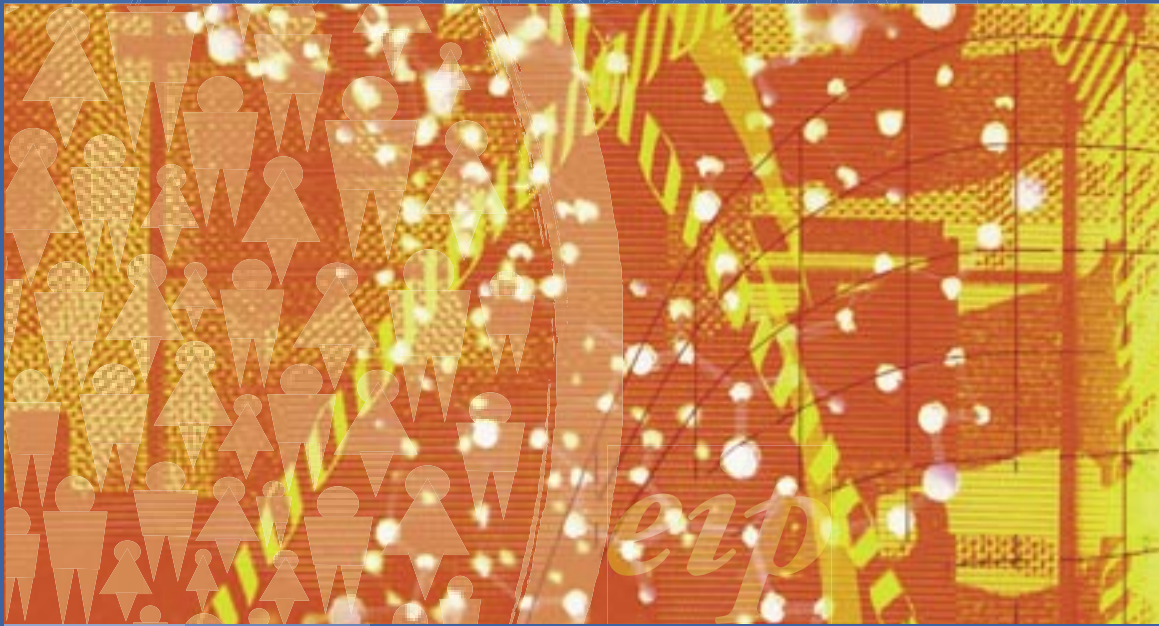




COMMONWEALTH  
DEPARTMENT OF  
EDUCATION  
SCIENCE &  
TRAINING

# Digital Rights Management in the Higher Education Sector



EVALUATIONS AND INVESTIGATIONS PROGRAMME **HIGHER EDUCATION GROUP**

**02/2**

Renato Iannella (Editor)

IPR Systems Pty Ltd

On behalf of Macquarie University



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## Executive Summary

Digital Rights Management (DRM) has become a much discussed topic, both nationally and internationally over the past eighteen months. It is, however, a concept open to widely differing interpretations. This particular study is one attempt to try and understand how DRM relates to the emerging online learning environments within the Australian higher education sector. In undertaking this study, the primary aims have been to:

- develop a coherent strategic approach to addressing a range of DRM issues relating to the development of new DRM-enabled managed learning and information environments for the higher education sector;
- produce a high-level 'blue-print' for DRM architectures applicable across all education sectors;
- enhance and promote Australia's ability to contribute to the IMS and other relevant international standards-setting processes.

The study develops a very structured and comprehensive overview of DRM, including rights issues and the potential benefits for online education environments. It is important that this overview be studied closely because the needs of the higher education sector for DRM go well beyond the issue of rights enforcement as promulgated by the software industry. In a thriving online learning and information environment, there will be extensive movement of learning and information resources and re-use, or repurposing, is integral to the way online learning takes place. The complexities of managing rights in such dynamic environments are considerable and it is for this reason that DRM is of key importance to the online learning marketplace.

Two key scenarios are presented, one relating to the use of learning objects in a particular course and one relating to access to library electronics information resources. These two scenarios demonstrate two very different sets of characteristics and different levels of complexity, but both require a structured approach to the application of DRM.

It is acknowledged that the development and trade in learning objects is still in its infancy and that it is more 'talked-about than done'. There is no doubt, however, that the emergent learning management systems and learning content management systems, together with content management systems for Web resources, offer the systems capability for a high degree of interoperability and they offer a solid context for the incorporation of DRM solutions.

The challenge now is to develop information architectures and a systems framework encapsulating the complexities of the scenarios envisaged in the higher education sector. There are no easy answers to this challenge and a great deal of work now has to be done in developing appropriate standards and protocols to facilitate the incorporation of DRM as an integral part of the systems component framework.

Bearing this in mind, the following recommendations deserve serious attention within the higher education sector and by the various funding authorities:

- Ensure that IMS Australia Centre takes the lead in forming a DRM group within the IMS Digital Repositories Working Group.
- Promote additional participation from the higher education sector in the IMS DRM group.
- Ensure that this report is used as input into the new IMS DRM group, in particular, the requirements outlined in Section 3.3 (Scenario requirements).
- Encourage the IMS DRM group to establish a formal liaison with the Open eBook Forum Rights and Rules (OEBF R&R) Work Group and to work together to form a unified DRM solutions for learning objects (including all forms of e-publications).
- Merge and reconcile the requirements outlined in Section 3.3 (Scenario requirements) of this report with the OeBF Rights and Rules requirements.
- Ensure that the IMS DRM group tracks the progress of the MPEG RDD-REL work to facilitate cross-compatibility.
- Report the progress of the DRM initiatives back to the higher education sector via the COLIS group and relevant peak bodies through seminars and other outreach/feedback mechanisms.
- Develop pilot projects through COLIS in the first instance to test systems architectures and the phased implementation of DRM systems modules.
- Prepare further proposals for submission to the various funding agencies.
- Establish firm links with the K-12 DRM interoperability initiatives.
- Seek development alliances with State-based DRM initiatives.

Because DRM affects all stakeholders in the online learning environment, including systems developers, content providers, academic staff, administrators and students, the organisational challenges of developing coherent and manageable strategies are significant and this means that the political and cultural issues are just as important as the technical issues outlined in this report.

The incentives however, for achieving success in this area are considerable, because digital rights managements could lay the foundations for Australia to become highly competitive and efficient as a national and international provider of higher education online learning.

# 1. Introduction

This document outlines the findings of the Commonwealth Department of Education, Science and Training Evaluations and Investigations Programme for the study of digital rights management within the Higher Education Sector. The project team involved is outlined in Appendix A.

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## 1.1 Project overview

The higher education sector is both the major creator of intellectual property (IP) in Australia as well as the major consumer of its own IP and that of other parties. The higher education sector produces significant amounts of IP each year which often represents a substantial commercial opportunity. The major obstacle to this opportunity is the lack of campus-wide management systems for these valuable resources.

Digital Rights Management is an emerging solution to the problem of managing the intellectual property rights over assets, including identifying rights holders, applicable allowable permissions, and tracking usage. DRM is often 'technology-focused' and drives its users into untenable situations in which their assets are locked into proprietary solutions lacking interoperability.

Digital Rights Management (DRM) has traditionally been focused on security and encryption as a means to solve these issues. That is, lock the content and limit its distribution only to those who pay. This is what is being referred to as 'first-generation DRM' and represents a substantial narrowing of its real and broader capabilities. DRM is now being defined to cover the description, identification, trading, protection, monitoring and tracking of all forms of rights permissions, constraints, and requirements over both tangible and intangible assets including management of rights holders relationships. This is the 'second-generation DRM' (Iannella, 2001).

The immediate opportunity for the higher education sector is to provide input into DRM initiatives to determine realistic requirements and to play a national and international role in this new arena. Failure for the sector to develop its own coherent strategy for DRM will see externally developed and often inappropriate strategies and technologies applied by default.

This project has undertaken a study of the DRM requirements for the higher education sector and provides these as input into a number of national and international DRM activities. Primarily, the work will concentrate on the IMS Global Learning Consortium (IMS) and its planned program for supporting DRM. IMS is developing global specifications for the access and management of education material.

Additionally, the impact from other standards bodies, such as the Open eBook Forum, and DRM initiatives such as the Open Digital Rights Language (ODRL) will be investigated.



The project aims to provide a core set of requirements that have been gathered and analysed from the Australian higher education sector and report on the impact these have on the state-of-play of relevant DRM initiatives. The report will conclude with a set of recommendations applicable to the Australian education sector which will also be presented at a workshop for sector feedback.

---

## 1.2 Anticipated benefits

The anticipated benefits from this study include:

- A coherent strategic approach to addressing a range of DRM issues relating to the development of new DRM-enabled managed learning and information environments for the higher education sector;
- Sharing of information resources to enhance each university's DRM offerings, reducing the duplication of effort and achieving cost efficiencies;
- Enhancement and promotion of Australia's ability to contribute to the IMS and other relevant international standards-setting processes;
- A high-level 'blue-print' for DRM architectures applicable across all education sectors;
- Facilitation of a new market for Australian higher education IP overseas via DRM-enabled systems.

---

## 1.3 Project methodology

Phase One of the project employed standard requirements gathering and analysis techniques, as the higher education sector needs to support many different business processes and models. These are sometimes described as scenarios. These scenarios describe situations in which DRM issues and services need to be considered. Scenarios often describe information at the instance or example level. This implies that instance level information can be generalised into the higher education sector models. Scenarios may be used to validate requirements, or, alternatively, scenarios may be seen as pathways through a specification of system usage.

The Phase One Scenario Requirements stages included:

1. Elicit Scenarios. Use cases are elicited directly from higher education stakeholders as histories of real world system usage or are created as visions of future system usage.
2. Scenario Analysis. The scenarios were reviewed and matched with the experience from DRM experts with respect to similar sector scenarios.

Emerging DRM strategies from relevant and compatible sectors were also used to verify each scenario.

3. Scenario Requirements. From the analysis a set of requirements was generated and classified appropriately.

The Higher Education stakeholders and DRM experts are listed in Appendix A. The selection of stakeholders determined the scope and scale of the elicitation stage. Scenarios were also compared to those generated from the Schools Online Curriculum Content Initiative (SOCCI), now known as The Le@rning Federation.

Phase Two of the project targeted the standards organisations and analysed their current DRM efforts. The analysis was framed on the requirements generated from Phase One and produced a set of recommendations for future opportunities.

The Phase Two DRM Standards stages included:

1. Review Standards. Review international standards from the identified organisations.
2. Requirements Comparison. Compare the requirements from Phase One to the review of the standards and identify overlaps and gaps in DRM standards, architectures, and frameworks.
3. Standards Recommendations. Develop a set of recommendations for addressing the needs of the higher education sector for DRM standards.

---

## 1.4 Project outcomes and scope

This project focused on the technical issues with respects to DRM in the higher education sector. In particular, the project aimed to provide strategic advice on the standardisation of DRM efforts and what role the higher education sector should and can play. These standards will effect how learning objects are created, maintained, traded, and used in the education sector.

The two phases produced three major outcomes:

- Stake holder workshop and report on the higher education requirements
- Stake holder workshop and report for the feedback on the recommendations
- A public report for the study of DRM standards in the higher education sector including the requirements and final recommendations.

It is important to note that this project did not address:

- the teaching and learning outcomes from the use of DRM-enabled learning objects
- Legal issues over copyright application and compliance
- Ownership of material developed in the university sector.

## 2. Overview of Digital Rights Management

This section provides an overview of digital rights management, including rights issues and potential benefits for the online education sector.

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### 2.1 The nature of knowledge and DRM systems

Digital rights management (DRM) systems involve the description, layering, analysis, valuation, trading, protecting and monitoring of the rights over an organisation's data and information, its other tangible and intangible assets.

Economic Knowledge, the category of assets relevant to the education sector, is defined by Lundvall (in Johnson 1992) as being of four distinct types:

- **Know What:** refers to information of factual propositions such as tables, dictionaries, regulations etc. Typically these are now held in databases.
- **Know Why:** refers to knowledge as understanding, explanatory structures which involve principals of more or less general applicability.
- **Know How:** refers to forms of information that allow the possessor to accomplish some observable task.
- **Know Who:** refers to information of actors in a social or business organisation and the relationships between them. Distribution agreements are often based on one party having better Know Who in a particular region.

We would suggest there is a fifth category to represent the cultural and artistic creations.

- **Know Art:** refers to information of tastes, technique and performance to create music, writing, paintings etc.

A knowledge-based organisation can succeed only if its information systems are built from the ground up to manage efficiently its knowledge, the knowledge of others and the rights and obligations of usage and payment over them

The different forms of information that a knowledge-based organisation will have to create and manage are protected by law under copyright and trade secrets legislation. However, current methods of managing, trading and protecting such knowledge are inefficient or else require the knowledge to be wrapped or embedded in a physical form such as a book, CD, production line or product.

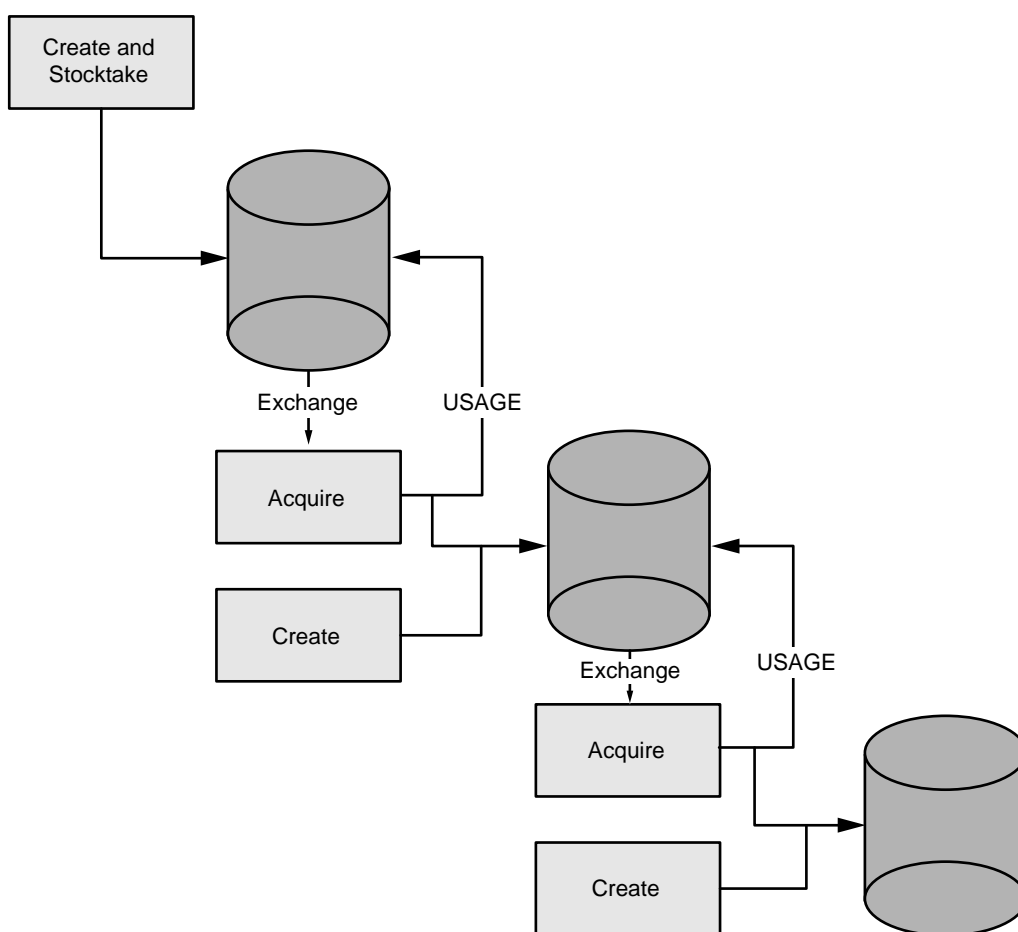
Managing and trading knowledge also requires its disclosure to varying degrees. Too much disclosure of certain types of knowledge renders it economically useless. Too little means it cannot be marketed as the prospective buyer has insufficient information about the item being purchased to make a 'feature/benefit/cost' valuation decision.

## 2.2 Accretion of knowledge

A key feature of managing knowledge in this decade will be the substantial increase in serial re-use of material. Rights holders will increasingly try to maintain their connection with the use of their works as the cost of creating new works such as software or microchip designs increases.

There will be substantial economic and time-to-market pressures which will require organisation to implement cost-effective mechanisms to enable other parties to add value, extend or adapt and aggregate the original material. Figure 1 shows this effect of a connected marketplace requiring a connected supply chain.

Figure 1 Knowledge accretion



Another common form of knowledge accretion is when the resultant work is so mixed between the various inputs that it is impractical to consider licensing the individual contributions as separate products.

The new combined object has to have ownership that respects the history of the various value contributions. Often cross licensing or revenue splitting is the best way of moving forward.

## 2.3 The 'layered' view of rights and obligations

Rights and obligations are the key concepts behind intellectual property (IP) and contract law. In computer systems design terms however an 'obligation' is effectively a negative form of 'right' and so can be managed by the one concept.

Every physical or digital object that is managed or exchanged embodies layers of rights. Each layer of rights in an object is nominally associated with a 'role' and can be licensed, sold or assigned (all are forms of transfers) to others with conditions attached.

For instance:

- A painting has a bundle of layers of rights normally associated with it.
- An individual has rights as a citizen, as an author of a work and as purchasers or things etc.

The right to publish a research paper is held by the person with the role of author. It may be transferred to the identity with the role of owner, very often a university, and then transferred to an identity with the role of publisher.

This approach also works for rights over tangible goods: owning a home includes the layers of right to occupy a dwelling and the right to title over a particular parcel of land. Other possible layers that are not included in this type of ownership are a right to mineral extraction and the right to build without permission etc.

Because of the university publish or perish culture much academically produced IP is assigned or completely transferred to a publisher, nearly always to the detriment of the university's long term interests in delivering courses based on the material and sometimes even to the academic who wrote it.

For instance, a researcher may have assigned her complete title in a research paper in order to get it published to complete a research grant condition. Instead she could have licensed a discrete, thin layer of the overall bundle of rights involving a printed journal publishing right, in English, in Australia, for a given period for just about the same amount of money (which is often zero). She would then have preserved some layers of rights to license to the university where she works and reserved the remaining layers to herself (see Table 1).

Table 1 Possible layers of rights to roles for academic author's works

Typical Role	Rights examples
Journal Publisher	To publish printed journal in English in Australia for 2 years
University	Right to use material in online course delivery and resell the resulting material for the next 5 years Right to use the material in internally presented courses for next 8 years Right of attribution Right to lodge patent and commercialize Right to revenue share
Academic	Right to publish with peer review and earn revenue Right to publish digital version Right of attribution Right to share proceeds from Patent commercialisation
External Funder	Right to 3 years exclusivity on commercialisation of patents

A party that can define a new layer of right has potentially increased the value of the works they hold to which that layer can be applied. If another party will pay for this newly created right then it has validity and a value.

Therefore any system that manages, exchanges or trades intellectual property must be able to handle the creation, management and transfer of many different layers of rights in objects over time and between many different parties.

This approach—using contracts—can ensure clarity over the use of copyrighted materials. Copyright and contract issues are discussed by the Copyright Law Review Committee (2001).

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## 2.4 The pricing of the transfer of a right

The particular price that is established for a specific right would be based on specific characteristics of user, usage and the confidence level or measures that could be expected.

For instance fair dealing, or fair use, and research use can best be thought of as specific layers of rights that can be made inherent in many instances of usage, by different types of users for specific types of artefact.

In effect these layers of fair use will automatically be contracted in to the price, user, usage, trust-matrix based on principles that might be agreed on or legislated for.

Library fair dealing could be partly described as: 'If the user is an anonymous citizen with a membership card accessing a digital book via the library intranet then they can view whatever they want on screen for free'.

As an example, a rights-managed online service for digital books will need to provide various level of access on demand:

- Part or all of a work can be viewed on screen, that is, it cannot be printed or saved
- Part or all of a work can be downloaded for reading offline on a PC or e-book device but it cannot be printed
- Part or all of a work to be downloaded and for a pre-agreed quantity to be printed with a personalised watermark
- Part or all of a work to be downloaded as text for embedding in another work

To establish an acceptable trade of rights between two parties is a matter of ensuring there are overlaps in the buyers and sellers acceptable deal matrix. Bids or auction type mechanisms can help find the most mutually acceptable intersection point between the two matrices.

Many types of cultural works do not change form over time but it is still essential to manage the chain of title of a work (or provenance) as it passes from owner to owner in order for the work to have the greatest value.

## 2.5 DRM and online learning

Over the course of the academic year Australia's universities and other tertiary institutions produce, for their internal use in teaching and tutoring, thousands of projects ranging from small Java simulations on 'cell biology' to complete online degrees.

Their museums and libraries hold hundreds of thousands of objects that could also be used to support learning and research once properly digitized, catalogued and managed.

Each university is independently working to provide resources, often for up to 200 courses, to its faculty and students. In a time of reduced educational funding this is a substantial resource commitment.

Many of these projects, products or objects created for one module are useful to other departments of the university as well as to other teaching institutions, universities, companies, TAFEs and schools, providing a cost-effective way is found to promote, describe and facilitate the trade or exchange of these objects.

To date the practice of re-use in learning objects has not been widespread because the quality, administrative, contractual and financial costs of finding, negotiating and integration are seen to be greater than the potential saving from re-use. For re-use to become widespread it has to become very simple and efficient to undertake with high commercial, learning and technical certainty.

Some universities are moving to control these issues with bilateral or group agreements. While that does provide a solution within the group it does not provide a robust solution to subsequent sale of a learning component to another party outside of the group. The 're-use barrier' has been moved away one step, but it has not been eliminated and it will restrict the realisable commercial value of the courseware developed.

Promoting the exchange and re-use of quality learning objects, while respecting and rewarding the intellectual property of the various contributors, are the two key issues which have to be solved before online learning can become cost effective and widespread. This involves the management of both the 'chain of title' of unchanged works and the sharing of rewards from accretion contributions.

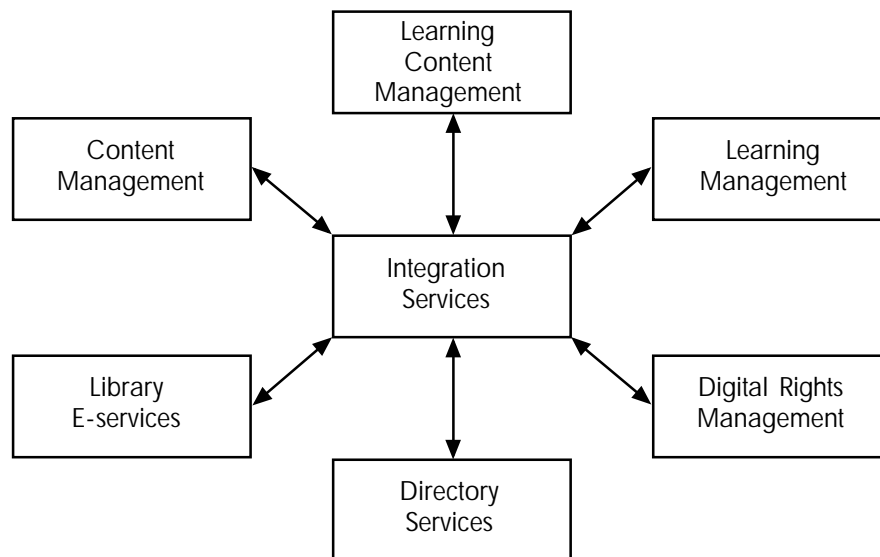
Giving people access to information or books within a library is a form of trade. A trade is also a form of exchange of value (see Clarke (1999) for other forms of trading models for the university sector). However, it is very difficult to set up a mechanism for exchanging knowledge unless it has been managed through its complete life cycle as it is often impossible or very expensive to undertake retrospective discovery of ownership of intellectual property.

Universities need to support frameworks, such as that depicted in Figure 2 (McLean 2001) that sustain the full life cycle of learning objects. This includes the management of the content as it evolves into 'learning' content and its use during teaching and access via library services. DRM needs to be tightly integrated all with support from directory services.

Knowledge owners and exchangers in the knowledge-based economy must utilise systems to properly identify, manage and track the trade in the many layers of rights

as well as managing the underlying asset life cycle and the delivery of the required representation of the work with the appropriate type and level of copy protection to the user or buyer. In essence, you cannot trade or exchange what you haven't described, managed and can prove title to.

Figure 2 University system framework



The education sector has some unique characteristics when dealing with DRM. Firstly, the creation of content (learning objects) usually evolves over a longer period of time and often involves the re-use of other parts of learning objects. Thus, the management of learning objects requires a long-term strategy and involves both the 'upstream' creation and 'downstream' use information. Secondly, the learners (users) have a stronger level of trust being part of an existing infrastructure relationship.

Existing processes and systems for the creation of learning objects will need to be augmented to support DRM services. Learning object creators will need guidance and education on the benefits of these additional requirements as it may require a profound change in the approach towards content creation and re-use in the higher education sector.



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## 3. Scenario Requirements

This section details the findings of Phase One of the project in determining the following:

- Eliciting scenarios
- Scenario analysis
- Scenario requirements

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### 3.1 Eliciting scenarios

Use case scenarios were elicited directly from the higher education stakeholders as histories of real world system usage or were created as visions of future system usage. A number of meetings with stakeholders were held to gather these scenarios, as well as general feedback from the Collaborative Online Learning and Information Services (COLIS) members.

A number of scenarios were also adapted from the Schools Online Curriculum Content Initiative (SOCCI) Business Requirements Specification (SOCCI-BRS, 2001) and modified to meet the higher education needs. After further analysis, the SOCCI scenarios were used to develop the Systems (SOCCI-SRS, 2001) and Functional (SOCCI-FRS, 2001) Requirements Specifications.

For consistency, the scenarios followed a DRM model for expressing rights information. The model is shown in Appendix B and consists of the following three core entities:

- Assets
- Rights
- Parties

Assets include any learning object and other physical or digital content. The assets can be uniquely identified and may consist of many subparts and be in many different formats. Assets can also be nontangible expressions of works and/or manifested in particular renditions (learning object is used in this report to refer to any asset/content/resource that has been developed for the purposes of teaching and learning).

Rights include permissions, constraints, conditions and requirements. Permissions are the actual usages allowed over the assets (for example, play a video asset). Constraints are limits to these permissions (for example, play the video for a maximum of five times). Requirements are the obligations needed to exercise the permission (for example, pay \$A5 each time you play the video). Conditions are exceptions that will disable the permissions (for example, if the consumer's credit card becomes invalid).

Parties include end users and rights holders. Parties can be humans, organisations, and defined roles. End users are usually the asset consumers. Rights holders are usually parties that have played any role in the creation, production, distribution of

the asset and can assert some form of ownership over the asset and/or its permissions.

With these three core entities, the DRM model can then express offers and agreements. Offers are proposals from rights holders for specific rights over their assets. Agreements are when parties enter into contracts or deals with specific offers.

As example use cases, conforming to the DRM model, consider the following two scenarios looking at offers and agreements.

### 3.1.1 Example scenario: offer

The computer science department at university X has developed a learning object for the teaching of advanced XML. The learning object consists of many subparts:

- lecture presentations,
- reference manuals,
- tutorial material,
- example code,
- XML software development tools, and
- exam questions and answers.

The department has developed all of the learning object content except for the XML software development tools. They have an agreement from the commercial vendor to allow distribution of their tools only.

The staff involved and the University make the learning object available on the national 'e-UNI Learning Object Exchange'. As rights holders, they agree among themselves who is entitled to royalties at what level. They then decide to make the following two offers:

1. University-wide site license for unlimited number of users for a period of one year for a fixed fee of \$A5000.
2. Department-wide license for a period of one year for a per-user fee of \$A50.

In addition, the parties accepting these offers will have to obtain commercial licenses from the XML software vendor. These license offers are directly linked from the asset information contained with the software.

### 3.1.2 Example scenario: agreement

The library at university Y needs to obtain electronic journals in the area of bio-technologies from publisher Z. Publisher Z has an online distribution service in which it has the following offers:

1. Free access to the table of contents for all e-journals.
2. Online access to all e-journals (25 in total and 12 issues per year) for an annual charge of \$US100 000.
3. Online access to a single e-journal for the annual charge of \$US10 000.
4. Online access to a single article for a per-use charge of \$US50.

The online access to the journals is via trusted network address ranges (that is, the university intranet).

The university decides to accept offer (1) and make it available to the entire campus network. It also decides to accept offer (4) but limit the access to a single address (that is, one machine) to control access.

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## 3.2 Scenario analysis

The final set of scenarios gathered is listed in Appendix C. These have been reviewed and matched with the experience from DRM experts with respect to similar sector scenarios. Emerging DRM strategies from relevant and compatible sectors have also used to verify each scenario.

The scenarios have been grouped based on the requirements eluded in the use case they describe. The groupings of related scenarios are described below.

### 3.2.1 Reporting

The ability to support reporting on the use of content, in particular, for formal reporting responsibilities, and supporting transparency in IP license offers.

The scenarios related to this group include:

- C.1 Compulsory Licensing
- C.3 Digital IP Reports
- C.4 Physical IP Reports

### 3.2.2 Licensing processes

The ability to support streamlining the usually long and arduous task of developing agreements between parties for specific uses of content.

The scenarios related to this group include:

- C.1 Compulsory Licensing
- C.15 Change of Context
- C.17 Academic Content Lifecycle
- C.18 Copyright Clearance House
- C.21 Digitising Rights
- C.26 Consortium LO
- C.27 Research IP Manager

### 3.2.3 Expressive rights

The ability to specify and offer a wide range of permissions, constraints, and requirements over content. This includes supporting new business models such as pay-per-use or earning loyalty points for use of content.

The scenarios related to this group include:

- C.2 Commercial LO Providers
- C.5 Granularity of IP Rights
- C.6 Commissioned Free Use
- C.10 Defining Usage Rights
- C.11 Content Rights Discovery
- C.17 Academic Content Life Cycle
- C.20 Single versus Multiple Users

#### 3.2.4 Fee payments

The ability to support the online payment of fees for use of content, including once-only and per-use fees.

The scenarios related to this group include:

- C.2 Commercial LO Providers
- C.8 Lecturer LO Customisation and Reuse
- C.9 Pricing Levels

#### 3.2.5 Learning object management

The ability to support the management and control of digital assets (for example, version control, metadata relationships, asset access and archives) and interfaces between DRM systems and Learning Content Management Systems (LCMS). See Chapman and Hall (2001) for a review of LCMS.

The scenarios related to this group include:

- C.5 Granularity of IP Rights
- C.7 Lecturer LO Customisation
- C.19 Archive Access
- C.24 Content Hosting

#### 3.2.6 Learning object usage

The ability to support the control of licensed learning objects at the Learning Management Systems (LMS) level, for the purposes of honouring the agreed constraints on the acquired permissions. For example, tracking usage for pre-use fees.

The scenarios related to this group include:

- C.2 Commercial LO Providers
- C.14 Student Educational Usage
- C.16 Usage Tracking
- C.23 Recording Lectures
- C.25 Software Licenses

### 3.2.7 Rights Holders

The ability to support specification of Rights Holders over assets and permissions, linking to authoritative data, the chain of title, and payments of agreed royalties.

The scenarios related to this group include:

- C.5 Granularity of IP Rights
- C.8 Lecturer LO Customisation and Reuse
- C.17 Academic Content Lifecycle
- C.26 Consortium LO

### 3.2.8 Discovery

The ability to support systems and interfaces for the search, access, and retrieval of content via Rights information.

The scenarios related to this group include:

- C.7 Lecturer LO Customisation
- C.11 Content Rights Discovery
- C.14 Student Educational Usage

### 3.2.9 Learning object granularity

The ability to support the specification, access, and customisability of parts of learning objects (to meet specific learning objectives).

The scenarios related to this group include:

- C.7 Lecturer LO Customisation
- C.8 Lecturer LO Customisation and Reuse
- C.10 Defining Usage Rights
- C.28 Fair-dealing Override

### 3.2.10 Security

The ability to support the specification and application of secure mechanisms for content control and delivery and user verification.

The scenarios related to this group include:

- C.12 Watermarked Pages
- C.13 Secure Content Usage
- C.22 User Definition

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## 3.3 Scenario requirements

From the analysis of the scenarios, a set of overall requirements can be generated and classified appropriately. The DRM model presented in Appendix B is used to provide a consistent view of the requirements as well as showing the relationship between the requirements.

### 3.3.1 Asset requirements

The scenarios pertaining to the management of Assets include:

- 3.2.5 Learning object management
- 3.2.9 Learning object granularity

From the above scenarios and analysis, the following specific requirements have been generated:

- Unique and trusted identification of assets (and its sub-parts) using open standards
- Granularity of assets to enable parts to be uniquely identified and reused
- Media format neutrality and support of packaging assets (and metadata) with standard mechanisms
- Sequencing of assets (for example, for learning object customisation)
- Manage versions of assets and relationships between versions (with respect to rights)
- Manage links from assets to rights metadata
- Support rights metadata embedding into assets
- Interfaces to digital asset management systems/repositories

### 3.3.2 Offer requirements

The scenarios pertaining to expressive offers (utilising the permissions, constraints, conditions, requirements, and rights holders) include:

- 3.2.3 Expressive rights
- 3.2.8 Discovery

From the above scenarios and analysis, the following specific requirements have been generated:

- Extensible list of terms applicable to the higher education sector for:
  - Permissions
  - Constraints
  - Requirements
  - Conditions
- Ability to express multiple offers based on:
  - Type of users
  - Type of asset
  - Granularity level of asset (for example, to assign different rights to parts of assets)
  - Type of usage
  - Degree of trusted environment

- Ability to group standard offers into reusable templates
- Ability to identify rights holders (and their roles) including royalty conditions
- Ability to effectively search and retrieve assets based on rights information (local or externally linked)

### 3.3.3 Agreement requirements

The scenarios pertaining to agreements (utilising the permissions, constraints, requirements, and parties) include:

- 3.2.2 Licensing processes
- 3.2.1 Reporting
- 3.2.4 Fee payments

From the above scenarios and analysis, the following specific requirements have been generated:

- Ability to express agreements from existing published offers
- Ability to identify all parties to the agreements
- Ability to interact with financial services to transact payments from the Parties and royalties to rights holders
- Support reporting on all financial transactions
- Mechanisms for generating and analysing usage reports from the agreements

### 3.3.4 Party requirements

The scenarios pertaining to the identification and management of parties (including rights holders) include:

- 3.2.7 Rights holders
- 3.2.2 Licensing processes

From the above scenarios and analysis, the following specific requirements have been generated:

- Ability to uniquely identify all parties, including from trusted sources
- Ability to specify parties in agreements and rights holders in offers
- Ability to specify roles for parties
- Ability to specify layers of rights holders over assets
- Ability to specify rights holders for parts of assets
- Ability to specify royalty payments based on various business models
- Ability to access and store information about parties from external trusted services
- Support privacy of party information
- Support anonymity of parties

### 3.3.5 System requirements

The scenarios pertaining to the systems operation of DRM services include:

- 3.2.6 Learning object usage
- 3.2.10 Security

The systems operations are dependent on the implementation of DRM services and their interfaces to common external services.

From the above scenarios and analysis, the following specific requirements have been generated:

- Ability to track and control the usage/exchange of assets in downstream environments (to verify the Agreement conditions, including payments)
- Ability to report up/downstream on asset usage
- Ability to verify from 'DRM License' services the validity of asset usage from prior Agreements
- Ability to support encryption/decryption of assets requiring higher levels of security
- Ability to verify parties based on common authentication and authorisation services, to support access control to assets based on rights information



## 4. Digital Rights Management Standards

This section details the findings of Phase Two of the project in determining the following:

- Review standards
- Requirements comparison
- Standards recommendations

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### 4.1 Review standards

A number of key standards and initiatives in both the educational and the DRM sector are summarised below. Each has potential impact on the higher education sector.

#### 4.1.1 IMS Global Learning Consortium Inc.

The IMS Global Learning Consortium (IMS) is the primary body developing standards for the educational sector and has the goals of:

- defining the technical specifications for interoperability of applications and services in distributed learning, and
- supporting the incorporation of the IMS specifications into products and services worldwide.

IMS endeavours to promote the widespread adoption of specifications that will allow distributed learning environments and content from multiple authors to interoperate.

IMS has produced and maintains a number of specifications including:

- Metadata – for describing learning objects
- Content Packaging – for the XML encapsulation of learning objects into transportable objects
- Question and Test Interoperability – a language for describing tests and exams
- Learner Information – information about a Learner (individual or group learners) or a Producer of learning content (creators, providers or vendors)
- Enterprise Specification – interoperability of Instructional Management systems with other systems that are used to support the operations of an organisation

Additionally, IMS has a number of new working groups developing proposals for:

- Digital Repository Interoperability – how data sources can interoperate amongst and between learning organisations
- Accessibility – how to support the equitable use of IMS content

- Simple Sequencing – how to organise the sequence of items in learning objects

The Digital Repository Interoperability working group has developed the framework and reference models for interoperability between systems that manage all aspects of LOs. The working group has set a clear agenda to also address the DRM requirements in such systems as the implications of DRM are evident when developing LO architectures.

IMS primarily operates by utilising existing standards (or proposals from significant groups) and re-working them into deployable solutions. A number of IMS standards are based on the IEEE and ISO standards, and are heavily influenced by proposals like the Shareable Content Object Reference Model (SCORM).

Australia has significant participation in the IMS working groups and hosts the IMS Australia Centre, funded by DEST.

For more information about IMS see <<http://www.imsproject.org/>>

#### 4.1.2 Open eBook Forum

The Open eBook Forum (OeBF) is an international standards and trade organisation consisting of members whose common goals are to establish specifications and standards for electronic publishing. The OeBF's work fosters the development of applications and products that will benefit creators of content, makers of reading systems and, most importantly, consumers.

The OeBF has the following technical working groups developing specifications:

- Identifiers – unique identification of ebooks
- Metadata – descriptions of ebook content
- Publication Structure – ebook content encoding and representation
- Rights and Rules – DRM issues for ebooks
- Systems – overall systems interoperability for OeBF standards

The Rights and Rules Working Group is addressing DRM issues for ebooks including the rights languages, and specification and management of a trust model for ebook vendors, services and devices. It has completed gathering and analysing significant numbers of requirements from multiple stakeholders. The requirements, many from the library community, cover technical, social, legal and business issues for e-publishers and consumers.

The Rights and Rules Working Group has now commenced the next phase of defining the semantics (and grammar) for a rights language. This will be based on a prioritised list of the above requirements.

For more information about OeBF see <<http://www.openebook.org/>>

#### 4.1.3 Open Digital Rights Language Initiative

The Open Digital Rights Language (ODRL) is a proposal from IPR Systems for the standardisation of expressing rights information in DRM systems.

ODRL is intended to provide flexible, interoperable mechanisms to support transparent and innovative use of digital resources in publishing, distributing, and

consuming of electronic books, broadcasting, digital movies, digital music, interactive games, computer software and other creations in digital form, in a way that enables protected digital content and honours the rights, conditions, and fees specified for digital contents.

The ODRL rights information consists of the following core entities:

- Assets – uniquely identifiable content at any level of granularity (may include Encryption information for secure asset delivery)
- Rights – the rights information consisting of:
  - Permissions – actual usages allowed over the assets
  - Constraints – limits to these permissions
  - Conditions – exceptions to control permissions
  - Requirements – obligations needed to exercise the permission
- Parties – include end users, roles, and rights holders who can assert some form of ownership over the Asset and/or its Permissions
- Offers – proposals from rights holders for specific rights over their assets (to end users)
- Agreements – when parties enter into contracts or deals with specific offers.

The ODRL model is based on an analysis and survey of sector specific requirements (including models and semantics) and as such aims to be compatible with a broad community base. ODRL is intended to meet the common requirements of many sectors and has been influenced by the ongoing work and specifications/models of over a dozen DRM activities.

ODRL utilises two XML schemata. One schema defines the Expression Language elements and constructs, the other defines the Data Dictionary elements. Both must be used to support valid ODRL expressions.

Further, the Data Dictionary schema is dependent on the Expression Language schema as the former defines elements that are constrained by the Expression Language model. ODRL was first created in April 2000 after reviewing the requirements from various DRM sectors, groups, projects, and technologies. The first public version was released in August 2000, and the latest version (1.0) was released in November 2001. ODRL is also unique in that it is the only proposed rights language that is open and royalty free.

ODRL has been submitted to a number of standards bodies for consideration in their work plans. The ODRL language has strong and significant support from many vendors and DRM stakeholders including Nokia, Real Networks, IBM, Adobe, Panasonic, PurpleCast, MarkAny, Simpsons Solicitors, OzAuthors, Pipers, ARPA, Vienna University, Information Management Australia, and Topologi.

ODRL can support a Rights Data Dictionary specific to the higher education sector.

For more information about ODRL see <<http://odrl.net>>

#### 4.1.4 Moving Pictures Expert Group

The Moving Pictures Expert Group (MPEG), a working group of the ISO/IEC, is in charge of the development of standards for coded representation of digital audio and video. Established in 1988, the group has produced:

- MPEG-1 – the standard for video CD and MP3
- MPEG-2 – the standard for digital television set top boxes and DVD
- MPEG-4 – the standard for video/audio encoding
- MPEG-7 – ‘Multimedia Content Description Interface’ – the metadata standard for describing video/audio. The latest, and most relevant work, is the new standard entitled MPEG-21 ‘Multimedia Framework’. The vision for MPEG-21 is to define a multimedia framework to enable transparent and augmented use of multimedia resources across a wide range of networks and devices used by different communities. The key difference of note is that MPEG-21 is no longer focused on video/audio content, but any (and all) digital content.

Another key point about MPEG is that it is still aimed at the downstream use of digital content (not upstream management), and still focused at the ‘high-end’ of the industry and content owners (eg media studios).

Currently the MPEG-21 framework will consist of the following technical parts:

- Part 2 – Digital Item Declaration
- Part 3 – Digital Item Identification and Description
- Part 4 – Intellectual Property Management and Protection (IPMP)
- Part 5 – Rights Data Dictionary
- Part 6 – Rights Expression Language

Parts 2, 3, and 4 are currently under development, with Parts 5 and 6 about to begin. The last three parts are of interest to the DRM sector. The IPMP work has concentrated on how a video/audio device interacts with a ‘black-box’ IPMP device to manage and enforce the rights. The Rights Data Dictionary and Rights Expression Language (RDD–REL) work will define how to describe the rights.

For more information on the work of MPEG see  
<<http://mpeg.telecomitalia.com/>>

#### 4.1.5 Other activities

There are a number of other activities that are relevant to DRM. These are not specific to DRM but should be tracked and consulted to ensure higher education issues are not overlooked.

These activities include:

- Digital Object Identifier (DOI) <<http://www.doi.org/>>
- Extensible Media Commerce Language (XMCL)<sup>1</sup> <<http://www.xml.org/>>

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1. The XMCL language has recently been merged into the ODRL language.

- World-Wide Web Consortium (W3C) DRM Workshop  
<<http://www.w3.org/2000/12/drm-ws/>>
- OASIS Extensible Access Control Markup Language (XACML)  
<<http://www.oasis-open.org/committees/xacml/>>
- Internet Research Task Force (IRTF) Internet DRM Working Group  
<<http://www.idrm.org/>>
- Dublin Core Metadata Initiative (DCMI) Education Working Group  
<<http://www.dublincore.org/>>
- Mobile ecommerce and DRM systems <<http://www.mobiledrm.com/>>

#### 4.1.6 Key standards groups

As can be seen from the above list of activities, there is significant and growing activities for DRM standards. However, there are a few key standards that will be influential to the entire DRM sector and will flow through to the higher education sector.

The most significant will be the IMS group as its standards have a direct and immediate impact for interoperability in the education sector. A number of their existing standards, for example Metadata, Enterprise and Content Packaging, may require some examination on how to support DRM. The new Digital Repositories Working Group is well placed to address DRM issue for all the existing IMS standards and outreach to groups like OeBF for cross-sector interoperability.

The Open eBook Forum (OeBF) is also critical because of its representation from the book and digital publishing industry. Such industry players are the major source of supplier to the education industry. The Rights and Rules Working Group will define a set of rights that are specific for e-books (and any 'e-publications').

Additionally, the MPEG-21 RDD-REL work should be followed to enable interoperability to this sector of the community. Traditionally, MPEG has addressed the major vendors and content owners. Their rights language may be suitable only for such high-end types of media and may require implementors to meet licensing obligations.

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## 4.2 Requirements comparison

This section will give a comparison of the requirements from Phase One to the review of the standards and attempt to identify overlaps and gaps.

Table 2 provides an overview of the identified key standards bodies and the requirements from Phase One. Each standards group (IMS, OeBF, and MPEG) is placed in terms of relevance and impact (High, Medium, Low) to the particular requirements and specific specification/working groups of interest.

Table 2 Requirements comparison

Requirement	IMS	OeBF	MPEG
Asset Requirements (See section 3.3.1)	HIGH <ul style="list-style-type: none"> <li>Digital Repositories Working Group</li> <li>Content Packaging Specification</li> </ul>	MEDIUM <ul style="list-style-type: none"> <li>Metadata and Identifiers Working Groups</li> </ul>	LOW <ul style="list-style-type: none"> <li>Digital Item Declaration Specification</li> <li>Digital Item Identification and Description Specification</li> </ul>
Offer Requirements (See section 3.3.2)	HIGH <ul style="list-style-type: none"> <li>New activity required to define the vocabulary for an education RDD</li> </ul>	HIGH <ul style="list-style-type: none"> <li>Rights and Rules Working Group</li> </ul>	MEDIUM <ul style="list-style-type: none"> <li>RDD-REL Working Group</li> </ul>
Agreement Requirements (See section 3.3.3)	HIGH <ul style="list-style-type: none"> <li>New activity required to define the vocabulary for an education RDD</li> </ul>	HIGH <ul style="list-style-type: none"> <li>Rights and Rules Working Group</li> </ul>	MEDIUM <ul style="list-style-type: none"> <li>RDD-REL Working Group</li> </ul>
Party Requirements (See section 3.3.4)	HIGH <ul style="list-style-type: none"> <li>Enterprise Working Group</li> </ul>	LOW <ul style="list-style-type: none"> <li>No work in this area</li> </ul>	LOW <ul style="list-style-type: none"> <li>Generic 'Users' only defined</li> </ul>
System Requirements (See section 3.3.5)	LOW <ul style="list-style-type: none"> <li>No work in this area</li> </ul>	HIGH <ul style="list-style-type: none"> <li>Rights and Rules Working Group (Trust Infrastructure)</li> </ul>	LOW <ul style="list-style-type: none"> <li>Intellectual Property Management and Protection Specification</li> </ul>

### 4.3 Standards recommendations

From the review, in Section 4.1 (Review standards), and analysis, in Section 4.2 (Requirements comparison), the following recommendations address the needs of the higher education sector for DRM standards:

1. Ensure that IMS Australia Centre takes the lead in forming a DRM group within the IMS Digital Repositories Working Group.
2. Promote additional participation from the higher education sector in the IMS DRM group.
3. Ensure that this report is used as input into the new IMS DRM group, in particular, the requirements outlined in Section 3.3 (Scenario requirements).
4. Encourage the IMS DRM group to establish a formal liaison with the OeBF Rights and Rules Working Group and to work together to form a unified DRM solutions for learning objects (including all forms of e-publications).

5. Merge and reconcile the requirements outlined in Section 3.3 (Scenario requirements) of this report with the OeBF Rights and Rules requirements.
6. Ensure that the IMS DRM group tracks the progress of the MPEG RDD-REL work to facilitate cross-compatibility.
7. Report the progress of the DRM initiatives back to the higher education sector via the COLIS group and relevant peak bodies through seminars and other outreach/feedback mechanisms.
8. Develop pilot projects through COLIS in the first instance to test systems architectures and the phased implementation of DRM systems modules.
9. Prepare further proposals for submission to the various funding agencies.
10. Establish firm links with the K-12 DRM interoperability initiatives.
11. Seek development alliances with State-based DRM initiatives.

## 5. Conclusion

DRM is poised to become a critical issue for online learning and information communities. The effective development and utilisation of on-line learning content will require flexible and expressive DRM solutions. The challenge therefore is to fund effective mechanisms for managing online learning content and to foster the collaborative development of DRM solutions.

The report has created a number of requirements from an analysis of typical DRM scenarios gathered from the Higher Education sector. These requirements, together with a review of current DRM efforts, have produced a number of recommendations in Section 4.3 (Standards Recommendations).

These recommendations are focused on providing a coherent strategic approach in addressing a range of DRM standardisation issues via the promotion of Australia's ability to lead and contribute to IMS and other relevant international standards-setting processes.

Australia is already leading the world in addressing DRM in The Le@rning Federation (SOCCI) and COLIS projects. These projects, together with Australia's lead in the proposed IMS DRM working group could establish Australia as the centre of expertise for DRM in the global education community.





# Appendix A: Project Participants

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## A.1 Project Team

The project team consists of:

- Project Director: Neil McLean, Macquarie University
- Principal Investigator: Renato Iannella, IPR Systems

The project Advisory team consists of:

- Neil McLean (Chair)
- Christine Goodacre, University of Tasmania
- Joyce Kirk, University of Technology, Sydney
- Des Thornton, Curtin University of Technology
- Paul Stubing, Australian Vice-Chancellors' Committee
- Evan Arthur, Department of Education, Science and Training
- Ex-officio: Renato Iannella

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## A.2 Project Consultants

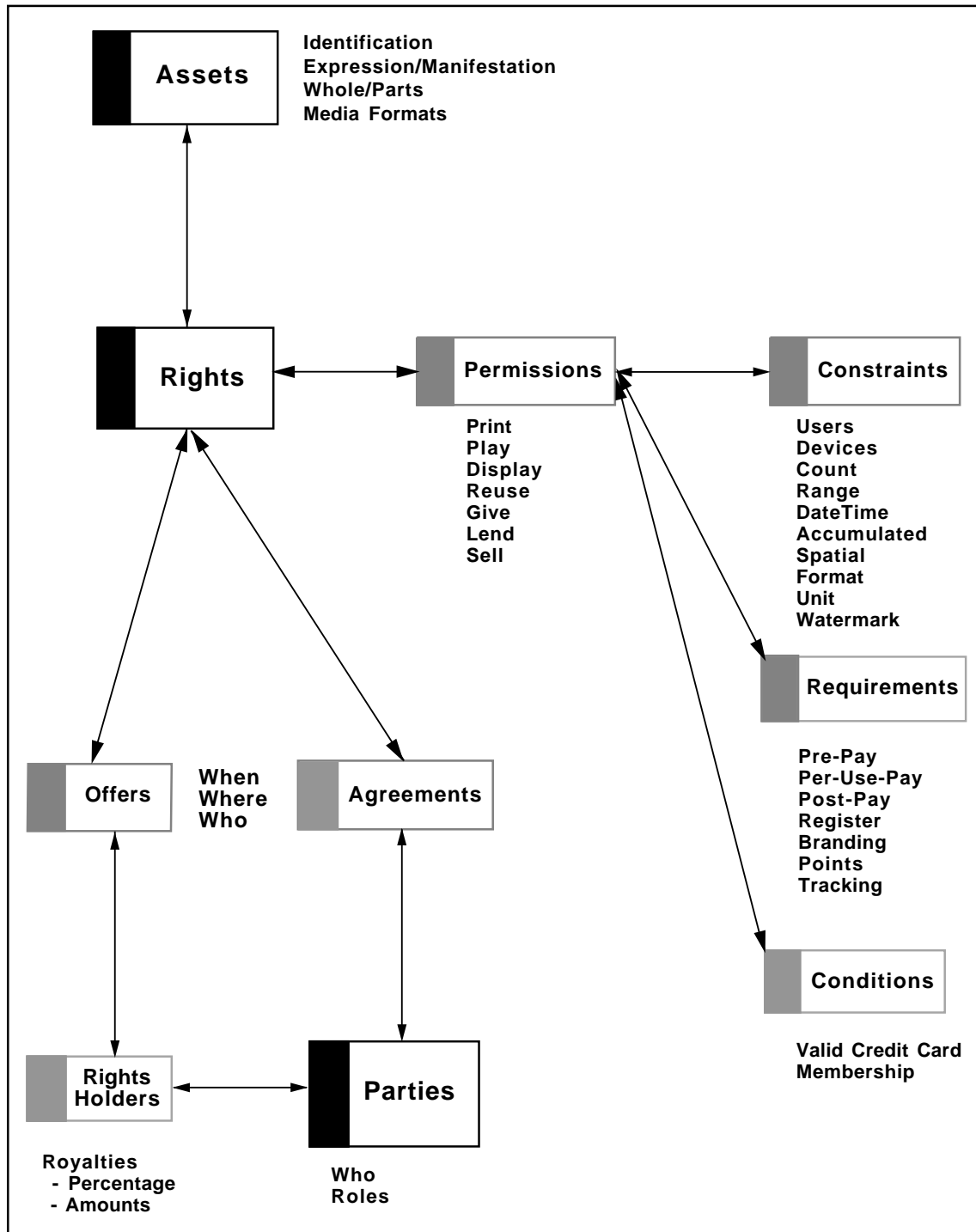
The project consulted the following higher education stakeholders and DRM experts:

- University of Newcastle
  - Trevor Gerdson
- University of Southern Queensland
  - Madeleine McPherson
  - Alison Hunter
  - Peter Dobson
- Macquarie University
  - Penny Carnaby
  - David Rich
  - Brian Kissell
- University of Queensland
  - Janine Schmidt
  - Chris Taylor
- IPR Systems
  - Peter Higgs
  - Libby Jeffery
  - Kerry Blinco

### A.3 About IPR Systems

IPR Systems (based in Sydney and Brisbane) is engaged as a principal partner in this project. IPR Systems develops open management systems for digital rights and media and a leader in DRM technologies in Australia. IPR System's Chief Scientist, Dr Renato Iannella, is acknowledged as an international expert in this field, particularly through the development of an Open Digital Rights Language (ODRL) and his participation in leading international DRM activities. IPR Systems have recently completed a comprehensive DRM analysis and architecture for The Le@rning Federation (formerly the Schools Online Curriculum Content Initiative, or SOCCI).

# Appendix B: DRM Scenario Model



## Appendix C: DRM Scenarios

### *C.1 Compulsory Licensing*

In moving to a DRM managed pool of digital resources, universities can provide more specific reports/records for tracking of learning materials (including supporting the privacy of the users). This is a good opportunity to set up a clear user-friendly licence series and to educate lecturers and departments in an online context about their copyright responsibilities and also to streamline the process of licence clearing and negotiation. It is also a way to refine and reform the whole business of record-keeping for the purposes of compulsory and statutory licensing to reduce the risk of duplication of effort.

### *C.2 Commercial LO Providers*

A commercial courseware developer builds a series of instructional guides for learning Advanced Japanese for students. The developer submits the learning object to national university LO system and attaches the digital rights—allowing university use only for a fixed fee per student per semester.

### *C.3 Digital IP Reports*

The education sector requires services available to support lecturers and Universities in abiding by their legal requirements for dealing with learning objects and copyright. This may include reporting on usage, technical controls to limit usage, and relevant compliance information accompanying resources. The reports can also be used as feedback on effective and popular usage of content for developers and management.

### *C.4 Physical IP Reports*

The education sector require the capacity to monitor and report on the usage of digital resources related to their copyright context. They should be able to support Universities in their legal use of non-digital resources, possibly through access to information on items covered by fair dealing and access to trading systems to negotiate usage of other items.

### *C.5 Granularity of IP Rights*

IP rights should be applicable to any form of learning objects and clusters of objects so as to:

- Accommodate various versions of objects
- Manage relationship between the object and the IP
- Handle a wide range of copyright, ranging from Crown through to commercial and mixtures within clusters of objects
- Support categories of objects/trading rules where multiple categories/arrangements may apply to each object and cluster

- Model the LOs many layers of components to ascertain and record the appropriate rights holders.

The system also has to be able to handle objects not covered by DRM. Such objects are those that are old (but still useful), where provenance cannot be established/or is not an issue, or which is used internally within certain parts of the education sector.

#### *C.6 Commissioned Free Use*

Biotech Australia has commissioned suppliers to develop digital material on the science and issues surrounding genetic modification of organisms. Their agreement with the developers is that Biotech Australia owns the copyright over the content but the developers retain their ownership on specific technological solutions they used to add inter-activity to the content.

Biotech Australia makes their content available to the higher education sector. They do not want payment for the use of the resources and, if required, are happy that the resources sit on a university server. Their only requirement is that the Biotech Australia logo is displayed with their content.

#### *C.7 Lecturer LO Customisation*

A lecturer uses a national system to locate two Japanese learning objects (LOs). The lecturer finds that both are suitable but would prefer to take Lesson 1,2,4,6 from LO#1 and Lessons 3,5,7,8 from LO#2. On viewing the digital rights, the lecturer sees that this is possible and instructs the university LOMS to do this and create a personalised LO for use by the students. The merged digital rights are still honoured.

#### *C.8 Lecturer LO Customisation and Re-use*

Extending the scenario above, the lecturer develops supplementary material to assist the students with the Japanese LO. These are so successful that the lecturer re-submits the whole LO back into the national system as a new LO. The digital rights on the original Japanese LOs allow this (re-use right was granted). The university decides to charge on each sale of the new LO. When all three digital rights are 'merged' the final fee for the new LO is calculated. Each time it is purchased, the three rights holders are credited.

Variation: The university decides not to charge any fee.

#### *C.9 Pricing Levels*

Price signals provide users of materials with an indication of their cost. If no pricing signals are given, users may not develop an appreciation of the monetary value of the materials used.

In the market for digital learning objects, price signals can operate in four ways:

- developers may wish to provide free access to Libraries to digital curriculum resources they have developed as a means of achieving some other business objective

- universities can meet the cost of accessing materials for departments and lecturers
- libraries and departments can make purchasing decisions between competing products and in terms of their own budget priorities; and
- lecturers can make purchasing decisions between competing products, either within a university system or in an independent capacity.

All of these approaches should be accommodated without making any of them mandatory. Except at the developer level, the decision about which approach or combination of approaches is to be adopted should be made at the university level.

#### *C.10 Defining Usage Rights*

Creators and contributors of learning objects need to add rights information for usage of whole, or parts, of learning objects. They want the system to be able to manage and deliver the required rights (or licences), the correct digital object and an appropriate (if any) level of copy protection defined by:

- the type of material
- the type of user
- the type of usage, and
- the degree of trust or certainty required by the owner.

On demand delivery of these rights is via a web site that allows (but not limited to):

- Part or all of a work to be viewed on screen in a controlled streaming format (that is, it cannot be printed or saved)
- Part or all of a work to be down loaded for reading, or interacting with, offline on a personal computer or reader device but which cannot be printed,
- Part or all of a work to be down loaded and for a pre-agreed quantity to be printed with a personalised watermark to restrict subsequent reprinting
- Part of a work to be down loaded as text for embedding in another work such as an educational web site, CD-ROM or text book without copy protection.

The usage options constrain the rights of usage by defining how many times they may be exercised, or other constraints. For example with print rights it defines how many times the item may be printed. Additionally, the usage options allow the specification of requirements that must be met in order to exercise the granted right, for example the payment of a fee.

Also, content owners should be able to specify in which cases they wish their content not to be used. For example, content could be recontextualised against the wishes of the authors. Legally, moral rights do apply, but the system should make this clear to potential users of content

### *C.11 Content Rights Discovery*

Users need services to support the discovery of content that includes rights metadata. The rights metadata needs to be transparent and supported by the discovery service, including the following features:

- A simple search to allow the user to enter any detail about the content and to search across these metadata fields.
- An advanced search capability specifically for DRM-related metadata properties
- Search for specific usages. For example, search for LOs that are able to be printed multiple times.
- Search based on fees. For example, search for LOs that are only free or less than a specific amount.
- Search based on end-user access. For example, search for LOs that are only available to a particular university (or other jurisdictions or user groups).
- Search for specific creators including other rights holders.
- View the biography and/or personal details of a content provider (usually the author or other creator).
- A user may want to preview the content of their requested learning objects (if allowed by the rights).
- Support e-commerce-like facilities such as ‘shopping-bags’ when acquiring large amounts of content, and ‘check-out’ facilities to handle payments for content.

### *C.12 Watermarked Pages*

One of the usage rights a user has purchased is to print pages from a learning object. Printed pages may need to be watermarked to identify the user, the date, the transaction identification and the authorised print quantity. Printed pages are charged at a fixed rate set by the content owner.

### *C.13 Secure Content Usage*

A user wants to download a learning object as a file to read/access off line on their computer at home. If a highly secure environment is required by the content provider, the system may use appropriate Digital Rights Enforcement Technology (DRET) to prevent copying by the user of a downloaded file to other computers. This may include encrypting the LO to support usage only on the users hardware device.

### *C.14 Student Educational Usage*

A student has an assignment to present to the class on volcanic lava flow patterns. The student researches on the web and gathers relevant information. In wanting something spectacular to end the presentation the student searches the University content repository and comes across a video clip. The student previews 10 seconds of the video online via QuickTime streaming to ensure it's appropriate. The student has the right to use this movie clip or parts of it for any educational project at



home or in the classroom. Opening the video editing tool the student edits the movie to 30 seconds in total and includes it in the project.

*C.15 Change of Context*

As described in scenario C.14, the supervisor of the student is impressed with his work and presentation. She decides to use his work as part of the university marketing drive into Asia. However, to do this she must first obtain additional rights over the video used in the project (as it currently was for 'educational purposes' only). She contacts the video rights holders and negotiates a fee and the university marketing department uses the video in an award winning commercial.

*C.16 Usage Tracking*

The same scenario in C.14 but the use of the video will be tracked for accounting purposes. Each time the video is played, the university content repository is updated with the appropriate information. No data is stored identifying the student.

*C.17 Academic Content Lifecycle*

A senior academic makes a videotape of the still images and videos from his lifelong research about cells titled 'Cells in Motion'. The videotape is used in his lectures and is available for purchase by other universities directly from the academic who publicises it via his papers at various national and international conferences.

He has had numerous research grants from government and industry while employed both at this university and his previous university in the USA. A number of additional images are provided by colleagues researching cells at other universities worldwide. Each contributed image has a written copyright clearance attached to it but each clearance is different. Many have been provided on condition that the image be used for teaching purposes only and not for sale or broadcast.

A couple of years later a DEST funding programme provides a competitive grant of \$A50 000 for the academic to digitise the images and videos in order to make a web-accessible version of the resources. Under the terms of the DEST grant, acknowledgement of DEST's contribution must appear on all published outcomes and the digital resources must be made available for the next three years at cost to any Australian university that requests it.

Instructional designers from the university's central production unit provide advice, suggest layouts, and sample navigational templates for free as a service aimed at improving teaching in the university.

The senior academic is looking to release the digital resources as a learning object for teaching. He wishes to obtain all rights to publish the material (for profit). The senior academic contacts all the IP owners of the images and obtains permission to digitise them and to publish them. In return, the owners receive digital copies of their images, others demand a once-only fee.

The senior academic wants the opening title screens to be set to a classical music soundtrack, a Strauss waltz performed by the ABC Youth Orchestra. The university negotiates with the publishers of the music to use this track.

The completed digital learning object is published on the university web site. As per the conditions of the DEST grant, it is available for educational use within Australia for a nominal fee of \$A100. The LO is also made available to other countries for a fee of \$US1000. The university and senior academic have agreed to a split of the income generated.

*C.18 Copyright Clearance House*

University e-reserve libraries deal with many collection societies to enable access to e-journals. The libraries would prefer to deal with a central trusted organisation to clear copyrights on their behalf and offer the e-journal access without the overheads of copyright management.

*C.19 Archive Access*

Universities require that access to content be available for the long term. Rights agreements need to consider this issue to ensure that content accessed today will be available tomorrow. In cases where rights to access content is for a limited time period (for example, access to a journal on a two-year subscription) then access after this period should be preserved (to the issues subscribed to).

This is extremely important when the access method is to a remote server operated by the publisher.

*C.20 Single versus Multiple Users*

Access to content needs to be clear as to the number of simultaneous users. Rights to access an online journal may be limited to a single user at a time or concurrent use. Such details need to be apparent in any agreements and will require systems to support such access methods.

*C.21 Digitising Rights*

Libraries that digitise physical content should make clear ownership and rights over the resultant content. Even given permission by the original rights holders may still limit what access and permission libraries are allowed to offer over the digitised content. Such arrangements should be agreed early before digitising.

*C.22 User Definition*

Typically universities have a broad and diverse range of people associated with it. From staff, students, visiting professors, alumni, external students to the general public. When negotiating agreements for content usage, the type of user should be appropriately articulated, including roles. For example, the Student President may be entitled to access content that others may not.

If left very broad then any person affiliated with the university may access the content. If very specific (for example, postgraduate full-time research students in computer science) then the university will be responsible to ensure that this class of

user—and only this class—can access the content. University systems must be capable of making such distinctions with their authentication/authorisation systems when interaction with the DRM systems. This may also require support for campus-wide directory services (based on X.500) and even across universities.

#### *C.23 Recording Lectures*

Extending the above scenario (C.22), a university video-tapes lectures for off-campus students. However, these become popular even for on-campus students (who may have missed the lectures).

The university decides to charge a small fee to access the videos and must ensure that they can differentiate between on-campus and off-campus students (or local versus international students).

#### *C.24 Content Hosting*

Universities may enter agreements that allows them to host content for student use with additional requirements. For example, students then may purchase textbooks that contain a 'ticket' that unlocks additional content for them. The additional content (hosted on the publishers site) may incur an extra fee for the student but provides supplementary material useful for the course.

#### *C.25 Software Licences*

Software licensed by a university for use in a PC laboratory is also available to students for 'educational' use only. The library manages the distribution of the software for students to install their own machines. An online service is also offered where (authenticated) students can install the software live over the network. The students are also automatically registered with the software creator for updates and help desk support.

#### *C.26 Consortium LO*

A university consortium (of six members) develops a learning object for teaching advanced Japanese language for use in flexible-learning online environments. The LO has a 'full' version and a 'light' version (the latter does not include any assessment or background material).

They develop the following criteria for usage and royalty payments: all consortium members can use the LO for no charge. Universities in Australia may use the full version for \$A1000 per year and the light version for \$A100 per year. All consortium members receive equal royalty payments.

Universities in the USA can use the full version for \$US5000 per year and the light version for \$US500 per year. In this case consortium member X receives 25% of the royalty payments. The other five consortium members receive an equal royalty payment from the remaining 75%.

Universities in all other countries can use the full version for \$US1000 per year and the light version for \$US100 per year. In this case consortium member Y receives 30% of the royalty payments, consortium member Z receives 30% of the royalty payments. The other four consortium members receive an equal royalty payment from the remaining 40%.

*C.27 Research IP Manager*

A University department creates a Research IP Manager. All IP assets and parties from current research projects are registered in the database. Assets created from previous research projects are also registered, but as most party information is not clear, the department assumes the primary rights holder.

Collaborative research projects (across departments, universities, and CSIRO) are also registered. The assets are reviewed for background IP and agreements are made as to the worth of the foreground IP. As the research project continues, and deliverables are created, the IP Manger is updated with the new information. As new research projects are started, that utilise the outcomes of other research projects, then the previous IP ownership is automatically transferred.

*C.28 Fair-dealing Override*

A company CEO is invited to give a guest lecture at a University. In her company she regularly uses an e-book for reference on Software Development. Her company has already purchased the rights to view and print one copy of the ebook. She decides that Chapter 5 of the ebook would be useful for the students of her guest lecture.

She makes 25 copies of Chapter 5 (a 'reasonable portion') and distributes them to the students as this falls under the allowed copyright 'fair dealing' exceptions.

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