

Relevant Information for Disclosure: Disclosure is certainly warranted when DRM will cause a product's function to deviate significantly from mainstream consumer expectations for the particular type of media in question. But expectations also evolve, and consumers likely will become increasingly accustomed to the flexibility with which they use digital files on their general purpose, Internet-connected computers and other devices. In evaluating what should be disclosed, product reviewers should think carefully about the full range of technical tradeoffs DRM entails.

Disclosure is particularly important where DRM-equipped products will not work with certain devices or in certain configurations. There is no shortage of examples: DVDs purchased on a trip abroad may not work in the purchaser's home DVD player due to region coding; songs downloaded from iTunes cannot easily be transferred to non-Apple portable music players; copy-protected CDs, unlike CDs without such protection, will not easily transfer onto the purchaser's iPod. Incompatibilities like these should be conspicuously labeled. Consumers should not learn about them only upon taking the products home, plugging them in, and receiving an error message.

Manner of Disclosure: Where some form of disclosure is provided, product reviewers should consider whether it is sufficiently prominent and understandable. What constitutes an appropriate manner of disclosure will depend in part on the likely importance of the information to consumers. It will also depend significantly on the nature of the product. Some come in physical packaging that can feature labels; others come as downloadable files and may have to find other means of providing notice. In some cases, it may be appropriate to disclose less significant details of DRM in licensing agreements. Because consumers rarely read through long license agreements, however, disclosure in the license accompanying a product will not always be sufficient. Reviewers should read license agreements carefully to determine if they contain key information that should be disclosed in a more prominent fashion.

Timing of Disclosure: An additional factor in evaluating disclosures is timing. Certainly information that is reasonably likely to affect a consumer's purchasing decision should be disclosed prior to purchase. But in general, notices should not be provided only once, when a possibly hurried user is signing up for a service or picking out a product in a store. Depending on the nature of the DRM, disclosure at other times may be warranted as well, as part of a user's ongoing interaction with a product or service.

For example, for songs purchased online that are limited in the number of times they can be burned to a CD, users should be notified appropriately as they approach the limit. If the first reminder of the limit is a message denying a user's effort to burn a CD after the limit has been reached, the user may well feel

unfairly surprised. Likewise, a CD that installs special DRM software when inserted into a computer should alert users of that fact immediately prior to installation. One of the complaints raised against Sony BMG was that some of its CDs installed software automatically, before providing any notice, or even when the user declined to consent to the installation.

Post-purchase disclosure also can be relevant in the case of upgrades. DRM systems inevitably get cracked, which can prompt their distributors to try to plug holes. Software upgrades, distributed online or otherwise, may update and fix vulnerabilities in DRM, but also could cause compatibility problems with older products now deemed insecure by the DRM devices.¹⁷ In addition, updates could change usage rules governing a user's already-purchased content; the major online music services reserve the right to do this in their terms of service.¹⁸ When upgrades have negative side effects, distributors may be tempted not to disclose them, because they do not want to discourage users from upgrading. Reviewers and consumer advocates should be watchful for such omissions.

2. Effect on Use

What specific parameters does DRM establish for the use of a work? What limitations does it entail? In particular:

- *To what extent do DRM measures facilitate or permit personal uses and copying of content, for purposes such as time shifting, place shifting, and limited sharing?*
- *Do DRM protections allow consumers to use media they buy on a wide variety of platforms and devices, or with a wide range of services – or is interoperability narrowly limited?*
- *To what extent do DRM measures facilitate end-user creativity, by allowing users to interact with and create content rather than just passively receiving it?*

¹⁷ An example of this type of backwards-compatibility issue was demonstrated when Apple released its iTunes 4.0.1 software upgrade. An upgraded version of iTunes on one computer could no longer be used to listen to music streamed over the Internet from a non-upgraded version on a separate computer. See *Apple iTunes update irritates fans*, BBC News (May 29, 2003) at <http://news.bbc.co.uk/1/hi/technology/2946180.stm>.

¹⁸ See, e.g., iTunes Music Store Terms of Service, § 9(b-d) at <http://www.apple.com/support/itunes/legal/terms.html> (visited May 19, 2006); Rhapsody Service Terms & Conditions, § 7 at https://rhapapp.real.com/rhapsody_pages/policy.jsp?policy=terms (visited May 19, 2006). One prominent example of a music service changing its terms and affecting previously-purchased content occurred when Apple released iTunes 4.5, reducing the number of times a user could burn a playlist of purchased music from 10 to 7. See *iTunes Celebrates Its First Anniversary; Over 70 Million Songs Purchased* (Apr 28, 2004) at <http://www.apple.com/pr/library/2004/apr/28itunes.html>.

- *Does a DRM scheme create risks that users could unexpectedly lose access to their content?*

Any evaluation of a DRM technology must include a careful look at the impact on the ways a creative work can be used.

Personal Use and Copying of Works: Consumers have developed a number of expectations concerning the use and copying of familiar types of content. Widespread use of the Internet and digital technologies is likely to foster additional expectations concerning personal use, as consumers grow accustomed to the flexibility that computer platforms provide. Of course, expectations may vary depending on the medium and the delivery method. But they may include (and are not necessarily limited to) the following:

- Flexible personal use – the ability to read, listen to, play, or watch a lawfully acquired copy of a work in a manner or sequence of the consumer’s choosing;
- Time shifting – the ability to record or store a work to enable use at a later time;
- Place shifting – the ability to use a work on different devices and at different locations within a personal, family, or work environment (for example, recording a program in one room to watch in another);
- Archiving – the ability to copy a work for purely archival purposes;
- Lending or reselling – the ability to lend, give, or resell a lawfully acquired copy of a work; and
- Limited copying for noncommercial purposes – the ability to engage in limited copying, such as that contemplated by the Audio Home Recording Act or the fair use doctrine.

Some traditional personal uses may not translate easily into the digital world. For example, it is easy and common to lend physical items, such as books. In contrast, it is somewhat less natural to “lend” a digital file, since people tend to copy files rather than physically moving or transferring them. Online music stores generally lack a simple mechanism for true lending – although users may be able to burn playlists onto physical CDs, which they could then lend. In addition, at least one major service permits subscribers to share music by sending a playlist to up to twenty friends, who may listen up to three times.¹⁹

¹⁹ See Musicmatch Terms of Use at <http://www.musicmatch.com/info/terms/index.htm> (visited May 19, 2006).

This may serve some of the same purposes as lending from the consumer perspective.

To the extent that consumers value the personal uses provided by traditional physical media, product developers should make every effort to implement comparable capabilities in digital products. Doing so without opening the door to widespread infringement may pose significant technical and business challenges, but consumers and product reviewers may reasonably press product and platform developers to take on these challenges. In addition, where DRM-equipped products will not allow personal uses that have been commonplace for that type of media, that fact should be disclosed to consumers.

Choice and Interoperability: Many consumers have already encountered compatibility limitations in the online music market. Songs purchased on iTunes will not work on portable music players other than Apple's own iPods, and Apple's iPods will not work with songs purchased from other online stores in Windows Media format. The confusing tangles of DRM incompatibility can be frustrating to users accustomed to buying CDs under the assumption that that they will play in any device in which they fit.²⁰

To some extent, compatibility limitations stem from the basic purposes of DRM. One major aim of DRM is to limit a user's technical ability to use or distribute digital content in ways the copyright holder has not authorized. To do that, DRM needs to make the content incompatible with devices or platforms that would enable (or fail to prevent) such unauthorized uses. For example, if Apple's iTunes song files were freely playable on any platform, then anyone could build a device or write software that played the songs but ignored or stripped the DRM.²¹ Thus, compatibility arguably needs to be limited to devices that are deemed trusted or secure.

Of course, DRM can also be used for purposes such as segregating markets or creating and enforcing different distribution windows. These uses of DRM can result in compatibility issues as well – as in the example of DVD region coding, which makes U.S. DVDs incompatible with players sold outside North America.

²⁰ The impact of compatibility limitations can be especially serious for users with special needs. For example, visually impaired users may not be able to access digital content effectively if DRM renders the content incompatible with specialized text-to-speech devices or software. See All Party Parliamentary Internet Group, *supra* note 3, at 13-14 (noting that DRM can "prevent the disabled from accessing digital content . . . because the specialist hardware and software that is used to convert the content into speech, Braille, or large type, fails to interwork with the protected material.").

²¹ Of course, compatibility limitations cannot prevent determined hackers from building or writing such devices or software anyway. See Tony Smith, *DVD Jon: buy DRM-less tracks from Apple iTunes*, The Register (Mar. 18, 2005) at http://www.theregister.co.uk/2005/03/18/itunes_pymusique/. But so long as such efforts require circumventing DRM, they create potential legal jeopardy under anticircumvention laws, which makes widespread commercial deployment unlikely.

Given the purposes of DRM and the likelihood of multiple distribution platforms, it is not realistic to expect every digital distribution service and every DRM-equipped file to be compatible with every other platform or playback device. Nonetheless, DRM that is compatible with a range of platforms and devices – and thus permits competition and consumer choice – generally should be favored over DRM that locks users in to a narrow set of complementary technologies. Media products and technologies that can be expanded and deployed in ways not anticipated by the original developers are likely to have significant long-term advantages over those with more closed architectures.

One route to greater interoperability is for different products, services, and devices to adopt the same DRM platform. For example, if a vendor of DRM solutions licenses its DRM widely, a variety of companies can incorporate that DRM into a variety of competing downstream products.²² Alternatively, a group of companies may come together to develop a joint DRM standard they would all use.²³ There is also an effort to develop an open, royalty-free DRM system, which in theory would eliminate licensing concerns as a potential barrier to widespread adoption.²⁴ In any event, reviewers should recognize that the licensing policy for a DRM system may help determine not only the range of existing devices with which a product using that DRM will interoperate, but its compatibility with future innovations as well.

A different way of achieving interoperability would be to develop standard interfaces and protocols to enable users to shift their content back and forth between separate DRM platforms, so that content acquired in one DRM format nonetheless can be accessed and used with devices employing different DRM systems. The idea is that information relating to the user's identity and the rights the user has acquired for particular content would be recorded in a standard format that is not specific to any one DRM platform. Based on that information, the content could be translated into, or exchanged for, alternative DRM formats as needed to make the content work with different devices – but only to the extent the user's rights so permit, and without jeopardizing protections against unauthorized use. The viability of such a scheme remains to be seen, however.²⁵

²² Perhaps the leading example of this approach is the Microsoft Windows Media DRM system, under the logo "PlaysForSure." A significant number of digital music stores and portable device vendors use the Microsoft system. See <http://www.microsoft.com/windows/windowsmedia/playsforsure/default.aspx> (visited Jul. 10, 2006).

²³ Members of the consumer electronics industry have formed a consortium called the Marlin Developer Group, which aims to develop a common DRM standard. See <http://www.marlin-community.com> (visited Jul. 10, 2006).

²⁴ See <http://www.openmediacommons.org/about.html>; Open Media Commons Releases Specifications and Source Code for Open, Royalty-Free Digital Rights Management (Mar. 21, 2006) at http://openmediacommons.org/news/03212006-omcworkshop_press_release.html.

²⁵ Sun's Project DReAM aims to develop this kind of standard interface between DRM systems, as does the electronics industry's Coral Consortium. See Gerard Fernando et al., *Project DReAM, An Architectural Overview* (Sept. 2005) at

In short, reviewers evaluating DRM-equipped products or services should probe the extent to which the DRM locks users into a particular family of products in complementary markets. Examining licensing agreements, policies for granting future licenses, and compatibility with any standard protocols that have been developed will be important parts of that inquiry.

As discussed above, where DRM does entail limitations on choice and interoperability, transparency is essential. Consumers would not have expected a tape deck to be capable of playing vinyl records, but in the world of digital media, compatibility-related complications may be less obvious for consumers to discern. Vendors should clearly and conspicuously label products in a way that makes it clear to users what compatibility problems they may face.

Facilitating End-User Creativity: Digital technologies and open computer architectures can empower individual consumers to be much more than passive consumers of media. The digital revolution has made mass publishing available to anyone with a computer. It provides cheap, easy access to the kind of music and video production tools previously available only to corporations and professionals. In a world in which people increasingly express themselves through rich media, they will want the ability to quote, comment, and editorialize on and through all kinds of media in the same way they have historically been able to do with text.²⁶ Naturally, copyright law establishes some boundaries for such activity, but the fair use doctrine provides a certain amount of leeway, especially for noncommercial uses that have little impact on the market for a copyrighted work.²⁷

As much as possible, DRM solutions should seek to allow users to interact with, excerpt, and expand on existing works in ways that are consistent with copyright law. They should allow reuse of content for noncommercial creative purposes – such as using purchased music as background in home videos. And they should take advantage of the metadata capabilities of digital media to make it easy to purchase licenses to expand upon and redistribute content as part of users’ own creations.

DRM is currently not well adapted to the task of facilitating end user creation. Nor is it a simple task to develop DRM solutions that, in accommodating a

<http://www.openmediacommons.org/collateral/DReaM-Overview.pdf>; <http://www.coral-interop.org> (visited Jul. 26, 2006); Coral Consortium Call to Action at <http://www.coral-interop.org/main/calltoaction.html> (visited Jul. 26, 2006). Neither has yet been implemented on a substantial scale in the marketplace.

²⁶ See, e.g., Tom Zeller Jr., *The Lives of Teenagers Now: Open Blogs, Not Locked Diaries*, New York Times (Nov. 3, 2005) (“Most teenagers online take their role as content creators as a given. Twenty-two percent report keeping their own personal Web page, and about one in five say they remix content they find online into their own artistic creations, whether as composite photos, edited video productions or, most commonly, remixed song files.”).

²⁷ See 17 U.S.C. § 107.

broad range of creative uses, do not also open the door to uses that infringe copyright. But reviewers should recognize that the potential for interactivity and user creativity is one of the great advantages of digital media. In the long run, DRM should work towards allowing users of computers and consumer electronics devices to interact with and transform content, not just to consume it passively.

Permanence / Risk of Unexpected Loss of Access: In some cases, DRM may create risks that a user's access to content unexpectedly could be interrupted or lost. In particular, DRM that involves some kind of ongoing, post-sale linkage to or dependence on the individual provider of the content could make content permanently inaccessible if the provider goes out of business. Access likewise could be impaired if the provider ceases to support a particular product line, format, or functionality.²⁸ Similarly, when DRM requires some kind of Internet-based "handshake" or verification on an ongoing basis, a user's access to purchased content could be interrupted if the user loses his Internet connection.

Of course, under some business models, users may acquire content with full understanding that their rights to access the content are not necessarily permanent. Access to rented content may expire after a certain period of time, and access to subscription-based content may expire if the user allows the subscription to lapse. But unless such limits are an explicit part of the bargain at the time of purchase, users generally expect that content they purchase will remain accessible and usable.

Whether risks of future loss of access exist is unlikely to be immediately apparent from direct tests of DRM equipped products or their associated platforms, or from the disclosures provided by the makers of those products or platforms. In general, assessing such risks will require a sound understanding of how a DRM scheme works and an effort to think through how it could be affected by various future contingencies. Product reviewers should conduct such an analysis, so they can inform consumers about any risk of purchased content becoming stranded and unusable.

²⁸ For example, Divx movie discs (a one-time competitor to DVDs, with no relation to the current video codec DivX) ceased to be playable after Circuit City discontinued support for the Divx system in mid-2001. For a description of Divx, see DVD Journal, *What Was Divx?* at <http://www.dvdjournal.com/extra/divx.html> (visited May 18, 2006). Note that industry-wide format changes, such as from 8-track tapes to audio cassettes to compact discs, can also leave a user with stranded media. But because the formats are open, continued access is not dependent on one company; so long as *any* vendor builds devices or supports or repairs old ones, the user has options. See All Party Parliamentary Internet Group, *supra* note 3, at 16 (noting that "there are rather more aspects to discontinuation when TPM [Technological Protection Measures] is involved" because "some schemes bind copies to particular machines" and moving a copy to a new machine "may involve access to the manufacturer's website, which may no longer be active.").

3. *Collateral Impact*

Does the DRM have any other potential impact on a user, aside from its direct impact on the ways the user can use or distribute the protected content?

- *Are users' privacy and anonymity preserved? What data is "phoned home" to a central server of the content distributor or other party?*
- *Does the DRM carry any risk of impairing the security of users' computers or other devices?*
- *Are there other ways in which the DRM could impair the functionality of users' computers or other devices?*

In some cases, DRM may affect more than just the use of the specific DRM-protected content. Secondary or collateral effects may relate to such matters as user privacy, computer or network security, or other potential impairment to the functionality of user devices.

Privacy and Anonymity: Analog media generally affords the ability to read, view, or otherwise access content anonymously. Some DRM systems, however, may associate a specific identity with each use of or access to content, and communicate that information back to the content distributor using the Internet.²⁹ This kind of system may benefit users by enabling them to access their content from multiple devices or remote locations, based on their identities. On the other hand, usage under such a system is not anonymous in the same way it is when one reads a book or watches a videotape.

Making usage less anonymous can raise significant privacy questions. Information about what individuals read, watch, and listen to can be quite personal and sensitive. Moreover, such information could be linked to purchase histories or other data that a content provider may possess, creating detailed profiles of individual users.

Evaluations of DRM should include an analysis of whether the DRM collects and communicates information about individual users. If so, it will be important to explore such questions as what information is collected; to whom the information is communicated; how the information will be used; with what other entities the information may be shared; and how long the information will be retained. In general, information collection, use, and retention should be narrowly limited to what is necessary to achieve the core functions of the DRM

²⁹ For example, the Google Video service embeds encrypted user account information in purchased videos, and relays that information back to Google each time a user plays a video. See *Google Video Player Privacy Notice* (Jan. 6, 2006) at <http://video.google.com/support/bin/answer.py?answer=32170>.

system, except where individuals have freely chosen to authorize broader use of the information. In addition, users have a right to expect that any privacy implications of DRM will be clearly disclosed.

Security: When DRM involves the installation or alteration of software on a user's computer or other device, there is a possibility that sloppy or overly aggressive programming could impair the general security of the device. The controversy over Sony BMG's copy protected CDs was partly due to reports that the software they installed created security vulnerabilities which could be exploited by virus writers seeking to access users' computers. Product reviewers, consumer advocates, and computer security experts should be alert for DRM behaviors that pose security risks. Examples of such behaviors include:

- disabling or changing users' firewall, anti-virus, or anti-spyware settings;
- gaining high-level operating system privileges;
- giving third parties remote access to users' devices;
- using techniques such as cloaking, which are most often associated with malicious software;
- executing even when a computer is starting in "safe mode;" and
- using techniques deliberately designed to make software difficult to uninstall.

Device Functionality: There may be other ways, not directly related to security, in which DRM could impair the overall functionality of a user's device. DRM may drain battery or processing power. It has been reported that playing music files with certain DRM can cut the battery life of MP3 players by 25 percent.³⁰ Some DRM software appears to run, and thus use processing power, even when the user is not accessing protected content – which could slow the performance of the device, particularly if multiple DRM systems operate this way and have a cumulative effect.³¹ DRM systems also could interfere with a device's general purpose copying hardware or software; there have been reports of certain DRM modifying the operation of the device drivers for DVD burners.³²

³⁰ James Kim, *The truth about battery life*, CNET (Mar. 13, 2006) at http://reviews.cnet.com/4520-6450_7-6467771-1.html.

³¹ Sony BMG's CD protection software reportedly continued to run and consume processing power even when the associated media player was not running. *See supra* note 14.

³² Jane Pinckard, *StarForce's \$1000 Break-Your-PC "Contest,"* 1up.com (Dec. 15, 2005) at <http://cgw1up.com/do/newsStory?cId=3146416&did=1>.

4. Purpose and Consumer Benefit

Does it appear that DRM is being used to innovate and facilitate new business models that fill previously unaddressed demand and give consumers new choices? Or is DRM being used to lock consumers into old business models or to limit consumers' choices in services and devices?

Individual consumers evaluating DRM in connection with specific purchasing decisions may focus mainly on the details of what the DRM's practical impact is and how that impact is disclosed. But product reviewers and consumer advocates should also step back and look at the big picture. Proponents of DRM often say it facilitates the development of new business models and delivery channels, which ultimately benefits not just content providers but consumers as well. Reviewers and advocates should try to evaluate whether particular DRM schemes appear in fact to be playing such a positive role in the marketplace – or whether they seem mainly to serve some other purpose, such as locking in users to a particular company's technology platform.

This inquiry may be more subjective than, for example, determining the particular usage parameters established by a DRM scheme. But in many cases, the purpose and role of DRM may not be terribly difficult to perceive.

For example, suppose an online video rental service uses DRM to cause downloaded video files to expire at the end of the agreed upon rental term. It is easy to understand why this online rental business, or the content companies licensing videos to it, would not be comfortable distributing so called "rentals" that in fact take the form of permanent files on customers' computers. Furthermore, there is clearly consumer demand for video rentals (at appropriate price points relative to those of outright purchases), and some renters may find it more convenient to obtain the videos online rather than from the local video store or through the mail from Netflix. So it seems reasonable to conclude that the DRM causing the video files to expire is facilitating a business model for which there is real consumer demand.³³

Another example may be DRM schemes that focus primarily on tracking and accounting for usage – rather than just restricting it -- to permit appropriate payment. A service named Weed offers a technology platform to enable users to share media files (songs or video) with one another on a temporary basis, and to earn commissions when those referrals lead to sales.³⁴ A person downloading a

³³ Several major movie studios have already experimented with this kind of delivery model. See Tim Gnatik, *An Online Supplier for Your Desktop Cineplex*, New York Times (Aug. 12, 2004) at <http://tech2.nytimes.com/mem/technology/techreview.html?res=9C00E0DF163FF931A2575BC0A9629C8B63>.

³⁴ See <http://www.weedshare.com/>.

Weed file – whether from a friend’s website, an email, or a peer-to-peer service – can play the file three times for free. If the person then decides to buy the file, portions of the purchase price go to whomever that person received the file from, and to whomever were the previous two sources of the file before that. This is an innovative business model that taps into consumers’ interest in using peer referral systems to promote and identify media they particularly like. It seems clear that, for the system to work, it needs to have a means for tracking referred files through the distribution chain, as well as for limiting each user to three free plays prior to purchase.

While DRM may help foster new choices for consumers, DRM with narrower competitive aims may limit such choices by making it harder for consumers to switch brands. We do not mean to suggest that it is or should be impermissible for companies to employ DRM for such a purpose. Companies are likely to seek to use DRM for competitive advantage where they see an opportunity to do so. However, we believe it is fair for reviewers and consumer advocates to point out when DRM is being used in ways that offer no significant consumer benefit, and to be appropriately critical.

▣ III. Applying the Metrics – Frames of Reference

In assessing how a particular DRM performs with respect to the criteria identified above, product reviewers and others may at times find it useful to compare DRM-equipped digital media products to their traditional analog predecessors. Comparisons to analog capabilities can be informative for consumers who are accustomed to analog media. Comparisons to competing digital products already in the marketplace can be informative as well. Such frames of reference could be helpful, for example, in evaluating how the specific use parameters and limitations associated with a DRM scheme are likely to relate to existing consumer expectations, or in thinking about what effects of DRM should be disclosed to achieve transparency.

At the same time, frames of reference based narrowly on existing products or services will tend to put the focus more on familiar features than innovative ones, and will cease to be useful over time. For example, several years ago, few were predicting that home users would easily be able to create, edit, and remix digital video. Now it is reasonable for product reviewers, in considering the uses DRM allows, to probe the extent to which users are able to interact with or excerpt digital video they purchase or capture.

CDT believes that, in applying metrics for DRM, it is important to consider a forward-looking frame of reference as well: specifically, what an honest and law-abiding consumer could do with networked, general purpose computers and

open-format media. In such an open-media environment, devices are freely interoperable. Content can be readily moved across home and personal networks, converted to different formats, and accessed on several devices. Consumers are able to easily transfer and access their content from diverse locations over the Internet. Wide personal and transformative uses of content are possible, limited only by the imagination of technologists in devising new ways to manipulate digital data.

Content owners will object that it is not reasonable to expect protected digital media to live up to such a standard. After all, completely unprotected media of the kind envisioned in the open media environment is easily susceptible to massive piracy. This is a fair observation. Our point is not that everything that is possible with unprotected content on general purpose computers should be immediately possible for DRM-protected media, nor that every deviation from the open media environment is somehow harmful or unfair.

Rather, using the open media environment as a frame of reference helps illustrate the technical choices and tradeoffs associated with DRM. In a world of technological convergence and digital media, there is no *technical* reason why content cannot be distributed with the flexibility that networked, general purpose computer architecture can provide. There may be economic, business model, or legal reasons for taking a different approach. But consumers and product reviewers seeking to evaluate DRM should have a clear picture of the tradeoffs that have been made in each of the areas described in the metrics.

Awareness of those tradeoffs may prompt product reviewers and other critics and commentators to press manufacturers and content owners to develop secure ways of implementing the missing capabilities. Over time, in other words, an open media environment can serve as an aspirational goal that helps shape the evolution of the DRM and media marketplace. Keeping the open media environment in mind, product reviewers, consumer advocates, and highly engaged consumers will be able to ask themselves whether makers of products and platforms are keeping up with advances in digital media technology – and apply marketplace pressure for them to do so.

▣ Conclusion

As valuable creative content continues to move online and creators migrate to digital media, DRM is likely to continue to play a major role in the media marketplace. Consumer education about DRM technology, which to date has been lacking, therefore will be critically important. The voice of consumers has been largely absent from many of the debates surrounding DRM. But it is

consumers who will ultimately have the final say in whether various approaches to content protection succeed or fail.

Product reviewers are uniquely situated to help ensure that consumers are informed in making these choices. Reviewers should push manufacturers to take full advantage of the revolutionary potentials offered by digital media and networking technologies. They should lay out the limitations and consequences associated with different DRM schemes. And they should distinguish between cases in which DRM enables new markets or fulfills previously unmet demands, and those in which product manufacturers or content owners are using DRM mainly to stifle innovation or hinder competition. Only through tough, honest, and educated reviewing will a robust and consumer-friendly marketplace in DRM and digital media emerge.

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DRM Metrics

Transparency

To what extent are the effects of DRM clearly disclosed to users?

Relevant Information for Disclosure -- Are users given fair notice of product characteristics that may be relevant to them?

Manner of Disclosure -- Is notice provided in a manner that is sufficiently prominent and understandable? Is important information buried in long license agreements or similar fine print?

Timing of Disclosure -- Is notice provided at appropriate times? For example, is notice provided both up front, and as part of ongoing interactions with the product or service?

Effect on Use

What specific parameters does DRM establish for the use of a work?

What limitations does it entail?

Personal Use and Copying of Works -- To what extent do DRM measures facilitate or permit personal uses and copying of content, for purposes such as time shifting, place shifting, and limited sharing?

Choice and Interoperability -- Do DRM protections allow consumers to use media they buy on a wide variety of platforms and devices, or with a wide range of services -- or is interoperability narrowly limited?

Facilitating End-User Creativity -- To what extent do DRM measures facilitate end-user creativity, by allowing users to interact with and create content rather than just passively receiving it?

Permanence / Risk of Unexpected Loss of Access -- Does a DRM scheme create risks that users could unexpectedly lose access to their content?

Collateral Impact

Does the DRM have any other potential impact on a user, aside from its direct impact on the ways the user can use or distribute the protected content?

Privacy and Anonymity -- Are users' privacy and anonymity preserved? What data is "phoned home" to a central server of the content distributor or other party?

Security -- Does the DRM carry any risk of impairing the security of users' computers or other devices?

Device Functionality -- Are there other ways in which the DRM could impair the functionality of users' computers or other devices?

Purpose and Consumer Benefit

Does it appear that DRM is being used to innovate and facilitate new business models that fill previously unaddressed demand and give consumers new choices?

Or is DRM being used to lock consumers into old business models or to limit consumers' choices in services and devices?