

Creation and Distribution of Torrent File in a Peer-to-Peer Environment

1. Aim

To create and distribute a **torrent file** for sharing data using a **peer-to-peer (P2P) computing model** and to verify file integrity after download.

2. Objective

- To understand peer-to-peer file sharing
- To create a .torrent file
- To seed a file from one peer
- To download the file from another peer
- To verify file integrity after download

3. Problem Statement

Traditional client-server file sharing creates a single point of failure and high server load. Peer-to-peer file sharing distributes data among peers, improving scalability and fault tolerance.

4. System Requirements

Hardware

- Laptop / Desktop system

Software

- Torrent Client: **qBittorrent**
- Operating System: Windows / Linux
- Internet or Local Network

5. Tools Used

- qBittorrent

- File system

6. Peer-to-Peer Architecture

In a P2P system:

- Every peer can act as both **client and server**
- Files are divided into pieces
- Pieces are shared among peers
- File integrity is verified using hash values

7. Torrent Creation Procedure

1. Create a sample file to be shared
2. Open qBittorrent
3. Select **Tools** → **Torrent Creator**
4. Choose the file/folder
5. Add tracker information
6. Generate the .torrent file
7. Start seeding immediately

8. Torrent Distribution Method

Due to NAT and firewall restrictions in campus/hostel networks, **localhost-based P2P communication** was used.

- Seeder and downloader were executed on the **same system**
- Two torrent clients were used to simulate two peers

9. Seeding Process

- The original file was added to the torrent client
- Seeding started automatically
- The peer began advertising file availability

10. Downloading Process

- The .torrent file was added to a second torrent client
- The peer connected to the seeder
- File pieces were downloaded and reassembled

11. File Integrity Verification

- Torrent clients verify data integrity using **SHA-1 hash**
- Downloaded file matched the original file
- No corruption was detected

12. Output

- Torrent file successfully created
- Peer connection established
- File downloaded completely
- File integrity verified

13. Result

The torrent file was successfully created and distributed using a peer-to-peer model. The file was downloaded and verified without errors, demonstrating decentralized file sharing.

14. Limitations

- Campus networks may block incoming peer connections
- NAT and firewall restrictions affect public tracker communication

15. Conclusion

This assignment demonstrates the working of peer-to-peer systems using torrent technology. Even under network restrictions, P2P file sharing can be demonstrated using a localhost-based setup.

16. Screenshots

The first screenshot shows the qBittorrent v5.1.0 interface with the torrent 'achuthan.txt' in the 'Seeding' state. The progress bar is at 100%. The left sidebar shows the 'STATUS' and 'TRACKERS' sections. The main panel displays the 'Transfer' and 'Information' tabs.

Torrent Details (First Screenshot):

Name	Size	Progress	Status	Seeds	Peers	Down Speed	Up Speed	ETA	Ratio	Category
achuthan.txt	492 B	100%	Seeding	0 (0)	0 (1)	0 B/s	0 B/s	∞	0.00	

Transfer Information:

Time Active:	ETA:	Connections:
< 1m (seeded for < 1m)	∞	0 (100 max)

Information:

Total Size:	Pieces:	Created By:
492 B	1 x 16.0 KiB (have 1)	qBittorrent v5.1.0

The second screenshot shows the same torrent 'achuthan.txt' in the 'Seeding' state, but with a different set of peers and trackers. The progress bar is still at 100%. The left sidebar shows the 'STATUS' and 'TRACKERS' sections. The main panel displays the 'Transfer' and 'Information' tabs.

Torrent Details (Second Screenshot):

Name	Size	Progress	Status	Seeds	Peers	Down Speed	Up Speed	ETA	Ratio	Category
achuthan.txt	492 B	100%	Seeding	0 (9)	0 (0)	0 B/s	0 B/s	∞	0.00	

Transfer Information:

Time Active:	ETA:	Connections:
< 1m (seeded for < 1m)	∞	3 (100 max)

Information:

Total Size:	Pieces:	Created By:
492 B	1 x 16.0 KiB (have 1)	qBittorrent v5.1.0

The bottom status bar shows the following information: DHT: 0 nodes, 0 B/s (0 B), 0 B/s (0 B).

qb

Torrent Creator

×

Select file/folder to share

Path: D:\Assignments\SEM 6\DSC\ASSIGNMENT_1\TORRENT\Peer_1\achuthan.txt

[Drag and drop area]

Select file

Select folder

Settings

Piece size: Auto

Calculate number of pieces: 0

☐ 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:

Disabled

Fields

Tracker URLs:

udp://tracker.opentorrent.top:6969/announce
udp://tracker.opentrackr.org:1337/announce

Web seed URLs:

Progress:

0%

Create Torrent

Cancel

qb

Torrent Creator

×

Select file/folder to share

Path: D:\Assignments\SEM 6\DSC\ASSIGNMENT_1\TORRENT\Peer_1\achuthan.txt

[Drag and drop area]

Select file

Select folder

Settings

Piece size: Auto

Calculate number of pieces: 0

☐ 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:

Disabled

Fields

Tracker URLs:

udp://tracker.opentorrent.top:6969/announce
udp://tracker.opentrackr.org:1337/announce

Web seed URLs:

Progress:

100%

Create Torrent

Cancel

