Digital Rights Management

Or

Digital Restriction Management?

"Your fair use of this content is restricted. You may only read this once." - Anonymous

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Background:

Digital Rights Management (DRM) is defined by many media distribution focused companies that implement the technology as, the platform via which various techniques are used to securely deliver content for playback of various media on computers and many portable devices. DRM applies to creative intellectual property like music, videos, pictures and text. Some of the biggest content distributors in the world like Apple, Microsoft, Sony and BBC use various DRM implementations for their media.

Content protection technology, such as DRM software, enables a content provider to "wrap" a set of rules around content that defines if and how the purchaser of the copyrighted or premium content can manipulate and share it. The rules can include, for instance, how many copies of the original file a user may make, whether a back-up or archive file can be created, and whether a user can move the content to another device(The Berkman Center for Internet & Society at Harvard Law, 2008). The DRM software is generally created by an independent software group from the company that provides the content. The content provider can control the conditions on the media. For example, Apple created a DRM technique called Fairplay for the content they distribute. What can be done with this DRM is decided by the record companies distributing the media and Apple when they sign deals for distributing the content.

At the heart of all DRM technology is a rights model. Rights models are schemes for specifying rights to content that a user can obtain in return for some consideration. DRM software can define rights to content according to a rights model, and then enforce those

rights. To function effectively, DRM software must understand the core entities and the relationships between them (Allen, 2002).

Popular DRM Techniques Used In Industry:

Controlling media distribution and consumption requires industry standards that deliver the interoperability needed for consumers and media companies to select and deliver content across multiple networks, services and devices (The Berkman Center for Internet & Society at Harvard Law, 2008). There are lot of current industry standards in use right now. The Content Scrambling System(CSS) is used for DVD's which include copy protection and region encoded settings. Fairplay by Apple, Microsoft DRM for WMA files is used by Wal-Mart, Musicmatch, Napster and Virgin Digital. Sony developed its own DRM format called the WDM DRM format. In 2005, Sony introduced its protected audio CD trying to curb piracy on the CD sales and prevent copying by installing custom DRM software on the user computer. The effects of this program led to many security bugs and did not go well with the consumers. This case shall be discussed more in detail at a later point in the paper. BBC uses Windows DRM to distribute digital copies of reruns of its shows using peer to peer technology. It can only be played by Windows Media Player and the BBC iPlayer. Macintosh and Linux operating system users have been known to have issues with Windows DRM as is not supported by the Windows API and has to be implemented through third party plug-ins. These users do not have an option to download but have to stream from their browser. The use of these techniques have been justified by content distributors in many ways. Some of these arguments are explored in the following section.

Why Do Vendors Implement DRM Systems?

Is there a reason content needs to be protected from digital pirates? One of the world's leading DRM providers, Aegis DRM argues that, not having DRM in downloadable media is a major cause for losses in the music industry. The threats fall into two broad categories, those from casual downloading, from networks such as Kazaa and Madster and those from organized piracy. In terms of music, casual downloading and peer-to-peer networks are responsible for 3.6 billion songs illegally downloaded each month in the United States. In the UK sales predicted sales of £1.5billion on recorded music between 2002-2004, were reduced to £858m because of downloads according to the British Phonographic Industry. Smaller music and video publishers are significantly more vulnerable as they lack the established retail outlets and marketing resources to push their legitimate hard copy content in competition with free, exchanged files. In terms of organized piracy 1.2 billion pirate music discs were sold in 2004 - 34% of all discs sold worldwide.

Sales of pirate music exceed the legitimate market in a record 31 countries in 2004 - including China (85% of sales are pirated copies), India (56%), Indonesia (80%), Mexico (60%), Pakistan (59%) and Russia (66%). Without DRM typical revenue losses for a site selling 50,000 tracks a month at 99¢each will therefore be $28,314 per month. ROI is therefore 3000% Without DRM typical revenue losses for a site selling 1,000,000 tracks a month at 99¢ each will therefore be $566,280 per month. ROI is therefore 12000% (Baker, 2005).The main goal of the system is thus to curb piracy and raise corporate profits from the sales of these digital commodities. It is viewed as a security system to prevent theft of a

commodity. It has been debated by a lot of people if intellectual property is analogous to this argument.

Conflicting Standards In Technology:

It can be inferred from various implementations of DRM that the technology is not perfect. Microsoft's ex-CEO Bill Gates, has been quoted saying, "DRM is not where it should be" (BBC, 2006). Like any other new technology, DRM is constantly evolving based on user feedback and the way a company perceives its consumers. Over time, conflicts between technology companies and content providers about compatibility and interoperability of DRM standards have emerged. This has led to some major conflicts in the past. Apple emerged as one of the forerunners of online music sales in the early 2000's. Real Networks introduced a program called Harmony that would let users upload content from Real to an IPod using Apple's proprietary format. Apple claimed, Real used a hack to circumvent the protection, which real claimed was within the limits of the Digital Millennium Copyright Act (DMCA). Real also sold content for 49 cents which is 50 cents cheaper than Apple's content. The price was targeted to IPod users. Apple got frustrated and updated the IPod firmware to prevent this circumvention and all the customers using Real Networks Content had their music rendered obsolete for the IPod (Borland, 2004). The Apple-Real contest underscores that while DRM compatibility and interoperability remain long-term market inhibitors, the actual market, the consumers have not been heard on this topic. This is changing as more consumers obtain digital content and look to use that content in a wide variety of devices. Quoting Bill Gates from his interview about DRM, "We don't have the right thing here in terms of simplicity or interoperability". Blogger Michael Arrington, of Techcrunch.com, said

Bill Gates' short-term advice for people wanting to transfer songs from one system to another was to "buy a CD and rip it" (BBC, 2006).

Corporate Outlook on DRM:

The consumers have spoken in the recent past and there was an appeal made to Apple to sell DRM free content through their leading iTunes online music store, so it could be played on various devices like mobile phones and game consoles. This provoked Steve Jobs, the CEO of Apple, one of the biggest distributors of digital media to write a piece titled, “Thoughts About Music”. When Apple approached these companies to license their music to distribute legally over the Internet, they were extremely cautious and required Apple to protect their music from being illegally copied. The solution agreed upon was to create a DRM system, which envelopes each song purchased from the iTunes store in special and secret software so that it cannot be played on unauthorized devices. There was a special clause added to the agreement between the recording companies and Apple stating that, if there was ever a compromise in the DRM system then Apple would have a few weeks to fix it, or they could withdraw their whole library. The FairPlay DRM system was not flawless and there were a few breaches in it, but they were fixed by Apple successfully.

Steve Jobs Talks:

Steve Jobs has answered the question of the effect on consumers by DRM, asked by many in his widely published article, “Some have argued that once a consumer purchases a body of music from one of the proprietary music stores, they are forever locked into only using music players from that one company. Or, if they buy a specific player, they are locked

into buying music only from that company's music store. Is this true? Let's look at the data for iPods and the iTunes store – they are the industry's most popular products and we have accurate data for them. Through the end of 2006, customers purchased a total of 90 million iPods and 2 billion songs from the iTunes store. On average, that's 22 songs purchased from the iTunes store for each iPod ever sold. Today's most popular iPod holds 1000 songs, and research tells us that the average iPod is nearly full. This means that only 22 out of 1000 songs, or under 3% of the music on the average iPod, is purchased from the iTunes store and protected with a DRM. The remaining 97% of the music is unprotected and playable on any player that can play the open formats. It is hard to believe that just 3% of the music on the average iPod is enough to lock users into buying only iPods in the future. And since 97% of the music on the average iPod was not purchased from the iTunes store, iPod users are clearly not locked into the iTunes store to acquire their music" (Jobs, 2006) .Using the statistics above, which have been collected by Apple, Steve Jobs elegantly answered the argument that DRM does not lock consumers down to a device. These are statistics that affect Apple as a corporation in terms of profit generated from music sales. Steve Jobs was one of the first influential personalities suggesting that DRM should be abolished. He stated that if the recording companies agreed to it, Apple would sell every song on its library without DRM.

What would make the music companies sell their music without DRM? DRM ensures that the songs don't get pirated when they are downloaded by the consumer. In 2006, under 2 billion DRM-protected songs were sold by online stores, while over 20 billion songs were sold completely DRM-free and unprotected on CDs by the music companies

themselves (Jobs, 2006). This means that, 90% of the music sold was unprotected and nothing is done to change this even though it is clear most of the revenue is from CD sales.

In early 2007, EMI and Apple announced that, all the songs sold on the iTunes Music Store would be sold without DRM. The price was upped to $ 1.29, but the music for the added cost was of a better quality and unprotected. EMI saw a boost in sales on the DRM free songs and was glad to increasing demands by consumers to enable full interoperability between devices (Healey, 2007).

Response to Steve Job's Outlook:

Adobe General Manager Bill McCoy thinks it is important that the concept of DRM not only extend to music as Steve Jobs mentioned, but also to videos in terms of DVD sales and the sale of eBooks. He argues that he would like to watch DRM follow the "Jobs Principle" and fade away. DRM is a means to ensure artists and writers are given a means of compensation for digital content that they have created and published. It would be unfair to completely get rid of DRM to the creative publishers. McCoy suggests that he has noticed that the concept of Social DRM is catching on with a lot of online content publishers. McCoy's quote on Social DRM explains a lot about the concept: "The main challenge we have in digital publishing is to get it adopted by mainstream consumers. And the main challenge 98% of book authors and publishers have is to get people to be aware of their books, not to prevent piracy. So my challenge to print publishers and authors: why not support "Social DRM", rather than heavyweight DRM? If that's a direction you are willing to go, Adobe will back you up, 1000%" (McCoy, 2007).

DRM Gone Wrong:

Apple has implemented a very successful DRM system. It has not been opposed by many consumers due to the liberal approach taken by the company. Not all DRM is perfect in implementation. The main issue with the technology is to avoid consumer wrath. DRM has had a very troubled past for Sony. In the fall of 2005, problems discovered in two Sony-BMG compact disc copy protection systems, XCP and MediaMax, triggered a public uproar that ultimately led to class-action litigation and the recall of millions of discs. Most CD DRM systems use both passive and active anti-copying measures. Passive measures change the disc's contents in the hope of confusing most computer drives and software, without confusing most audio CD players. Active measures, in contrast, rely on software on the computer that actively intervenes to block access to the music by programs other than the DRM vendor's own software. Active protection software must be installed on the computer somehow. XCP and MediaMax use Windows Autorun, which (when enabled) automatically loads and runs software from a disc when the disc is inserted into the computer's drive. Autorun lets the DRM vendor's software run or install immediately. Once the DRM software is installed, every time a new CD is inserted the software runs a recognition algorithm to determine whether the disc is associated with the DRM scheme. If it is, the active protection software will interfere with accesses to the disc, except those originating from the vendor's own music player application. This proprietary player application, which is shipped on the disc, gives the user limited access to the music (Halderman & Felten, 2006).

Many users did not expect audio CDs to contain software. Users did not want the software, and they recognized that Sony-BMG chose to include it anyway. The installation

led to privacy and security risks on the user computer. The implementation of this DRM was compared to spyware infections on computers. The security flaws introduced by the program led to a public uproar. There were many lessons learned from this episode. DRM, even if backed by a major content distributor, can expose users to significant security and privacy risks. Incentives for aggressive platform building drive vendors toward spyware tactics that exacerbate these risks. Bad DRM design choices can seriously harm users, create major liability for copyright owners and DRM vendors, and ultimately reduce artists' incentive to create (Halderman & Felten, 2006).

Is There A Perfect DRM System?

It could be analyzed from the above examples that, DRM is essential to preserve artist rights. Getting rid of it completely is not in everybody's best interests. It is important to implement it in the right way so that either the user or the benefactor feels violated. A workable, sustainable and balanced DRM solution would minimize the inevitable tensions, tradeoffs and dilemmas as much as possible. Some computer science researchers have suggested the idea of perfectly portable content. Perfectly portable content seeks to balance the needs for access and control of digital content distributed on the Web. Perfectly portable content allows copyrighted content to move from device to device under a user's control. At any point in time, a piece of content exists in only one instance (though more than one instance is possible, depending on the rules established by the copyright holder or publisher), which can be viewed on a PC, PDA or any other device that can be authenticated. Content can be "locked" by authenticating the digital certificates used by DRM technologies. Perfectly portable content meets publishers' needs to prevent unauthorized and

uncompensated copies while giving consumers a sense of ownership and the ability to engage in fair use manipulation of their legitimate digital content (The Berkman Center for Internet & Society at Harvard Law, 2008).

The path suggested by The Berkman Center for Internet & Society at Harvard Law to attain portable content is as follows:

- At any given time there are a present number of active uses of the content. A specific number of copies can be made and can be ripped to mp3 and moved to a portable media player.
- If the media is borrowed in physical or digital form the owner cannot listen to it unless the protection lets you burn it for a second time or has location based usage.

The system sounds idealized but it has some impracticality built into it. The technology to have this system in place will make the cost of the media go up to compensate for the technology costs. It tries to mine a lot of information from the user about the music usage which could lead one to believe that if there is a software flaw in the implementation, it would leads to issues like the ones seen in the Sony DRM case. This policy might still not be consumer friendly. A more liberal policy needs to be established so that the consumer does not feel 'cheated'. This leads us to think about 'Social DRM'.

Social DRM: The Middle Ground

What exactly is Social DRM? Social DRM works by embedding names and/or other identifying information into files you buy, so P2Ping isn't as tempting. It seems very unsafe and unintuitive to publishers to sell content without DRM or some sort of protection built

into it. Social DRM could be a compromise. It has successfully been adopted by many eBook publishers such as Pragmatic Programmers who have seen a growth in eBook sales on this implementation of a loose form of DRM. This concept has taken onto the online video business and companies like Streamburst embed a watermark with the name from the credit card used to purchase the movie on to the main page of the movie. Thereafter, it is included as a digital invisible watermark in the video. This helps in reducing casual copying as it involves the user's real name used on the credit card. This process is a lot less complex that current DRM systems. If anything, the technical expertise and overhead required to create, operate and update a DRM system has limited the number of participants selling DRM protected music. If such requirements were removed, the digital content industry might experience an influx of new companies willing to invest in innovative new stores and players (Jobs, 2006).

A Lesson From The Pornography Industry:

The term piracy and P2P networks are very synonymous for content distributors. The implementation of DRM is viewed as a solution by many to curb piracy. It is a known fact that pornography is the most commonly traded type of file, far outstripping music and Hollywood movies, and constituting nearly half of all searches. Yet, despite this rampant copyright infringement, Internet porn has grown dramatically as a business over the last few years, now reaching an estimated $2.5 billion per year compared to just $1 billion a few years ago. This explosive growth is taking place even as record labels and movie studios are in the throes of a major slump (Bailey, 2006).

There is a fundamental difference in the content sold by the porn and music industries. The porn industry has taken a very unique approach to the piracy problem. Their business depends on DVD sales and online subscriptions. It is very susceptible to copyright violations. Even then they manage to take advantage of the market. This is because of their business model and the way content is distributed. In a popular post made on the Plagiarism Today blog, suggestions were made to explain why there was such a stark difference in the porn and music industry.

It is quoted as follows: " Though porn undoubtedly owes a great deal of its success to its subject matter, there are several things that are unique about Internet porn that make it significantly more resistant to piracy:

1. **Watermarked Content** - Almost all content from porn sites, including images and videos, free and paid, are watermarked and tagged. This means that, even if they are copied and pirated, that they will be advertisements for the site itself. This eliminates plagiarism and content theft by other sites while also helping interested viewers find the original site.
2. **Regular Updates** - Most pornographic sites update either weekly or monthly with new content. This means that, in most cases, when the content hits the file sharing networks it is already out of date. If people enjoy the content they download for free and wish to keep up to date on it, they have to pay the monthly fee.
3. **Niche Content** - Though adult sites try to push boundaries, most operate in very tight niches. This enables them to earn a reputation as the best in a field and makes owning a membership there a prerequisite for anyone interested in that type of

material. This also helps to attract the rabid fans that pay for content even when it is available for free" (Bailey, 2006).

This technique could be employed by the music and movie industry to its advantage. It is hard to use it with ebooks where there is text based content. Social DRM is more applicable in that scenario. It is important that the media distributors learn from their counterparts about various techniques and business models that have been developed and known to work. The old business models don't necessarily apply to the digital market mainly because of the ease of exploitation of technology.

Conclusions:

DRM is routinely circumvented and different competing standards cause confusion for consumers. There are a multitude of tools out there that allow you to strip DRM off of files relatively easily. So while DRM might make illegal sharing a bit more difficult if someone really wants an unprotected version of the file it's not very hard to do this. " Every time a 42 year old figures out how to lock something up, a 14 year old is going to figure out a new program" (Baase, 2008). Anyone selling content on CD is already selling unprotected files anyway. With the exception of debacles like the Sony rootkit, most CDs sold contain unencrypted files. This means that anyone who sells content on CDs is making unprotected content available and that putting those files online is as easy as ripping them to MP3 files, a pretty simple task these days. It takes one person to crack the file and distribute it over P2P networks. Piracy exists; it always has, and it always will. But study after study has shown that the vast majority of consumers, certainly enough to sustain a healthy market, will pay a

fair price for digital content if it is made available to them in the unencumbered formats they desire (Jonz, 2008).

We have been locked in DRM wars and format wars for too long. The online content delivery business has suffered from running into a wall that doesn't inter-operate the way web services do. It's time to change those things. It would be fascinating to see the major providers decide that it's finally time to get smart and play the digital game rather than fight it (Grossman, 2007). For content publishers, taking the step to provide open access to proprietary content can seem threatening, something to be resisted and avoided. The concept of Social DRM is crucial and plays a key psychological factor in the consumer. If introduced in the correct way it could be revolutionary and could help universalize content for multiple devices, under open proprietary formats. We can use technology and design to help enforce laws. Doing so involves lots of choices, but the fact that limits are imposed hardly makes the products defective by design. We need to decide what rules we want, about limits on the content and about control over copies and then figure out ways to make those rules work in actual practice.

Experimenting with various business models is more crucial than completely abolishing DRM. Anyone running a site on the Web that relies on old models of business probably need to take a long look at their plans anyway. They were probably flawed from the start (Bailey, 2006). DRM is a technology and historically technology evolves with time. With the current status of DRM technology, like the one implemented by Apple, a compromise between the corporate and the digital world has been reached temporarily. If a

greater amount of transparency is introduced in the system the concept of DRM might become more acceptable to the ever growing digital society.

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