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CS330: Operating Systems & Networking

2. Discussion of other ‘Peer to Peer’ Networks

I. Napster

Napster was created in June of 1999 by Shawn Fanning and Sean Parker as an alternative to the archaic file sharing methods used by the then-popular file sharing aspect of IRC (which is today used mainly for chatting). *Napster* remained popular and continued to be the prevalent file sharing protocol until 2001 when the RIAA and several assorted musical groups such as Metallica and Dr. Dre filed lawsuits against the developers of *Napster*, making the following claims:[1]

1. *[Napster’s] users are directly infringing the plaintiff’s copyright;*
2. *Napster is liable for contributory infringement of the plaintiff’s copyright; and*
3. *Napster is liable for vicarious infringement of the plaintiff’s copyright*

Napster lost the lawsuits and eventually declared bankrupcy.

The reason *Napster* was legally responsible for the material distributed on it’s service was because it used a centralized model; all of the indexing and hashing was done internally on a meta-server, and it was also responsible for connecting peers to seeds. Even though none of the actual files were held on the meta-server, *Napster* was responsible for the content shared through it (since they had some sort of control on what could be shared), and therefore became legally responsible for it’s users.

[1] 17 U.S.C. A&M Records. Inc. v. Napster. Inc. 114 F. Supp. 2d 896 (N. D. Cal. 2000).

Protocol-wise, a *Napster* client used the http protocol to talk to it's meta-server, making the connections to the meta-server nigh undetectable by firewalls. After finding a suitable seed, the meta-server would connect the client to the seed and the file transfer would begin over TCP/IP.

Napster did not enforce encryption or anonymity, but clients may have offered it as an option; no information was found on the subject.

II. BitTorrents/Trackers

BitTorrent is a peer to peer file sharing protocol in the same vein as *Napster*, and also uses a centralized networking model. Instead of using one centralized meta-server though, the *BitTorrent* protocol uses a bunch of different centralized servers called *trackers*.

The *BitTorrent* protocol is one of the most popular protocols for transferring large files, and according to *TorrentFreak.com*[2] accounts for at least 45% of all internet traffic. *BitTorrent* is popular because it doesn't require a central server with high bandwidth to share files; just multiple seeds delivering the files to multiple peers.

When a torrent client connects to a *torrent tracker*, the tracker redirects the client to the most suitable seeds and peers from whom the client will receive the data (this is decided by by figuring out which seeds have the best bandwidth upstream and also require least amount of 'hops' through networks.) Once the client has a suitable amount of data, it will then itself become a seed to new clients joining the network, thus creating a pseudo-decentralized system (should the tracker be taken down after the connections are made the client should be able to continue downloading from the seeds it is already connected to.)

[2] http://torrentfreak.com/bittorrent-still-king-of-p2p-traffic-090218/

Torrent clients also employ many security measures such as anonymity and encryption, but this is on a client-by-client basis (some clients support features others may not.) This anonymity has led to many legal disputes, and many popular torrent sites (websites that distribute .torrent files) have been threatened or even taken down.