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Digital Rights Management

The Librarian's Guide

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Chapter One

What Is Digital Rights Management?

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Digital rights management, usually shortened to DRM, is a frequent guest in technology news. Creators of movies, TV shows, books, software, and other content argue that DRM prevents pirates from stealing and profiting from their work and thereby encourages the creation of more content. Users, on the other hand, challenge that DRM is overly aggressive in limiting their ability to use content, thereby punishing legitimate purchasers of content while doing little to discourage thieves. Librarians find themselves negotiating the middle, trying to balance users' and owners' rights. In order to manage this balance, librarians need to understand what DRM is and how it works, what issues are involved with its use, and how to create DRM responses and policies that satisfy the needs of both users and content owners.

Before going any further, let's agree upon this simple definition: DRM is technology that controls access to content on digital devices.¹ Although discussions of DRM are often coupled with copyright, it should be apparent from this definition that DRM is not copyright. Rather, it is technology employed to protect the rights of the copyright holder, whether it be the creator or subsequent owner of the content. Ideally, DRM should equally protect the content owner's, content creator's, and content user's rights under copyright law.

This introduction to the debate surrounding DRM discusses what prompted the development of DRM, how it works, and the ways librarians encounter DRM every day. In doing so, it will introduce you to both sides of the DRM debate.

WHY DIGITAL RIGHTS MANAGEMENT EXISTS

DRM appears on much digital content, whether it is a movie, e-book, research subscription database, website, or some other source of information. Why is this technology used so often?

Preventing Piracy

It seems that as long as humanity has had the technology to publish information and distribute it to the masses, people have been copying other people's work and selling it or giving it away without the creator's permission. In its early days, the United States used piracy to boost its citizens' access to knowledge and to jump-start the fledgling republic's economy. The Copyright Act of 1790 granted protection only to United States citizens. As a result, from the colonial days through the Civil War, many American citizens learned how to read from cheap, pirated copies of works by British authors. The United States was prompted to grant copyright to foreign authors' works when American authors emerged on the world stage and discovered pirated copies of their works were being sold overseas. In response, Congress acted and granted copyright protection to foreign authors in 1891.²

Modern technology has made copying even easier than it was for our predecessors. Someone living in the nineteenth century who wanted to make a copy of *Moby Dick* needed access to a printing press. Similarly, manufacturing and reproducing music required phonograph cylinders. Duplication of a song, such as "Oh! Susanna," required musicians to perform the song multiple times to make multiple copies.³ As technology evolved, mimeographs and photocopiers allowed for easier duplication of written works. VHS and audiocassette tapes allowed for easy at-home copying of movies and TV shows, but the quality degraded as copies were made from earlier copies. Fast-forward to today. Now you can get a free perfect digital copy of a work with a few clicks of a mouse. Within eight hours of airing, 1.5 million pirated copies of the *Game of Thrones* fifth season finale were downloaded.⁴

The creators of books, movies, music, and other entertainment are interested in DRM for more than the prevention of unauthorized copying. They also see DRM as a way to stop other people from changing their works or using them in ways the creator did not intend.

Artistic Control

The protection United States law gives to content creators is known as copyright law. This law gives the creator the exclusive right to reproduce a work, create derivative works (such as translating into a different language, creating a trailer for a movie, or adapting a novel into a movie),⁵ distribute copies

of a work for sale to the public, or perform or display a work publicly.⁶ This is an economic right that can be transferred, wholly or partially, from one person or organization to another.⁷

Many European countries, however, observe an additional idea of control over a work, called *moral rights*, which is a collection of rights that ensures the content's authenticity and protects exploitation of the original artist's vision. Unlike the rights granted under copyright, moral rights cannot be transferred. No matter who officially owns the copyright in a work, the moral rights remain with the original creator. Moral rights are divided into the right of attribution (the right to be recognized as the work's creator), the right of disclosure (the right to decide when and how a work is released), and the right of integrity (the right to prevent a work from being changed without the creator's approval).⁸

Although moral rights have much stronger protection in Europe, the concept has started to make inroads in the United States. In 1990, Congress passed the Visual Artists Rights Act, which grants limited moral rights to creators of "visual art" (defined as a limited-edition painting, drawing, print, sculpture, or photograph).⁹ Even though there is not much official legal protection for moral rights in the United States, many people have voiced support for an expansion of its protections.¹⁰

Just as the Internet has made it much easier to copy a work, it has also simplified the process of altering a work against an artist's will, which violates that artist's moral rights. Kris Straub, author of the web comic *chain-sawsuit*, posted an example of a comic he created that was altered to change the comic's meaning and to remove any attribution to Straub. The altered version of the comic was shared ten times more than the original.¹¹ In the 2000s, movie studios sued companies that sold "clean" versions of the filmmakers' movies. Customers, usually members of the public, would send a DVD of the original movie they bought to a "clean" movie company to have objectionable material, such as profanity, nudity, or violence, edited or covered up. The filmmakers won in court, but then Congress passed the Family Movie Act of 2005,¹² which allowed the sale of equipment and software that can temporarily edit or remove scenes from motion pictures being viewed at home.¹³ Now, members of the public can buy DVD/Blu-ray players from companies such as ClearPlay¹⁴ that create "clean" versions of movies on the fly, or install a filter that "cleans" streaming movies.

Violations of copyright law and moral rights drove the need for a new solution to protect content creators and owners. DRM is the perceived solution. But how does it work?

HOW DIGITAL RIGHTS MANAGEMENT WORKS

DRM crafts the relationship between the digital content owner and user. It can be interjected at the very outset by controlling how the content is accessed or during the transfer and use of the content. The following discusses the various means content owners use to control access and use of content.

Access Control

DRM works through a variety of *access controls*. Access control limits the ways a user obtains access to a work. There are several methods content owners can use to control who can access a digital copy, and what users can do with a digital copy to which they have access. Owners may opt to use one of these methods or to combine multiple methods.

Permission Management

The first form of access control restricts how a work is used by *limiting who has permission* to use it. Makers of computer programs may issue *software licenses and keys* that are required in order for the program to work. The key usually takes the form of an alphanumeric code the user has to enter before the program will run. The computer then authenticates the key with the manufacturer via the Internet. Other times, the manufacturer asks the user to make a phone call. Much of Microsoft's software uses this form of DRM.

Another type of permission management is *user authentication*, technology that ensures that the person reading, viewing, or using the product is really the person who is supposed to have access to it, either through purchase or belonging to an identified class of users. There are traditionally three ways to authenticate a user. The first method is described as "something you know," which is usually a password or question based on your unique personal history such as what street you grew up on or the name of your first pet. For library users, it is often their library card number and related PIN that provide access to the subscription database. Next is "something you have," such as a cell phone to which the software maker will text an access code. The third method is "something you are," which might be a fingerprint or retinal scan.¹⁵

Many libraries use *IP authentication* as their "something you are." Internet Protocol (IP) addresses are like mailing addresses for computers and other devices on the Internet. IP addresses are often tied to physical locations as well, so a person can tell what part of the world you are in by looking at your computer's IP address. Many database companies will work with libraries to identify and automatically authenticate the IP addresses of the library's computers. This allows anyone trying to access the databases from comput-

ers with those authenticated IP addresses to automatically access and use the database without having to enter a user ID and password. If a library wants its users to be able to use a database even if the users are not physically there, the library can use a *proxy server* or a *virtual private network* (VPN). The library's users log in to the proxy server or VPN using an ID and/or password (such as their library card number), and the proxy server or VPN makes it look as if the user is accessing the database from the library's IP address (i.e., a computer located in the library).

Another type of permission management is a *regional restriction* (also known as *geoblocking*). Many entertainment companies have the contractual right to sell a movie, TV show, or book only in certain parts of the world. Regional restrictions are added to digital content to ensure that only those users living within the identified region can access and view the content. When you log in to Netflix, they will check the IP address that your computer is using. If that address is not from the United States, Netflix will not allow you to access their streaming videos.¹⁶ The DVD Consortium, a group of ten companies (Hitachi, JVC, Matsushita, Mitsubishi, Philips, Pioneer, Sony, Thomson, Time Warner, and Toshiba) that created the DVD standard,¹⁷ divided the world into seven regions. The United States is in Region 1, Japan and Europe in Region 2, and so on. Most DVDs and DVD players are encoded with the region they are connected to, so a DVD player sold in Region 1 cannot play a DVD sold in Region 2.¹⁸

A content producer can also design its product so that it will only work on *specialized hardware or software*. Video game consoles, such as the PlayStation and Xbox, are examples of specialized hardware. Bloomberg terminals, specialized computers rented from Bloomberg in order to access Bloomberg's financial reporting service, are another example of this access control. In the alternative, a library can install software on their computers instead of a renting a standalone terminal, but the software needed to access the content is available only from Bloomberg.

Permission management can also come in the form of *tethered content*, also referred to as *trusted computing*. Tethered content scrambles the e-book, movie, or other work so that the content can only be unscrambled by a key attached to a specific device. A program, for example, would only run on a specific computer with a specific serial number.¹⁹

Content creators have experimented with *disposable media*. One of the earlier efforts reflecting this technology was DIVX, spearheaded by the now defunct Circuit City. DIVX video discs (which have no relation to the DivX video format that exists today) had to be played in special disc players. Once a person began playing a DIVX disc, it deactivated forty-eight hours later unless the user called a billing center to reactivate the disc.²⁰ Vendors of e-books used by libraries, such as OverDrive, use a variation of this technology. When a library patron checks out an e-book using OverDrive, the e-book

effectively self-destructs at the end of the checkout period, disappearing from the patron's account and becoming unreadable by the patron's devices unless renewed.²¹

Copy Protection

DRM also operates through *copy protection*, which prevents the user from making a copy of a work. One of the more commonly encountered forms of copy protection is *encryption*. The digital content is written in a code that can only be read by devices or software with the proper key to unlock the code. DRM often uses a form of encryption called *scrambling*, in which the key to decrypting the content is hardwired into the computer or device that reads the content.²² Often, people will use the terms *encryption* and *scrambling* interchangeably. The copy protection on DVDs and Blu-ray discs is an example of scrambling. Encryption is frequently used to disable copying features, because the key to decode the encryption often only lets the user make a limited number of copies or prohibits copying completely. User authentication technology often accompanies encryption to make sure that the device attempting to play the content is using a legitimate key to unlock the code.

Another method content makers use to protect against copying is by *disabling or restricting copying features* or *copy equipment*. The DRM that Sony previously placed on its music CDs used this method of access control. This DRM came in the form of a "rootkit," software that hides itself on the computer so that a user will not notice it through ordinary processes. Sony's rootkit installed a program that allowed the user to burn a copy of a disc a maximum of three times.²³

Instead of using technology that prevents copying, content makers sometimes use *digital watermarks*. Just as a traditional watermark design on a piece of paper is only visible when you hold the paper up to the light, a digital watermark is a file or piece of computer code that the everyday user is unlikely to notice. On the other hand, a person looking for the watermark to verify legitimate use, such as the content maker, will know where to find it. If a content maker uses digital watermarking, usually each copy of a work sold gets a unique watermark. That way, if a program or movie shows up illegally on the Internet, the content owner will know the exact copy of the work that was used to create the illegal copy or copies. Content makers sometimes make the watermarks more obvious. Movie and TV producers often send screener DVDs to the people who vote on the Oscar and Emmy Awards. When playing one of these screener discs, words will appear on the screen notifying the viewer that they are watching a copy of the disc intended for use by award judges only, along with an ID number that is tied to a specific screener recipient. Although it does not prohibit or disable the playing of the

content, there is the hope that the notice, which will also be embedded in any illegally created copies, will discourage reproduction and distribution.

While watermarking adds something extra to the content to make it easy to identify the origin of the illegal copy, *fingerprinting* seeks to identify copies by using aspects of a work such as a song's rhythm and tempo, or the colors and hues used in a movie, to create unique identifiers.²⁴ YouTube's Content ID system is an example of fingerprinting.²⁵

As you can see, there are a number of different options available to content owners if they want to include DRM in their product, and those options have the support of the law if someone tries to circumvent them. But what do these technologies look like in everyday life?

DIGITAL RIGHTS MANAGEMENT LIBRARIANS OFTEN ENCOUNTER

DRM is an everyday presence for many people, especially librarians. Whether enjoying entertainment at home or helping patrons access information at work, librarians regularly encounter numerous examples of DRM.

DVDs and Blu-ray Discs

Commercially produced DVDs and Blu-ray discs include DRM. DVDs use a technology called Content Scramble System (CSS), which combines user authentication and disabling of copying with scrambling. A DVD encoded with CSS has a list of keys that are used to unlock the code. The DVD then compares its list of keys with the key the DVD player is using. If the player's key is on the list of valid keys, the DVD plays.²⁶

Blu-ray discs have several types of DRM. Advanced Access Content System (AACS) works much the same way as CSS by encrypting the content on the disc and authenticating the user.²⁷ Cinavia technology acts as a digital watermark.²⁸ High-Bandwidth Digital Content Protection (HDCP) is an added form of user authentication. A DVD player with a proper key to decode CSS can play the disc on any monitor or TV set, but a Blu-ray player with the right key to decode HDCP must be attached to a TV or monitor that also has a valid HDCP code. Otherwise, the Blu-ray player deliberately downgrades the resolution of the playback.²⁹

E-books and Online Journals

DRM appears in many e-books and online subscription journals. With e-books, it often takes the form of specialized hardware and software. Reading a book in Amazon's AZW or KF8 formats requires a Kindle standalone e-reader, Amazon's Kindle program for computers, or Amazon's web browser

plugin.³⁰ Apple's iBooks are protected by Apple's FairPlay technology; iBooks can only be read on Apple devices.³¹

Adobe's Portable Document Format (PDF) is a file format that can be created and read by a variety of programs and devices, but Adobe also has a format called Digital Editions that uses DRM called ADEPT (Adobe Digital Experience Protection Technology). ADEPT combines specialized software with user authentication and watermarking so that a person can install Digital Editions on different devices and read an e-book on all of them as long as they log in with the user ID connected to the book.³²

DRM is embedded in journal articles in subscription databases such as EBSCO or Elsevier, as well as articles from the *New York Times's* website. Some databases watermark articles that users download, and they often employ a form of user authentication. NYTimes.com makes you create a user ID and password to confirm you are a subscriber entitled to read all the articles on the website or a nonsubscriber who can only read a certain number of articles per month. If someone does not want to log in, NYTimes.com might use some other way to identify them, such as adding a cookie (a small file) to the browser that lets the website know who the user is and how many articles they have read. Databases designed with institutional access in mind, such as EBSCOHost or Elsevier's ScienceDirect, often use IP authentication.

Software

Software comes wrapped in DRM. Sometimes the DRM is placed there by its maker, such as when Microsoft requires you to agree to a user license and input a key in order to install Windows or Office. Sometimes the DRM is added by a distributor. Valve Software's Steam is a program users install on their computer that acts as a distribution system for game software made by numerous companies, not just Valve. Steam acts as encryption and user authentication, only allowing someone to access and run the games it installs when the user is logged in as the purchaser of those games. Steam also acts as specialized software DRM. If Steam is not installed, the game it installed won't run.³³ Apple uses specialized hardware and user authentication DRM for its iOS devices, such as the iPad and iPhone. If someone wants to use an app for an iOS device, they must install it through Apple's App Store, which requires them to log in with their Apple ID.³⁴

Makers of software for video game consoles use several DRM techniques to protect their programs. The console is a classic example of specialized hardware. For example, PlayStation game discs only work on a PlayStation. Sony, Microsoft, and Nintendo also have online stores where you can purchase digital copies of games. These stores employ user identification much like Steam or Apple's App Store; you must log in with your user ID in order to play games you purchased with that ID.³⁵

Sometimes, software with DRM will play on as many devices as you like. As long as you have the physical game disc, a Sony PlayStation game will play on any PlayStation console anywhere. As long as you are logged into your Steam account, you can install and play any games you have purchased through that ID.

Other times, the DRM will limit the number of computers or devices on which you can use the software. A specific PlayStation Network user ID can only install downloaded games on a capped number of different PlayStation consoles. Microsoft software keys only work for a specific number of installs before you have to contact Microsoft to ask permission for additional installs.

Streaming Audio and Video

Streaming audio and video services such as Spotify, Netflix, and Hulu are becoming very popular with the general public. Libraries are also subscribing to video streaming services, such as Hoopla, Swank, and Kanopy, in order to provide TV programs and movies for their patrons. More and more people are willing to pay a monthly subscription fee for a large collection of music, TV shows, or movies instead of paying piece by piece to buy individual works. Even YouTube, which allows free access to most of its videos, has a system called Content ID³⁶ that acts as fingerprinting DRM, as well as Encrypted Media Extensions (EMEs), plugins that allow the website to attach DRM to streaming media and prevent someone from downloading a copy of a video to their computer's hard drive.³⁷

Many streaming services contain user authentication and encryption technology to prevent users from downloading and saving a copy of streamed content, only allow a download that lasts for a limited amount of time, or make sure that only subscribers can access the shows or the music. Many streaming sites use Microsoft's Silverlight, DRM that can prevent audio/video streams from being saved to a computer or deactivate permissible downloads after a specified period of time unless the content provider extends the user's access.³⁸ Microsoft has stopped developing and supporting Silverlight,³⁹ but other forms of DRM are stepping in to take its place. The World Wide Web Consortium, the primary organization that sets standards for the World Wide Web, recently released recommended standards for HTML5.⁴⁰ HTML5 is the latest version of Hypertext Markup Language, the computer language that forms the backbone of websites. One of the features of HTML5 is the ability to add EMEs. Many apps that play media on Android or Apple iOS devices also include proprietary DRM to prevent the user from copying content and to stop unauthorized users from accessing the audio/video stream.⁴¹ Adobe has also created DRM technology called PrimeTime that works in much the same way as Silverlight.⁴²

Whether using a database for research, reading an e-book, or watching a video, today's librarian encounters many forms of DRM. But why is it so popular among content owners today? What are the reasons for including DRM in so many products?

ARGUMENTS IN SUPPORT OF DIGITAL RIGHTS MANAGEMENT

Content creators and content owners argue that DRM is vital to protect the rights granted to them by law to control how content is sold, copied, repurposed, modified, and publicly performed. In the United States, the Constitution gives Congress the authority to create copyright law to grant authors "for limited Times . . . the exclusive Right to their respective Writings" in order "to promote the Progress of Science and Useful Arts."⁴³ U.S. copyright law gives copyright owners several exclusive rights,⁴⁴ which they can transfer to others. DRM provides copyright holders with an additional set of tools to limit access to their works and prevent the violation of their copyright.

First and Third Exclusive Rights

(1) "to reproduce the copyrighted work in copies or phonorecord" and (3) "to distribute copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease, or lending"⁴⁵

From its inception, copyright law's primary function has been to prevent the unauthorized reproduction, or copying, of protected works by imposing civil and criminal penalties on those who violate this exclusive right.⁴⁶ The ability to create high-quality, perfect digital reproductions of creative works that will not degrade in quality as these copies are shared has led to a boom in piracy compared to the level of copying that existed when things were done mechanically or with analog technologies.⁴⁷ With the proliferation of software copying in the 1980s and 1990s, followed by the advent of peer-to-peer file sharing services such as Napster that led to rampant unauthorized audio MP3 and video file distribution in the 2000s, it seems that the penalties contained in the Copyright Act are not a sufficient deterrent to preventing unauthorized copying.

The ease of copying items found on the Internet may be creating a culture in which people do not see such copying as a bad thing. A 2011 study by the American Assembly at Columbia University found that 46 percent of American adults acquired media through ways other than buying a legal copy, but that number went up to 70 percent for people age eighteen to twenty-nine. Over 70 percent of American adults in the study said that it was "reasonable" to share movies, TV shows, and music with family, while about 60 percent said the same thing about sharing those works with friends. Only

15 percent of all American adults said it was reasonable to upload pirated copies of works to websites where anyone could download them, but again that number increased to 24 percent of Americans age eighteen to twenty-nine.⁴⁸

DRM copy protection technology provides an additional degree of deterrence by making it more difficult to engage in unauthorized copying. Just as there are a variety of ways to store physical goods securely (safe deposit box, house safe, locking the front door of your house), there are several methods of DRM that content creators can use to lock down digital versions of their works. By the same token, DRM is supported by legal penalties just as physical locks are supported by laws against burglary.

The Digital Millennium Copyright Act⁴⁹ (DMCA) adds legal weight to DRM's technological controls. The DMCA includes an *anti-circumvention provision*⁵⁰ that makes it illegal to work around any DRM measure or to make or offer to the public any technology that circumvents DRM.⁵¹ This provision attempts to increase deterrence for digital copying by imposing hefty fines on those who successfully tamper with the technology and then make and distribute copies. The copyright holder can sue someone who violates this law and get either actual damages (including any profit the violator made) or \$200 to \$2,500 per violation.⁵² Every three years, the Librarian of Congress creates a list of exceptions to this rule, but they are very specific (for example, allowing e-readers to read e-books aloud for people with visual impairment) and expire at the end of the three-year period if they are not renewed.⁵³ The Librarian of Congress released the latest list of exemptions on October 28, 2015.⁵⁴ The U.S. Copyright Office has created a web page that includes a FAQ listing all the approved exemptions, along with exemptions the public asked for but the Librarian of Congress rejected. This page also has public comments on, and transcripts of hearings about, the exemptions.⁵⁵

DRM also allows a content owner or distributor to terminate access to a copy of a work if it is determined the copy or the user infringed copyright. In July 2009, some Kindle readers discovered that Amazon had revoked access to copies of George Orwell's *Animal Farm* and (ironically) *1984*. By 2009, Orwell's books were in the public domain in the UK but not in the United States, and the revoked books were UK editions created under public-domain rights being sold on Amazon US's Marketplace (an eBay-like area for third-party sellers) by an unauthorized dealer.⁵⁶

Major publishers, music labels, movie studios, and software companies have been strong proponents of DRM because piracy of digital media has taken a toll on the profits of authorized distributors and copyright holders of popular creative works. The access controls provided by DRM attempt to limit the use of a work to only those authorized to do so, who are ordinarily those who have paid for access to that work, such as purchasers of FairPlay-

protected audio, video, and e-book files from Apple's iTunes and iBooks stores.

It was estimated in 2013 that piracy of digital media costs the related industries \$18.5 billion per year.⁵⁷ While the music and movie industries have initiated several high-profile lawsuits against the makers of DVD ripping software,⁵⁸ peer-to-peer file sharing services,⁵⁹ and individual infringers,⁶⁰ these lawsuits have resulted in a small recovery of the revenue lost due to piracy.⁶¹ In order to "promote the Progress of Science and Useful Arts,"⁶² content creators expect compensation for the use of their work, and that expectation helps encourage other potential creators to dedicate their time toward making original creative works. The threat of legal penalties under copyright law has not slowed the growth of piracy of digital media content, making DRM a more effective deterrent for unauthorized copying by placing a technological barrier between the use of content and copying.

Silicon Valley and Hollywood banded together in 2007 to launch Hulu, an ad-supported video streaming site where viewers could watch content from ABC, Fox, NBC, and several other television networks and movie studios, as a joint venture between the parent companies of those networks. Hulu content is encoded with Microsoft PlayReady DRM to prevent unauthorized saving or copying of the video streams.⁶³ Through this joint venture, along with many other licensed and DRM-protected streaming video and music services such as Netflix, Pandora, and Spotify, content distributors have been able to monetize the use and distribution of their content while resting assured that the content will not be copied and pirated by users of these services.

Second Exclusive Right

(2) "to prepare derivative works based upon the copyrighted work"⁶⁴

This second exclusive right extends the copyright holder's control beyond how the original creative work is used and grants control over how later works are permitted to build on, borrow from, or modify the original work. The creation of unauthorized derivative works flouts the spirit of the moral rights that some countries have granted creators in order to protect their artistic vision from being distorted by others. Derivative works may be critical of the creator of the original work and harmful to that creator's reputation. Derivative works may also be profitable when they take advantage of the popularity of the original work to create unauthorized content appealing to consumers interested in the original work.

One of the highest-profile examples of the ease of creating a profitable derivative work from a digital original using common software is the now-iconic Barack Obama "Hope" poster created by visual artist Shepard Fairey

during the 2008 presidential campaign. Fairey created the poster using an online digital photograph from Associated Press photographer Mannie Garcia. Fairey altered the photograph in Adobe Photoshop, printed it out, hand cut four layers of rubylith film using the printouts as a guide, scanned the result back into Photoshop, and then finished creating the poster in Adobe Illustrator.⁶⁵ Fairey went on to earn roughly \$1 million from the poster and, in anticipation of a lawsuit from the Associated Press for copyright infringement in the creation of the derivative work, sued seeking a declaratory judgment that his poster was protected as a fair use of the original image.⁶⁶ The suit settled in 2011 for an undisclosed amount.⁶⁷

DRM helps creators ensure that their works will be experienced in the form they intended by preventing others from making any changes to the work. DRM also prevents profitable derivative works from being created that could potentially compete with the original work and strip away part of its market share. In the absence of DRM, technology today makes the creation of a derivative work as easy as choosing “Save As” for a digital work and modifying that work in text, image, or video editing software.

Fourth, Fifth, and Sixth Exclusive Rights

(4) “in the case of literary, musical, dramatic, and choreographic works, pantomimes, and motion pictures and other audiovisual works, to perform the copyrighted work publicly”; (5) “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, to display the copyrighted work publicly”; and (6) “in the case of sound recordings, to perform the copyrighted work publicly by means of a digital audio transmission”⁶⁸

For many creative works, such as film and dramatic works, a large portion of revenue to the copyright holder comes from the performance of those works to a paying audience rather than the sale of copies of the work. These benefits are protected by the exclusive rights to public performance and public display of particular types of work along with the exclusive right to digital audio performance.

For the film industry, the majority of profits come from box office ticket sales at movie theaters.⁶⁹ Nearly all movie theaters in the United States use digital cinema technologies to project their movies,⁷⁰ and these technologies use DRM to prevent the unauthorized use and copying of the movies. Digital cinema relies on DRM that associates a security key with both a particular movie file and the specific projector intended to display that movie to ensure that a movie file cannot be played on any other projector, even if it is the same make and model.⁷¹ This extremely limiting form of DRM demonstrates

how strict the film industry has become in order to combat the digital piracy of movie in venues where the film is intended to be publicly viewed.

In the case of the music industry, public performance of digital audio includes transmission through an online interactive music service, such as Pandora's online radio stations or Spotify's on-demand playing of individual music tracks.⁷² Industry revenue from digital music sales and streams is now on par with physical music sales—the sale of CDs and vinyl records.⁷³ These digital audio streams are protected by DRM to ensure that the streamed music is only used in the manner licensed to the streaming service, making unauthorized transmission or copying difficult to achieve. Similar to the other exclusive rights granted to copyright holders, public performance and display rights are aided by the protection of DRM in industries where digital distribution and sales are making up an ever increasing portion of revenues, soon to become the dominant source of revenue, for the creative works that serve as the lifeblood of that industry.

Content creators and owners have several artistic and financial reasons for including DRM in digital works—reasons that are backed by copyright and moral rights laws—but many users and people in the library community oppose it. What are their reasons?

ARGUMENTS AGAINST DIGITAL RIGHTS MANAGEMENT

Most people agree that content creators and owners should be properly compensated for their work. Many also agree with the idea of protecting an artist's moral rights in their work, even if those rights are not generally protected under United States law. We would frown on someone who copied another person's work and tried to pass it off as their own, even if they didn't make any money doing it. When footage of the late Fred Astaire was photo-shopped into an ad for a vacuum cleaner, many people felt it was *wrong*, even if it was legal at the time.

Even though most people agree on that point, many in the content user and librarian community believe that DRM, in its current form at least, is the wrong way to balance the rights of the content owners and users. The American Library Association⁷⁴ and digital civil liberties advocacy group Electronic Frontier Foundation⁷⁵ have advocated against DRM. Why does DRM face such strong opposition?

Fair Use

Even though the U.S. Constitution describes the right of authors to their "Writings" as an exclusive one for a limited time, American law has developed exceptions to this right in order to strike a balance between an author's private rights and the public interest. DRM threatens this balance.

One of the most well-known exceptions to copyright protection is *fair use*. Anglo-American law developed the concept of fair use so that the exclusive rights the government granted creators would not interfere with copyright's main purpose: promoting science and the useful arts. By allowing authors to excerpt, within reason, copyrighted works, those authors could build on their predecessors' efforts through commentary, criticism, and the creation of new works, adding to the body of public knowledge.⁷⁶

Fair use is often a hard concept to clearly define. When a person is accused of infringing someone else's copyright and claims fair use, the court weighs several factors to determine if fair use applies in the situation or not. The analysis is done on a case-by-case basis; there is no simple formula to tell a person whether or not what they want to do is fair use.⁷⁷ American courts have spent many years developing a body of law that protects the rights of both creators and users.

DRM, however, skews the equation in content owners' favor. A content owner can prevent the use of material even if that use would be fair use, and there may be little the user can do about it. For example, in 2009, video remix artist Jonathan McIntosh created a video using clips from the *Twilight* movies and from *Buffy the Vampire Slayer* and posted his video to YouTube. McIntosh's video, a commentary on gender role portrayals in popular media, was specifically cited by the U.S. Copyright Office as an example of fair use worthy of protection. Nevertheless, in 2012, the movie studio that owned the rights to the *Twilight* movies, Lionsgate Pictures, used YouTube's DRM, called Content ID, to identify McIntosh's video as infringing content.

McIntosh disputed the infringement claim twice, but under YouTube's process, the copyright holder considers the disputes and appeals and decides whether to drop their infringement claim or to take down the video.⁷⁸ Lionsgate, the copyright holder, rejected McIntosh's initial dispute of the claim but later accepted his appeal, and YouTube reinstated the video. The same day McIntosh's appeal was accepted, though, Lionsgate filed a second claim that the video infringed on its copyright. Lionsgate rejected McIntosh's next dispute and appeal; YouTube pulled the video and put McIntosh's account on probation. Eventually, after McIntosh's troubles went public, YouTube restored his video without comment.⁷⁹

McIntosh was able to get his work of fair use restored in the end, but he was a fair-use activist willing to go through considerable hassle in order to protect his rights and had the help of a nonprofit legal firm. Many other users in the same situation would likely give up and stop exercising their right of fair use. United States copyright law has a section⁸⁰ that is supposed to prevent copyright holders from ordering the removal of works that are clearly fair use. Under this section, a copyright holder can be forced to pay litigation costs if it says a work infringes their copyright but knows that it does not. In reality, however, this is hard to prove in court. In a recent case,⁸¹ a federal

appellate court said that the copyright holder does not have to thoroughly consider whether fair use applies, they just have to consider it, and the judges opined that using a computer algorithm might satisfy this need.⁸²

DRM can stop the exercise of fair use before it even starts. At a hearing on May 27, 2015, officials from the U.S. Copyright Office heard the story of Janine Cook, who is the head teacher at YESPhilly, a nonprofit organization that helps young adults earn their GEDs. Cook wanted her students to use clips from various movies to create their own poetry videos for a project, as allowed under fair use, but they would have to work around the DRM on streaming videos or DVDs to do that. Had YESPhilly been a college program, it would have had a legal exemption allowing it to work around DRM on the videos. Nonprofit GED programs such as YESPhilly, however, do not have an exemption and could be fined for circumventing the DRM.⁸³ Later that year, the Librarian of Congress created a new exemption for nonprofit organizations such as YESPhilly,⁸⁴ but since the exemptions only last three years, organizations such as YESPhilly must rely on the continuing mercy of the Librarian of Congress to avoid returning to the same problem in the future.

Limits Users' Options

DRM effectively punishes people who own legitimate copies of a work by subjecting them to restrictions that owners of pirated copies do not face. A purchased print book comes with certain rights. A person willing to pay for a legitimate copy of the same work in digital format may find that she simply cannot replicate the print owner's rights because she owns the "wrong" e-reader or other device, lives in the wrong area, or does not have the proper Internet connection.

DRM technology often locks users into specific devices. A Nook cannot read an e-book in Kindle format. How about that audiobook you checked out from the local library? For many years, many audiobooks from libraries came from OverDrive, and most of their audiobooks came with DRM that did not let the audiobook play on Apple devices.⁸⁵

Difficult to Use

Sometimes, DRM prevents a person from accessing content no matter how much they would be willing to pay. Regional restrictions coded into a DVD or Blu-ray disc purchased in another country can prevent it from playing on a person's player in their home. Someone who subscribes to Major League Baseball's or the National Football League's game-streaming service will find that games involving the local team are blacked out, courtesy of DRM. For example, the only way a Seattle Seahawks fan can watch their team

online is if he or she does not live in the Pacific Northwest.⁸⁶ Americans who pay for a Netflix or Hulu subscription discover that regional restriction DRM prevents them from watching their subscription when traveling or living overseas.⁸⁷

People often find that DRM makes it difficult for their device to play the content they are trying to use. Several high-profile video games come with “always-online DRM.” This form of DRM requires the computer or console playing the game to have an active Internet connection to help verify that the copy of the game is legitimate. If the player’s Internet connection is disrupted for a moment (a realistic possibility for most people), there is a good chance the game will stop and cause the player to lose progress made since the last save.⁸⁸

DRM can make it difficult for a person who is not tech savvy to read or watch the material they want to borrow from the library. A person who checks out an audiobook with DRM using Overdrive might have to decode messages such as “Error:0x80070057: The parameter is incorrect”⁸⁹ or “Unable to acquire license to play selected title. The requested license is either invalid or already acquired.”⁹⁰ A user who is fairly comfortable with troubleshooting technology can easily search the web to find a solution to the error messages, but errors such as these add an extra barrier to users who are less adept at solving technology issues. A web comic called *The Brads* illustrates these problems nicely; the solution the comic comes up with implies that the best way to handle DRM is to avoid it.⁹¹

Can Be Harmful

DRM can do more than just annoy users. In some cases, DRM can pose a threat to the users’ devices. Sony BMG added a rootkit DRM to its CDs in 2004. This rootkit installed a music player and software that would only allow a computer to play the CD using that music player. This software also limited the computer to making three copies of the CD.

In addition to the copy restrictions, though, the rootkit put the user’s computer at serious risk. It took over some of a computer’s most important processes so that antivirus software cannot detect it. Sony’s rootkit, called XCP, was poorly written and created security holes in the computers on which it was installed.⁹² At least three different viruses were created to take advantage of these security holes.⁹³

Even if the user decided not to play Sony BMG CDs on their computer anymore, XCP made itself very difficult to remove. The rootkit did not display as an entry in the Add/Remove Programs menu, nor did the CD come with a program to uninstall XCP. A user could not remove it through the usual procedures. If a user tried more advanced techniques to remove the rootkit, it would damage the operating system, potentially rendering the CD

drive unusable and requiring the user to reinstall the operating system.⁹⁴ Sony BMG eventually provided a tool to uninstall XCP, but that tool created a new security vulnerability.⁹⁵ By November 2005, Sony BMG stopped including XCP on its CDs, and Microsoft identified it as spyware.⁹⁶ As security expert Bruce Schneier put it, “the only thing that [made] this rootkit legitimate is that a multinational corporation put it on your computer, not a criminal organization.”⁹⁷

License, not Ownership

Along with making it difficult to use the content they have paid for and potentially damaging a user’s equipment, DRM prevents a user from truly owning the copy of the purchased content. At best, a user has bought a license to use the content for as long as the content owner is willing and able to provide it.

As discussed above with the Kindle versions of Orwell’s *Animal Farm* and *1984*, a content owner or distributor can revoke access to a copy of a work that a user has purchased. Although in this case Amazon had a legal reason for removing these copies of Orwell’s books, Amazon could have just as easily revoked access to any other book. The only thing stopping them is the Kindle terms of service, which Amazon has the right to change at any time.

In 2013, a purchaser of Disney streaming video through Amazon later discovered that Amazon revoked his access to the video at Disney’s request. Disney, it turned out, wanted to distribute the video exclusively through its own channels during the holiday season. Amazon restored the purchaser’s access to the video after the media reported on it, but it seems as if this action was at its discretion. The terms of service for buying streaming videos from Amazon noted that the purchaser had no recourse if they lost access to the video because Amazon’s license to sell it expired.⁹⁸

DRM’s ability to create self-destructing copies of a work means that libraries may now find themselves paying repeatedly for the same book. E-books that HarperCollins sells to libraries now come with a DRM-enforced twenty-six-loan cap. If a library wants to lend the book out more than twenty-six times, it has to buy another copy.⁹⁹

Even if the user’s license does not have an explicit cap on how long the user can access a copy, a change in the content owner’s DRM technology can leave the user with a useless collection of bits and bytes. Boston Red Sox fan Allan Wood bought several hundred dollars’ worth of videos from MLB.com (Major League Baseball’s online video service), then one day discovered that his videos became unplayable because MLB.com changed the company that provided their DRM. MLB.com’s initial response was that the videos were onetime sales—no refunds. Wood, of course, was free to buy the videos

again if he wanted to watch them. MLB.com later changed their stance and allowed Wood and other affected customers to redownload the videos for free, but MLB.com was under no obligation to do so.¹⁰⁰

A licensor of DRM-protected content can also lose access to their copies if the content owner goes out of business. JManga was a website launched by several Japanese publishers to provide legitimate, online English-language translations of manga (Japanese graphic novels). JManga's DRM required users to access the manga using JManga's website; users could not download copies to their local device. The website closed less than two years after it began, and customers lost all access to the manga they had purchased with no refunds.¹⁰¹

User Privacy

Along with the restrictions it places on a user's access to purchased content, DRM also has the potential to intrude on a user's privacy. Adobe's Digital Editions DRM keeps track of what books a user has downloaded, how long a user has read a particular book, how far in a book the user has progressed, and where the user is reading that book and sends that information back to Adobe. Additionally, in 2014, users learned that Adobe was transmitting this information unencrypted over the Internet, where it could be easily intercepted.¹⁰² Adobe promised to encrypt the data in the future, but that still leaves a lot of information about reading habits in one location where it could potentially be improperly used or even subpoenaed in a legal action.

DRM restricts customers' ability to exercise their full legal rights to use copies they have legitimately purchased. It turns purchasers from owners into licensors at the content owner's pleasure, potentially harms their devices, and invades their privacy. These circumstances have led many users and librarians to resist DRM.

CONCLUSION

Technological advances make it easy for artists to reach audiences they could have only reached in previous eras with great difficulty. On the other hand, that same technology makes it easier to make unauthorized copies of artists' works, whether pure copies or modified versions. DRM is one of the tools artists, content owners, and content distributors use to reduce unauthorized access, copying, and distribution, but it is a tool that comes with substantial costs to the end users of that content. The debate over DRM is an important one, and we hope you find this book a useful guide to the technology and its use.

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