ISSN 2395-1621

Live Streaming with Receiver-Based Peer-Division Multiplexing

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ABSTRACT

This paper presents a number of commercial peer-to-peer systems for live streaming have been introduced in recent years. The behavior of these popular systems has been extensively studied in several measurement papers. Due to the proprietary nature of these commercial systems, however, these studies have to rely on a "black-box" approach, where packet traces are collected from a single or a limited number of measurement points, to infer various properties of traffic on the control and data planes. Although such studies are useful to compare different systems from end-user's perspective, it is difficult to intuitively understand the observed properties without fully reverse-engineering the underlying systems. In this paper we describe the network architecture System, one of the largest production live streaming providers in Europe at the time of writing, and present a large-scale measurement study of System using data collected by the provider. To highlight, we found that even when the System was heavily loaded with as high as 20,000 concurrent users on a single overlay, the median channel join delay remained less than 2 to 5 seconds, and that, for a majority of users, the streamed signal lags over-the-air broadcast signal by no more than 3 seconds.

Keywords— **Live streaming, network architecture, peer- to-peer (P2P) system.**

ARTICLE INFO

Article History

Received : 2nd April, 2015

Received in revised form :

4th April, 2015

Accepted : 8th April, 2015

Published online :

10th April 2015

I. INTRODUCTION

There is number of commercial systems which give services over the Internet. Those are similar as traditional thing like as over- the-air, cable. Live television is famous on internet. There are IPTV services for increased broadband speed, growth of broadband subscription base, and improved various video compression technologies.

We distinguish 3 use of peer-to-peer (P2P) network: delay-tolerant file download of archival material, delay sensitive progressive download (or streaming) of archival material, and real-time live streaming.

1. Delay-tolerant file download of archival material

In the first case, bandwidth in the P2P network play important role to completion of download .Because download depend on available bandwidth. The application buffer receives data and informs the user upon the completion of download. Then the user can start playing back the file for viewing in the case of a video file. Eg.bit torrent, varients.

2. Delay sensitive progressive download of archival material

In the second case, the application decided it has sufficient data buffered that video playback starts as soon as, given the estimated download rate and the playback rate, it will not deplete or reduce the buffer before the end of file. If this assessment is wrong, the application would have to either pause playback and re buffer or slow down playback. While users would like playback to start as soon as possible, the application has some degree of freedom in trading off playback start time against estimated network capacity.Eg.video-on-demand.

3. Real-time live streaming

The third case, it has hard delay requirement. It has initial buffering of tens of seconds or even minutes while download but live streaming generally cannot tolerate more than a few seconds of buffering. The delay introduced by signal getting and encoding,network transmission and propagation. The System peer-to-peer live streaming is a free-to use network maximum of over 60000 concurrent users on a single channel. The live streaming system can introduce only a few seconds of buffering time end-to-end and still be considered "live".

II. PROBLEM STATEMENT

- Now a day many requests in server for streaming video there bandwidth are main problem.
-Delay to download file as well as play.

We can solve problem by following steps:
1. Every server or peer provide the single user a single channel.
2. Use channel switching: after gets the peer failure before gets the peer failure extra requests allocate into another peer.

Existing System:

In Existing system, firstly users download video and then start to play for viewing. In some situation there end users may have different bandwidth for data receiving or forwarding, especially in large-scale streaming with hundreds of thousands of users. If a description has a high coding rate, some network paths may not have enough bandwidth to support its delivery. The loss rate of data will be high. On the other hand, if descriptions have low coding rates, the number of descriptions and accordingly the coding cost will be high.

Drawback of our existing system:

- Limited Access Only.
- No Secure because No Encode/Decode Operation of Sharing.
- Time Delay.
- No live streaming accessing.

Proposed System:

We intend live streaming system by studying various systems. It delivers live steaming content on peer-peer network. We are able to collect network core data from a large production system with over 3 million registered users with intimate knowledge of the underlying network architecture and protocol. We intend only a few seconds of buffering time end-to-end and still considered "live". Accessing data from peer-peer network so it can reduce buffering time as well as reduce delay. Added only a list of peers currently joined to the P2P network.

Advantages of proposed system:

- To minimize per-packet processing time of a stream.
- Streaming of video done fast and reduce time delay and buffering problem.

More secure because Encode/Decode Operation used Validity Time for Peer Registration.

Cool streaming: Design, Theory and Practice

There have been major studies on P2P live and technical innovations for live video streaming, in which the recent keyword are:
1) Peers communicate with each other for content availability information.
2) Peers use somewhat similar to the technique used in Bit Torrent, for content delivery.

Make some new in this paper by referring a peer-to-peer (P2P) live video streaming system, in which there is no topology explanation. One of best is Cool streaming presented large-scale P2P video streaming experiments, which has been widely referenced in the community as the standard. Since P2P-based live streaming system has the capacity to scale. When choose random partner selection while keeping the random partner selection, improve the system in nearly all aspects, specifically [4]. Recently study on cooling system we get some achievement which useful in understanding system:
1. Based on a simple topology model, we implement how random peer selection can lead to topology.
2. By observation, we provide the hidden truth on how the buffering technique can resolve the problems associated with dynamics and heterogeneity
3. Show how sub stream and path variety can help to alleviate the impact from network congestion and peer churns
4. Discuss the scalability and limitations of a P2P based live video streaming system.

Insights into PP Live: A Measurement Study of large-scale P2P IPTV System

However, the IPTV service brings important new challenges. IPTV systems can be divided into two categories: infrastructure-based and peer-to-peer based. In infrastructure-based systems, video servers and application-level multicast nodes are placed in the Internet, and video is streamed from servers to clients via the multicast nodes. PP Live is a free P2P system and depend on IPTV application. 1) P2P IPTV users have the similar viewing behaviors as regular TV users. 2) During its session, a peer exchanges video data dynamically with a large number of peers. 3) A small set of peers act as video proxy and contribute service to video data uploading. According to the PP Live web site in January 2006, it provides 200+ channels with 400000 daily users on average. The bit rates of video programs mainly range from 250 Kbps to 400Kbps with a few channels as high as 800 Kbps. The PP Live network [5].

III. OVERVIEW OF PPLIVE

Real – Time Live Streaming:

Real-Time live streaming has the most accurately expressed delay requirement. While download may take initial buffering of tens of seconds or even minutes, live streaming cannot take more than a few seconds of buffering. The delay introduced by signal absorb and encoding, and network transmission and propagation, the live streaming system can introduce only a few seconds of buffering time end-to-end and still be considered "live".

Rendezvous Server:

Rendezvous Server returns to the user a list of peers which are currently joined to the P2P network carrying the channel, together with a signed channel ticket. Add only registered and currently joined user. It maintain list of peers. If the user is the first peer to join a channel, the list of peers it receives contains only to the Encoding Server.

Search Phase:

In this the new joining peer decides its set of potential neighbors. a joining peer sends out a search message to a random subset of the existing peers returned by the Rendezvous Server. The search message contains the sub-stream indices for which this new joining peer is looking for peering relationships. The joining peer will be looking for peering relationships for all sub-streams and have all the bits in the bitmask turned on.

Join Phase:

Usually the file details are encoded state if peer can join in a peer list the files are decoded state. In case the set of potential neighbors is established, the joining peer sends join requests to each potential neighbor. The join request lists the sub-streams for which the joining peer would like to construct virtual circuit with the potential neighbor. The list of peers returned by both the Rendezvous Server and potential neighbors all come attached with topological locations.

Reed Solomon error correct code algorithm:

- Many number of request are generated for peers.
  - Some of the attackers enter the peer.

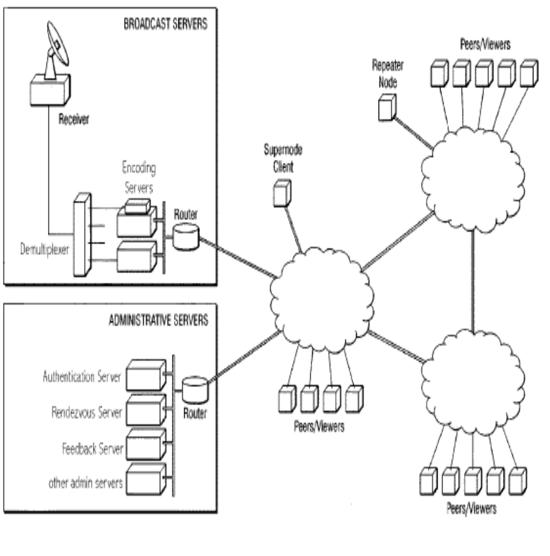

Fig.1System delivery network architecture.

The System rebroadcasts live TV, captured from satellites, onto the Internet. The system carries each TV channel on a separate peer-to-peer delivery network and is not limited in the number of TV channels it can carry. Although a peer can freely switch from one TV channel to another, thereby departing and joining different peer-to-peer networks, it can only join one peer-to-peer network at any one time. Since description of the system delivery network as it relate to carrying one TV channel. Fig. 1 shows a typical setup of a single TV channel carried on the System network. TV signal captured from satellite is encoded into streams, encrypted, and sent onto the System Network. The encoding server may be physically separated from the server delivering the encoded content onto the Network System. Users are required to register themselves at the System for access data from server easily.

Peer-Division Multiplexing

The System protocol sets up a virtual circuit with multiple fan outs at each peer for minimize per-packet processing time of a stream. When a peer joins a TV channel, it establishes peer-division multiplexing (PDM) scheme among a set of neighboring peers by building a virtual circuit to each of the neighboring peers. Performance degradation of a neighbor peer, the virtual circuits are maintained until the joining peer switches to another TV channel. With the virtual circuits set up, each packet is forwarded without further per-packet handshaking between peers.

IV. STREAM MANAGEMENT

a We present a peer as a packet buffer, called the IOB. The IOB allows a peer to absorb some changeable in available network bandwidth and network delay. They have two pointer:1)The input pointer point to the slot in the IOB where the next incoming packet with sequence number higher than the highest sequence number received so far will be stored.2)The output pointer of a destination indicates the destination’s current forwarding horizon on the IOB.

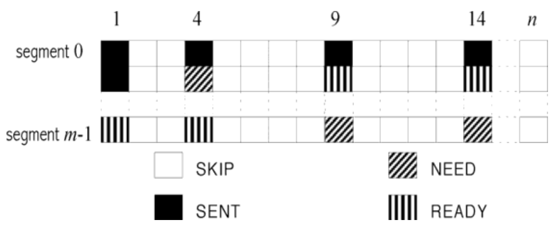

Fig.2 packet map associated with peer pointer.

We have three types of output pointers: player pointer, file pointer, and peer pointer. One would typically have at most one player pointer and one file pointer, but potentially multiple concurrent peer pointers, referencing an IOB. The System player application does not currently support recording. Since we maintain the IOB as a circular buffer, if the incoming packet rate is higher than the forwarding rate of a particular destination, the input pointer will overrun the output pointer of that destination. We could move the output pointer to match the input pointer so that we consistently forward the oldest packet in the IOB to the destination. Doing so, however, requires checking the input pointer against all output pointers on every packet arrival implemented the IOB as a double buffer. A peer receiving a retransmission request will honor the request only if the requested packets are still in its IOB and it has adequate left-over capacity, after serving its current peers, to transmit all the requested packets

V. ADAPTIVE PDM

While we rely on packet retransmission to recover from transient congestions, we have two channel capacity adjustment peer also computes a loss rate over the packets. If the loss rate is above a threshold, the peer considers the neighbour slow and attempts to reconfigure its PDM. In reconfiguring its PDM, a peer attempts to shift half of the sub streams currently forwarded by the slow neighbour to other.

VI. GLOBAL BANDWIDTH SUBSIDY SYSTEM

Each peer on the Zattoo network is assumed to serve a user through a media player, which means that each peer must receive, and can potentially forward, all sub streams of the TV channel the user is watching.The limited redistribution capacity of peers on the Zattoo network means that a typical client can contribute only a fraction of the sub streams that make up a channel. This shortage of bandwidth leads to a global bandwidth deficit in the peer-to-peer network.

VII. CONCLUSION

We have presented a receiver-based, peer-division multiplexing engine to deliver live streaming content on a peer-to-peer network. The same engine can be used to transparently build a hybrid P2P/CDN delivery network by adding Repeater nodes to the network. By analyzing a large amount of usage data.We have also shown that error-correcting code andpacket retransmission can help improve network stabilityby isolating packet losses and preventing transient congestion from resulting in PDM reconfigurations.

VIII. FUTURE ENHANCEMENT

We have shown that error-correcting code and packet retransmission can help improve network stability by isolating packet losses and preventing transient congestion from resulting in PDM reconfigurations. We have further shown that the PDM and adaptive PDM schemes presented have small enough overhead to make our system competitive to digital satellite.

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