Cloud-Based Mobile Video Streaming Techniques

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Abstract- *Reasoning processing is changing the landscape of the electronic digital multi-media market by moving the end customers concentrate from possession of video to buying entry to them in the form of on-demand delivery solutions. At the identical time, the cloud is used to collect possessed video pathway and form way out that assist viewers to find a whole new variety of multi-media. Cellular devices are a key car owner of this change, due to their natural mobility and exclusively high transmission rate among end customers. This document investigates cloud centered video streaming methods particularly from the mobile viewpoint. The qualitative part of the research contains explanations of current video development methods, streaming methods and third celebration 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. KEYWORDS QCIF, CIF, 4CIF, HD, FFMPEG Encoding/ Streaming, Zencoder cloud based Encoding API , Amazon Cloud Front service, Video Streaming, H.264, MPEG- 4, RTMP, RTMPT, RTMPE, RTMPTE*

Keywords- Mobile multimedia, wireless network, cloud computing, video streaming, video sharing

I. INTRODUCTION

In mobile platforms video sharing and streaming is done in successful way. The cloud computing paradigm is used for fast and intelligent processing in near-real time data transmission such as audio, video, text and games [1]. According to survey among all the mobile data traffic across the world, the 66.5 percent will be only video related till 2017. This was only 51 percent in last survey. As mobile devices are limited by computation, memory, and energy, it may not serve as platforms for rich media, were it not for cloud applications and services. It is forecasted that cloud applications will account for 84 percent of the total mobile data traffic in 2017 [2]. Mobile cloud computing is bridging the widening gap between the mobile multimedia demand and the capability of various mobile devices. These devices are provided better storage, processing of video & audio smoothly only because of this technique [3]. Mobile media cloud computing is becoming an important computing paradigm to support mobile media services. In Mobile cloud computing is providing data and control between the cloud and mobile devices through wireless networks such as 3G and Wi-Fi (see fig 1). Wireless networks have limited bandwidth, probably longer latency, and intermittent connectivity [3, 4].

II. VIDEO SHARING AND STREAMING METHODS

Video Share:- is an IP Multimedia System (IMS) enabled service for mobile networks that allows users engaged in a circuit switch voice call to add a unidirectional video streaming session over the packet network during the voice call. Any of the parties on the voice call can initiate a video streaming session. There can be multiple video streaming sessions during a voice call, and each of these streaming sessions can be initiated by any of the parties on the voice call. The video source can either be the camera on the phone or a pre-recorded video clip. Fig1: video sharing and streaming Video share is initiated from within a voice call. After a voice call is established, either party (calling or called) can start a Video Share (VS) session. The sending User is then able to stream one-way live or recorded video. The default behavior is that the receiving handset will automatically go to speakerphone mode when video is received, unless the headset is in place. The sender will be able to see what is being streamed on their handset, along with the receiving User. In this scenario, the sender can ―narrate‖ over the CS audio connection while both parties view the video. Both users will have the ability initiate a video share session, and either the sender or recipient in a video share session can terminate the session at any time. As part of the VS invitation, the recipient can choose to reject the streamed video. It is intended that both sender and receiver will receive feedback when the other party terminates a session or the link drops due to lack of coverage. The Video Share service is defined by the GSM Association (GSMA). It is often referred to as a Combinational Service, meaning that the service combines a circuit switch voice call with a packet switch multimedia session. GSM Association has split the Video Share service definition into 2 distinct phases. The first phase (also called Phase 1) involves sharing a simple peer-to-peer, one-way video stream in conjunction with, but not synchronized to a circuit switch voice call. The second phase (also called Phase

2) introduces the Video Share Application Server in the solution and supports more complex features and capabilities, such as point-to-multipoint video share calls, video streaming to a web portal, and integration of video share with instant messaging.

III.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.

IV.VIDEO STREAMING ARCHITECTURE

A cloud based mobile movie streaming scheme is represented in Figure 1. [3]. A cloud based source implements a streaming hosting server which is responsible for retrieving, sending and adapting it clip flow. Depending on the application, it clip may be protected on-line for a real-time broadcasting or pre -encoded and stored for broadcasting an on demand [3]. Programs such as interactive movie, live broadcast, mobile movie streaming or interactive online games require real -time encoding. However, applications such as movie on-demand require pre-encoded movie. When the multicast session is initialized, the streaming hosting server retrieves the compressed movie and begins the loading with the adequate bitrate stream.

Real-time video applications require media packets to arrive in a timely manner; excessively delayed packets are useless and are treated as lost [6]. In streaming programs it is necessary for the information packets to reach their location in regular basis because the wait can cause the network blockage, and can result in the decrease in all those packets suffering from extreme wait. This causes decrease in quality of information, the synchronization between customer and hosting server to be damaged and mistakes to distribute in the provided movie.

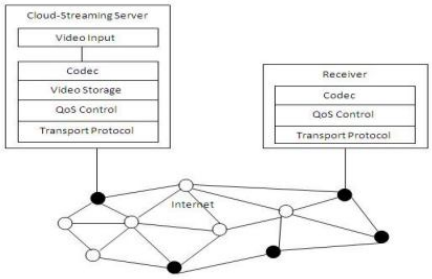

Figure 1. Video Streaming Architecture

V.ENCODED VIDEO STREAM

An encoded video stream consists of two types of encoded frames [1]: 4.1.1. I-Frames An I-frame is encoded as a single image, without referencing to any other frames. Each 8x8 block is first transformed from the spatial domain into the frequency domain [5]. This is known as a key frame, for the reason that it signifies the referrals key of it video content flow. All pixels that describe the image are defined in the I-frame. Videos clip decoder must begin with an I-frame to decode it clip flow because without an I-frame, a movie decoder has no referrals to determine how movie pixels have changed as the earlier frame. For this reason, compressed movie recordings normally do not begin until an I-frame is received by the videos device. 4.1.2. P-Frames A P-frames is encoded relative to past reference frame [5], which can either be an I-frame or a before P-frame. The quantity of information in a P-frame is many times small than the quantity of information in an I-frame. If videos clip begins understanding on a P-frame at an endpoint, an individual might see either scrambled movie or no movie, because there is no referrals frame. 4.2. Video Streaming package (.MP4, .3GP) When streaming multi-media files to cellular handsets, it clips and audio data must be placed in the proper structure. The package structure for cellular multi-media streaming is the .3gp, defined by the 3rd Generation Partnership Project (3GPP) [1] and .mp4 file for delivery to cellular phone devices. For the reason that the bandwidths of multimedia telephone systems networks are confined, Multimedia data included in a .3gp file is compressed considerably. Within the .3gp package, movie can be encoded with specific movie codecs specified by the 3GPP. FFMPEG Encoding and Zencoder cloud based Encoding API support .3gp, .mp4 files with the H.263, MPEG-4, and H.264 movie codecs.

VI.VIDEO STREAMING TECHNIQUES

There are various streaming techniques for different mobiles, Smartphone describe below: 5.1. Progressive Download The mobile customers have the choice to gradually get a compressed data clip partitioned in the appropriate codecs for the product to play by using HTTP or HTTPS. As the data file starts to gradually download, play-back is started enabling an almost immediate watching of the material [8]. In the qualifications, the press gamer is constantly on the download the rest of the material. By comparison, without modern download the user would have to wait for the whole data file to obtain to the product before watching would start. During the play-back process, audiences are able to seek back and forth through the whole press data file. If the audience looks for forward to a point in the schedule that has not yet downloadable, the press gamer stop play-back until the data comes. 5.2. HTTP Live Streaming Hyper text transport protocol (HTTP) structured multimedia streaming communications protocol carried out by Apple company is known as Hyper text transport protocol (HTTP) Live Streaming (HLS).For Apple company products like IOS, Ipad and Iphone etc., This is an adaptive streaming multimedia distribution standard protocol. It is an exemplified and segmented in MPEG family transport channels and M3U8 - MP3 Playlist File (UTF-8) to offer live and on demand multimedia data by utilizing H.264 multimedia codec. On the behalf of most suitable channel or stream like bandwidth, platform and CPU limits selected by device instantly, it downloads available bits for buffering to play multimedia file. HLS streaming provides the best user experience, but its benefits also include good IT practices and important business considerations: 1) The best user experience - There are different formats of multimedia or video files available on server in form of numerous versions, an iPhone end user can not stream a better high quality version of the multimedia or video than iPad end user watching over 3G network. International Journal of Wireless & Mobile Networks (IJWMN) Vol. 5, No. 1, February 2013 90 2) Achieve more audiences - Transfer protocols are not supported for video delivery contents but firewall and routers settings are supported for video delivery with Hyper text transport protocol (HTTP) that's why viewers can access video easily. 3) Profit on bits transfer - With the help of HTTP live streaming , User can download a couple of segments of multimedia or video at time, that time user have to pay only transferred stream data . In addition, HTTP bits are cacheable by browsers or CDN and throughout network system. 4) Protected video clip information- The HTTP Live Streaming(HLS) requirements have conditions to make sure protection of the stream data, so it is fantastic information for Tv stations or marketers for those users used to certified content stream. Using AES-128, the complete HTTP Live Streaming (HLS) stream is protected over network infrastructure. Figure 2 and Explanation shows my practical work for mobile video streaming on Cloud with streaming server by using Amazon CloudFront services which have lots of components which are playing key role. 5.2.1. Explanation of R&D work The characteristics of Adobe Flash Media Server (AFMS) version 4.5 can be utilized by Amazon Web Services (AWS) with live multimedia or video streaming, a sequence of HTTP requests from the end user devices deliver live video stream which is handled by manifest data files. By using Flash Media Server(FMS), end user can use two kind of HTTP file models, one is HTTP live streaming (HLS) for Apple company Products (Ios ,iPad ,iPhone etc) and second is HTTP Dynamic Streaming (HDS) for Flash type of programs or applications. By utilizing the Flash Media Live Encoder, viewer can get good quality of media streaming for different platforms or operating systems like windows and Macintosh OS. On-demand Real Time Messaging Protocol (RTMP) streaming from FMS would be assisted by CloudFront Information delivery program. It provides the flexible low cost Content Delivery Network (CDN) alternative for multimedia based organizations. In this approach, make useful actions to set up CloudFront streaming: a. For live content delivery, create Simple Storage Service account known as S3. b. Create a "bucket" in S3 to store media files. c. Shift content to S3 bucket and set its permissions to allow public access. d. Set up a CloudFront streaming distribution that point at S3 storage bucket. e. Now you are ready to stream. CloudFront provides the on demand multimedia streaming services with the help of Real Time Messaging Protocol by using Adobe Flash Media Server The following versions of the RTMP protocol facilitated by CloudFront: a. RTMP—Adobe's Real-Time Message Protocol b. RTMPT—Adobe streaming tunneled over HTTP c. RTMPE—Adobe encrypted over HTTP d. RTMPTE—Adobe encrypted tunneled over HTTP RTMPE is most secured protocol than RTMP.

VII.CONCLUSION

The video streaming architecture that develop streaming servers which are responsible for downloading, uploading and adapting the video stream content in 3G or others networks. Cloud Computing is applied to calculate adjustable video encoding streaming based on mobile device hardware characteristics, decoding characteristics. Hence, the research and development is of Upmost important in boosting the competitiveness of traditional media techniques in cloud computing. The combination of mobile computing and cloud computing is fulfill the basic needs of today's smart phone very easily and amazingly. But still this combined environment is under process for better utilization of various resources. In smart phone transmission of multimedia data such as audio, video and text are transfer rapidly. For better

scope in future researcher are work progressively in this area but still mobile video streaming needs to address challenging issues inherent mobile devices and mobile network.

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