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A CONSOLIDATE MINIATURE AND SEARCH OF P2P VOD REPRODUCTION AND ARRANGING

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Abstract: **A peer-to-peer non-linear media streaming system needs to schedule both on-demand and prefetch requests carefully so as to reduce the server load and ensure good user experience.A few change of this replication issues have been calculated recently with somewhat various result. Then they introduce a merging request scheduling model parameterized by the maximal number of peers that can be used to serve a single request . This arrangement is called Fair Sharing with Bounded Degree (FSBD). Based on this unifying model, they can analyze the various replication approach for different degree hop. Also it introduce a simple (primarily) distributed replication algorithm and show that this algorithm is able to modify itself to work well for different quality in arrangement. Based on this unifying model, we can compare the different replication strategies for different degree bounds and see how and why different replication strategies are favored depending on the degree.We also propose a simple (primarily) distributed replication algorithm and show that this algorithm is able to adapt itself to work well for different degrees in scheduling.**

I INTRODUCTION

Network security consists of the provisions and policies adopted by a network administrator to prevent and monitor unauthorized access, misuse, modification, or denial of a computer network and network-accessible resources. Network security involves the authorization of access to data in a network, which is controlled by the network administrator.The most common and simple way of protecting a network resource is by assigning it a unique name and a corresponding password. Since this requires just one detail authenticating the user name i.e. the password—this is sometimes termed one-factor authentication. With two-factor authentication, something the user 'has' is also used (e.g. a security token or 'dongle', an ATM card, or a mobile phone); and with three-factor authentication, something the user 'is' is also used (e.g. a fingerprint or retinal scan).In recent years, multimedia content (especially video) distribution has to a great extent moved to the Internet. Peer-to-peer (P2P) technology is often used to either off-load content servers [and content distribution networks (CDNs)] or create completely decentralized content sharing and distribution communities. Popular P2P systems include BitTorrent and PPTV. There are several forms of P2P services:file downloading, BitTorrent is a good example;live streaming, multichannel TV programs are a good example for live content streaming; streaming video-on-demand (VoD), movies are a good example suitable for streaming VoD service.In set-top-box (STB)-based systems, the local peers may also continue to offer service without user control.The best replication algorithm will place the contents at different peers, satisfying storage and other constraints, so that the expected server load is minimized.

Although it is simple to state the problem, it is very challenging to find the optimal solution. Even if we can solve the stochastic queueing model mentioned above for given placements of contents, there are combinatorially many replication options to consider. In practice, only simple algorithms are considered, for example, proportional replication, or iterative and adaptive algorithms, such as Least Frequently Requested or First-in-first-out. Some studies conclude that the simple algorithms can work quite well.More importantly, we can use this framework to unify several important works in the literature—they correspond to analysis based on different request scheduling policies (or assumptions) in the queueing network model. Because of such differences, they arrive at somewhat different replication algorithms as optimal solutions.We propose a commonmodel for request scheduling, called Fair Sharing with Bounded Degree (FSBD), using the maximum degree (the maximum number of peers that can serve a single request) as a parameter. Based on this model, we can compare the different replication strategies under different scheduling settings. Finally, we propose a new replication algorithm that is adaptive and essentially distributed. This algorithm is oblivious to the underlying scheduling policy, but is shown to perform well compared to the "optimal" replication strategies for specific scheduling policies.

II RELATED WORK

Hybrid P2P CDN systems are proposed by Xu et al. to take advantage of both CDN and P2P, in which servers are deployed to guarantee performance and peers make best effort to reduce server load. There are many practical hybrid systems such as Thunder and QQXuanfeng, who provide cloud file downloading service. Ioannidis et al. analytically studied hybrid P2PCDNsystems and showed that, under a properly designed randomwalk propagationmechanism, hybrid systems can support a large number of peers with limited resources both at the server and peers.It is necessary to estimate how many users can be supported with limited server bandwidth. To save cost, replication algorithms should be designed carefully to reduce server load without lowering streaming quality.

Boufkhad et al. proposed an early work to study the relationship between the movie population and peer resources in P2P VoD systems. The peer resources include peers' upload capacity and storage. The work studied the number of movies supported by peers to satisfy a minimum number of distinct movie requests with limited peer resources.Zhou et al. proposed an analytical model for movie replication in P2P VoD systems with multiple movies and first proposed the analysis technique used in this paper. The Perfect Fair Sharing (PFS) scheduling model, RLB and ARLB replication algorithms, and the server bounds for these cases are all from Zhou et al.

our contributions are to: unify the P2P VoD replication works from several important papers in the literature; propose a unifying and more practical request scheduling policy FSBD; and propose a new distributed and adaptive replication algorithm that works well with FSBD.These two works are complementary to ours since we assume that peer population is much more than movie population such that movies are never too cold. Wu et al. tried to characterize the optimal replication strategy. Their conclusion is that proportional replication is not optimal and P2P VoD system should allocate more resources to cold movies, which is consistent with our results. However, in their model, peers also serve the movie that they are downloading, which is a detail not in our model.

III PROPOSED SYSTEM

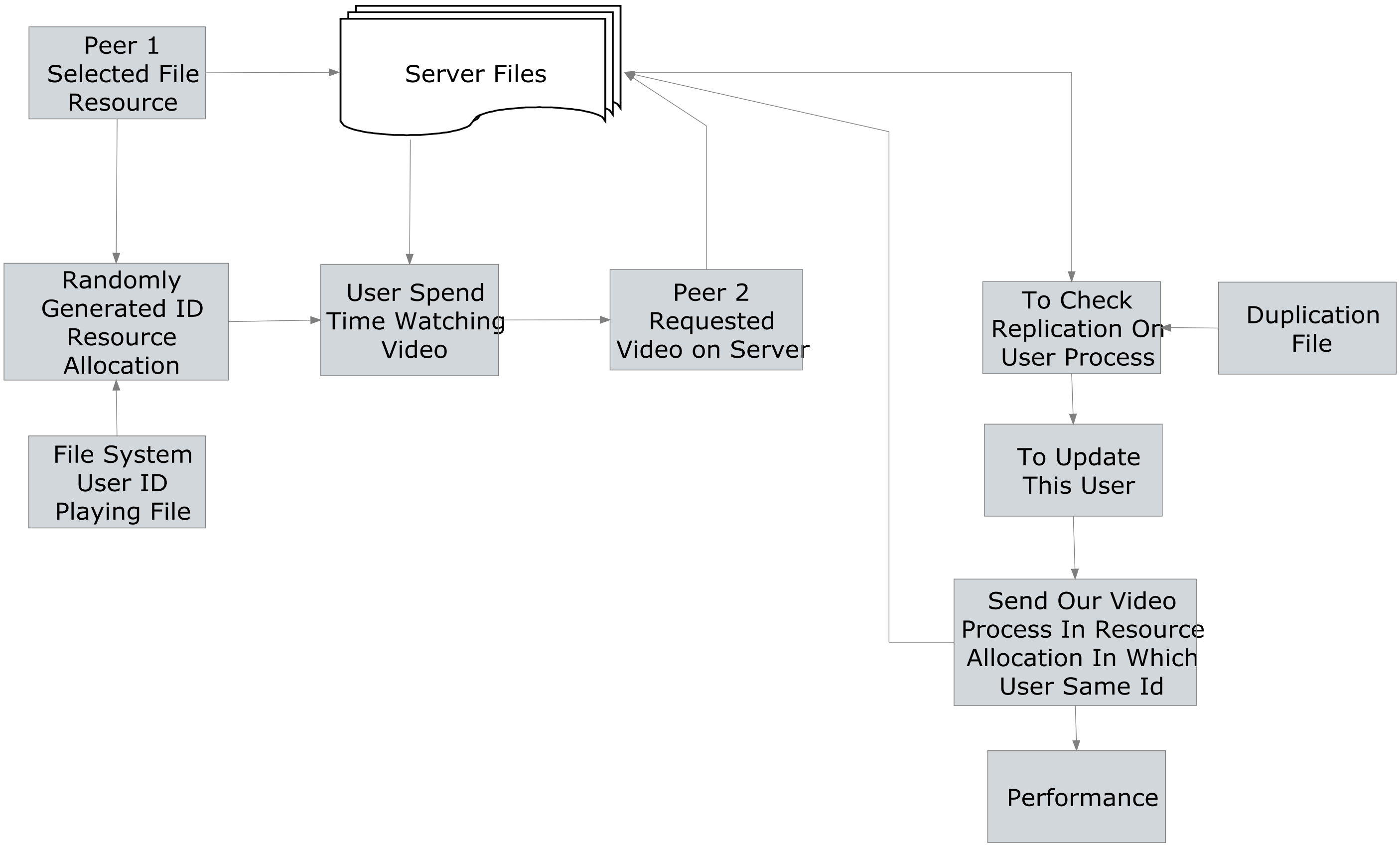
To simplify our analysis and presentation, our discussions so far assume that peers have the same upload capacity. It is, however, not difficult to extend our result to the heterogeneous case. The request scheduling strategy and movie replication strategy together determine the bandwidth allocated to each movie. None of the request scheduling strategies will take into account peers' upload capacity. For example, when a lucky subrequest finds a peer with double the normal upload capacity, that subrequest will get allocated two times of the bandwidth. Thus, to achieve balanced bandwidth allocation, the corresponding movie replication strategy needs to adjust the movie copies according to peers' upload capacity.

It is worth emphasizing that the discussion of FSFD and FSBD assumes the existence of a load balancer such that movie sub requests are perfectly distributed to different peers. The load balancing job is quite challenging, especially for the heterogeneous setting. Furthermore, having a degree or a bound of degree also complicates the job of the load balancer. In simulating of FSFD and FSBD cases, peers send out subrequests randomly, without any careful balancing. The result is still within our theoretical bound because the bound is for the worst case.

The idea of our algorithm is simple. Each peer viewing movie will use a sliding window to calculate the average streaming rate provided by other peers. After a peer finishes viewing a movie, a replication decision is made based on the value of . The peer must also obtain the current value of for by communicating with other peers (or a central server maintaining such information). Then, the peer selects the movie with maximum downloading rate . If , the peer will store movie locally, replacing the movie with downloading rate . Otherwise, movie is discarded. The generated overhead is just the exchange of the information of between peers. The overhead is caused only when there exists subrequests for a particular movie. Compared to the transmission of the movie content, the overhead is negligible. It start us to improve an efficient searching data that in turn goods the performance bounds on server load.Using FSFD for scheduling, reciprocal motion picture replication can produced equitable peer bandwidth sharing.

IV SYSTEM DESIGNS

SYSTEM ARCHITECTURE



V MODULES AND MODULES DESCRIPTION

MODULES

STREAMING VIDEO ON DEMAND ASSUMPTION
DYNAMIC ANALYSIS OF SCHEDULING
UNLIMITED SERVICE DISTRIBUTION
UNIFYING ADAPTIVE REPLICATION
PERFORMANCE ANALYZE

VI MODULES DESCRIPTION

STREAMING VIDEO ON DEMAND ASSUMPTION

A typical example is for a service provider to provide a client that controls how local resources are used for the overall service. The local peers may also continue to offer service without user control. The model of a P2P VoD system can be thought in terms of a queuing network model A number of peers who have the requested content to serve it. This is like the service discipline of a queuing system.

DYNAMIC ANALYSIS OF SCHEDULING

Specifies how a request is served—by which peers and with how much bandwidth from each. Our approach to study content replication strategies is to first fix the scheduling factor. We describe and analyze three request scheduling models that have been adopted in different recent studies of P2P VoD systems. We show how these different request scheduling models lead to different optimal movie replication strategies, even though they all try to optimize the same system.

UNLIMITED SERVICE DISTRIBUTION

we have presented reasonable replication strategies for it and corresponding performance bounds of average server load .The optimal movie replication strategy depends on the request scheduling model assumed. We can regard PFS as representing unlimited service distribution. This comparison helps characterize the power of unlimited service distribution for load balancing. As there are various overheads in dividing a request into too many sub requests and handling them

UNIFYING ADAPTIVE REPLICATION

A load balancer to distribute sub requests evenly such that peers can achieve maximum streaming rate. The request scheduling strategy and movie replication strategy together determine the bandwidth allocated to each movie. To achieve balanced bandwidth allocation, the corresponding movie replication strategy needs to adjust the movie copies according to peers' upload capacity. The allocated bandwidth should be adjusted by the upload capacity of the peer

VII PERFORMANCE ANALYZE

Request scheduling strategies and analyze their corresponding optimal movie replication strategies we can explain why some P2P VoD systems prefer proportional replication. Request scheduling in real-world systems is likely to be in between fair sharing and perfect fair sharing . Proportional is a reasonable algorithm by simply allocating storage resource proportional to movie popularity.

VIII ALGORITHM DESCRIPTION

The replication algorithm is an extension of the read replication algorithm. It allows multiple nodes to have both read and write access to shared data blocks Because many nodes can write shared data concurrently, the access to shared data must be controlled to maintain its consistency.

One possible way to keep the replicated data consistent is to globally sequence the write operations. A simple strategy based on sequencing uses a single global gap-free sequencer which is a process executing on a host participating in DSM. When a process attempts a write to shared memory, the intended modification is sent to the sequencer. This sequencer assigns the next sequence number to the modification with this sequence number to all sites. Each site processes broadcast write operations in sequence number order. When a modification arrives at a site, the sequence number is verified as the next expected one..

An adaptive algorithm is an algorithm that changes its behavior based on information available at the time it is run. This might be information about computational resources available, or the history of data recently received. Another example is adaptive sort, whose behaviour changes upon the presortedness of its input. An example of an adaptive algorithm in radar systems is the constant false alarm rate (CFAR) detector. In machine learning and optimization, many algorithms are adaptive or have adaptive variants, which usually means that the algorithm parameters are automatically adjusted according to statistics about the optimisation thus far (e.g. the rate of convergence). Examples include adaptive simulated annealing, adaptive coordinate descent, AdaBoost, and adaptive quadrature.In data compression, adaptive coding algorithms such as Adaptive Huffman coding or Prediction by partial matching can take a stream of data as input, and adapt their compression technique based on the symbols that they have already encountered.

REPLICATION ALGORITHM

For both FSFD and PFS, randomization is used to place movies in Qi to minimize variance of service capacity for each movie. For FSFD, random placement works because subrequests for a movie are sent randomly to peers holding that movie; and for PFS, it works because all (randomly selected) peers storing a movie serve requests for that movie together. But, it is a challenge to design or construct a solution to satisfy the constraints in and minimize that objective function in polynomial time. Therefore, we propose a new distributed and adaptive replication (DAR) algorithm to iteratively converge to a solution that load-balances as well as minimizes the variance for each movie's rate.

ANALYSIS OF SHEDULING

The system performance depend on two factors: (a) content replication and (b) request scheduling. Factor (a) determines which peers *can* serve a given request. Factor (b) specifies how a request is served - by which peers and with how much bandwidth from each. Our approach to study content replication strategies is to first fix the scheduling (b), and derive the best solution for (a). We analyze three kinds of request scheduling models that have been adopted in recent studies of P2P VoD systems. We show how these different request scheduling models lead to different optimal movie replication strategies, even though they all try to optimize the same system objective - minimize the expected server load. There are two parts to each request scheduling strategy. The first is how peers seek service from neighboring peers. The second is how a peer serves a request.

Perfect Fair Sharing (PFS)

PFS is a highly idealized model. When a peer wants to stream movie j, it sends out sub-requests to all peers storing movie j to fetch parts of that movie. When serving other peers, a peer treats all sub-requests the same. In other words, if there are k outstanding sub-requests at a peer, each sub-request gets 1/k of its bandwidth.

Fixed Bandwidth Allocation (FBA)

Each movie is divided into a number of substreams.

Fair Sharing with Fixed Out Degree (FSFD)

When a peer wants to stream a movie j, it sends out sub-requests to exactly y peers who store movie j. It is assumed that there is a load balancer that helps distribute the sub-requests to different peers replicating movie j to ensure balancedload.The optimal replication for FSFD is proportional, whereas PFS favors cold movies more. Then we

design the DAR algorithm for FSBD .The DAR still is the best one. we propose a new distributed and adaptive replication algorithm that works wellwith FSBD.

SIMULATION

Simulation is used to validate the performance bounds on server load, and compare different replication algorithms.

SERVICE MODEL

Having streaming-sufficient capacity does not guarantee all downloading((at streaming rate) requests can be satisfied by the P2P system. Whenever the P2P system cannot meet user demand, the server is assumed to be always ready to provide the additional downloading rate To accomplish this, the server is assumed to store all the movies. How often the server needs to step in depends partly on (a) how well the system replicates content to match demand, and (b) how well the system schedule the peers to serve requests. We settle the latter first. Request scheduling, the algorithms determining which peer(s) to serve a given request, is very complicated in practical systems. For our discussion, we adopt the *Perfect Fair-Sharing Model* (PFS) [5] as an abstraction. Figure 1 illustrates the PFS scheduling model. This service model approximates the strategy for each peer to simultaneously download from multiple peers, as founded in practical P2P streaming VoD services such as those described in [1], [2]. In this model, %! denotes the movie set stored on peer # and &" denotes the peer set storing movie '.

1The server is not necessarily a single physical server, but a farm of servers possibly organized as a CDN.

2We use the terms movies, video or content to mean the same thing.

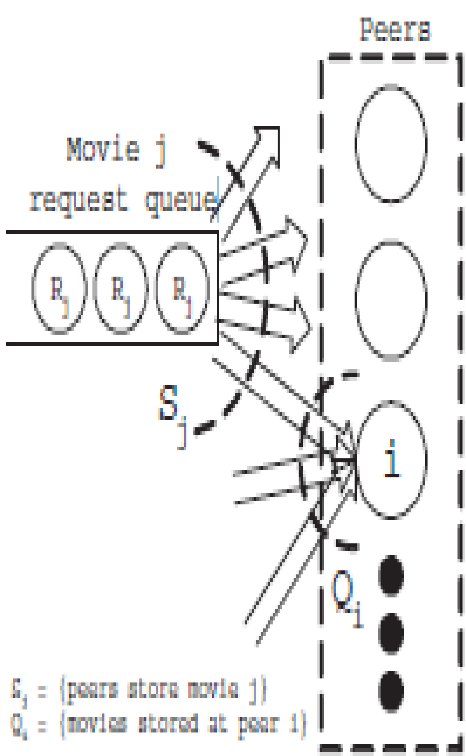


Figure 1. Perfect Fair Sharing Model

IX CONCLUSION

In this paper, we studied the challenging problem of how to replicate and place content in P2P for streaming VoD.P2P VoD systems prefer proportional replication, whereas others prefer providing more than proportional replication for cold movies. Actually, request scheduling in real-world systems is likely to be in between fair sharing (with some fixed degree) and perfect fair sharing. Therefore, we propose an FSBD model with varying limit of degree for different movies. This allows us to illustrate the effect of degree in request scheduling and visualize the reason for allocating more copy resources to cold movies in networks with large degree. Furthermore, ourmodel corrects the viewpoint from allocating movie copies to allocating bandwidth resource. Proportional is a reasonable algorithm by simply allocating storage resource proportional tomovie popularity, though the true objective for system designer is to allocate bandwidth resource proportionally.We use simulation to validate our analysis andmake various comparisons between different scenarios.

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