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An Adaptive Resource Allocation Strategy for Cloud based Video Streaming

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ABSTRACT

This paper is on video streaming using multiple resources. An adaptive scheme is applied to perform the resource allocation in terms of bandwidth and video memory in cloud based video streaming. Advances and commoditization of media generation devices enable capturing and sharing of any special event by multiple attendees. We propose a novel system to collect individual video streams (views) captured for the same event by multiple attendees, and combine them into multi-view videos, where viewers can watch the event from various angles, taking crowdsourced media streaming to a new immersive level. The simulation results demonstrate that this scheme generates an optimal and adaptive solution for resource allocation.

Keywords: Cloud Computing, Video streaming, MultiView, Cloud based Streaming (CBS)

I. INTRODUCTION

The world around us is getting smarter and autonomous in remarkable increase in growth. Cloud computing provides seemingly unlimited "virtualized" resources to users as services across the whole Internet, while hiding platform and implementation details. Today's cloud service providers offer both highly available storage and massively parallel computing resources at relatively low costs. As cloud computing becomes prevalent, an increasing amount of data is being stored in the cloud and shared by users with specified *privileges*, which define the access rights of the stored data.

Traditional cloud networks are designed with tight coupling of control and data planes. The recent growth of data traffic overwhelmingly brought a paradigm shift from voice-traffic to data-traffic. Cisco made observations at internet service providers and predicted that the annual global Internet traffic will rise to 1.4 petabyte by the year 2017, as compared to 528 Exabyte in 2012. This architecture conforms to the main objective of ubiquitous coverage and spectrally efficient voice-oriented homogeneous services. One of the contributors in this massive growth of Internet traffic is the proliferation of mobile devices and machine-to-machine communication. Due to this growth, the capacity and coverage requirements exploded in recent years with a worldwide mobile traffic forecast of more than 127 EB in the year 2020. An increase of a thousand-fold in wireless traffic is expected in 2020 as compared to 2010 figures with an expected figure of 50 billion communication devices.

In the proposed system called An Adaptive Resource Allocation Strategy (AARAS), multiple resources stream their videos to the cloud. AARAS applies the resource allocation strategy and allocates the video in based on bandwidth and video memory.

The organization of this paper is as follows. The existing system and its drawbacks is discussed in Section II. The proposed system and its benefits is detailed in Section III. Section IV presents the proposed solutions using AARAS. Section V concludes the paper.

II. EXISTING SYSTEM

Crowdsourced live streaming is gaining popularity and millions of viewers' watch the live video streams generated by novice users. Various crowdsourced platforms are already being used heavily for live

streaming, such as Twitch, YouTube Live, Meerkat, Periscope, and YouNow. However, none of these popular platforms offers crowdsourced multi-view video streaming. Considering the proliferation of media capturing devices, network advancements, and elastic cloud capabilities, a crowdsourced multi-view live streaming platform is feasible and practical. Existing crowdsourced streaming systems and applications may also be enhanced by adding the multi-view streaming features.

Common cloud services are mostly meant to speed up CPU computing. However, with improved graphics processors, cloud services that can speed up GPU computing concerning remote streaming are coming into the spotlight, such as virtualized screen, remote operation interface and cloud gaming systems, etc. Increased GPU computing was first achieved through open source code, and through hybrid streaming architectures, etc., which have been proposed in recent years. Regarding the current research topic, while there are already many relevant studies of the reduction of data transfer, solutions under unstable network Resource remain lacking. In terms of this research topic, however, there have been few relevant issues concerning network speed and quality in terms of remote streaming systems, thus, this research sets out to enhance graphic capabilities through the graphic operations of mobile devices. Given that remote streaming might call for greater Internet Resource, this research takes the graphic processing capabilities of mobile devices into consideration, and simultaneously puts the graphic processors of mobile devices and cloud-based platforms into computing operations, and with the graphics capabilities of current embedded devices, the current network transmission rate and quality as the selective parameters for the function of cloud support streaming in the current research. Through this parameter operation, the users are able to carry out drawing via the remote cloud-based platform when network transmission is not stable. In order to achieve a relatively smooth frame rate for the local computer, as well as to reduce the transmission of network packets, the priority of this research will be given to the graphics processing capabilities of the local computer. In addition, the resource allocation strategy for mobile graphics streaming for mobile graphics streaming proposed here will only be used in drawing when the mathematical capabilities of the local computer are below the minimum frame rate.

A. Drawbacks of the existing system

- The existing system is used to protect different multimedia content types including videos, images and audio. It is deployed in both public and private cloud.
- It creates signatures for multimedia content, and distributed matching engine for multimedia objects.
- The signature is generated based on the depth signal in the video like spectrum value of the audio signal.
- The distributed matching engine achieves high scalability and it is designed to support different multimedia objects.
- If the file size is large then signature code size is high.
- It increases the complexity of the signature generation process.

III. PROPOSED SYSTEM

The Cloud Computing (CC) part consists of cloud data center and cloud provider, which are accessible through the Internet. The cloud provides the end users with all of the CC functionalities that are needed for mobile computing. With the progress of web communication technologies, many manufacturers are buying large cloud computing platforms to set up cloud services, which have gradually transferred computer-exclusive functions to mobile devices by providing the users with faster computing speed. This also means that the computing resources provided by local computers are now supplied by the cloud-based platforms.

With the popularity of mobile devices and wireless communication network, so that users have the high demands of multimedia services. Differing from general network services that have a high acceptance rate for packet loss, the correctness, sequence order and real-time nature of packets are punctuated in the multimedia services. In order to provide the multimedia services to mobile devices smoothly, media files are always divided into segments instead of downloading complete files. It makes users are able to have multimedia services instantly rather than downloading

entire files. Generally speaking, accessing multimedia video services through mobile networks is no longer a problem.

Cloud computing is the long dreamed vision of computing as a utility, where cloud customers can remotely store their data into the cloud so as to enjoy the on-demand high-quality applications and services from a shared pool of configurable computing resources. The cloud user devices are connected to the Internet through a WLAN access point or a cellular data network base station. These devices access the end users from via different applications. Maintaining the communication reliability is the complex process in cloud data storage since the database is maintained.

A. Merits of the proposed system

- To propose a cloud-support streaming architecture that enables simultaneous streaming on the cloud-based platform and mobile devices by graphic application programs.
- To design a graphics subsystem, and to integrate the cloud-support streaming function into mobile devices.
- To make real-time measurements of the user Resource, in order to adjust the graphic configurations in the current streaming system in line with the current network environment.

IV. PERFORMANCE EVALUATION

Simulation is conducted in random environment 50 mobile devices using NS2 with random way point mobility model. Network area is defined as 1000 x 1000 sq.ft area. The connection pattern is generated using Video Generation and the mobility model is generated using setdest utility. Setdest generates random positions of the nodes in the network with specified mobility and pause time.

Protocol performance is estimated in terms of Packet delivery ratio, Throughput, Transmission Delay. Cloud based Regular Video Streaming model achieve acceptable results compare to Video Streaming.

Packet delivery ratio has been evaluated for Cloud Video streaming and regular streaming results as shown in Figure 1.

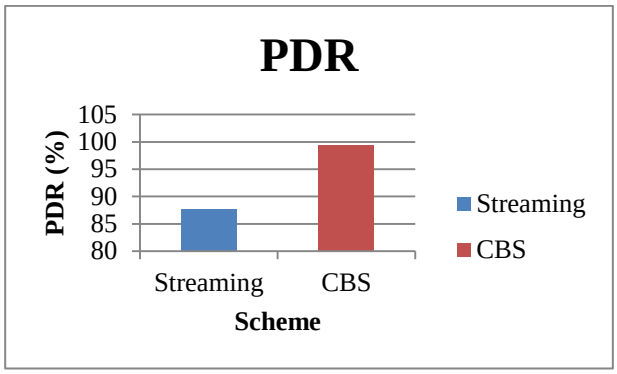

Figure 1. Packet delivery ratio

Throughput has been evaluated for Cloud Video streaming and regular streaming results as shown in Figure 2.

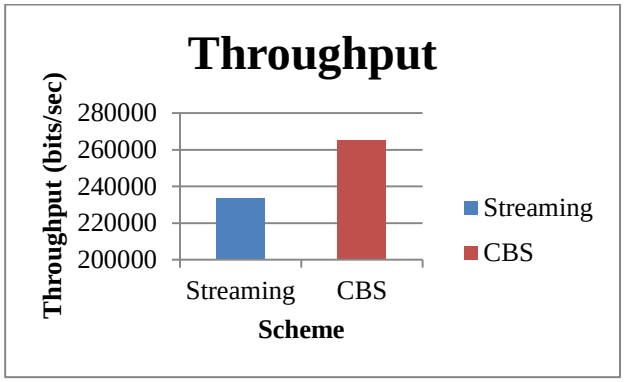

Figure 2. Throughput

Transmission delay has been evaluated for Cloud Video streaming and regular streaming results as shown in Figure 3.

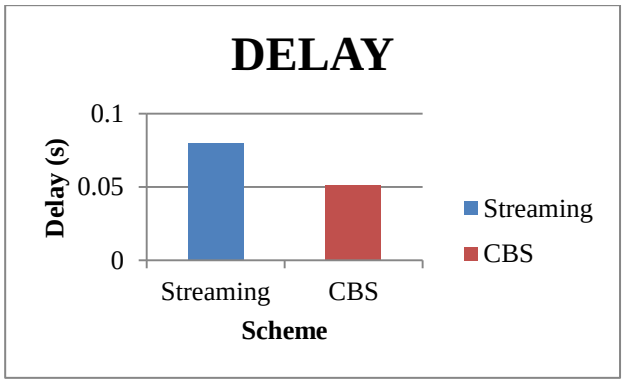

Figure 3. Delay

V. CONCLUSION

This work is to support the video streaming in various fields like events, matches where live streaming is required and also in other places where you require multiple resources like video conferencing and so on. We have formalized a scheme to allocate resources based on the bandwidth required and also the video memory, and so it makes it easy and reliable to stream any video present in the cloud using frames. The simulation could be further applied to verify the number of devices it supports and implement it real time, to maximise the capabilities of video streaming.

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