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P2P Video Delivery with SURFNET For Fast Search

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Abstract— **A Peer To Peer video on demand has been developed to reduce the pressure of the YouTube by reducing the search delay of existing peer to peer system. The system we consider consists of peers which are interested in receiving the video stream(RTP server) and peers which have obtained the complete video stream and are willing to share it freely with other peers(RTP client). In Peer To Peer Video Delivery With SURFNET For Fast Search the video is divided into chunks and superchunks to construct an AVL tree which provides data which is chunk level data.**

Keywords- **Superchunk; Chunk; Peer To Peer networks; Video On Demand Service; Java Media framework; Live Streaming video streaming.**

I. INTRODUCTION

A. *Peer To Peer Systems*

Peer To Peer solutions for Video-on-Demand (VoD) services, which stream pre-recorded and live video content to multiple clients. 1. A content discovery algorithm needed to discover the appropriate content on a specific peer. 2. Enhanced download support using peer to peer system. 3. No use of server systems. 4. Using the system to store videos online in a diverse way. The problem with any server driven system is the storage of all the data at a particular place and a particular server is accessible by a certain number of people at one time. This factor reduces the availability of server in case the preoccupied with maximum limit of serviceable clients. Such a problem can be very easily be solved by use of a peer to peer system , which essentially is a system where all the (peers or nodes) are connected via a network but none of them represents the characteristics of a server. The problem again is the cost affectivity of the server based system. The servers are bulky and costly system and need a fully trained and committed work force to keep the server running all 365 days of the year. On the other hand peer to peer systems are just simple computers that could even be at some body's home and hence they are distributed all over the World Wide Web. Also when the server at repair all the web content available with the server also becomes offline, hence no user can view the data stored by the server. Hence such a case also the peer to peer system become highly effective as not all web content is stored on one computer. So even if one peer goes down for service related problem but only the data associated with that particular node goes offline. The system consists of peers which are used to share freely the interested video stream wit h each others. The peer which receives the video is called as client peer(leechers) and the peer which have completely received the video stream and going to share it with other peers are called stable peer(seeders). Mechanisms to implement this could be centralized, with a server keeping track of who is in the network, or decentralized, for example, by using epidemic protocols or DHT rings. Peer-to-peer (p2p) video- On-demand (VoD) services are becoming increasingly popular. These services have the potential to revolutionize how people view media content. However, the current VoD services offer a different playback experience from download-based systems, like Bit Torrent.

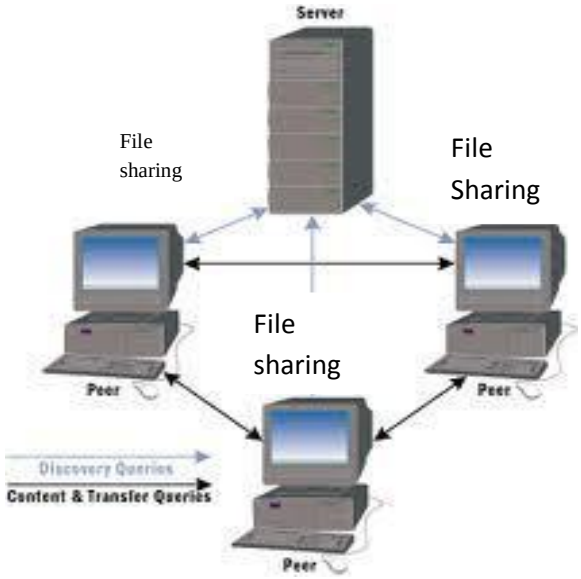

Figure 1. Peer To Peer System

Download-based systems require the content to be downloaded in its entirety, but once downloaded provide the freedom to fast-forward, rewind and seek to arbitrary locations in the content during playback. P2p VoD systems do not support this kind of interactive playback they depend on being able to spend minutes caching content before commencing playback and then rely on contiguous playback from the beginning of the media to the end.

B. *Video-on Demand (VoD)*

Video-on-Demand (VoD) is an interactive multimedia service which allows users to watch the video of their choice at any time, after waiting for a some startup delay, and perform control operations such as pause, play, fast forward, fast search, reverse search and rewind, while downloading the video in parallel. The first point to address in the implementation of such a service is the amount of available media content; the amount of titles should at least compare with that available in an average video store. This should no longer be an issue considering the huge storage capacity commonly available on much of the Internet current servers. The second point and first critical problem is the bandwidth required for providing such a service. While providing low quality short videos to a limited number of users could easily be implemented using a server cluster and a classical client/server architecture, providing full length movies with a DVD-like quality to several thousands of users at the same time poses a significant challenge in terms of scalability. The third point is that users should be able to watch the video at an arbitrary time. Although a large number of users may be watching the same video, they are asynchronous to each other and different users are watching different portions of the same video at any given moment. This particularity causes an additional problem in the use of P2P networks in order to meet the scalability issue mentioned in the previous point. The fourth point is the tough issue of supporting interactive VoD. While pause and rewind can be supported by introducing more buffer space, fast search and fast forwarding are the most difficult features to implement in overlay protocols. Fast forward requires the video data transmitted in shorter time than normal, while fast research generally causes important latency delays that dramatically drop the Quality of Service (QoS).

C. *Benefits Of P2P Video delivery with SURFNET for fast search*

1. Such a system would be highly useful for small and medium scale enterprises since they would be free to use a system. 2. Such a system would be highly efficient and inexpensive for small and medium scale companies which do not have money and man power resources to employ a fully edged server system. 3. Peer to peer system also has an added advantage that the data or the video content we are taking here would be contained in a diverse way and hence would not be affected by a virus attack. 4. Significant increase in speed and performance 5. Resource sharing - It is possible to exploit computer and other resources that are available by networked and mobile users; 6. Information sharing - Permitting remote access to data such as business processes definitions, data, peers' profile etc.; 7. Great Scalability - It is very easy to add any number of peers where needed; 8. Reliability and availability - That is achieved by redundancy and dynamic allocation; no longer depending on a single centralized server (even when some peers are down, the execution of process instances could still continue).

II. LITERATURE SURVEY

Video-over-IP applications have recently attracted a large number of users over the Internet. On YouTube, the world's most popular online video community, people are watching hundreds of millions of videos a day, and uploading hundreds of thousands of videos daily. In fact, every minute, ten hours of video is uploaded to YouTube [YouTube 2008]. In the same time, Internet live video streaming systems, also known as Internet Protocol Television (IPTV), such as PPLive [PPLive 2008], Cool Streaming [Cool Streaming 2008] and Zattoo [Zattoo 2008] have been developed and deployed, and have been watched by thousands of users. With the fast deployment of high speed residential access, video traffic is expected to be the dominating traffic on the Internet in the near future [Liu et al, 2008].

P2P Video Delivery With SURFNET For Fast Search allows users to watch any point of video at any time. Compared with live streaming, VoD offers more flexibility and convenience to users and truly realizes the goal of watch whatever you want whenever you want. VoD has been identified as the key feature to attract consumers to IPTV service. Video-on-demand (VoD) dedicates a single channel to each user and enables the video to be started at any time with VCR-like controls (pause, rewind, fast-forward, etc.)[1][2]. P2P Video Delivery With SURFNET For Fast Search divides the video into chunk and super chunk. YouTube employs CDN to stream video to end users" [Liu et al, 2008]. "YouTube videos today are typically less than 10 minutes in length and have a bit rate under 200 kbps**".** P2P Video Delivery with SURFNET for Fast Search uses hashing algorithm and in this length of video can be more than 10 minutes. The existing system provides video-on-demand streaming service to a large population of clients using peer-to-peer approach is drawing great interest recently. Since clients' demands are asynchronous and the buffered contents are continuously changing, how to find partners with expected data and collaborate with each other for future content delivery are very important and challenging. An effective solution for video-on-demand (VoD) streaming services based on Bit Torrent mechanism is present. In this solution, several modifications have been incorporated into bit torrent to support high quality streaming content delivery. First,

pieces are selected based on the double windows algorithm instead of the rarest-first policy. Second, some neighbor peers are selected based on the time when the peers join in the system not randomly[4][6]. Finally, each peer gives more free tries to the early joined peers to let them participate sooner in the media distribution. The result shows that our modifications shorten the startup latency, improve the continuity as well as the bandwidth utilization, and a good streaming quality can be achieved. So, P2P video delivery with SURFNET for fast search is efficient solution for retrieving on demand videos between peer to peer.

III. *MODULES*

P2P Video Delivery with SURFNET for Fast Search has the following modules:

A. RTP Server

B. RTP Client

C. Java Media Frame Work

A. *RTP Server*

Real Time Protocol (RTP) is a network control protocol designed for use in entertainment and communications systems to control streaming media servers[3]. The protocol is used for establishing and controlling media sessions between end points. The transmission of streaming data itself is not a task of the RTSP protocol. Most RTSP servers use the Real-time Transport Protocol (RTP) in conjunction with Real-time Control Protocol (RTCP) for media stream delivery; however some vendors implement proprietary transport protocols[4][5].

B. *RTP Client*

Real Time Protocol (RTP) Clients of media servers issue VCR-like commands, such as *play* and *pause*, to facilitate real-time control of playback of media files from the server.

1) Play

A PLAY request will cause one or all media streams to be played. Play requests can be stacked by sending multiple PLAY requests.

2) Pause

A PAUSE request temporarily halts one or all media streams, so it can later be resumed with a PLAY request.

C. *Java Media Framework*

The Java Media Framework (JMF) is a large and versatile API used to process time-based media [1]. However, JMF's complexity can take weeks to understand. With that complexity in mind, this article introduces JMF the easy way. We start by drawing an analogy with a stereo system, and then proceed with discussions of JMF's most common interfaces and classes. Finally, we'll see working code that demonstrates part of the API's capabilities. The Java Media Framework (JMF) is a Java library that enables audio, video and other time-based media to be added to Java applications and applets. This optional package, which can capture, play, stream, and transcode multiple media formats, extends the Java Platform, Standard Edition (Java SE) and allows development of cross-platform multimedia applications. JMF can: Play various multimedia files in a Java applet or application. The formats supported include AU, AVI, MIDI, MPEG, QuickTime, and WAV. [5][6]
Play streaming media from the Internet. Capture audio and video with your microphone and video camera, then store the data in a supported format. Process time-based media and change the content-type format. Transmit audio and video in real-time on the Internet.Broadcast live radio or television programs.

IV. *APPLICATIONS*

Data collection

Data collection will be done by the stable peer themselves by physical or on line downloading. The system is not concerned from where the data has been copies but it does care where the data has been stored. Since conventially the data needs to be stored in a single folder which would recognized as the gate way to all video resources in the peer system.

Inventory Logistic Management

Inventory information in hospitals can be maintained over the real time protocol. Users managing the inventories or peers at different locations can provide and report the information about their inventory needs and current inventory status in a request generation.

Reports

Reports of failure of download or access to the system or corruption can be made through the network of emails. Such a system would be extremely handy as it would be separate of the online network of peer to peer.[2][3][4] Problems related to virus infections and service related issues could be done using the application itself.

Surveys and Campaigning

Surveys can be conducted using the application as to what people want to view and download. They can also

conduct surveys on how to improve the system and how many of the viewers are active users of the system. Later on a system of money payment can be introduced for valued customers[7][8].Also campaigning could be done to advertise the system on other systems like internet websites and other TV and radio channel to increase the viewership of the videos and better the financial viability of the system. Also products can be advertised on the p2p system to increase the revenue from the system.

V. *ALGORITHM*

1) Start

2) Peer1 (Server) get started and waiting for Peer2 (client) connection.

3) Peer2 (which acts as a client) sends the request to a peer1 (which act as server) to get connected with content peer1 through IP (Internet Protocol)address, Audio/Video ports and control ports.

4) Peer1 (which act as server) or content peer accept the request and create new socket which manages new sessions.

5) Peer1 create the server socket then uses the listen method to know which of the port of client (audio, video) want to be connected.

6) To handle different sessions it make use of different threads which is created using server socket thread.

7) Connection is set.

8) After the connection Peer1 socket prepared the list of contents and sends the list of contents to peer2 which is displayed on the bottom left corner of video receiver.

9) Peer2 selects the contents or songs from the list and plays the particular application.

10) Peer2 can perform the various operations such as play, pause, stop etc.

11) Peer2 will also download and upload the audio and video files by making use of chunks and super chunks which is faster than YouTube.

12) Peer2 can also see the list of peers which are playing particular songs, downloading and uploading various songs.

13) Number of peers can connect to the other peers which will connect in Tree format. So, it works exactly as peer-to-peer.

14) Assume, Peer3 (child peer) is connected to Peer2(parent peer) and Peer2 is connected to Peer1 which is root peer.

If Peer2 is disconnected then

Peer3 is automatically get connected to Peer1.

Else if

Peer4 wants to connect to the network then it becomes the child peerof Peer3.

VI. RESULTS AND DISCUSSION

Fig1.Describes that Java Media Framework which we used for conversion of one type of video into other type video.JMF supports the different types of video file formats such as AVI, MPG, GSM and so on.

Fig1. Starting of Java media framework

Fig2 Describes that for playing the different types of videos we have to maintain the RTP Sessions.

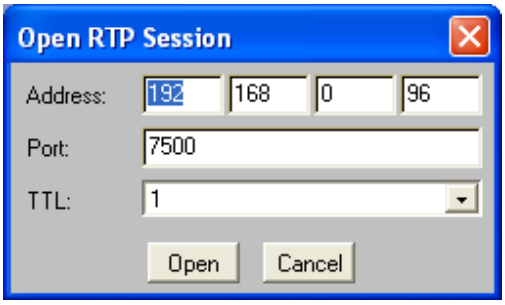

Fig2. Maintaining RTP sessions

Fig3 Describes that clients are able to play , pause, stop the videos.

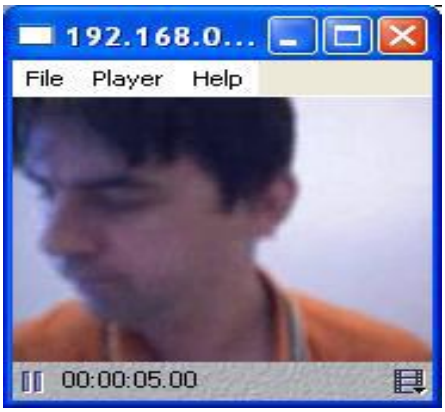

Fig3. Video playing

Fig4.Describes that we can do login at admin side for authentication purpose.

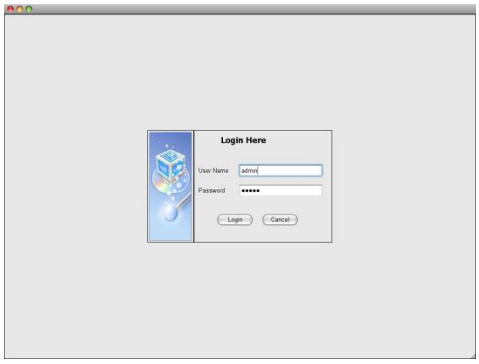

Fig4. Login Window

Fig4.Describes that we can transfer the videos from one peer to other peer by using RTP protocol.

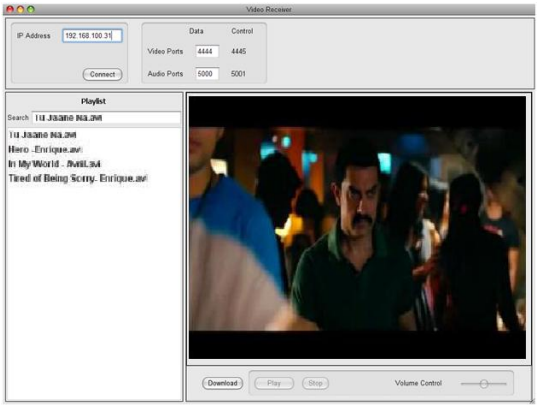

Fig 4. Video Receiver

VII. CONCLUSION

Thus our system Superchunk based Fast Network (SURFNet) to reduce search latency in P2P (peer to peer) VoD(video on demand) systems. It constructs an AVL tree with stable peers to provide a data which is superchunk-level availability of information and combines superchunk holders into holder-chains. So it provides the efficient and fast searching mechanism although there is a large amount of data and overcomes the drawback of YouTube.

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