vol. 17, no. 9, pp.1227–1237, Sep. 2007.
[10] P. McDonagh, C. Vallati, A. Pande, and P. Mohapatra, "Quality-oriented scalable video delivery uses H. 264 SVC on an LTE network," in Proc. WPMC, 2011.
[11] Z. Huang, C. Mei, L. E. Li, and T. Woo, "Cloud-Stream: Delivering high-quality streaming videos through a cloud-based SVC proxy," in Proc. IEEE INFOCOM Mini-conf., 2011, pp. 201–205.
[12] Q. Zhang, L. Cheng, and R. Boutaba, "Cloud computing: State-of-the-art and research challenges," J. Internet Services Applic., vol. 1, no. 1, pp. 7–18, Apr. 2010.
[13] D. Niu, H. Xu, B. Li, and S. Zhao, "Quality-assured cloud bandwidth auto-scaling for video-on-Demand applications," in Proc. IEEE INFOCOM,2012, pp. 460–468.
[14] F. Wang, J. Liu, and M. Chen, "CALMS: Cloud assisted live media streaming for globalized demands with time/region diversities," in Proc. IEEE INFOCOM, 2012, pp. 199–207.
[15] H. T. Dinh, C. Lee, D. Niyato, and P.Wang, "A survey of mobile cloud computing: Architecture, applications, and approaches," Wiley J. Wireless Communication. Mobile Computing, Oct. 2011.
[16] S. Chetan, G. Kumar, K. Dinesh, K. Mathew, and M. A. Abhimanyu, "Cloud Computing for Mobile World," 2010.
[17] N. Davies, "The case for VM-Based Cloudlets in mobile computing, "IEEE Pervasive Computing, vol. 8, no. 4, pp. 14–23, 2009.
[18] B. Aggarwal, N. Spring, and A. Schulman, "Stratus: Energy-efficient mobile communication using cloud support," in Proc. ACM SIGCOMM, 2010, pp. 477–478.