CSN-361

Computer Networks

Initial Project Proposal

Group-6

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Topic: BitTorrent inspired P2P based file sharing system

Abstract

We aim to build a BitTorrent inspired P2P file sharing system which allows downloading files from distributed set of peers rather than a central server. BitTorrent, also referred to simply as torrent, is a communication protocol for peer-to-peer file sharing, which enables users to distribute data and electronic files over the Internet in a decentralized manner. It involves oversight of the peers, pieces (file is divided into parts called pieces), connections among peers, seeding, downloading etc.

Possible Directions

BitTorrent is based on use of tracker server which manages the peers of a torrent network. It also involves client program which runs on users' system and is responsible for managing connection with peers, requesting from peers, downloading and seeding to other peers.

A P2P network can be implemented in two ways. One involves use of tracker server and other involves use of DHTs (Distributed Hash Tables) in place of a tracker server. While both directions seem interesting, we are yet to finalize on this choice. We will first thoroughly research about the pros and cons, and feasibility of both choices and select accordingly.

We can also benchmark different algorithms and parameters of the protocol to evaluate the efficiency of each variation, if it is feasible to do so in the given time constraints.

Advantages of BitTorrent

BitTorrent is better for certain types of file sharing and distribution compared to traditional methods due to several key advantages:

1. **Decentralized Distribution:** Uses a peer-to-peer (P2P) network where files are distributed across multiple users (peers). Each peer shares parts of the file with others, reducing the load on any single source and making

the system more resilient to failures.

2. **Efficiency and Speed:** As more people download and share (seed) the file, the download speed can increase because peers upload to each other, distributing the load. This swarm effect can result in faster download speeds, especially for popular files.

3. **Scalability:** Scales naturally with the number of participants. More peers mean more distribution points, which can handle more users without requiring additional resources from the original uploader.

4. **Cost Effectiveness:** Distributes the cost of bandwidth across all peers. Each peer contributes to the overall distribution, reducing the burden on any single entity.

Why BitTorrent

BitTorrent protocol is widely used in the field of computer science, in fact one third of internet traffic contains BitTorrent data packets. It is in Simple Storage Service(S3) by AWS. Facebook uses BitTorrent to distribute updates to Facebook servers. Hence, a thorough knowledge of how the protocol works is essential for better understanding of the field of computer networks.

What problem does it solve?

BitTorrent solves the problem of efficiently distributing large files over the internet by decentralizing the file-sharing process. Traditional file distribution methods, like downloading from a single server, can be slow, inefficient, and prone to server overload when many users try to download the same file simultaneously.