Dan Tynan
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As we move to a world where all entertainment is delivered digitally, the battle over copyright protection is turning into a full-blown war. And consumer rights may end up being the biggest casualty as media companies hunker down and try to redefine what users can and can't do with the content they've paid for and the hardware they own.

From Apple's iTunes and Real Networks' Rhapsody music network to movie rental sites like CinemaNow and Starz' Vongo, legitimate digital media services are exploding. But each additional option brings a new battle, new restrictions, and even new dangers for unsuspecting users. Copy protection included in Sony BMG audio CDs allowed virus writers to co-opt the system and sneak onto users' PCs. Satellite and HD Radio, which promise higher-quality audio and more content, may become difficult for listeners to record if the music industry has its way. And TV fans are finding that cable stations are limiting their ability to time-shift shows; pending federal legislation may curtail their rights even more.

Worse, since we last looked at this battle in 2002, technology firms, which once struck a balance between the rights of content owners and the rights of users, have sided more and more with Hollywood as they strive to secure the content they believe will help sell their products.

We'll look at the multiple fronts of the digital wars--from file sharing to music to TV--and give you a hint of what's next.
COPYRIGHTS AND WRONGS

Peer-to-peer file sharing remains the bogeyman, driving entertainment companies toward ever-increasing control over content. Despite the U.S. Supreme Court decision holding Grokster liable for the actions of its copyright-defying users, and despite more than 13,000 lawsuits filed by the Recording Industry Association of America and the Motion Picture Association of America, file swapping is still growing. According to P-to-P research site Big Champagne, some 6.5 million U.S. users share files at any one time--up more than 30 percent from the year before.

Media companies have responded in two ways. Using their influence in Washington, D.C., they've pushed for laws friendlier to the rights of content owners. At the same time, Hollywood has threatened to withhold access to its libraries unless electronics manufacturers build devices with sufficient copy protection.

This is not the way the copyright process was supposed to work, according to Jessica Litman, author of Digital Copyright (Prometheus Books, 2001).

"Copyright law was intended to protect reading, viewing, and listening as much as creating and distributing," says Litman, a professor of copyright law at Wayne State University Law School. "Now it takes what people previously saw as their rights and treats them as loopholes the copyright owners will close, if they can."

Take books, for example. You can read a book anywhere you want, skip chapters at will, give the book away or sell it, quote portions of it on your blog, or scan it into your PC and print out a copy. And when the book eventually becomes part of the public domain, you can do anything you please with it--including printing copies and selling them at a profit.

Buy an electronic book, however, and your rights start to wither. You're now subject to the terms of an end-user license agreement. Depending on the EULA, you may be able to read the book on only a limited number of machines (usually just one), and you probably won't be allowed to sell it, lend it, or make backup copies.

As you move up the content spectrum to digital music, movies, radio, and TV, the rules can be just as restrictive.

"[Hollywood's] model is to make experiencing copyrighted material--reading a book, listening to music, or watching a movie--legally like going to a movie theater," Litman says. They want you to buy a ticket, watch ads, eat only their food, leave when they want you to, and pay for it all again each time you do it, she says.

Brad Hunt, senior vice president and chief technology officer for the MPAA, disagrees, arguing that content owners are seeking ways to offer users more options than they have with today's media. "Instead of saying 'here's the movie locked to a piece of plastic, take it or leave it,' content owners may make other rights available to you to do more with it," he explains.

MUSICAL Discord

The primary battleground for digital content has long been music. To combat widespread file swapping, the record industry has attempted both copy protection for
CDs—most notoriously in the form of Sony BMG's XCP rootkit (see "Copy Controls: How Far Will They Go?" for more)—and digital rights management schemes for online music. Each has made life more difficult for legal purchasers of music.

Usually, copy-protected CDs don't prevent you from making copies so much as they limit how many copies you can make and where you can make them. If you played a protected Sony CD on your PC, for example, you could rip three copies of the CD to your hard drive. If you then put this music into your Windows Media Player library, you could burn three other CDs. But Sony's XCP scheme prevented iPod fans from easily copying MP3s from the CD to their music libraries, though a workaround was available upon request.

Online music rules are even more complex. You can play music purchased from iTunes on up to five systems, for example, but if you want to add a sixth, you have to log on to one of the other machines and "de-authorize" it. You can burn a playlist to a CD, but no more than seven times. You can share tunes across five computers on a local network, but the other users can only listen to the music. Still more restrictive are the rules for iTunes' video downloads—there's no sharing at all.

Yet as DRM schemes go, iTunes' FairPlay system is fairly transparent, Jupiter senior analyst Joe Wilcox notes. "People know it's there only if they try to violate it," he says, adding that with Windows DRM, he's had problems with both legit music playback and the purchasing process.

Moreover, incompatible DRM schemes can lock users into a particular technology. If you purchase your music from iTunes, realistically you have two options: to buy iPods for the rest of your life—since iTunes music won't play on other players—or to ditch your library and start over. Players that support Windows Media Audio DRM are more plentiful, but similar restrictions apply to them.

Later this year, new DRM technologies may challenge the hegemony of FairPlay and WMA, says Bill Rosenblatt, president of GiantSteps Media Technology Strategies and editor of DRMwatch in New York. One approach, the Marlin DRM scheme, is based on personal identity: It would let you access content on a variety of portable devices according to who you are, not what device you're using. Another DRM platform, code-named Coral, would allow service providers to convert content from one DRM format to another, making it playable on a wider variety of devices. Both schemes are backed by two closely allied consortia whose members include 20th Century Fox, Hewlett-Packard, Philips, and Sony.

Navio, a small Silicon Valley startup, is taking yet another tack. Instead of buying digital files, users, in Navio's scheme, buy the rights to enjoy them. So when a user is at work but wants to hear a song that he downloaded at home, he can log in to Navio, which confirms that he has rights to the song and allows him to download or stream the song to a new device. Files can still use DRM technology to prevent unfettered file swapping, while consumers get many of the same freedoms they've grown used to with analog content.

"If the rights are properly defined and ubiquitous, they'll become more valuable to consumers than the actual files," says Navio CEO Stefan Roever. Then only people with no money and lots of time will fool around with file sharing, he adds.

Navio already enforces media rights for the Fox Sports and Fox Music Web sites, and at press time it was preparing to announce a deal with a major record label.
Meanwhile, another front is opening in the war over digital music: The RIAA is pushing for legislation that would prohibit listeners from recording or sharing individual songs broadcast via new digital radio services unless they paid a fee for each song. Nevertheless, the group favors being able to record digital radio in blocks of 30 minutes or longer.

"We support time-shifting," says RIAA spokesperson Jenni Engebretsen, but not "cherry-picking individual songs and storing them in a library on an MP3 player in a manner that substitutes for a sale."

According to Public Knowledge, a consumer rights group based in Washington, D.C., such rules would extinguish fair-use rights that listeners have enjoyed in the past--there are no such restrictions on the right to record personal copies of songs from traditional radio broadcasts.

DIGITAL TV BEHIND GATES

The battle over rights in the digital TV arena is already well under way. By March 1, 2007, according to Federal Communications Commission rules, all new TV devices (tuners, VCRs, DVRs, and set-top boxes) for sale in the United States must be capable of receiving digital TV signals. For the past few years, media conglomerates have been scrambling to keep their expensively produced, highly profitable digital content from drifting all over the Net. But the protections they've devised may keep viewers from doing things they are accustomed to doing--such as recording, time-shifting, and sharing shows.

In 2003, the FCC ruled that over-the-air digital TV shows must carry an 8-bit "flag" that broadcasters could use to limit how viewers recorded such programs; all TV gear would have had to recognize this flag. But last May, a federal court struck down the broadcast flag, ruling that the FCC had exceeded its authority. Flag supporters have tried to persuade Congress to authorize the flag; that has yet to happen.

The MPAA's Hunt says such controls are necessary. "If content owners have no assurance there will be some form of protection from redistributing digital TV, that high-value content normally provided to broadcasters would move into the pay-TV world," he says. That could mean networks like ABC and NBC might no longer get the rights to show Star Wars or Harry Potter movies, for example.

Meanwhile, TiVo owners recently got a taste of what life under such a flag might be like. Last September the popular DVR service changed how it responded to the Macrovision copy protection built into pay-per-view and video-on-demand content. For the first time, content owners could prevent viewers from recording PPV and VOD shows on a DVR. They could also require deletion of shows from the recorder after a certain period. TiVo already prevented viewers from burning protected content to DVDs or using the TiVoToGo service to transfer it to a PC.

Fred von Lohman, senior staff attorney for the Electronic Frontier Foundation in San Francisco, says that this change is a classic case of content owners taking away features consumers have paid for.

"Two years ago the TiVo you bought did one thing, and now suddenly it does something different," he says. "Despite the fact we're buying more media than ever before, products are treating us more and more like pirates each day."
But TiVo VP of product marketing Jim Denney says the changes have had little impact on the vast majority of TiVo users.

More restrictions may be on the way for home recording. At press time, sponsors had just introduced the Digital Content Security Act (HR 4569) in the House. This bill would close the "analog hole" by requiring devices that allow users to make digital copies from analog sources to employ copy protection technology. If the analog hole were closed, protected shows could carry signals that prevented them from being copied by any device at all, or could limit copies and prohibit them from being digitally redistributed, or could restrict viewers' time-shifting abilities to within 90 minutes after a broadcast.

Next-generation home recording via high-capacity blue-laser DVD technology promises a little more freedom but also additional restrictions. Both Blu-ray and HD DVD discs (the two major blue-laser DVD formats) will carry a digital watermark that will let players identify illegally copied discs and prevent playback of the content. Backers of both Blu-ray and HD DVD formats have announced their support for "mandatory managed copies," which will allow home users to make a single copy of their high-definition discs and share them across a home network--something that consumers can't legally do with today's commercial DVDs.

VISTA BLURS HIGH-DEF

If Microsoft has its way, your digital entertainment options will be served via a PC in your living room. To fully enjoy the benefits of digital content, however, you may have to buy new hardware.

When Windows Vista appears later this year, it will allow playback of HD video--but it may do so only if your monitor or TV supports Intel's High-bandwidth Digital Content Protection scheme. Without a DVI or HDMI port that handles HDCP, your aging 42-inch plasma set could display the film at lower DVD-quality resolution, or not play it at all (for details, see "Most Monitors Won't Play HD Video,"). The same will likely be true of Blu-ray and HD DVD recorders, though final specs of the content protection scheme for those two formats were not available at press time.

The Vista DRM scheme puts playback decisions in the hands of content providers. But showing the content at a lower resolution is more likely than shutting it off, says Marcus Matthias, a product manager in Microsoft's Digital Media Division. "Frankly, we'd have zero interest in doing all this if it wasn't something [that content owners that Microsoft partners with] were interested in having," he admits.

Although HDTVs sold today typically support digital copy protection via their HDMI ports, many older models do not. According to Rhoda Alexander, director of monitor research for market research firm iSuppli in San Jose, California, the percentage of HDCP-compatible computer monitors was "in the low single digits" when she surveyed the market in 2005.

HDCP will make it more difficult for consumers to share HD content--and will keep them from making legal "fair use" copies--by preventing the capture of HD programs by unlicensed devices. But like most DRM schemes, it's unlikely to stop determined pirates. In 2001 researchers at Carnegie Mellon University uncovered several flaws in the scheme, long before it was developed for commercial purposes. German electronics company Spatz is already selling devices that it claims convert HDCP signals for non-HDCP displays.
Olin Sibert, a longtime DRM developer, believes that Vista's DRM, while technologically impressive, is unlikely to be effective in the long run. "Content that can be experienced can also be copied. You can place obstacles in the way, but you can't ensure content will never be copied."

PLAYING FAIR

Only the most rabid BitTorrent users would want to live in a world where copyrights don't exist, but nobody wants one side to call all the shots either.

"Hollywood is speaking with one voice, holding the reins on the one thing everyone needs: content," says EFF's von Lohman. "In that kind of environment, consumers are going to get screwed."

But Microsoft's Matthias says that it's in everyone's best interest to find solutions that media firms and users can live with. "At the end of the day, if consumers don't see a value proposition for next-generation content, there are a lot of very big companies who've made some very big bets that aren't going to pan out," he notes.

As happened with the backlash against Sony BMG's copy protection technology, users must reject bad DRM schemes--not because they violate computer security, but because they punish the people who actually paid for the digital content, say consumer advocates.

"One approach [to piracy] is to make it as hard as possible to create and share illegal copies of digital content," writes Navio's Roever in his corporate blog. "Another is to make it as attractive and easy as possible to buy digital content. The more successful the industry becomes at achieving the latter, the less it will need to rely on the former."

DIGITAL MEDIA FAQ

MUSIC

How do I know whether my CD has copy protection on it? Copy-protected CDs often come with a label identifying them as such, though that's not legally required. Amazon.com clearly identifies CDs containing copy protection schemes, so searching there for the CD title may turn up the answer.

Ack! My CD has DRM all over it. What can I do? Not a lot. Most tools for bypassing DRM are illegal under the Digital Millennium Copyright Act, though low-tech workarounds exist. Some users have circumvented Sony BMG's copy protection by placing a strip of tape on the CD's outer edge where the data layer is, to stop the PC from reading it--but if the tape comes loose, it could gum up your CD drive. Other solutions involve drawing over the outside track with a black marker or disabling the computer's autorun feature--and thereby preventing the copy protection software from loading--by holding down the <Shift> key as the CD loads.

Can't I rip MP3s without a PC? If your MP3 player offers in-line recording, you can legally rip MP3 files directly to it from your stereo, bypassing your PC. Archos, Cowon, iRiver, and Samsung all make players with this feature. Video Without Boundaries' Flyboy portable video player can do the same with DVDs. Since this method relies on analog output and doesn't break digital encryption, it doesn't run afoul of the DMCA.
My DVR has "flagged" a program I recorded and will delete it in a week. Is it still possible to keep a copy? Nope. If content owners use Macrovision's copy protection to flag a program, you can't burn a copy of that show to any other storage medium. But this affects only a small number of pay-per-view and video-on-demand programs, and it applies only to TiVo subscribers—so far. Other video recorders or TV service providers may have different rules; for example, the Dish satellite network lets you record pay-per-view programs but not its Dish on Demand movies.

I'm in the market for a new high-def display. Should I wait until the DRM dust settles before I buy? Not necessarily. Virtually all new HDTVs have an HDCP-compatible digital interface, which is the one new HD players will use. More and more PC monitors do, too; look for the term "HDCP-HDMI" in the product description as you shop.

Contributing Editor Dan Tynan writes

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