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1. System Introduction

In today's world of distributed systems, gadgets and networks, individuals with access to intranet and internet have need to copy the files from one device to another device (specially from Laptops to Desktops, from Desktops to Servers, etc.). Peer to Peer File Sharing System is a cost effective console based solution that enables the file copy process easier. It provides:

- A centralized database where users can register their files (Indexing Server)
- Other users can actually search through this file database and download the files as per their requirement
- A peer based log file where operations done by client can easily be recorded

Some of the features available in the current System are,

- **Easy to use console based interface**

  A console based interface allows user to select through various operations (Register, Lookup, Download, Unregister, etc.). Depending upon the operation selected by user, System prompts for the required inputs (like File Name, File Path, IP Address, etc.) This helps users to opt to work selected files rather than all or a set of files.

- **Highly parameterized system**

  The ".properties" files allows administrator or user to define the various options (like IP Address, Port, Default Sharing directory, Default Download directory, etc.) for keeping the System scalable and parameterized.

- **File Coverage**

  System supports both Text as well as Binary Files. This facilitates users to share their professional as well as personal data (like multimedia files, photos, etc.) easily.

- **TCP Support**

  System uses TCP / IP Protocol to ensure that the data is downloaded with consistency. The reasons for choosing TCP / IP over UDP are listed below.
  - TCP is connection oriented – once a connection is established, data can be sent bidirectional.
  - It is also widely used by other protocols like HTTP, HTTPS, FTP, SMTP, and Telnet which makes this protocol widely popular for Net Traffic.
  - TCP is more reliable since it manages message acknowledgment and retransmissions in case of lost parts. Thus there is absolutely no missing data. UDP does not ensure that

communication has reached receiver since concepts of acknowledgment, time out and retransmission are not present.

- TCP transmissions are sent in a sequence and they are received in the same sequence. In the event of data segments arriving in wrong order, TCP reorders and delivers application. In the case of UDP, sent message sequence may not be maintained when it reaches receiving application. There is absolutely no way of predicting the order in which message will be received.
- It has its own Error checking mechanism ensuring the data order and consistency.

2. Prerequisites and Constraints

In order for the effective and proper functioning of System following details needs to be ensured.

- Since the System uses connection oriented TCP / IP Protocol, network connectivity must be ensured among Peer Servers, Peer Clients and Indexing Server as and when required.
- A Peer Client and Peer Server must have access to the required files (the files to be shared or downloaded) in order to register them or provide them for download respectively.
- Please ensure that ".properties" file is available in the working folder of each module to run the System smoothly.

3. Indexing Server Module

Peer Client communicates with Indexing Server in order to register, lookup, and unregister various files. This module maintains the database of all the files registered or unregistered by various Peer Client modules.

A. Inputs / Constraints / Prerequisites

i. Network connectivity between various Peer Clients and Indexing Server will have to be ensured during all operational time.
ii. Since Indexing Server will not be having access to various files being registered, searched or unregistered; users will have to ensure the correctness of the data.

B. Process

a. Register

i. This operation accepts File Name, File Path, IP Address, Port Number and File Size data from Peer Client and registers the file into Indexing Server database.
ii. If the Indexing Server database already has entry of the referred File Name and IP Address combination, then the existing entry will be updated with the latest details provided by client machine.
iii. If the details are not existing already then the data will be inserted into Indexing Server database.
iv. Final status of the operation is passed to Peer Client.

b. Search

i. This operation accepts File Name from Peer Client and searches the file name into Indexing Server database.
ii. If the Indexing Server database already has occurrence(s) of the referred File Name, then the data with relevant fields (like File Name, File Path, File Size, Peer Server IP Address, Peer Server Port for downloading) will be sent back to Peer Client.
iii. If the search returns no result, then similar message is sent back to Peer Client.

c. Unregister

i. This operation accepts File Name and IP Address from Peer Client searches the file name into Indexing Server database.
ii. If the Indexing Server database already has occurrence(s) of the referred File Name and IP Address combination, then the referred entry or occurrence is deleted or removed from Indexing Server database
iii. Final status of the operation is passed to Peer Client.

C. Output

i. Depending upon the type of operation, Indexing Server database is either updated (in case of Register or Unregister operation) or available existing data (in case of Search operation) is sent back to Peer Client.

4. Peer Server Module

Peer Client communicates with Peer Server in order to download various files. It supports only operation to pass the requested file to client.

A. Inputs / Constraints / Prerequisites

i. Network connectivity among various Peer Clients and Peer Server(s) will have to be ensured during all operational time.
ii. Peer Client will have to ensure the correctness of the data for the file to be downloaded.

B. Process

a. PassFile

i. This operation accepts File Name, File Path, IP Address and Port Number data from Peer Client.
ii. Peer Server first confirms the existence of the requested file. If the file is unavailable at given Physical Path, then appropriate status message will be sent back to client and the file transfer operation will be terminated.
iii. If the file with provided details is available and accessible, then Peer Server will start transferring the file to Peer Client after sharing some additional data (like File Size, etc.).
iv. Final status of the operation is passed to Peer Client.

C. Output

i. Depending upon the file existence either the file will be downloaded at Peer Client or Peer Client will receive appropriate status message.

5. Peer Client Module

Peer Client communicates with Indexing Server and Peer Server in order to register, lookup, unregister and download various files. This module does have a console based interface to accept the various inputs from user and perform the operations accordingly.

A. Inputs / Constraints / Prerequisites

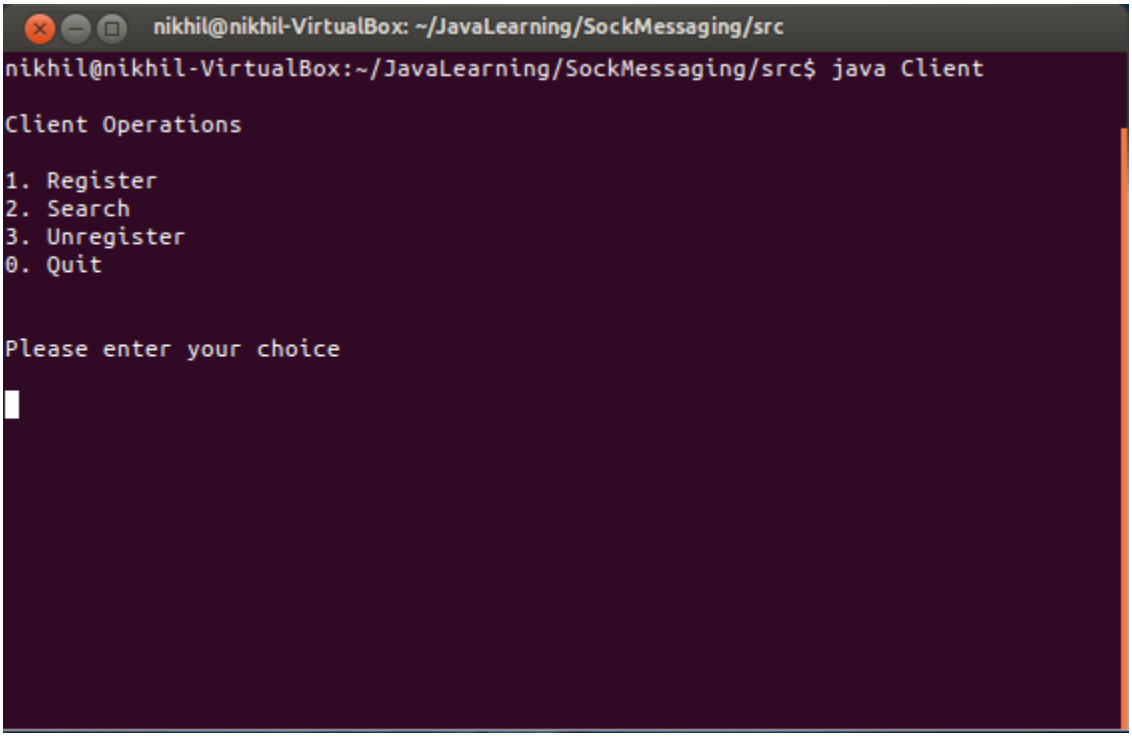
i. Network connectivity between various Peer Clients, Indexing Server and Peer Server will have to be ensured during all operational time.

ii. Since Indexing Server will not be having access to various files being registered, searched or unregistered; users will have to ensure the correctness of the data.

B. Process

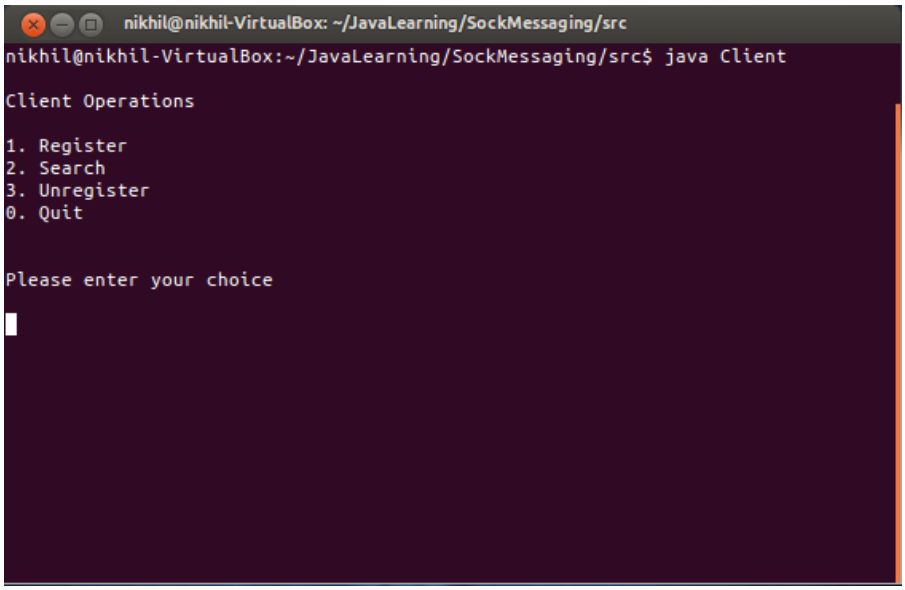
a. Operation Selection

i. Peer Client module have a console based menu driven interface to select the operation to be performed. The interface is displayed in the screenshot below.

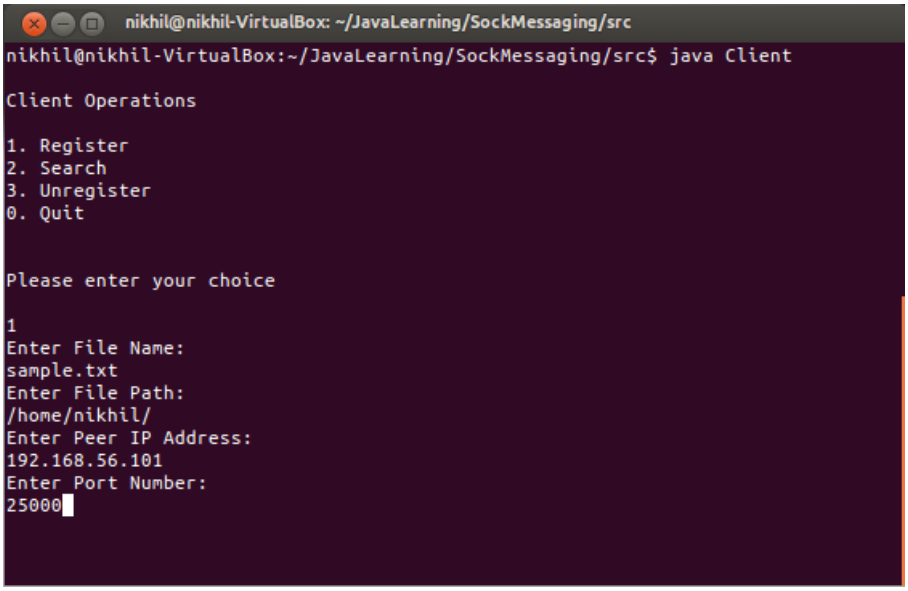


b. Register

i. Peer Client module have a console based menu driven interface to select the operation to be performed. The interface is displayed in the screenshot below.



ii. Enter choice as 1 to register the file

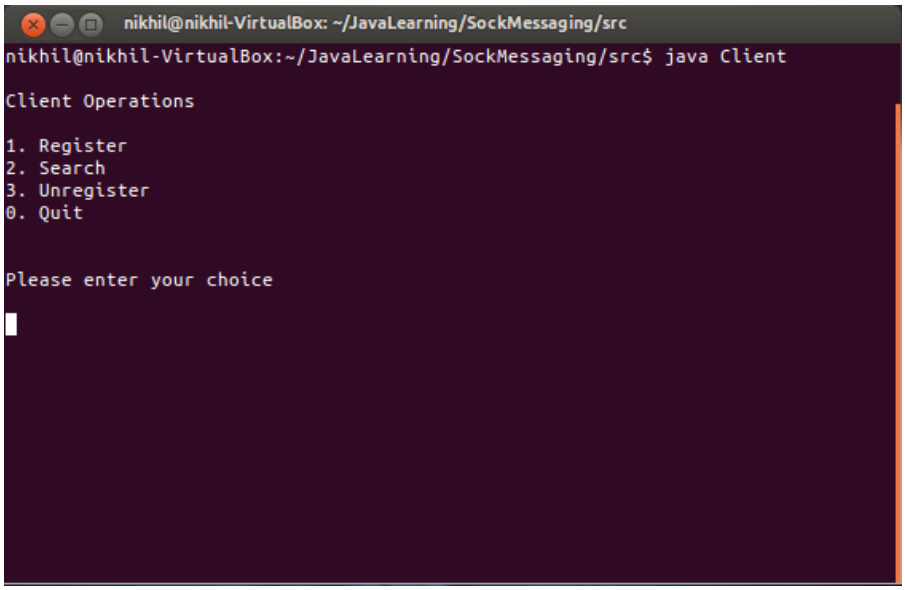


iii. This operation prompts for File Name, File Path, IP Address, Port Number to user. The data entered by user will be sent to Indexing Server for registration.

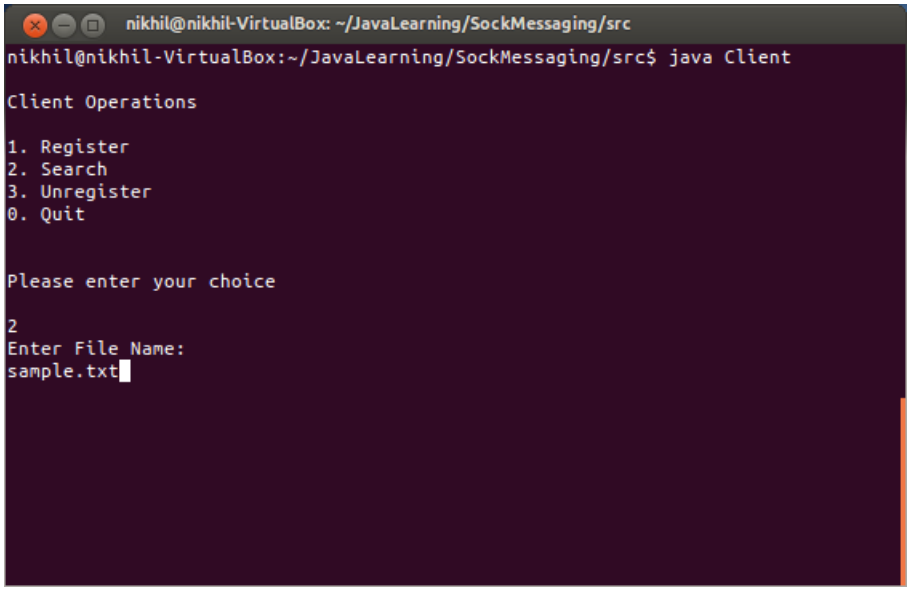
iv. Final status of the operation is will be displayed on Peer Client console.

c. Search

i. Peer Client module have a console based menu driven interface to select the operation to be performed. The interface is displayed in the screenshot below.



ii. Enter choice as 2 to search the file.



iii. This operation prompts for File Name to user. The data entered by user will be sent to Indexing Server for lookup.

iv. If the Indexing Server database already has occurrence(s) of the referred File Name, then the data with relevant fields (like File Name, File Path, File Size, Peer Server IP Address, Peer Server Port for downloading) will be sent back to Peer Client.

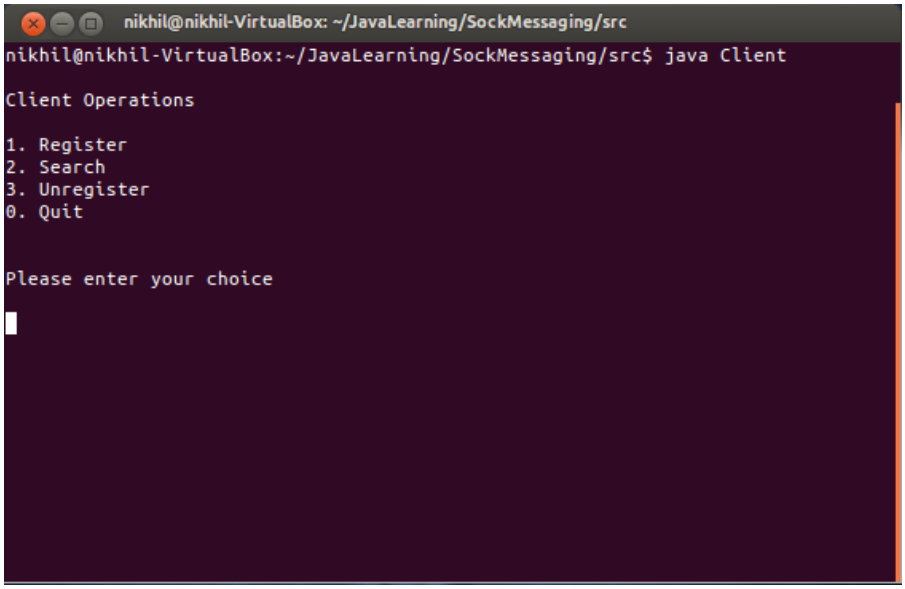
v. If the search returns no result, then similar message is sent back to Peer Client.

vi. If there are one or more results returned for the search, then user can input “Sr. No.” corresponding to one of the search result to download the file on immediate basis.

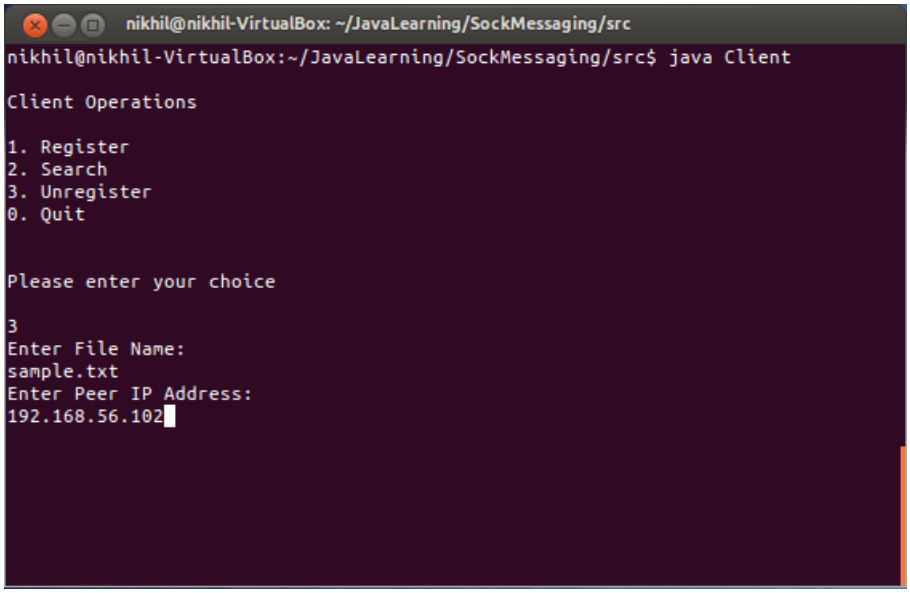
vii. The status of download will be again displayed on Peer Client console.

d. Unregister

i. Peer Client module have a console based menu driven interface to select the operation to be performed. The interface is displayed in the screenshot below.



ii. Enter choice as 3 to search the file.



iii. This operation prompts for File Name and IP Address to user. Data entered by user will be sent to Indexing Server for unregistering the file.

iv. Final status of the operation is passed to Peer Client.

C. Output

i. The final status message of each operation requested by user will be displayed on console.