P2P: From File Sharing to Meta-information Pooling

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Abstract: P2P networks have mainly been used for downloading cultural goods. This sociological research focuses on the practices and norms of users and designers. Drawing on a qualitative survey, it explores the many ways sharing takes place. It looks at P2P networks as file sharing communities and probes the underpinnings of such file sharing. This article particularly scrutinizes the way in which users are brought together in communities founded on exploration and discovery. The latest developments seem to point towards a type of community chiefly based on exchanging meta-information.
Key words: P2P, file sharing, online communities, meta-information, cultural goods, MP3.

The general public became more familiar with Peer-to-Peer (P2P) between 1999 and 2000 when this data sharing facility was introduced on the Internet. Since then, P2P networks have mainly been used for downloading cultural goods. At the time, Napster software (BEUSCART, 2002) popularized MP3 music files. By P2P we refer to software that enables users to create a network that enables the sharing and free downloading of files. It is supposed to work both ways: downloaders are also expected to be uploaders. Five years on, the success of P2P software can be measured both by the proliferation of such programs and the heated controversy raised by the cultural industry about their economic consequences. This particular debate will not be dealt with here (on this issue, see BOURREAU & LABARTHE-PIOL, 2004; LESSIG, 2004).

Our sociological research focuses on the representations, practices and norms of a number of users and a few designers. The article also examines

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the various functions P2P networks perform when sharing takes place. In order to share files, P2P users also share technical advice, personal likes or dislikes and explore various topics of interest.

This implies the availability of specific software that enable peers to congregate in different-sized communities. This article draws on a qualitative field survey whose framework is set out in the first section. The second section looks at P2P networks as file sharing communities and probes the underpinnings of such file sharing. To conclude, the article closely scrutinizes the way users are brought together in communities based on exploration and discovery.

■ Methodology of the survey

This survey makes use of qualitative research carried out in 2004 and updated in 2005. It mainly consists of interviews with 26 users of this kind of software, but also includes an observation of their practices. The two authors are themselves both P2P users and have taken advantage of this kind of software ever since it first appeared. Over twenty applications have been tested.

The 26 P2P users were recruited through the social networks of the authors and their acquaintances. Eventually, only 5 among the 26 individuals who remained in the survey (out of the fifty-odd people we met to talk about those practices) were previously known to us. The persons who were retained met our criteria of duration and intensity of use of P2P software (as well as some technical criteria): they had been using such software for no less than one year, rather intensively (at least once a week, and 17 among them had been using it continuously). They had a DSL connection at their disposal (which they had usually signed up for to take advantage of P2P) and they used at least one of the three applications studied below.

For the most part this sample is made up of young men aged between 16 and 35 - there are only two young women. They live in the Paris area and half of them are students. Among the remaining 13, 10 have got a job and 3 are unemployed. Interviews were held at the homes of the P2P users, usually in the room where their computer was located. The assessment of practices took place after the talks, to illustrate what had been said. The interviews were recorded and then partly transcribed; in some cases we were able to record use statistics. The configuration details of the

applications, which allowed one kind of sharing or another and thus determined the type of sharing community the particular user belonged to, were noted systematically.

This analysis is supported by the users' discourse on and representations of their own practices, as well as by direct observation of these actual practices. This research deliberately focuses on proficient users by giving greater importance to frequency of use. In all cases, the people surveyed had already shown a keen interest in computers and the web before the advent of P2P software. However, downloading files quickly became a major concern. This user profile was targeted because of the importance of such a criterion to an acquaintance and familiarity with virtual communities.

■ 2P2P networks as file sharing communities.

The main attraction of P2P networks lies in the extensive range of information goods made available by all users. The more P2P users share through the network, the greater the amount of files that can be downloaded. Thus, in this kind of system, a lot is at stake in making sure that peers actually share the greatest possible number of files instead of only downloading others' files without contributing their own. Several types of rules can be laid down to ensure an adequate number of uploaders.

Firstly, some applications carry explicit statements of norms and provisos concerning sharing requirements. These embody the "hacker spirit" they chiefly stem from and contribute to spread. However, there are variations in such norms according to the sharing communities involved and the type of software in use. Moreover, there is no telling whether peers agree with such requests and actually comply. Sometimes technical restraints are applied at a software level: some applications ensure a minimum amount of actual sharing. This is a way of "fencing in" networks by means of technical exclusiveness, which seems far removed from the initial ideal of openness.

In terms of both norms and software configuration, peers are directly confronted with the designers' representations. How are these representations sustained? How do they spread? What part do pioneers play? How does the software itself function and what role is played by the representations it may possibly induce? To what extent does installing a P2P program determine a sharing oriented use?

To begin with, a close study of P2P software shows that there is no single P2P archetype. In a way reminiscent of developments in the world of Free software, P2P applications have proliferated as much as a result of the specific expectations of some designers/users as of the competition between the culture industry and designers of new software that is both safer and more inconspicuous. The instant Napster was closed new applications were launched right away - making use of improved network decentralization techniques. Furthermore, new versions of these applications are still being produced at an unflagging pace.

Users have become increasingly proficient and less dependent on their mentor's initial suggestions (appropriation phase) as a result. In the beginning users often employed several P2P applications simultaneously, and selected for specific operations according to their respective merits. Once their "beginner stage" was over, P2P users who wished to try new applications or configurate the ones they already used could turn to dedicated chat rooms. For some of the most driven P2P users mastering the software was turned into a kind of contest: the aim was to achieve the best technical performances. In particular, this competition focused on sustaining the highest possible transfer rate - making the most of the notional capacity of users' DSL connections.

P2P users can experience sharing as a communal value, or as something imposed upon them, or as a process that can be configured. On first discovering new applications, users come into contact with these representations and their active support is sometimes required. We wish to show that the diversity of P2P applications is noticeably reflected in the representations of sharing conveyed by them.

Figure 1: Features of P2P

Software	*Type of P2P network*	*Number of users (*)*	*Specialties*	*Ads / Spywares*	*Type of sharing*
eMule	eDonkey2K	2.900.000	Big files; High diversity	No / No	Compulsory for running files / Can be configured
DC++	Direct Connect	360.000	Big files; Video files	No : No	Compulsory / Extensive downloads
Soulseek	Soulseek	<100.000	Music only	No / No	Can be configured / Firm requests

(*) Connected at the same time ; www.slyck.com, november 2004.

In this study, we have focused on three types of software used by the people we interviewed. The first one, *eMule*, is the best known of the three and the most frequently used of all P2P programs. Open to all (that is, to all

the people who know how to use it), this particular application makes it possible to share the largest amount of goods (several hundred million files of all kinds). It has one drawback though: its download speed can be extremely low. Using eMule implies sharing only a small number of files, whereas many P2P users share a far greater number.

DC++ is not so well known, but it is greatly valued by those who want a very fast connection. You can download a movie in three hours, compared to several days on average for *eMule*. To be able to download, you must belong to a Hub and fulfil the terms of admission (e.g. having more than 40 Go of movies or 20Go of music stored in your own public files). On the whole, its transfer quality is considered excellent. On the downside, the supply remains smaller than on *eMule* and it betrays some signs of technical and/or cultural elitism.

Finally, *Soulseek* has a distinctive feature: its scope is narrowed to music. Its users include more or less knowledgeable music lovers, as well as a number of avid collectors. Owing to the number of members, the diversity of music files is staggering, and lots of users exchange as many as thousands or even tens of thousands of MP3 files. Many little-known or sold-out records are made available.

Soulseek has the toughest sharing requirements. This may be due to the vulnerability of the Soulseek network, which is definitely the most exposed of the three. As a matter of fact, it is quite often unavailable, which does not stop its users from setting themselves up as its champions.

More often than not, P2P is routinely described as one big community of members, whereas its users rather think about it as a galaxy of peer communities - and these communities themselves as made up of a galaxy of P2P users. Users see themselves less as a group than as individuals sharing their resources equitably. Those who took part in the survey may use up to four different applications and they may belong to as many as five groups on each application. Moreover, peer communities have evolved, been broken up and re-assembled in a different way on a regular basis. The experienced users we interviewed had all been through the closing of a number of networks (Napster, AudioGalaxy). They were consequently forced to look for new applications and explore them.

Sharing files, looking for files and sharing them again

Getting familiar with the application interface in a very basic way involves localizing and mastering the functionality of the search engine and the download window. Many other functions may be available. This additional functionality is not the same in each application: it varies according to the latter's particular set of values. P2P users - at least in the early stages - tend to keep an eye on their dashboards and often pay attention to ongoing download and upload. They are often tempted to try and understand how sharing works - who gives to whom and in what way. Not all P2P users, however, are equally expert at keeping such a close watch on download/upload. Some applications make it possible not only to choose which files to share, but also to keep a careful check on what is going on. The most practised users usually take a keen interest in their upload, i.e. in the goods they make available. Conversely, some people systematically take a look at the downloaders' share folder. If there is nothing in it for others to share, they will either be notified or disconnected (banned). However, looking at the way downloaders share their own goods can also be an opportunity for communicating between individuals.

As Mickaël puts it:

> "I like to know what the guy who downloads stuff watches. If he is into horror films or SF or whatever […]. If he downloads out-of-the-way stuff, chances are this bloke is clued up and could let me have some other good stuff […]. Then we can see about a slot […]. Still, mind you, I'm not always stuck in front of the PC"

The various practices in connecting and disconnecting P2P software provide another clue as to how much users have integrated the ethics of sharing. The most committed P2P users will run the program continuously, whether they are themselves downloading a file or not. The amount of uploaded files may soar. Stalwarts like Cyril find it easy to justify such a practice:

> "I can't understand those jerks who keep downloading and then disconnect the instant they've got all the stuff they want. Those guys don't understand how the system works: you can only ‘take' because others ‘give'. The files gotta come from some guy's hard disk […] some guy who's not too stingy with his bandwidth. Without those leechers I was telling you about we'd share ten times as quickly…"

Rules about sharing and strong representations are distinguishing features of the world of P2P. "Share or die" sums it up: P2P systems are at

the mercy of their users' willingness to abide by this requirement. When stated so explicitly, such a rule seems to bring back a "netiquette" specific to the P2P world.

Once the question of configuring the application has been settled, another soon arises: how to organize the downloaded files. They quickly pile up and become difficult to find and consult. Some "tidying up" is then necessary. P2P users may do this for their own sake, but also as a way of putting their files on display, of exhibiting their wares — with their peers in mind. Seasoned P2P users may, for instance, give information about their files and arrange them thematically.

■ P2P networks as exploration and discovery communities

Besides the space dedicated to file sharing, applications may provide additional functionality that makes it possible for peers to communicate. These functions are related to exchanging and sharing activities. It is worth mentioning that not all P2P programs supply mailboxes or chat rooms. And yet, such facilities are a significant feature of the world of P2P. Actually, the people in our sample spend a lot of time on these programs and they show a rather amazing assiduousness. Although downloading is mainly a background operation, P2P users still have to be there now and then and perform a few tasks in front of the screen. Some of them are permanently connected to a sharing network and only occasionally stop downloading in order to "reboot" - when after having toiled for several days (and nights) their computers are beginning to lag. Such assiduousness may be considered as both a cause and an effect of exchanges with other P2P users as the more comfortable with an application users become, the more likely they are to chat with others (to receive information requests about it, to answer, and to ask further questions in turn). Once peers have first come into contact, P2P networks may even turn into a virtual sitting room and meeting place for regulars - until they sometimes seem to lose sight of P2P's original downloading purpose. According to their particular application, peers can either join in live discussions via IRC (Internet Relay Chat) or directly post messages on topic rooms. The topics discussed are mainly shared contents, music, movies and video games.

Our observation has led us to discriminate between two main categories: on the one hand, talks about the workings of P2P and the know-how of file sharing; on the other hand, discussions about the artistic, literary or intellectual characteristics of the files they share - and also more general discussions about daily life.

Discussions about P2P and file sharing

P2P does not always confine itself to sharing files. A lot is at stake in exchanges; peers play an important part in setting up those networks. The people involved choose a nickname and write, publicly or privately, on chat-rooms. Users sometimes need to be highly skilled to be able to configure very complex P2P applications; in that case, outside help is necessary. From time to time, users can only come to understand an application by discussing it with peers until they finally begin to grasp its workings, its characteristics or even its advantages (if they are comparing programs).The issue may be how to configure this program so as to be able to share several files at the same time; or how to log into this or that server. But help may also be needed in connection with the shared files themselves. Users may want more information on their technical quality or reliability.

"Anti-fake communication and "technical solidarity"

To begin with, users' chief aim is to detect and avoid "fakes". Corrupting files is called "spoofing" - such as producing cut files of uneven quality. There are two common sources of "fakes": on the one hand, users who, for instance, substitute a pornographic movie for another file; and the culture industry, on the other hand, which tries to discourage P2P users from sharing by making exchange systems less efficient. *eMule* owes its success largely to its technical ability to fight against the increase in the number of "fakes" on P2P networks - on Kazaa in particular. Every *eMule* user can leave a message on a file to alert others to its poor quality or warn them that it is a fake. In this way, they can inform all their peers, who are (potentially) interested in the said file, that it is not the genuine article.

This communication system between peers primarily provides meta-information - i.e. training information. Such comments also come in useful to let peers know about movie particulars like languages, subtitles, or how to install an application. Comments can also carry normative injunctions, like

asking to put one's files "on release", urging peers to share, berating "leechers" or complaining about sluggish downloading. However varied the uses to which these annotations are put, involvement is a common denominator. In the words of an *eMule* user:

> "I don't put comments on all my files, only on some of them; sometimes I feel like writing a comment I try to write useful comments. No need to put scrap like 'Please share' or 'right click' which you find all the time. It's rather pointless. I leave comments on the file's quality. If there is a problem, for instance, if a song is missing, I point it out. It's great when you download a file to know if it's good quality. eMule is a sharing system. You've got to pull your weight."

Here are a few comments left by peers about a film version. They can be read before even beginning to download a file. According to the comments they find, peers may continue to download a particular file, or try to find another, better file with the same movie elsewhere.

Figure 2: Comments about a movie (eMule)

The users' comments meant for all peers, the forums and the advice exchanged between peers on configuring applications produce a new form of cooperation, mutual support and solidarity between peers. The way P2P works is reminiscent of the concept of "technical solidarity" in humans-machines networks, as articulated by Nicolas Dodier. It can be defined as a type of bonds between entities that is generated by the workings of technical systems This technical solidarity comes in different shapes. Mutual information is at the heart of its operation - as can be seen in anti-fake communication. Making the most of a number of goods on P2P definitely calls for all sorts of technical skills. How to use the P2P application, where to find the proper video/audio codecs (compressors/decompressors), where to find and how to read the subtitles of a movie in a foreign language, how to install and operate software, how to install a "cracked" video game, etc. This

team spirit leads to, and mainly rests on, such regular information exchanges - a practice to be absorbed by each new member.

Discussions about the artistic, literary or intellectual characteristics of shared contents and everyday life

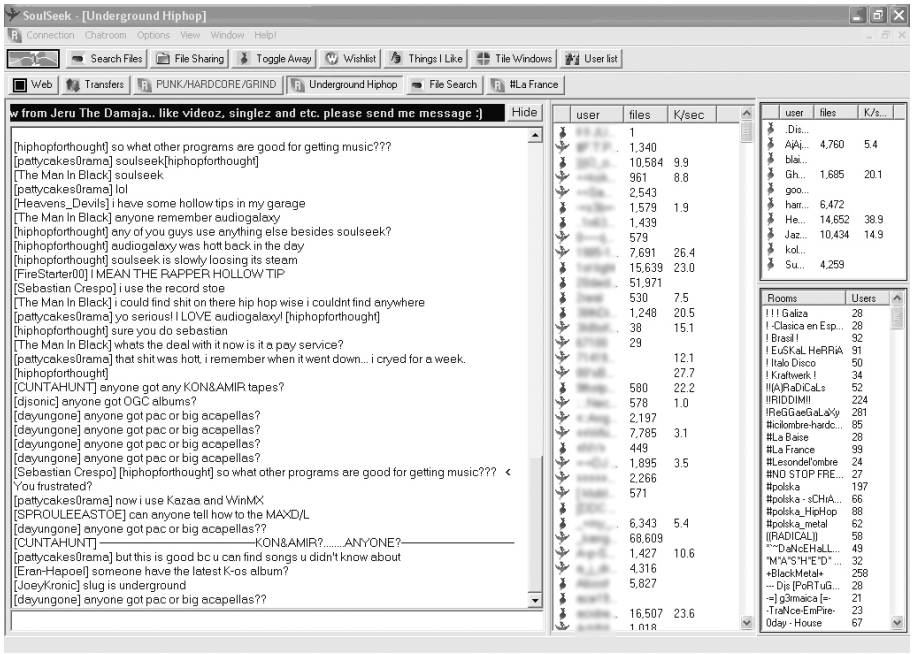
Besides the kind of meta-information generated by devices such as the one used by *eMule*, there is another kind that requires direct contact with a peer. Discussion - public and/or private depending on the application - takes place in real-time and leaving information at the disposal of the best part of P2P users is no longer the main goal.

Once again, it is posible to distinguish between several types of discussion. The need for exchange may arise from a peer's practical concerns (requests for advice or tips on speeding up transfer time). However, many P2P users actually enjoy conversing with others, over and above the practical and technical benefits of such exchanges. Therefore, some users regard their chosen network(s) as part of their social life. Topics vary - comments on everyday life, jokes, cultural exchanges, the future of P2P and practical advice can all be found. A call to order may well be followed by a talk on configuring and customary norms:

> "In the beginning, I wasn't the one trying to get in touch, because I simply didn't know how it worked. It was because I had downloaded too many files at one go. On Soulseek you've got to show respect. You're not supposed to download too many files from one single guy. There's maybe some other guy who wants to download too. That bloke posted me a message: 'Calm down!' he went 'Not all at the same time!' And then we talked, and he showed me how to set/ adjust the parameters. Since that time, I've been talking to him about twice or three times a week, and sometimes everyday. I met him once, and now that he's going to live in Paris, he's going to be a mate of mine. The first time I downloaded something from him, it was '8 bits' music. He had a few pieces. I had more, so I sent him some later on. I tipped him off about some groups and so did he."

This emphasis on social interaction varies as some applications offer fewer incentives than others. It can take place via friendly topic rooms based on similarities of taste, and/or by creating lists of friends. The file folder plays a part in the presentation of self, and conversely, it also provides useful hints on the peers you are willing to meet. Some applications, like *Soulseek* and *DC++* allow peers to gather together on "chat rooms". To illustrate this, here is a Soulseek *screen* shot.

Figure 3: Soulseek communities windows



The screen shot above shows how this application encourages public and private communication. The chat room is on the left, the members' list (featuring connection rates and the number of files that can be downloaded for each of them). In the top right hand corner is this particular user's friends' list. That space enables a user to collect the peers s/he wishes to talk to into an acquaintance group. In the bottom right hand corner the various communities or chat rooms are listed with the number of users online (up to a thousand for some, but more often around twenty). These chat rooms bring together *Soulseek* users according to their affinities (music styles, performers, etc.) Finally, the area with a black background is used to post messages that can be seen by the members of all the different *Soulseek* communities.

Topic rooms: finding your cultural bearings

Shared files and a common chat room form the interactive core of these micro-communities. Such facilities supply opportunities to establish privileged bonds between members. There are topic rooms on all kinds of subjects: movies, music styles, performers, manga, video games,

applications, etc. The features of the offerings characterize every micro-community. Giving becomes an ethos. Members own cultural goods that draw them together; their likes and dislikes are partly similar. Thanks to the wide range of chat rooms, newcomers have no trouble finding communities to their taste; they fit into them by sharing files and communicating with peers:

> "It makes it easy to communicate with people who have the same taste as you, to meet people who are attracted to the same things as you."

The main value of topic rooms lies in their promoting exchanges between peers who share common interests. The notion of "online friendship" is reminiscent of the "nerd" image of a technically-competent person whose social network is all long-distance.

Shared files as presentation of self

P2P has developed into a communication area thanks to several facilities (forums, IRC, email) in this universe. Share folders serve as a medium for the presentation of self and/or communities. A P2P user presents him/herself to peers through his/her share folder. The various files it contains, as well as the way in which they are arranged roughly define this person's taste. Peers are brought closer to one another through shared goods and relatively common likes and dislikes. Some P2P applications allow users to introduce themselves, pin their own picture, and leave messages. E. Goffman's terminology seems appropriate here: we are indeed dealing with the presentation of self in everyday life as P2P promotes private conversations and meeting people like oneself.

A P2P user explains how he has customized his share folder to leave messages for visitors:

> "On Soulseek it's less anonymous People have a file about themselves where they can put their picture. On my own file there's my picture and I've written ‘share or be banned' but also ‘nazis are banned'. I've occasionally chatted with people late in the evening, trying to find out whether someone new wanted to chat, but I prefer talking to people who like the same kind of music as me. There are people I've been chatting with for one month, and then out of the blue they disappear or stop chatting. But I've chatted a lot with three or four people."

Friends' lists: creating elective and "invisible" micro-communities

Once a P2P user has got in touch and got on well with a peer, he can put his new acquaintance on his friends' list. *Soulseek* and other applications have friends' lists managed by users themselves. Adding someone in your friends' list means you will know when they are online. Moreover, it implies, on technical grounds, that when there is a waiting list for downloading files those on the friends' list will be served first. Being identified as a "friend" entails a privileged sharing relationship: it gives you uploading/downloading and communication priority. *eMule* also makes it possible to get in touch with someone to exchange one or several pieces of goods more quickly: messages can read like "looking for friendly slot". Obviously, there are solid practical motives for becoming "friends," but only a minority of users seem to adopt an exclusively self-seeking approach. Such lists may also be considered as both an opportunity for and the sign of a shift from mere cultural affinity to friendship.

Paradoxically, communication between peers may be desirable and expected, as a decisive ingredient that may turn an application into a big hit, while programmers may well take a more jaundiced view - because they either see it as a threat, some degree of takeover by laymen, or as a sign that the application is not up to standard since more advice is needed to run it. Affinity communities are sometimes considered as a hazard for networks, given that their members only put their goods at the disposal of "friends" while ordinary users are left out in the cold. On the one hand, buddy lists are obviously attractive when you have to wait quite a long time before you can begin downloading files, or when you seek more direct contact between peers. On the other hand, it can be argued that having your "friends" served first (or exclusively) means scaling down an application's "global community" of users. There is also a fear that this direct, but restricted mode of exchange might entirely displace the old "open" one. However, such a fear seems unsubstantiated, as most peers generally use both.

Users between "Hackers" and "Leechers"

Distinguishing between different approaches to sharing on P2P is rather tricky. Characteristics are not always clear-cut: there are various mixtures and combinations. This paper uses the two ideal types of the hacker and the the leecher to suggest a first rough outline - with the amount of time spent in front of a PC and the different approaches to sharing as its main criteria.

Figure 4: A typology of users

Types	*Connection duration / Frequency*	*Volume D/L – U/L (*)*	*Sharing management*	*Exchanges / Discussions*
Hacker	Nearly continuous	U/L (much) > D/L	All-inclusive and very informed	Frequent; membership in communities
Active P2P user	Long with breaks	U/L > D/L	Conscientious	Occasional; seeking advice
Occasional P2P user	Low and irregular	D/L >= U/L	Erratic	Infrequent
Leecher	Can be very long	U/L=0	Blocked, undetectable	No information

(*)D/L= Download ; U/L= Upload

The term "Hackers" refers to computer and web enthusiasts, who are highly skilled technically and share a common (counter) culture; they take part in many ways in the exchange of information goods (see LEVY, 1984; FLICHY, 2001).

The term "leechers" is often found on P2P, to refer to "parasites" who consume, i.e. download, but don't share their own files and turn off their upload. Selfishness is not the only explanation. These "free riders" offer two other rationalizations for not sharing their files: they are scared that someone might try to take control of their computer or damage it, or they worry that they may be detected, fined and sentenced for copyright violations. Concern about computer security and fear of legal proceedings combined with some amount technical ignorance all play a part in this deliberate refusal to share generously.

Hackers cannot stand leechers who download but do not share. They jeopardize P2P networks or at the very least slow down all the exchanges, and reduce the number of potentially available goods by not adding any. Conflicts may occur between active users (hackers) and passive ones (leechers). It mainly shows on the most community-oriented applications like DirectConnect. In a way, Leechers act like passive "trolls".

Between those two polar extremes there are gradations in the approaches of users, from those who share the Utopian ideal of a perfect exchange to those who are nervous they might inadvertently "open a backdoor" into their computer and therefore do not contribute as much as they could to the community's resources. On the whole, those P2P users we met mostly classify as hackers. Using our four ideal types, they may be pigeonholed as follows: fourteen of them may be regarded as "hackers",

seven as "active P2P users"; three "occasional P2P users" and two "leechers".

The communities studied here bear a resemblance to the virtual communities mentioned by H. Rheingold in connection with the Well (Californian community). According to him: "Virtual communities are social aggregations that emerge from the net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace". P2P communities can also generate rewarding interaction between peers. Sharing and giving play an essential part in the structure of these communities. We want to emphasize the fact that the norms, beliefs, common culture and topics of interest peers share are encoded in the software design.

■ Conclusion

To begin with, P2P networks were generally considered only as a means of exchanging files; in rather the same way, Amazon first saw itself as just an online shop. Increasingly, both turned into a type of meta-information exchange network. Today, these very exchanges are at the core of the most active P2P networks. It seems worth mentioning that meta-information was often brought in surreptitiously by P2P users, and that designers soon found a way to accommodate it on their new interfaces. Once meta-information had been accordingly scripted (i.e. encoded) in the software, peers were in turn encouraged to use it. And the more they used it, the more noticeable meta-information became.

Every P2P user relies on a combination of tools to "potter about" in their own particular way; this paper tries to point out the main trends that can be identified. These trends fluctuate between the two figures of the hacker and the leecher. Using P2P involves a double training: learning how to configure applications and learning about community rules. These rules may be global on sharing for nearly all P2P applications or local at an application level or at a sharing sub-communities level.

To all the people surveyed, P2P networks meant more than simply sharing files; they have proven to be a very efficient training and discovery environment, which met their expectations better than some discussion forums and commercial websites. However, some users supplemented P2P with other tools, like online data bases (DAGIRAL & TESSIER, 2005). It has

been suggested that such applications might be reducing music firms' profits, which remains to be proven. Conversely, it can be argued that P2P actually expands people's horizons and provides opportunities to discover and try out new songs and performers. All in all, P2P practices bear striking similarities to those of internet pioneers (decentralization, information-sharing, turning computer science into a form of art), but on a considerably larger scale.

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