THE FUTURE OF THE ENTERTAINMENT INDUSTRY

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<u>Introduction</u>

The movie and music industries continue to sell "products"[1] and are fighting piracy as hard as they can. The RIAA must have at first thought of itself as akin to the little Dutch boy with his finger in the dyke, believing that if it didn't stop the trickle of illegal online file sharing it would be destroyed.[2] But the story of the little Dutch boy was pure fantasy,[3] and so is any belief that the RIAA's current policy of suing its own customers[4] will be successful. It is impossible to stop the torrent that is BitTorrent.

The situation presents an important question: When most traditional forms of entertainment content can be easily stolen, will they still be produced? This author's hypothesis is that they will continue to be produced, but with smaller production and promotion budgets. The major players in the entertainment industry will instead shift their attention to interactive entertainments that cannot be so easily copied.

Systems for protecting content in digital formats are known as digital rights management (DRM) or technical protection measures (TPM). While these systems may become increasingly common in corporate and government environments where hardware and software requirements can be imposed on workers, they are not likely to dominate the consumer entertainment market.

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[1] Newer licenses don't claim the purchaser is getting a good at all, but is instead getting a service.

[2] Mary Elizabeth Mapes Dodge, <u>Hans Brinker or the Silver Skates</u>, 1865.

[3] See http://www.thehollandring.com/hans-brinker-story.shtml.

[4] See http://recordingindustryvspeople.blogspot.com/.

For traditional content (books, movies, and music), this author believes that all DRM systems are either able to be circumvented or too burdensome for legitimate users to become widespread in the traditional content market. For a low enough price, consumers will suffer through onerous DRM just as consumers today suffer through the onerous process of locating and downloading unlicensed music and movies. But the combination of high prices and onerous DRM will continue to drive more consumers to obtain the content they desire through illegal means (namely, peer-to-peer file sharing). Although some customers will continue to purchase content no matter how annoying DRM makes the experience, rightsholders will need to find a balance between price and convenience if they wish to stem the tide of unlicensed sharing of copyrighted content.

Because the revenue streams for music and movies (and, to a lesser extent, books) have been shrinking and will likely continue to do so, rightsholders will seek revenue from ancillary sources. For music, the most obvious ancillary source is live concerts. For some genres of movies, merchandising is an option.[5] For other content, advertising may be an option. Finally, as the costs of production go down, artists themselves (the real content creators) may abandon the traditional systems of book publishers, record labels, and movie studios and instead interact with their audiences directly. One option is to create works only *after* they are paid the money necessary to cover production costs. Another is releasing their works for free and asking for tips. Regardless of the exact method used, artists will be the first to find ways to migrate from an intellectual property regime based on copies of fixed works to systems based on membership in interactive services.

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[5] See Friedman note 119, pointing out that of the $12.4 billion in revenue made from the Star Wars films and merchandise up to 2005, $9 billion was from merchandise.
http://money.cnn.com/2005/03/31/news/newsmakers/starwars/index.htm

This paper will begin by explaining the current state of copyright and paracopyright legislation and litigation. It will then analyze the current state of piracy and anti-piracy technologies such as peer-to-peer file sharing, encryption, anonymous communication, watermarking, digital rights management technologies, automated monitoring of communications and personal computers, and some basic DRM-defeating strategies. It will end with a discussion of alternative business models and what legislative changes, if any are necessary to make them viable.

Technologies of Freedom[6]

All of the technologies relating to digital distribution and content protection are used for three purposes: content protection and monitoring (DRM), defeating DRM, and distribution/communication. Some technologies can be used for more than one purpose. For example, encryption is an important part of many DRM schemes, but it can also be used to distribute "cracked" copies of works (copies from which the DRM has been removed) anonymously.

An Analogy

Before delving into the technical details of Digital Rights Management systems, let's begin with a simple analogy: locks on doors. Although most locks can be easily defeated[7], we still use them. I believe the reason is that locks are not that inconvenient to use compared to the peace of mind they bring to the user. They also give notice to those who wish to enter but do not have a key. They say "If you don't have a key, you don't have permission to enter. If you do

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[6] Ithiel de Sola Poole, Technologies of Freedom (1983).

[7] The technique of "bumping" can be used by someone with no training to open most common locks in a matter of seconds. http://video.google.com/videoplay?docid=-5177213949300140850

enter by picking this lock, you're breaking the law." But if the door and/or lock are sufficiently

flimsy, people might think that it really isn't a crime to enter—for if the owner really wanted to

protect the contents, they'd do a better job of securing them.

Now imagine a locked door at your

employer's office.[8] The lock is meant to protect their

property, not yours. If you need to regularly go in to

the locked room and your employer has made the

process of unlocking the door tremendously difficult,

you are likely to just prop the door open. One

solution, used for exterior doors intended only to be

used in case of fire, is to include an alarm that goes

off whenever the door is opened.[9] This acts as a dis-

incentive to using the door improperly, but a dis-

incentive that is nowhere near as severe as the

consequence of not using the door in an actual emergency.

An invention with almost the opposite goal, of ensuring that someone *does* go through a

certain door, is the watchman clock.[10] These systems are used to ensure that security guards

actually make their rounds. The guards carry the watchman clock, which contains a special

keyhole that marks a paper tape with the date and time each time they are used, along with an

indicator of which key was used. The proprietor then installs a number of compatible keys

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[8] Source of image: http://www.foundmagazine.com/wordpress/lock_this_door.jpg.

[9] See, for example, http://www.homesecuritystore.com/detail_pages/STI6400.htm#a1

[10] See http://en.wikipedia.org/wiki/Patrol_clock. An example system is http://www.accutime.co.uk/nightporter.php

around their premises. The guard must "log" their presence at each location by inserting each key into the watchman clock as they make their patrol. If the security guard does not key in at each station, it is strong evidence that they were not actually doing their patrols and they will likely be fired.

These simple mechanical examples highlight three basic methods by which DRM systems affect their users: They can completely prevent users from taking certain actions (door locks), they can dissuade them from taking certain actions by alerting others when they do (emergency exit alarm), or they can force users to take certain actions by alerting others if they don't (watchman clock). But when the inconvenience of using such systems or the benefit of subverting these systems is high enough, they will be subverted. Robbers routinely pick locks to break into buildings. Security guards may be able to buy replacement keys, duplicate the existing keys, or pick the watchman lock. A simpler solution is to steal the keys and blame the disappearance on vandals.

DRM

Digital Rights Management (DRM), also known as Technical Protection Measures (TPMs), promises security to content owners while still giving immediate gratification to consumers in the form of "protected" files. Although not specifically listed as an exclusive right in the copyright law, copyright holders are free to employ such technological means to protect their rights. This practice is referred to as 'self-help' because it does not need government enforcement as is the case with copyright and contracts.

Although rightsholders use DRM in an attempt to secure their products from unlicensed copying, these protections also limit the usefulness of their products for the licensed users. Two common examples of this are copy-protected audio CDs that do not play in some devices

(usually computers), and copy-protected downloadable music that will only play on a single computer. If the uses that owners of CDs have traditionally enjoyed are restricted, they will not be happy about it.

The above examples are side-effects of DRM. The basic purpose of DRM is to ensure that only authorized users have access to the content, and that only authorized uses are made of the content. Verifying the identity of the individual every time a different media file is played would be annoying, so devices are used as proxies—once a device is verified as being owned by a verified user, only the identify of the device needs to be verified each time a file is played. And the identity of a device can be easily verified without user intervention. In the DRM context, "device" refers to software as well as hardware. DRM system designers use proprietary file formats and reveal how to use them only to software companies who agree to limit the functionality of their software as directed by the DRM system designers. These limitations can include limitations on the number of times that a file can be played, limitations on the number of devices the file can be played on, forcibly displaying advertising while a song is played, prohibiting copying text from an electronic book, prohibiting users from taking screenshots of frames from movies, and still others. While the DRM system designers decide what limitations will be possible, which limitations apply to a particular file are usually specified in the file itself. These limitations sometimes have nothing to do with protecting files from unlicensed copying. One example that many people may be familiar with is how some DVDs prohibit users from fast-forwarding through trailers and FBI warnings at the beginning of the disc.[11] This is why some call products that include DRM "defective by design."[12]

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[11] http://en.wikipedia.org/wiki/User_operation_prohibition

[12] http://defectivebydesign.org/about

Knowing that hackers may be able to "crack" some encryption keys, the latest DRM systems allow the keys associated with certain media, software, or hardware to be revoked. This is accomplished by requiring all playback devices to "phone home" for updates and/or distributing the latest list of revoked keys with new media. Because content can contain hundreds or thousands of keys, if a particular playback device is compromised, a software update (possibly included with the content) can have it simply switch to a different (uncompromised) key. If a particular playback device (hardware or software) is compromised and not updated, it may be able to continue to play existing works, but it likely will be unable to play works produced after the compromise is realized.

To use the earlier analogy of locks, think of your computer as a closet and each media file as a box. Unprotected files are in unlocked boxes and DRM-protected files are in magic locking boxes. These boxes are magic because although you can easily copy them, they automatically shut and re-lock themselves after each use. And although it's easy to copy the boxes, it's very difficult to copy the keys. The locked boxes aren't just locked with a single lock. Each is locked with hundreds of locks. You are given a single key for each box you obtain.

In addition to re-locking automatically, these magic boxes are in constant communication with their owners (which is definitely not you). If the owners discover that you've somehow duplicated a key, they can remotely disable the compromised lock. If you ask nicely, they can send you a new key to one of the other locks on the box. This allows you continued access to the contents of the box, without the owners having to send you a whole new box.

Here in the real world, our magic boxes (computers) really can stay in constant communication with content owners. Subscription-based music services allow users to download an unlimited amount of "tethered" music, but if your magic box doesn't "phone home" at least

once a month, the locks are automatically disabled and all your downloaded music becomes a bunch of useless files. Consumer electronics like HD-DVD players, which aren't connected to the Internet, may require a firmware upgrade, which can be installed from a disc either mailed to owners or downloaded from the Internet. What's really annoying for legitimate users about this process is that they must go through the trouble of updating their products when someone else hacks the system.[13]

The "phone home" functionality used to verify and update devices and files can also be used to keep tabs on what media a particular user listens to or watches, as well as exactly when and from what device they watch it.[14] Although not part of a DRM system, the TiVo digital video recorder reports so much information on users that the company was able to identify the baring of Janet Jackson's breast during the 2004 Super Bowl half-time show as the most re-watched moment in its three-year history of recording such data.[15] Although the transmittal of this information is done anonymously and with the prior consent of users, that is not always the case with other products.[16]

Defeating DRM

Technological protection measures last only until someone figures out a way to defeat them. In the case of music, the 'analog hole' allows these protections to be defeated quite easily: Simply connect the line-out from your computer to the line-in on a tape recorder, record the

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[13] http://www.engadget.com/2007/04/06/aacs-patch-for-windvd-hd-dvd-and-bd-players-update-or-never-wa/

[14] https://www.law.berkeley.edu/institutes/bclt/drm/papers/cohen-drmandprivacy-btlj2003.html, http://www.epic.org/privacy/drm/

[15] http://news.com.com/2100-1041_3-5152141.html

[16] http://web.archive.org/web/20060427035838/http://www.sysinternals.com/blog/2005/11/more-on-sony-dangerous-decloaking.html, http://en.wikipedia.org/wiki/2005_Sony_BMG_CD_copy_protection_scandal

music on cassette tape, and then reverse the connection and re-record from the cassette tape back to the computer. You can do the same with video content by using a VCR instead of a tape recorder. Although the analog hole method involves some loss of quality and a lot of effort, hackers have become expert at defeating DRM schemes directly.[17] Because DRM-protected files are stored on users' own computers, they can spend as much time as necessary attempting to defeat the DRM system. And although this process may be far beyond the capabilities of the average computer user, the DRM on a particular file only has to be defeated once. As will be more fully explained in a subsequent section, once the DRM is defeated, the unprotected file can be spread far and wide via peer-to-peer filesharing services.

<u>Watermarks and Fingerprints</u>

In an attempt to defeat the problem of the analog hole, some DRM systems use "watermarks" that survive the conversion from digital to analog and back again. These watermarks are not perceptible to the user while the content is played, but can be detected by software. Watermarks alone do not protect content. But if all player devices look for watermarks in unprotected files and refuse to play unprotected files containing watermarks, the analog hole can only be exploited by users with devices that do not include the watermark scanning functionality.

Watermarks may be effective with future releases, but they can't be used to protect content already released without watermarks. Digital fingerprints can solve this problem. To date, digital fingerprinting systems have only been deployed for audio files. Digital fingerprinting is the process of calculating a unique signature for a song based on its acoustics.

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[17] For example, the DRM in Windows Vista, which was developed over a period of years, was cracked within a week of the product's release. See http://www.boingboing.net/2007/01/29/vista_drm_cracked.html

The fingerprinting process can be done quickly by player devices, which could then compare the generated fingerprint with a list of fingerprints for copyrighted music.

Because legitimate purchasers of CDs have an implied (if not legal) right to "place-shift" their music onto their computers and/or portable music players, it is not clear what actions a player device should take when it finds a matching fingerprint. A much more effective solution that would also be less disruptive for users is to fingerprint and filter out identified protected content before it reaches the user. This can be done by Internet Service Providers (ISPs) and/or peer-to-peer file sharing software.

Distribution Technologies

Although DRM systems can impose other limitations, their primary purpose is to limit copying. While some users may want to defeat DRM so that they can "place-shift" content (e.g. place-shifting a DVD so that it can be played on an iPod), defeating DRM also allows the unprotected content to be shared with others. This is where distribution technologies fit in.

The simplest distribution technology is what's jokingly referred to as "Sneakernet."[18] The process is simple: Copy the data to be transferred to a portable media such as a floppy disk, CD-ROM, or USB flash drive and then physically deliver it to the intended recipient. From the perspective of a copyright criminal, sneakernets are ideal because there is almost zero risk of being caught (unless a friend rats you out to reduce their own sentence after they get caught).[19] There is even software to automatically copy the entire contents of an iPod.[20] With capacities of between 20 and 80 gigabytes, this is actually a very fast way to copy a lot of media. The

[18] http://en.wikipedia.org/wiki/Sneakernet

[19] http://crunchgear.com/2007/05/14/help-key-the-essential-guide-to-piracy/

[20] http://macs.about.com/od/ipod/a/copy_from_ipod.htm

downside of sneakernets is that because they are limited to people who already know each other and require physical transfer of the data, it can take a long time for content to propagate through the network and there is no system for maintaining an index of what content is available.

Sneakernets are based on two concepts: Physical transportation of media and an existing relationship between each set of two "nodes"—in this case, people. Each of these concepts is present in other pirate distribution systems. For examples of physical distribution systems involving no prior relationships, look no further than the local flea market, where you are likely to find someone selling bootleg DVDs and CDs. More examples can be found on Craigslist.com and other classifieds listings where people offer to sell "backups" of console games and movies in iPod format.

There are also "closed" online distribution networks that only allow access to known individuals. To ensure that the identities of everyone in the network can't be compromised by a single leak, some darknets have been designed so that each "node" (in this context, meaning both the user and their computer) anonymizes the information passed through it.[21] Such networks can maintain a dynamic index of the files available and can transmit those files across the Internet, but can do so while maintaining the anonymity of every node except the single "upstream" node that the current user is connected to. Ironically, although encryption technology is removed when DRM is circumvented, it is added back by anonymous darknets.

Both sneakernets and darknets are made possible by a technique known as peer-to-peer networking. Peer-to-peer networks are best defined by distinguishing them from client-server networks. In a client-server network, each node (in this context, a computer), is either a client or a server. In a typical office network, there may be a single server for tens or hundreds of clients.

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[21] See http://freenetproject.org, and http://freenetproject.org/papers/ddisrs.pdf in particular.

All communication is between the clients and the server; there is no direct communications between clients. For Client A to send a message to Client B, it would send the message to the server with the intended recipient marked as Client B. The server would then transmit the message to Client B. In client-server networks, if the server is unavailable, the network is useless.

Peer-to-peer networks don't identify nodes as either clients or servers; every node has both functions. In peer-to-peer networks used for file sharing, this usually means that what is downloaded is also shared for others to download. The peer-to-peer concept is not new and is not exclusive to file sharing. The Internet was based on it.[22] The biggest advantage of peer-to-peer networks is that they can scale. Considering the explosive growth of the Internet, this is a very good thing.

One possible way to eliminate darknets is to prohibit encrypted communications on the Internet (or only allow encryption with a government backdoor, the so-called "key escrow" model[23]) and actually monitor everyone's Internet traffic (which the government may already be doing with Eschelon[24] and Carnivore[25]) or require users to give rightsholders access to their hard drives. But few if any users will voluntarily opt-in to such restrictions.

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[22] http://en.wikipedia.org/wiki/Peer-to-peer

[23] See, for example, http://en.wikipedia.org/wiki/Clipper_chip

[24] http://en.wikipedia.org/wiki/ECHELON

[25] http://en.wikipedia.org/wiki/Carnivore_%28FBI%29

A Downhill Battle

Copyright has been described as a "delicate balance"[26] between the right of artists to profit from their work and the public's right to free expression. The founders, in drafting the Constitution, realized that "to promote progress in science and the useful arts" copyright protection should only apply for "limited times."[27] But digital technologies have upset that balance, in ways much greater than previous technologies like the photocopier.

Digital technologies allow virtually limitless copying and limitless distribution. When a work in digital form is copied, the copy is identical to the original. This means there is no "generational loss"—you can make a copy of a copy a thousand times and the final copy will still be exactly the same as the original. The Internet and peer-to-peer software make distribution of copies incredibly easy—and if necessary, anonymous.

To truly secure one's content, one must secure either the distribution network and/or the playback devices. ISPs are not likely to want to filter their networks as it requires additional resources and provides a less desirable product to their customers. But they may warm to the idea if the law was changed so that they received additional safe harbors from liability. Alternatively, current law could be interpreted so that failing to implement filtering would make ISPs liable for "contributory infringement" based on Grokster.[28] But these legal solutions fail to recognize the practical reality that such systems are easily bypassed by using encryption.[29]

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[26] David Nimmer, A Riff on Fair Use in the Digital Millennium Copyright Act, 148 U. PA. L. REV. 673 (2000).

[27] United States Constitution Article I, Section 8, Clause 8, known as the Copyright Clause.

[28] See http://www.freedom-to-tinker.com/?p=862

[29] *Id.*

Assuming the network can't be secured, the playback device must be secured. One attempt at securing playback devices has been the "Trusted Computing" initiative.[30] The idea is for operating system manufacturers, hardware manufacturers, and rightsholders to design a closed system that users are prevented from tampering with. It allows works to be locked to an individual computer, just as books were chained to the shelves in medieval libraries.[31] The "Trusted Computing" name is apropos because the goal is to make the computers trustworthy so that the trustworthiness of the users is irrelevant. But even when DRM is imposed at the hardware level, it has been circumvented. There have been so-called "mod chips" made for every current-generation video game console that circumvent their DRM systems meant to prevent the consoles from playing copied game discs.[32] One possible solution is to scan's users' hard drives for infringing software, but users are not likely to consent to such measures and installing such software without consent is a crime.[33]

The cross-industry coordination necessary for something like the Trusted Computing initiative is extremely difficult to accomplish. The Secure Digital Music Imitative was an imitative similar to Trusted Computing that dissolved because the member companies could not settle their differences.[34] Consumers are also not likely to submit to such control. Witness the backlash at current DRM systems in evidence at websites like DefectiveByDesign.org, DownhillBattle.org, to name but a few.

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[30] http://en.wikipedia.org/wiki/Trusted_computing

[31] Henry Petroski, The Book on the Bookshelf, Vintage (2000). http://www.amazon.com/Book-Bookshelf-Henry-Petroski/dp/0375706399

[32] See http://en.wikipedia.org/wiki/Mod_chip

[33] http://www.internetnews.com/bus-news/article.php/3656911

[34] http://en.wikipedia.org/wiki/SDMI

Even assuming the content and consumer electronics industries can agree on a single

DRM system to be implemented in all products, they couldn't *force* manufacturers to use the

system, as doing so would be an antitrust violation. In order to encourage manufacturers to use

the system, licensing fees would have to be low. Another option is to have Congress mandate use

of the technology. Congress is usually against mandating specific technologies, but the FCC did

try mandating a "broadcast flag" for High-Def television and a proprietary format for HD radio

that requires radio stations and device manufacturers to pay royalties to a single company.[35] If

such a requirement was imposed, it is not certain that users would upgrade. As the inconvenience

factor of using DRM increases, the number of consumers willing to put up with that

inconvenience will go down. And as the implementation costs for manufacturers increase, those

costs will be passed on to consumers in the form of higher prices.

The only way to get consumers to willingly migrate to a new product, or to give up rights

they already have (or perceive they have) is to give them something they want and cannot get

any other way. There have been over a million songs downloaded from Apple's iTunes music

service, and yet these songs can be played on only one type of portable device—the Apple iPod.

This suggests that limiting one's freedom to choose from competing portable music devices isn't

a problem if you offer compelling content at a competitive price. But if consumers can access the

same content for free and in unprotected format from illegal peer-to-peer networks, the cost (and

by "cost" the author is referring to both the price and the inconvenience factor of the included

DRM) for legal content will need to be low. This isn't necessarily a bad thing for consumers, but

it will eventually force the music and movie industries to find other revenue models that don't

involve fixed unchanging works that can be easily copied and distributed. Even with a

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[35] http://en.wikipedia.org/wiki/Hd_radio#Overview

Congressional requirement to include some new DRM system in all new computers and consumer electronics, it could take a long time for consumers to migrate to the new platform. In the meantime, rightsholders will likely release their works in current (and relatively unprotected) formats.

The End is Near

Considering that there is increasing broadband penetration and increasing broadband speed, the threat of peer-to-peer distribution of unlicensed content will only increase. And despite the many lawsuits against file sharers, the practice actually *doubled* from 2005 to 2006.[36] Against this backdrop, it's no wonder the movies and music industries are panicking. Their current business model is based mostly on the distribution of fixed, unchanging works that are already in digital format. CDs have no copy protection and the copy protection in DVDs is very easy to crack. There has even been commercial software that would do it for you (though it is no longer sold).[37] And yet there is conflicting data on whether the decline in CD sales in the past few years is due to illegal file sharing.

Although there are two new media formats (HD-DVD and Blu-Ray) intended to replace the DVD, both of which contain much more robust DRM systems, both have already been cracked[38] (at least to limited extents) and consumer demand for these new formats is very low.[39] There have been successors to the CD-Audio format for music for years, but consumers are again uninterested. If the High-Definition television conversion process is any indicator, it may take

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[36] http://www.vnunet.com/vnunet/news/2173629/movie-pirating-popular-ever

[37] http://www.wired.com/entertainment/music/news/2004/08/64453

[38] http://www.engadget.com/2007/04/10/aacs-hacked-to-expose-volume-id-windvd-patch-irrelevant/

[39] http://www.highdefdigest.com/news/show/564

decades for consumers to voluntarily switch from CDs and DVDs to next-generation media formats that provide at least decent DRM protection. And if only the media is secured, the analog hole exploit can still be used.

Alternative Business Models

There are plenty of business models not based on selling pre-packaged physical media containing a static copy of a DRM-protected digital work. This section discusses a few of them.

Sell It DRM Free

Although digital distribution of content doesn't require the use of DRM, many rightsholders believe that if they offer their content for sale in unprotected formats their users will suddenly become copyright criminals. But the market for books and magazines survived the introduction of the photocopier, the movie industry survived the introduction of the VCR (and in fact benefited from it), and the music industry survived the introduction of cassette recorders, DAT and MiniDisc, and MP3s. Audio CDs *usually* do not include DRM, and the DRM included on most DVDs is trivial to circumvent. But these industries have survived.

In the past few weeks, the music industry has done an about-face on its DRM stance. The precursor was an open letter from Steve Jobs, CEO of Apple, in which he stated that Apple would embrace a DRM-free world "in a heartbeat" but the problem was that the Big Four music labels refuse to license their music without DRM.[40] Jobs went so far as to claim that "DRMs haven't worked, and may never work, to halt music piracy."[41] Less than two months later, Apple announced a deal with EMI (one of the Big Four music labels) to offer its entire digital repertoire in DRM-free (and higher-quality) versions for $1.29 per track, while continuing to offer DRM-

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[40] http://www.apple.com/hotnews/thoughtsonmusic/

[41] *Id*.

protected versions for the same 99¢.[42] All users who have previously purchased EMI songs can also upgrade for the 30¢ difference.[43] Microsoft's General Counsel responded soon after the Apple/EMI announcement stating that he believed the rightsholders "deserve the opportunity to make their own decisions about how they want to provide that content to the public," and that Microsoft is also interested in offering DRM-free versions of music on its online music store.[44] And just today (May 16), Amazon announced it will be launching a completely DRM-free online music store with music from over 12,000 record labels.[45] Apple is currently re-negotiating its contracts with the other major record labels, and is pushing hard to provide more DRM-free music.[46] A recent market research report described the situation as follows:

> Imposing stringent restrictions on how a consumer can use the digital products they purchase is not having the effect of securing revenue for the copyright holder, but pushing the consumer completely away. Restrictive DRM is keeping illegal file-sharing alive and well. The iTunes experience has shown the media sector that consumers are more than prepared to pay for online content. It is now time for media companies to show a little more trust in their customers and stop telling them what they cannot do, and begin listening to what their customers want to do.[47]

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[42] http://www.emigroup.com/Press/2007/press18.htm

[43] *Id.*

[44] http://www.macnewsworld.com/story/g0Kzn4x5S34rGI/MS-Exec-Apple-Shouldnt-Blame-Labels-for-DRM.xhtml

[45] http://biz.yahoo.com/bw/070516/20070516005337.html?.v=1

[46] http://biz.yahoo.com/ap/070506/apple_record_labels.html?.v=4

[47] http://www.emarketer.com/Article.aspx?1004765

The report went on to quote Steve Jobs as predicting that "well over half of the 5 million tracks offered on iTunes today will be also offered in DRM-free versions by the end of this calendar year."[48] The author of the report believes this means "the death of DRM is at hand."[49]

Even without DRM, digital distribution of content has some clear advantages for rightsholders over physical distribution. Because the physical costs associated with manufacturing and distributing CDs are the same whether a CD contains an entire album or a single song, the CD single market has all but disappeared. If the only purchase option for someone who wants a particular song is to buy the entire album on CD for $14.99, there are many people who won't buy the album. Online music stores like Apple's iTunes Music Store allow individual songs to be purchased for 99¢, which appeals to consumers who might not buy an entire album. And if these services adopted peer-to-peer distribution technologies, the major cost of an online store—the bandwidth—would be greatly decreased.[50]

Subscription Services

Files protected by DRM can "expire" after a certain event such as a set period of time or a certain number of "plays" of a song. For example, Microsoft's Zune portable music player allows any song to be shared wirelessly with other nearby Zune owners, but shared songs can only be played "three times in three days."[51] After that, the song must be purchased.

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[48] *Id.*

[49] *Id.*

[50] YouTube's monthly bandwidth bill is estimated to be $2 million. http://arstechnica.com/news.ars/post/20061003-7892.html. Some have suggested it would cost much less if the company developed a peer-to-peer client. http://networkblog.itproportal.com/?p=124.

[51] http://www.msnbc.msn.com/id/15669798/site/newsweek/page/3

This kind of flexibility allows works of intellectual property to be packaged as something other than fixed copies, which allows completely new pricing and usage structures. By using DRM, the downloaded content can simply expire (refuse to play) once the user is no longer a subscriber. Subscription-based online music services give users access to their entire library for a fixed monthly fee, but use DRM to cause the songs to expire after membership is cancelled. Compared to the cost of purchasing each desired song for 99¢ each (as with Apple's iTunes music store), being able to download and play millions of "tethered" songs for $14.99 a month (as with Rhapsody.com) may be a compromise many consumers are willing to make—especially if they can play the tethered files on the same devices (or at least types of devices) on which they can play unprotected songs. The subscription service model may benefit consumers in another way: If copyright holders can be reasonably assured they will obtain additional revenue by making out-of-print products available, without incurring the cost of producing physical goods which may not sell, consumers benefit by gaining access to that previously unavailable or hard-to-find content.

For these models to work, subscription-based online services need to some assurance that customers won't immediately download everything they desire and then cancel their membership. If we assume that users will eventually tire of their music library, no matter how large, then there will always be an incentive to re-subscribe. Some subscription services available today seem designed to make the process of downloading songs difficult so that users can't download too many songs at once. But if those users can more easily download songs from unlicensed peer-to-peer services, subscription-based services are shooting themselves in the foot. Even if the only way to defeat a DRM system is by using the analog hole, some users may still choose to re-subscribe only once every few months to update their libraries. But hopefully, many

more users will decide that it's worth keeping their membership active so they don't have to deal with the time and trouble of circumventing the DRM.

While there are some subscription services for movies, more common is a video-on-demand, pay-per-view, "virtual" rental model. DRM allows online video stores to virtually "rent" movies—where for a price ranging from $1.99 to $3.99 users can download a protected movie file that they can watch an unlimited number of times during a 24-hour period.[52] There are now at least five such services.[53] One market research company estimated consumer spending on online movie and TV show downloads was $111 million in 2006 and would increase to $4.1 billion by 2011.[54] In comparison, box office revenue was $9.49 billion in 2006.[55]

Webcasting

Broadcasting was based on the model of giving the content away to the viewers in exchange for the viewers watching the advertising. Advertisers would pay the broadcasters for advertising and the broadcasters would spend the money on building the broadcast network (studio/equipment, etc.) and content (paying the artists). The broadcasting model has gone stale because broadcasters decided they could increase their revenues if they bring the content in-house. The content they brought in-house catered to the least-common-denominator and audiences revolted and went looking for more appealing content elsewhere—on the Internet.

Broadcasters are finally realizing that their model still works, but they need appealing content. Furthermore, the traditional terrestrial broadcasting model of content tailored for the

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[52] The largest two online video rental services are CinemaNow.com and MovieLink.com.

[53] http://www.pcmag.com/print_article2/0,1217,a=202817,00.asp

[54] http://www.emarketer.com/Article.aspx?id=1004604

[55] http://mpaa.org/researchStatistics.asp

local market no longer works because audiences are too heterogeneous and their attentions are divided between a variety of media. Broadcasters with a national reach (cable and satellite TV channels and the national broadcast networks) may be able to survive this change, but because of the costs involved in running a single station/feed, it's difficult to diversify their offerings enough to appeal to the numerous niche interests of viewers.

Enter the Internet. The Internet allows broadcasters to provide a wide variety of content at low cost. On-demand programming is also more convenient for viewers. But there are two problems: Current broadband speeds limits the video quality and viewers would prefer to watch long-format content on a TV instead of a computer monitor. This has been characterized as the "lean forward" versus "lean back" phenomenon.[56] Users are usually sitting upright and leaning forward when using a computer. This position is not as relaxing as reclining on a couch, as is typically done when watching television.

The major broadcast networks are currently experimenting with streaming popular shows from their websites. One study found that a quarter of viewers of streaming or downloaded network TV video say they watch regular TV shows more often because of what they have seen on Internet video.[57] This suggests a win-win situation: broadcasters get increased advertising revenue and consumers get a legal alternative to unlicensed peer-to-peer networks.

There is another benefit to Webcasting: it is on-demand, providing additional convenience for viewers. Faced with the choice between buying an expensive DVR (Digital Video Recorder; TiVo, for example) that requires at least some technical abilities to install and program and simply watching shows online, the choice for most consumers is obvious—even if

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[56] http://www.rtnda.org/resources/intnews/artpc.htm

[57] http://www.emarketer.com/Article.aspx?1004638

the DVR allows skipping commercial and the online shows do not. Avoiding the DVR's ability to skip commercials is also a boon for rightsholders. And if customers are assured that the shows will remain available for an indefinite period, there will be little desire to circumvent any DRM used to prevent the webcasts from being saved.

In the music arena, instead of on-demand streaming (which may be part of some subscription services), there are customizable streaming services such as Pandora and Last.fm. These services don't give users the ability to pick the exact song they want to listen to, but instead provide a computer-programmed stream that is customized based on how the user rates the songs as they're played and/or based on a user-submitted list of artists they like. This provides a function somewhere between radio and a jukebox. For many, the problem with commercial radio is too many commercials and too small playlists.[58] Although the largest iPod model selling today can store 20,000 songs,[59] there is still a desire to hear something new. And while you can set an iPod on shuffle, it takes some effort to make a playlist with a few hours of music in the same style. Pandora allows users to rate songs as they listen. If a user doesn't like a song, one click will inform Pandora of your preference and automatically go to the next song. If you just don't want to hear the song for some other reason (i.e. you like it, but you've heard it a bit too many times recently), clicking another button will skip to the next song without indicating a preference. By comparing the preferences of all its users, Pandora can play music that you will probably like but may have never heard before. This kind of "crowdsourcing" has never been possible before.

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[58] http://futureofmusic.org/images/FMCradiostudy.pdf

[59] http://store.apple.com/1-800-MY-APPLE/WebObjects/AppleStore?family=iPod

<u>Buyshifting</u>

As more devices are introduced to connect computers to televisions (such as Apple TV[60]), the experiences will converge. Another convergence is happening between hours spent consuming ad-supported media and hours spent consuming media supported predominantly by consumer purchases, as shown in the figure below.[61] As further evidence, seven of the top 25 DVDs on Amazon are TV shows, and one in five DVDs rented on Netflix is a TV show.[62]
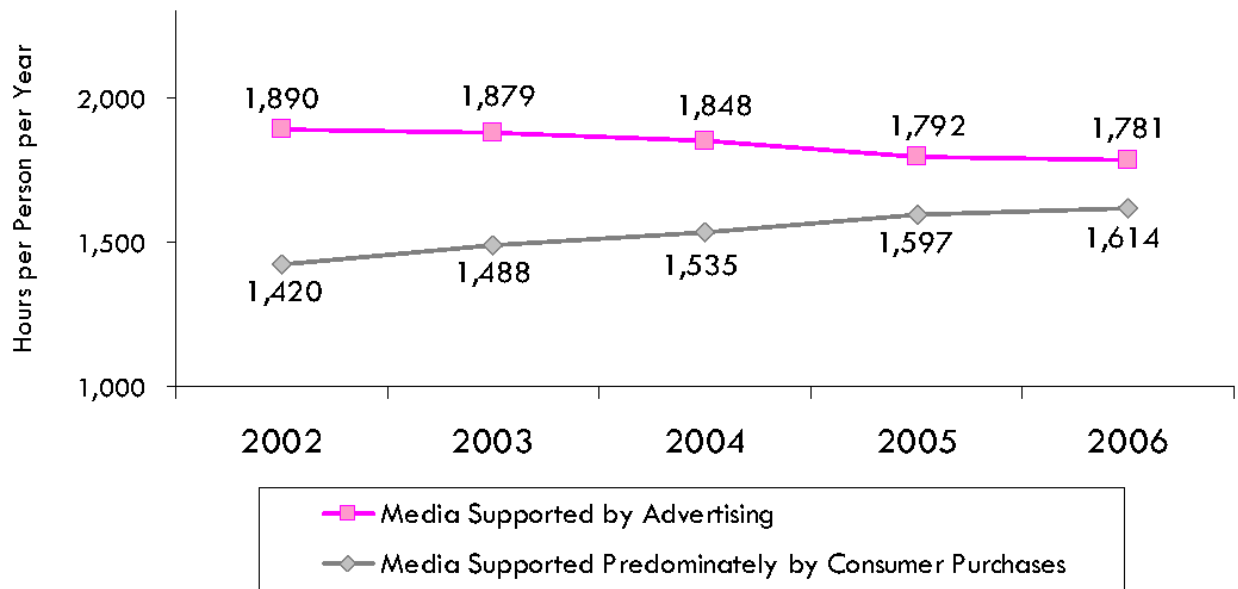
One industry expert has christened this phenomenon "buyshifting" and considers it similar to timeshifting and placeshifting.[63] Already, you can purchase and download video content from an X-Box 360, PlayStation 3, TiVo, some proprietary set-top boxes, some mobile phones, as well as from your computer. But if networks make TV shows available online for free, they are killing the market for buying those shows.

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[60] http://www.apple.com/appletv/

[61] http://mpaa.org/USEntertainmentIndustryMarketStats.pdf, page 50.

[62] http://www.engadget.com/2007/05/04/ins-and-outs-is-buyshifting-the-future-of-television-part-1/

[63] *Id.*

A quick review of the top 10 bestsellers in Amazon's TV DVDs category[64] shows that four are seasons of shows that aired more than five years ago ("The Simpsons," "Martin," "Frasier," and "Wings"). Three are different formats (DVD, HD-DVD, and Blu-ray) of a single show, "Planet Earth - The Complete BBC Series" (which was just aired on The Discovery Channel). There is also a spin-off exercise video for the TV show "Dancing With the Stars." The only recently-aired season (besides "Planet Earth") in the top 10 list is the fifth season of "Scrubs." The "Scrubs" season was also one of the few season compilations in the top 10 that included bonus materials. The others were "The Simpsons" and "Planet Earth." Although most of the shows had aired more than five years ago, these DVDs were just released or will be released soon (and presumably are in the top 10 because of advance sales). The Amazon data suggests people are more interested in buying old shows than new shows, and that bonus content is not a factor in the buying decision. The data for iTunes TV sales tells a different story. Both the top-selling episodes and seasons are all recently-aired. This may be due to Apple being unable to license some works. "Frasier" and "Wings" were completely unavailable.

It remains to be seen what motivates people to buy TV series or a la carte TV shows, whether on DV or in downloadable form. Some may buy because they want to watch the shows on portable devices and the process of converting a show from DVD or a DVR is too complicated. Others may buy the occasional episode if they miss it on broadcast TV. Still others may prefer buying entire seasons and watching them in long marathon sessions rather than suffer through a cliff-hanger every week when a show is first aired and innumerable commercials.

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[64] The list is updated every hour. It was last checked at 7:30pm on May 16, 2007. The list, in order is as follows: Planet Earth - The Complete BBC Series, Planet Earth - The Complete BBC Series [HD DVD], Scrubs - The Complete Fifth Season, Frasier - The Ninth Season, The Simpsons - The Complete Ninth Season (Collectible Lisa Head Pack), Dancing With the Stars - Cardio Dance, Planet Earth - The Complete BBC Series [Blu-ray], Martin - The Complete Second Season, Wings - The Fourth Season.

Finally, some may have decided to abandon the variety of cable television in favor of downloading only the shows that they really watch. What is interesting is that the top TV episodes on iTunes are all shows on broadcast networks, but three of the top 10 series are cable-only shows ("The Daily Show," "The Colbert Report," and "Weeds").

Give It Away

The opposite of buyshifting is giving the content away. This model differs from Webcasting in that the content can actually be downloaded to users' computers, may be more heavily laden with DRM, and users are usually encouraged to share the files with others. Because peer-to-peer networks virtually eliminate distribution costs, rightsholders can release free singles on the Internet to promote album sales. When given away for free, there is less incentive to circumvent DRM. The DRM could be used not to limit distribution, but to monitor it. For up-and-coming bands, determining where their fans are located could be invaluable for planning a tour. And statistics on the number of times their music is played or shared could convince labels to offer a record contract. Another option is something like the DRM system in Microsoft's Zune portable device, which allows users to wirelessly share songs with other nearby Zune owners. The shared songs can be used for only three days or three plays and provide links for purchasing the complete song or album. Similarly, some artists have released DRM-protected promotional tracks that "expire" once the album is released. If a user tries to play the song after it has expired, they will be presented instead with information on how to purchase the album--or just the one song.

While these techniques may work for promotional tracks, artists need to earn a living. DRM can do for music and video what banner ads have done for blogs—provide advertising revenue. DRM can be used to wrap a song or video clip with advertising that plays before and/or

after each time the clip is played. For music, ads can also be displayed while the song is playing. Again, although it may be possible to circumvent such DRM systems, consumers have accepted advertising-sponsored content on television and radio for decades.

This model can also be flipped around, with music (or other content) given away to build an audience for some other product. Interactive features that are currently ancillary to the primary product may become the primary product. In the music world, many bands have given up trying to profit from album sales and have instead focused on concert revenues. They welcome distribution of their recordings by fans as free advertising. As Jeff Rabhan, an artist manager, told The Wall Street Journal, "[CD] sales are so down and so off that, as a manager, I look at a CD as part of the marketing of an artist, more than as an income stream. It's the vehicle that drives the tour, the merchandise, building the brand, and that's it."[65] Brand-building may be the new thrust of the music industry. "The climate for marrying brands to musical artists has never been more favorable," said Paul Verna, senior analyst and author of an eMarketer report on the music industry.[66] Good thing, considering eMarketer projects that sales of CDs, which currently accounts for 55% of the music industry's total revenues, will fall to 29% of revenues by 2011.[67] But this loss will be more than offset by growth in online and mobile music, live concerts, and licensing of music for commercials, TV shows, films, video games, and public performances.[68]

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[65] http://www.emarketer.com/Article.aspx?1004862

[66] *Id.*

[67] *Id.*

[68] *Id.*

Although the movie industry was founded on box office sales, "secondary" revenue sources have actually been the greatest source of revenue for years.[69] In 2005, VHS and DVD consumer spending on home video rentals and purchases was almost three times spending at theater box offices.[70] And although a number of successful movies have been developed into unsuccessful video games, there is the occasional success story.[71] Other movie tie-ins such as toys can also be a lucrative revenue source. The total annual revenue for the video game industry surpassed that of the movie industry in 1999,[72] and the top-selling games earn a lot more than the top-selling movies.[73] Movies could do for video games what albums do for concerts—simply act as advertising. But tie-ins such as video games and toys are only appropriate for certain kinds of movies.

Crowdsourcing

Even if piracy results in decreased revenues, the Internet can help lower production costs and possibly increase total profits. Movies that don't lend themselves to tie-ins can benefit from another aspect of the digital revolution: crowdsourcing. Crowdsourcing is the process of outsourcing tasks to the masses, usually with little or no pay.[74] The Internet's low-cost communications functions can be used to raise capital, recruit talent, find shooting locations, and

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[69] Compare the annual consumer spending for movie sales and rentals at
http://www.entmerch.org/annual_reports.html with the box office gross on page 4 of
http://www.mpaa.org/USEntertainmentIndustryMarketStats.pdf.

[70] http://www.entmerch.org/annual_reports.html

[71] See http://www.fortheretarded.com/?p=135

[72] http://www.time.com/time/magazine/article/0,9171,1101040412-607837,00.html

[73] http://www.sfgate.com/cgi-bin/article.cgi?f=/chronicle/archive/2004/12/18/MNGUOAE36I1.DTL. World of
Warcraft generates about $900 million in revenue each year from subscription fees.
http://baris.typepad.com/venture_capitalist/2006/03/hollywood_vs_th.html. Another source estimates its over $1
billion. http://www.jivemagazine.com/article.php?pid=5197.

[74] http://en.wikipedia.org/wiki/Crowdsourcing

even come up with scripts. One excellent example is A Swarm of Angels: "A groundbreaking project to create a £1 million film and give it away to over 1 million people using the Internet and a global community of members."[75] The project is seeking small contributions from a large number of people who are then invited to participate in the production of the film by voting on the script, contributing materials, and even being part of the crew. The music world's simpler equivalent is musicians holding a "regular" job until they have received enough money (either in liquid form or as pledges) to afford to take time off to record a new album, which is then first distributed to the contributors, possibly as a special edition.

While the production costs for big "Hollywood" movies are increasing, the production costs for independent films are going down.[76] This is probably largely due to the plummeting costs for high-quality digital video cameras and editing equipment. The switch from celluloid to digital also means that producers don't need to worry about the expense of film stock.

Conclusion

Bruce Lehman, who helped draft the 1976 Copyright Act, chaired the National Information Infrastructure Task Force, and founded the International Intellectual Property Institute, recently commented that we are entering a "post-copyright" era for music, and that a new form of patronage will emerge with support coming from industries that require music (webcasters, satellite radio) and government funding.[77] The future of entertainment will not be about either/or decisions, it will be about following both paths simultaneously. Just as iTunes

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[75] http://www.aswarmofangels.com/

[76] Although the average negative cost (production costs, studio overhead, and captialized interest; doesn't include marketing costs) for films produced by MPAA member companies increased from $58.8 million in 2002 to $65.8 million in 2006, the average negative cost for films produced by MPAA subsidiaries and affiliates went from $34 million in 2002 to $30.7 in 2006. http://mpaa.org/USEntertainmentIndustryMarketStats.pdf, page 17.

[77] http://www.michaelgeist.ca/content/view/1826/125/

will soon offer EMI's catalog in both DRM-locked and DRM-free versions, other forms of content will likely be offered in multiple formats in the future. Concern that "the existence of multiple SKUs at digital retail [will] confuse and alienate consumers"[78] is unwarranted.

The real question is what will the majority position be. The next few months may set the stage for the next few decades. If consumers embrace EMI's DRM-free music and other record labels follow suit, strong DRM restrictions on online music sales will likely all but disappear. Of course, the DRM-free songs are also of higher quality, so it's not a perfect test case. But there are others. Microsoft just introduced its new Windows Vista operating system, which contains so many DRM protections that it has been described as "the longest suicide note in history."[79] And we have the format war between HD-DVD and Blu-Ray, both of which contain DRM that far exceeds that included in DVDs. Only time will tell if consumers will blindly accept these new limits on their abilities to adapt the content they purchase to fit their needs, whether by placeshifting, timeshifting, or something else. This author is guardedly optimistic.

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[78] http://www.emarketer.com/Article.aspx?1004765

[79] http://www.cs.auckland.ac.nz/~pgut001/pubs/vista_cost.html