

Strong Copyright + DRM + Weak Net Neutrality = Digital Dystopia?

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Three critical issues—a dramatic expansion of the scope, duration, and punitive nature of copyright laws; the ability of Digital Rights Management (DRM) systems to lock-down digital content in an unprecedented fashion; and the erosion of Net neutrality, which ensures that all Internet traffic is treated equally—are examined in detail and their potential impact on libraries is assessed. How legislatures, the courts, and the commercial marketplace treat these issues will strongly influence the future of digital information for good or ill.

Editor's Note: This article was submitted in honor of the fortieth anniversaries of LITA and *ITAL*.

Blogs. Digital photo and video sharing. Podcasts. Rip/Mix/Burn. Tagging. Vlogs. Wikis. These buzzwords point to a fundamental social change fueled by cheap personal computers (PCs) and servers, the Internet and its local wired/wireless feeder networks, and powerful, low-cost software. Citizens have morphed from passive media consumers to digital-media producers and publishers.

Libraries and scholars have their own set of buzzwords: digital libraries, digital presses, e-prints, institutional repositories, and open-access (OA) journals, to name a few. They connote the same kind of change: a democratization of publishing and media production using digital technology.

It appears that we are on the brink of an exciting new era of Internet innovation: a kind of digital utopia. Gary Flake of Microsoft has provided one striking vision of what could be (with a commercial twist) in a presentation entitled "How I Learned to Stop Worrying and Love the Imminent Internet Singularity," and there are many other visions of possible future Internet advances.¹

When did this metamorphosis begin? It depends on who you ask. Let's say the late 1980s, when the Internet began to get serious traction and an early flowering of noncommercial digital publishing occurred.

In the subsequent twenty-odd years, publishing and media production went from being highly centralized, capital-intensive analog activities with limited and well-defined distribution channels, to being diffuse, relatively

low-cost digital activities with the global Internet as their distribution medium. Not to say that print and conventional media are dead, of course, but it is clear that their era of dominance is waning. The future is digital.

Nor is it to say that entertainment companies (e.g., film, music, radio, and television companies) and information companies (e.g., book, database, and serial publishers) have ceded the digital-content battlefield to the upstarts. Quite the contrary.

High-quality, thousand-page-per-volume scientific journals and Hollywood blockbusters cannot be produced for pennies, even with digital wizardry. Information and entertainment companies still have an important role to play, and, even if they didn't, they hold the copyrights to a significant chunk of our cultural heritage.

Entertainment and information companies have understood for some time that they must adapt to the digital environment or die, but this change has not always been easy, especially when it involves concocting and embracing new business models. Nonetheless, they intend to thrive and prosper—and to do whatever it takes to succeed. As they should, since they have an obligation to their shareholders to do so.

The thing about the future is that it is rooted in the past. Culture, even digital culture, builds on what has gone before. Unconstrained access to past works helps determine the richness of future works. Inversely, when past works are inaccessible except to a privileged minority, future works are impoverished.

This brings us to a second trend that stands in opposition to the first. Put simply, it is the view that intellectual works are *property*; that this property should be protected with the full force of civil and criminal law; that creators have perpetual, transferable property rights; and that contracts, rather than copyright law, should govern the use of intellectual works.

A third trend is also at play: the growing use of Digital Rights Management (DRM) technologies. When intellectual works were in paper (or other tangible forms), they could only be controlled at the object-ownership or object-access levels (a library controlling the circulation of a copy of a book is an example of the second case). Physical possession of a work, such as a book, meant that the user had full use of it (i.e., the user could read the entire book and photocopy pages from it). When works are in digital form and are protected by some types of DRM, this may no longer be true. For example, a user may only be able to view a single chapter from a DRM-protected e-book and may not be able to print it.

The fourth and final trend deals with how the Internet functions at its most fundamental level. The Internet was designed to be content-, application-, and hardware-neutral. As long as certain standards were met, the network did not discriminate. One type of content was not given preferential delivery speed over another. One type of

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content was not charged for delivery while another was free. One type of content was not blocked (at least by the network) while another was unhindered. In recent years, network neutrality has come under attack.

The collision of these trends has begun in courts, legislatures, and the marketplace. It is far from over. As we shall see, its outcome will determine what the future of digital culture looks like.

Stronger copyright: 1790 versus 2006

Copyright law is a complex topic. It is not my intention to provide a full copyright primer here. (Indeed, I will assume that the reader understands some copyright basics, such as the notion that facts and ideas are not covered by copyright.) Rather, my aim is to highlight some key factors about how and why United States copyright law has evolved and how it relates to the digital problem at hand.

Three authors (Lawrence Lessig, Professor of Law at the Stanford Law School; Jessica Litman, Professor of Law at the Wayne State University Law School; and Siva Vaidhyanathan, Assistant Professor in the Department of Culture and Communication at New York University) have done brilliant and extensive work in this area, and the following synopsis is primarily based on their contributions. I heartily recommend that you read the cited works in full.

The purpose of copyright

Let us start with the basis of U.S. copyright law, the Constitution's "Progress Clause": "Congress has the power to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."² Copyright was a bargain: society would grant creators a time-limited ability to control and profit from their works before they fell into the public domain (where works are unprotected) because doing so resulted in "Progress of Science and useful Arts" (a social good). Regarding the Progress Clause, Lessig notes:

It does not say Congress has the power to grant "creative property rights." It says that Congress has the power to promote progress. The grant of power is its purpose, and its purpose is a public one, not the purpose of enriching publishers, nor even primarily the purpose of rewarding authors.³

However, entertainment and information companies can have a far different view, as illustrated by this quote from Jack Valenti, former president of the Motion Picture Association of America: "Creative property owners must

be accorded the same rights and protections resident in all other property owners in the nation."⁴

Types of works covered

When the Copyright Act of 1790 was enacted, it protected published books, maps, and charts written by living U.S. authors as well as unpublished manuscripts by them.⁵ The act gave the author the exclusive right to "print, reprint, publish, or vend" these works. Now, copyright protects a wide range of published and unpublished "original works of authorship" without regard for "the nationality or domicile of the author," including "1. literary works; 2. musical works, including any accompanying words; 3. dramatic works, including any accompanying music; 4. pantomimes and choreographic works; 5. pictorial, graphic, and sculptural works; 6. motion pictures and other audiovisual works; 7. sound recordings; 8. architectural works."⁶

Rights

In contrast to the limited print publishing rights inherent in the Copyright Act of 1790, current law grants copyright owners the following rights (especially notable is the addition of control over derivative works, such as a play based on a novel or a translation):

- to reproduce the work in copies or phonograph records;
- to prepare derivative works based upon the work;
- to distribute copies or phonograph records of the work to the public by sale or other transfer of ownership, or by rental, lease, or lending;
- to perform the work publicly, in the case of literary, musical, dramatic, and choreographic works, pantomimes, and motion pictures and other audiovisual works;
- to display the copyrighted work publicly, in the case of literary, musical, dramatic, and choreographic works, pantomimes, and pictorial, graphic, or sculptural works, including the individual images of a motion picture or other audiovisual work; and
- in the case of sound recordings, to perform the work publicly by means of a digital audio transmission.⁷

Duration

The Copyright Act of 1790 granted authors a term of fourteen years, with one renewal if the author was still living (twenty-eight years total).⁸ Now the situation is much more complex, and, rather than trying to review the details, I'll provide the following example. For a personal author who produced a work on or after January 1, 1978, it is covered for the life of the author plus seventy years.⁹ So, assuming

an author lives an average seventy-five years, the work would be covered for 144 years, which is approximately 116 years longer than in 1790.

Registration

Registration was required by the Copyright Act of 1790, but very few eligible works were registered from 1790 to 1800, which enriched the public domain.¹⁰ Now registration is not required, and no work enriches the public domain until its term is over, even if the author (or the author's descendants) have no interest in the work being under copyright, or it is impossible to locate the copyright holder to gain permission to use his or her works (creating so-called "orphan works").

Drafting of legislation

By 1901, copyright law had become fairly esoteric and complex, and drafting new copyright legislation had become increasingly difficult. Consequently, Congress adopted a new strategy: let those whose commercial interests were directly affected by copyright law deliberate and negotiate with each other about copyright law changes, and use the results of this process as the basis of new legislation.¹¹ Over time, this increasingly became a dialogue among representatives of entertainment, high-tech, information, and telecommunications companies; other parties, such as library associations; and rights-holder groups (e.g., ASCAP). Since these parties often had competing interests, the negotiations were frequently contentious and lengthy. The resulting laws created a kind of crazy quilt of specific exceptions for the deals made during these sessions to the ever-expanding control over intellectual works that copyright reform generally engendered. Since the public was not at the table, its highly diverse interests were not directly represented, and, since stakeholder industries lobby Congress and the public does not, the public's interests were often not well served. (There were some efforts by special interest groups to represent the public on narrowly focused issues.)

Frequency of copyright term legislation

With remarkable restraint, Congress, in its first hundred years, enacted one copyright bill that extended the copyright term and one in its next fifty; however, starting in 1962, it passed eleven bills in the next forty years.¹² Famously, Jack Valenti once proposed that copyright "last forever less one day."¹³ By continually extending copyright terms in a serial fashion, Congress may grant him his wish.

Licenses

In 1790, copyrighted works were sold and owned. Today,

many digital works are licensed. Licenses usually fall under state contract law rather than federal copyright law.¹⁴ Licensed works are not owned, and the first-sale doctrine is not in effect.¹⁵ While copyright is the legal foundation of licenses (i.e., works can be licensed because licensors own the copyright to those works), licenses are contracts, and contract provisions trump user-favorable copyright provisions, such as fair use, if the licensor chooses to negate them in a license.

Criminal and civil penalties

In 1790 there were civil penalties for copyright infringement (e.g., statutory fines of "50 cents per sheet found in the infringer's possession").¹⁶ Now there are criminal copyright penalties, including felony violations that can result in a maximum of five years of imprisonment and fines as high as \$250,000 for first-time offenders; civil statutory fines that can range as high as \$150,000 per infringement (if infringement is "willful"), and other penalties.¹⁷

Once the copyright implications of digital media and the Internet sunk in, entertainment and information companies were deeply concerned: digital technologies made creating perfect copies effortless, and the Internet provided a free (or low-cost) way to distribute content globally.

Congress, primarily spurred on by entertainment companies, passed several laws aimed at curtailing perceived digital "theft" through criminal penalties. Under the 1997 No Electronic Theft (NET) Act, copyright infringers face "up to 3 years in prison and/or \$250,000 fines," even for noncommercial infringement.¹⁸ Under the 1998 Digital Millennium Copyright Act (DMCA), those who defeat technological mechanisms that control access to copyrighted works (a process called "circumvention") face a maximum of five years in prison and \$500,000 in fines.¹⁹

Effect of copyright on average citizens

In 1790, copyright law had little effect on citizens. The average person was not an author or publisher, private use of copyrighted materials was basically unregulated, the public domain was healthy, and many types of works were not covered by copyright at all. In 2006,

- virtually every type of work imaginable is under automatic copyright protection for extended periods of time;
- private use of digital works is increasingly visible and of concern to copyright holders;
- the public domain is endangered; and
- ordinary citizens are being prosecuted as "pirates" under draconian statutory and criminal penalties.

Regarding this development, Lessig says:

For the first time in our tradition, the ordinary ways in which individuals create and share culture fall within the reach of the regulation of the law, which has expanded to draw within its control a vast amount of culture and creativity that it never reached before. The technology that preserved the balance of our history—between uses of our culture that were free and uses of our culture that were only upon permission—has been undone. The consequence is that we are less and less a free culture, more and more a permission culture.²⁰

How has copyright changed since the days of the founding fathers? As we have seen, there has been a shift in copyright law (and social perceptions of it) from

- promoting progress to protecting intellectual property owners' "rights";
- from covering limited types of works to covering virtually all types of works;
- from granting only basic reproduction and distribution rights to granting a much wider range of rights;
- from offering a relatively short duration of protection to offering a relatively long (potentially perpetual) one;
- from requiring registration to providing automatic copyright;
- from drafting laws in Congress to drafting laws in work groups of interested parties dominated by commercial representatives;
- from making infrequent extensions of copyright duration to making frequent ones;
- from selling works to licensing them;
- from relatively modest civil penalties to severe civil and criminal penalties; and
- from ignoring ordinary citizens' typical use of copyrighted works to branding them as pirates and prosecuting them with lawsuits. (Regarding lawsuits filed by the Recording Industry Association of America against four students, Lessig notes: "If you added up the claims, these four lawsuits were asking courts in the United States to award the plaintiffs close to \$100 billion—six times the total profit of the film industry in 2001.")²¹

Complicating this situation further is intense consolidation and increased vertical integration in the entertainment, information, telecommunications, and other high-tech industries involved in the Internet.²² This vertical integration has implications for what can be published and the free flow of information. For example, a company that publishes books and magazines, produces films and television programs, provides Internet access and digital content, and provides cable television services (including broadband Internet access) has different corporate interests than a company that performs a single function. These interrelated interests may affect not only what information is produced

and whether competing information and services are freely available through controlled digital distribution channels, but corporate perceptions of copyright issues as well.

One of the ironies of the current copyright situation is this: if creative works are by nature property, and stealing property is (and has always been) wrong, then some of the very industries that are demanding that this truth be embodied in copyright law have, in the past, been pirates themselves, even though certain acts of piracy may have been legal (or appeared to be legal) under then-existing copyright laws.²³

Lessig states:

If "piracy" means using the creative property of others without their permission—if "if value, then right" is true—then the history of the content industry is a history of piracy. Every important sector of "big media" today—film, records, radio, and cable TV—was born of a kind of piracy so defined. The consistent story is how last generation's pirates join this generation's country club—until now.²⁴

Let's take a simple case: cable television. Early cable television companies used broadcast television programs without compensating copyright owners, who branded their actions as piracy and filed lawsuits. After two defeats in the Supreme Court, broadcast television companies won a victory (of sorts) in Congress, which took nearly thirty years to resolve the matter: cable television companies would pay, but not what broadcast television companies wanted; rather they would pay fees determined by law.²⁵

Of course, this view of history (big media companies as pirates in their infancy) is open to dispute. For the moment, let's assume that it is true. Put more gently, some of the most important media companies of modern times flourished because of relatively lax copyright control, a relatively rich public domain, and, in some cases, a societal boon that allowed them to pay statutory license fees—which are compulsory for copyright owners—instead of potentially paying much higher fees set by copyright owners or being denied use at all.

Today, the very things that fostered media companies' growth are under attack by them. The success of those attacks is diminishing the ability of new digital content and service companies to flourish and, in the long run, may diminish even big media's ability to continue to thrive as a *permission* culture replaces a *permissive* culture.

Several prominent copyright scholars have suggested copyright reforms to help restore balance to the copyright system.

James Boyle, professor of law at the Duke University Law School, recommends a twenty-year copyright term with "a broadly defined fair use protection for journalistic, teaching, and parodic uses—provided that those uses were not judged to be in bad faith by a jury applying the 'beyond a reasonable doubt' standard."²⁶

William W. Fisher III, Hale and Dorr Professor of Intellectual Property Law at Harvard University Law School, suggests that “we replace major portions of the copyright and encryption-reinforcement models with . . . a governmentally administered reward system” that would put in place new taxes and compensate registered copyright owners of music or films with “a share of the tax revenues proportional to the relative popularity of his or her creation,” and would “eliminate most of the current prohibitions on unauthorized reproduction, distribution, adaptation, and performance of audio and video recordings.”²⁷

Lessig recommends that copyright law be guided by the following general principles: (1) short copyright terms, (2) a simple binary system of protected/not protected works without complex exceptions, (3) mandatory renewal, and (4) a “prospective” orientation that forbids retrospective term extensions.²⁸ (Previously, Lessig had proposed a seventy-five-year term contingent on five-year renewals). He suggests reinstating the copyright registration requirement using a flexible system similar to that used for domain name registrations. He favors works having copyright marks, and, if they are not present, he would permit their free use until copyright owners voice their opposition to this use (uses of the work made prior to this point would still be permitted).

Litman wants a copyright law “that is short, simple, and fair,” in which we “stop defining copyright in terms of reproduction” and recast copyright as “an exclusive right of commercial exploitation.”²⁹ Litman would eliminate industry-specific copyright law exceptions, but grant the public “a right to engage in copying or other uses incidental to a licensed or legally privileged use”; the “right to cite” (even infringing works); and “an affirmative right to gain access to, extract, use, and reuse the ideas, facts, information, and other public-domain material embodied in protected works” (including a restricted circumvention right).³⁰

Things change in two hundred-plus years, and the law must change with them. Since the late nineteenth century, copyright law has been especially impacted by new technologies. The question is this: has copyright law struck the right balance between encouraging progress through granting creators specific rights and fostering a strong public domain that also nourishes creative endeavor? If that balance has been lost, how can it be restored? Or is society simply no longer striving to maintain that balance because intellectual works are indeed property, property must be protected for commerce to prosper, and the concept of balance is outmoded and no longer reflects societal values?

DRM: Locked-up content and fine-grained control

Noted attorney Michael Godwin defines DRM as “a collective name for technologies that prevent you from using a

copyrighted digital work beyond the degree to which the copyright owner (or a publisher who may not actually hold a copyright) wishes to allow you to use it.”³¹

Like copyright, DRM systems are complex, with many variations. There are two key technologies: (1) digital marking (i.e., *digital fingerprints* that uniquely identify a work based on its characteristics, *simple labels* that attach rights information to content, and *watermarks* that typically hide information that can be used to identify a work), and (2) encryption (i.e., scrambled digital content that requires a digital key to decipher it).³² Specialized hardware can be used to restrict access as well, often in conjunction with digital marking and encryption.

The intent of this article is not to provide a technical tutorial, but to set forth an overview of the basic DRM concept and discuss its implications. What is of interest here is not how system A-B-C works in contrast to system X-Y-Z, but what DRM allows copyright owners to do and the issues related to DRM.

To do so, let’s use an analogy, understanding that real DRM systems can work in other ways as well (e.g., digital watermarks can be used to track illegal use of images on the Internet without those images being otherwise protected).

For the moment, let’s imagine that the content a user wishes to access is in an unbreakable, encrypted digital safe. The user cannot see inside the safe. By entering the correct digital combination, certain content becomes visible (or audible or both) in the safe. That content can then be utilized in specific ways (and only those ways), including, if permitted, leaving the safe. If a public domain work is put in the safe, access to it is restricted regardless of its copyright status.

Bill Rosenblatt, Bill Trippe, and Stephen Mooney provide a very useful conceptual model of DRM rights in their landmark DRM book, *Digital Rights Management: Business and Technology*, summarized here.³³

There are three types of content rights: (1) render rights, (2) transport rights, and (3) derivative-works rights. Render rights allow authorized users to view, play, and print protected content. Transport rights allow authorized users to copy, move, and loan content (the user retains the content if it is copied and gets it back when a loan is over, but does not keep a copy if it is moved). Derivative-works rights allow authorized users to extract pieces of content, edit the content in place, and embed content by extracting some of it and using it in other works.

Each one of these individual rights has three attributes: (1) consideration, (2) extents, and (3) types of users. In the first attribute, consideration, access to content is provided for something of value to the publisher (e.g., money or personal information). Content can then be used to some extent (e.g., for a certain amount of time or a certain number of times). The rights and attributes users have are determined by their user types.

For example, an academic user, in consideration of a specified license payment by his or her library, can view a DRM-protected scholarly article—but not copy, move, loan, extract, edit, or embed it—for a week, after which it is inaccessible. We can extend this hypothetical example by imagining that the library could pay higher license fees to gain more rights to the journal in question, and the library (or the user) could dynamically purchase additional article-specific rights enhancements as needed through micropayments.

This example is extreme; however, it illustrates the fine-grained, high level of control that publishers could potentially have over content by using DRM technology.

Godwin suggests that DRM may inhibit a variety of legitimate uses of DRM-protected information, such as access to public-domain works (or other works that would allow liberal use), preservation of works by libraries, creation of new derivative works, conduct of historical research, exercise of fair-use rights, and instructional use.³⁴ The ability of blind (or otherwise disabled) users to employ assistive technologies may also be prevented by DRM technology.³⁵ DRM also raises a variety of privacy concerns.³⁶

Fair use is an especially thorny problem. Rosenblatt, Trippe, and Mooney state:

Fair use is an “I’ll know it when I see it” proposition, meaning that it can’t be proscriptively defined. . . . Just as there is no such thing as a “black box” that determines whether broadcast material is or isn’t indecent, there is no such thing as a “black box” that can determine whether a given use of content qualifies as fair use or not. Anything that can’t be proscriptively defined can’t be represented in a computer system.³⁷

No need to panic about scholarly journals—*yet*. Your scholarly journal publisher or other third-party supplier is unlikely to present you with such detailed options tomorrow. But you may already be licensing other digital content that is DRM-protected, such as digital music or e-books that require a hardware e-book reader.

As the recent Sony BMG “rootkit” episode illustrated, creating effective, secure DRM systems can be challenging, even for large corporations.³⁸ Again, the reasons for this are complex. In very simple terms, it boils down to this: assuming that the content can be protected up to the point it is placed in a DRM system, the DRM system has the best chance of working if all possible devices that can process its protected content either directly support its protection technology, recognize its restrictions and enforce them through another means, or refuse access.³⁹ Anything less creates “holes” in the protective DRM shell, such as the well-known “analog hole” (e.g., when DRM-protected digital content is converted to analog form to be played, it can then be rerecorded using digital equipment without DRM protection).⁴⁰

Ideally, in other words, every server, network router, PC and PC component, operating system, and relevant electronic device (e.g., CD player, DVD player, audio-recording device, and video-recording device) would work with the DRM system as outlined previously or would not allow access to the content at all.

Clearly, this ideal end-state for DRM may well never be realized, especially given the troublesome backward-compatibility equipment problem.⁴¹ However, this does not mean that the entertainment, information, and high-technology companies will not try to make whatever piecemeal progress that they can in this area.⁴²

The Trusted Computing Group is an important multiple-industry security organization, whose standards work could have a strong impact on the future of DRM. Robert A. Gehring notes:

But a DRM system is almost useless, that is from a content owner’s perspective, until it is deployed broadly. Putting together cheap TC components with a market-dominating operating system “enriched” with DRM functionality is the most economic way to provide the majority of users with “copyright boxes.”⁴³

Seth Schoen argues computer owners should be empowered to override certain features of “trusted computing architecture” to address issues with “anti-competitive and anti-consumer behavior” and other problems.⁴⁴

DRM could potentially be legislatively mandated. There is a closely related legal precedent, the Audio Home Recording Act, which requires that digital audiotape equipment include special hardware to prevent serial copying.⁴⁵ There is currently a bill before Congress that would require use of a “broadcast flag” (a digital marker) for digital broadcast and satellite radio receivers.⁴⁶ Last year, a similar FCC regulation for broadcast digital television was struck down by a federal appeals court; consequently, the current bill explicitly empowers the FCC to “enforce ‘prohibitions against unauthorized copying and redistribution.’”⁴⁷ Another bill would plug the analog-to-digital video analog hole by putting “strict legal controls on any video analog to digital (A/D) convertors.”⁴⁸ Whether these bills become law or not, efforts to mandate DRM are unlikely to end.

DMCA strongly supports DRM by prohibiting both the circumvention of technological mechanisms that control access to copyrighted works (with some minor exceptions) and the “manufacture of any device, composition of any program, or offering of any service” to do so.⁴⁹

What would the world be like if all newly published (or released) commercially created information was in digital form, protected by DRM? What would it be like if all old works in print and analog formats were only reissued in digital form, protected by DRM? What would it be like if all hardware that could process that digital information had to support the information’s DRM scheme or block any access to it because this was mandated by law? What would it be

like if all operating systems had direct or indirect built-in support for DRM? Would "Progress of Science and useful Arts" be promoted or squashed?

■ Weaker Net neutrality

Lessig identifies three important characteristics of the Internet that have fostered innovation: (1) edge architecture: software applications run on servers connected to the network, rather than on the network itself, ensuring that the network itself does not have to be modified for new or updated applications to run; (2) no application optimization: a relatively simple, but effective, protocol is utilized (Internet Protocol) that is indifferent to what software applications run on top of it, again insulating the network from application changes; and (3) neutral platform: the network does not prefer certain data packets or deny certain packets access.⁵⁰

Lessig's conceptual model is very useful when thinking about Net neutrality, a topic of growing concern.

EDUCAUSE's definition of Net neutrality aptly captures these concerns:

"Net neutrality" is the term used to describe the concept of keeping the Internet open to all lawful content, information, applications, and equipment. There is increasing concern that the owners of the local broadband connections (usually either the cable or telephone company) may block or discriminate against certain Internet users or applications in order to give an advantage to their own services. While the owners of the local network have a legitimate right to manage traffic on their network to prevent congestion, viruses, and so forth, network owners should not be able to block or degrade traffic based on the identity of the user or the type of application solely to favor their interests.⁵¹

For some time, there have been fears that Net neutrality was endangered as the Internet became increasingly commercialized, a greater percentage of home Internet users migrated to broadband connections not regulated by common carrier laws, and telecommunications mergers (and vertical integration) accelerated. Some of these fears are now appearing to be realized, albeit with resistance by the Internet community.

For example, AOL has indicated that it will implement a two-tier e-mail system for companies, nonprofits, and others who send mass mailings: those who pay bypass spam filters, those who don't pay don't bypass spam filters.⁵² Critics fear that free e-mail services will deteriorate under a two-tier system. Facing fierce criticism from the DearAOL.com Coalition and many others, AOL has relented somewhat on the nonprofit issue by offering special treatment for "qualified" nonprofits.

A second example is that an analysis of Verizon's FCC filings reveals that "more than 80% of Verizon's current capacity is earmarked for carrying its service, while all other traffic jostles in the remainder."⁵³ Content-oriented Net companies are worried:

Leading Net companies say that Verizon's actions could keep some rivals off the road. As consumers try to search Google, buy books on Amazon.com, or watch videos on Yahoo!, they'll all be trying to squeeze into the leftover lanes on Verizon's network. . . . "The Bells have designed a broadband system that squeezes out the public Internet in favor of services or content they want to provide," says Paul Misener, vice-president for global policy at Amazon.com.⁵⁴

A third example is a comment by William L. Smith, BellSouth's chief technology officer, who "told reporters and analysts that an Internet service provider such as his firm should be able, for example, to charge Yahoo Inc. for the opportunity to have its search site load faster than that of Google Inc.," but qualified this assertion by indicating that "a pay-for-performance marketplace should be allowed to develop on top of a baseline service level that all content providers would enjoy."⁵⁵ About four months later, AT&T announced that it would acquire BellSouth, after which it "will be the local carrier in 22 states covering more than half of the American population."⁵⁶

Finally, in a white paper for Public Knowledge, John Windhausen Jr. states:

This concern is not just theoretical—broadband network providers are taking advantage of their unregulated status. Cable operators have barred consumers from using their cable modems for virtual private networks and home networking and blocked streaming video applications. Telephone and wireless companies have blocked Internet telephone (VoIP—Voice over the Internet Protocol) traffic outright in order to protect their own telephone service revenues.⁵⁷

These and similar examples are harbingers of troubled days ahead for Net neutrality. The canary in the Net neutrality mine isn't dead yet, but it's getting very nervous.

The bottom line? Noted OA advocate Peter Suber analyzes the situation as follows:

But now cable and telecom companies want to discriminate, charge premium prices for premium service, and give second-rate service to everyone else. If we relax the principle of net neutrality, then ISPs could, if they wanted, limit the software and hardware you could connect to the net. They could charge you more if you send or receive more than a set number of emails. They could block emails containing certain keywords or emails from people or organizations they disliked, and block traffic to or from competitor web sites. They could make filtered service the default and force users to pay extra for the

wide open internet. If you tried to shop at a store that hasn't paid them a kickback, they could steer you to a store that has. . . .

If companies like AT&T and Verizon have their way, there will be two tiers of internet service: fast and expensive and slow and cheap (or cheaper). We unwealthy users—students, scholars, universities, and small publishers—wouldn't be forced offline, just forced into the slow lane. Because the fast lane would reserve a chunk of bandwidth for the wealthy, the peons would crowd together in what remained, reducing service below current levels. New services starting in the slow lane wouldn't have a fighting chance against entrenched players in the fast lane. Think about eBay in 1995, Google in 1999, or Skype in 2002 without the level playing field provided by network neutrality. Or think about any OA journal or repository today.⁵⁸

Is Net neutrality a quaint anachronism of the Internet's distant academic/research roots that we would be better off without? Would new Internet companies and noncommercial services prosper better if it was gone, spurring on new waves of innovation? Would telecommunications companies (who may be part of larger conglomerates), free to charge for tiered-services, offer us exciting new service offerings and better, more reliable service?

Defending the Internet revolution

Sixties icon Bob Dylan's line in "The Times They Are A-Changin'"—"Then you better start swimmin' or you'll sink like a stone"—couldn't be more apt for those concerned with the issues outlined in this paper. Here's a brief overview of some of the strategies being used to defend the freewheeling Internet revolution.

1. **Darknet:** J. D. Lasica says: "For the most part, the Darknet is simply the underground Internet. But there are many darknets: the millions of users trading files in the shady regions of Usenet and Internet Relay Chat; students who send songs and TV shows to each other using instant messaging services from AOL, Yahoo, and Microsoft; city streets and college campuses where people copy, burn, and share physical media like CDs; and the new breed of encrypted dark networks like Freenet. . ."⁵⁹ We may think of the Darknet as simply fostering illegal file swapping by ordinary citizens, but the Darknet strategy can also be used to escape government Internet censorship, as is the case with Freenet use in China.⁶⁰

2. **Legislative and Legal Action:** There have been attempts to pass laws to amend or reverse copyright and other laws resulting from the counter-Internet-revolution, which have been met by swift, powerful, and generally effective opposition from entertainment companies and other parties affected by these proposed measures. The moral of this story is that these large corporations can

afford to pay lobbyists, make campaign contributions, and otherwise exert significant influence over lawmakers, while, by and large, advocates for the other side do not have the same clout. The battle in the courts has been more of a mixed bag; however, there have been some notable defeats for reform advocates, especially in the copyright arena (e.g., *Eldred v. Ashcroft*), where most of the action has been.

3. **Market Forces:** When commercial choices can be made, users can vote with their pocketbooks about some Internet changes. But, if monopoly forces are in play, such as having a single option for broadband access, the only other choice may be no service. However, as the OA movement (described later) has demonstrated, a concerted effort by highly motivated individuals and nonprofit organizations can establish viable new alternatives to commercial services that can change the rules of the game in some cases. Companies can also explore radical new business models that may appear paradoxical to pre-Internet-era thinking, but make perfect sense in the new digital reality. In the long run, the winners of the digital-content wars may be those who are not afraid of going down the Internet rabbit hole.

4. **Creative Commons:** Copyright is a two-edged sword: it can be used as the legal basis of licenses (and DRM) to restrict and control digital information, or it can be used as the legal basis of licenses to permit liberal use of digital information. By using one of the six major Creative Commons Licenses (CCL), authors can retain copyright, but significantly enrich society's collective cultural repository with works that can be freely shared for noncommercial purposes, used, in some cases, for commercial purposes, and used to easily build new derivative creative works. For example, the Creative Commons Attribution License requires that a work is attributed to the author; however, a work can be used for any commercial or noncommercial purpose without permission, including creating derivative works.⁶¹ There are a variety of other licenses, such as the GNU Free Documentation License, that can be used for similar purposes.⁶²

5. **OA:** Scholars create certain types of information, such as journal articles, without expecting to be paid to do so, and it is in their best interests for these works to be widely read, especially by specialists in their fields.⁶³ By putting e-prints (electronic preprints or post-prints) of articles on personal home pages or in various types of digital archives (e.g., institutional repositories) in full compliance with copyright law and, if needed, in compliance with publisher policies, scholars can provide free global access to these works with minimal effort and at no (or little) cost to themselves. Further, a new generation of free e-journals are being published on the Internet that are being funded by a variety of business models, such as advertising, author fees, library membership fees, and supplemental products. These OA strategies make digital

scholarly information freely available to users across the globe, regardless of their personal affluence or the affluence of their affiliated institutions.

Impact on libraries

This paper's analysis of copyright, DRM, and network neutrality trends holds no good news for libraries.

Copyright

The reach of copyright law constantly encompasses new types of materials and for an ever-lengthening duration. As a result, copyright holders must explicitly place their works in the public domain if the public domain is to continue to grow.

Needless to say, the public domain is a primary source of materials that can be digitized without having to face a complex, potentially expensive, and sometimes hopeless permission clearance process. This process can be especially daunting for media works (such as films and video), even for the use of very short segments of these works. J. D. Lasica recounts his effort to get permission to use short music and film segments in a personal video: five out of seven music companies declined; six out of seven movie studios declined, and the one that agreed had serious reservations.⁶⁴ The replies to his inquiry, for those companies that bothered to reply at all, are well worth reading.

For U.S. libraries without the resources to deal with complicated copyright-related issues, the digitization clock stops at 1922, the last year we can be sure that a work is in the public domain without checking its copyright status and getting permission if it is under copyright.⁶⁵ What can we look forward to? Lessig says: "Thus, in the twenty years after the Sonny Bono Act, while one million patents will pass into the public domain, zero copyrights will pass into the public domain by virtue of the expiration of a copyright term."⁶⁶ (The Sonny Bono Term Extension Act was passed in 1998.)

Digital preservation is another area of concern in a legal environment where most information is automatically copyrighted, copyright terms are lengthy (or endless), and information is increasingly licensed. Simply put, a library cannot digitally preserve what it does not own unless the work is in the public domain, the work's license permits it, or the work's copyright owner grants permission to do so.

Or can it? After all, the Internet Archive does not ask permission ahead of time before preserving the entire Internet, although it responds to requests to restrict information. And that is why the Internet Archive is currently being sued by Healthcare Advocates, which says that it: "is

just like a big vacuum cleaner, sucking up information and making it available."⁶⁷ If it is not settled out of court, this will be an interesting case for more digitally adventurous libraries to watch.

As the cost of the hardware and software needed to effectively do so continues to drop, faculty, students, and other library users will increasingly want to repurpose content, digitizing conventional print and media materials, remixing digital ones, and/or creating new digital materials from both.

With the "information commons" movement, academic libraries are increasingly providing users with the hardware and software tools to repurpose content. Given that the wording of the U.S. Copyright Act section 108 (f) (1) is vague enough that it could be interpreted to include these tools when they are used for information reproduction, is the old "copyright disclaimer on the photocopier" solution enough in the new digital environment? Or—in light of the unprecedented transformational power of these tools to create new digital works, and their widespread use both within libraries and on campus—do academic libraries bear heavier responsibilities regarding copyright compliance, permission-seeking, and education?

Similar issues arise when faculty want to place self-created digital works that incorporate copyrighted materials in electronic reserves systems or institutional repositories. End-user contributions to "Library 2.0" systems that incorporate copyrighted materials may also raise copyright concerns.

DRM

As libraries realize that they cannot afford dual formats, their new journal and index holdings are increasingly solely digital. Libraries are also licensing a growing variety of "born digital" information. The complexities of dealing with license restrictions for these commercial digital products are well understood, but imagine if DRM was layered on top of license restrictions. As we have discussed, DRM will allow content producers and distributors to slice, dice, and monetize access to digital information in ways that were previously impossible.

What may be every publisher/vendor's dream could be every library's nightmare. Aside from a potential surge of publisher/vendor-specific access licensing options and fees, libraries may also have to contend with publisher/vendor-specific DRM technical solutions, which may:

- depend on particular hardware/software platforms,
- be incompatible with each other,
- decrease computer reliability and security,
- eliminate fair or otherwise legal use of DRM-protected information,
- raise user privacy issues,
- restrict digital preservation to bitstream preservation (if allowed by license),

- make it difficult to assess whether to license DRM-protected materials,
- increase the difficulty of providing unified access to information from different publishers and vendors,
- multiply user support headaches, and
- necessitate increased staffing.

DRM makes solving many of these problems both *legally* and *technically* impossible. For example, under DMCA, libraries have the right to circumvent DRM for a work in order to evaluate whether they want to purchase it. However, they cannot do so without the software tools to crack the work's DRM protection. But the distribution of those tools is illegal under DMCA, and local development of such tools is likely to be prohibitively complex and expensive.⁶⁸

Fostering alternatives to restrictive copyright and DRM

Given the uphill battle in the courts and legislatures, CCLs (or similar licenses) and OA are particularly promising strategies to deal with copyright and DRM issues. Copyright laws do not need to change for these strategies to be effective.

It is not just a question of libraries helping to support OA by paying for institutional memberships to OA journals, building and maintaining institutional repositories, supporting OA mandates, encouraging faculty to edit and publish OA journals, educating faculty about copyright and OA issues, and encouraging them to utilize CCLs (or similar licenses). To truly create change, libraries need to “walk the talk” and either let the public-domain materials they digitize remain in the public domain, or put them under CCLs (or similar licenses), and, when they create original digital content, put it under CCLs (or similar) licenses as well.

As the OA movement has shown, using CCLs does not rule out revenue generation (if that is an appropriate goal), but it does require facilitating strategies, such as advertising and offering fee-based add-on products and services.

Net neutrality

There are many unknowns surrounding the issue of Net neutrality, but what is clear is that it is under assault. It is also clear that Internet services are more likely to require more, not less, bandwidth in the future as digital media and other high-bandwidth applications become more commonplace, complex, and interwoven into a larger number of Internet systems.

One would imagine that if a corporation such as Google had to pay for a high-speed digital lane, it would want it to reach as many consumers as possible. So, it may well be that libraries' Google access would be unaffected or possibly

improved by a two-tier (or multi-tier) Internet “speed-lane” service model. Would the same be true for library-oriented publishers and vendors? That may depend on their size and relative affluence. If so, the ability of smaller publishers and vendors to offer innovative bandwidth-intensive products and services may be curtailed.

Unless they are affluent, libraries may also find that they are confined to slower Internet speed lanes when they act as information providers. For libraries engaged in digital library, electronic publishing, and institutional repository projects, this may be problematic, especially as they increasingly add more digital media, large-data-set, or other bandwidth-intensive applications.

It's important to keep in mind that Net neutrality impacts are tied to where the chokepoints are, with the most serious potential impacts being at chokepoints that affect large numbers of users, such as local ISPs that are part of large corporations, national/international backbone networks, and major Internet information services (e.g., Yahoo!).

It is also important to realize that the problem may be partitioned to particular network segments. For example, on-campus network users may not experience any speed issues associated with the delivery of bandwidth-intensive information from local library servers because that network segment is under university control. Remote users, however, including affiliated home users, may experience throttled-down performance beyond what would normally be expected due to speed-lane enforcement by backbone providers or local ISPs controlled by large corporations. Likewise, users at two universities connected by a special research network may experience no issues related to accessing the other university's bandwidth-intensive library applications from on-campus computers because the backbone provider is under a contractual obligation to deliver specific network performance levels.

Although the example of speed lanes has been used in this examination of potential Net neutrality impacts on libraries, the problem is more complex than this, because network services, such as peer-to-peer networking protocols, can be completely blocked, digital information can be blocked or filtered, and other types of fine-grained network control can be exerted.

Conclusion

This paper has deliberately presented one side of the story. It should not be construed as saying that copyright law should be abolished or violated, that DRM can serve no useful purpose (if it is possible to fix certain critical deficiencies and if it is properly employed), or that no one has to foot the bill for content creation/marketing/distribution and ever-more-bandwidth-hungry Internet applications.

Nor is it to say that the other side of the story, the side most likely to be told by spokespersons of the entertainment, information, and telecommunications industries, has no validity and does not deserve to be heard. However, that side of the story is having no problem being heard, especially in the halls of Congress. The side of the story presented in this paper is not as widely heard—at least, not yet.

Nor does it intend to imply that executives from the entertainment, information, telecommunications, and other corporate venues lack a social conscience, are fully unified in their views, or are unconcerned with the societal implications of their positions. However, by focusing on short-term issues, they may not fully realize the potentially negative, long-term impact that their positions may have on their own enterprises.

Nor has this paper presented all of the issues that threaten the Internet, such as assaults on privacy, increasingly determined (and malicious) hacking, state and other censorship, and the seemingly insolvable problem of overlaying national laws on a global digital medium.

What this paper has said is simply this: three issues—a dramatic expansion of the scope, duration, and punitive nature of copyright laws; the ability of DRM to lock-down content in an unprecedented fashion; and the erosion of Net neutrality—bear careful scrutiny by those who believe that the Internet has fostered (and will continue to foster) a digital revolution that has resulted in an extraordinary explosion of innovation, creativity, and information dissemination. These issues may well determine whether the much-touted information superhighway lives up to its promise or simply becomes the “information toll road” of the future, ironically resembling the pre-Internet online services of the past.

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Appendix A: NCSU Libraries Catalog Usability Test Tasks

Known-Item Questions

1. "Your history professor has requested you to start your research project by looking up background information in a book titled *Civilizations of the Ancient Near East*."
 - a. "Please find this title in the library catalog."
 - b. "Where would you go to find this book physically?"
2. "For your literature class, you need to read the book titled *Gulliver's Travels* written by Jonathan Swift. Find the call number for one copy of this book."
3. "You've been hearing a lot about the physicist Richard Feynman, and you'd like to find out whether the library has any of the books that he has written."
 - a. "What is the title of one of his books?"
 - b. "Is there a copy of this book you could check out from D. H. Hill Library?"
4. "You have the citation for a journal article about photosynthesis, light, and plant growth. You can read the actual citation for the journal article on this sheet of paper." Alley, H., M. Rieger, and J.M. Affolter. "Effects of Developmental Light Level on Photosynthesis and Biomass Production in *Echinacea Laevigata*, a Federally Listed Endangered Species." *Natural Areas Journal* 25.2 (2005): 117-22.
 - a. "Using the library catalog, can you determine if the library owns this journal?"
 - b. "Do library users have access to the volume that actually contains this article (either electronically or in print)?"

Topical Questions

5. "Please find the titles of two books that have been written about Bill Gates (not books written by Bill Gates)."
6. "Your cat is acting like he doesn't feel well, and you are worried about him. Please find two books that provide information specifically on cat health or caring for cats."
7. "You have family who are considering a solar house. Does the library have any materials about building passive solar homes?"
8. "Can you show me how would you find the most recently published book about nuclear energy policy in the United States?"
9. "Imagine you teach introductory Spanish and you want to broaden your students' horizons by exposing them to poetry in Spanish. Find at least one audio recording of a poet reading his or her work aloud in Spanish."
10. "You would like to browse the recent journal literature in the field of landscape architecture. Does the Design Library have any journals about landscape architecture?"

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