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Delivery Methods for Video on Demand over the Internet

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***Abstract*-Video on Demand has become increasingly popular, especially in terms of watching videos through Internet. All the users expect that the video has to be fetched from the Internet with best resolution and at a faster rate. This paper analyses the usage of these different approaches in distributing video files to the client. It also discusses the various formats that support Streaming media. The advantages and the limitations of each approach are also dealt with respect to delivering videos to the end users. Finally, it examines the various public cloud that offers various ways to deliver video files.**

***Keywords*-Video on Demand, Video delivery methods, Cloud Environment.**

I. INTRODUCTION

In the current scenario, Internet has seen high popularity and has been used in large scale. People are witnessing the emergence of a connected, mobile society, with a variety of information sources and means of communication available at home, work, educational institution and in society at large. Today's Web applications are providing more personal, more rich and more impressive experiences and information. Along with gathering information, people use Internet as a part of entertainment media, starting from watching videos of their choice to watching real time events or matches. The Video on demand requires enormous storage facility accoutered with high speed access and replication facility. The videos can be retrieved from the server and delivered to the users in two different methods namely, download approach, streaming approach. Each of these approaches has its own advantages and limitations. This paper analyses the usage of these different approaches in distributing video files. It also discusses the various formats that support Streaming media. The advantages and the limitations of each approach are also dealt with respect to delivering videos to the end users. Finally, it deliberates and examines the various public cloud that offers various ways to deliver video files.

The first method, Download approach is like pouring the water in the glass and drinking it. That is, the media file will be first downloaded fully in the client machine from the server and then the user can play it, whereas the Streaming approach is like drinking the water straight from the tap that is as when the media file gets downloaded the user can play it.

II. DOWNLOAD APPROACH

There are two ways to incorporate multimedia file using download approach. They are linking and embedding. In this approach, the file will be fully downloaded before it starts playing. Thus the advantage of this approach is, once it is downloaded, the user can listen to it any number of times, can navigate to and fro easily without any delay. The drawback here is depending upon the size of the file and the bandwidth, the time taken to download the file varies. The other main disadvantage is that, even to listen to a small portion of media file, the user has to wait till the whole file gets downloaded.

III. STREAMING APPROACH

Streaming Media is very powerful and it is used very often these days. In this approach, the audio or the video files starts playing as it is arriving from the server. It doesn't make the user to wait for the whole file to get downloaded. As and when the data arrives, it is stored in the buffer for the user to listen. The controls of the media player are also monitored by the server. Thus, if the user presses the stop button, the server also stops sending the data. If the user resumes the play button, the server again starts sending the data. Thus in this case, the data are sent only when the user requires them. Due to this reason, the traffic is reduced, the user also need not wait too long to listen to a small portion of the video or audio. The streaming can be done in two techniques.

- TRUE Streaming
- HTTP Streaming / Progressive download

The TRUE Streaming is putting your file in the streaming server which is dedicated to stream the files. This is actually called as Live streaming. This technique is an expensive one, as you need to put your file in the dedicated streaming server, whereas the HTTP Streaming merges both download approach and

streaming approach. It just simulates the True Streaming, but it is better than the download approach. This HTTP Streaming is also known as Progressive download. It almost has many of the advantages of LIVE Streaming. This approach is not expensive as it is streamed from the normal webserver. In True Streaming, no bit of data is stored in Client's machine, whereas that is not the case in HTTP Streaming. Similarly, there is also difference in protocols used by both the streaming technique.

As Http Streaming uses the normal web server to stream the file, it uses the same http protocol which is used to send the data from web server to client browser. The True Streaming uses different protocols like Real Time Streaming Protocol (RTSP), Real Time Messaging Protocol (RTMP), Progressive Networks Protocol (PNM - Older version of RTSP), Microsoft Media Services(MMS). Using RTSP Protocol, windows media file, Real Media File and Quick Time files can be streamed. RTMP Protocol is used to stream Flash files. The PNM and MMS protocols are used to stream real media files and windows media files respectively. But these two protocols are not in practice these days.

Most of the streaming servers support only few file formats to be streamed. In such case, you need to convert your file to the format that the server will support. But, now-a-days, there are few dedicated streaming servers available which can stream all file formats, in such case, the cost will still increase. In such case, you need not worry about the file format. The most common used formats are as follows:

- Microsoft's Windows Media Format
- Real Networks Real Media Format
- Apple Quicktime Format
- Adobe Flash Format

Based on your requirement and the streaming server, you can choose any of the above format. You can either record it directly in any of the above format or convert the existing file to any of these formats.

Popular web sites such as YouTube and Google Video uses progressive download approach to serve video over the internet. An HTTP streaming-capable server can start streaming from a specific key frame if the video file is encoded with proper metadata [5]. The progressive download approach cannot be used for streaming live events; it can only be used with stored video files. At the same time, "Most end users cannot tell the difference between the video delivered by progressive download and that delivered via a streaming video server," said Steve Liddell, CEO of Panther Express [6]. HTTP progressive download can work with any CDN service, thereby allowing faster access even for large number of users in disparate location.

IV. CLOUD ENVIRONMENT

Download Approach is offered by almost all public clouds that supports storage as a service, like Windows Azure, Google App Engine and Amazon. Streaming video is done by investing a lot of money in the streaming servers but the cloud environment provides a very simple mechanism for serving the media files to large customers in disparate locations. The Cloud Computing offers an underlying infrastructure, which can dynamically allocate the required computation and the storage resources for retrieving the video files from the server. The streaming services provided from the cloud are more like running one's own you tube.

Wowza is a high performance flash based streaming server provided by Amazon web services that takes H.264 content to any screen like the desktop, mobile and the living room for unified streaming to all popular media platforms [3]. It is used to stream the audio tracks with the help of protocols like "Real Time Streaming Protocols" and "Real Time Media Protocol", these protocols are used to stream whatever audio from the client machine to the server and this is recorded with the help of a flash based component, which interacts with the system components. By using Flash Component instead of html component, helps the user to detect the appropriate decibel of the audio and it also checks whether the mike is switched on or off and many more interaction happens with the system. Even if the mike is switched off, it alerts the client to unmute the mike when the record button is clicked. The recording time limit can be implemented, the resolution conversion and publishing is also possible. When the user uploads a video, the information like the video resolution, video bit rate, and all other meta data's are gathered with the help of the special software and based on those information, the encoding will be done and the video can be published with a high resolution.

In Silverlight Live Streaming, the media files are hosted on a Content Delivery Network (CDN) and distributed delivered via basic progressive download and not streamed. As it delivers video through CDN, the video will be fetched faster even if large number of users accesses it. The Silverlight player is used to play bytes of stream arriving at the clients end. Microsoft released a Publishing Plugin for Expression Encoder 2 to facilitate uploading videos to the Silverlight Streaming web site. This plugin is highly recommended

because it almost fully automates the uploading process [5]. It is also easy to upload a video to Silverlight Streaming without Expression Encoder, merely by using the Silverlight Streaming web-based UI. The Silverlight Streaming website performs onsite encoding to reduce the bandwidth requirements of the video.

V. CONCLUSION

Download approach will be better for those users who will require the full video file to access. The progressive approach can attain the similar effect of the streaming approach in much lesser cost, as it uses only web server and not streaming server. The progressive approach cannot be used for Streaming Live events. For those videos, which will require larger clients accessing the file simultaneously can shift to the cloud environment that promises the dynamic allocation of computation and the storage resources. All the public cloud that offers storage layer supports download approach and amazon wowza supports Live streaming of media files through wowza streaming server and Microsoft supports progressive download approach through Silverlight Live Streaming.

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