



Protecting Digital Content Utilizing Standards

Roadmap

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1 Table of Contents

1	Table of Contents	2
2	Introduction.....	3
3	DRM Patents.....	3
4	Commercial Strategy	4
5	Future Roadmap	5

2 Introduction

OpenIPMP is an open source reference implementation designed to provide a Digital Rights Management (DRM) solution that is based on open standards from MPEG, ISMA, OMA and other international standards bodies.

The goals of *OpenIPMP* are:

- Provide a working model of the various standardized interfaces required for a complete standards-based DRM / IPMP system.
- Allow for testing the technical feasibility of the standards that are emerging in the fields of DRM and IPMP (Intellectual Property Management and Protection).
- Providing a test-bed for use by various vendors in testing interoperability and standards compliance.

These were, and still are, the original goals that were laid out at the project's inception (almost 4 years ago, to date). However, the commercial/social/technological landscape has changed dramatically since the project was first released. Apple and Microsoft have emerged as the dominant forces in commercial media distribution. The Music and Film industries have begun to invest heavily in their digital 'manufacturing' operations. digital production and network distribution costs have been reduced significantly, giving rise to new disruptive production-consumption models such as 'user-centric' media (YouTube), IPTV ('cable by-pass'), podcasting, and mash-ups.

At the core of it all, still, are the debates concerning DRM and its attendant polemics of 'Fair Use' definitions, and the *Digital Millennium Copyright Act*. Although there is no shortage of heated debate, there is, surprisingly (in our view), a shortage of available code to test out the 'religion'. Open-source software should provide the technical underpinnings for dispassionate analysis of new Internet-based socio-economic models, yet there is a dearth of code available to smart engineers who wish to tackle these problems. We believe this, coupled with often predatory hoarding of intellectual property, has had a stunting effect on progress. Thus, those with the most money (and apparently all of the free time), get to decide what is both commercially and socially viable.

3 DRM Patents

There are numerous patents that govern the use of digital rights management techniques in commercial applications. It is important to note that *Mutable, Inc. DOES NOT INDEMNIFY any company or individual deploying any portion of the OpenIPMP Project, either by itself or used in a derivative application, against the possibility of patent infringement claims by any DRM or other patent holder. OpenIPMP is to be*

used at the implementer's or deployer's own risk. The OpenIPMP project software is provided by Mutable, Inc. AS IS and does not include any warranty. We believe strongly in upholding the intellectual property rights of others.

MPEG-LA and the Essential DRM Patent-Holders

Several years ago, a licensing agency called MPEG-LA¹ was founded in response to the growing number of standardized digital media compression and distribution technologies, each of which were subject to a large number of essential patents. Although companies requiring patent licensing are free to negotiate their own terms with individual patent holders, MPEG-LA aims to simplify the matter by providing fair, reasonable, and non-discriminatory access to the fundamental standardized technologies.

In 2003, MPEG-LA began work on developing a DRM Reference Model and called for companies with DRM-related patents to submit their claims for evaluation in the context of that model in an effort to determine the essential patents. Currently, MPEG-LA has developed only two DRM profiles²: OMA (Open Mobile Alliance) and Internet Music Distribution.

Developers wishing to understand more about DRM patent issues are encouraged to contact MPEG Licensing Association, or Mutable, Inc. (info@mutablemedia.com).

Also note that Mutable, Inc. and its partners provide commercial version of the OpenIPMP product. Warranty and indemnification can be included in such commercial deals. Please contact us for more information.

4 Commercial Strategy

Although we periodically release the OpenIPMP source code, we are a commercial software and services company focusing primarily on the management, protection, and distribution of intellectual property in its various digital forms. Mutable commercially “extends” OpenIPMP with the following products and services:

- *Quicktime (OSX, Windows), and DirectShow Plug-Ins that enable secure MP4 audio/video rendering*
- *Strategic relationships with commercial CODEC vendors*
- *Code obfuscation/client tamper-resistance*
- *Custom OpenIPMP porting*
- *DRM deployment reviews for essential patent coverage.*

¹ MPEG-LA, LLC (<http://www.mpegla.com>) is a for-profit company which derives its proceeds from the administration of patent pools. Despite its name, MPEG-LA is separate from the ISO MPEG non-profit organization, and does not limit its patent pools to that of MPEG-based standards.

² Note that these profiles are *nearly* complete, but have not been finalized.

5 Future Roadmap

OpenIPMP attempts to demonstrate the state of the art with respect to open standards based DRM technology. Such standards are continuing to emerge, and will evolve as the market matures. *OpenIPMP*'s evolution will not only continue to track to emerging standards, but hopes to be an integral contributor to the standards community. By making source code available to MPEG, ISMA, OMA, MOSES, and other organizations, *OpenIPMP* is committed to the process, aiding in the validation of experimental standards, the design of new specifications, and in producing openly available reference implementation software. The decision to include any or all of the following is a function of our interpretation of the current market dynamics and our resource constraints. The following provides an overview of a future roadmap for DRM standards and *OpenIPMP*.

- **Coral Consortium** – The Coral Consortium a cross-industry group to promote interoperability between digital rights management (DRM) technologies used in the consumer media market. The Consortium's goal is to create a common technology framework for content, device, and service providers, regardless of the DRM technologies they use. This open technology framework will enable a simple and consistent digital entertainment experience for consumers. At the time of the release of OpenIPMP v2.0, the Coral Consortium had just released its first set of specifications. The OpenIPMP development team will review these specifications and consider adding support for Coral in the next release.
- **DLNA (Digital Living Network Alliance)** – DLNA is focused on delivering an interoperability framework of design guidelines based on open industry standards to complete the cross-industry digital convergence. The OpenIPMP development team will review DLNA's specifications and consider adding support for DLNA in the next release.
- **MPEG-21** – MPEG-21 has the ambitious objective of providing a set of standardized interfaces for nearly all major processes and components of a complete system for multimedia management, protection, distribution and consumption. Although much of the work in MPEG-21 is still yet to be finalized, *OpenIPMP* has already begun to anticipate and proactively incorporate many of the emerging MPEG-21 concepts:
 - **Digital Item Declaration (DID) & Identification / Description (DIID)** – The Digital Object Identifier (DOI) is being adopted in MPEG-21 as a means for uniquely and globally declaring (registering) content and identifying content. The DOI scheme is used in many other fields and industries; it is able to support such variety in usage by incorporating a core Kernel of declarative meta data, and extendable Application Profiles for specific verticals. *OpenIPMP* uses DOIs for content identification, and

provides a mechanism for content registration that includes declaring the digital item and assigning a globally unique DOI. *OpenIPMP* currently supports DOI Kernel metadata, and will support the extended Application Profile when it is finalized by MPEG-21.

- **Persistent Association of Meta Data** – Persistent Association is a mechanism for linking content metadata with the content itself. Having issued a Call for Requirements for persistent association, MPEG-21 is currently working to define standards for this feature. Most proposed solutions for persistent association (e.g. cIDf) involve the use of a content hash to authenticate (and link) the content with which the meta data is associated. *OpenIPMP* has experimented with support for a content hash, and has incomplete code for this purpose. Note however, that there is confusion (and practicality issues) with whether or not the hash is calculated on cleartext or ciphertext. *OpenIPMP* will continue to evolve its support in this area as these issues are resolved and as MPEG-21 chooses technologies for standardization.
- **Digital Media Project (DMP)** – Created by the founder of MPEG (Leonardo Chiariglione), the Digital Media Project attempts to make progress where MPEG has failed. As DMP releases standards specifications, the OpenIPMP development team will review the specifications and consider adding support in a future version of OpenIPMP.
- **Creative Commons** – We feel strongly that this unique and flexible licensing system should be included within *OpenIPMP*. CC licensing is an archetype example of the future “read-write” media distribution model, neo-qualifying the future of ‘Fair Use’. OpenIPMP hopes to include special features whereby CC licensing terms – albeit different than typical commercial media business models – can not only be accommodated, but *enforced*.
- **Tamper-resistance Techniques** - Many DRM systems use such techniques as code obfuscation and key splitting and hiding in an effort to make the application more resistant to hacker attacks. Code obfuscation focus on making the application more difficult to reverse engineer and compromise. Key splitting and hiding techniques are used to defend against hackers debugging the application’s memory space in an effort to locate and obtain unauthorized access to cryptographic keys. *OpenIPMP* does not employ any such advanced techniques as its main goal is not to provide a hack-proof implantation commercial implementation. Moreover, it is unclear whether this level of software protection is really needed in the marketplace. Regardless of the commercial applicability, we feel it may be possible to build key-derivation schemes with an extremely high degree of entropy enabling full disclosure of engine in source-form.

- **Watermarking** – Often combined with or integrated into DRM solutions, watermarking is an important feature that is noticeably absent from the *OpenIPMP* system. *OpenIPMP* can be integrated with almost any watermarking technology.
- **Trusted Computing Services (Hardware/Software)**– Since hardware based cryptography, authentication, and storage technology is generally more secure than pure software-based PKI, *OpenIPMP* will track support for Trusted Computing initiatives as they develop.

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (<http://www.openssl.org/>)

For more information on any of the above, please contact Mutable, Inc.
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