

**The Future Digital Economy
Digital Content – Creation, Distribution and Access**

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Media and Rights Management

1 The new Tower of Babel

From the Bible, Genesis 11:1-9:

Now the whole world had one language and a common speech. As men moved eastward, they found a plain in Shinar and settled there.

They said to each other: "Come, let's make bricks and bake them thoroughly". They used brick instead of stone, and tar for mortar. Then they said: "Come, let us build ourselves a city, with a tower that reaches to the heavens, so that we may make a name for ourselves and not be scattered over the face of the whole earth".

But The Lord came down to see the city and the tower that the men were building. The Lord said: "If as one people speaking the same language they have begun to do this, then nothing they plan to do will be impossible for them. Come, let us go down and confuse their language so they will not understand each other".

So The Lord scattered them from there over all the earth, and they stopped building the city...

No citation comes handier than this one to comment on the miserable state of the debate on media, digital media, rights, rights management, content protection and – most of all – Digital Rights Management (DRM). The mess is all man-made as, apparently, there has been no direct divine intervention that we are aware of.

Purpose of this paper is to clarify some of the issues that appear more confused in the debate and indicate an avenue of development.

2 Rights Management

Apparently many consider rights management as one evil result of digital technologies. Purpose of this chapter is to show how rights management is an issue that is at least 2,000 years old, but probably more.

2.1 Rights Management in the 1st century AC

In the 1st century AC, Marcus Valerius Martialis, a Latin poet, had the problem that somebody was presenting Martial' epigrams as his. This is the "rights management" problem statement that he wrote in epigram I. 52 [1]:

*Commendo tibi, Quintiane, nostros -
Nostros dicere si tamen libellos
Possum, quos recitat tuus poeta...*

(I entrust our booklets to you, Quintianus, if I may call "ours" the booklets your poet recites...)

Those were not easy years for creators, unless you could count on a patron like Horace. So poor Martial can only suggest that his friend Quintianus helps him by doing the following:

*... cum se dominum vocabit ille,
Dicas esse meos manumque missos.
Hoc si terque quaterque clamitaris,
Impones plagiaro pudorem.*

(...when he will call himself “owner”, tell him that they are mine and were released by me. If you will repeat this claim three or four times, you will impose a sense of shame on that thief)

It is not known how effective this strategy - clearly a (very soft) forerunner of today’s “notice and take down” - has been in silencing the "thief", called plagiarist by Martial. This is actually the first time the word was used with today’s meaning (the original meaning was “abductor”).

2.2 Rights Management in 1515 AD

Ludovico Ariosto, the author of the epic poem "Orlando Enraged" was afraid that people would copy his poem without rewarding him. As he lived in the city of Ferrara, whose lord was Duke Alfonso d’Este, he could not lobby any member of parliament, because there was none. So he wrote a very precise business proposition to the Duke:

“YOU fine those who pirate my works and WE share the proceeds”

It is not known how well the proposal captured the eyes and ears of the duke Alfonso d’Este, but it is reasonable to assume that the proposal went nowhere.

2.3 Rights Management in 1710 AD

Gutenberg’s invention gave the possibility to produce a large number of books using machines operated by humans instead of learned amanuenses. But once a book, with all the investment that is needed to publish it, is "out there" and “sells”, anybody can reprint it and sell it in competition with the original publisher, with much less effort but comparable gain.

This is the problem the British publishers, 200 years after Ludovico Ariosto’s proposal to the Duke of Ferrara, submitted to the English Parliament. The following prose:

Whereas some printers and publishers have of late frequently taken the liberty of printing, reprinting and republishing books without the consent of Authors or Proprietors of such Books.

shows that the workings of democracy are more efficient than those of absolutism in channeling organised voices. The following prose:

To stimulate the flow of knowledge for the encouragement of the learned Men to compose and write useful books

in the preamble of the Queen Anne’s Act [2], titled

... for the Encouragement of Learning, by Vesting the Copies of Printed Books in the Authors or Purchasers of such Copies, during the Times therein mentioned

justifies the establishment of copyright and provides the legal means to enforce such right.

2.4 Rights Management in 1886 AD

Right to copy is an important right, good for publishers. But an author has other needs as well, not necessarily the same as the publisher. For instance, as an author I want to be able to:

- Claim authorship of a work I created
- Object to any distortion or mutilation which would be prejudicial to my honour or reputation
- Authorise the reproduction of my work
- And many others...

and, by the way, I would also like to be able to exercise those rights internationally. The response to this request was the Berne Convention for the Protection of Literary and Artistic Works [3], an international

treaty that established such rights within the members of a Union, leaving to the signatories the task to actually enact the necessary legislation in their jurisdictions.

It is important to note that the Berne Convention takes a balanced approach because, while supporting authors' needs to manage their rights, it also provides exceptions, e.g.:

- Different media types are protected for different periods of time;
- Quotations from a work made available to the public are permitted;
- Works can be used by way of illustration in publications, broadcasts or sound or visual recordings for teaching;
- Reproduction of works in certain special cases is permitted.

2.5 Rights Management in 1970 AD

In order to improve the ability to manage published books, publishers would like to be able to uniquely identify any book published internationally. This demand, originated by a British publisher, eventually led to ISO 2108:2005 Information and documentation – International standard book number (ISBN) [4]. This employs a 10-digit number called International Standard Book Number (ISBN) that can be printed on the cover of all books to achieve the stated goal.

ISBN lends itself to the implementation of efficient right management systems. One of them is to have the clerk at a bookstore automatically read the ISBN code when a book is sold. A computer can easily manage the inventory and report sales back to the publisher.

2.6 Rights Management in 1992 AD

With technology, especially the digital variety, providing more functionality at the end-user level, some value chain users, such as music publishers, would like to be able to determine how many copies customers can make of a given recording.

The technical solution is easy: put a code in the audio material describing what end users can do. In the United States the enforcement task is taken care of by Audio Home Recording Act of 1992 [5] that imposes a Serial Copy Management System (SCMS) regime in all digital recording equipment.

2.7 Rights Management in 2001

The Queen Anne's Act and the Berne Convention take a rather conservative view in their support to "rights holders" wishes. Rights holders simply reserve all rights when they release a work or publication. Actually there are rights holders, who are willing to retain and manage only a subset of the rights that legislation grants them, because this gives them more freedom to manage the value of their content.

This problem has been tackled by Creative Commons (CC) [6] which has defined

- 4 permissions, i.e. what users can do with the work:
 - Copy: yes/no
 - Distribute: yes/no
 - Display: yes/no
 - Perform: yes/no

- 4 conditions under which permissions are granted:
 - Attribution, i.e. give credit to rights holder: yes/no
 - Commercial use, i.e. make commercial use: yes/no
 - Derivative works, i.e. make derivative work: yes/no
 - Share alike, i.e. share under a license identical to the original: one yes/no

Out of theoretically possible 16 licenses 11 have been actually drafted in US legal terms and translated into legal expressions valid under other jurisdictions. Those who wish to publish their works with a Creative Commons license can do so by stating their intention and by indicating the type of license they adopt.

3 Rights Enforcement

With the exclusion of poor Martial's case, all systems devised to manage rights have to eventually rely on law. This is no surprise since it is the law that originally grants the rights. In some cases, however, like in the USA Audio Home Recording Act, the intervention of law is more mediated, as it mandates what a playback device should do actually to exist as a device.

How is rights enforcement actually carried out? there are manifold ways, of which a few examples are provided here:

- Collective Management Societies enforce authors' rights by sending their inspectors where works of authors they represent are performed;
- Devices complying with Technical Protection Measures (TPM) correctly execute the code contained in the content;
- A properly designed device reads watermarking information to determine ownership or use of a media item;
- A signal is descrambled using a key to get a usable signal;
- Etc.

A large number of technologies for Rights Management have been invented. So far we have mentioned:

- Identification technologies: e.g., IBSN, ISRC, ISWC, ISAN etc.;
- Rights expression technologies: e.g. the 2 bits – 4 states of SCMS: copy always, copy once, copy no more, copy never;
- Watermarking: embed a signal in the actual content;
- Encryption: scramble the bits to make them useless unless a key is used to return the bits to a usable state.

However, it is unfortunate that Rights Management has become such an ambiguous term because

- Strictly speaking it only means “management” 1;
- But it is also used to include “enforcement” techniques, e.g. via TPM, as these are often a necessary complement to management;

- To make things worse some people use Rights Management, especially DRM - the Digital variety of it - to mean *only* “protection”.

Therefore, for the purpose of progressing the analysis I will introduce a definition of Digital Rights Management (DRM). This is a derivative of the NIST definition of DRM [7]:

DRM System: A system of Information Technology components and services which strives to distribute and control content and its rights. This operates in an environment driven by law, policies and business models.

The Open Digital Rights Language (ODRL) Initiative [8], an international effort aimed at developing and promoting an open standard for the Digital Rights Management expression language, has expressed the CC licenses using ODRL. Ergo, if a rights holder publishes his work using a CC license expressed in ODRL, an excellent tool to augment the value of CC content by facilitating rights management, the rights holder is employing a DRM technology.

4 What should we do of DRM?

The question is very pertinent because rights management is a natural consequence of this special type of property that today we call Intellectual Property (IP) but has been around for at least 2000 years in the Western civilisation. The fact that people have started making use of Information Technology is just a natural step: DRM technologies have been with us from at least the time mainframes have been used by Collective Management Societies and major media companies as a means to streamline rights and assets management.

Looking around we see that several major technology market players have developed DRM solutions to various degrees of completeness (Apple, DivX Networks, Google, IBM, Microsoft, Real Networks etc.) and several major market players are offering media services that rely on DRM solutions (Apple, Google, MSN, Napster, OD2, Yahoo!, etc.)

The reason why DRM has become such a hard issue in the media is because end users are facing unexpected constraints on their expected use of media. For some time there has been a flurry of writings, some of which seem to bring us back 200 years ago to England at the time of the industrial revolution.

It is of course understandable that individuals facing the unexpected react with an attitude of refusal. Less so if professional writers make arguments against DRM – of course implying the only “protection” component of it, never mind “management” – that boil down to the refusal of the technology because “it will never work”, “only media behemoths stand to gain”, “users only stand to lose from DRM” etc.

The problem is that saying these things, to some of which I largely subscribe, leads us nowhere, if there is no plan B to put in place that is not calling back DRM endeavours. This is not going to happen because everybody in the business senses that the mythical information society is going to be based on how trading of IP will happen and DRM, whatever its definition and its eventual shape, is going to be the way to go.

What if you are not one of those companies betting their future on the use of DRM? Doing nothing is still a valid option even though DRM will affect you. But never mind, ostriches are not an endangered species in spite of their inclination to bury their heads in the sand when a danger approaches. Still, I believe humans should be able to devise a better strategy.

Mine starts by highlighting the fact that the way DRM is currently developing is not in the interest of creators and end users but generally also not in the interest of many industry players. This should be clear from the following - incomplete - list, where you see that the use of DRM can:

- Require the setting up of an entire value chain, typically based on proprietary technologies;
- Be costly because most technologies are proprietary with little economy of scale;

- Make it difficult to experiment new business models;
- Raise the entry barrier to a value chain;
- Give rights holders full control of what happens downstream in the value chain;
- Limit what end-users have grown accustomed to consider *the* way to use media;
- Disable many interesting uses of media that were enabled by digital technologies.

It is clear that many an industry player can see a benefit in one of the bulleted points listed as shortcomings. The problem is that to any of those points there is a host of other industry players, including creators and end users who object to it. This is the real mess we are in with DRM as implemented today.

A level play field is needed, but what is currently being done to remedy some of the DRM shortcomings? The not particularly original answer is to make a “DRM conversion box”. The idea is that everybody can go on with his own individual choices of technology because there will eventually be somebody else who will make and handle a box where a content item with one DRM enters and the same content item with a different DRM leaves the conversion box.

Examples of “common formats” or “intermediate formats” – the technology enabling conversion boxes – litter the Information and Communication Technology (ICT) landscape. None of them is known to have been adopted in any significant way. Therefore there is little or no hope that a “DRM conversion box” will ever be accepted in the market place if one considers that past examples were just “technology boxes”, not a “business box” as a “DRM conversion box” is, for all practical purposes.

For somebody who has witnessed decades of troubles created by communication systems defined and deployed without coordination, it is - I believe - natural to observe that human life seems to have been designed so that that every new generation can repeat exactly the same mistakes of the old one.

5 The DRM plan B

But relax, there is a plan B. It is called interoperable and scalable DRM (isDRM) and is based on the following principles:

- Study what value chain users do
 - Define the functions executed by value chain users in an industry-agnostic fashion;
 - Define “primitive functions” so as to maximise their re-use across functions (so-called “componentisation”);
- Standardise basic DRM technologies (called “Tools”) with the following features
 - Tools implement “primitive functions”;
 - Interoperability is achieved at the level of “primitive functions”;
- Make Tools accessible
 - As reference software;
 - At RAND terms (IP);
- Reference software modules have
 - If possible an Open Source license;
 - Otherwise a “use/modify/redistribute” license;
- Do the work in phases
 - Start with simple use cases;
 - Gradually extend technology coverage.

Which are the advantages of isDRM?

- Specifications are industry agnostic
 - You build the value chain you need without alien “business model strings” attached;
 - Value chains are built by combining Tools drawn from the toolbox;
- Capabilities of a value-chain can be extended
 - By adding more Tools to your solution, if and when needed;
 - Plug in your technology so that it fits in the framework;
- Access to standardised Tools has reduced cost because Tools
 - Can be re-used;
 - Are provided by multiple suppliers;
- Value chains are interoperable
 - Within value chain of the same type;
 - Between different value chains;
- Innovation can be continuously fed into the system
 - Technology-wise, because of the Tool approach;
 - Business-wise because setting up new value chains is easy.

But, foremost, interoperable and scalable DRM makes a clear business proposition: to

- Rights holders
 - You can choose the value chain that suits your needs;
 - With a low barrier to entry;
- Intermediaries
 - You can setup a broad variety of business models – old and new;
 - You have simple access to the necessary technologies;
- End users
 - You are freedom to choose the content you need from the source you want;
 - You retain most of the rights and usages traditionally enjoyed, e.g. interoperability.

6 How real is plan B?

Implementing plan B is the task of the Digital Media Project (DMP), a not-for-profit organisation registered in Geneva [9], with the mission to

promote the development, deployment, and use of digital media that safeguard the rights of creators to exploit their works, the wish of end-users to fully enjoy the benefits of digital media and the commercial interests of value-chain players to provide products and services.

... the goal is achieved through the development of technical specifications.

DMP started as a grass-roots movement on the Internet with the Digital Media Manifesto [10] with a strong end-user focus, e.g.

- DRM may disable certain traditional end-user rights and usages (TRU), e.g. privacy, freedoms to use content, continuous access to content etc.

- End users should be given the opportunity to contribute to standards. e.g. on public mailing lists, as independent contributors

DMP has a strict process followed in the development of specifications:

- For each phase, use cases deemed to be significant are identified and documented;
- Primitive functions required to implement the selected use cases are singled out;
- Requirements for primitive functions are developed through inputs from relevant value-chain users;
- Calls for proposals for Tools with the identified requirements are issued;
- Tools are selected, documented through an open process. DMP favours Tools that have already been developed, standardised or adopted by other bodies, possibly adapting them to DMP needs;
- Specifications of how Tools can be assembled to implement the selected use cases are developed;
- In subsequent phases, calls for proposals for additional Tools needed to support new primitive functions or additional functionalities of existing Tools are issued.

These are the main DMP milestones

- Specifications for Portable Audio and Video (PAV) Devices [11] in April 2005 (completed). PAVs are devices that cannot be connected directly to the network.
- Specifications for Stationary Audio and Video (SAV) Devices [12] in February 2006. SAVs are devices that can be connected to the network or to a broadcast channel.
- Release in July 2006 of
 - Reference software
 - Conformance testing
 - Mapping of traditional rights and usages (TRU) to the digital space.

7 Conclusions

DRM or Digital Rights Management is a term that represents the latest phase of support of the deep-rooted desire of rights holders to manage their content when it is released for publication.

DRM can take many forms: management, protection or a combination of both, of course, as the D implies, using digital technologies. DRM does NOT imply protection.

Industry has already made huge investments in the development of DRM solutions, but the lack of interoperability between DRM solutions, along with serious limitations to what end users have been accustomed to expect from digital media, is a source of concern to many.

Far from blasting DRM as an evil design, this paper has taken the approach that the technology component of DRM can become a liberating technology from which all stakeholders, particularly creators and end users but without excluding intermediaries, can stand to gain if DRM is defined just right. A healthy market can then be built on top.

8 References

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- 1 - From the Webster's: the conducting or supervising of something (as a business)
2 - The document has been withheld by the European Commission