

Cloud-Based Mobile Video Streaming Techniques

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Received: 14 December 2011 Accepted: 2 January 2012 Published: 15 January 2012

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 same time, the cloud is also being used to store possessed video paths and create solutions that help audience to discover a whole new range 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 BalackBerry phones etc.

Index terms— QCIF, CIF, 4CIF, HD, FFMPEG encoding/ streaming, zencoder cloud based encoding API, amazon cloud front service, video streaming, H.264, MPEG- 4, RTMP

1 Introduction

Developing multi-media content for effective indication over reasoning of cloud based centered mobile system with limited data rates, such as the 3G-324M system needs skills and knowledge. It needs an knowing of the fundamentals that have an effect on movie quality, such as codec choice and compression, and the use of specific resources, such as the FFMPEG Development, and Zencoder Cloud centered development API which can be used to validate that the material of videos clip data file are effectively specified for end customers.

2 II.

3 Video fundamentals

Due to bandwidths of mobile networks are limited, video data must be encoded/compressed considerably. This part wraps the fundamentals of encoded video and its characteristics within different networks.

4 a) Bandwidth

In multi-media streaming programs, video encoding is used for the reason that uncompressed video needs huge information space to store data. In fact, High definition (HD) films on DVD or Blu-ray are

Author : E-mail : saurabh.goyal6@gmail.com already in a compacted format that provides information of 4 -6 Megabyte per second. For cellular streaming systems, which can require information rates as low as 30 kilobytes per second, this means that it clip must be compacted thousands of times or more to achieve the required information. With the growth of cellular multimedia streaming, you should work within the information restrictions of the network and the ability of the endpoint. Although 3G and next generation systems provide much higher bandwidths to cellular phone devices, as more and more endpoints use these systems for multi-media projects, conformance to focus on end customers bitrates will become more essential than today [1]. To accomplish such small bitrate audio/video, codecs make use of both lossless and lossy compression methods. We

can accomplish this by third celebration system like FFMPEG open source libraries and Zencoder cloud-based encoding API.

5 b) Networks for Video Streaming

Compression performance is the capability of a codec to encode or decode more video/audio features into an information flow described by fewer bits. The more effective a codec is at compression, the better the quality and sharpness of the video/audio clip.

6 III.

7 Video streaming

In streaming procedure, it clip data file is sent to the end individual in a (more or less) continuous flow. It is simply a strategy for shifting information such that it can be prepared as a stable and ongoing flow and it is known as Streaming or encoded movie that is sent across information system is known as Streaming. Streaming movie is a series of "moving images" that are sent in compacted form over the Internet and shown by the audience as they appear [4]. If a web individual is getting the information as sources then he/she does not have to wait around to obtain a large data file before viewing it clip or enjoying the sound.

8 a) Streaming Principle

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.

There are two types of steaming, one is realtime and other is prerecorded streaming. The protocol used for streaming purpose is UDP (User Datagram Protocol), which delivers the multi-media flow as a sequence of small packets [4]. The majority of transport protocols perform over an RTP stack, which is implemented on top of UDP/IP to provide an end-to-end network transport for video streaming [2].

9 b) Video Streaming Architecture

A cloud based mobile movie streaming scheme is represented in Fig. ???. 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 preencoded 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 preencoded movie. When the multicast session is initialized, the streaming hosting server retrieves the compressed movie and begins the loading with the adequate bitrate stream. 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]. It is also called a key frame, because it symbolizes the referrals key of it clip 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.

10 P-frames:

A P-frames is encoded relative to past reference frame [5], which can either be an I-frame or a before Pframe. The quantity of information in a P-frame is many times small than the quantity of information in an Iframe. 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. b) 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) ??

11 V.

12 Video streaming techniques

There are various streaming techniques for different mobiles, Smartphone describe below: a) Progressive Download

The mobile customer has the option to use HTTP or HTTPS to gradually download a pre-created press data file partitioned in the appropriate codecs for the product to play. 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. most appropriate stream given available bandwidth, CPU and platform constraints, downloads a manifest for that stream, and then downloads segmented chunks to the buffer for the playback.

HLS streaming provides the best user experience, but its benefits also include good IT practices and important business considerations: 1) The best user experience: Since the server can maintain multiple versions of the video clips in different formats, an iPad user with a Wi-Fi connection can stream a higher quality version of the video than an iPhone user viewing over a 3G connection. 2) Reach more viewers: Routers, NAT, and firewall settings are more likely to support video delivered with HTTP than other transfer protocols, so more users will be able to access your video. 3) Save on data transfer: As opposed to a progressive download of a video, with HLS, only a few segments of video are downloaded at time. If a viewer only watches five minutes of streamed video, publishers only pay for that data transfer. Moreover, the HTTP chunks are cacheable by CDNs and across network infrastructure, so files are served from an origin server only once and cached close to users. 4) Secure video content: The HLS specification has provisions to ensure security of the stream, which is great news for broadcasters or publishers who want to stream licensed content. The entire HLS stream can be encrypted using AES-128.

Fig. 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.

13 Explanation of R&D work

Live streaming with Amazon Web Services allows you to use the features of Adobe Flash Media Server version 4.5, including live video streaming where your live video is delivered by a series of HTTP requests from the player that is controlled by manifest files. Flash Media Server 4.5 supports two HTTP file formats: HLS (HTTP Live Streaming) for iOS devices and HDS (HTTP Dynamic Streaming) for Flash applications. You can stream high-quality media using the free Flash Media Live Encoder desktop application either for Windows or for Mac OS.

CloudFront content delivery service would support on-demand RTMP streaming from Flash Media Server 4.5. In practice, this offers a new, flexible low-cost CDN solution, particularly for users with relatively small or intermittent streaming delivery needs. AWS charges only for bits stored and bits transferred. There's no monthly minimum, no sign up fee or setup fees, and no ongoing costs unless you're actually using the service [10].

In this example, we will walk through the steps of setting up CloudFront streaming and getting it working on your site: a. Set up an AWS Simple Storage Service (S3) account where content will live. b. Create a "bucket" in S3 to store media files. c. Shift content to S3 bucket and set its permissions to allow public access. VI.

14 Conclusion

In this paper, we have discussed firstly in audio/video basics which deliver video on network with required bandwidth and codecs then after we discussed about the video streaming architecture that develop streaming servers which are responsible for retrieving, sending and adapting the video stream data in 3G or others network.

For streaming the multimedia file over network, video compression techniques are major issue to encode the different types of audio/video file for different mobile devices. Compression can be performed by FFMPEG Encoding; Zencoder cloud based Encoding API which provides lots of Encoding techniques which are solution for the cloud based environments.

Then we presented the main issue of video streaming techniques for streaming the video over the internet or cloud based network for iPhone, Android, Window phone and Smartphone. Apple Company provides the solution for video streaming in terms of HTTP Live streaming which are accepted by many reputed companies for mobile devices for video streaming purpose for future perspective by using RTMP family protocols.

I believe that a lot of effort should be done in this paper to propose efficient and viable solution for mobile video streaming in cloud based environment.

VII. ^{1 2}

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Figure 1: Fig

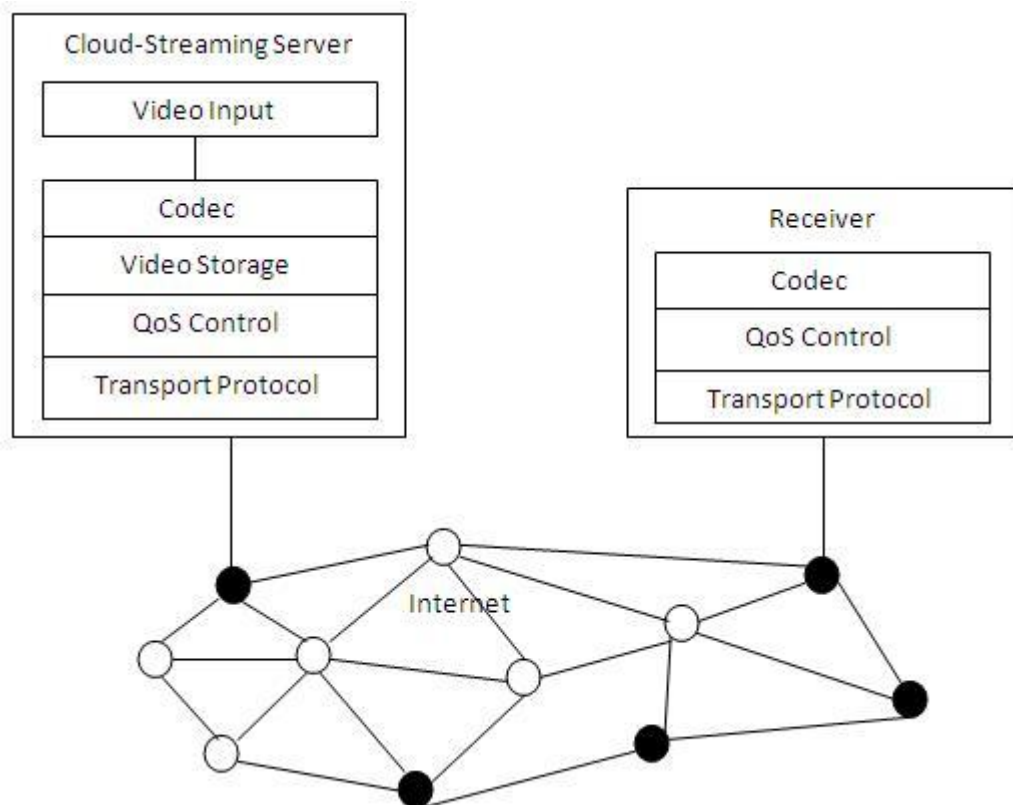


Figure 2:

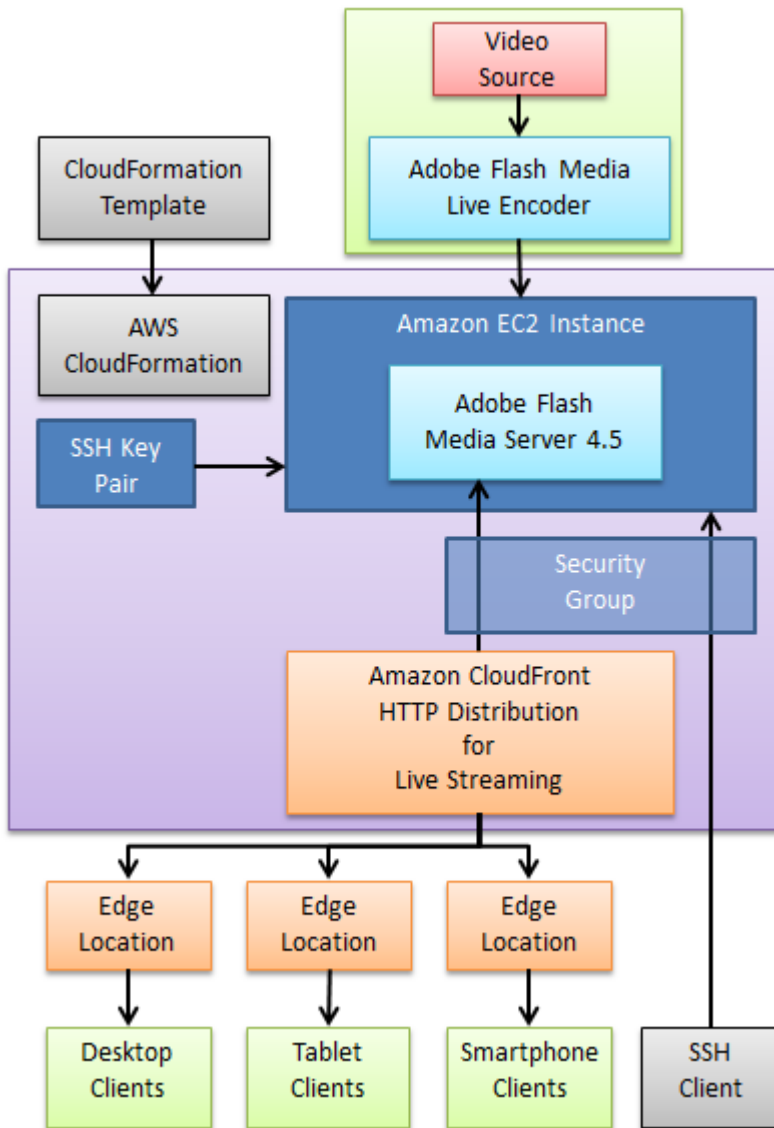


Figure 3:

I

illustrates the network atmospheres
used for distributing video services with different
aspects [1]:

Figure 4: TABLE I

I

Network	Bandwidth h	Terminal s	Codecs	Image Size	2012 Year (D D D D) E
3G-324M	64 Kbps	Video Handset s	H.263,MP EG- 4,H.264	QCIF,CI F	
3G Wireless	256-768 Kbps	Video handset s, smart phones	H.263, H.264, MPEG-4	QCIF, CIF	
Broadban d IP	768 Kbps	Smart phones, soft client on PC	H.264	QCIF, CIF	
Enterprise	2-5 Mbps	Soft client	H.264	CIF, 4CIF, HD	
WiMax, LTE	2-100 Mbps	PC, TV, portable devices	H.264	CIF, 4CIF, HD	

[Note: Examples: AAC, ADPCM, MP3, WMA, PCM,]

Figure 5: Table I :

II

Families

c) Video Streaming limitations

Video streaming is constrained by the network channel capacity, 3G-324M channel bandwidth, Multi-coded stream, Transcoding, Packet loss, Bandwidth management and endpoint capabilities.

1] and .mp4 file

for delivery to cellular phone devices. Because the bandwidths of movie telephony networks are limited, it clips and audio data included in a .3gp file is compressed significantly. 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.

Figure 6: Table II :

.1 Acknowledgment

There are some key personalities involved, whose role has been very vital to pave way for success of the paper. I take the opportunity to express my sincere thanks and gratitude to them.

I would like to thank my R&D team members of Pariksha Labs Pvt. Ltd, Gurgaon, India. Last but not the least, I would like to extend my heartfelt regards to all those who helped me directly or indirectly in the accomplishment of the paper.

[Amazon CloudFront] , <http://aws.amazon.com/cloudfront/> *Amazon CloudFront*

[Ffmpeg Streamingguide] , Ffmpeg Streamingguide . <http://ffmpeg.org/trac/ffmpeg/wiki/StreamingGuide>

[Delivering content to Apple iPhone, iPod Touch and iPad using RealNetworks Helix Solutions ©2010 RealNetworks] *Delivering content to Apple iPhone, iPod Touch and iPad using RealNetworks Helix Solutions ©2010 RealNetworks*, <http://www.real.com>

[Dong ()] *Efficient and Effective Streaming Technologies for 3-D Wavelet Compressed Video*, Jianyu Dong . 2002. the Ohio State University

[FFMPEG x264 Encoding Guide] <http://ffmpeg.org/trac/ffmpeg/wiki/x264EncodingGuide> *FFMPEG x264 Encoding Guide*,

[for Creating Streamed Video Content over 3G-324M Mobile Networks, White paper] *for Creating Streamed Video Content over 3G-324M Mobile Networks, White paper*, www.dialogic.com

[Hatem (March 27-31)] Bettahar Hatem . *SETIT 2005, 3rd International Conference: Sciences of Electronic, Technologies of Information and Telecommunications*, March 27-31. p. 2005. (Tutorial on Multicast Video Streaming Techniques)

[Walker et al. (2003)] ‘Mobile video-streaming’. M D Walker , T Nilsson , R Jebb , Turnbull . *BT Technology Journal* July 2003. 21 (3) .

[Zhou] ‘New Techniques for Streaming MPEG Video over the Internet’. Jian Zhou . *UMI Microform 3111144, Copyright 2004 by ProQuest Information and Learning Company*, p. .

[Prof et al. ()] ‘Realtime and Object-based Video Streaming Techniques with Application to Communication System’. Prof , R Nitin , Prof Talhar , K S Mrs , Thakare . *Proc .of CSIT*, (.of CSITSingapore) 2011. 2011. IACSIT Press. 1.

[Streaming media from Wikipedia] http://en.wikipedia.org/wiki/Streaming_media *Streaming media from Wikipedia*,

[Asghar et al. ()] ‘SVS -A Secure Scheme for Video Streaming Using SRTP AES and DH’. Mamoon Asghar , Saima Sadaf , Kamran Eidi , Asia Naseem , Shahid Naweed . *European Journal of Scientific Research* 1450-216X. 2010. 2010. EuroJournals Publishing, Inc. 40 (2) p. .