# Sharing and Trading

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Julita Vassileva

# Historical Overview

- 1980ies, 90ies – organizational fileservers, ftp
- 2000 – Napster: web-based, centralized index
- 2000 – 2004 - P2P: entirely decentralized
  - Gnutella: KaZaA – peers, super-peers…
  - Torrents: BitTorrent
- 2004 – Flickr                    Del.icio.us
- 2005 – YouTube                 CiteYouLike

- **Napster** was an online music file sharing service created by Shawn Fanning while he was attending Northeastern University in Boston and operating between June 1999 and July 2001. Its technology allowed people to easily share their MP3 files among each other.
- Peaked at 13 million users
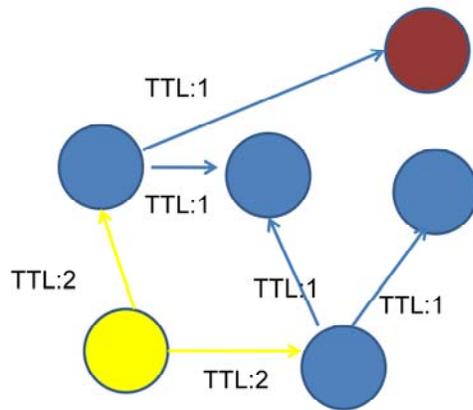- Closed due to lawsuit for copyright infringement

# Napster P2P architecture



From: http://ntrg.cs.tcd.ie/undergrad/4ba2.02-03/p4.html
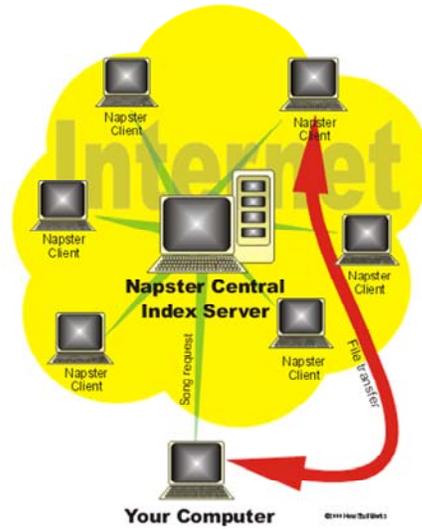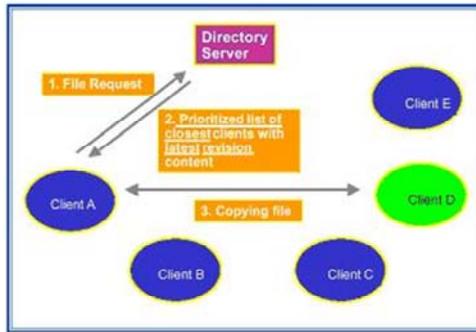
# Gnutella: "Pure" P2P

• A fully decentralized protocol for P2P sharing



Each node knows a few "neighbours"
for example, 2
Each message has "time to live" (TTL
for example, 2
A search query is sent to the node's
neighbours, who send it to their
neighbours, etc. until the TTL is
reached.

- Second generation P2P network
  - Invented by Niklas Zennstrom from Sweden and Janus Friis (who also invented Skype) from Denmark around 2001
  - "Super-peers" with copy of directories to speed up search
  - Most popular in 2002-2004, about 140 million PCs and increasing worldwide have KaZaA installed to share files of all kinds, from obscure bootlegs to raunchy porn.
  - Kazaa client often downloaded with a set of spyware apps.

Invented by Niklas Zennstrom from Sweden and Janus Friis (who also invented Skype) and introduced by their Dutch company Consumer Empowerment in March 2001, near the end of the first generation of P2P networks. Napster had shut down that July.

Initially, most users of Kazaa were users of the Morpheus program, formerly a client of MusicCity. But once the official Kazaa client became more widespread, its developers used their ability to automatically update it, changing the protocol in February 2002, to shut out Morpheus clients when its developers failed to pay license fees. Morpheus later became a client of the Gnutella network.

Like the creators of similar products, Kazaa's owners have been taken to court by music publishing bodies to restrict its use in the sharing of copyrighted material. Consumer Empowerment was sued in the Netherlands in 2001 by the Dutch music publishing body, Buma/Stemra. In November 2001, the court ordered Kazaa's owners to take steps to prevent its users from violating copyrights, or else pay a heavy fine. Consumer Empowerment responded by selling the Kazaa application to a complicated mesh of offshore companies, primarily Sharman Networks, headquartered in Australia and incorporated in Vanuatu. The Kazaa client was freely downloadable and is financed by attached adware and spyware.

Endless lawsuits, in the US and Australia, people forced to pay $3000 on average in damages for copyright infringement.

Bram Cohen was intrigued by a problem familiar to many Internet users and felt acutely by friends who were trading music online legally: the excruciating wait while files were being downloaded.

"Obviously their problem was not enough bandwidth to meet demand," Mr. Cohen said in an interview at a Mexican restaurant near his home in Seattle. "It seemed pretty clear to me that there is a lot of bandwidth out there, but it's not being used properly. There's all of this upload capacity that people aren't using."

That was the essential insight behind BitTorrent. Under older file-sharing systems like Napster and Kazaa, only a small subset of users actually share files with the world. Most users simply download, or leech, in cyberspace parlance.

BitTorrent, however, uses what could be called a Golden Rule principle: the faster you upload, the faster you are allowed to download. **BitTorrent cuts up files into many little pieces, and as soon as a user has a piece, they immediately start uploading that piece to other users. So almost all of the people who are sharing a given file are simultaneously uploading and downloading pieces of the same file** (unless their downloading is complete).

BitTorrent system makes it easy to distribute very large files to large numbers of people while placing minimal bandwidth requirements on the original "seeder." That is because everyone who wants the file is sharing with one another, rather than downloading from a central source.

It is open source.

The first usable version of BitTorrent appeared in October 2002, but the system needed a lot of fine-tuning. Luckily for Mr. Cohen, he was living in the Bay Area at the time and his project had attracted the attention of John Gilmore, the free-software entrepreneur, who had also been one of the first employees at Sun Microsystems. All along, Mr. Cohen had accepted donations from BitTorrent users at his Web site, bitconjurer.org, but the sum had been minimal. In October, however, Mr. Cohen's father prevailed on him to ask a bit more directly. Now, Mr. Cohen said, he is receiving a few hundred dollars a day. "It's been a pretty dramatic turnaround in lifestyle in just a few months, with the job and the donations coming in," Mr. Cohen said. "It's nice.“

The BitTorrent company, which is based in San Francisco and has 45 employees launched in 2007, now has 160 million clients around the world. They offer the technology which can help other

- **Delicious (del.icio.us)**, is a social bookmarking web service for storing, sharing, and discovering web bookmarks.
- The site was founded by Joshua Schachter in 2003 and acquired by Yahoo! in 2005. It has more than five million users and 150 million bookmarked URLs. It is headquartered in Sunnyvale, California.
- The service coined the term social bookmarking and featured tagging, a system he'd invented for organizing links

The "del.icio.us" domain name was a well-known example of a domain hack, an unconventional combination of letters to form a word or phrase. *Del.icio.us* and *delicio.us* now redirect to the new domain, *delicious.com*.

In an interview, Schachter explained how he chose the name: "I'd registered the domain when .us opened the registry, and a quick test showed me the six letter suffixes that let me generate the most words. In early discussions, a friend referred to finding good links as 'eating cherries' and the metaphor stuck, I guess."

Joshua Schachter has a B.S. in Electrical and Computer Engineering from Carnegie Mellon University in Pittsburgh.

On December 9, 2005, Yahoo! acquired Delicious for an undisclosed sum. According to *Business 2.0*, the acquisition was close to $30 million, with Schachter's share being worth approximately $15 million. On June 19, 2008, Schachter announced his decision to leave Yahoo!. *Techcrunch* reported that the recent news coming out of Yahoo! about mass resignations of senior staff pressed his decision to leave. Joshua also said that he had no future plans but would instead join the "gloriously unemployed".As of January 12, 2009, he is working for Google

Delicious uses a non-hierarchical classification system in which users can tag each of their bookmarks with freely chosen index terms (generating a kind of folksonomy). A combined view of everyone's bookmarks with a given tag is available; for instance, the URL "http://delicious.com/tag/wiki" displays all of the most recent links tagged "wiki". Its collective nature makes it possible to view bookmarks added by similar-minded users.

Delicious has a "hotlist" on its home page and "popular" and "recent" pages, which help to make the website a conveyor of internet memes and trends.

Delicious is one of the most popular social bookmarking services.[2] Many features have contributed to this, including the website's simple interface, human-readable URL scheme, a novel domain name, a simple REST-like API, and RSS feeds for web syndication.

Use of Delicious is free. The source code of the site is not available, but a user can download his or her own data through the site's API in an XML or JSON format, or export it to a standard Netscape

Richard Cameron, from the University of Manchester, was running the service on his own computer until 2007…

In the style of other popular social bookmarking sites such as delicious.com it allows users to bookmark or ''tag'' URIs with personal metadata using a Web browser; these bookmarks can then be shared using simple links such as those shown below. The number of articles bookmarked in CiteULike is approaching 2 million, indicated by the roughly incremental numbering used. While the CiteULike software is not open source, part of the dataset it collects is currently in the public domain.

CiteULike normalizes bookmarks before adding them to its database, which means it calculates whether each URI bookmarked identifies an identical publication added by another user, with an equivalent URI. URIs have the following format: *http://www.citeulike.org/article/1708098*. This is important for social tagging applications, because part of their value is the ability to see how many people (and who) have bookmarked a given publication. CiteULike also captures another important bibliometric, viz how many users have potentially read a publication, not just cited it. It seems likely that the number of readers considerably exceeds the number of citers [84,150], and this can be valuable information. Time lags matter, too. This is particularly the case with Open Access, where the ''most-accessed'' *Journal of Biology* paper of 2007 had in June 2008 been accessed in excess of 12,000 times, but has been cited just nine times (note that early access statistics can provide good predictors for later citations ). CiteULike provides metadata for all publications in RIS (EndNote) and BibTeX.
http://network.nature.com/people/mfenner/blog/2009/01/30/interview-with-kevin-emamy

The code behind CiteULike is a mix of Tcl, Common Lisp, Perl, and Erlang; data is stored using PostgreSQL [2] There is no API but plugins can be contributed using Subversion

**flickr**

- **Flickr** is an image and video hosting website, web services suite, and online community platform.
- History – 2004 by Vancouver's Ludicorp company → acquired by Yahoo in 2005
- Features
  - photo uploading and filing backend for users,
  - tags (medata) and tag clouds, locations, favourites, group photo pools (sets), API

**History**

Flickr was developed by Ludicorp, a Vancouver-based company that launched Flickr in February 2004. The service emerged out of tools originally created for Ludicorp's Game Neverending - a web-based massively multiplayer online game. Flickr proved a more feasible project and ultimately Game Neverending was shelved.[5] In March 2005, Yahoo! acquired Ludicorp and Flickr

Early versions of Flickr focused on a multiuser chat room called FlickrLive with real-time photo exchange capabilities. There was also an emphasis on collecting images found on the web rather than photographs taken by users. The successive evolutions focused more on the uploading and filing backend for individual users and the chat room was buried in the site map. It was eventually dropped as Flickr's backend systems evolved away from the Game Neverending's codebase.

Some of the key features of Flickr not initially present were tags, marking photos as favorites, group photo pools and interestingness, for which a patent is pending.[6]

In March 2005, Yahoo! acquired Ludicorp and Flickr. During the week of June 28, 2005, all content was migrated from servers in Canada to servers in the United States, resulting in all data being subject to United States federal law.

In December 2006, upload limits on free accounts were increased to 100MB a month (from 20MB) and were removed from Pro Accounts, permitting unlimited uploads for holders of these accounts (originally a 2GB per month limit).

In January 2007, Flickr announced that "Old Skool" members—those who had joined before the Yahoo acquisition—would be required to associate their account with a Yahoo ID by March 15 to continue using the service.[10] This move was criticized by some users.[11]

On April 9, 2008, Flickr began to allow paid subscribers to upload videos, limited to 90 seconds in length and 150MB in size. On March 2, 2009, Flickr added the ability to upload and view HD videos, and began allowing free users to upload normal-resolution video. At the same time, the set limit for free accounts was lifted.

**Features**

The company is based in San Bruno, California, and uses Adobe Flash Video technology to display a wide variety of user-generated video content, including movie clips, TV clips, and music videos, as well as amateur content such as video blogging and short original videos. Most of the content on YouTube has been uploaded by individuals, although media corporations including CBS, the BBC, UMG and other organizations offer some of their material via the site, as part of the YouTube partnership program.[3]

Unregistered users can watch the videos, while registered users are permitted to upload an unlimited number of videos. Videos that are considered to contain potentially offensive content are available only to registered users over the age of 18. The uploading of videos containing defamation, pornography, copyright violations, and material encouraging criminal conduct is prohibited by YouTube's terms of service. Accounts of registered users are called "channels".

**Social impact**

Before the launch of YouTube in 2005, there were few simple methods available for ordinary computer users who wanted to post videos online. With its easy to use interface, YouTube made it possible for anyone with an Internet connection to post a video that millions of people could watch within a few minutes. The wide range of topics covered by YouTube has turned video sharing into one of the most important parts of Internet culture.

Has been blocked in China, Morocco, Thailand, more recently, in Turkey, Iran, Pakistan.

## eBay

- Founded in September 1995, by Pierre Omidyar (French-Iranian).
- First item sold – a broken laser pointer (test)
- In early 2008, the company had expanded worldwide, counted hundreds of millions of registered users, 15,000+ employees and revenues of almost $7.7 billion.
  Now it owns PayPal, Kijiji and Skype.
- Reputation mechanism – crucial for success

The first item sold on eBay was a broken laser pointer, for $14.83. The transaction closed in September 1995, not long after Founder, Pierre Omidyar, had spent Labor Day weekend writing the code for eBay, then-called AuctionWeb Omidyar was experimenting with how equal access to information and opportunities affects the efficiency of marketplaces. As a test he posted a listing for a broken laser pointer, which to his astonishment sold Omidyar contacted the winning bidder to ensure he realized the item was broken. The buyer answered, "I'm a collector of broken laser pointers." At that moment, Omidyar knew he was on to something very big From day one, Omidyar built eBay around what remain the company's core values; a belief that: People are basically good

Everyone has something to contribute

An open environment brings out the best in people.