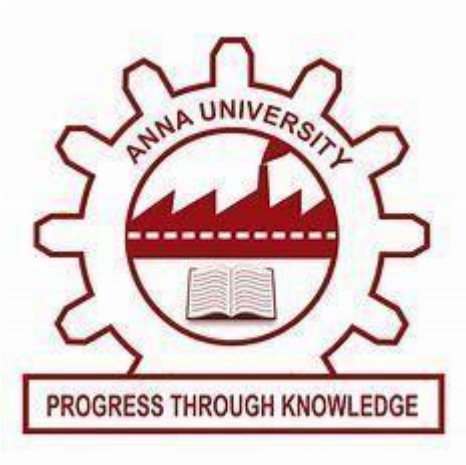
ANNA UNIVERSITY

COLLEGE OF ENGINEERING GUINDY

DEPARTMENT OF INFORMATION SCIENCE AND TECHNOLOGY



DSC ASSIGNMENT- 2

TITLE : Create and Distribute a Torrent File in a Peer-to-Peer Environment

By,

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1. Introduction

Peer-to-Peer (P2P) computing is a distributed system model in which computers, known as peers, share resources directly with each other without relying on a centralized server. One of the most widely used P2P technologies is BitTorrent, which enables efficient file sharing by dividing large files into smaller pieces and distributing them among multiple peers.

This assignment demonstrates the creation and distribution of a torrent file to share a file in a peer-to-peer computing environment, highlighting decentralized file sharing using BitTorrent concepts.

2. Objectives

- To understand the fundamentals of Peer-to-Peer (P2P) computing
- To create and configure a torrent file
- To demonstrate decentralized file sharing using BitTorrent
- To perform seeding and downloading between peers
- To verify file integrity after download

3. Overview of BitTorrent Technology

BitTorrent is a distributed file-sharing protocol that splits files into small pieces. Peers download and upload these pieces simultaneously, improving download speed and reducing server load. A tracker helps peers find each other, while cryptographic hash values ensure the integrity of the downloaded data.

4. System Architecture

Components

- Seeder: The peer that initially has the complete file

- Leecher: The peer that downloads the file
- Tracker: A server that coordinates peer discovery
- Torrent File (.torrent): A metadata file containing file information and tracker details

Architecture Flow

File Selection → Torrent Creation → Seeding → Downloading → Integrity Verification

5. Tools and Technologies Used

- Torrent Client: qBittorrent / Transmission
- Protocol: BitTorrent
- Platform: Local system or cloud-based system
- Tracker: Public tracker or local tracker

6. Torrent Creation

A non-copyrighted and non-sensitive file is selected for sharing. Using a torrent client, a .torrent file is generated. This torrent file contains metadata such as the file name, file size, piece length, hash values for integrity verification, and tracker information.

7. Torrent Distribution

Seeding

The original peer loads the .torrent file into the torrent client and starts seeding. This makes the file available for other peers in the network.

Downloading

Another peer opens the same .torrent file in a torrent client. The client connects to the tracker, discovers available peers, and downloads the file pieces from the seeder.

Peer-to-Peer Communication

Peers exchange file pieces directly with each other, enabling decentralized and efficient file sharing.

8. File Integrity Verification

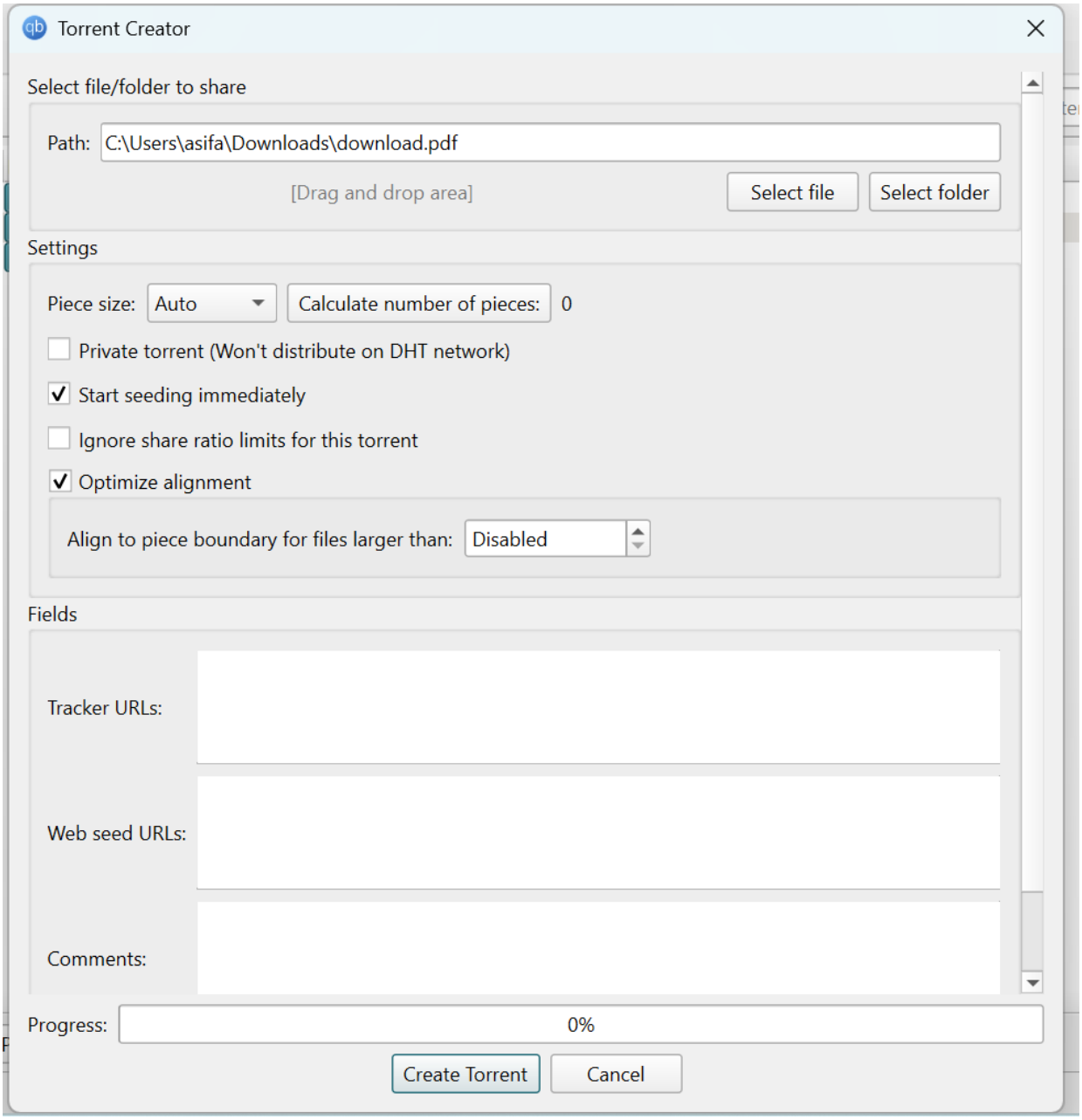
BitTorrent ensures file integrity by verifying each downloaded piece using hash values. If a piece is corrupted, it is automatically re-downloaded. Once all pieces are verified, the final file is confirmed to be an exact copy of the original file.

9. Cloud or Local Deployment

Torrent clients can be run on local machines or cloud-hosted systems. Cloud deployment allows peers to connect using public IP addresses, demonstrating real-world distributed and decentralized file sharing.

10. Expected Output

- Successful creation of a .torrent file
- Successful seeding of the file from one peer
- Successful downloading of the file by another peer
- Complete and verified downloaded file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Settings
Piece size:
Auto
Calculate number of pieces:
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Private torrent (Won't distribute on DHT network)
Start seeding immediately
Ignore share ratio limits for this torrent
Optimize alignment
Align to piece boundary for files larger than:
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Web seed URLs:
Comments:
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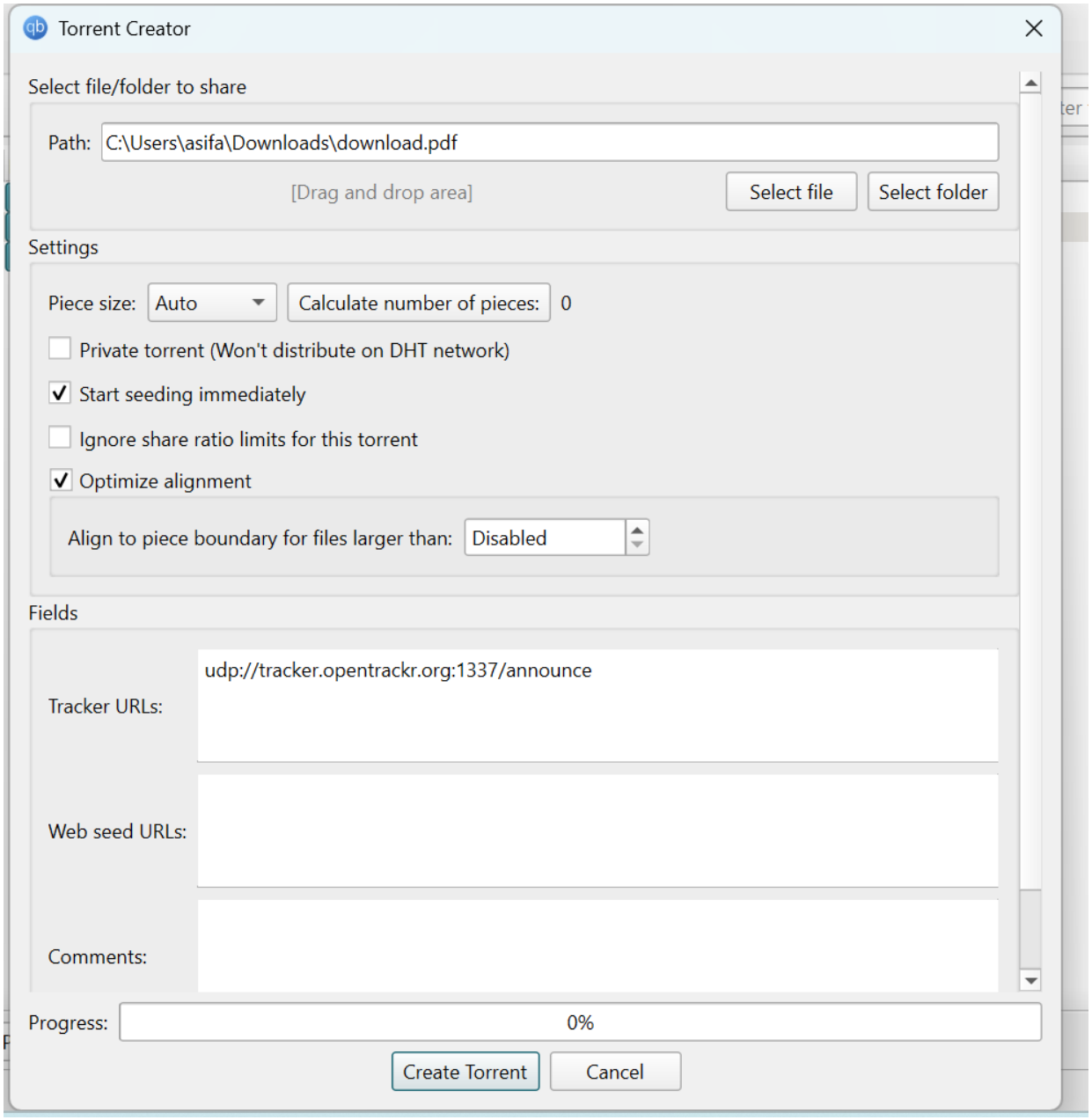
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Private torrent (Won't distribute on DHT network)
Start seeding immediately
Ignore share ratio limits for this torrent
Optimize alignment
Align to piece boundary for files larger than:
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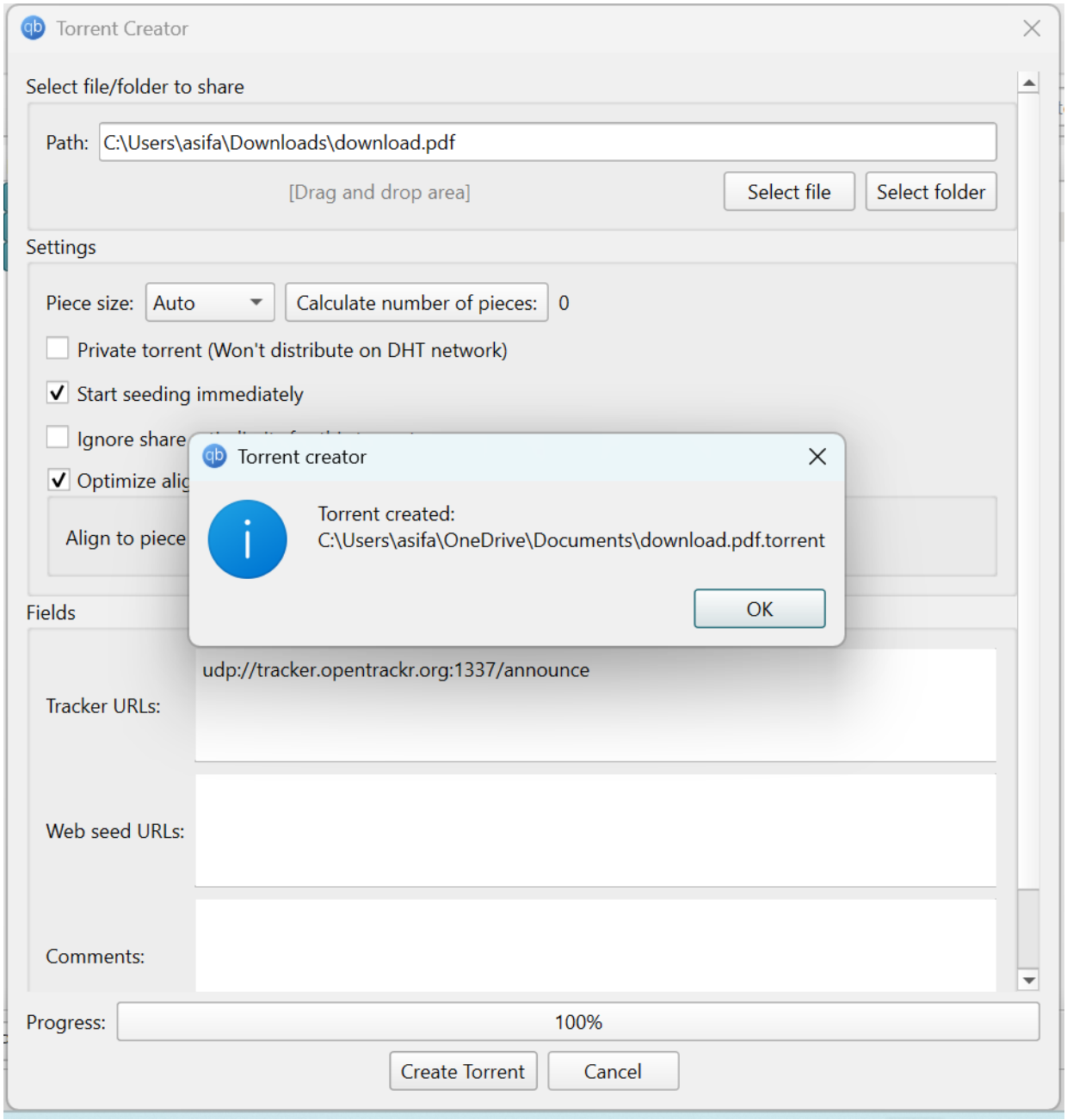
Torrent Creator
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Start seeding immediately
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Optimize alig
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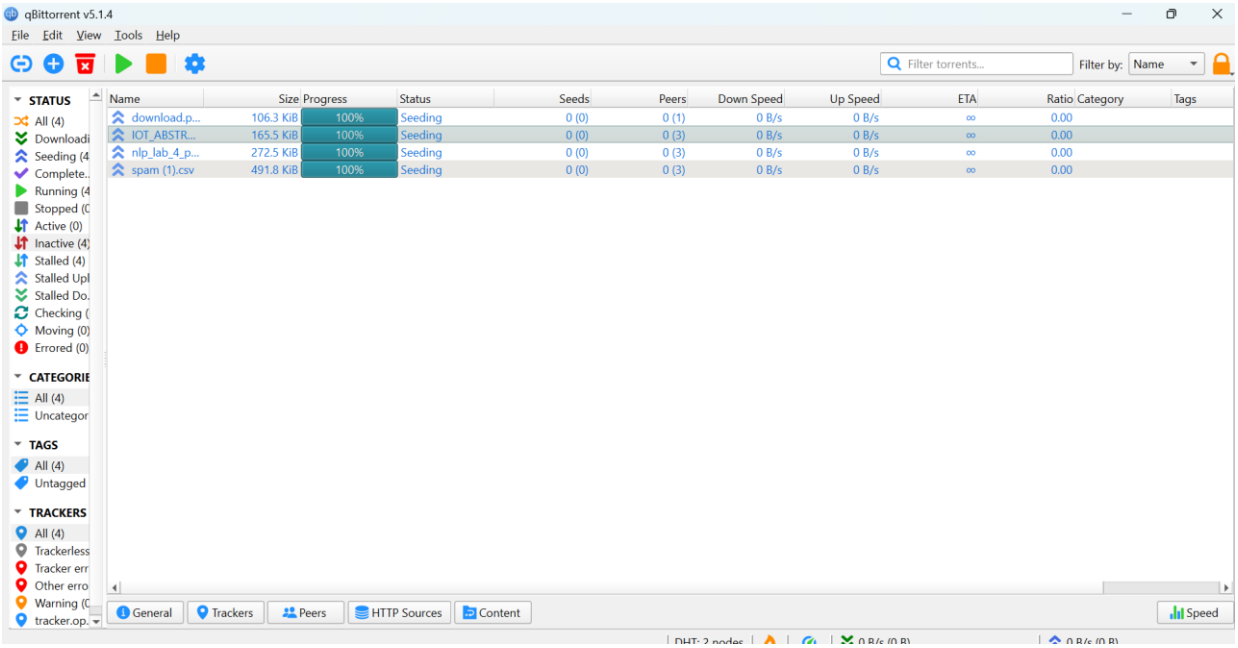

11. Conclusion

This assignment successfully demonstrates the creation and distribution of a torrent file in a peer-to-peer environment. By performing seeding, downloading, and integrity verification, the experiment highlights the efficiency, scalability, and reliability of BitTorrent-based decentralized file sharing systems.