International Journal of Computational Research and Development (IJCRD)
Impact Factor: 4.775, ISSN (Online): 2456 - 3137
(www.dvpublication.com) Volume 2, Issue 2, 2017

A CHRONOLOGICAL REVIEW OF THE VIDEO STREAMING OVER P2P NETWORKS

Gajanand Sharma* & Dr. Dinesh Goyal**
* Research Scholar, Suresh Gyan Vihar University, Jaipur, Rajasthan
** Professor, Department of CEIT, Suresh Gyan Vihar University, Jaipur, Rajasthan

Cite This Article: Gajanand Sharma & Dr. Dinesh Goyal, "A Chronological Review of the Video Streaming Over P2P Networks", International Journal of Computational Research and Development, Volume 2, Issue 2, Page Number 15-18, 2017.

Abstract:
P2P networks are characterized by a potentially large and highly dynamic population of hosts that join and leave the network frequently. Lots of Research has been done at design and evaluation of a quality adaptation streaming mechanism in a multi-source streaming to a single receiver. Multimedia streaming is a real time application so, the main challenges in the design of this mechanism are (1) selection of senders peers nodes; (2) stream switching among the peers; (3) optimizing video quality by active measurements of links; and (4) enhancing the overall Quality of Service (QOS). Key technique to provide quality adaptation is based on active measurements of network links and selection of sender peers to enhance the overall throughput.

KeyWords: Peer to Peer streaming, Video Streaming, QOS, Quality Adaptation& Active Measurement

1. Introduction:

Content sharing between communities has revolutionized the Internet. During the last few years, we lived a new phenomenon that changed the Internet business model especially for ISP (Internet Service Provider). Peer-to-Peer (P2P) systems have gained tremendous intentions during these years. The Peer-to-Peer (P2P) phenomenon is facilitating information flow from and back to the end users. Unlike traditional distributed systems based on pure client/server model, P2P networks are self-organizing networks that aggregate large amount of heterogeneous computers called nodes or peers (nodes and peers are used interchangeably in this paper). In P2P systems, peers can communicate directly with each other for the sharing and exchanging of data, besides this data exchange these peer nodes also share their communication and storage resources (15). The characteristics of P2P systems make them a better choice for multimedia content sharing/streaming over IP networks. P2P systems are dynamic in nature where nodes can join and leave the network frequently and that might not have a permanent IP addresses and observe dynamic changes over the inter connection links. Virtual networks are built on the top of these networks at the application level in which individual peers communicate with each other and share both communication and storage resources, ideally directly without using a dedicated server.

The main concept of P2P networking is that each peer is a client and a server at the same time. P2P media sharing uses two basic concepts. In the 'openafter-downloading' mode, the media content is played after downloading all the contents of the file from different participants, while the 'play-whiledownloading' mode allows playing while downloading the content, which is commonly known as streaming. The 'play-while-downloading' has many advantages over 'open-after-downloading' as it requires lesser memory and client is not expected to wait for longer time to finish download first. In this paper, we consider the problem of Peer-to-Peer streaming defined as a content streaming from multiple senders to a single receiver in the P2P network, i.e. a single receiver peer is receiving same content from different peers present in the P2P network. Multiple sender peers are selected on the fact that a single sending peer may not be able or willing to share an outbound bandwidth of actual playback rate. Dynamic behavior of P2P systems is another reason of selecting multiple sender peers for media sharing, as it is possible that any sender peer sharing media can leave/crash without any prior notification.

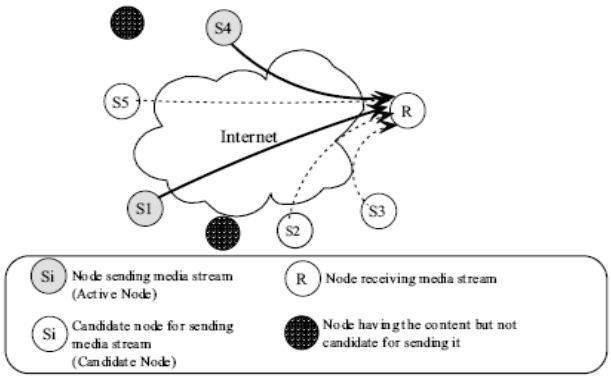

Figure 1: Peer-to-Peer Multimedia Streaming Architecture [2]

Figure 1 illustrates our target architecture, which is composed of many senders and one receiver peer. In this architecture, several peers are connected logically and they form P2P network. In figure 1, we present

only those peers which have the requested content. It is possible that there are many other peers present in the network which are not having the requested contents or they don't intended to share their contents. All the peers having the requested contents are named potential peer for sharing of contents. A subset of them is candidate for sending the content during next period of time. Furthermore, a subset of these candidate peers is selected called active peers. The receiver peer orchestrates the overall streaming mechanism by selecting potential candidate and active peers. It is worth noting that the overall quality at the receiver peer may not increase when additional sender peers are added because multiple sender peers may be connected behind the same bottleneck link. For this reason, we track each peer individually to measure its performances and capabilities, and then decide whether to activate sender peer or not.

Real-time traffics are generally carried over Internet using Real-Time Transport protocol (RTP). P2P networks are widely used for multimedia streaming.

Quality of the multimedia steams can be affected badly due to dynamic characteristics of P2P networks. Quality of video packets is influenced by available bandwidth, jitter/inter packets delay and packet loss rate. Inter packet delay/jitter plays major role in streaming applications. If jitter rate is high there will be distortion in the video which makes the user annoyed.

2. Chronological Review:

*In 2016, Sergej Alekseev(et.al)*presented a paper forP2P technology which has been explored thoroughly; due to it has number of limitations that compared to conventional paradigm of client server. Despite of the advantages of it, overall conventional approach, a ubiquitous high-speed availability, the low latency and high bandwidth networks are supported by the conventional paradigm of client-server. Currently, the streaming surge services have generated the renewed interest in P2P technologies. And in addition to this, the services such as browser technologies and databases of geo location as well as the browser technologies such as the Web-RTC in order to make the attractive hybrid approach. In research paper, they have presented the algorithms for construction as well as for hybrid P2P overlay maintenance based on multicast tree, on the topological distances. An important idea of particular algorithms needs to build the multicast tree by selecting the neighbors that close to each other. All the topological distances will be obtained easily by browser utilizing the geo-location API. Hence, algorithms implementation will be done depended on web in the cascaded manner. We have presented the algorithms proofs and practical evaluations and results.

In 2014, C. Göktug Gürler(et.al) presented a paper for3D video is destined to be available in homesand mobile devices. Stereoscopic TV broadcastshave already begun in frame-compatible format for stereoscopic 3D. The natural next step is todeliver 3D content in the form of multi-viewvideo (MVV) that enables a natural glasses-free3D experience. Unfortunately, the number ofviews needed to drive multi-view displays variesdepending on the price vs. quality trade-off.Therefore, the bitrate requirement of MVV contentchanges according to users' display technology, making transmission over fixed bit ratechannels inefficient. IP provides a flexible transportmechanism for 3D content; however, well-knownproblems such as fluctuations in available link capacity and varying transmission delays pose challenges to 3D video services over the Internet. In this study, we discuss quality-ofexperienceaware rate adaptation methods specificto 3D video and efficient encoding schemes. Then; we introduce a framework to design P2Poverlays to deliver 3D video. P2P overlays offer a promising approach to alleviate the high bandwidth requirement of MVV. Furthermore, two use case scenarios are provided to show the discussed methods can help to make 3D video delivery practical over the Internet.

In 2013 Reza Rejaie (et.al) presented a paper for suggest a Joint-Family, the protocol which gathers P2P and ABR (Adaptive Bitrates) Mechanism of streaming for the VOD (Video-On-Demand). While the P2P for ABR and VOD have suggested before, they haven't studied altogether as they are attempting to tackle the issues with the orthogonal goals seemingly. We have motivated the approach through the result analysis which overcomes the resulting misconception from the prior analytical work, and illustrates which P2P swarm popularity and the time of seed staying has the noteworthy bearing that gain able each receiver download rate. Particularly, the analysis illustrates which the affected popularity of swarm efficiency when it seeds that stay the "long enough". We have showed that P2P setting including ABR assists the user to gain the fewer interruptions and/or maximum playback rates. We have developed protocol of Joint-Family that based on different analysis observations. The Peers in the Joint-Family correspondingly participate in the multiple swarms in order to exchange the numerous bitrates chunks. We have adopted the chunk, policies of peer selection and bitrate, which reduces the interruption occurrence while delivering the video of high-quality and enhancing system efficiency. By using the traces from VOD service (large-scale commercial), we compared the Joint-Family (available with different approaches) for P2P-VOD and then illustrate that the viewers in the Joint-Family enjoy the greatest playback rates with less interruption, irrespective of the video popularity.

In 2012 Stefan Lederer(et.al) presented a paper which represents the P-DASH (Peer-assisted Dynamic Adaptive Streaming over HTTP) proposal and the DASH simulation that depended on the environment that in comparison to the traditional approaches, that is, NP-DASH (Non-Peer-Assisted DASH). Certain approach keeps the standard MPEG-DASH conformance by enabling the straightforward and easy path of improving the system streaming with the peer assistance in order to minimize the infrastructure and bandwidth needs of the

service/content provider. In the results anticipation, the system gains the bandwidth reduction of CDNs (Content Distribution Networks) and as the corresponding infrastructure consequence at the cost of service/content providers that up to the 25% by leveraging neighboring peer's upstream capacity. Next to this, the cost of savings has evaluated by using the model cost which is depended on the pricing scheme of recent Amazon Cloud Front. Next to this, we evaluated the execution impact which various the quality levels combinations of content have in the streaming system (peer-assisted) as well as the behavior of client in such environment. In the research paper, we presented the peer-assisted streaming integrated into currently ratified MPEG DASH standard that without compromising merits of it like existing infrastructure exploitation. The simulation results of paper, have been demonstrated which we can reduce the bandwidth server up to 25% that thanks to the peer assistance. In addition to this, we have illustrated in which certain reduction of bandwidth can be straightly converted to the costs of infrastructure that provides the peer assistance in the streaming of video streaming with the significant impact of business.

*In 2011 Kevin J. Ma (et.al)*presented a paper forParticular survey observes at how conventional techniques of networking (for example, load balancing, path diversity, traffic shaping, and caching) have adapted in order to address the requirements of video delivery (based on Internet). The relativity and stringent timing of large need of bandwidth of the video-traffic that are taxing on the best networks effort and number of video precise to delivery methods and protocols have then emerged over the attempt time in order to mitigate the restriction of network. The video quality is straightly tied that to a networks' underlying ability require delivering the data in play out time. The research paper surveys the three categorize of techniques that have suggested for enhancing internet quality that delivered the video: network load distribution, interruption mitigation of network, and network load reduction. We have discussed the every particular paradigm that applied within numerous E2E (End to End) segments video of delivery system: by a server, in a network, or at client, with precise concentration on how the conditions of underlying network affect the optimization of video quality.

*In 2009, N.Qadri (et.al)*presented a paper for the P2P streaming & MANETs have turned out as the extreme active area of research for the pervasive computing. Certain areas get independently developed with every result that there's an insufficient verification of the distribution paradigm P2P as well as the specific real-time video streaming P2P, need to be function on the MANETs. In research paper, we have illustrated the mesh depended P2P-streaming all together with the MDC (Multiple Description Coding) over the MANETs efficiently gives the current time (real time) streaming of video. The MDC is the promising technique of video coding, it is an emerging alternative path to enhance the quality of video for all P2P over the internet as well as the MANET applications. Certain research paper illustrates which the P2P (mesh-based) when gathered with the improvement in MDC results in the making of video quality, it is acceptable for AHN's (Ad Hoc Networks). For particular purpose, the simulator GloMoSim was changed to support the MDC and P2P (mesh-based). The real-time streaming of video will be more useful for number of Ad Hoc Applications like rescue and search applications, video conferencing, inter-vehicular communication and military applications.

In 2010, Mubashar Mushtaq (et.al) presented a paper for considered the real-time streaming issue of packet IP video over the P2P networks from the multiple numbers of senders to sole receiver. The P2P networks are usually designed by the highly dynamic and potentially large host's population which join and then leaves a network commonly. We represented the evaluation and design of the streaming mechanism quality adaptation in the multiple streaming sources to the sole receiver. The multimedia streaming is the application of real time so, the major design challenges of particular mechanism are: (1) The selection senders peers nodes; (2) the stream switching along peers; (3) the video quality optimization by active links measurements; and (4) Enhancement of overall QoS (Quality of Service). The key technique to give the quality adaptation is depended on the active network links measurements and sender peers selection in order to improve the entire throughput. We have utilized the video traffic that organized as the MDC layers (Multiple Description Coding Layers) that gives the high-error resilient. The simulations results by using the ns2 illustrate which our solution permits to utilize effectively available bandwidth network of sending the peers and permit the maximizing qualities of streaming at the peer reception.

3. Conclusion:

In this paper, we give the review of a quality adaptive streaming mechanism for P2P networks. The presented papers allow us to perform smooth quality adaptation for streaming of IP packet video. The mechanism used is receiver-centric i.e., receiver peer is in charge for selection of active peers and it also coordinates the overall streaming mechanism by switching from one congested node to other present in subset of candidate peers and offering better QOS.

4. References:

1. Mohamed Hefeeda, Ahsan Habib, Boyan Botev, Dongyan CA, November 2003.
2. R. Rejaie and Antonio Ortega, "PALS: Peer-to-Peer Adaptive Layered Streaming", NOSSDAV'03, June 1-3, 2003, Monnterey, California, USA.

3. V. N. Padmanabhan, H. J. Wang, and P. A. Chou, “Resilient Peer-to-Peer Streaming”, IEEE ICNP, Atlanta, GA, USA November 2003.
4. N. Aboobaker, D. Chanady, M. Gerla, and M. Y. Sanadidi, "Streaming Media Congestion Control using Bandwidth Estimation," In Proceedings o/MMNS '02, October, 2002.
5. Joohee Kim, Russell M. Mersereau, and Yucel Altunbasak, “Network Adaptive Video Streaming using Time (s) Multiple Description Coding and Path Diversity”, ICME 2003.
6. KaZaA: http://www.kazaa.com
7. Morphous: http://www.morpheus.com/
8. J. Kim, Russell M. Mersereau, and Yucel Altunbasak, Description Coding and Path Diversity”, ICME 2003.
9. V. K. Goyal, “Multiple Description Coding: Compression Meets the Network” IEEE Signal Processing Magazine page 74-93, Sep 2001.
10. Vitali, M. Fumagalli, and Cefriel, “Standard-compatible Multiple-Description Coding (MDC) and Layered Coding (LC) of Audio/Video Streams”, Internet Draft, Network Working Group. July 2005.
11. J. Stuart Hunter. “The Exponentially Weighted Moving Average” J Quality Technology, Vol. 18, No. 4, pp. 203207, 1986.
12. Network Simulator 2: http://www.isi.edu/nsam/ns/
13. O. Rose, "Statistical properties of MPEG video traffic and
14. their impact on traffic modeling in ATM systems", in Proceedings of the 20th Annual Conference on Local Computer Networks, Minneapolis, MN, 1995, pp. 397-406.
15. Dinesh Goyal et.al “Improve Security For Mobile Adhoc Networks Using Genetic Zonal Routing Protocol”, in International Journal of Innovative Science and Research Technology, Volume 1 Issue 9, 2016.