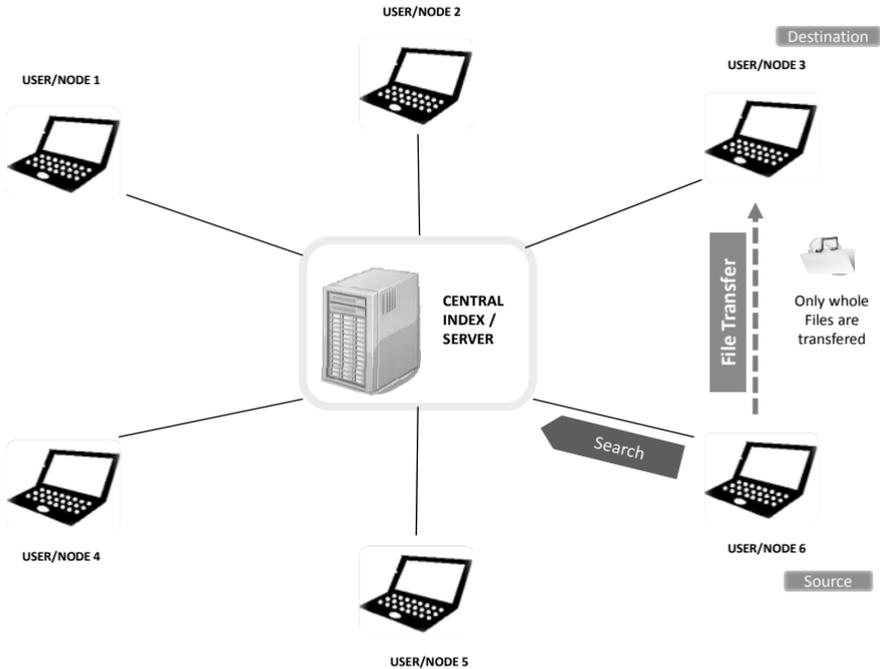


# Annex I: P2P “Generations”

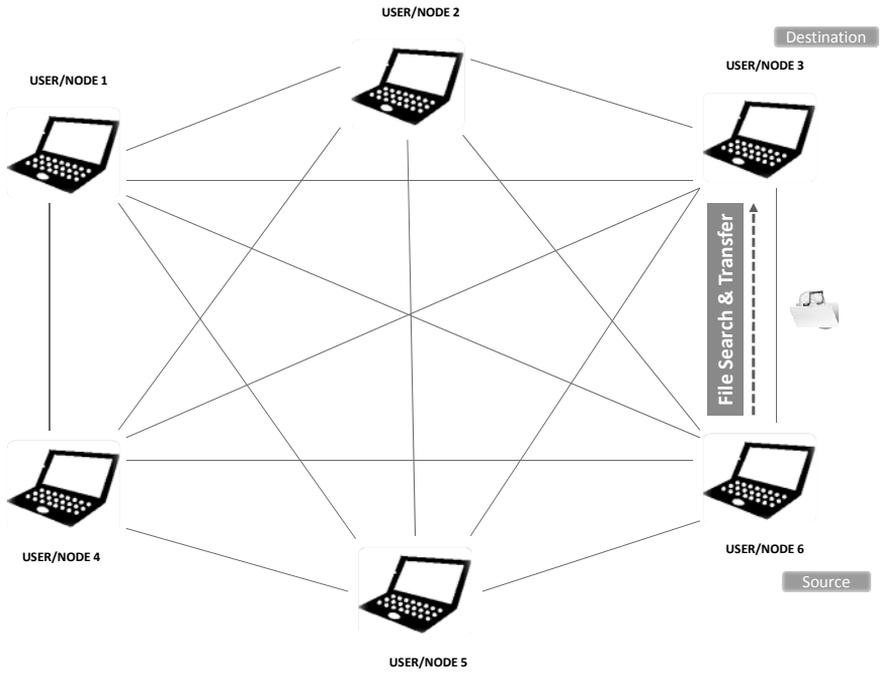
Fig. I.1. P2P Centralized Model<sup>413</sup>



In centralized P2P systems, despite the transfer of files occurring between users, some reliance exists on central servers that keep directories of IP addresses and shared files stored by users, which are constantly updated (“one-to-many relationship”; e.g., Napster).

413 This figure draws its inspiration partially from OECD 2004 Report, *supra* note 10, *Forms of P2P file sharing*, at 3 Box 5.1. (containing a graphic representation of a “centralized” P2P system).

Fig. I.2. P2P Decentralized Model<sup>414</sup>



P2P decentralized systems are characterized by a “many-to-many relationship”. Instead of resorting to a centralized directory, search queries are sent by a user to the computers of other users until the requested file is found (the query is thus “flooded” through the network). Once (and if) the file is found, information is sent back to the original searcher and a direct connection is established between the two peers (e.g., Limewire).

414 This figure draws its inspiration partially from OECD 2004 Report, *supra* note 10, *Forms of P2P file sharing*, at 3 Box 5.1. (containing a graphic representation of a “decentralized” P2P system).

**Fig. I.3.a) P2P Third Generation Models (BitTorrent Tracker and Swarm)**

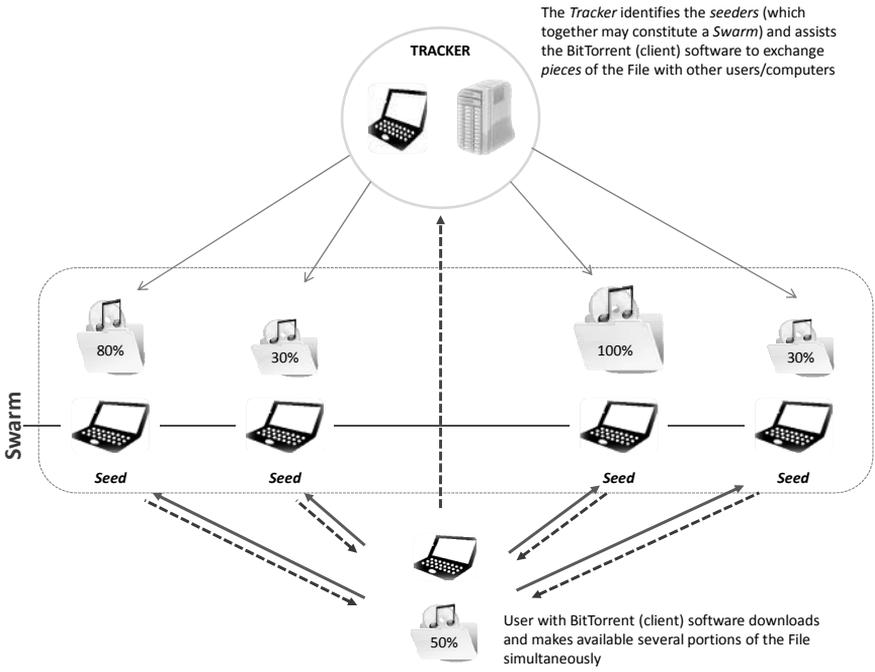
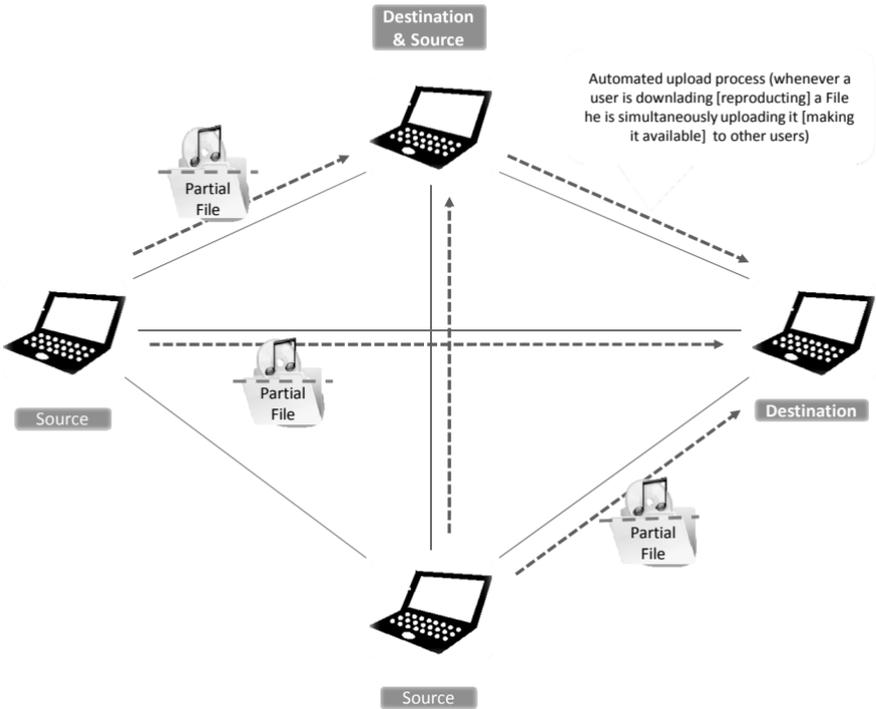


Fig. I.3.b) P2P Third Generation Models (BitTorrent overview)



Third generation systems use a “controlled decentralized framework” where peers identified by the P2P software as the high performance computers at any given time in the network are used as super (or overlay) nodes for carrying out administration functions of the online content and manage eventual scalability issues (e.g., KaZaA, Grokster and Pirate Bay).<sup>415</sup>

The most popular P2P protocol in the world is BitTorrent.<sup>416</sup> This protocol typically uses a central server (*tracker*)<sup>417</sup> that identifies other users downloading or uploading the requested file.

It performs this function by collecting IP addresses from the latter users and sharing them with the first, as well as recording data from each file or torrent tracked. Such data can include the file’s unique identification code (*hash*), the

415 See OECD 2004 Report, *supra* note 10, at 3.

416 See *supra* II.A and note 25.

417 See Envisional Report, *supra* note 25, at 7 & n.7 (referring that trackers are the most common source of IP addresses gathered through this protocol).

number of users that hold that file (*seeds* or *seeders*), those users downloading it (*leechers*), and sometimes the number of complete downloads.<sup>418</sup>

For efficiency reasons, a file is made available for download by multiple users which have a complete copy of the same (*seeders*), being that the final downloaded version consists of elements contributed by many and not just one *seeder*.

418 *Id.* at 7.