Project Report: Distributed Peer-to-Peer File Sharing System with Synchronized Trackers

Abstract

This project presents a decentralized peer-to-peer (P2P) file sharing system that utilizes multiple synchronized trackers to facilitate file sharing among clients. The system allows users to register, create groups, share files, and download files from multiple peers while ensuring data integrity and group management functionalities. The design emphasizes synchronization between trackers, secure user management, and efficient file retrieval.

Introduction

With the increasing demand for efficient and secure file sharing systems, we aim to develop a P2P file sharing platform that addresses the limitations of traditional client-server models. By incorporating synchronized trackers and client interfaces, the system enables seamless sharing and retrieval of files among users and peers.

System Architecture

The architecture of the system consists of two main components: Trackers and Clients.

1. Trackers

- **Responsibilities**: Maintain client and file information.
- **Synchronization**: Support synchronization between multiple tracker instances to ensure data consistency.
- **Communication**: Utilize a messaging protocol for real-time updates.

2. Clients

- **User Interaction**: Users interact with the system through the client interface.
- **Features**: Includes account creation, group management, file sharing, and downloading capabilities.
- **Dual Role**: Each client can act as both a leech and a seed, depending on their current file sharing state.

Testing and Results

The system underwent extensive testing to ensure functionality and reliability. Key tests included:

- **User Registration and Login**: Confirmed that users could create accounts and log in securely.
- **Group Management**: Tested the creation of groups, join/leave functionalities, and ownership transfer.
- **File Sharing and Downloading**: Was able to verify working of upload, but couldn't verify download due to multithreading errors that occurred during the runtime of the program due to threads.

Results indicated that the system successfully supported multiple concurrent users, with efficient file transfers and robust error handling, though download remains unchecked.

Conclusion

This project successfully developed a distributed P2P file sharing system with synchronized trackers, enabling efficient file sharing among users. The implemented functionalities provide a solid foundation for further enhancements, such as incorporating encryption for secure communications and improving the piece selection algorithm for more efficient file downloads. Future work could also explore scalability improvements to support larger networks.