

# Fair digital rights management

Is the idea of fair digital rights management an oxymoron? The music industry has been turned upside down by the Internet, and has tried various methods to protect its profits. But many of its actions have been either futile or heavy-handed. **Christian Bonnici** and **Keith Martin** examine various approaches to see which would be most effective and fair to all parties.



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**T**HERE ARE FEW issues more provocative than that of the management of rights to digital content. For some consumers the internet is seen as an agent of digital freedom, facilitating free and easy access to digital content such as music and films. For some digital content providers the internet has been seen as a technology that has damaged their ability to earn money from selling their products.

The solution to providers' fears has been various attempts to control access to digital content through the use of technology such as digital rights management systems. But such systems often restrict the very basic rights that a consumer expects from purchased content, such as the right to make private copies or lend content to a friend.

In this article we discuss the dilemma at the heart of the debate about digital rights management and ask whether it is possible that solutions can be found that are acceptable to all parties. Is it possible to have fair digital rights management?

## THE BIRTH OF DIGITAL RIGHTS MANAGEMENT

We will frame our discussion around music media, which is one of the most high profile types of digital content. **FIGURE 1** (page 3) shows a simple timeline indicating some of the milestones in the development of music media. The publication of the MP3 music compression algorithm in 1991 represents the most significant development with respect to digital rights to music media, and this event is pivotal to our discussion.

Prior to 1991, the speed, quality and cost of music replication, distribution and storage arguably presented an appropriate balance between the music industry's copyright rights and consumers' fair use rights. For example, it was easy for consumers to fairly replicate a tune for personal use. Consumers would purchase a Long Play (LP), Music Cassette (MC) or Compact Disc (CD) and only required access to a low cost MC recording module in order to make a copy. The illegal mass replication and transfer of pirate

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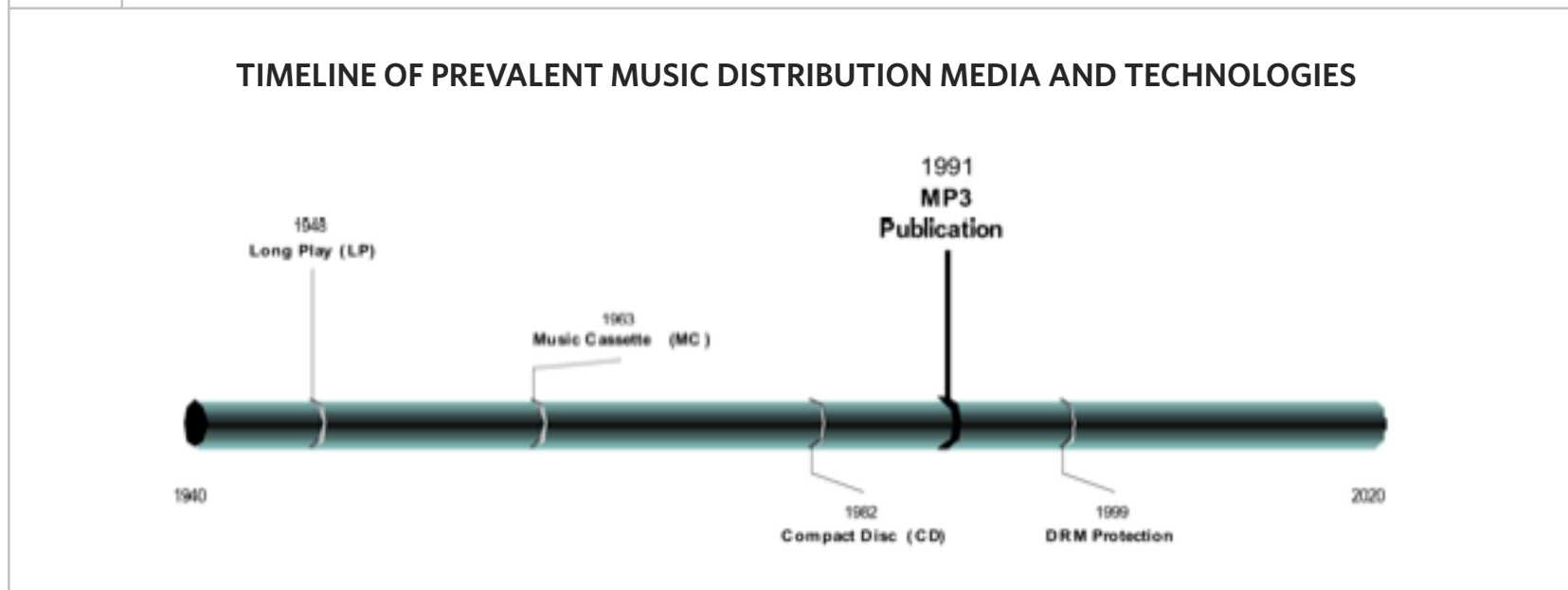
copies required expensive arrangements such as access to high quality recording equipment and costly logistical arrangements. Prior to 1991 it can be argued that we had fair music media rights management.

However, since 1991 several technological developments have contributed to making illegal replication, storage and distribution processes accessible to virtually everyone. These include the development of the MP3 algorithm, the proliferation of the internet, bandwidth expansions,

storage device cost reductions, and the emergence of Peer-to-Peer (P2P) networking. These developments have pushed the balance between the music industry's copyright rights and the consumers' fair use privileges beyond the boundary of acceptability of the music industry. In other words, we now have the potential for unfair digital rights management. Unfair, that is, to providers.

This imbalance led to an era of Digital Rights Management (DRM), which refers to any technology that does "... everything that can be done to

FIGURE 1



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*define, manage, and track rights to digital content*" [1]. These technologies have taken different approaches towards addressing the perceived imbalance but, as we will shortly discuss, almost all have proved highly unpopular with consumers, who have seen them as providing unnecessary restrictions on the basic rights that they feel they are entitled to when owning music media. Thus there are many who would claim that these schemes also provide unfair digital rights management. Unfair, now, to consumers.

## **UNFAIR DIGITAL RIGHTS MANAGEMENT**

Until January 2009, the most prevalent DRM regimes supporting online music stores such as iTunes were ex-ante based DRM systems. By this we mean that they provide the music industry with the means to control how music media should be consumed in an a priori fashion.

For example, if Bob legally purchases the Guns N' Roses' tune "Chinese Democracy" from an online music store, the store is likely to restrict his use of it in a number of different ways:

- **Device restriction:** The tune is likely to be restricted to about five devices. Given current trends towards more ubiquitous computing

environments, many users are likely to own more than five devices on which they might potentially want to listen to music media that they have purchased.

- **Music sharing.** Bob is unlikely to be able to share his tune with a friend, which is something he was able to do with all music media prior to 1991.
- **Onward selling.** Bob is unlikely to be able to sell his tune once he has finished with it, which is again something he was able to do prior to 1991.

It would seem very reasonable that consumers such as Bob should be allowed to perform all these actions.

Indeed there are established doctrines to back this up. Within jurisdictions controlled by the World Intellectual Property Organisation (WIPO), copyright laws are likely to endorse a doctrine which in the US is referred to as Fair Use and in the UK as Fair Dealing. The doctrine's underlying principles aim to create a balance between copyright rights and fair use exceptions by:

1. Enabling consumers of copyright protected

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material to flexibly use material in ways that promote creativity, and the dissemination and application of its results, in ways that contribute to economic and social development...

2. ...while providing statutory expression to the moral and economic rights of creators in their creations and to the rights of the public in accessing those creations. In other words, it is unreasonable to expect that music content be made available to all at zero cost.

Thus ex-ante based DRM systems enforce contracts in ways that actually breach the WIPO ideologies. This is definitely unfair DRM.

## **WHY DID UNFAIR DIGITAL RIGHTS MANAGEMENT “PREVAIL”?**

It might seem surprising that unfair DRM could be so easily imposed on online music consumers. It might also seem surprising that in the presence of such unpopular technology, the non-mainstream music industry was not able to gain competitive advantage by adopting business processes that did not employ ex-ante DRM. There are several explanations.

Although online music consumers do disap-

prove of ex-ante based DRM, they cannot do much to influence the exercising of DRM controls. As Cohen argued, “...market processes are not well suited to enable consumers to exert positive, as opposed to negative, influence on the design of technical standards. Consumers can refuse to buy, or can switch from one provider to another, but there are no mechanisms to allow consumers to communicate as a prospective matter the precise level of functionality that they want...” [2].

Another reason is that the big four music distributors are currently in control of the physical music distribution market, which constituted over 80% of the total music market revenues in 2007<sup>3</sup>. This is possible because they have the ability both to promote the mainstream music producers’ works on an international level, and to support the investments required to mass replicate music to tangible media to meet global demand. Consequently, although the proliferation of the internet has provided the infrastructure required for very low cost mass distribution of music, any mainstream music producers holding the privilege of being able to establish binding contracts with major music distributors would not opt out of these contracts in order to supply music to a digital market that constitutes only a

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small portion of global music sales [3].

Thus the music distributors have the power and autonomy required to decide through which of the online music stores to conduct business. This implies that the success of online music stores is dependent on the participation of the music distributors [4], since the music distributors hold the rights over music produced by the mainstream music producers. Therefore the music distributors are in a strong market position that enables them to control the evolution of the DRM technologies that are used for the protection of the digital music distributed online.

## **A DIGITAL RIGHTS DILEMMA FOR THE MUSIC INDUSTRY**

The music industry thus currently finds itself in an uncomfortable situation. It is aware that there is technology widely available that enables everyone to freely share music with everyone else for virtually no cost. It is also aware that consumers not only do not like ex-ante based DRM systems, but are able to circumvent today's ex-ante based DRM systems quite easily. For example, DRM circumvention software is often widely available. Circumvention is also often possible through exploitation of the "analogue hole", for example

by using microphones to record the output of protected music.

The situation is not helped by the uncertain approach adopted by the law. There is precedent

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to suggest that circumvention of ex-ante based DRM can be regarded by the law as being fair. One example of such ruling is the decisions taken in the case of Jon Lech Johansen's DeCSS software, a computer program capable of decrypting content on a DVD-Video disc encrypted using the Content-Scrambling System (CSS) [5].

After Johansen released DeCSS, he was taken to court in Norway for computer hacking in 2002. In the first trial in the Oslo district court in December 2002 the defence argued that it is

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legal under Norwegian law to make copies of such data for personal use. Thus no illegal access was obtained to anyone else's information since Johansen owned the DVDs himself. The verdict was announced in January 2003, acquitting

*Once a tune's DRM protection is circumvented, the tune may be widely distributed through one of the many existent channels without leaving traces of its origin.*

Johansen of all charges. The Norwegian National Authority for the Investigation and Prosecution of Economic and Environmental Crime (Økokrim) filed an appeal but Johansen's second DeCSS trial resulted in an acquittal in December 2003. Økokrim did not appeal the case to the Supreme Court. In February 2008 Johansen launched doubleTwist [6], a software tool which allows customers to bypass DRM in music files and convert files between various formats.

A further complication is that even if the law adopted a strict position against DRM circumventions, if at least one consumer professionally recorded legally-owned DRM protected music using such techniques, it would probably not be possible to hold that consumer responsible. This is because current ex-ante based DRM systems do not employ watermarks or fingerprints to link actual records to consumers. Once a tune's DRM protection is circumvented, the tune may be widely distributed through one of the many existent channels without leaving traces of its origin.

### **TOWARDS DRM-FREE MUSIC DISTRIBUTION**

In 2009 the mainstream music industry seems to be moving in a "DRM-free" direction. Following long awaited agreements, iTunes, the most popular online music store enjoying links with mainstream music distributors and producers, seems to be ditching ex-ante DRM protection [7] [8]. Clearly iTunes is not able to ditch ex-ante DRM without the music distributors' blessings, so this suggests a move by the distributors in the direction away from DRM.

This suggests a major swing in the DRM debate back in favour of consumers, but potentially

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against creators of digital content. However, is this the right direction to move in?

## **ALMOST FAIR DIGITAL RIGHTS MANAGEMENT**

As stated earlier, for any system to conform to the WIPO ideology, it must both respect the moral and economic rights of creators in their creations (by enforcing copyright rights), and enable the flexible use of copyrighted material in ways that promote creativity (by enforcing the fair use exceptions to copyright rights). Therefore it may be argued that given the existence of technologies that facilitate mass illegal distribution of digital music, while on one extreme ex-ante based DRM fails to respect the consumers' fair use rights, on the other extreme the complete lack of protection may actually fail to respect the creators' copyright rights.

One example of a DRM system for the protection of music which seems to have been endorsed by the consumers is the system supporting the eMusic online music store. This system employs an acoustic fingerprinting technology that reads users' files. Once a match with an eMusic song is made, eMusic sends a Digital Millennium Copyright Act (DMCA) infringement notice to the user

with a 24 hour grace period [9]. Such a system may be categorised into what may be referred to as ex-post based DRM since it employs monitoring and tracking mechanisms that enable human judges to decide about the fairness of an operation performed by a consumer after, not before,

*For any system to conform to the WIPO ideology, it must respect the rights of creators, and enable the flexible use of copyright material.*

the media operation actually occurs. This essentially shifts some power from the music industry back to the copyright regime under the legal authorities' control.

eMusic does not promise strong protection to the non-mainstream music industry's copyright rights. In fact, it offers weak protection. For instance, since it does not encrypt digital content, the system lacks the ability to keep unauthorised users from accessing the music. This also implies

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that the system cannot revoke access rights if things go wrong. For example:

- The system cannot implement a court's ex-post decision that requires the revocation of a consumer's access to a particular tune.
- If an acoustic fingerprinting algorithm is compromised then all music "protected" by the algorithm becomes vulnerable to attacks. No key revocations can be implemented to contain the leakage, for example by requiring the tune's re-download under the protection of a stronger algorithm.
- If Mallory breaks into Bob's network and illegally transfers 10 gigabytes of legally purchased tunes to a remote location, then Mallory can illegally mass distribute the music knowing that any DMCA infringement notices would be sent to Bob. But the system does not encrypt the content, and therefore Mallory does not require access to any decryption keys to access the content. This implies that a court might not be able to keep Bob or anyone responsible for such activity. In addition the lack of encryption means that no key revocations can take place to contain the leakage.

Therefore it may be argued that eMusic does present an interesting compromise between the competing needs of consumers and providers, but probably does not offer adequate protection to the music industry's copyright rights.

### **LOOKING TO THE PAST FOR FAIR DIGITAL RIGHTS MANAGEMENT**

In order to find a more satisfactory compromise solution, it is worth reconsidering the conditions that existed prior to the arrival of the MP3, where we argued that a fair balance between content creator and content consumer rights was achieved. We suggest that a DRM scheme could be designed that replicates these conditions by:

1. Allowing consumers to replicate, distribute and store music at costs of diminished quality, slow replication and slow distribution. It might also be the case that small monetary charges were made for these services.

2. Ensuring that copyright holders would be unable to interfere with digital music consumption behaviour which a judge would or could rule as fair.

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In such a scheme the consumers would be able to consume the music content easily and spontaneously within interoperable regimes, in ways similar to those of the pre-MP3 world. Also consumers' privacy rights would be respected in congruence with the relevant legislation, although

*One possible approach towards integrating such characteristics into a DRM scheme would be to employ Trusted Third Parties.*

this might imply a level of privacy infringement which may be higher than that incurred by consumers in the pre-MP3 world.

Such a DRM scheme is likely to necessarily be ex-post based, mainly because decisions about whether particular operations are fair or not are based on ambiguous fair use legislation. Such ambiguity makes the taking of such decisions hard to automate, implying that decisions may only be taken by human judges after particular

uses occur.

One possible approach towards integrating such characteristics into a DRM scheme would be to employ independent Trusted Third Parties (TTPs) that are trusted by all the DRM stakeholders, including consumers. These TTPs could be used to:

**1.** Implement policies related to the purchasing, replication and distribution of music at a monetary cost, and the replication, distribution and storage of music at the cost of diminished quality, slow replication and slow distribution.

**EXAMPLE 1:** A consumer Alice might transfer her usage rights on a tune to consumer Bob's system through the TTP at a cost. Such transfer would include transactions such as the temporary revocation of Alice's rights, and the re-watermarking and re-encryption of the original tune in ways binding the tune to Bob for a temporary period of time.

**EXAMPLE 2:** The TTP could store all transactional information and all encryption and decryption keys. Therefore, if a consumer should lose all or some of his tunes and all his decryption keys, then the TTP could send all the tunes to

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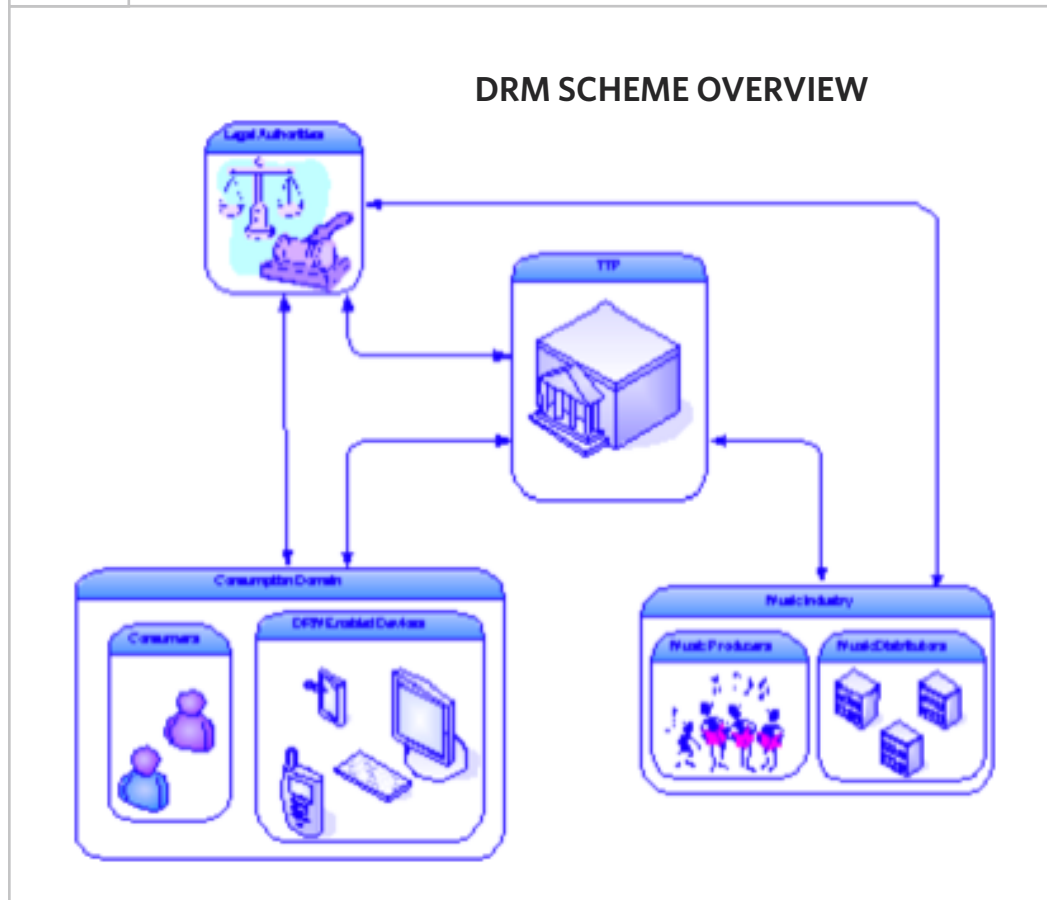
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the consumer again, perhaps at a cost.

**EXAMPLE 3:** A consumer Alice might replicate a tune through the TTP at reduced quality. Such

transfer would include transactions such as the re-watermarking and re-encryption of a diminished quality tune in a manner that binds the resulting tune to Bob. Either Alice or Bob would pay for the replica through the TTP.

FIGURE 2



2. Ensure that all communications between different entities (as indicated in **FIGURE 2**) are carried out securely in ways that respect and enforce policies regarding the consumers' privacy.

**EXAMPLE:** The TTP could compile and send non-privacy breaching statistical information to the music industry in ways that enable the copyright holders to identify possible copyright breaches and, if necessary, take legal action. This process recognises the legal authorities, and not any other DRM stakeholders, as the final decision makers about whether particular uses are copyright breaching.

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## CONCLUSIONS

The future of copyright protection for digital music media remains uncertain. As indicated in [7] and [8] it may be that we are on the verge of a digital music distribution revolution that will end the dominance of physical music distribution in favour of DRM-free digital music distribution. However it would seem unlikely that the music industry can survive without some type of DRM controls. It is clear that ex-ante DRM is not a fair solution; however we have suggested that a look at the past suggests the benefits of considering ex-post DRM solutions based on the balance that was in place prior to the invention of MP3. Further details concerning this discussion and our proposals can be found in [10]. ■

## ABOUT THE AUTHORS

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