

# Competency in Caching For Hybrid Peer To Peer Systems

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**Abstract**— Peer-to-peer networks are used in distributed systems. Normally P2P networks are classified as Unstructured and Structured networks. In structured peer to peer network, peers are connected in a regular topology while in Unstructured, they are connected arbitrary fashion. Objective of this paper is to develop Hybrid peer to peer network, which will overcome all the disadvantages in both structured and unstructured network and also improve the caching scheme in this network. Different Top Caching algorithms helps to develop an effective cache to boost system performance. This cache relieves the over-caching problems for most of objects.

**Index Terms**— Hybrid, peer-to-peer systems, unstructured p2p, Structured.

## • Introduction

In some recent years, some new innovative network architecture were discovered, named “peer-to-peer (p2p)”. A distributed system in which peers employ distributed resources to perform a critical function in decentralized fashion are Peer-To-Peer networks. These network contain large number of nodes which helps in networking functions known as peers. Peer-to-peer networks are dynamic in nature as any participant can join or leaves the p2p system very frequently. These networks can also be used for distributed computing which utilizes the idle resources in network.

Peer-To-Peer Networks have topology in which all peers are connected to each other. According to this topology, peer-to-peer network is divided in two different categories known as Structured Peer-to-peer Networks and Unstructured Peer-to-peer Networks. In Structured peer-to-peer networks, these peers are connected in regular topology. Each peer maintains its routing table for routing of packets and data in whole network. While in Unstructured peer-to-peer networks, topology is arbitrary i.e. peer are not arranged in any manner. Hence both structured and unstructured networks can't provide robust service, efficient and flexibility alone.

Hybrid peer-to-peer system is a system which contains all advantages of both structured and unstructured networks. Also all disadvantages of both networks are removed in this network. In this hybrid network, backbone is structured ring-based core network and multiple unstructured peers are attached and communicate through this backbone. Objective of this paper is to enhance the caching system and power consumption in hybrid peer-to-peer network, also to increase efficiency of data sharing in peer-to-peer system by using reliable and robust technique. Improved cache system has been proposed in this paper with its implementation, result and conclusion.

## • Related works

In the past, many prototypes for peer to peer information retrieval systems have been developed, but none of it prove beneficial to real world and thus for file sharing information retrieval is still dominated by centralized solutions. Many peer to peer networks have been proposed for different applications, here focus is on peer to peer networks for efficient distributed data sharing (file sharing). There have several ways to cope with network heterogeneity. The most popular way is to cluster peers, and select a super peer in each cluster as a local server to manage the cluster as well as to index objects. The super peer can also form a overlay to provide inter-cluster communication.

BitTorrent[6] is a centralized unstructured peer to peer network for file sharing. When peer has received a complete file, it should stay in the system for other peers to download at least one copy of the file from it. Since BitTorrent uses a central server to store all the information about the file and the peers downloading the file suffers so called “single point of failure” problem, which means that if central server fails, the entire system is brought to halt.

IRM file consistency techniques [2] which is generally used to integrate file replication and consistency maintenance by letting each node autonomously determine need for file replication and update based on actual file query rate and update rates. However they are based on the chord P2P system.

## [1] Methodology

Peer to peer system is used for efficiently transfer data between different peers and in case of hybrid peer to peer system, it is used to efficiently transfer data (file sharing) over a distributed network. In these system, combines structured and unstructured peer-to-peer network. A structured ring based core network forms a backbone of the system and multiple unstructured peer to peer networks are attached to backbone. There are two terminologies related to hybrid peer to peer networks and they are, Core Transit Network : Core transit network is a structured peer to peer network also called as T-network. Core transit network organizes peers in a ring like structure. Peers in the T-networks are called as T-peers. Every peer in T-network is assigned a peer ID. Each T-peer maintains two pointers just like a double linked list which points to its successor and predecessor, respectively. Stub Network: Stub network is unstructured peer to peer network also called as S-network. Each S-network is attached to a T-peer and this T-peer belongs to both T-network as well as S-network. The basic idea behind hybrid peer to peer system is that t-network is used to provide efficient and accurate service while s-network is used to provide approximate best effort.

## • Java Technology

Java technology is both a programming language and a platform. This System is built by using a java language, using one of its API (Application Programming Interface), RMI (Remote Method Invocation).RMI(Remote Method Invocation) is an API that provides a mechanism to create a distributed application in java. The RMI allows an object to invoke methods on an object running in another JVM. RMI allows remote communication. By using RMI (Remote Method Invocation), one central machine which listens on to fixed port number acts as a central machine and there can be many machines which can be connected to central machine, where that central single machine acts as T-peer of T-network and all machines which are connected to central machine acts as a S-network, which is a collection of S-peers. T-peer listens onto a fixed port while S-peers listen on several different peers.

## • Result and Discussion

In this opportunistic network, code is been developed using effective caching algorithm for hybrid peer to peer system. Once complete code has been generated and tested for any faults and errors, execution takes place. In executing phase of program, client socket connection is needed to be established since complete work is on peers. Client side and server sided code has to be generated using socket programming so as to establish connection between both ends. Socket provides communication between two nodes or computers using TCP. Socket is created by client program to its side and that socket tries to connect to the socket developed at server side. Once the connections is established, server creates its socket object on its end of communication. File sharing is done using effective caching algorithm for sharing files. Firstly Server side program is executed and on the other hand client side program has to be executed. Connection establishment is done once both programs are executed. Request is made by client to server for some data which is stored in we say xyz file. Server will accept this request and analyze it. File xyz if present will be then transferred to client side. At this stage file which is transferred towards client side is stored in its cache memory and data is accessed by client one by one units. Now if client requires another file in between, xyz file must be flushed from cache and new file request is to be given to server. After using this new file again xyz file is required, this becomes irrelevant for client for continuously switch to different files. As file xyz is stored in cache of client, this file is permanently stored in clients memory so that repetitive requests can be avoided.

## Conclusion

The main purpose of conclusion is to tie together the various issues and research. It mainly focuses on noting the any implications resulting from the project. As we are using web caching, it reduces latency because request is satisfied by cache instead of web server. Time of getting object is reduced by using this web caching as well as traffic is minimized. Amount of bandwidth is reduced as each object is called once from server. This saves money if client is paying through internet traffic and keeps bandwidth requirement less and more manageable. New algorithm OLGR is proposed by both algorithms LRU and LFU by considering frequency, perfect-history and size in replacing policy. As per experimental results shows that this algorithm reduces internet traffic and latency of data access efficiently. Referring to large traffic on P2P network, improving only one percent of memory hit rate accounts to saving terabytes of traffic on WAN links. Designing efficient caching zoning technique different workloads occupy different zones in the cache with different cache spaces.

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