

# Design Document

## Napster Style Peer to Peer File Sharing System

## **TABLE OF CONTENTS**

### **1. Introduction**

- 1. Purpose**
- 2. Scope**
- 3. Acronyms, Abbreviation and Definition**
- 4. References**

### **2. System Overview**

- 1. Functionality**

### **3. System Architecture**

- 1. High Level Architecture**
- 2. Sequence Diagram**
- 3. Class Diagram**

### **4. Component Description**

### **5. Software Requirement**

### **6. Future Scope**

## 1. Introduction

### a. Purpose

- It is not possible for single server to hold all files and have enough bandwidth to handle all requests.
- Purpose of the Napster Style peer to Peer File Sharing system is to share load of file downloading across multiple machine.

### b. Scope

- This system is designed to share the files between peers (Client/Server) connected over network. There are mainly 3 functions
- **Register**- Each peer (Client/Server) can register itself as a service provider over the network.
- **Search**- Each peer can search for other peer's files with the help of Index Server.
- **Download** – One requesting peer received address of peer containing file, download the file from that specific server directly.

### c. Acronyms, Abbreviations and Definition

- **Peer** – is Machine on server as client or server (Napster Client)
- **Index Server** – is Indexing server (Napster Central Index Server)

### d. References

- <http://computer.howstuffworks.com/file-sharing1.htm>
- To understand the Napster System Architecture and its original intent

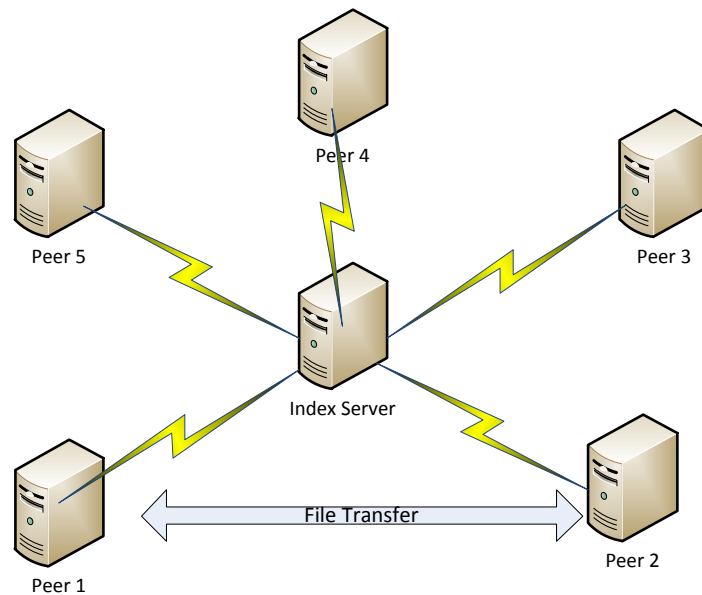
## 2. System Overview

### a. Functionality

1. In Napster Style Peer to Peer File Sharing System, peers use to communicate with each other for file downloading purpose.
2. Firstly Index Server gets start and put itself in ready state to accept request from peer for two reasons either to **register** or to **search** the file address.
3. In **Register** call, peer send its list of file name present on hard disk to share with other peer along with the address to download those file  
(<arraylist> FileList, Token <IPAddress+PortNumber>)
4. After receiving **Register** call server stores the file name and their addresses in Hash Map in the format of that is <Key, Value> pair , Where key is filename and value is Token (IP Address +Port Number)
5. If same file is present in Hash Map Server simply add the token value with that filename key.
6. In **Search** call, Index Server search for specific file name send by peer on successful search, Index Server returns the address(es) of peer(s) otherwise unsuccessful search message to client.
7. In case of successful search, peer can initiate the file downloading request with peers who all contain that file.

### 3. System Architecture

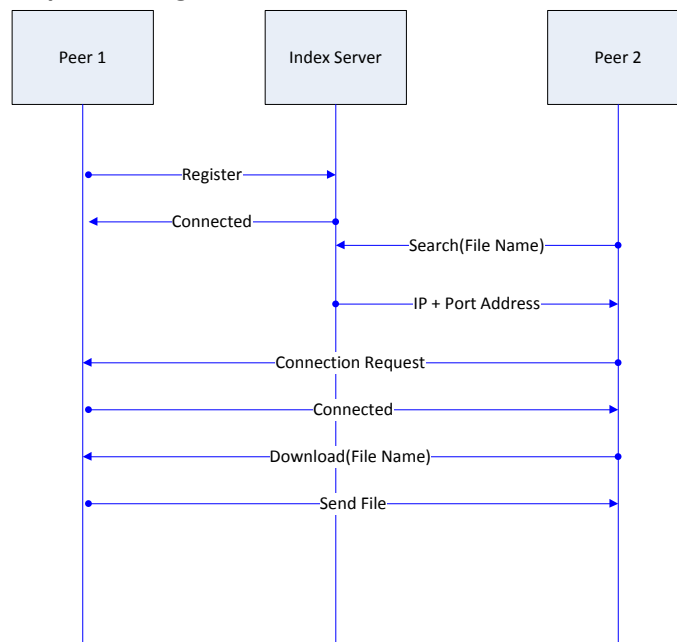
#### a. High Level Architecture



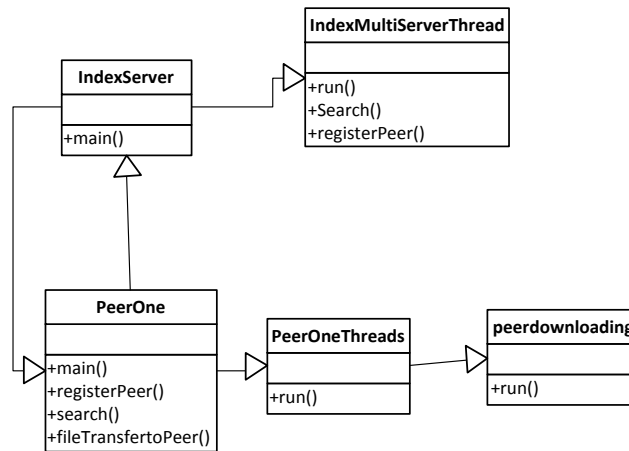
As shown in diagram Napster Peer to Peer File Sharing system is consisting of below components.

1. **Index Server** - maintain directory of files and peer IDs who contain those files
2. **Peer (Client/Server)** – Peer is user of Napster system who can register its own file on Index server and make them available for other peer to download. Also peer can search for file address on Index Server and get it download form respective peer hold that file.

#### b. Sequence Diagram –



### c. Class Diagram –



## 4. Technical Overview

### a. IndexServer

- IndexServer is a server side class. It shall always listing for new requests from client.
- As soon as clients get connected with this server it will create new thread for requesting client. And again go on listing for new client request.

### b. IndexMultiServerThread

- This is helper class for IndexServer. Every time a new request comes to Index Server class, IndexSever will initiate a new thread that will be process by IndexMultiServerthread
- This thread will help in registering files on server (Hash Map).
- This thread will help in searching file address. After search result will be send back to client requested by.

### c. PeerOne

- PeerOne class could be client requesting for file address
- PeerOne class could be clients who register its file directory on Index Server.

### d. PeerOneThreads

- This class is peer acting as a server for listing new requests.
- Whenever new request comes, this class will initiate thread and request will serve by that thread.

### e. Peerdownloading

- This is thread initiated by PeerOneThread to serve the client for downloading file.

**5. Component Description**

There are 2 main components in Napster Style Peer to Peer File Sharing System

- a. **Index Server**
- b. **Peer**

**6. Software Requirement**

- a. **Java** installed on machine
- b. **Ant** for building Java Application

**7. Future Scope**

- a. Backup Index Server – In case Index server goes down other server should take command and serve as Index Server to avoid complete dependency.
- b. If any peer is down after registering itself server should update the Hash Map to avoid error hit ration on client side.
- c. Multiple file search option should be there so that Client can request to search more than one file at a time.

**Note**

**For Extra credits- Application is able to send the binary file as well as simple text files.**