



Copyright in the networked world: the technology of enforcement

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Received 12 June 2008
Revised 14 June 2008
Accepted 15 June 2008

Abstract

Purpose – This column aims to examine the influence of technology on copyright infringement and looks at the contemporary technology race between tools for rights enforcement and tools for copying and sharing.

Design/methodology/approach – The method is fundamentally anthropological with strong consideration given to reports contemporary behaviors in law cases and news reports.

Findings – The findings suggest that rights-holder organizations like the Recording Industry Association of America are learning how to apply technology more effectively to their policing efforts. This could significantly alter the risk of infringement.

Originality/value – Technology has long been recognized as a key factor in enabling copyright infringement. Some new technologies attempt to restrict copying (e.g. Digital Rights Management software). Now internet software is being used systematically for discovery and policing.

Keywords Copyright law; Law enforcement, Communication technologies

Paper type General review

Introduction

Copyright infringement is a problem closely tied to technology. In most ways this is quite obvious. Since much of the copyright law was written with pre-digital technology in mind, artifacts of these assumptions continue in the law despite attempts to modernize it. This column looks particularly at the relationship between technology and copyright enforcement and begins with the three key technology factors that matter to rights holders who want to earn money from their creative works: copying technology, distribution technology, and sales technology.

In this paper, I make the distinction between “public” infringers who make works available to others, either for free or for profit, and “private” infringers who are making a personal copy. The copyright law in most countries allows copying for private use, which makes most private infringement legal. In any case, the economic consequences of public infringement are much greater and is the focus of this paper.

Copying technology

If the technology for making copies of a work requires expensive machines, large numbers of people, or financial resources beyond ordinary reach, then the infringement remains a relatively modest and manageable problem. Once the technology changes to



make copying trivially easy, as is true at present with digital materials, then the traditional limiting factors that previously made the law enforceable cease to be effective. Ease of copying is often seen as the main problem in allowing infringement, but it is really only one factor.

Distribution technology

Access technology has two parts: one is the simple distribution of a work; the other is the ability of those receiving the work to make use of it. Distribution matters for any form of public infringement that has an effect on the value of a work. Both rights holders and public infringers need a cost-effective mechanism for getting copies to the point of sale. If a mechanical distribution technology makes distance a factor in the price, then gaps in the distribution of legitimate copies may appear and markets may grow up where the legitimate product cannot (or for pricing reasons does not) fill the demand. If technology drops distribution costs to virtually nothing, then the market becomes effectively global. Access to the contents can be more complex. In pre-digital times, it often meant language, and infringement often had to do with unauthorized translations. Today access means software, network access, and server space.

Sales technology

The technology of sales determines how a rights holder or a profit-seeking public infringer can get money for a work. The technology can be a mechanical network of transfer payments from bookstores to publishers to authors. Within a common currency area it may function more smoothly than across currency boundaries, and across certain economic boundaries sale may not function at all – such as during the cold war. Digital sales mechanisms certainly exist in today's internet, but they have cumbersome aspects, often for security reasons, that make them less attractive for some potential buyers than in-store payment.

Pre-digital enforcement technology

The point of this section is to argue that commercially damaging infringement has tended to drop over time and reached an historic low in the early twentieth century because remunerative publishing costs more than any ordinary person could afford and the sales and distribution technology enabled easy discovery of any large-scale infringement.

Seventeenth and eighteenth centuries

In the early days of printing, the copying technology was not cheap, but relied on a relatively common machine that was fundamentally a modified wine press. Early printing prospered in part because these machines were within reach of a large number of moderately well-to-do businessmen. Since the distribution and sales technology tended to limit the effective market reach for print products, multiple printers in multiple markets could feed demand without necessarily taking sales from each other. As sales and distribution mechanisms improved, market overlap became a problem that governments tried to regulate via early copyright laws. The first such law, the Statute of Anne in England, did not exist until 1710.

Enforcement statistics from the eighteenth century can be found in the records of law cases, but any judgment about what percent of actual infringements these cases

represent is hard to form. Enforcement in a metropolitan area like London meant physically finding an infringing copy of a work in a bookstore or having a relationship with the bookstore owners that gave them some reasonable incentive to let the rights holder know about infringing copies. Since distribution of heavy paper books restricted the scope, and since sales took place almost exclusively through dealers and stores, infringing works could most easily be stopped at these points in so far as they could be intercepted at all. Infringement in the colonies or in other countries ran largely uncontrolled.

Nineteenth century

Enforcement became easier in some sense in the nineteenth century when publishing shifted to more of a factory-style process with expensive machines that produced thousands of copies forced smaller hand-operated presses out of the mainstream markets. The small publishers continued to work in small niche markets where the hand-crafted quality of the object mattered more than the cost or content. Of course hand-operated printing did not vanish quickly or uniformly, but the most serious form of infringement tended to come from competing factory-presses.

Improvements in transportation, both shipping and trains, made the distribution networks far broader, but sales stayed largely in the hands of bookstores. Book selling remained highly localized with small and generally privately owned shops. Training in recognizing infringing works did not exist. A book seller who wanted to report infringement could not necessarily distinguish a legitimate from an infringing copy. But with mass-market sales a publisher who suspected infringement could go from store to store looking for infringing copies within a metropolitan area, and the legitimate rights holder only needed to find one copy in order to bring a suit for legal redress. Copies not for sale could circulate more easily without interception, but the cost of printing remained high enough that free distribution rarely became a problem. The main infringement problems came from copies produced in other countries: the United States, for example, was a notorious infringer of British copyrights, which the US law failed to recognize.

Statistics on the number of infringing works might possibly be calculated by searching for authors whose works are known to have been pirated. A search for author like Charles Dickens, fiction only, and the years 1850-1900 in Worldcat showed 48 US publishers out of the first 100. This figure might overstate the problem, since some publishers could voluntarily have had licenses with Dickens, but clearly the degree of infringement was substantial enough to affect Dickens's income.

After the Berne Convention (1886)

The Berne Convention provided a mechanism for eliminating the protection that many major infringers took advantage of because of differences in national statutes. Not all countries signed immediately and the United States became a full member only in 1989. The general rule for the Berne convention is that a work with copyright protection in one member country receives full protection in other member countries, though only under local rules. This means, for example, that the US "fair use" (17 USC, 107) applies to all works with European Union (EU) copyright protection, even though no exact equivalent to the US fair use statute exists in the EU.

The Berne Convention symbolizes the increasing internationalization and organization within the book trade. Listings of books-in-print, reference numbers like the International Standard Book Number (ISBN) or International Standard Serial Number (ISSN), and shared cataloging data among libraries made it relatively easy to distinguish legitimate and illegitimate publishers of a standard commercial book or journal.

Bookstores also tended to consolidate. While independents remained strong, chain stores began to appear and a limited number of distributors served large markets. For most paper-based commercial works, the bookstore remained the most significant point of sale and bookstore owners if they chose could avoid selling pirated works relatively easily. Infringement did not cease, but it became less of a main street enterprise and generally less profitable.

Some typewritten copying took place and the duplicating technology of the early twentieth century enabled the distribution of a moderate number of typewritten copies, but the quality tended to be low. No one could mistake a mimeographed version of a Steinbeck novel for an original, and the time and energy needed to make a mimeograph could not compete economically with commercial printing.

For all practical purposes by the 1980s, commercial paper-based works had little effective competition from public infringers. This made the contrast with the digital era more striking.

Digital era enforcement technology

Four changes complicated copyright enforcement in the last 30 years. One was the expansion of multimedia sales directly to consumers. Another was the improvement in copying technology via new hardware and software, which resulted in a dramatic lowering of copying costs. A third was the ability to substitute virtually free digital for expensive physical distribution mechanisms. And a fourth was a radical expansion of potential points of sale to any household or business with an internet connection.

Text

The ability to copy text changed in the 1960s with the advent of the copy machine, but only for private copying. A photocopy was much easier to make than a mimeographed copy and looked better, but still did not compete commercially with the original. No special technology was needed to recognize a photocopy, and the scale of copying remained comparatively low until copying services appeared that mixed digital tools with conventional bound paper copies at a price that could undercut the increasingly high prices charged for text books.

Cases like “Princeton University Press vs Michigan Document Services” (US Circuit Court, 1996) showed how easily publishers could find the source of putative infringement. Copy shops operated then and now as open enterprises. Some shops are well known on American campuses for their failure to seek permissions. The secret that they are infringing is to some extent protected within the community because of a sense that publishers overcharge students for text books, but the fact remains that finding public infringers takes no more effort for a rights holder than a visit to half a dozen shops near major campuses and checking permissions records to find out whether the copying was authorized. It is interesting how rarely this occurs. Perhaps the amount of infringement is not worth the cost of enforcement.

Text scanning has become cheaper than photocopying. Students can buy a flatbed scanner for about \$100 and could scan any book or textbook and then send the page images to everyone they knew. So far this rarely happens. One factor that inhibits it is the unwillingness of many people to read works on contemporary computer screens. Another is the relative size of the image files. Neither is, however, a significant barrier. The scanners can also act in effect as private photocopy machines with the computer printing pages.

Infringements in commercial print publications tend now to be ones like the recent case of J.K. Rowling *v.* Steven Vander Ark, who created a “Harry Potter Lexicon”, which borrows heavily from her works but is not pure copying. (Associated Press, 2008) Discovery again was easy, since Vander Arc wants to sell his lexicon commercially and argues that it is a fair use of the Harry Potter texts.

Database collections of digital text have had more problems with infringement. JSTOR has had to institute technical measures to detect systematic downloading. Most of this appears (so far) to be private copying without a clear intent to resell the contents. The technology detects sequential downloading from a single internet address where the lag time is too short for humans to have read or even glanced at the texts. JSTOR is also involved with universities in the development of Shibboleth, a system that provides information about who is authorized to view an online resource. The advantage to rights holders is that it also provides specific identification, and thus offers an avenue for recourse in case of misuse.

Multimedia

The technology for capturing sound recordings improved significantly in the 1960s with the advent of cassette tapes and tape recorders. This made copying sound recordings or capturing broadcast sound simple enough for most people to do, if they wanted. The main drawback was the significant quality loss from analog copy to analog copy. This loss sufficed to make infringing copies less attractive in the commercial market, and music stores, like bookstores, avoided them. Illegal music could be bought on the street at a discount price, and these irregular sales were hard to discover. The size of street markets is hard to estimate, since they operate illegally, generally avoiding tax as well as copyright laws. The weakness of their distribution and sales mechanisms appears to have kept this form of infringement within bounds.

When the Sony Betamax video recorder came onto the market the broadcast industry grew worried and initiated a lawsuit to prevent further sales. This lawsuit was an important test of whether a technology could be banned because it could be used for an illegal purpose. Sony won (US Supreme Court, 1984). If video recorders had been banned, the same question could have arisen over computing technology.

Video-recording broadcasts had no obvious quality loss over what consumers received on their television screens and favorite programs or broadcast movies could be saved and watched over and over again. The videos could also be loaned to friends or sold. The latter happened relatively rarely, because video-to-video copying had a high quality loss rate. This put some limit on physical distribution. As video stores developed, they, like bookstores and music stores, functioned as an effective barrier against the sales of infringing works. The street market was again the chief competition.

No court case has yet arisen over TiVo and other devices that store broadcasts in digital formats on hard disks, though distributing these programs is easy. The issue

that has engaged industry attention is the digital copying of music from CDs and its distribution via server-based software. The Napster case was important for two reasons: one was that it shut down a major hub for infringing copies of commercial music; the other, and more important, was that the Napster software was not banned, only its illegal use. This follows the pattern set by the Sony Betamax decision.

From an industry viewpoint Napster was a frustrating victory. By the time of the victory, those wanting to share copies of commercial music had already started to shift from a centralized server to a distributed system that had no fixed organizational home and thus was harder to bring to court. The fact that the distribution is free further complicates the discovery process. Electronic payments have audit trails and even theoretically confidential payment methods like Pay Pal could presumably be required to provide information for a trial. The dynamic assignment of internet addresses also makes it harder (though by no means impossible) to find out who was using a particular IP address at a particular time.

Music is not the only multimedia product to be found in Kazaa and other Napster successor systems. Copies of new commercial movies also appear on these systems. Nine months ago I learned about a relatively high quality copy of a recent Masterpiece Theater version of Northanger Abby on a publicly available website and have been watching ever since to see how long it will remain undisturbed. It is still there. There are a number of ways that the producers could discover the copy and force the server owners to remove it, if they wished to bother. (I am not footnoting the location so as not to contribute to the infringement.)

Recent tactics

Recently the Recording Industry Association of America (RIAA) began using the same tools that let people find free (presumably infringing) copies of music and videos in the internet.

Here's how the process works: The RIAA maintains a list of songs whose distribution rights are owned by the RIAA's member organizations. It has given that list to Media Sentry, a company it hired to search for online pirates. That company runs copies of the LimeWire program and performs searches for those copyrighted song titles, one by one, to see if any are being offered by people whose computers are connected to the LimeWire network (Chronicle of Higher Education, 13 May 2008).

They can then send a Digital Millennium Copyright Act take-down notice to the institution running the server. This is swift, effective, and well within the spirit of the copyright act, whose enforcement provisions require some degree of effort and self-interest on the part of the rights holders.

An important feature of this approach is that it does not interfere with "fair use" provisions for legal private copying the way some forms of Digital Rights Management software can. It is also non-invasive and installs no secret programs like the infamous Sony rootkit that exposed Microsoft Windows machines to viruses (Halderman, 2006). It addresses only public infringement and, while unpopular on the US campuses, the tactic can hardly be called unfair, especially since it does not interdict deliberate sharing by less-well known musicians, who gain more in reputation through free sharing than they lose in sales. This tactic is an example of using the distribution technology of infringers to aid discovery.

Conclusion

The future of copyright enforcement will likely continue to be a function of technology. Public infringement that aims to make a profit, as did the US publishers in the nineteenth century, can relatively easily be discovered and controlled in a world where financial transactions are all recorded and routed through a few major institutions. Public infringement that purely seeks to share works strips away established control mechanisms at the point of sale, but may turn out to be controllable via the same mechanisms that allow outsiders to discover the copies.

Technology applications by infringers are unlikely to stop there. Open networks can be closed, in which case rights holders will need to find a (legal) means of entry. Sharing among a closed set of people also complicates the boundary between private and public infringement. It may not be in the interests of those who believe that private copying lies within fair use to encourage open abuses of closed networks. In any case the technology race between infringers and rights holders will continue to evolve and to provide interesting issues for columns like this.

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