Decentralized Peer to Peer File Sharing System

CS-550 Advanced Operating System

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Introduction:

Decentralize Peer to Peer file sharing applications are most common these days and are widely used. Applications like Bit Torrent, Torrentz, Napster, Gnutella, etc. are some of the examples of decentralize applications. The implementation of decentralized peer to peer file sharing is designed with the notion that the peers can send and receive the data over the network and can register their files over multiple index servers, hence removing the use of central index server. This is an example of decentralize peer to peer file sharing system which avoids central index server for storing the information of files located on any peer connected with the server. It rather focuses on the use of sharing files between the peers directly thus using the multiple servers for indexing purpose.

Requirements:

Software Requirements:

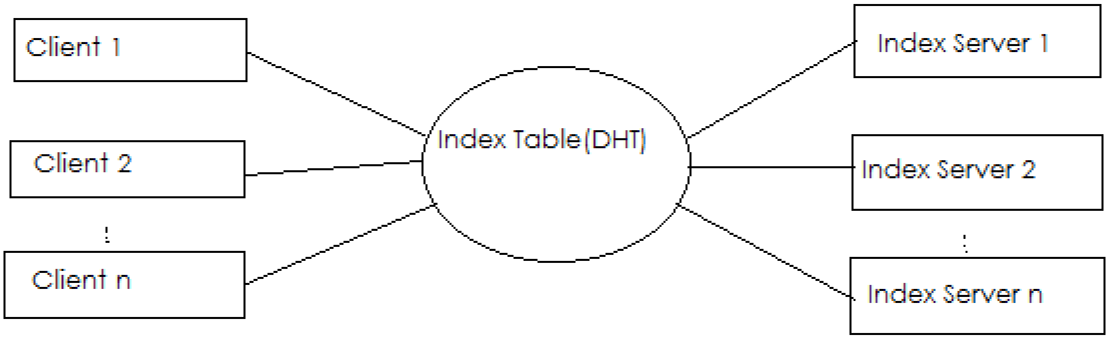
- JDK, NetBeans 8.0.2, Eclipse, Blue J,JRE
- Linux/ Windows Operating System
- Apache Ant

Hardware Requirements:

- Single System for running the Multiple Index Server
- Multiple systems for running multiple Peers
- Virtual machines for Multiple Index Servers and Peers

System Architecture:

In Decentralized peer to peer file sharing system, multiple indexing server register every peer with on the server and gives information to each peer the availability of files with their peers maintained in the indexes. It provides the facility to register the client/peers on the server and look for the file they want to download. It provides the name of the peers holding the file requested by any peer. Each index server is connected to every other index server on the network using socket. Each index server on the network maintains the registry when receives the broadcasted message from the other index server for the newly registered peer. Peer also has the functionality of searching the file and if available, downloads the file from peer holding the peer.



Decentralized P2P System

Design and Implementation:

- Decentralized Peer to Peer file sharing system has two components;
- registerYourPeer (Peer)--- this method is used by the Peer/Client to register itself with the Index Server and logs its files
- searchFileOverP2PNetwork (String file, String requestingPeer) – this method is used by the Peer/Client to search for the file over PeerToPeer network.

Implementation of Napster style peer to peer is divided into various core modules:

- registerYourPeer(Peer)
- updatePeerClientIfChanged (NetworkClientInterface peerClient)
- downloadFilefromServer (NetworkClientServerInterface peerWithFile, String filename)

Tradeoffs:

- Used the LinkedBlockingQueue to maintain the Peers connection with the performance complexity of O (1).
- HashMap and ConcurrentHashMap for successful peer connection with the time complexity of O (1).
- Large size files cannot be transmitted.

Improvements:

- Large file transmission
- User Friendly Interface
- Use of better searching algorithms