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An Evaluation of Multiple Perceptions of Digital Rights Management

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ABSTRACT

Digital Rights Management (DRM) solutions have generated much interest because of their influence on the expectations and responsibilities of customers and related organizations. It was created to restrict piracy and enhance digital media sales, however, it is found to be unable to fulfill its objectives. We find the protections by DRM lack an understanding of the end user and the evolving nature of copyright and fair use. The potential motives for pirating appear to increase as DRM becomes more intrusive causing a conflict in the objectives of DRM. Thus, adjustments must be made to the current DRM model in order for it to become beneficial for both the producer and the consumer. Our research identifies the needs, desires, and responsibilities of the various DRM stakeholders so that a successful use of DRM technologies can be modeled: a challenge faced by the media industry.

Keywords

Copyright, digital rights management, DRM, electronic commerce, fair use, online music business, piracy

INTRODUCTION

Rapid improvement in technology and processing capabilities of computing infrastructure is altering the nature of our society. The availability of the Internet has changed how we transfer data and communicate. We are not only using Internet applications like email to send messages, but are also utilizing the Internet to legally/illegally share the intellectual property (music, games, software, to name a few) with our friends, acquaintances, and strangers contacted both directly and indirectly over the Internet. Social networks and peer-to-peer (P2P) technologies further assist in the delivery of these digital files. Although some companies have made an attempt to restrict the transfer of their products by using encryption techniques, decryption is not difficult by today's tech-savvy generation. Content providers are trying to respond by utilizing techniques that restrict the way a user can use the media on a computer, MP3 player, iPod, etc. Digital rights management (DRM) technologies are aimed to manage the scope of the rights of the end user while providing protection to the owners of the digital assets.

If one were to search "DRM" in popular technology-related news website Slashdot.com, the result would be hundreds of articles containing grumblings and outcries from the more technologically minded audience against DRM. Research on this widely debated topic, in general, tends to move toward the technical and away from the people that it affects the most: i.e. the average iPod user that has no idea how their iPod works, just that it plays music they like. These are the consumers DRM affects the most and the one crowd that gets little representation in DRM research. The cryptography sided research in DRM discusses how to implement a stronger form of protection using advanced algorithms and complicated frameworks (Heileman and Jamkhedkar, 2008). Such research is quick to forget that beyond the DRM implementation is a product that should appeal to a wide consumer base in order for it to meet full sales potential. Consequently, there is a need to understand the aspirations and constraints faced by various stakeholders in order to use DRM successfully.

The focus of this research is on the applicability and usefulness of DRM, especially in the digital music industry, and the viewpoint of each role played in the DRM system. The research aims to contribute by investigating the standpoint of each stakeholder affected by DRM along with its objectives to determine what attributes DRM must possess in order to work as a beneficial solution to the digital media industry.

The structure of this paper is as follows. The next section presents an overview and purpose of DRM. Subsequently, we discuss the viewpoints of the various stakeholders of DRM technology to gain a better understanding of their needs, desires, and responsibilities. Throughout this discussion we evaluate the advantages and disadvantage each stakeholder possesses in the current DRM model. This is followed by an assessment of DRM as a balanced system that supports the rights of all stakeholders. Finally we present our conclusions and areas for future research.

DIGITAL RIGHTS MANAGEMENT: AN OVERVIEW

DRM is defined as a piece of technology that encapsulates, controls, and manages content (Kwok, 2002). DRM refers to a range of access control technologies used by content providers to limit and restrict use of provided content. The ways in which these management technologies are implemented vary according to the providers needs. The objectives of DRM can be simplified as the following (Garnett, 2001):

1. Provides consumers with a new way to enjoy digital media.

2. Protects and manages the rights of copyright owners.

3. Implements elements of copyright law and fair use in an appropriate manner.

4. Protects end user's personal rights and interests.

These objectives have an impact on various parties in different ways. For example, DRM can help the copyright owners to restrict the illegal sharing of digital media with other parties. However, it is frequently argued that the same systems can erode the capabilities provided to the users by fair usage doctrine. It is therefore important to first identify various stakeholders which are affected by the adoption of such systems.

THE STAKEHOLDERS:

The current DRM system model contains the following essential stakeholders: the creator, the rights holder, the distributor, and the end user (Bartolini et al, 1999; Arnab and Hutchison, 2004). The legal requirements and conditions of DRM and the copyright/fair use discussions surrounding DRM lead to the recognition of lawmakers as an important addition to this list of stakeholders. Thus, one can establish the following essential stakeholders:

1. *The author or the creator responsible for creating the work*
   In the case of music, this would be the musicians that composed or recorded the work.

2. *The rights holder (or copyright owner) of the work*
   In the music industry, the company owns the work and controls all reproduction rights.

3. *The media distributor*
   Music distributors gain licenses from the rights holders in order to sell their music.

4. *The end user*
   The end user is the final step in the process involving the purchasing of the digital music through the distributor.

5. *The lawmaker*
   Lawmakers pass copyright laws to protect the author and rights holder while allowing fair use exceptions for the end user.

THE CREATORS' VIEWPOINT

For the creators of content, DRM serves to protect their creative output and labor. A moral problem exists where digital technology is used to pirate copyrighted content. This act cheapens the value of the authors' creativity and undermines the basic building blocks of modern society (Garnett, 2001). While the creative community desires to take advantage of the Internet and its possibilities, without the protection of DRM the ability to legally enforce the rights of the creators grows increasingly more difficult.

Analog content has high levels of integrity not only because of the difficulty of altering analog content but also because of its widespread distribution (Camp, 2002). Digital media lacks in this area. With the advent of digital media, distribution is now synonymous with copying, a nearly cost-free process that can now be completed almost instantaneously. With this in mind, creators could view DRM as not only trying to solve a piracy problem, but also creating a system of integrity for their digital content.

THE COPYRIGHT OWNERS' VIEWPOINT

Copyright owners want to track the illegal use of DRM enabled media, collect the correct revenue for their works, create a secure distribution channel, and prevent the illegal use of their works (Arnab and Hutchison, 2004). DRM is the result of copyright owners demanding that distributors take law enforcement in their own hands. From the copyright owners' point of view, drastic action was needed because law enforcement was not able to make a large enough impact to discourage piracy (Schultz, 2006). DRM implementation offers greater control of the digital product and the potential to obtain the full possible

revenue. While the protection that DRM offers to the copyright owners appears beneficial, the current model fails to create any benefits to those on the receiving end (Callas, 2007).

Copyright owners have undergone heavy criticism for implementing DRM systems on CDs and computer software. Sony BMG was sued in late 2005 for installing spyware on music CDs (Bradbury, 2007). Girard Gibbs recently filed a class action lawsuit on October 27th, 2008, versus Electronic Arts for all games bundled with SecuROM (SecuROM Lawsuits, 2008). SecuROM, a DRM system created by Sony DADC, has become problematic because many legitimate users have experienced technical problems with their PC as a result of the software being installed. Users having made genuine purchases of these softwares became outraged because illegal DRM-free copies did not have the same problems. Backfires like these have caused a large focus of heavy criticism to fall on these companies.

Faced with a similar piracy problem, the television industry took a different approach. File sharers were uploading their video files of television shows and causing advertisers to complain to the networks because people were watching the shows without the advertising. The solution: FOX, NBC, ABC, and many other television networks made the shows available online for free for a couple month period after it aired. On these uploaded videos, brief commercials were inserted throughout the show. Not only did these videos appeal to advertisers as an additional and new way of advertising, but they also appealed to the users since the videos streamed quickly, were of a high quality, and were provided on a safe website.

THE DISTRIBUTORS' VIEWPOINT

Acting as the man-in-the-middle, distributors must manage the demands of the music providing right holders while still remaining appealing to the consumer. It would be false to assume that online music business distributors have cornered the music market. Online music companies like iTunes have taken online sales to new levels, but there is still a large amount of competition from physical stores. The 2007 Digital Music Survey (Entertainment Media Research, 2007) estimates that digital downloading of music has not affected 45% of CD buying consumers with 7% of consumers buying more CDs as a result of digital music downloading causing the cost of CD's to drop.

In one of Steve Jobs' letters to the public he states that one of the difficult requirements Apple must meet to sell music from big name music companies is the protection of their content (Jobs, 2007). The problem is that there are many people who break DRM systems and publish their techniques allowing previously DRM-protected material to be accessed both legally and illegally (Jobs, 2007). If DRM is so easily broken by hackers, why not make a stronger system? While it is technically possible to create a DRM system that is almost unbreakable, it would be almost impossible to use (Bradbury, 2007).

As a result of the desires of copyright owners, alternative methods have been researched such as a DRM system that implements tracking of protected media. This creates a new problem that produces a logistical nightmare for ISPs requiring every ISP to implement such a tracking system (Arnab and Hutchison, 2004). Also, the use of firewalls and proxies will mean users will only get a consolidated bill and additional detectors will be required to detect the actual users of the work (Arnab and Hutchison, 2004). Further more, analyzing data that is distributed on secure encrypted channels would not be worth the result.

Distributors are often criticized for creating DRM systems lacking fair use, with research and public opinion both demanding the implementation of fairer DRM rules (Fox and LaMacchia, 2003). This responsibility is unfairly placed on the distributor. The development of these systems has been the result of pressure from the copyright holders. The goal of DRM architects is to appease the wishes of the copyright holders in order that the distributors may gain the rights to sell the product. Furthermore, DRM vendors can not simply define fair use as it has no clear values and it is continually developing and changing with technology and common practice (Lohmann, 2002). Historically, the copyright system has allowed for consumers to use the court system to intervene and make fair use decisions if the right holder does not agree with the use. Steve Jobs position states "those unhappy with the current situation should redirect their energies towards persuading the music companies" (Jobs, 2007).

THE END USERS' VIEWPOINT

End users are ready for a DRM system that handles most fair use scenarios, protects their confidentiality, allows for the transfer of rights, and is flexible according to its media type (Arnab and Hutchison, 2004). The reasons DRM has proven to be unpopular is simply expectation and cost: the consumer does not want DRM because nobody wants to pay for something that in the past was unrestricted. To many end users this basic conclusion appears to be ignored by the content providers and copyright owners, leading to a potential decline in online digital media sales if current DRM models remain in use.

The ability to connect millions of people together makes digital music, video, PC games, pictures, documents, and more available for the unbeatable price of "free" hard to beat. Technical support in case of problems as well as a fear of computer

viruses is among the ten most important reasons for people to purchase rather than pirate software (Jaisingh, Kwan, and Tam, 2008). The same result does not appear true for music media (Jaisingh, Kwan, and Tam, 2008). Instead, end users fear that their security and privacy will be violated by quietly implemented DRM systems using rootkit techniques similar to those applied by Sony BMG (Bradbury, 2007).

The same consumers that use peer-to-peer systems to download pirated music are the same people that would never think of purchasing pirated CDs in the physical world (Garnett, 2001). Illegally downloading music does not have a social stigma attached to it. There is no perceived social cost as the result of pirating (Schultz, 2006; Balestino, 2008). With this lack of social cost there is no pressure acting on law enforcement from end users.

As mentioned earlier, the one sided design of DRM fails to offer any benefits to the one paying for the product (Callas, 2007). Since DRM-free music files are already available on CD and P2P networks, those already file sharing have little reason to stop. There are an estimated 885 million music files available for illegal downloading (Balestrino, 2008). With DRM detracting from the appeal of online media purchases, DRM is actually giving the consumer *more* reasons to share files; a dangerous threat to online media businesses. Consider this: If an individual pays for the music, the person is limited to how many times it can be played, how many times can be copied, and who it belongs too. These constraints result in frustrating the user, who otherwise might have never illegally shared the work with another. Such a person might have simply used the file in different situations (MP3 audio player while in the car, or iPod while in a room). But, if one illegally downloads music, the person can convert the files freely and also can copy it unlimitedly, reflecting as if it really belongs to the person. DRM only manages to make a product less appealing to the end user. Content owners seek to use DRM to reduce piracy and change expectations while consumers are not concerned about infringement and demand full use of purchased content (Lohmann, 2002).

THE LAWMAKERS' VIEWPOINT

Acting as the moderator of the other relationships, lawmakers are positioned to find a protecting balance between everyone. Copyright laws have been present in the United States as early as the Copyright Act of 1790. Copyright protected the creative property of maps, charts, and books. In an age where technology allows us to own most things digitally, copyright laws have extended themselves into the digital realm. The problem that we face today is that the laws behind copyright are becoming harder to interpret, as is ownership. Knowing "who owns what" is not as easy as searching a shelf of books anymore. On October 28, 1998, the Digital Millennium Copyright Act (DMCA) was signed into law by President Clinton (Pub. L. No. 105-304, 112 Stat. 2860). In brief, the act criminalizes the production and distribution of technology, devices, or services intended to circumvent measures that control access to copyrighted works. The DMCA also heightens the penalties for copyright infringement on the Internet.

DRM exhibits three basic flaws in the area of fair use (Felten, 2003):

1. Lack of knowledge about the circumstance: the DRM system cannot understand the situation that the protected content is being used in.

2. Inadequate artificial intelligence: currently, no computer's intelligence system is complex enough to make the same decisions that judges and lawmakers make. Computer programmers can not (at this time) program restrictions that take into account the maddeningly vague concept of fair use.

3. It is a system of approximation: in this system, both parties lose. DRM's weaknesses can be exploited for unfair use and legitimate users may be restricted from fair use.

To this, one can also add that DRM prohibits the evolutionary nature of copyright law. In the famous *Sony-Betamax* or *Universal City Studios v. Sony Corporation of America* case the U.S. Supreme Court ruled that Sony could not be held liable for illegal copying of copyright works made using their Sony-Betamax video recorder (Arnab and Hutchison, 2004). The evolution of fair use allowed for these home copies to become legal. Since DRM is not capable of acting as a legal enforcement of rights as it cannot compute the complexities of fair use, it must not be constructed in such a way that its management is stagnant and unwilling to change.

A further analysis of DRM technologies suggests that the DRM is not as much about copyright as it is about end-user agreements (Delgado, Garcia, and Gil, 2007). An end-user agreement is a legally binding contract between the users and the producers. The user must consent to the agreement before they can gain access to the produced content. DRM enforces its ownership, not by copyright, but by an agreement between an individual and the distributor when clicking "Agree to the Terms and Conditions." These terms and conditions do not treat the end user as if he has rights, but rather expectations. Since no technology, and in the same manner, no DRM system has proven to be unbreakable (Samuelson, 2003) it would seem that

the main goal of DRM is not to stop piracy, but rather to change the expectations of the digital downloading consumers regardless of rights. But are our rights in the analog world comparable to our rights in the digital world? DRM emphasizes "restrictions" rather than "rights" (Samuelson, 2003); therefore making DRM an attempt to eliminate the lawmaker by creating a system of end user agreements rather than of copyright and fair use.

CONCLUSION

Copying right owners have strained the importance of protecting their content to media distributors (Jobs, 2007) because law enforcement is not making a large impact on piracy (Schultz, 2006). DRM has become that method of protection. DRM currently lacks the ability to model the vague concept of fair use (Felten, 2003) which effects DRM's ability to mirror and form with social evolution. As shown in Table 1, there are needs and desires of various stakeholders which are yet to be filled under the current DRM mechanisms. In order to create the most stable and optimal balance between the information industries and the consumers, DRM needs to be modeled in a way that protects the rights of all parties (Chang, 2007) while balancing each of their needs and desires. Until the viewpoint of all the stakeholders is taken into consideration, tension will continue to present an unsuccessful online sales model. It is important to note that eliminating DRM completely fails to address the problems that digital content providers and copyright owners face. It is therefore important to assess the failures of DRM and find new models that satisfy the needs, desires, and responsibilities of each stakeholder.

Stakeholders	Needs/Desires	Responsibilities
Creators	Creativity protection Content integrity	Content creation
Copyright Owners	Correct collection of revenue for works Prevention of illegal use of works	Maintain and manage copyrighted content
Distributors	Profitable sale of digital content	Manage product demand and supply
End Users	Fair use of digital content Flexibility Confidentiality	Purchase content legally
Lawmakers	Cohesion between DRM stakeholders	Rights for content creators and owners Fair use for end users

Table 1. The Stakeholders Under Current DRM Model

DRM's current lack of balance endangers the ability online media sales have to compete with physical media sales. There will still be the desire for the convenience of digitally downloading music, but if legitimate purchasing methods mean restricted content, more reasons are created for piracy. DRM is currently not implemented on most physical music media allowing unprotected music to become available on P2P file sharing sites. P2P sites will offer the same digital product but DRM-free. This will create a poor marketing environment for legal distributors of music as consumers who are willing to pay for music may choose to pirate on the sole basis of getting a better product.

DRM must provide a neutral and trusted environment in which technology enforces these agreed-upon arrangements without giving one party an advantage over the other (Garnett, 2001). To achieve this goal, there is a need to maintain a free and effective commercial society that supports the rights of all participants equally. The current DRM is not capable of acting as a legal enforcement of rights since it cannot compute the complexities of fair use. Library and privately owned content no longer covers all aspects of ownership. DRM must also handle these complications (educational use, right to backup, etc) or the entire system fails (Camp, 2002). DRM has had a rough entrance into the media industry. To be successful, DRM needs to appeal to the consumer while still remaining a beneficial solution to content providers. DRM and the tools that break down DRM both have copyright and fair use elements, but neither have solved the problems that the copyright systems solved for physical media - that is, to create a balance, and hence, cohesion between the stakeholders.

CONTRIBUTION AND FUTURE RESEARCH

We see the current DRM model as a step backwards for the entertainment industry. We are not only concerned about the rights that the end user should have, but we also wish for the success of the entertainment companies selling their products digitally. If DRM is going to be destructive to online media sales, then a new solution is needed and current DRM implementation needs to be completely reevaluated. This paper contributes by: 1) providing an understanding of the needs and expectations of various stakeholders affected by DRM, 2) evaluating and determining whether current mechanisms provide an effective and balanced solution beneficial to the digital media industry, and 3) identifying the areas for the needed improvements.

In future research, we plan on assessing the strengths and weaknesses of different implementations of DRM systems by various vendors. As mentioned before, certain television networks have created new ways to combat piracy that benefit all stakeholders. Evaluating the successes and failures of different approaches will help form improved systems and future online business models that are beneficial to everyone. We are also assessing the perception and expectations consumers have toward digital media in order to find a balance between the demands of the right holders and the end users.

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