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Remuneration in the Cyberspace : To Conceive Information Like a Public Good

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Since the beginning of the nineteen's, problems on the application of law concerning copyrights have raised due to the development of computers and Internet and the proliferation of illegal exchange of files. Anti-pirate devices were applied, but without any truly dissuasive effects. New devices will probably applied in an approached future, but their effectiveness is not proved and they imply significant restrictions of rights of utilization and would be socially contestable. The nature of technologies make status quo impossible and force a reconfiguration of authors and users rights. We will have to do a social choice: restrict the access to works or implant the taxation of devices that give access to works. The last one appear more appropriate for today's technologies.

It is largely recognized that copyright must guarantee an adequate remuneration for authors in support of artistic and intellectual live in our society. But at this time, we're entering into a trouble phase of our history. Computers and Internet, both, allow to pirate any musical, cinematographic, literary and software works. This paper tries to demonstrate that legislative and technical efforts intending to protect author's work against this phenomenon are at best socially contestable, at worst technically impossible. The fundamentally principles of copyright regime of any countries must be replaced.

Firstly, there was the famous Napster issue. This software allowed to search and download music files from an Internet user to another partner with his integrated search engine. The Napster central server didn't have to operate in the download process. At that point, Napster inc. counted on that no-intercession process to avoid any juridical fail. However, this central server indicated at every computers the localization of files in Internet. This element persuaded the American justice to require a filtration of downloadable files¹. Consequently, Napster have started to flopped and must declare it bankrupt².

Nevertheless, illegal download didn't lost popularity at all. Clones of Napster, equipped with same functionalities, but allowing to distribute file without indication of a central server, are used with same

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www.theses.ulaval.ca/2004/21429/21429.pdf

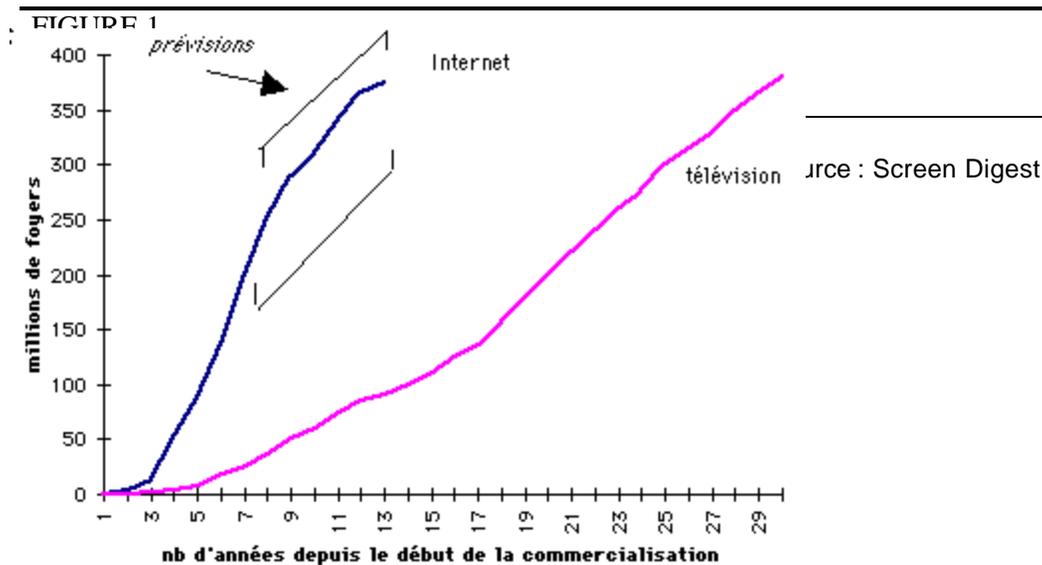
¹ US 9th Circuit Court of Appeals, <http://laws.findlaw.com/9th/0016401.html>

² <http://zdnet.com.com/2100-1106-956382.html>, « Napster buyout blocked; fire sale likely », september 3, 2002.

straightforward handling. Called “peer to peer”, like Morpheus, KaZaA and Grokster, these clones are now extremely popular. Due to the absence of a location file register, these software have no juridical fail (Biddle et al, 2002 : 5-6).

An investigation published in June 2002 by IFPI (International Federation of the Phonographic Industry) reveals that there are more than three millions of Internet users permanently connected on Internet are made available about 500 millions files which unauthorized copy is illegal (IFPI, 2002 : 10). This simply access support pirate CD production: from 640 millions units produced in 2000, this activity achieved 950 millions of pirated CD in 2001 (IFPI, 2002 : 3).

With a larger Internet community who’s growing every year, it’s probable that this phenomenon will take more overweight during few years again. The future perspective to see Internet coming as popular and spread as TV, make cultural industries so far in danger. In fact, the number of Internet users raises so fast. The specialized magazine Screen Digest have established that the development of Internet is three times faster than television since the beginning of their commercialization for both of them³



³ www.cem.ulaval.ca/ObservationsCadre.html, « Internet : trois fois plus rapide que la télévision... » Centre d'étude sur les médias, novembre 1999.

According to these predictions, in 13 years of commercial existence, the Internet will reach the same level of television, that it achieves this step after 30 years. So, illegal copying would improve and challenge selling CD and DVD in the legal market.

The solution is not the closing of peer-to-peer networks by a court order. Notably, in the United States, jurisprudence disadvantages the right holder when they want to prohibit an innovative technology that can also have legal applications (Pépin, 2002 : 3-5). A recent decision of an American judge confirms this tendency. According to this decision⁴, people's using peer-to-peer tools are responsible for their own acts and the software exploiter doesn't have any responsibility for infringements.

Then, two remaining solutions:

- 1- Reinforce laws and conventions in order to formally criminalize non-authorized copying and distributing by computer. In the same way, prohibit the tools production for the circumvention of anti-copying protection, and finally, define roles of each concerned actor in the copyright protection, notably Internet access provider (IAP). We'll call that "traditional regime" further on paper.
- 2- Think about a new copyright regime with radically different foundations. The traditional regime, founded on the preservation of exclusive access on works since the Bern Convention of 1887, would be unsuitable for today's technologies. Otherwise, this paper defends this approach and will suggest in the final section an alternative to the traditional regime.

The Analysis Model: Theory of Public Goods

When an intellectual work is pirated, some people take a benefit without any permission of the author, so he can't control the price of his or their discs that he just created, due to their incapacity to control access to their creation. The production of cultural content in music and movie producers provokes benefits in the population at large that are exterior to the legal distribution network. In economic language, we can describe this phenomenon like a positive externality (Cornes and Sandler, 1986 : 3). The theory of public good is incredibly appropriate for the analysis of our problematic. This model does the comparison between public good and private good by the distinction of two variables: the exclusion level and rivalry level of the good (Cornes and Sandler, 1986 : 6-8). Some researchers have already used this model for the analysis of information properties (Varian, 1998), within a premise that I consider misguided.

The exclusion variable concerns the capacity to exclude or not every person of the utilization of the good when they don't pay for their usage. A public good is free of exclusion. For example it's the case of public security services, as police or army, which their work is profitable necessarily for all the community, without capacity to exclude some individuals. It is recognized that exclusion is more likely a social choice than an inherent property of the good (Varian, 1998). Exclusion can be deliberately provoked by repressive measures institutionalized by the law or the technical devices' instauration for blocking access. However, this premise must be revised. I will support new technologies provoking constrain effects that limit the social choices possibility.

About the rivalry variable, a good is not considered rival when its utilization by one doesn't stop utilization by another one. To take up again the precedent example: The benefit that procure public security at one individual doesn't alter benefit gained at another one. It can be the same for musical work. The duplicated MP3 file utilization doesn't stop the original copy utilization by another one simultaneously. The diffusion of a

⁴ A copy of the decision is available online on United States District Court web site: Central District of California. [http://www.cacd.uscourts.gov/CACD/RecentPubOp.nsf/bb61c530eab0911c882567cf005ac6f9/e19d0bcc761118ad88256cb700708a1f/\\$FILE/CV01-08541SVW.pdf](http://www.cacd.uscourts.gov/CACD/RecentPubOp.nsf/bb61c530eab0911c882567cf005ac6f9/e19d0bcc761118ad88256cb700708a1f/$FILE/CV01-08541SVW.pdf)

intellectual work can benefit for everyone without altering their quality and that is particularly true for computerized files.

This paper defend musical, cinematographic, literary and software works that become public goods due to the evolution of information technologies.

Notice on “Information”

According to Chesterman and Libman (1988: 18-19) and Varian (1998), every audio, video, text and software documents are information. All are a symbolic sequence characters recognizable and interpretable by the person or the device that is addressed. It can be a phonographic sequence characters in a text printed on paper or a zero and one sequence recorded on a floppy disk. The problem we are confronted is format of non digital information can be converted for example by scanning pages of a book or by recording with an appropriate software a musical piece in MP3 format. Computers allow to convert in binary codification any format of information (text, picture, audio, video), this most often designated “multimedia”. It’s possible to pirate on Internet not only products that are already digitized, but also that can become digitized. That’s why our problem concern music and movie piracy that are actually the most pirated documents, but also every information, regardless of their format and their codification, that can be the effect of a work meriting remuneration.

It’s useful also to ask the question: “What is information?”. John Perry Barlow, founder of the *Electronic frontier foundation*, was attired the attention of the American public with the diffusion of his essay: “Selling Wine Without Bottles : The Economy of Mind on the Global Net”.⁵ In his manuscript, he defines information like an immaterial and intangible item due to the absence of visual representation and of tangible and personified incarnation. Whereas nothing are more mistaken. Information, always recorded on a physical support, present intrinsically material proprieties that are important to consider. Because of the unusual character of the problem, I consider that an unusual model of information for economists must be used.

Cybernetics, a general and interdisciplinary theory of information, offer a more appropriate view on information. Set up in the 1940’s with the researches of Norbert Wiener (1965) and his collaborators, cybernetics is still a frequently referred theory in many topics. According to this theory, information is essentially used to regulate actions of a device in the pursuit of a specific objective with a negative retroaction. This is right for the human as any machines, organic bodies and of course computers too. Information behaves like a rudder in a material process.

In this conception, a CD reading or other support is an act of production. In fact, the CD, containing information, pilots the computer or other sound device during that reading. During this process, the CD order which signals must be transmitted at which moment to the speakers. Modulations of surrounding air produced by speakers goes to our ears that they read it after that. It’s at this moment that the human can evaluate if the CD correspond with musical harmony searched and, if not, change the CD (the negative retroaction).

Most of economist pretend that the production of a good is executed with two factors of production: physical capital (equipment, machines...) and labor. However, cybernetics indicate they are wrong. Information constitutes a third factor of production perfectly distinct. It’s variation in quality and quantity has an impact on physical capital and labor performances.

⁵ www.eff.org/Misc/Publications/John_Perry_Barlow/idea_economy_article, « Selling Wine Without Bottles The Economy of Mind on the Global Net »

This conception is also implicating that economist are wrong on another point: a CD is not a finished good. It is more an intermediary good of production, like industrial machinery. Finished good is, in fact, the surrounding air modulation by speaker. This analysis of factors of production with cybernetics help to understanding that pirates are not only consummators, but also producer. We will return on this in conclusion. For a better understanding of the manner that information become a public good, we must measure his levels of exclusion and rivalry.

Exclusion and Rivalry Levels of Information in the History

The objective of this section is to show that the level of exclusion and rivalry have always decreased as the technology evolutes. Firstly, I notice on a fundamental question of this paper that tearing social sciences: Is the social values or the technologies used that determines the law regime? According to Marshall McLuhan (1993), “the medium, it’s the message”. This famous aphorism means that the largest social mutations are not caused by the content of transmitted information or ideas, but rather the vehicle by witch they are transported, so the technology. For example, the phone’s invention has permitted the messages transmission at the speed of electrical current, that, yesterday, took many days, sometimes many weeks with post office. This first form of instant messenger has transformed the activities of many social organizations. It’s the same for computers.

This section is talking about what we currently tell in French “technologies de l’information”. This French expression refers essentially to computerized equipment. But, in this paper, we will take this expression to designate all technologies that have a function of recording, processing and exploiting information (in the sense of cybernetics). For example, in case of long-playing vinyl record where information is stored and the record player that exploiting information. It’s also the case of a book where literary information is stored on paper, read by our own eyes and decoded by our brain.

Level of Exclusion

Manual Writing

In the medieval age, copying a manuscript was a fastidious task. It done with a pencil and took a lot of time. This activity was limited to restrained social groups, like the religious monk in medieval Europe. The problematic of non-authorized copying was not considered as a problem since the cost of reproduction (time and energy invested) was mainly in the writing of information and not in its conception. Consequently, we protected literary works not because they were imagined information, but because they were material goods intensively labored. For example, in medieval England, the laws concerning creative works protected them against the theft, but not against copying (Bonham-Carter, 1978 : 11). Each copy was extremely expensive. In microeconomics, we call this high variable cost (Côme, 1994 : 53). This is cost rapidly raise with each supplementary copy produced. Exclusion of information is so high due to the price to pay (see figure 2, column 1).

Automated Writing

The first form of automated writing, the printing, allow to duplicate large quantity of information with minimal variable costs. The design of works remains a long-term job which becomes accessible with automated copying. Yet, this copying initially requires the acquisition of expensive heavy equipments. In microeconomics, we call this high fixed cost (Côme, 1994 : 53). Therefore, the average cost for each copy is high when only a small quantity is produced, but becomes low while producing more. With large production, it becomes possible to sell pirated copies inexpensively. The level of exclusion, which applied by fixing the price of the copy, is low when a large quantity of unit is produced. In addition, due to the

need for selling them in the illegal market, a large distribution network must emerge (see figure 2, column 2).

In the second half of twenty century, new devices for duplication reduce considerably the fixed cost of piracy. The photocopier makes the books vulnerable. In commercial establishments and public institutions, they are accessible to the public at large, so this ones don't have to defray high fixed cost. Piracy become accessible to everybody and it cost ten cents for each piece of paper, sometimes less. Variable costs are so relatively low. Rather than to engage a fight counters the pirates by photocopy, the authorities of most countries chose the sale of licences to the owners of the photocopiers, which is a prelude to the solution defended in this paper.

Audio and video tape becomes the means of piracy of the electronic medias. In the beginning, during the sixties, audio tapes become the record support for most of music album, with the long-playing record (Chesterman et Libman : 37). Copying device was accessible, inexpensive and user friendly.

Thus, technologies of automated writing such as the photocopier and magnetic tape allow for most of people to produce copies with relatively low fixed and variable costs. Average cost for each copy is low for small or large quantity produced. However, this copying is done especially for personal needs or the needs of friends or parents in our social environment. This is why the scale of distribution is small (see figure 2, column 3).

I must notice that organization specialized in piracy can also use these low fixed cost devices for a large scale production. Due to the specialization of this use (these devices cannot really serve personal needs during specialized piracy), there is a need for making profitable the fixed costs. Devices, not used for other legal personal activities like simply playing a movie, constitute a wider investment. This is why specialized organization fit more as column 2 than column 3 in figure 2.

The Computer and the Peer-to-Peer

Data processing distinct from preceding technologies due to a largely higher level of automation. Here, it is not only the production of the copies which is automated, but also the distribution.

The fixed cost, the personal computer, can be considered low because this equipment also serves several other personal and professional needs. This cost is not defrayed exclusively for coping. Of course, variable cost is practically inexistent. We just have to check the available space in disk drive. So, quantity of copy produced can be small or large.

The Internet have great consequences on distribution. With old technologies (photocopier, tape recorder), domestic piracy are not systematically organized. They are organized only when individual A finds what he seeks in individual B possessions. This contact is often unexpected. No tool facilitates it. While with Internet and peer-to-peer networks, piracy is systematically organized. Individual A find what he seeks in individual B possessions without personal contact. Content will be pirated each time that a request appears. When searched content is located by individual A, it is downloadable with only some click. Any Net surfer can make this request and the holder of the original copy does not have to pose any gesture in the process. So, distribution can be small or large, adjusted to the demand. (see figure 2, column 4).

FIGURE 2

Comparison of exclusivity level in access of information according to technologies of information

	1	2	3	4
Technologies of information	Manual writing	Automated writing (specialized)	Automated writing	Computer and Internet
Fixed cost	Near nonexistent	High	Low	Low
Variable cost	High	Low	Low	Near nonexistent
Graphical representation of medium cost				
Scale of production	small	large	small or large	small or large
Scale of distribution		large	small	or
Exclusion type	<u>By price and By access</u>	<u>By price</u> for finance fixed cost	<u>By access</u> Due to a small scale distribution	None

While examining the last line of figure 2, we can realize that the level of exclusion have never been so low since the beginning of the technological history. It's become founded to worry in actual era where Internet connection in all homes is forecasted. In the actual copyright regime, characteristics of column 4 permit to predict more awful difficulties to cultural industries. Examination of rivalry level still confirms that computer and Internet have a liberation function of information.

Level of Rivalry

There are no rivalry during the use of information as much as this one is reproducible without deterioration. It's the case of computerized files. Copies are always perfectly identical to the original one. But for other technologies, the copy of a copy is never the perfect clone of the original and have worse quality (Pépin, 2002 : 7). The original document is so preferred, but cannot be owned by everybody.

In addition, storage of information in old technologies become depreciate with the use and time. For example, the photocopier that use a storage supported on paper is easily degradable with manipulations, humidity, daylight, etc. But, computerized files are immunized against these alterations. It is a significant characteristic because computerized coping is not discouraged when we reproduce a copy of a copy. The person who downloading can in his turn become a producer of the same information. The number of document ready for piracy can only raising.

All things considered, a link appear obvious between the technological evolution and the intrinsic attributes of information (exclusion and rivalry) exposed on figure 3.

FIGURE 3

Technologies and their effects on characteristics of information

Technologies of information	Exclusion by price	Exclusion by access	Rivalry for quality
Manual writing	✓	✓	✓
Automated writing (specialized)	✓	none	✓
Automated writing	none	✓	✓
Computer and Internet	none	none	none

Attempts for Preservation of Traditional Regime

The traditional regime is founded since the XVIth century on the preservation of exclusive access of documents only to those which provide an adequate remuneration of it. This exclusion was in first technical due to difficulties occurred by fastidious manual writing. But this technical form of exclusion become out-of-date with the invention of printing. Consequently, a new form of exclusion emerged, institutionalized by the law and the repression. The printers was vigorously opposed against the institutional exclusion policy. However, the history is maybe repeated today. The IAP (Internet access providers) and peer-to-peer software creators are in the same situation as the printers of XVIth century. All they provide an access to information, all they makes their profits with them with the expense of authors and all they claim that any limitations to an access constitute a violation of freedom and an insidious control of information. For example, in the case of *Verizon Communications*, an IAP, they assert that the revealing of the individual identities to control the exchanges in network could constitute a first step towards an indiscreet control of the activities of the Net surfers by the IAP⁶. Them always as in XVI century, the public authorities attempt to preserve the exclusive character of the access to works. The historical parallel appears so striking.

Institutional Exclusion

Many legislative measures were adopted in various countries. In the United-States, The Information Infrastructure Task Force of federal government brings in 1995 its draft amendments to the laws. Quickly, a controversy emerge. Pamela Samuelson, professor at University of California and member of *School of Information Management and Systems*, denounces according to her expression the *maximalist agenda*, a schedule of the cultural industry that goal to control any aspect of a copyrighted work (Rosenberg, 1997 : 251-252). According to their opinion, this project of law eliminate the fair use doctrine. Also, the resale of an item would become illegal and the IAPs would be forced to engage a policemen role by deferring any infringements to the authorities and cutting access to the offenders. The project of law was finally rejected by the Congress under the pressure of IAPs and consumers associations.

⁶ « Internet/Musique-Verizon fait appel contre les labels », *Yahoo Canada*, nouvelles technologiques, 31 janvier 2003. <http://cf.news.yahoo.com/030131/3/8vh4.html>

« Verizon seeks delay on file-trader info », *ZdNet* revue, February 14th 2003. <http://zdnet.com.com/2100-1105-984573.html>

Another bill proposed in 1998, the Digital Millennium Copyright Act (DMCA), and finally adopted by the Congress, have been also severely critiqued. The production and the distribution of any tools being used mainly for the circumvention of anti-piracy devices is prohibited by the DMCA⁷. However, consumers associations and some university lecturer reproach him its too great restrictions on the fair use doctrine (Waelde, 2001). For example, the creators of DeCSS.exe, a software running on Linux exploitation system and which have for task to read DVDs, were prosecuted by eight movie studios and the judge was concluded that the DMCA was violated⁸.

Whereas, within the European Union, a debate occur on the level of protection to institute. A framework, *Proposal for a Directive on Copyright and Related rights in the Information Society*⁹, propose to stop the propagation of the tools that serve for circumvention of protection. There are mentioned that member states should:

« (...) provide adequate legal protection against the manufacture, import, distribution, sale, rental, advertisement for sale or rental, or possession for commercial purposes of devices, products or components or the provision of services which: a) are promoted, advertised or marketed for the purpose of circumvention of, or b) have only a limited commercially significant purpose or use other than to circumvent, or c) are primarily designed, produced, adapted or performed for the purpose of enabling or facilitating the circumvention of, any effective technological measures. » (cited in Waelde (2001) and Perchaud (2002 : 7))

The proposal principally target a production ceiling and distribution of circumvention instruments which would be more or less great regarding of possible legal usages.

Despite these legislative acts in various countries, the application of the law focus actually on easy targets, like the public institutions and the corporations where survey can be implemented. I must recall that with peer-to-peer networks, detection of illegal download is possible by forcing IAP to reveal its IP address (number identifying used computer), most often with a legal procedure (Biddle and al, 2002 : 7). Consequently, it is possible to prosecute the contraveners. But when there are a number of millions, this task become so hard. It's more effective to prosecute organizations, responsible of many peoples. In United-States, a sub-comity of House of Representatives requested a strengthening of sanctions against piracy in the universities, where piracy is often regarded as a minor offence in their disciplinary code.¹⁰ As well, the Recording Industry Association of America (RIAA), the Motion Picture Association of America (MPAA) and the International Federation of the Phonographic Industry (IFPI) have send, in February 2003, a booklet to hundreds of business that enjoined to inspect their local network and to erase the files illegally downloaded. The document also mentioned that in absence of cooperation, judiciary pursuits would be started¹¹. But, for individual pirating at home, no action of this kind that would be too intimidate is planed.

Authorities does will succeed in XXIth century what they carried out in XVIth century? The challenge is more hard today. In XVIth century, only specialized organization can produce large quantities of copies.

⁷ The relevant section of the law is available online : <http://www4.law.cornell.edu/uscode/17/1201.html>

⁸ « Congress asked to dilute copy lock laws », *ZdNet* revue, October 4th 2002. <http://zdnet.com.com/2100-1106-960731.html>

⁹ A copy is available online : <http://europa.eu.int/comm/dg15/en/intprop/intprop/1100.htm>

¹⁰ US House of Representatives, Comity on the judiciary, Subcommity on Courts, the Internet, and Intellectual Property. <http://www.house.gov/judiciary/courts.htm> See topic of mars 26th 2003.

¹¹ « Labels turn up heat on corporations », *ZdNet* revue, February 14th 2003. <http://zdnet.com.com/2100-1105-984548.html>

There were easily detectable and not numerous, so there were simple to stop with police repression. In opposition, the piracy of XXIth century is produced in millions households. Modern piracy have nothing in common with piracy of old era and legislative solutions have not the same effectiveness. This is why during the History, more piracy is practiced without specialization in a large public, more institutional exclusion is substituted by technical exclusion, applied with devices protection.

Technical Exclusion

Since the beginning of the seventies, research has been started in the objective to introduce a signal in authorized copies. This signal would be too perceptible by copying devices. On this way, the copy produced would be imperfect and non-decodable. Also, the signal would must be imperceptible by the player devices. This signal of dissimulation, sometimes called spoiler, was on some applications a technical success, notably with video recorder, but there were difficult to commercialize due to consumers exigencies on device compatibility and pressures of competitors.

Moreover, the coming of the first generation of personal computers in the eighties gives place to a new field of exploitation for the pirates: the software. Immediately, technical devices were applied. For example, software are often programmed to require an input of information (regularly a serial number) contained in the instruction manual provided with the program. An incorrect answer causes the ending of the program. But, these information are easily communicable between pirates simply by noting the code in an attached document.

Another way is to conclude deals between computer manufacturers and software producers. They can sell to consumers a computer with some software included in the package deal. This is a good method notably for software that are necessarily for the computer operating, like Windows exploitation system, but is limited for few software.

The CD copy-prevention is another method, but very inefficient. There are registred with a track that trick players of computerized systems. However, one of this prevention devices is easy to circumvent by tracing a black circle with a felt around the disk, obstructing the security track¹². Also, the totality of those can be circumvent with an appropriate software (Halderman, 2002 : 9-10).

Some techniques have for pattern to verify the authenticity of authorized copy by online computerized procedures. The document, electronically locked, can be used only if required information is send by Internet to the right holder server. These procedures were often abandoned due to the annoyance of consumers and the pressure of competitors (OECD, 1996 : 7-8). They create also some trepidation about the protection of privacy considering the personal data collected. Another lock category have for design an non-erasable identification code recorded on any digital copies. These copies would be decodable only by a disk drive specially created for recognition of these codes (OECD, 1996 : 22-23). A technology like this, commercialized under the name of DataPlay, was announced in October 2002 and should invade the markets of music before long¹³.

On another way, five large societies specialized in copyright management working on what they call the "Fast Track" project. The objective is to construct an international networked database that will survey the digital works on Internet (Lardant 2001, OCDE 1996 : 17, Lorot 2001 : 34-35). With a "Common Information System", each works would be marked with a code that identify the type of work, the author, but also the location of its purchaser and his use on Internet with a search engine that locating and

¹² « Trait de crayon, trait de génie », *Le Soleil*, p C1, 27 mai 2002.

¹³ « L'industrie du disque veut changer de CD », *Le Soleil*, p C1, octobre 2002.

analyzing the diffusions and downloads. Though, protection of privacy would constitute a agonized issue and is not pragmatist to tracking down in justice court a large number of offender.

So, we see that public authorities and associations have deployed and will still deploy many legislative and technical means to preserve the exclusive access to works. We can interrogate ourselves on the situation which will result from these means. On the future of the traditional regime, there are the optimists and, of course, the least optimists.

An Alternative to the Traditional Regime

The battle for survival of the traditional regime will maybe not successful. At least, there outcome stay unsure due for tree reasons:

1- Pirates Prepare Adaptation With Obstacles Set Up

Right holders and pirates would develop each one in its turn new techniques that adapting to the technological development of the adversary. Standardization of anti-pirate protection become so impossible. We seen in precedent section that anti-pirate solutions apply to computers have almost all a technical fail or a social inconvenient. Some devices, of which the use is supposed to remain permanent, are easily circumvented. It's the case of CD copy-prevention which was used in particular with one of last albums of Céline Dion, *A New Day Has Come*.

John Halderman (2002), researcher in the department of computer science at University of Princeton, have investigated on the efficiency of this device. On this topic, he wrote:

« The concept of CD copy-prevention is fundamentally misguided. It is based on the false premise that specific deviations within the framework of a standard data format could result in lasting incompatibility. Yet hardware and software adaptation is an inevitable and natural extension of improved design and bug fixing. These ill-conceived schemes will amount to little more than a temporary speed bump for copyright infringement and promise to further alienate customer from the record industry. » (Halderman, 2002: 10)

An obstacle set up cannot really stopping in any circumstances the access to information. As long as information is recorded on a disc, it's always possible to adjust reader devices if necessary.

Therefore, a conceivable solution would be to filter the peer-to-peer networks, like Napster had to make after a court ordinance in the objective to stop unauthorized file downloads, but now there is no central server contributing to this task. An American business, Audible Magic¹⁴, undertook to achieve this technological challenge. However, a second problem could occur due to the advent of sharing software that proceed by codification of data and, on this way, making obscure the identity of the counterfeiters and the nature of the files exchanged. Some software like Freenet and Mnemosyne, that will probably succeed the actual peer-to-peer, try to preserve anonymity with a pathway download that bypass towards other user terminals and apply mechanisms of migration files to other Net surfers. Lawyers task would be more complicated (Biddle and al, 2002 : 7). In the eventuality (improbable, I would say) where mass distribution would become difficult to practice with these sharing software, we could consequently assist at the emergence of a multitude of small networks built around the social background of each individual and operates by chat software or instant messenger. Certain Net surfers taking part in more than one network would play a role of connection between them what would more propagate the diffusion of the pirated documents. This pattern would be effective for the most popular titles (Biddle and al, 2002 : 9-10).

¹⁴ www.audiblemagic.com

For the authorized works recorded with a digital “fingerprinting” (a singular inscription associated to the user identity scripted during the purchase at the shop), an experimented user could purchase a some quantity of copies and determine the similar data and those dissimilar. On this way, the fingerprint can be determined and could be erased or altered (Biddle and al, 2002 : 14).

All this examples do not draw up an exhaustive list of obstacles against the pirates, but they are excellent examples of techniques for which required many resources are allocated for their conception and which does fail their objectives due to pirate’s adaptation capabilities and the evolution of their factors of production. For this purpose, some programmers of the Microsoft corporation wrote in a framework: “*The legal future of darknet-technologies is less certain, but we believe that, at least for some classes of user, and possibly for the population at large, efficient darknets will exist.*” (Biddle and al, 2002: 14) Evenly at Microsoft, experts believe that “darknets”, underground download networks, have high likelihood to survive.

2- Expensive Solutions for Users

Some technical devices truly effectives would require on behalf of the user some expenditures for additional equipments in which he would not see any advantage. Some disk drives were deseigned especially to stop the access to information obtained illegally. Information producers envisage a codification of their products before distributing them in market. Only an equipment installed in a computer system, specifically designed to decode these information with a particular algorithm can read files.

However, all solutions requiring supplementary equipment for the user are risking a commercial flop. In fact, some devices like that marketed in the past were not very purchased. Impossibility of making backup copies or the occupation of a supplementary computer port make users frustrated and provoke more disagreement to them than pirates (Perchaud, 2002 : 4-5). Considering also the cost of the disk drive, products of competitors which does not require this device are inevitably preferred. Probably that only the constraint of a law would help this device on the market, but all the problems would not resolved. This type of device permit a restrictive usage of information and risk to be rejected by the society at large.

3- A Difficult Social Acceptability

More effective devices imply the dump by the user of some rights which he already possess on his copies. In addition, some anti-pirates solutions provoke controversy on the protection of privacy due to the accumulation of data on users that they imply. So, we must reflect on the propensity of our society to accept the reshaping of copyrights to the advantage of rights holders and to the disadvantage of users. Other techniques, like locking by codification see previously, or CD copy-prevention (their technical fail are not their only inconvenient) can also be controversial. These anti-pirates techniques imply the abandon by the public at large some rights that he already possess with actual hardware. For example, we all have the right to make copies for own personal uses. Copies can serve for the security of data, for the loading of music to a removable MP3 player or for the production of a personal mix (Halderman, 2002 : 1). These rights could be threatened by anti-pirate techniques previously mentioned. These techniques can also makes impossible the resale or the lending of a work (Rosenberg, 1997 : 251-252). The copying of works that entered in the public domain, which copyrights are expired or which are produced by a public service, could also become impossible (Waelde, 2001). The *fair use*, an American concept that have jurisprudential origins, constitute a package of exemptions to the exclusivity of exploitation right that considering the nature of the work, the objective of the reproduction, the importance of the portion reproduced and their effect on the potential market of the original work (Pépin, 2002 : 3). Concepts relatively comparable existing also in Canada and Europe and all are threatened.

The nature of rights lost by the new anti-pirates techniques would depend on the level of legal protection applied. According to Waelde (2001), three standards of protection, unequal in intensity, are envisaged by public authorities of various countries:

- 1- The first standard, the least severe, want to make out of law any person who circumvent the protection by copying and giving access to the work at other people. However, copying and distribution of any works would be legal in some conditions, notably if it's in public sphere or if it's conform with fair use doctrine. In other words, the prohibition have for target specifically the piracy, not technologies allowing it.
- 2- The second standard want to make out of law any persons that circumvent the protection, regardless of motivations.
- 3- The last standard, the most severe, have for objective to make out of law not only the act of circumvention, but also the conception and the distribution of any technical instruments that have for utility, regardless of legal usage, to circumvent the protection.

User rights are lost in the second standard, but the third can as well prevent the use of some tools that have also legal utility. In the extreme, this juridical limitation could prohibit the famous "copy-paste" function programmed in a various corpus of software. This is why the third standard have never been adopted and applied like a universal panacea, but is notably employed to prohibit some tools having for only utility (or near) to circumvent anti-pirates devices.

In one hand, the newest technologies of information force to reshape the actual configuration of rights dispatched between right holders and users of works. On another hand, a social choice must be done. Our society have the choice to conserve the traditional regime with larger restrictions on use conditions of works, or to adopt a new regime which dump the principle of exclusive access. The status quo becomes impracticable due to the evolution of technologies.

The "Publicization" of Information

In the word "publicization", we must understand the opposite of "privatization". This section suggest the instauration of institutional mechanisms customized for non-exclusion and non-rivalry characteristics of information, without menacing the remuneration of authors. A frequently proposed solution of this kind is the payment of a license on equipments giving access to information and on storage disk (Pépin, 2002 : 25). In comparison, this so called "tax" is the method of remuneration for most of public goods in our society. To apply a regime of this kind to information is not really a new idea. For example, it's common since the eighties to compel any commercial business with photocopiers to pay an obligatory license (Hébert, 1987 : 1). The Western Germany have already instituted in 1965 a sell tax on video recorder (Chesterman et Libman, 1988 : 146-147). In exchange of this tax, the Net surfer would have the right to download any desired information.

The Advantages

The traditional regime have for objective to intentionally create rarity by reducing the access to works (Perchaud, 2002 : 8). With a regime of taxation, works have a greater utility in the society since their access is unlimited. The conditions are converged for benefiting the economies of scale at the maximum. These economies, maximized when we produce a large quantity of copies, is characteristic of this kind of goods with a high fixed cost at the conception (ex: produce a movie) and a low variable cost for the reproduction (ex: copy a DVD). In the taxation regime, no access restriction are introduced. So, no rarity is provoked. The duplicative nature of information, with a near inexistent cost, support McLuhan purpose: the wealth is created by the interchange of information (McLuhan : 109-110).

In addition, a remark must be considered about the increase in the availability of software. In some cases, more the number of user of the same software raise, more their utility increase. This phenomenon is explained by the fact that works compatible with the same software becomes more numerous and that it become possible to exchange a greater number of it. (Perchaud, 2002 : 8-9).

Other advantage concern the freedom of the users. In opposition of traditional regime, the taxation regime doesn't provokes any problems with the fair use and the friendly exchange. For those preoccupied by the control of artistic and intellectual works by consortiums, this regime also advantage the exchange of ideas and allow an unlimited access to information. This is conditions that guaranty a dynamic social live.

The Disadvantages

In first, the taxation regime force Net surfers to pay for remuneration of authors and for access to information despite the fact that access are unused. The opponents against this eventual politic, notably IAPs that could targeted by the taxation, would use certainly this argument and open the way to a social contestation. This is another element to consider in the social choice which we have to do about the regime of right.

The rest of disadvantages are not insurmountable. The collectivization of the intellectual property can induce some doubts on the integrity of the downloaded files. In fact, files broadcasted on peer-to-peer networks are sometimes infected by virus (Biddle and al, 2002). Other files can simply be edited (mix, amputation or other alterations) that can surprise the user. However, the technique of watermarking, initially created to protect the traditional regime, could be a solution. This technique have for objective, in addition to identifying the authors, to check the integrity of the work. For example, in a music file, some needless bits, notably which produce inaudible frequencies of ultrasonic sounds for human ear, are replaced by a particular signature decodable by an appropriate software (Dusollier, 1999 : 2 et 9-10). The reading of this signature with a mathematical algorithm can authenticate the content of the file (Information Infrastructure Task Force, 1995: 187).

Once the regime of taxation is already in place, we must to determine the method that we will use for the redistribution of amassed fee to the authors. Indeed, how to distribute funds? Do we must to adopt a regulation type like legal licenses used for radio-phonoc channels where a lump sum is paid for the exploitation of an entire catalogue? Or do we must elaborate a redistribution determined on the base of number of downloads in the network?

The payment of a lump sum for an access to an entire catalogue imply great disadvantages and this solution, normally applied for the radio, is probably not fitting with the Internet. At the opposite of the radio, peer-to-peer software allow to listen a selected musical piece in a selected moment with a downloaded information, which substitute entirely the purchase of a CD. We're talking absolutely about a personal possession. It would be more appropriate that the remuneration of authors is determined on the base of utility level for the public at large (Côme, 1994 : 36). In the opposite case, with an utilitarian perspective on the problem, we can say that the remuneration of catalogues don't allow an evaluation of the popularity of a work, could not support the attempts of authors to attract the public and could pay a cultural production for which broad audiences would grant little value to him.

However, in the eventuality where we achieve a measurement technique of the level of use of any works on Internet and remunerating authors on the base of this measurement, a problem would subsist. Such a method of payment would provoke a distortion in the demand of high quality products. Considering that tax payment gives access to all the products, everybody would take only the best. David Potter, creator of the game *flight simulator*, said on this purpose: "if you could photocopy cars, we'd all have Ferraris" (cited in Chesterman and Libman: 67). Consequently, the affectation of resources for the conception of

software and other products would not be determined by the budgetary constraint of the users (Perchaud, 2002 : 10). Each creators would affect a maximum level of resources to obtain best quality and to compete with the products of competition. In the case where we have a tax adjusted at production cost, some difficulties could emerge for users due to a high level of remuneration for top quality products. On the opposite situation, where tax stay at the same level independently of the cost production, financial risk could emerge due to the impossibility to adjust the unit price on the base of the production cost. In this case, the creators can get profits only if the number of users are sufficient and the economies of scale are enough. This element press me to recommend this method due to high capacity of economies of scale for this kind of product. But, in two cases, there are imperative to measure the demand for products.

Like it was mentioned above, some collective societies of authors are working on the construction of international databases (Lardant 2001, OCDE 1996 : 17, Lorot 2001 : 34-35) and on a common information system allowing to identify the nature of the works broadcasted on the Internet. With a search engine, it would be possible to detect and analyze the broadcasts and the downloads on the Net and, on this way, to inventory them. An American business, named BigChampagne¹⁵, is already specialized in a similar task. However, it don't use marked information by some digital signature. Using powerful search engine, this business measure two aspects of the peer-to-peer exchanges: the number of search for a title and the personal collection of musical files of Net surfers. It display also a billboard of the most researched titles on his web site. Without constituting exhaustive measures, these evaluations have enough credibility for disk producers that demand regularly to this business what are exchanged on the net. In addition, the watermarking could determine if the content of a file detected on the net was modified by the user (Dusollier, 1999 : 35-36). So, it would be possible to identify the original documents in circulation and those which were modified.

Conclusion

The status quo in the regime of right becomes impossible. The traditional regime, if we want that it survives, would require, because of nature of the technologies employed, some anti-pirate techniques that will restraint the rights of users. The disk drive with a decoder key which make impossible the reading of a disk on other disk drive is a excellent example, because it make also impossible the faire use and the lending of a work.

It's possible to choose a regime. But, newest technologies of information are forcing a reconfiguration of rights. Authors and users will cannot conserve the same rights.

So what is the best regime? From an utilitarian view, we must consider all costs and all benefits for the society at large. I must notice that is not completely guaranteed that it's possible to construct a permanently and full effective anti-pirate system. The attentive reader of this paper has could observe that the users of information are never designated as "consumers", but rather than "users". This designation is motivated by the fact that they not only consumes, but also produce information and they use them like a factor of production. They possess the tools necessary to understand, decode, edit, replicate and transmit information. The newest technologies of information give to users the capability to adapt their methods for new obstacles. The users are handyman after all. As long as information exists on a physical support, there are a risk of piracy. As a result, the traditional regime contain risks of high costs for society in the protection of exclusive access and can be technically impossible to apply. In addition, it prevents complete freedom of movement of information. In comparison, the regime of taxation present undeniable advantages. It doesn't require investment in a risked anti-pirate systems. As well, no restriction is instituted in the access to information and allow to copy works ad infinitum with near-inexistent costs, which makes it possible to benefit the maximum of the economies of scale inherent to the production of

¹⁵ <http://www.bigchampagne.com/>

the electronic works. The traditional and taxation regimes show completely inversed configurations. One is founded on the creation of a rarity, the other on the creation of an abundance.

The idea of a taxation regime, despite of its advantages, is not highly promoted actually by the political actors concerned. We can hope that collectives societies of authors and important distributors will become more receptive to the advantages of the taxation regime. In the probable eventuality where piracy will continues to increase and takes endemic proportions in next years, they will probably more attentive to more original possibilities than the protection of the exclusive access.

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