Distributed Systems
Project Proposal

Distributed File Sharing System - BitTorrent

Goal

In this project, we will build a group based file sharing system where users can share, download files from the group they belong to. Download should be parallel with multiple pieces from multiple peers with support for fallback multi-tracker system, parallel downloading and custom piece selection algorithm.

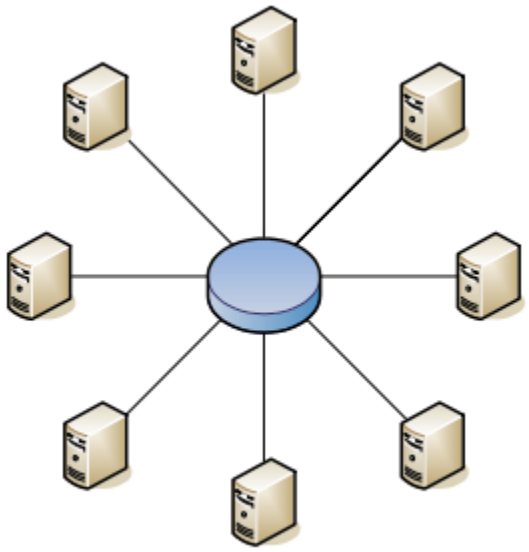

Figure 1

Architecture Overview

1. Synchronized trackers (2 tracker system) :
a. Maintain information of clients with their files (shared by client) to assist the clients for the communication between peers.
b. Trackers should be synchronized i.e all the trackers if online should be in sync with each other.

2. Clients:

a. User should create an account and register with tracker

b. Login using user credentials.

c. The clients which create the group, by default should become owner of that group. (If Owner leaves the group, some other group member should become owner of that group).

d. Fetch list of all Groups in server.

e. Request to join a group.

f. Leave Group.

g. List/Accept Group join requests(if owner)

h. Share file across group: Share the filename and SHA1 hash of the complete file as well as piecewise SHA1 with the tracker.

i. Fetch list of all sharable files in a Group.

j. Download file [Core Part]

Retrieve peer information from tracker for the file.
Core Part: Download file from multiple peers (different pieces of file from different peers - piece selection algorithm) simultaneously and all the files which client downloads will be shareable to other users in the same group.
Algorithm should ensure that pieces are downloaded from more than 1 peer (If available). Ensure file integrity from SHA1 comparison.
Users should be able to download files concurrently in their respective sessions.

k. Show downloads

l. Stop sharing file

m. Stop sharing all files(Logout)

n. Whenever client logins, all previously shared files before logout should automatically be on sharing mode.

Working

1. At Least one tracker will always be online.

2. Client needs to create an account (user_id and password) in order to be part of the network.

3. Client can create any number of groups (group_id should be different) and hence will be owner of those groups.

4. Client needs to be part of the group from which it wants to download the file

5. Client will send join request to join a group

6. Owner Client Will Accept/Reject the request.

7. After joining group, client can see list of all the shareable files in the group.

8. Client can share file in any group (as an owner or member; note: file will not get uploaded to tracker but only the : of the client for that file)

9. Client can send the download command to tracker with the group_id and filename, and tracker will send the details of the group members which are currently sharing that particular file.

10. After fetching the peer info from the tracker, client will communicate with peers about the portions of the file they contain and hence accordingly decide which part of file to take from which peer (You need to design your own Piece Selection Algorithm)

11. As soon as a chunk of file gets downloaded it should be available for sharing (the client becomes a ‘leecher’)

12. After logout, the client should temporarily stop sharing their own currently shared files/file chunks till the next login.

13. All trackers need to be in sync with each other, so that any seeding/sharing information is available to all