

A Framework for Legal Analysis of DRM Systems: Copyright and Privacy

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Abstract

Recent developments in profitable digital content distribution such as those in the music industry have seen the increase in the use of digital rights management (DRM) solutions. These systems restrict the usage of digital content and have been recognised for their ability complement, augment or even contradict the law. The aim of this paper is to identify a set of copyright and privacy legal concerns relating to particular features of DRM solutions. DRM solutions can be evaluated on this basis for its ability to correspond to the relevant law, as well as its ability to protect the interests of copyright holders and consumers. Too little protection for the copyright holder will result in copyright holders seeking alternative solutions; too much erosion into the rights and expectations of consumers may attract law suits and poor uptake of products sold using the DRM technology.

1. Introduction

Concerns of digital content piracy have prompted uptake of DRM technologies in recent years by many content providers, notably in the music industry.¹ DRM has the potential to complement, or conversely, usurp the law's ability to preserve the delicate balance between the rights of consumers and the rights of copyright holders [1]. DRM systems essentially implement a "code as code" [2] regime where uses of digital content are regulated by technical instead of legal means and can contradict legal policy [3]. Content providers' tendency to use it to exert extensive control over the use of digital content purchased by consumers pushes the balance in favour of copyright owners, causing an attrition of consumer expectations that are protected by law. This trend is likely to continue with the expansion of DRM into peer-to-peer distribution business models.² This paper attempts to analyse this situation by identifying the legal rights that certain features or capabilities of DRM systems may protect, or on the other hand, cause friction with.

¹ For example: iTunes, MusicMatch.

² These are preferable to publishers of large digital files because the cost of distribution is shifted onto the consumer. One such model proposed is [4].

1.1 Scope

Due to the cross-border nature of distributing digital content via the Internet, an unfeasibly large number of jurisdictions would need to be examined for a full coverage of the law in this area. As such, this paper will instead restrict itself to considering legal issues manifest in the New Zealand jurisdiction with comparisons to the United States jurisdiction where applicable. While certain intricacies will no doubt differ between jurisdictions, this will serve as a general mapping of legal problems to DRM solutions' functionality. The author does not propose an exhaustive expose of all possible issues.

1.2 Terminology

For the purposes of this paper, the term 'DRM system' refers to the technology that carries out the process of packaging (attaching use control mechanisms onto the content), distributing and restricting uses of content. The term 'content' refers to data that is subject to DRM imposed restrictions. It may also be assumed unless otherwise specified that the law discussed is New Zealand law.

1.3 Structure of this paper

The main focus of this paper will be on copyright law, which is separated into subcategories of temporal restrictions, general access restrictions, exceptions to the restrictions and moral rights. Issues relevant to privacy are then examined briefly. For each section, the law will be outlined and its relevance to DRM systems highlighted. The analysis is then summarised in an example based on the Microsoft Media DRM system.

1.4 Contractual Issues

It should be noted that certain consumer rights and expectations may be contracted out of [5].³ That is, the copyright owner may acquire certain rights via contract that would otherwise be considered an intrusion upon consumers' rights. Analysis undertaken in this paper focuses on the functionality of DRM systems, and not on the validity of specific license agreements. It evaluates a DRM system's ability to protect the interests of both consumers and copyright owners without assuming the exclusion of any rights by either party.

³ Some rights are expressly protected by legislation or judicial decisions rendering purported limitations on those rights void.

2. Copyright

It was observed in [6] that “copyright law is difficult (if not impossible) to reduce to code”. The legal validity of restrictions on uses of content is highly circumstantial and varies from case to case depending on what is considered reasonable in context by the Court. This represents one of the fundamental challenges of creating an efficient DRM system that accurately corresponds to legal standards. The following is a more in depth look at what functionality a DRM system would need to support in order to be consistent with copyright law. This section is broken down into the following areas: general principles, access restrictions, fair use exceptions and moral rights.

2.1 General Principles

2.1.1 Temporal Restrictions

Copyrights expire after a predefined number of years, resulting in the cessation of license restrictions on previously protected content. The content becomes public property useable by anyone for any purpose [7]. In New Zealand, the general rule is that copyright expires 50 years after the death of the author for musical, literary, dramatic and artistic works [8].⁴ In the US, copyright protection typically lasts for 70 years after the death of the author [9].⁵ DRM systems, however, have the ability to bar access to content indefinitely, even after the expiration of copyright. This allows former copyright owners to exert control over content that they no longer hold exclusive rights to.

Two points of interest relevant to DRM systems here are: whether the DRM system can provide open access to the content upon expiration of the associated copyright i.e. release the content from DRM restrictions, and whether it can enforce these restrictions based on the jurisdiction that applies to the user.

2.1.2 Restriction of Public Property

This is the inverse of the problem created by DRM systems impeding content from moving into the public domain after copyright has expired. DRM may lock up content that is already in the public domain. The problem is not serious if the content is already widespread, but it is grave if distribution has been limited, and access to unfettered copies is not reasonably available. This is

⁴ s 22 Copyright Act 1994 ([8]).

⁵ s 302, 17 USC ([9]).

exacerbated by the fact that users risk contravening anti-circumvention laws if they seek to access the restricted content by hacking the DRM protection measures. To overcome this issue, a DRM system should audit the content it protects such that public content does not come under DRM restrictions. Alternatively auditing may be done outside the scope of the DRM system, prior to submitting content for packaging.

2.1.3 Doctrine of first sale

One of the principles of copyright law is that the copyright holder loses control of the subsequent flow of content after it has been purchased by a consumer. That is, the copyright owner is prevented from demanding royalties from subsequent dispositions of a published copy [10]. DRM however attaches to the content after first sale and in fact some proposed DRM systems for peer-to-peer distribution are based on the collection of royalties from subsequent sales by peers [11]. Such systems extend control of content beyond copyright laws, and intrude upon consumers' rights.

2.2 Access Restrictions – the rights of copyright owners

Copyright laws protect against copying, adapting, publishing and performing the creation without acquiescence from the copyright owner. These rights are subject to permitted uses exceptions. DRM systems are capable of enforcing the rights technologically, but may also permit control over the use of digital content that extends beyond the ambit of legal protection. It should be noted that copyright, as the name implies, refers to the act of copying content. However in the digital context, where access to content normally requires copying it (e.g. to RAM), it would be naïve to consider the problem solely on the act of copying. DRM systems generally protect copyright holders' rights by restricting the *use* of copied content. Thus references to 'copying' in the following discussion include the subsequent use of copied content i.e. if content cannot be used after it has been copied, then for the purposes of this paper that act of copying has been prohibited by the DRM system.

2.2.1 Copying

It is a breach of copyright to copy the whole of, or any substantial part of another's work in any material form without permission by the copyright owner [7]. The question of whether a substantial part has been copied is not solely a quantitative analysis – it must be determined whether the *essence* of a work has been copied, which is ultimately a subjective decision by a Court. For example, taking a few lines of a song's lyrics may constitute breach [12]. Thus the reproduction of a small part of the content may amount to breach of copyright.

The second method of breach by copying is the reproduction of the content in any other material form. Copyright protects the form of exposition of an idea, i.e. the format and presentation of an idea [7]. This raises some conceptual difficulties in law due to the principle that copyright protects only the expression of an idea, not the idea itself [10] [13]. The distinction between the form of expression and the idea that is protected can be subtle and the courts have not applied it uniformly. The Courts will consider the extent that the detail of an original work has been copied. The more detail that is copied, the more likely a breach of copyright will be found.

Determining whether the essence of a work or the form of exposition is being copied necessitates analysing the actual content and making human judgements. However, it is difficult to see how this element can be incorporated into an efficient and uniform DRM system due to the subjectivity involved in determining what represents the ‘essence’ of a work. Analysis of the *quality* of the content copied may to an extent approximate determination of the ‘essence’ of the work e.g. audio fingerprinting, upon which permissions may be granted or denied. A further complexity to this problem is the retrospective nature of the analysis – the content would need to be first copied, then analysed for compliance. Prohibiting copying as a whole or partially is relatively straightforward in comparison.

From these legal requirements, three questions relevant to DRM systems arise; each question if answered in the affirmative represents greater accord with the law than the previous. First, whether the DRM system restricts copying as a whole. Second, whether the DRM system allows partial copying, but restricts the quantity that may be copied from the content. This accounts for the quantitative component of determining whether a substantial part of the content has been copied. Third, whether there are mechanisms capable of determining if copying certain parts of the work constitutes the ‘essence’ of the original such that copying is prohibited only if the ‘essence’ of the work is being copied.

2.2.2 Adaptation

Similar to copying, adaptation is the conversion of content from one form of expression into another, for example converting a novel into a play, translating a computer program from one programming language into another, or an arrangement or transcription of musical works.⁶ As with the prohibition against copying content in any material form, the distinction between the idea and its expression is weak. In terms of digital content, file conversion may constitute an adaptation.

⁶ S 2 Copyright Act 1994 ([8]).

2.2.3 Publication to the public

It is a breach of copyright to put into circulation copies of a work which were not already in circulation, for sale or otherwise.⁷ This includes rentals of computer programs, sound recordings and films subsequent to their being put into circulation.⁸ In order to protect this right, the DRM system needs the ability to simulate rental licenses and restrict similar uses without licensed consent.

2.2.4 Performance in Public

The performance of any work in public is an infringement of copyright. Performance “includes any mode of visual or acoustic presentation of a literary, dramatic, musical, or artistic work, including presentation of the work by means of a sound recording, film, broadcast, or cable programme”.⁹ In the digital context, streaming audio or visual content will constitute broadcasting of the content. DRM systems thus need to accommodate for licenses that allow for streaming. For visual content, this may include displaying content statically, such as the use of a picture on a webpage.

2.3 Exceptions to Use Restrictions – Protecting Consumers’ Rights

Exceptions to the rights listed above are known as fair uses, or fair dealings. These are the set of uses which a user may make of copyrighted content without prior consent of the copyright owner and are not considered breaches of copyright. Non-exhaustive lists of these uses are set out in legislation;¹⁰ examples include copying the content for purposes of criticism, education and research. In each case, whether the use is a fair use is determined in relation to statutory guidelines which a Court must have regard to:¹¹

- (a) The purpose of the copying; and
- (b) The nature of the work copied; and
- (c) Whether the work could have been obtained within a reasonable time at an ordinary commercial price; and
- (d) The effect of the copying on the potential market for, or value of, the work; and
- (e) Where part of a work is copied, the amount and substantiality of the part copied taken in relation to the whole work.

⁷ s 169(1)(b) Copyright Act ([8]).

⁸ s 9(2)(3) Copyright Act ([8]).

⁹ s 2 Copyright Act ([8]).

¹⁰ Part 3 of the Copyright Act ([8]). In the US, the guidelines provided in s 107 of the Copyright Act 1976 similar.

¹¹ s 43(3) Copyright Act ([8]).

It is evident that the above guidelines require an element of human judgement the implementation of which remains the core obstacle to DRM systems development. Instead, DRM systems generally define a narrow set of authorised actions which restrict fair uses [6], and fail to account for the considerations in law. Technical solutions to this problem have been suggested in [14] and provide a basis for evaluating the ability of a DRM system to approximate fair use. Briefly, these are:

1. *Coding for Fair Use*: implementing a more relaxed set of restrictions such that the majority of anticipated uses will be preauthorised.
2. *Key access for fair use*: Involves an external decision making mechanism, which may be automated or human. Dialogue is initiated by the user with the mechanism to seek permission for a certain use. Information relevant to the user's intentions is given to the mechanism and interpreted. Judgement is then made as to whether the intended use qualifies for permission. It is this component which has the ability to consider the legal guidelines.
3. *Mixed fair use infrastructure*: A combination of the above two structures, giving the advantage of efficiency of granting permission for anticipated acts (pre-authorisation), coupled with the flexibility of an external mechanism that can consider unanticipated uses.

The existence of an external mechanism as described above thus allows a DRM system to better accommodate for fair use, though such a mechanism would need to have means of ensuring the accuracy of the information given to it. Failure to do so will not only render the DRM system inefficient but also defeat its purpose by allowing fraudulent users to circumvent use restrictions. Implementing a more relaxed set of restrictions is a matter of choice by the copyright holder, largely irrelevant to the availability of DRM functionality.

2.3.1 Statutory Fair Use Limits

The NZ legislation also imposes a quantitative restriction on copying for fair use in s 43(4) – the making of more than one copy on any one occasion is not authorised by its fair use provisions. The US legislation on the other hand imposes no such restriction. A DRM system would thus need to be able to restrict the number of copies made, if any, conditional upon the location of the user to provide the copyright owner with the maximum protection that the law offers in each jurisdiction.

2.3.2 Established Fair Uses

There are several use expectations in legal and technical literature that are generally accepted as fair use, though the legal validity of each still depends upon an analysis according to the guidelines above. These include [15]: transformative uses, parody, time-shifting and space-shifting.

2.3.2.1 Transformative uses

A ‘transformative use’ is generally defined as a use that adds to an original work, with a different purpose or different character, altering its meaning, expression, or message [16]. Parodies are an example of such use. DRM systems would need to allow content to be modified and excerpted to protect this use.

2.3.2.2 Time-Shifting

Users are expressly permitted to record content solely for the purpose of viewing or listening to the content later in time in s 84 of the New Zealand Copyright Act, and also in US case law [17]. This is not an absolute permit to copy for later use. If the recording is retained for longer than is necessary to enable the user to view the content, then becomes an infringement of copyright.¹² Thus copies of content should be allowed, but only valid for a limited period of time.

2.3.2.3 Space-Shifting

The ability of a user to access content in different devices falls under the concept of space-shifting. For the purposes of DRM, analysis of the problem can be broken down into whether content can migrate to devices of the same type or of different types and whether the frequency of migration can be restricted.

2.4 Moral Rights

Moral rights are related to copyrights. They are rights of authors as opposed to copyright owners, although generally authors will own the copyright unless it has been assigned to a third party. Moral rights are provided for in Part IV of the New Zealand Act. The US jurisdiction on the other hand has been relatively unwilling to recognise moral rights due to conflicts with the First Amendment – they are granted on a limited basis in the Visual Artists’ Rights Act.¹³ Despite the nomenclature which may suggest that a mere moral obligation is owed to authors, moral rights are enforceable legal rights. There are two components to moral rights as provided in the New Zealand

¹² s 84(2) Copyright Act ([8]).

¹³ s 106A, 17 USC ([9]).

Act: attribution and integrity. The following discussion is based on the New Zealand provisions as they are more developed than in the US legislation.

2.4.1 Attribution

Attribution is “an express or implied statement as to the identity of the author of the work or the director of the film.”¹⁴ There are two aspects to rights relating to attribution of content to authors: the right against false attribution, and the right to attribution. The latter is not an automatic right and requires express assertion by the author. Where content is attributed to an author, the DRM system would need to confirm the propriety of the claim. Where content is not attributed to an author, the system would need to check whether attribution is necessary. In other words, the DRM system is required to have the ability to audit the attribution of content protected by it in order to protect authors’ rights.

2.4.2 Integrity

The author has a right not to have his/her work subject to derogatory treatment resulting in detriment to his/her the reputation.¹⁵ Protection of the integrity of content implies restricting the modification of the content. Again, this legal concept relies on human judgement as to what is ‘derogatory’ and also conflicts with the need to allow modification for fair uses. An absolute prohibition on modification of content would preserve integrity and avoid consideration of what is ‘derogatory’, but it may be difficult to justify this trade-off in the protection of authors’ rights against the protection of consumers’ rights in DRM systems.

3. Privacy

Privacy laws are based upon the individual’s interests in personal autonomy. DRM can place constraints on this by surveillance of intellectual activity, and interference with intellectual activity itself [18]. The former is an intrusion upon seclusion in the common understanding of ‘privacy’ [19], while the latter overlaps with copyright in terms of what a consumer can or cannot do with the content and is similar to issues relating to fair use and the doctrine of first sale discussed above. Both of these concepts involve the use or disposal of content in the private sphere and presume anonymity. In New Zealand, the legality of collecting private information depends largely on

¹⁴ s 102(2) Copyright Act ([8]).

¹⁵ ss 98-99 Copyright Act ([8]).

disclosure of the act.¹⁶ Issues associated with how information collected from the DRM systems can be used fall outside the scope of this paper.

To disable the monitoring of user activity altogether would be to ignore the fact that privacy rights are not absolute and contract provisions may override them. A DRM system therefore needs to be capable of monitoring content use while preserving different degrees of privacy that may conceivably be agreed to in contract. Broadly speaking, it may identify a user, or it may keep the user anonymous while reporting usage patterns as stipulated by the contractual terms of use. Details regarding the means of identification depend on the specific agreement entered into and will not be speculated here. Furthermore, anonymity has added importance where an external mechanism is employed by the DRM system because the user will likely provide more information about him or herself through dialogue with the external component than by being passively monitored.

4. Example: Microsoft Media DRM

Table 1 shows an application of the legal issues identified above to the Microsoft Media DRM (WMDRM) system. The test for each issue is whether the WMDRM system meets the specific function requirements on the assumption that the DRM restrictions have not been illegally circumvented. In Table 1, the column titled ‘Favours’ indicates if the feature predominantly advances the interests of consumers (C) or copyright holders (R). This distinction may be ambiguous for certain features, in which case both C and R appears. Information about WMDRM is derived from [21].

Table 1. Microsoft Media DRM example

Favours	Functionality	Y/N	Implementation details
	Copyright		
	General Principles		
C	Can open up content upon expiration of copyright	Y	By renewal of license after expiration. However no mechanism is in place to fully release of content from DRM restrictions.
C	Can enforce different restrictions depending on location	N	Does not identify user by location, although different licenses may be issued for the same content.
C	Does audit for public domain content?	N	No such feature was advertised
R	Can derive royalties for subsequent distribution?	N	No such feature was advertised

¹⁶ See Part 2 of the Privacy Act ([20]).

Access restrictions			
R	Can restrict copying the content as a whole?	Y	Until it is copied to CD (if authorised by license), in which case it loses DRM protection
R	Can allow partial copying but restrict the quantity of content copied?	N	Does not appear to have the option of restricting the quantity copied
R	Can restrict copying a substantial part of the content representing its essence?	N	No mechanism to approximate determination of whether the 'essence' of the content has been copied
R	Can restrict conversion file format?	Y	But can allow content to be burnt onto CD where authorised
R	Can simulate rental licenses?	Y	Via use of different licenses for the same content with time limits
R	Can simulate broadcasting licenses? (static or dynamic)	Y	Allows packaged content to be streamed according to license restrictions
Fair Use			
C	Uses external decision making mechanism?	N	No such feature was advertised
R/C	Can limit the number of copies made?	Y	Content provider can adjust how many licenses are granted for the content
C	Can modify or excerpt from file?	N	No details were given
C	Can copy content that is valid for a limited time only?	Y	Licenses may be set to expire
C	Can use across multiple devices of the same type?	Y	Each computer requires a new license to play the content.
C	Can use in devices of different types?	Y	In compatible devices, e.g. for wma format, these devices are usually marked with 'Plays for sure' labels.
C	Has mechanism to lift restrictions legitimately?	N	No such mechanism advertised. Would need to acquire unfettered content via other channels.
Moral Rights			
R	Does audit for author accreditation?	N	No such feature was advertised
R	Can identify the author?	Y	Supported formats such as wma can store author/performer information
Privacy			
R	Can monitor user activity?	N	No built-in functionality to monitor user activity for record or analysis was advertised
R	Can identify a user?	N	Does not identify the user directly, although identity based on hardware is given
C/R	Preserves user anonymity?	Y	Though identifies according to a unique id generated based on hardware

The WMDRM system appears to protect consumers and copyrights holders' interests fairly evenly. It conforms to legal expectations broadly, but as expected, is not capable of supporting the more contextual functionality such as granting fair uses based on the specific circumstances of that use. One fundamental conflict with copyright law identified here is the inability of it to fully release content from DRM restrictions once copyrights have expired. Access to public property becomes

reliant on the grant of license – there is thus an inherent risk that license may not be granted by choice of the content provider, or by unavailability of the licensing server.

5. Conclusion

By taking a broad overview of the law as relevant to DRM systems, a number of features affecting the rights of copyright owners and consumers have been identified. This exercise has highlighted specific areas where code may never be able to correspond accurately to the law due to the element of human discretion required. It has yet to be seen whether the law will interfere with DRM systems design (e.g. by deciding that a certain feature is inconsistent with the law), but if greater compliance with the law is required, the above discussion provides some indication of how this can be achieved. It is also evident that the implementation of one feature that protects an aspect of copyright holders' interests will likely conflict with the interests of consumers in other areas – this merely confirms opinions expressed in this area generally, but the above analysis may serve as a guide for pinpointing exactly which features cause conflict.

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