App for peer-to-peer file transfer

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Abstract - *The proposed application aims at creating a system for sharing files using a peer-to-peer network. Our goal was to make a streamlined easy-to-use peer-to-peer file-sharing desktop app. Putting more effort into the user's experience and the simplicity to get things done. The desktop app is not just for a particular group of individuals, it's for the whole community. A peer-to-peer network allows computer hardware and software to communicate without the need for a centralized server. P2P file sharing allows users to access media files such as books, music, movies, and games using a P2P software program that searches for other connected computers on a P2P network to locate the desired content.*

Key Words: **P2P network, File sharing, Simplicity, Desktop app, Convenient.**

1.INTRODUCTION

Peer-to-Peer File Sharing systems are no longer just a new fad technology. They have become ingrained in our Internet culture. Peer-to-peer (P2P) is a decentralized communications model in which each party has the same capabilities and either party can initiate a communication session. Unlike the client/server model, in which the client makes a service request and the server fulfils the request, the P2P network model allows each node to function as both a client and server. Peers are equally privileged, equipotent participants in the application. This application aims to create a file-sharing platform by establishing a peer-to-peer connection.

The individual users in this network are referred to as peers. The peers request the files from other peers by establishing a decentralized UDP server. Using a secure peer-to-peer connection and its data channel huge files can be transferred without storing them on any server. It is expected that there will be an even stronger convergence between them as p2p technologies become more sophisticated [1].

Online File transferring apps are required because:

- You can manage your documents and send your files anywhere and anytime.

- Distributing documents is not so complicated with file-sharing software.

- Simplified administration as it keeps files maintained and organized.

- Greater security compared to physical file transfers.

- Saves time and eliminates multiple file versions.

1.1 Drawbacks of other file sharing platforms:

- **FTP:** Servers can be spoofed to send data to a random port on an unintended computer. Also, Inconsistent due to the inability to track what has been uploaded on the remote system,

- **Server-client:** If all the clients simultaneously request data from the server, it may get overloaded. This may lead to congestion in the network. If the server fails for any reason, then none of the requests of the clients can be fulfilled.

- **Cloud-based:** Cloud-based storage is dependent on having an internet connection. If you are on a slow network, you may have issues accessing your storage. Also, there are additional costs for uploading and downloading files from the cloud.

1.2 Reasons for choosing a P2P file-sharing network

1. Using a secure peer-to-peer connection and its data channel huge files can be transferred without storing them on any server. Making it really robust and truly private as only the connected clients/peers are communicating directly with no middle server for transfers makes it really robust and truly private as only the connected clients/peers are communicating directly with no middle server for transfers.

2. It has high fault tolerance as it is not dependent on a single server. The failure of a single peer will not affect the rest of the network.

3. The architecture is simple and very cost-efficient.

1.3 Drawbacks of the existing system:

1. It is open source and available to all.

2. Delicate content can be added to the network.

3. Copyright issues and illegal sharing.

4. Spyware and malware can be added in disguise of friendly files.

5. No backup available.

1.4 Characteristics of P2P network:

- Nature of node**:** The nodes are symmetric which means every node in the network can act as a client (raising requests) as well as a server (serving queries).
- Scalability: There is no restriction on the number of participating peers whereas in traditional networks the number of participating nodes depends on the capacity of the server [2].
- Heterogeneity: The participating machines are not necessarily homogenous. A P2P network may have a very slow machine and a high-end supercomputer working together.
- Attacks: The heterogeneous peers make viruses and worms harder in the network. Thus, P2P is resilient to attacks.
- Dynamism: In P2P applications we find a dynamic change of topology due to the joining of new nodes or leaving of existing nodes from the network.
- Self-organization**:** The nodes of the network reconfigure according to the dynamic changes in the topology due to a node joining or leaving [2].
- Fairness: Each participating machine should contribute resources to the network based on its capacity [3].
- Huge Resources: In P2P, we will have a large collection of resources due to the voluntary participation of millions of simultaneous users from all over the world.
- Flexibility: As there is no central controlling system, each participating peer is completely flexible, making the overall system unreliable.
- Performance: To avoid single-point-of-failure, data and object references are replicated at distinct peers. This also balances access load and enhances search & retrieval of data.

2. SUGGESTED IMPROVEMENTS

- The peers participating in the transfer should be monitored and a record should be kept.
- Personalised recommendation according to the liking of each individual.
- The network should be secure to prevent sharing of malware by anonymous peer entities in the network.
- A central repository for all files added to the system should be maintained.

3. PROPOSED SYSTEM

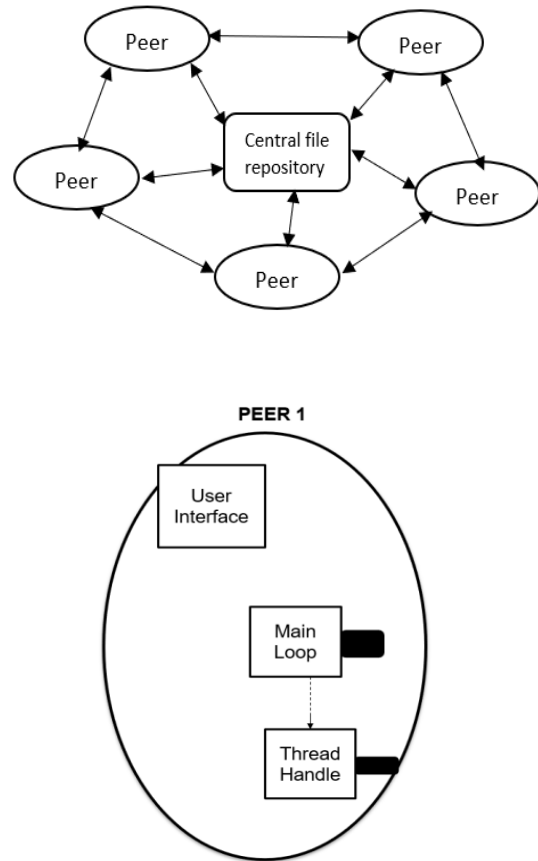### 3.1 Architecture Diagram

Figure 1. Architecture diagram for the proposed system

The Peer module: manages the overall operations of a single node in the P2P network. It contains the main loop that listens for incoming connections and creates separate threads to handle them. The Peer module for various message types and the main loop would dispatch incoming requests to the appropriate handler. The Peer is initialized by providing a port to listen for incoming connections and node identifiers.

The PeerConnection module: encapsulates a socket connected to a peer node. The framework currently uses TCP/IP sockets for communication between nodes. A PeerConnection object provides methods that make it easy for the peer to send and receive files and acknowledgments in the P2P algorithm.

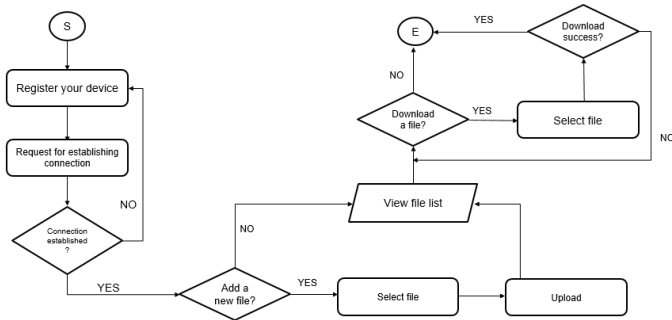## 3.2 Information Architecture Diagram

Figure 2. Information Architecture

A peer can request or send a file to another peer in the network. Also, it can view the files already existing files and download them.
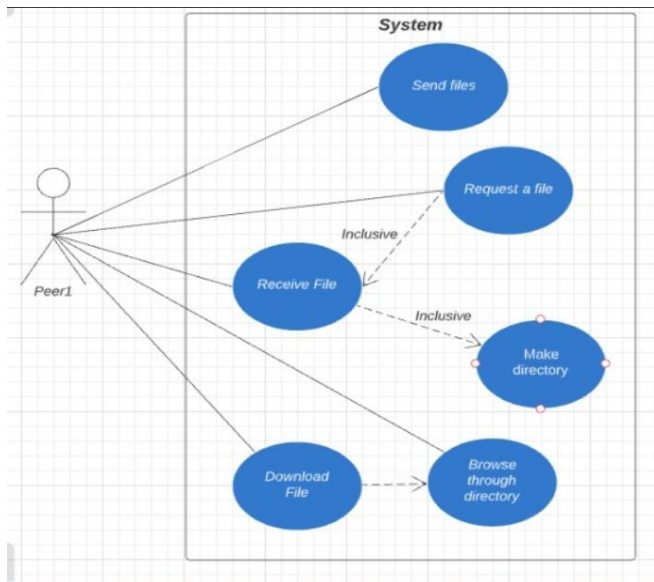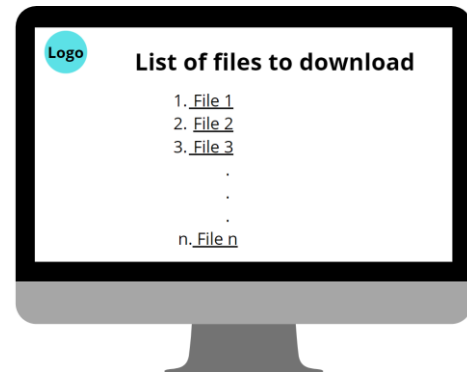

Figure 3. User case diagram

## 3.3 User Interface

- **Homepage**

On starting the application, the first page gives a menu for the user to select from various options like receiving or sending files and downloading or viewing files.

- **View all files present in the repository**

The user can view all the files already present in the repository systematically. The user can select the file he wants to download from the available list.

- **Add file**
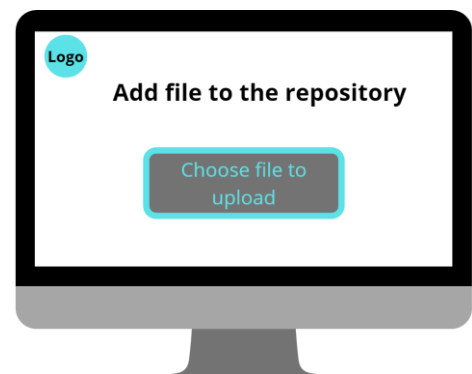
To share a file, the user must upload it by clicking on the button which will redirect the user to select the file he wishes to share from his local remote device.

- **View downloaded files**
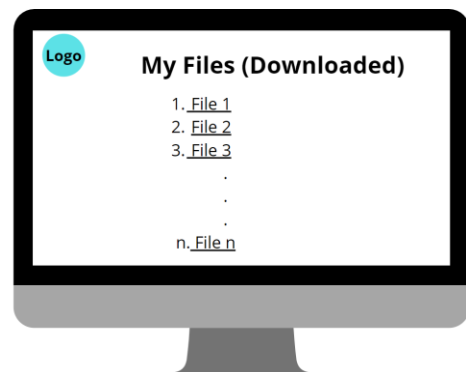
The user can also view the files already downloaded on his system.

3. CONCLUSION

A peer-to-peer file transfer application is prominently used for video and file sharing as it provides privacy over most other file transfer methodologies. The data shared between two or more users is not saved anywhere. The file is transferred directly between the users. Thus, there is no involvement of any third-party server, cloud, etc. This is the main reason why P2P is popular. It is one of the cheapest file-sharing networks.

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