

LUISA

Learning Content Management System Using Innovative Semantic Web Services Architecture

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Deliverable D5.1 Digital Rights Management requirements

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EXECUTIVE SUMMARY

This deliverable presents the LUISA Digital Rights Management (DRM) requirements.

A definition of the term DRM in the scope of e-Learning in general, and LUISA in particular, and the main characteristics of a DRM system are discussed in order to focus the requirements gathering.

Based on this definition, a questionnaire has been provided in order to get the most relevant DRM requirements, mostly based in the needs of the LUISA case studies. The DRM capabilities of Moodle and Learn eXact® have been also studied. In this regard, the previous questionnaire has been directed to GIUNTI as well, in order to check their understanding about DRM in the scope of LCMS.

On the other hand, in the LUISA DoW it is said that DRM is about *“integration of the different aspects that an open architecture could arise in terms of protection of content providers’ rights and their intellectual and business rights. This aspect is especially relevant when considering composition of Learning Objects from different authors.”*

The objective of this deliverable is then not limited to gathering requirements from the case studies, but to find out what is required by LUISA as a framework, including issues such as LO composition, LO coming from multiple repositories, etc. To cover these LUISA specific needs, extended requirements have been also taken into account.

The results of the answers to the questionnaire and the extended requisites have been discussed and collected as requirements. These requirements have been rated as desirable or mandatory for our future LUISA DRM module.

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1 INTRODUCTION

The mission of LUISA is that of exploiting the advantages of a Semantic Web Service Architecture to make richer and more flexible the processes of query and specification of learning needs in the context of Learning Management Systems and Learning Object Repositories. As these repositories may involve learning material in different supports, there is a clear need of specifying a digital rights policy to follow.

The main task of this deliverable is about getting the DRM requirements for the LUISA framework. In order to do that, the requirements of the two use cases have been gathered.

Our approach to DRM has to take into account some LUISA specific aspects that may or may not be entirely covered by the case studies. The objective of this deliverable is then not limited to gathering requirements from the case studies, but to find out what else is required by LUISA as a framework, including issues such as LO composition, LO coming from multiple repositories, etc. Later in the document the “extended requirements” are provided to tackle these issues.

The document is structured as follows. Section 2 provides a definition of DRM within LUISA. Section 3 introduces the way the requirements have been gathered from the use case partners. In section 4, the findings of the requirements gathering are summarized, while in section 5 a discussion on possible extended requirements for LUISA and the list of final DRM requirements is presented. Finally we draw a conclusion and provide an outlook to future DRM work within LUISA.

2 TOWARDS A LUISA DRM DEFINITION

The aim of this section is to achieve a better understanding of what is DRM in e-Learning, and particularly in the case of LUISA. In order to reach this understanding, first of all the typical and more general aspects and definitions or DRM are provided, to go step by step to discuss what is DRM in context of e-Learning in general, and after that to explain the specific LUISA needs.

2.1 DRM general definitions and features

There are multiple definitions of DRM. In a general view, we can say that DRM encompasses everything that can be done to define, manage, and track rights to digital content in order to protect the author’s rights. This definition includes the following elements:

- o Business rights (or contract rights): an item of content can have rights associated with it by contract, such as an author’s rights to a magazine article or a musician’s rights to a song recording. Such rights are often

very complex and have financial terms attached to them that depend on the content's use (e.g., royalties).

o Access tracking: DRM solutions in the broader sense can be capable of tracking access to and operations on content. Information about access is often inherently valuable to content providers, even if they do not charge for access to content.

o Rights licensing: content providers can define specific rights to content and make them available by contract. It is often not possible to track rights licensing by technological means: for example, a book publisher may offer language translation rights to a novel, and in general there is no technological way to ensure that the translation of the licensee is either faithful or distributed according to the same terms as the original book.

On the other hand, we are talking about DRM in the sense of controlling the digital rights in a distributed system. A good definition for a distributed DRM system is provided in La Macchia (2002) [6]:

“The ultimate goal of a distributed DRM system is for content authors to be able to project policies governing their content into remote environments with confidence that those policies will be respected by the remote nodes”

In order to achieve the previous definition, a DRM system should cover two different aspects:

- On the one hand, the term DRM identifies the “management of digital rights” by means of content encryption and the distribution under payment of the access keys, in order to prevent illegal access to the contents.
- On the other hand, under a newer definition (that has been also adopted by the W3C* as official), the term DRM identifies the “digital management of rights”, thus assuring not only security against illegal access or duplication of contents, but also involving description, identification, delivery, protection, control and tracking of every usage right for a licensed specific content.

Taking into account the previous two aspects, a DRM system should typically allow to:

- define a set of rules (business model) according to which the system is able to allowed the access to contents only to authorized users;
- manage the distributive intermediation if there are third parties involved in the process between the rights holder and the end user;
- account accesses to contents and the relative remuneration to all parties involved in the distributing chain;

- codify contents at the origin and to decode them for the end usage, according to the validity of the digital licence acquired by the end user and as allowed;
- control digital licence distribution only to those who have paid to acquire a proper licence to access content

One of the most important elements of complexity in content processes is content rights. The processes of tracking rights, controlling, and managing access to content based on rights information are increasingly necessary nowadays due to various business imperatives. Adding persistent protection to content is the most effective way to control and track access.

2.2 DRM in e-Learning

DRM in e-learning has to be seen in the light of the previous definitions of distributed DRM, taking into account the management of relationships between providers of e-learning digital content and consumers (learners, teachers, etc.). This is a topic of broader social, economic, legal and technical relevance, concerning the ways digital information is distributed and used in an electronic environment.

In order to understand the specific problems that e-Learning poses to DRM, it is necessary to identify the main actors:

- Content providers: parties directly involved in the planning and creation of digital content and the distribution and/or delivery of the same. Usually they are publishers or teachers that provide the learning content.
- Learning brokers: aggregators of the content provided by the content providers. The LCMS systems can be placed in this category.
- Final users: there can be two different types of final users, nominally the purchasers of the learning content, and the consumers of the learning content. Sometimes they can be the same, but in many cases institutions such as universities or companies buy the content and put at disposal of the real consumers (teacher and students).

The content providers usually plan and create the learning content. In this phase the copyright of the material produced is generated. Then the content providers have to identify the material. That leads to the identification of Learning Objects. It is in this stage when the metadata identification of LO is produced. Typically, metadata regarding DRM should be produced at the same time, in order to identify the DRM issues of every LO. Also Technical Protection Measures (TPM) such as encryption or watermarking can be put in practice at this stage. The LO and the metadata associated is stored in a learning repository, ideally containing the DRM metadata as well.

The content is then available to the end-users, but in usually learning brokers, such LMS or LCMS educational platforms offers the mediation to the end-users.

The contents are then searched and selected by the end-users. The system has to take into account the DRM issues when delivering the material.

2.3 DRM in LUISA

In our case, the LUISA platform acts as a learning environment that offers the service of gathering LOs from multiple repositories. It is rather difficult to classify this kind of business model because the players in the value chain can be quite many and different.

Taking into account not only the two case studies in LUISA, LOs could be developed and implemented directly by the users' community or provided by commercial content providers or non-profit organizations. This means that the variety of DRM situations can be very high. It is still not clear how the relationship (even economic) between the parties shall be regulated. In order to reach an achievable goal, LUISA DRM will probably reduce the scope of requirements to a manageable extent.

In order to do that, we have studied the DRM coverage in the two candidates LUISA LCMS. The selected candidates for LUISA LCMS are Moodle, as an Open Source reference implementation, and Learn eXact, as GIUNTI's own LCMS.

Though Learn eXact[3] has not a proper DRM module inside, it provides a secure and controlled access to eLearning contents. So:

- Only users properly registered and logged in the system can search and access materials.
- LMS users can only access materials they have been enrolled.
- LCMS users can access, download and reuse eLearning content depending on the access permissions assigned by either LCMS administrators, project managers or content owners. Access and modification permissions can be assigned at a very detailed level of granularity.
- Digital Rights information is stored in metadata, according to IMS and SCORM[5] (IEEE LOM) specifications. The support of LOM for DRM is anecdotal – but the specification mentions the use of other standards to tackle with these issues.

Moodle[4] is a course management system (CMS) - a free, Open Source software package designed using sound pedagogical principles, to help educators create effective online learning communities.

Moodle offers very little support for DRM. It has a tracking system and there are no plans to improve the system with DRM characteristics. The open-source community around the project is not implied in rights concerns, so they discourage the development of a license module.

Just the PAYPAL module allows you to set up paid courses and make some DRM stuff. If the cost for any course is zero, then students are not asked to pay for entry. There is a site-wide cost that you set here as a default for the whole

site and then a course setting that you can set for each course individually. The course cost overrides the site cost.

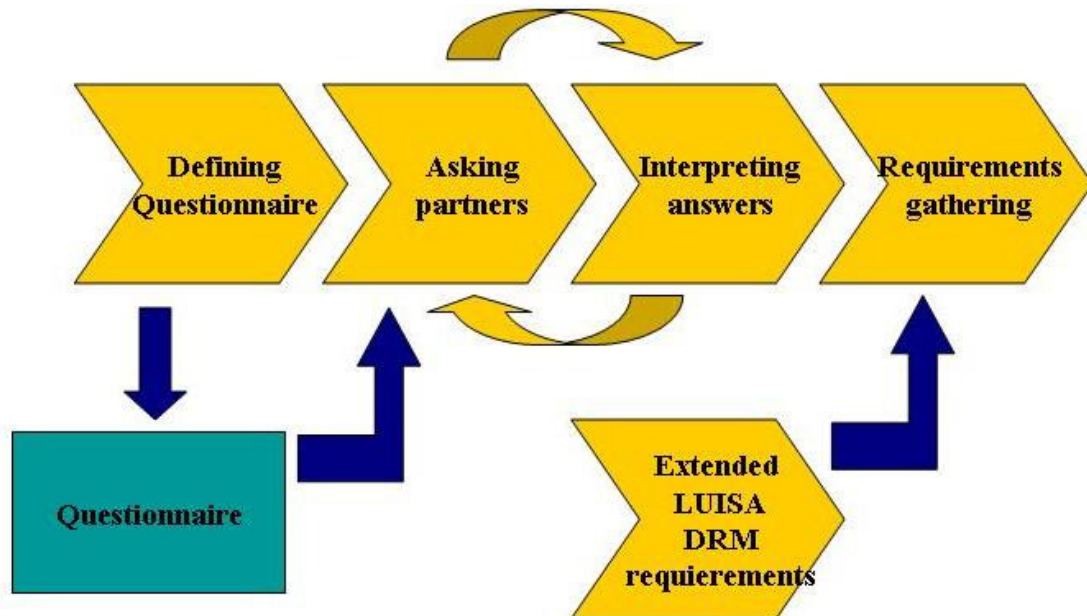
There is also a roles and permissions architecture, which maps what we hope to do with Moodle content.

In this document we have a close look to the case studies requirements on DRM. This is of course a must, but as we have explained in the introduction, DRM in LUISA should not be restricted only to those requirements. In fact we have identified other important issues derived from the LUISA architecture that a DRM module must take into account:

- Federation of repositories: The LUISA architecture allows the federation of multiple learning repositories. This feature has to be taken into account in the requisites to integrate DRM features, because different repositories can rely on different DRM standards.
- Composition of LOs: There will be a study at this point, for composition is a critical process in the negotiation layer, and rights may be included to store and offer the end user the proper resources. The composition of LOs coming from different repositories, or with different level of DRM requirements or standards is a challenge that has to be taken into account.
- DRM Annotation: As it has been pointed out before, annotation of digital management rights of learning objects is something very important. As part of the data layer, the possibility of annotating DRM data alongside the LOs themselves should be taken into account. A possible extension of the LUISA annotation tool to cover the DRM requirements should be considered.
- Based in open standards: As there exist different standards dealing with DRM to some extent (LOM, ODRL, etc), and the data layer deals with disparate repositories, LUISA should bring the possibility of being open to work with different DRM standards, although the implementation within the scope of the project could be restricted to work with just one of them.
- Rights over metadata records: As it is a special kind of content delivered by LUISA, the DRM over metadata records should be considered.

3 REQUIREMENTS GATHERING APPROACH

This section explains the methodology followed in order to get the requirements. The next figure shows the main steps followed in order to gather the DRM requirements:



According to this figure, first of all a questionnaire has been provided to the two case study partners and to Giunti, due to their special knowledge of Learn eXact and Moodle. This questionnaire can be seen in Annex 1 – Questionnaire. The use case partners have been instructed to think exclusively in their case study when answering to the questions.

The questionnaire is divided in four sections:

- Contents.
 - Partners should mainly identify the types of contents in their repositories, as well as the intended usages.
- Third parties.
 - The goal of this section is clarifying the value chain components between the content provider and the end user. So, we ask about how each bead in the chain has an effect on the rights of the content. We also raise questions about payment issues and tracking facilities.
- Protection measures.
 - We need to know if any technical protection measure on the content is to be applied and which.
 - Use case partners are also questioned about content access by means of passwords.

- Standards.
 - We propose the LOM standard in order to check if it fulfils the user's requirements. We stay open to proposals to meet other more complex standards.

Then, once the questionnaire was ready, it was sent to the selected partners, who filled it in and provided to ATOS their feedback and answers. This was an iterative process. Fed with partner's review, the questionnaire was refined and chunked into more meaningful pieces, so we could entail the use cases knowledge and get the exact requirements. In other words, the user understands the questions to fill in the questionnaire and we are able to infer requisites from the answers.

But, as it was explained before, LUISA poses some extra DRM requisites, which come from the study of the architectural aspects. Issues such as dealing with LO coming from multiple repositories, LO composition and interoperability with existing or future DRM standards had to be discussed.

The requirement gathering ends up with merging specific case study DRM requirements with the extra requirements.

4 QUESTIONNAIRES RESULTS

In this section the responses to the questionnaires are presented.

4.1 Academic case study requirements

The following table contains the responses to the DRM questionnaire given by UHP:

G1. Contents.
Q1.1. Describe the kind of contents you are looking for.
The contents are, by decreasing frequency: <ul style="list-style-type: none"> a) Many PDF and HTML pages. b) Some PowerPoint and MS Word files. c) Others: videos, excel.
Q1.2. Are the contents mainly text files? Have you also media files?
Contents are mainly text files. There are few media files.
Q1.3. Are the contents encoded or encrypted? (yes/no)
No.
Q1.4. In case the contents are codified, list the different coding methods.
--
Q1.5. Which are the usage types of the contents? Relate the contents with the intended usages.
Read and copy.
Q1.6. Should we allow the access to contents only to authorized users?
At the end of the project, some content will be accessed only by authorized users (university members) and other contents will be open.
Q1.7. Are there open contents to everyone?
Yes.

G2. Third parties.
Q2.1. Enumerate all contents provider.
Other universities.
Q2.2. Are there any third parties involved in the process between the rights holder and the end user?

Some contents come from other universities. At the beginning, every content have private access (only for UHP members). When an author gives his authorization, his content becomes open to everyone.

Q2.3. If there are third parties, how will they impact to the contents rights? Will the third parties be able to change the content usage rules?

They will not affect usage rules.

Q2.4. Is it necessary to integrate the third parties needs in a license server and intermediate to external payment gateways?

No.

Q2.5. Should the system manage the payment? Just tracking?

No requirement for payment. We need to track content related activities for pedagogic purpose only.

Q2.6. In case you need tracking of content-related activity, which information should LUISA store regarding both the content and the user?

What is being accessed and who is accessing it.

G3. Protection measures.

Q3.1. Regarding to technical protection measures (TPM) enumerated in deliverable D3.1, would you like to apply any of them? (yes/no) Which?

No.

Q3.2. Do you need access granted to the contents by mean of passwords?

Moodle already checks access to a content and tracks a little the user. This is enough for us.

G4. Standards.

Q4.1. Which are the rights information (cost, copyright, restrictions and so on) you need?

No need for cost information.

Q4.2. Is the LOM standard enough to meet your requirements? Do you want to be compliant with other standards? Which?

LOM rights are enough in our case.

G5. Only for use case partners.

Q5.1. Do you think your use case needs a DRM component?

No.
<p>Q5.2. In case you need a DRM component, what kind of DRM system do you imagine?</p> <p>a) Just tracking the access to contents.</p> <p>b) Just compliant with DRM standards.</p> <p>c) Just applying technical protection measures.</p> <p>d) A complete DRM system covering the previous options, payments and so on.</p>
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4.2 Industrial case study requirements

The following table contains the responses to the DRM questionnaire given by EADS:

G1. Contents.
<p>Q1.1. Describe the kind of contents you are looking for.</p> <p>The materials can be text, images, video or software. Texts are mainly PowerPoint presentations, PDF, Word and Excel files.</p>
<p>Q1.2. Are the contents mainly text files? Have you also media files?</p> <p>Contents are mainly text files. There are few media files.</p>
<p>Q1.3. Are the contents encoded or encrypted? (yes/no)</p> <p>No.</p>
<p>Q1.4. In case the contents are codified, list the different coding methods.</p> <p>--</p>
<p>Q1.5. Which are the usage types of the contents? Relate the contents with the intended usages.</p> <p>These materials, when available, shall be downloadable, copied and printed...</p>
<p>Q1.6. Should we allow the access to contents only to authorized users?</p> <p>In LUISA, the access to contents depend on user's profiles, for instance:</p> <ul style="list-style-type: none"> • The supervisor role shall <ul style="list-style-type: none"> ○ Manage all information on registered users (rights). • The content provider role shall <ul style="list-style-type: none"> ○ Create (upload) and update some digital content. ○ Annotate the contents using LOM metadata.

- Not annotate using competency referential.
- Decide for private/public status of the information.
- The training manager role may be either an internal academy or a human resources department. He shall
 - Create and update the training package.
 - Annotate using LOM metadata.
 - Annotate using the competency referential.
 - View available statistics and monitor results about content access.
 - Assign engineers to courses (the engineer is considered as registered).
 - Register a user for session.
- The engineer role shall
 - Access only to public documents.

For our needs, any digital content shall be associated to at least one Learning Object.

Q1.7. Are there open contents to everyone?

Within EADS context, “open” means open to EADS users. Of course, the external training provider (external organism in charge of training) can access the content that it provided.

G2. Third parties.

Q2.1. Enumerate all contents provider.

External training provider, Airbus internal academies.

Q2.2. Are there any third parties involved in the process between the rights holder and the end user?

Academies content providers create, update and annotate some contents and decide for private or public status of the information.

Q2.3. If there are third parties, how will they impact to the contents rights? Will the third parties be able to change the content usage rules?

Each third party is responsible of their contents.

Q2.4. Is it necessary to integrate the third parties needs in a license server and intermediate to external payment gateways?

No economic aspect at LO search and access level. But the payment will be required to register a user for a session.

Q2.5. Should the system manage the payment? Just tracking?

No requirement for payment. We need some tracking for monitoring purposes only.

Q2.6. In case you need tracking of content-related activity, which information should LUISA store regarding both the content and the user?

What is being accessed and who is accessing it.

G3. Protection measures.
Q3.1. Regarding to technical protection measures (TPM) enumerated in deliverable D3.1, would you like to apply any of them? (yes/no) Which?
No.
Q3.2. Do you need access granted to the contents by mean of passwords?
No.

G4. Standards.
Q4.1. Which are the rights information (cost, copyright, restrictions and so on) you need?
No need for cost information.
Q4.2. Is the LOM standard enough to meet your requirements? Do you want to be compliant with other standards? Which?
LOM rights are enough in our case.

G5. Only for use case partners.
Q5.1. Do you think your use case needs a DRM component?
Yes.
Q5.2. In case you need a DRM component, what kind of DRM system do you imagine?
<ul style="list-style-type: none"> a) Just tracking the access to contents. b) Just compliant with DRM standards. c) Just applying technical protection measures. d) A complete DRM system covering the previous options, payments and so on.
A and B.

4.3 Requirements from Giunti

The following table contains the responses to the DRM questionnaire given by GIUNTI:

G1. Contents.
Q1.1. Describe the kind of contents you are looking for.
ELearning contents are usually multimedia. They comprise text, images, audio, animations and videos.
Q1.2. Are the contents mainly text files? Have you also media files?
--
Q1.3. Are the contents encoded or encrypted? (yes/no)
No, unless the content has been purchased from a third party that codes such content. This would imply to provide the authorised user with the needed software to access the content.
Q1.4. In case the contents are codified, list the different coding methods.
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Q1.5. Which are the usage types of the contents? Relate the contents with the intended usages.
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Q1.6. Should we allow the access to contents only to authorized users?
Whenever the content is used within a secured environment, then a lower level of on-line control could be applied, yet it could be a plus if the system could track content usage and check such usage against provided or expected usages (prevention of unexpected or unauthorised usage even within a secured environment).
Q1.7. Are there open contents to everyone?
Yes, there is open content, freely accessible as promotional material, yet be enclosed as part of a training offer.

G2. Third parties.
Q2.1. Enumerate all contents provider.
--
Q2.2. Are there any third parties involved in the process between the rights holder and the end user?
Sometimes there is an interaction between multiple rights holders.
Q2.3. If there are third parties, how will they impact to the contents rights? Will the third parties be able to change the content usage rules?
This is usually done via "paper based" contract. Therefore if the system would allow direct handling of this, it would be a plus.
Q2.4. Is it necessary to integrate the third parties needs in a license server and intermediate to external payment gateways?
No.

Q2.5. Should the system manage the payment? Just tracking?

The management of payment should be a configurable option. Tracking of content related activity is already part of the management of SCORM courses but with a different purpose. Therefore an extension of such control towards a DRM completed management could be interesting. Nevertheless, within the same training offer, it could be possible to have a combination of SCORM and non-SCORM delivery. Then, it is clear that while for SCORM content, the tracking is already ready, for non-SCORM (IMS or other delivery format) a proper solution should be conceived.

Q2.6. In case you need tracking of content-related activity, which information should LUISA store regarding both the content and the user?

As far as data to be collected is concerned, we would collect data about: what is being accessed, who is accessing it, when such content has been accessed, how many times it has been accessed, what kind of usage has been done of the accessed content.

G3. Protection measures.

Q3.1. Regarding to technical protection measures (TPM) enumerated in deliverable D3.1, would you like to apply any of them? (yes/no) Which?

We believe that TPM has a direct impact on DRM as certain TPM require specific components/tools to be accessible to users and therefore the DRM module should be able to interact with such components, keep track of performed actions and prevent unauthorised usage.

Q3.2. Do you need access granted to the contents by mean of passwords?

Usually access to a courseware through a LMS/LCMS is password bound and the password is granted after administrative procedures that may comprise payments..

G4. Standards.

Q4.1. Which are the rights information (cost, copyright, restrictions and so on) you need?

--

Q4.2. Is the LOM standard enough to meet your requirements? Do you want to be compliant with other standards? Which?

The DRM solution that is going to be implemented should be integrated in a LMS/LCMS solution. Due the introduced overhead and cost, the DRM solution should be able to integrate with both standard content solutions and standard content management solutions. The LOM standard does not provide a complete coverage, therefore extensions to standards should be provided whenever needed to grant a real and effective DRM implementation.

4.4 Summary of results of the questionnaires

In the previous subsections, we gathered the requirements from the case studies partners and Giunti. In this subsection a summary of the results is provided.

In the academic use case, there is not a clear need of a DRM component within LUISA architecture. Moreover, just complying with a standard such as LOM and tracking the use of LOs would be enough to this case study. There is also no need to apply special technical protection measures. Regarding contents, they are mainly text and the definition of rights belongs to the university.

In the industrial use case, there is a need for a DRM component that should be compliant with standards. Again there is a need of tracking the access and use of LOs, more stressed than in the previous use case. Regarding contents, they are mainly text too, though the definition of rights belongs to the content provider.

To Giunti, contents to be considered include also multi-media contents. There is a clear need for a full tracking of access and usage. Regarding standards, LOM is not enough and it is mandatory thinking in other standards for a complete coverage of a LMS/LCMS solution.

Overall, it is detected that the most advanced DRM features such a connection with a license server, a payment gateway, a transactional and negotiation phase, are all avoided and considered a plus.

The next table shows a summary of the requirements from the use case studies and Giunti:

Requirements	UHP	EADS	GIUNTI
Content <ul style="list-style-type: none"> - Kind of content? - Controlled access? 	Mainly text. At the end, some authorization.	Mainly text. Access depends on user's profile.	Usually multimedia Track and check usage
Third parties <ul style="list-style-type: none"> - Rights holder? - Track activity? - Payments? 	No need for licenses Yes (mandatory) No	No need for licenses Yes (mandatory) No	It would be a plus Yes (interesting) No (just provide data)
Protection measures <ul style="list-style-type: none"> - Apply? 	No	No	It would be a plus
Standards <ul style="list-style-type: none"> - Just LOM? - Other? 	Yes (mandatory) No	Yes (mandatory) No	It is not enough Yes
Need a DRM component	No	Yes	Yes

5 REQUIREMENTS FOR DRM IMPLEMENTATION WITHIN LUISA

In this section, we point out the requirements that LUISA will take care of, based on the previous responses to the questionnaires and the extended requirements to cover other aspects such as the discussed in section 2.3.

5.1 Discussion on requirements

From the use cases perspective, we will deal mainly with text files and need to track activities. There is no need to apply TPM, and neither to be compliant with other standard but LOM in order to give complete coverage to the LMS/LCMS solution.

On the other hand, LUISA has some extended requirements as discussed in section 2.3.

At least, these requirements must be considered in the design phase. The summary of main issues derived from the architecture of LUISA that will affect to an extension of the use cases' requirements are the following:

- LOs from multiple repositories
- Composition of LOs
- Annotation of digital rights to LOs
- Architecture open to different standards
- Allow to define rights over metadata records

There is a need to deal with data from different repositories, so federation of repositories would be a great concern when talking about rights, due the disparate standards in use.

Another concern is that of composition of LOs and the impact this issue is posing to DRM. The system should be able to retrieve, compose and store LOs coming from the same or different repositories, taken into account the different digital rights of the disparate LOs being composed. The composer should be aware and overcome the mismatching of rights of the different learning objects.

Related with this, LUISA should provide a mechanism to annotate the proper rights to new or existing LOs. So, the annotation tool should probably have to take into account the DRM annotation of LOs.

Another important issue when dealing with multiple repositories is that of the use of different DRM standards. To reach interoperability with other DRM standards, the use of an ontology to bridge the gap between different DRM representation has to be considered. At least, a methodology to go this way should be defined.

5.2 Summary of requirements

The following table shows the summary of the requirements taken into account the different answers to the questionnaires and the extended requirements discussion.

Requirement	Type
1. Ensure access control to LOs	Mandatory
2. Tracking the usage of LOs	Mandatory
3. Checking the usage of LOs (prevention of unexpected / unauthorised usage even within a secured environment)	Optional
4. Other TPM (watermarking, PDF protection, etc.)	Optional
5. Compliance with standards. LOM	Mandatory
6. Compliance with standards. The DRM platform has to be “open” and interoperable to new DRM standards (use of an copyright ontology would be desirable)	Mandatory
7. Connection with payment gateways	No need
8. Allow the annotation of LOs with DRM metadata	Desirable
9. Composition of LOs with different DRM features, or coming from different repositories, or different DRM standards	Mandatory
10. DRM in federation of repositories	Desirable
11. DRM in annotation tool	Desirable
12. Rights over LO metadata	Desirable

6 CONCLUSIONS AND FUTURE WORK

This deliverable has highlighted the most important LUISA DRM requirements. A certain lack of DRM requirements from the case studies has been detected, but a discussion about possible extra features regarding DRM taking into account the nature and architecture of LUISA has been carried out.

Our approach to gather DRM requirements has taken into account some LUISA specific aspects that are not entirely covered by the case studies. We have gathered then several extra requirements required by LUISA as a framework, including issues such as LO composition, LO coming from multiple repositories and openness to DRM standards.

As a conclusion a module or set of modules have to be accommodated in the LUISA architecture in order to give a minimal DRM functionality to the LUISA framework. These modules should take into account the requirements highlighted in this document.

On the other hand, the description of work does not mention any development work regarding DRM in LUISA, but instead it is described as "DRM integration". One of the challenges is then to identify possible Open Source modules and ontologies for minimizing the development effort on DRM within the LUISA consortium.

ANNEX 1 – QUESTIONNAIRE

G1. Contents.
Q1.1. Describe the kind of contents you are looking for.
Q1.2. Are the contents mainly text files? Have you also media files?
Q1.3. Are the contents encoded or encrypted? (yes/no)
Q1.4. In case the contents are codified, list the different coding methods.
Q1.5. Which are the usage types of the contents? Relate the contents with the intended usages.
Q1.6. Should we allow the access to contents only to authorized users?
Q1.7. Are there open contents to everyone?

G2. Third parties.
Q2.1. Enumerate all contents provider.
Q2.2. Are there any third parties involved in the process between the rights holder and the end user?
Q2.3. If there are third parties, how will they impact to the contents rights? Will the third parties be able to change the content usage rules?
Q2.4. Is it necessary to integrate the third parties needs in a license server and intermediate to external payment gateways?
Q2.5. Should the system manage the payment? Just tracking?
Q2.6. In case you need tracking of content-related activity, which information should LUISA store regarding both the content and the user?

G3. Protection measures.
Q3.1. Regarding to technical protection measures (TPM) enumerated in deliverable D3.1, would you like to apply any of them? (yes/no) Which?
Q3.2. Do you need access granted to the contents by mean of passwords?

G4. Standards.

Q4.1. Which are the rights information (cost, copyright, restrictions and so on) you need?

Q4.2. Is the LOM standard enough to meet your requirements? Do you want to be compliant with other standards? Which?

G5. Only for use case partners.

Q5.1. Do you think your use case needs a DRM component?

Q5.2. In case you need a DRM component, what kind of DRM system do you imagine?

- e) Just tracking the access to contents.
- f) Just compliant with DRM standards.
- g) Just applying technical protection measures.
- h) A complete DRM system covering the previous options, payments and so on.

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