REPLICATING AND SEARCHING POPULAR VIDEOS IN P2P VIDEO ON DEMAND SYSTEM

C.Srigurulakshmi, G.Sivakumar

Abstract: - Online social networks have popular video sharing sites, but the experience of user watching videos is still unsatisfactory because of service overload. The client request the videos continuously, the sever overhead is high, and good quality video require high bandwidth. In P2P VoD systems, each peer acts like a client as well as the server. In this P2P, the system overhead and access latency is less compare to the client-server model. The main principle of Caching and Replication techniques is to retrieve the video contents from the source before it is requested by the user. Caching techniques perform various algorithms to find and store the frequently used videos. And Replication techniques used to make the duplicate videos in popularity based. Caching and Replication techniques are used to reduce or eliminate the potential load among server and decrease the service delay. In existing **Random with Load Balancing technique**, there is a problem of maintain limited cache capacity of storing videos, Replicating the videos based on popularity is very challenging task in video streaming process, Each peer contribute more storage to replicate the videos, and poor searching speed. In proposed, the **Popularity Based Load balancing technique is introduced** in order to improve the cache space, to increase searching efficiency, and to reduce the overload among peers.

Index Terms: - Peer to Peer (P2P), Video on demand (VoD), Random with Load Balancing (RLB), Popularity Based Load balancing (PLB)

1. INTRODUCTION

1.1 Peer to Peer Network

A Peer-to-Peer (P2P) computer network uses diverse connectivity between participants in a network and the cumulative bandwidth of network participants rather than conventional centralized resources where a relatively low number of servers provide the core value to a service or application. [1]P2P networks are typically used for connecting nodes via largely ad-hoc connections. Such networks are useful for many purposes. Sharing content files containing audio, video, data or anything in digital format is very common, and real time data, such as telephony traffic, is also passed using P2P technology.

A pure P2P network does not have the notion of clients or servers but only equal peer nodes that simultaneously function as both "clients" and "servers" to the other nodes on the network. This model of network arrangement differs from the client-server model where communication is usually to and from a central server.

1.2 Video Streaming

Video streaming over the Internet is already part of our daily life.[1] It is an emerging technology for distributing and watching digital videos over the network. Today, large number of people accesses the Internet. People can access not only the text and the image data, also video data, and can watch news and concerts from all over the world. Usually, digital video can only be played after downloading the entire file to one's PC. Digital video data is massive data compared to text and image data and it takes long time to download that all.

- *C.Srigurulakshmi is currently pursuing Masters Degree program in Computer Science and engineering in Erode Sengunthar Engineering College, India. E-mail: sriuma910@mail.com*
- *G.Sivakumar, Associate Professor, Dept of CSE, Erode Sengunthar Engineering College, India. Email:g_siva@yahoo.com*

In order to solve this problem they proposed, a streaming technology has been developed that receives the data from a server based on user access pattern. So the people can easily obtain the videos without waiting. Video Streaming is a method of transmitting data from the internet directly to the user's computer screen without the need to download it. The video streaming process can be classified into two types: 1. Live Video Streaming 2. Video on Demand

1.2.1 Live streaming

P2P live video streaming has a very popular and successful service on Internet. As one of the most successful profitable P2PLVS systems, P2PStream has attracted millions of users all over the world. The source server broadcast the contents and all the clients play the contents at a same progress. In this systems shorter end-to-end delay is more desirable for better perception of stream. For example: Radio channel, TV live programs

1.2.2 Video on Demand

Video on Demand System, the user can flexibility of watching whatever video clips whenever they want. The source server broadcast the contents and all the clients play the contents at a different progress. VOD systems either stream the video contents through a set-top box, a computer or other device, allowing viewing in real time, or download it to a device such as a computer, digital video recorder (also called a personal video recorder) or portable media player for viewing at any time. For example: YouTube

2. CACHING TECHNIQUE

Caching is processed on the media chunks. The caching is done in media chunks in two ways. The first way is to cache the chunks in a predefined manner when no data regarding the popularity of the media is available.[6] The second way caching is working based on the popularity of the video. For example, when a server receives a request from a client, it immediately responds to the client if the object is in its local cache storage space. In cache storage space storing frequently used videos. Cache uses various algorithms to store the video contents. So Caching increase the searching speed, hit rate and reduces the client waiting time and communication among peers.

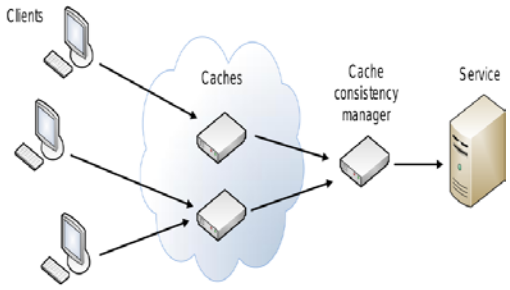

Fig1. Caching object

3. REPLICATION TECHNIQUES

Replication is the process of creation and maintenance of duplicate copies of objects in internet- scale distributed system.[2] Replication improves the system performance, fault tolerance, reduces a network bandwidth usage and increases the availability of popular data objects by distributing the source of information in globally. To efficiently use the server storage we need to replicate objects that will yield the best performance.

Replication is needed in the case of System failure, network traffic and to increase system scalability, load balancing, and to reduce access cost. For example, users can access a local object rather than origin server to minimize network traffic, access latency and provide location transparency. [7]There are different models of object replication. We mainly deal with a distributed replication group. A distributed replication group contains several servers dedicating some storage for the replicas. A server has to serve requests from its clients and also from other servers in the group. When a server receives a request from a client, it immediately responds to the client if the object is in its local storage.

Otherwise, the object is fetched from other servers within the group at a higher access cost or

from the origin server, at an even higher cost; in the case no server within the group stores a replica of the object. The purpose of the replication group is to achieve minimum access cost.

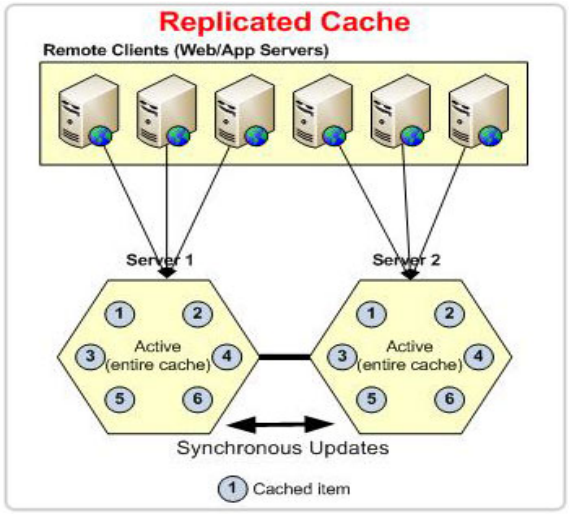

Fig2. Replicating objects

4. EXISTING WORK

Video sharing is a challenging task because of demand on a large amount of load at server site. In the existing caching and replication methods, they used various techniques to get the video contents from the peer system. There are several caching and replication techniques have been developed. Here, some of the caching and replication techniques are compared.

Table 4.1 Comparison of Caching and Replication techniques

Algorithm (or) Techniques	Advantage	Result	Limitation
WRCR[8]	It reduces cache space	Minimum of 31 object & maximum of 177 object	Maximum latency between client and server
MDC & MRU[4]	Reduce package losing problem	Maintain leading object only	Video watching rate is limited
FSS & CBS[14]	Reduces Client waiting time	FSS more consistency than CBS	Missing contents on server
PALC[9]	increase cache contents	95% efficiency, cache hit ratio 90%	maintain popular videos in cache
RLB[17]	**Adapt all the video object**	**Homogenous & heterogeneous Peers**	**load will be increased.**
ORA[15]	Accurate to find popular objects	Pop=81 %, unpop=10 %	partially obtain the videos
HB[13]	Accurate measure of distance between two peers	Saves 60% of server load	Path delay for video session
RBS[16]	High cost reduction	Cu=0.2, 1,2. obtain 2=high price	Not Dynamically adjust price
TLC[5]	Better load balance,	Replication reduced	limitation on cache capacity
PRA[10]	It replicate object based on user access pattern	Iteration increased to 20 to 50, maintain steady state	Can't adapt dynamic user request, replicate the videos partially.
RESTREAM[11]	Maximize the number of consumers	Sending request of leave message 0.5	Bandwidth consumption is high
LAZY Replica[3]	Decrease server load	Decrease server load at 15%	Cost is increased
ACMA & TC[6]	Reduce delay, better load	Decrease join latency 2.5	Network traffic

	balance	only	
DARPP[12]	Minimizes Cost & Increase Availability	1% degradation system performance	Not provide individual system performance
QIRMA[2]	High availability	Bandwidth utilization of QIRM is nearly 80-90%	Access latency, Bottleneck Problem,

The Table 4.1 shows the comparison of caching and replication techniques. Each technique has some limitations. Some of the techniques have the problem of maintaining cache capacity and increase in computational load. Because of the limitation of cache space, more number of popular videos cannot be replicated. The computational load is also a problem because of dynamically increasing the peer population, movie popularity and user access pattern.

5. PROPOSED WORK

All the Caching and Replication techniques are applied to the entire P2P network. Hence, it is difficult to maintain the cache capacity and increase in computational load. Random with Load Balancing technique is implemented which stores the both popular and unpopular videos. It performs Replication process to find the replication allocation that balances the server bandwidth for different movies. So wastage of bandwidth is minimized. Maintaining both popular and unpopular videos for all the peers is a difficult one, Replicating the videos based on popularity is very challenging task, and also uses only low searching speed.

The proposed work is to apply Popularity Based Load Balancing technique, in order to improve the cache space, increase searching efficiency, and reduce the overload among peers. This technique uses four components,

- ✓ Creation on peer infrastructure
- ✓ Video on Demand (Popularity Based Load Balancing) & Dynamic Cache Space
- ✓ Replicate Popular Videos
- ✓ Search for Specific Videos

Creation of peer infrastructure

Peer infrastructure creates the multiple peers to form a p2p network. All the peers are connected with each other. It is used to share the videos in neighboring peers. In this process, each peer acts like a client and server also. It is used to reduce the client waiting time, improve the scalability and low cost.

For example, the P2P network connected with 50 peers. The client currently working peer path can be set as destination. If the client requests to watch any video to other peer then the particular path is set as source. In this p2p network sharing the videos in neighboring peers immediately. So it reduces the client waiting time and decreases the delay.

Video on Demand (Popularity Based Load Balancing) & Dynamic Cache Space

Video on Demand (VoD) process focuses on popularity based videos. The client can request the particular video to the other peer. This method is used to watch the movie in user expectation basis. It introduces the Popularity Based Load Balancing (PLB) technique. [9]These techniques are used to select videos based only on video popularity. It reduces cache space for unpopular videos.

For example, the clients select the popularity video based on the count value. The cache space changes dynamically.

Replicate Popular Videos

Replication [7] is the process of creation and maintenance of duplicate copies. It mainly used to recover the data when the system crash.

For example, the client can watch popular video to other peer means that particular video will be replicate in current system.

Search for Specific Videos

The peer currently watching particular video segments can be retrieved from other peers. These methods can effectively searching the particular video segments.

For example, the client wants to watch a particular video. That video size is 20MB. The currently using peer having only 5MB segment for that particular movie, then remaining 15MB segment searching or retrieved to neighboring peers in efficiently. It reduces the searching delay for video segment.

CONCLUSION

By caching and replication method, improve the cache space, to increase searching efficiency, and to reduce the overload among peers. By improving cache space, it maintains only popular videos. Hence we can use the cache space efficiently. The video segments of the currently watching movie can be searched quickly. So it reduces searching delay. This concept is to be implemented using MATLAB Software in future.

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