University Library and Computing Center
University of Stuttgart

Application Profile for LiLa

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e*Content*plus

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[1] OJ L 79, 24.3.2005, p. 1.

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1 The LiLa AP – Aims and Scope

Library of Labs (LiLa) is a project of eight European universities and three companies co-funded by the EU programme ***e*Content*plus***. The overall goal of the LiLa Project is to develop a portal providing users easy access to remote and virtual laboratories and experiments. Besides user access, the project provides additional services such as library integration, a scheduling system and a tutoring system. The target group of the project includes teachers and students in higher education in the field of science and technology.
This report documents the LiLa Application Profile (LiLa AP) that describes the metadata used by the LiLa project. It defines a core set of metadata elements to describe individual laboratory resources like remote and virtual experiments as well as other media; all this content is combined in student activities and lessons. The metadata plays a vital role since it used for management purposes as well as for searching and retrieval. It facilitates and allows the entry of experiments into library catalogues and repositories as well as an exchange of contents with other portals.

1.1 Structure of the LiLa Application Profile

To provide interoperability with other applications, the LiLa AP is modeled using the Singapore Framework provided by Dublin Core. This is being reflected both in the structure of the documentation and the derived artifacts. The structure of the Singapore Framework is presented in Figure 1.

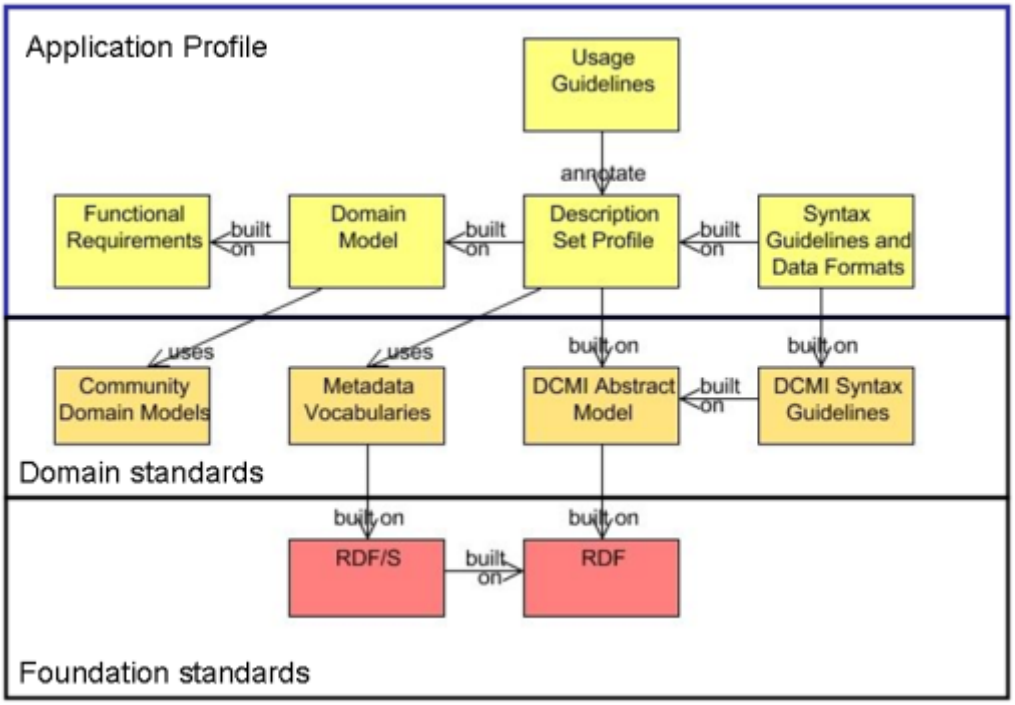


Figure 1: Singapore Framework for Dublin Core Application Profiles, source: http://dublincore.org/documents/singapore-framework/

The structure of this documentation corresponds to the various artifacts of the Singapore Framework. The functional requirements are given in chapter 2. Chapter 3 describes the domain model. The description set profiles as well as syntax guidelines and data formats are

lined out in chapters 4 (overview) and 5 (in detail). The documentation is accompanied by the Description Set Profile in machine readable form.

1.2 Intended Audience

The scope of this document is to provide an in depth description of the metadata used and handled by the LiLa Portal and for exchange with other infrastructure units, as e.g. other portals, repositories or library catalogues. It is intended to be useful for people dealing directly with the metadata within and beyond the LiLa project. The average portal user, i.e. the teacher or the student deploying LiLa content is less concerned with metadata, but rather its involvement in the functionality that depends on such data indirectly, such as searching. The following audience may find this document useful:

- LiLa administrators managing the resources
- LiLa developers implementing the application profile
- library catalogue or repository administrators integrating LiLa metadata
- administrators of existing portals for integrating LiLa metadata
- developers of new portals who want to use the LiLa AP for their metadata

1.3 Availability

The LiLa AP including the Description Set Profile in machine readable form is made available on the website of the Universitätsbibliothek Stuttgart (University Stuttgart, University Library) and on the LiLa website (http://www.lila-project.org).

2 The LiLa AP – Functional Requirements

This chapter presents the requirements that lead the definition of the LiLa AP. Based on existing profiles (SWAP Profile (http://www.ukoln.ac.uk/repositories/digirep/index/Eprints_Application_Profile), Lab2Go Profile(http://www.lab2go.net/lab2go/metadata)) and input from partners, the following requirements have been identified and must be supported by the LiLa AP.
The requirements have been split up into groups, to simplify application

2.1 General Requirements

Richer metadata set

- **Requirement**: Provide a set of metadata that contains all the elements required to describe and manage virtual and remote laboratory setups currently not supported by simple DC.
- **Usage scenario:** One major issue is that the fifteen simple Dublin Core metadata elements do not offer the level of detail that is required to describe experiments and its accompanying materials. A richer set of metadata would enable a user to describe experiments with a sufficient level of detail and allow offering services built upon repository metadata and content.
- **Proposed solution:** LiLa Application Profile proposes a set of richer metadata.

Consistent metadata

- **Requirement:** Facilitate the creation and sharing of consistent metadata.
- **Usage scenario:** With many people still using traditional information sources like library catalogues, it is advisable to enable retrieving information about experiments and accompanying materials in those traditional resources. Library requirements on the quality and format of metadata must be met and satisfy the standards needed for catalogue integration.
- **Proposed solution:** LiLa Application Profile will be tailored to requirements and offer guidance.

Library cataloguing approaches

- **Requirement:** Allow and facilitate the integration of metadata on experiments into library catalogues.
- **Usage scenario:** Library catalogues currently do not index experiments, but this usage is envisioned in the LiLa project. Integration of such resources requires a metadata description that complies with the existing classification categories.
- **Proposed solution:** Wherever possible a mapping between the metadata collected in LiLa and the metadata needed for integration into a library catalogue is discussed and thought of beforehand with members of scientific libraries and library networks.

Extensibility

- **Requirement:** Support extensibility of the application profile for other types of material.
- **Usage scenario:** The current scope of the Lila Application Profile has a narrow definition. If the Profile gains community acceptance, its users may wish to use the Profile for a wider range of material types that fall under the broader remit of experiments and

accompanying materials (e.g. experiment data, lessons, complete courses, etc.). Other application profiles may exist for other data types, and it would also be beneficial for the community if the approaches taken by this and other application profiles were mutually supportive and could be successfully mapped.

- **Proposed solution:** The Domain Model could be extended by using the dc:type element.

Fielded searching

- **Requirement:** Support searching of some, or all, elements, particularly of title, author, description, domain, and keywords.
- **Usage scenario:** Teachers requiring experiments as part of a lesson; in the preparation phase of such a lesson, a teacher will be enabled to search for an experiment on the subject covered by the lesson and suitable for the target audience. Simple DC does not contain elements for types of experiments or target groups.
- **Proposed solution:** Richer metadata set facilitates this.

Limit the search space by any element

- **Requirement:** Support browsing by any element, as required. This does not include browsing of description or identifier elements, but may include browsing by keyword, author, date, publisher, domain, intended audience or material type.
- **Usage scenario:** A teacher wants to create a new lesson using the material provided by the LiLa portal. He or she wants to survey the material already available for the given domain of his lesson and the targeted audience. Simple DC does not provide elements for domains or a controlled vocabulary for the education level.
- **Proposed solution:** Richer metadata set facilitates this.

Controlled vocabularies

- **Requirement:** Support browsing based on knowledge of controlled vocabulary.
- **Usage scenario:** The targeted user group work in research areas as diverse as e.g. physics, chemistry, engineering, and each of them has their own set of keywords to classify their experiments. As creating a new combined controlled vocabulary is far out of scope for this project, it should be possible to use different vocabularies, but it should be possible to distinguish between these different vocabularies to enable merging them at a later time.
- **Proposed solution:** Subject element allows using vocabulary encoding schemes.

Filtering of search results and browse tree

- **Requirement:** Support filtering of search results and browse tree. For example, by type, subject, author or keywords
- **Usage scenario:** Teachers looking for material might want to narrow the search result by providing additional search criteria or filtering. The different users of its service have different requirements, some need only the simplest form of searches, but others require much more refined search, browse and filter capabilities. Legal constraints might limit the applicability of some content, for example because it requires registration or licensing.
- **Proposed solution:** Richer metadata set facilitates this.

Names and name authority

- **Requirement:** Provide an authoritative form of agent names, to include personal names (authors) and corporate names (right holder, publishers).

- **Usage scenario:** Costs for setting up and maintaining experiments might be covered by license fees to be paid by users of such setups; such license fees are potentially up to negotiation between users and providers. In this application scenario, an interested user must be enabled to retrieve information on the authorized legal contact entitled to define license terms and payment conditions.
- **Proposed solution:** Agent entity and rich metadata set providing properties for this kind of information.

Statement of technical responsibility

- **Requirement:** Enable the user of an experiment to easily reach a person if necessary, in case the experiment fails, due to e.g. a hardware failure at the provider side.
- **Usage scenario:** A teacher runs a lesson on the platform using a remote experiment, but the experiment fails or breaks down during its use. The teacher should then be able to easily find and reach the person in charge.
- **Proposed solution:** Special contact element.

Dates

- **Requirements:**
  - **Date issued**: necessary to establish when an experiment or accompanying material was made publicly available (dcterms:issued)
  - **Date of modification of an experiments** - necessary to identify the latest version (dcterms:modified)
- **Usage scenario 1:** A user looking for experiments finds two similar experiments and the date helps him to decide which one to take for the integration in his lesson.
- **Usage scenario 2:** The experiment should be integrated into a library catalogue. Library quality standards require publication dates on all entities indexed by a catalogue.
- **Proposed solution:** Elements included for the above dates.
- **Consider requirements:**
  - **Date created** - can help identify older experiments which has only recently been made publicly available (dcterms:created)

2.2 Translations and Versions

Translated resources

- **Requirement:** Support experiments or accompanying material that have been translated.
- **Usage scenario:** Users should be able to find translations of LiLa material in their mother language, e.g. an experiment description originally only provided in English but translated by a secondary content provider into German should be locatable as such in the LiLa portal.
- **Proposed solution:** Define a class or property for referring to the translated resource.

Translated metadata

- **Requirement:** Enable the used to add metadata elements that have been translated to different languages.
- **Usage scenario:** Translating the title into several languages even though the experiment itself is only available in English – or does not require a translation because it involves only a graphical user interface – eases the task of finding it in the portal.
- **Proposed solution:** Use a language attribute for all translatable elements.

Version identification

- **Requirement:** Offer a preliminary recommendation to handle versioning issues related to the identification of a unique experiment and its variations. These include different revisions, translations and multiple formats.
- **Usage scenario:** A teacher includes a version of an experiment into his lesson. As the experiment requires software to be accessible, the publisher provides a more stable, but otherwise functionally identical version of the experiment. A teacher using this experiment should be informed that a newer version of an experiment he/she uses is available. It should be made clear to the creator of the experiment that a user of his experiment should be able to upgrade to a newer version without the need to rework his pedagogical concept, etc
- **Proposed solution:** The Model groups different 'versions' together, providing by default only access to the newest version; translations are identified by an extra Translation class.

Navigation between versions

- **Requirement:** Support navigation between different 'versions' of the same experiment.
- **Usage scenario:** A teacher should be enabled to check whether a newer version of the used experiment fulfils all the requirements. This becomes especially important once an experiment has been integrated into a lesson or once accompanying material for it is available, e.g. assignments. It should be possible to easily switch between versions, allowing a direct comparison.
- **Proposed solution:** The profile facilitates this by linking different 'versions' together. (dcterms:isVersionOf)

Transparency of versions

- **Requirement:** Support identification of the most appropriate or most recent version of an experiment.
- **Usage scenario:** A user should be enabled to get information on related versions of an experiment found in a library catalogue. When he/she accesses the experiment via a link from the library system, the most appropriate/newest version should be presented or at least it should be clearly evident for the user that an updated version is available.
- **Proposed solution:** Date Modified element.

2.3 Rights

Access restrictions

- **Requirement:** Facilitate identification of material that is easy accessible.
- **Usage scenario:** A user of a the portal wants to see if an experiment or accompanying material is freely accessible or subject to any restrictions in regard to access rights. The portal can provide this information easily and unambiguously, e.g. by only selecting elements with the desired Creative Common license.
- **Proposed solution:** Access Rights and License elements.

Copyright holders

- **Requirement:** Enable identification of copyright holders of an experiment.
- **Usage scenario:** A user should be able to easily identify the copyright holder of an experiment in case he or she wants to alter an experiment whenever the license condition requires a permit from the copyright holder.
- **Proposed solution:** (dcterms:copyrightHolder) element.

Intellectual Property Rights

- **Requirement:** All experiments and accompanying materials must be annotated with a license that defines the usage conditions.
- **Usage scenario:** A teacher preparing a lesson selects experiments and accompanying materials. She/he wants to know what the conditions are for reusing the selected materials in a lesson or whether a license must be bought.
- **Proposed Solution:** Define resources for a set default licenses (Creative Commons) and use the (dcterms:license) elements.

2.4 Management

Define costs and credits

- **Requirement:** Content providers should be enabled to cover the costs for hosting experiments by license fees.
- **Usage scenario:** An institution is providing access to a chemical laboratory. Running the experiments requires the usage of expensive consumables. Costs for the usage of this experiment must be made transparent for the interested user.
- **Proposed Solution:** Richer metadata set facilitates this.

System Requirements

- **Requirement:** It should be possible to indicate the system requirements required in order to run an experiment.
- **Usage scenario:** A teacher wants to use a remote experiment in his or her class. The computers available in the computer rooms have a given software installation which is fixed and cannot be changed. The teacher should be able to find and possibly filter out all experiments which cannot be run in the computer rooms available to him.
- **Proposed Solution:** Richer metadata set facilitates this.

3 The LiLa AP - Domain Model

This chapter presents the main building blocks of the LiLa AP. It first introduces the basic concepts that define the main structural elements followed by the crosscutting concerns introduced by the requirement to use the metadata also for managing the experiments. Afterwards, we discuss issues concerning the reusability of the core dataset. Finally, the complete structure is presented.

3.1 The basic building blocks

Before metadata elements are discussed in detail, the building blocks of the LiLa AP will be introduced. The central goal of the LiLa Project is to provide access to virtual and remote experiments as well manuals on the experiments, here denoted as “accompanying materials”. Furthermore, the portal also provides access “traditional” media such as documents, images, video or audio streams. These are denoted as “media files” in the following.
A secondary goal is to enable users to orchestrate these elements into pedagogical structures like assessments, lessons or courses.

Along these goals, the LiLa AP classifies its building blocks into the following two groups:

- Technical Components, for providing the framework to run experiments by accessing rigs, but are bare any pedagogical intent or use case. Accompanying materials, such as media files, are also considered technical components as they stand for themselves without – at this level – any intent. Technical components address the needs of teachers for having material to build lectures from; they do not address the needs of students as they lack any explanation and structure to follow.
- Pedagogical components, orchestrated from the technical components, define a pedagogical goal to be reached by the material they are constructed from. In the simplest possible use case, a single technical component annotated by its pedagogical intent may become a pedagogical component, though in general more than one technical component is needed to design a sound pedagogical structure. Such a structure is a composition, for example a sequence, of technical components realizing the intent of the teacher. Pedagogical components address mostly student needs, though teachers may want to study existing structures to base their lecture or class design on.

Figure 2 shows the building blocks of the LiLa AP that are discussed in the following section.

3.1.1 Technical components

The technical components define the foundation the LiLa content is based on. They *administrate* experiments and media files in the portal, define access rights to their content, define licenses and technical requirements needed to display or execute them, but they do not define goals *why* students should run experiments or browse through them. Technical components can be again classified into two types: *Interactive* and *Non-Interactive*.

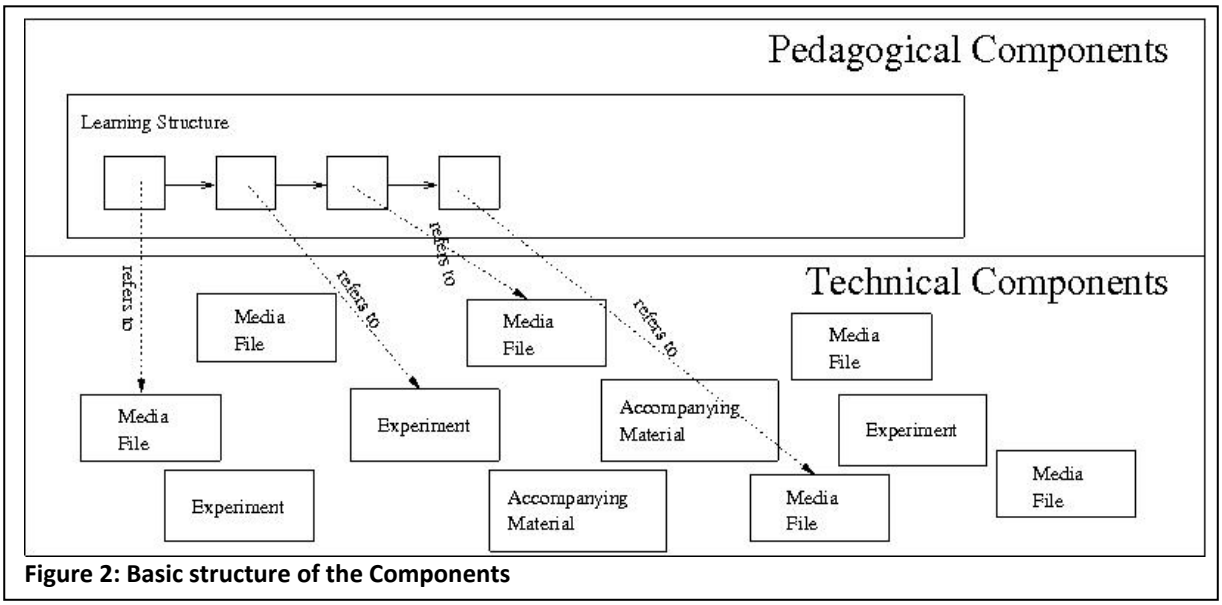


Figure 2: Basic structure of the Components

3.1.1.1 The Non-Interactive Elements

The most basic building block in the system is the *media package*. It contains data of traditional, less interactive media like text documents, movies or audio recordings. These elements contain material supporting the experiments. A typical media package contains a text document containing an assignment for an experiment or an introductory text for a specific topic.

3.1.1.2 The Interactive Elements: Interaction Packages and its "Accompanying Material"

The second technical component is the *interaction package*; its central aim is to enable the user to run an experiment in a browser. Specifically, the interaction package contains the necessary technical components to access a hardware setup (a *rig*, see below) from a browser as well as the metadata to locate it, and configuration data for rigs as required. While media files can only be consumed by the user, the interaction package allows him or her to engage actively in the learning process. The "accompanying material", while technically represented as a *media package* as well, contains **technical** manuals how to start and handle an experiment, e.g. the descriptions of the GUI, and is – as such – quite similar to a non-interactive media file. However, it is so tightly bound to a specific experiment that it is not classified as an component independent of it. Instructions with a pedagogical goal **must not** go into these elements as they can differ from application to application.

The *interaction packages* themselves can be classified into the following two types: virtual and remote experiments. The first group contains experiments that are entirely computer-based, though do not necessarily only need to run on the system used by the student. The second type manipulates a physical rig located in a distant laboratory instrumented by a computer interface.

3.1.2 The pedagogical components

The technical components administrate experiments, accompanying materials and other media files in the system. They can be used to build a content repository that would provide users access to individual experiments or assignments, but it would not be possible to group them together into a structure that is suitable for a learner. To facilitate this, *Activities* and *Lessons* are defined.

3.1.2.1 Activity

Activities are the smallest component with a didactical purpose and the building block of *Lessons.* Two typical activities would be *Introduction* and *Assignment.* The introduction would group together elements that would provide an introduction of a specific topic to a learner. An assignment could contain elements like a description of a task, an experiment to conduct and some questions to answer with the help of the experiment. While activities usually consist of more than one technical component, they might, in some cases, just extent such content by a pedagogical goal. For example, a single media file showing a video on an experiment as seen in the lab might serve the purpose of being an introduction to a remote experiment, in which case this activity would only consist of a single element.

3.1.2.2 Lesson

The last building block of the system is the lesson. Their purpose is allowing teacher to group activities into entire lessons concerning a given topic. While activities provide the learner with a self-contained activity like provide an introduction, the lesson will provide him or her with one or more paths through a certain subject containing different activities like an introduction followed by one or more assignments and end with a final assessment. The Lila Portal itself contains a tutoring system which provides the user with an easy to use interface to follow his or her path through a lesson.

3.1.3 Component Overview

Figure 3 visualizes the relation of components presenting the building blocks of the LiLa Portal. It shows, in addition to the structure mentioned above, that every component has its metadata set. In addition to the interaction package which provides access to the hardware, a component denoted as “rig” is introduced here that represents distant lab equipment on which an experiment is run, i.e. which is accessed by the interaction package. This rig, as a physical component, is not part of the LiLa portal, though the metadata set identifying the rig is. Reasons for splitting metadata for “experiments” into *interaction package metadata* and *rig metadata* are given below.

3.2 The LiLa AP Domain Model

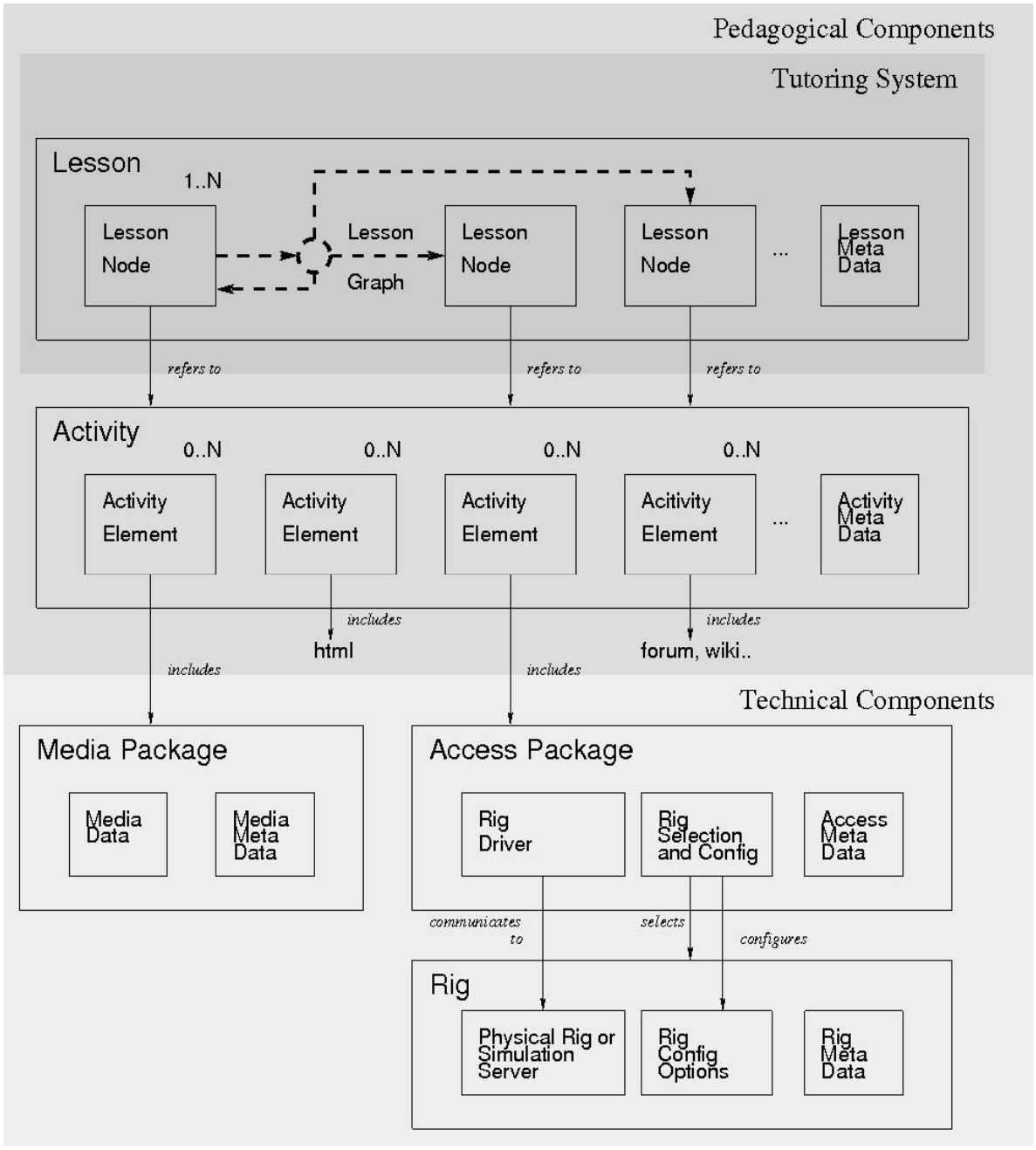
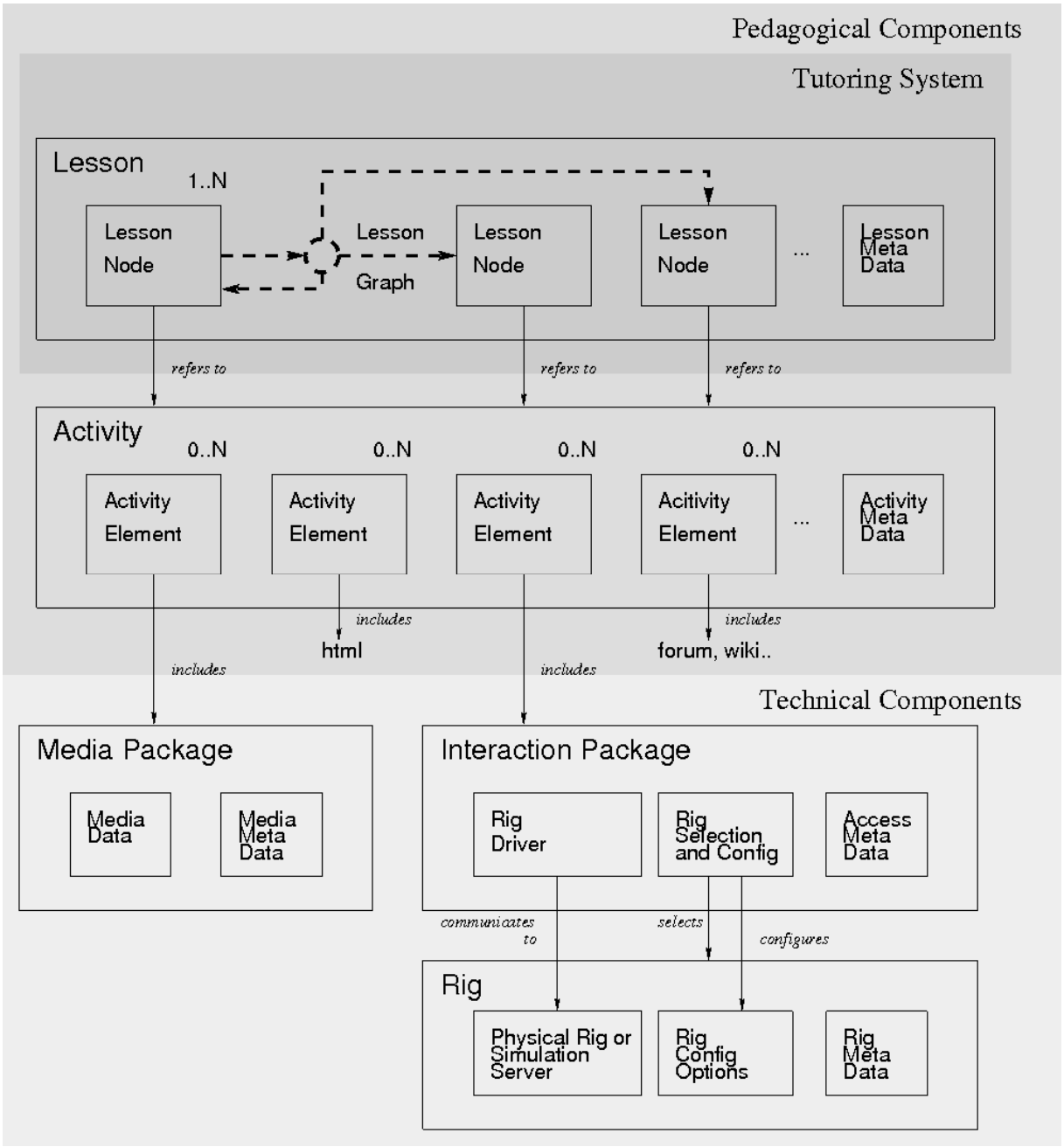


Figure 3: The data model

3.2.1 Media Package

The metadata of a *Media Package* contains basic attributes describing traditional non



-interactive media. This includes elements like title, description, creators, language and the scientific field. For files which contain a time span, like video or audio files, this information will also be recorded. It further contains management information like access rights, licensing information and version. Additional information like software requirements to be able to use the Media Package can be added. This could be information like you need to have a flash installed. If a media package acts as accompanying material for an interaction package, its metadata also contains a link to the corresponding package.

3.2.2 Interaction Package and Rig

The metadata for *interaction package* contains two elements. The metadata of a *Rig* is used to describe a hardware setup located at the provider. This hardware setup can either consist of instrumented lab hardware, or a server running a numerical simulation. Specifically, rigs can be configured by information present in the access packages by a mechanism beyond the scope of this document such that several access packages may use the same physical rig. Reversely, a rig may exist in several physically identical copies to allow load-balancing at the provider side - nevertheless, the metadata set only exists once, but indicates the number of copies.
The distinction between rig and interaction packages accessing rigs becomes relevant when "experiments" are booked by the LiLa booking system: Since rigs and interaction packages are not in a one-to-one relation and the physical hardware, and not the interaction package, defines usage constraints, rigs – and not interaction packages – are the entities that are managed by this system; thus, a distinct representation of the two entities is required.

Information associated with *rigs* includes general attributes like a title, description, creator, language and the scientific field. *Interaction packages* represent the part of an experiment that is visible to a user. It contains basic attributes like title, description and creator. Depending on the type of experiment (virtual or remote), it will contain a link to *Rigs* it requires. It further contains management information like access rights and licensing information. Additional information like software requirements to be able to use the *Interaction Package* can be added, e.g. the java version required to run the experiment and a link to the download location. It should be noted that an *Interaction Package* does not include any assignments, etc, and thus it does not include any metadata like duration or education level.

3.2.3 Activity and Lesson

The *Activity* and *Lesson* are containers to structurally coarser grained components. They both are pedagogical components. As such, they contain a similar set of attributes. They contain the basic attributes like title, description, creator, language and the scientific field. They also have similar sets of management attributes like license and version. In contrast to the technical components, these metadata sets contain pedagogical information like education level, learning objectives and a time needed to use an activity or a lesson.

4 Overview of LiLa AP elements

In this chapter, an overview of the metadata elements used to describe the access package will be given. Before providing every element used in the profile, section 4.1 describes the reasons for splitting up the data into a core metadata set being located in the namespace http://online-lab.org/ and an additional metadata set being located in the namespace http://www.lila-project.org/

In the following tables, all URIs will be notated using namespace. This is mainly done for readability purposes. Table 1 gives an overview of namespaces used in the rest of the document.

Table 1: Overview of namespaces used in class definitions

Vocabulary name	Namespace URI	Prefix
DCMI Metadata Terms	http://purl.org/dc/terms/	dcterms:
LiLa encoding schemes	http://www.lila-project.org/terms/	lilaterms:
GEM Element Set	http://purl.org/gem/elements/	gem:
GEM Element Set Qualifiers	http://purl.org/gem/qualifiers/	gemq:
Online Laboratory Metadata Terms	http;//online-lab.org/terms/	olm:
RDFS	http://www.w3.org/200/01/rdf-schema#	rdfs:
FOAF	http://xmlns.com/foaf/0.1/	foaf:

4.1 The split up profile

When design the Lila AP, one requirement was is that it should be extendable. This means, that people using the LiLa AP should be able to easily reuse the AP. The second requirement is that is should contain enough information to make is usable for managing the metadata and thus the annotated metadata. For those reason, the metadata for each element is split up into two elements, one containing the basic metadata and one adding additional properties, only used by the portal. Thus, two each two elements like olm:MediaPackage and the lila:MediaPackage belong together. For somebody interested in the metadata set, the elements in the namespace http://online-lab.org/ should be sufficient. There is no need to use the http://www.lila-project.org/ namespace.

4.2 Definition of OLM classes

The following tables provide an overview about the classes defined. The tables show the min and max occurrence of each property, if the property is a literal and indicates if value constraints exist. For further information, it also contains a reference to each class

Table 2: Properties of the olm:Agent Class (Details see section 5.3)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
foaf:name	1	0	yes	no
foaf:mbox	0	0	no	yes

Table 3: Properties of the olm:BaseMetaData class(Details see section 5.4)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
dcterms:title	1	0	yes	no
dcterms:description	0	0	yes	no
dcterms:creator	1	0	no	yes

Table 4: Properties of the olm:InteractionPackage Class(Details see section 5.5)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
dcterms:alternative	0	0	yes	no
dcterms:language	1	0	no	yes
dcterms:contributor	0	0	no	yes
dcterms:publisher	1	0	no	yes
olm:contact	1	0	no	yes
dcterms:rightsHolder	1	0	no	yes
dcterms:accesRights	0	0	no	yes
dcterms:license	1	1	no	yes
dcterms:format	0	0	yes	yes
dcterms:requires	0	0	no	yes
dcterms:isVersionOf	0	0	no	yes
dcterms:source	0	0	yes	yes
dcterms:issued	1	1	yes	yes
dcterms:modified	0	0	yes	yes
olm:interactionPackageType	1	1	no	yes
olm:scientificField	1	0	no	yes
dcterms:subject	0	0	no	yes
olm:usesRig	0	1	no	yes

Table 5: Properties of the olm:MediaPackage Class(Details see section 0)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
dcterms:alternative	0	0	yes	no
dcterms:language	1	0	no	yes
dcterms:contributor	0	0	no	yes
dcterms:publisher	1	0	no	yes
dcterms:rightsHolder	1	0	no	yes
dcterms:accessRights	0	0	no	yes
dcterms:license	1	1	no	yes
dcterms:format	0	0	yes	yes
dcterms:requires	0	0	no	yes
dcterms:isVersionOf	0	0	no	yes
dcterms:source	0	0	yes	yes
dcterms:issued	1	1	yes	yes
dcterms:modified	0	0	yes	yes
olm:scientificField	1	0	no	yes
dcterms:subject	0	0	no	yes
dcterms:duration	0	0	no	yes

Table 6: Properties of the olm:Rig Class (Details see section 5.7)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
olm:bookingSystemURL	0	1	yes	yes

Table 7: Properties of the olm:Requirement Class (Details see section 5.8)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
olm:resourceLocation	0	0	yes	yes

Table 8: Properties of the olm:Translation Class (Details see section 5.9)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
olm:translatedTo	1	1	no	yes
dcterms:source	1	1	no	yes

4.2.1 Definition of Lila Classes

Table 9: Properties of the lila:BaseMetaData Class (Details see section 5.10)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
dcterms:identifier	1	0	yes	yes

Table 10: Properties of the lila:InteractionPackage Class (Details see section 5.11)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
lila:deploymentPath	1	1	yes	yes
gemq:priceCode	1	1	no	yes
lila:hasSupportingMaterial	0	0	no	yes

Table 11: Properties of the lila:MediaPackage Class (Details see section 5.12)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
lila:deploymentPath	1	1	yes	yes
gemq:priceCode	1	1	no	yes

Table 12: Properties of the lila:SupportingMaterial Class (Details see section 5.13)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
lila:deploymentPath	1	1	yes	yes
dcterms:language	1	0	no	yes

Table 13: Properties of the lila:Agent Class (Details see section 5.14)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
dcterms:identifier	0	0	yes	yes

Table 14: Properties of the lila:Translation Class (Details see section 5.15)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
dcterms:identifier	0	0	yes	yes

Table 15: Properties of the lila:Activity Class (Details see section 5.16)

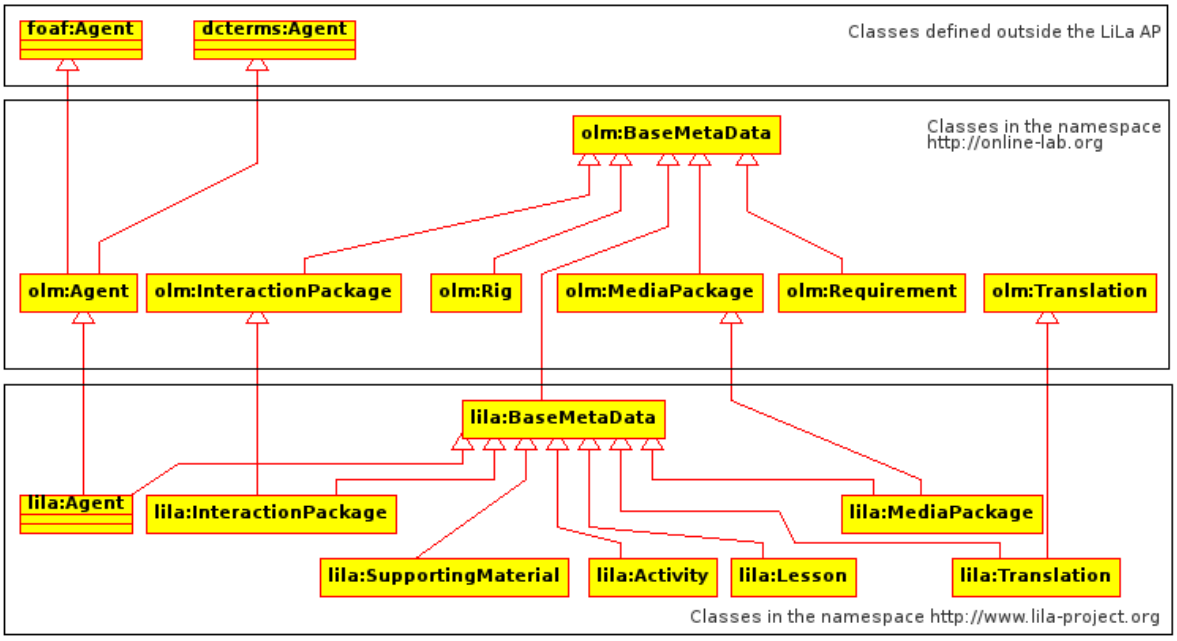
Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
dcterms:language	1	0	no	yes
dcterms:rightHolder	1	0	no	yes
dcterms:accessRights	0	0	no	yes
dcterms:licence	1	1	no	yes
olm:scientificField	1	0	no	yes
dcterms:subject	1	0	no	yes
dcterms:educationLevel	0	0	no	yes
gem:duration	0	0	yes	yes
gem:prerequisites	0	0	yes	no
olm:learningObjective	0	0	yes	no
gemq:teachingMethod	0	0	no	yes
gemq:grouping	0	0	no	yes

Table 16: Properties of the lila:Lesson Class (Details see section 0)

Property Name	Min occ.	Max occ.	Is Literal	Has Value Constraints
dcterms:type	1	1	no	yes
dcterms:language	1	0	no	yes
dcterms:rightHolder	1	0	no	yes
dcterms:accessRights	0	0	no	yes
dcterms:licence	1	1	no	yes
olm:scientificField	1	0	no	yes
dcterms:subject	1	0	no	yes
dcterms:educationLevel	0	0	no	yes
gem:duration	0	0	yes	yes
gem:prerequisites	0	0	yes	no
olm:learningObjective	0	0	yes	no
gemq:teachingMethod	0	0	no	yes
gemq:grouping	0	0	no	yes

4.2.2 Relationship between the Classes

The following diagram visualizes the relationship between the classes in the LiLa AP.


foaf:Agent
dcterms:Agent
Classes defined outside the LiLa AP
olm:BaseMetaData
Classes in the namespace http://online-lab.org
olm:Agent
olm:InteractionPackage
olm:Rig
olm:MediaPackage
olm:Requirement
olm:Translation
lila:BaseMetaData
lila:Agent
lila:InteractionPackage
lila:MediaPackage
lila:SupportingMaterial
lila:Activity
lila:Lesson
lila:Translation
Classes in the namespace http://www.lila-project.org

5 LiLa AP - The Entities of the Description Set Profile in Detail

In this chapter the metadata elements of the remote and virtual laboratory resources are described and specified in detail. This chapter is split up into three sections. The first one presents the entities described by this application profile. The second shows the URIs defined to type the entities and the third one presents the resources describing the controlled vocabulary used in this description set profile.

5.1 General information concerning the LiLa AP

Each entity described by this profile contains a set of properties. For each of the properties used, a table as shown in Table 17 is presented. Table 18, Table 19 and Table 20 show the constraints that can apply for each property. They are presented where applicable. In addition, each property is presented by an example.

Table 17: The common set of attributes given of each property.

Label	**LiLa AP name property**
URI	Specifies the URI of the given property
Min Occurrence	The minimal number of occurrences of this property
Max Occurrence	The maximal number of occurrences of this property
Literal	States if this property is a literal
Definition in LiLa AP	Specifies the definition of the given term in the LiLa AP context which will be based on the DC definitions in most cases
Comments and best practice examples	Recommendations on how to use this term
Pica field for mapping	Specifies the Pica library catalogue field that the property used in the LiLa AP gets mapped to
LOM field for mapping	Specifies the LOM property that the property used in the LiLa AP gets mapped to

The following constraints are applied for each property if they are applicable:

Table 18: Value URI Constraint

Occurrence	Shows, if a constraint is given. Possible values are: optional, mandatory
Choose from	A list of values that can be used as URI.

Table 19: Vocabulary Encoding Scheme Constraint

Occurrence	Shows, if a constraint is given. Possible values: optional, mandatory
Choose from	A list of values that can be used.

Table 20: Value String Constraint

Occurrence	Shows, if a constraint is given. Possible values are: optional, mandatory
Choose from	A list of values that can be used.

5.2 Vocabulary Encoding Scheme Constraint

The LiLa AP contains several encoding schemes for vocabularies. The following list present the used vocabulary.

- Entity type encoding scheme:
  - Scheme name: http://www.online-lab.org/entityType
  - Possible values:
    - http://www.online-lab.org/entityType/Agent
    - http://www.online-lab.org/entityType/BaseMetaData
    - http://www.online-lab.org/entityType/InteractionPackage
    - http://www.online-lab.org/entityType/MediaPackage
    - http://www.online-lab.org/entityType/Rig
    - http://www.online-lab.org/entityType/Requirement
    - http://www.online-lab.org/entityType/Translation
- Education Level encoding scheme
  - Schema name: http://www.online-lab.org/educationLevel/
  - Possible values:
    - http://www.online-lab.org/educationLevel/school
    - http://www.online-lab.org/educationLevel/underGraduate
    - http://www.online-lab.org/educationLevel/graduate
    - http://www.online-lab.org/educationLevel/scientific
- Interaction Package type encoding scheme:
  - Scheme name: http://www.online-lab.org/interactionPackageType/
  - Possible values:
    - http://www.online-lab.org/interactionPackage/virtualExperiment
    - http://www.online-lab.org/interactionPackage/remoteExperiment
- PriceCode encoding scheme:
  - Schema name: http://www.lila-project.org/priceCode/
  - Possible values:
    - http://www.lila-project.org/priceCode/free
    - http://www.lila-project.org/priceCode/pratialyFree
    - http://www.lila-project.org/priceCode/notFree

5.3 Class "olm:Agent" and the description profile properties

Label	**Agent**
URI	http://online-lab.org/terms/Agent
Type of term	Class
SubClassOf	http://purl.org/dc/terms/Agent http://xmlns.com/foaf/0.1/Agent
Definition in LiLa AP	The olm:Agent class represents a person or institution. It associates basic information like name and email address.
Comments and best practice examples	Each person or institution used in the LiLa portal should be represented by an instance of olm:Agent.

Label	**type**
URI	http://purl.org/dc/terms/types
Min occurrence	1
Max occurrence	1
Literal	No

Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type olm:Agent
Comments and best practice examples	Every agent used in the LiLa AP needs to have this property. Otherwise it won't be identified as an olm:Agent
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: mandatory Choose from: http://www.online-lab.org/entityType/Agent **Vocabulary Encoding Scheme Constraint** Occurrence: mandatory Choose from: http://www.online-lab.org/entityType **Value String Constraint** Max occurrence: 0

Label	**name**
URI	http://xmlns.com/foaf/0.1/name
Min occurrence	1
Max occurrence	0
Literal	yes
Definition in LiLa AP	The name of the agent
Comments and best practice examples	This field should be used for the name of the person or institution represented by this agent.
Pica field for mapping	
LOM field for mapping	

Label	**mbox**
URI	http://xmlns.com/foaf/0.1/foaf
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	The e-mail address of this agent
Comments and best practice examples	This property should associate the email address under which the agent can be reached by email
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Disallowed **Value String Constraint** Max occurrence: 0

5.4 Class "olm:BaseMetaData" and the description set profile properties

Label	**BaseMetaData**
URI	http://online-lab.org/terms/BaseMetaData
Type of term	Class

subClassOf	-
Definition in LiLa AP	A basic set of properties, like title, description and creator that most other classes of the LiLa AP have in common.
Comments and best practice examples	This class is defined only to easy the implementation of the LiLa AP. It is not meant to be used directly by any user

Label	**type**
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type olm:BaseMetaData
Comments and best practice examples	Every resource that should be identified as olm:BaseMetaData
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: mandatory Choose from: http://www.online-lab.org/entityType/BaseMetaData **Vocabulary Encoding Scheme Constraint** Occurrence: mandatory Choose from: http://www.online-lab.org/entityType **Value String Constraint** Max occurrence: 0

Label	**Title**
URI	http://purl.org/dc/terms/title
Min occurrence	1
Max occurrence	0
Literal	Yes
Definition in LiLa AP	The title of the described resource.
Comments and best practice examples	The title is the name of the resource. Examples are “The ideal gas” or “Coupled pendula” for InteractionPackage or “The result of Aquaplaning” for a MediaPackage.
Pica field for mapping	
LOM field for mapping	general.title

Label	**Description**
URI	http://purl.org/dc/terms/description
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	A description of the resource (InteractionPackage, Rig, MediaPackage) that is denoted by this olm:BaseMetaData.
Comments and best practice examples	
Pica field for mapping	

LOM field for mapping	

Label	**Creator**
URI	http://purl.org/dc/terms/creator
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	An instance of the class olm:Agent responsible for creating the resource
Comments and best practice examples	Each user/institution/service is represented as an instance of the class olm:Agent. They will be link to the instance of class olm:BaseMetadata to indicate the creator of an InteractionPackage/MediaPackage/etc.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	Description: olm:Agent **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed *Language Constraint:* Occurrence: optional

5.5 Class "olm:InteractionPackage" and the description set profile properties

Label	**InteractionPackage**
URI	http://online-lab.org/terms/InteractionPackage
subClassOf	http://online-lab.org/terms/BaseMetaData
Type of term	Class
Definition in LiLa AP	The InteractionPackage class represents the part of an experiment running at the user. This class is a subclass of the olm:BaseMetaData and contains additional information like a link to the olm:Rig, licenses, etc
Comments and best practice examples	An InteractionPackage class is used to store the metadata of an InteractionPackage

Label	**type**
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type olm:InteractionPackage
Comments and best practice examples	A resource representing an olm:InteractionPackage must have this type to be recognized as such.
Pica field for mapping	
LOM field for mapping	

Value(Non-Literal)	**Value URI Constraint**	
	Occurrence	Mandatory
	Choose from	http://www.online-lab.org/entityType/InteractionPackage
	Vocabulary Encoding Scheme Constraint	
	Occurrence	mandatory
	Choose from	http://www.online-lab.org/entityType
	Value String Constraint	
	Max occurrence	0

Label	**Alternative Title**
URI	http://purl.org/dc/terms/alternative
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	An alternative name for the InteractionPackage.
Comments and best practice examples	In this field, subtitles, additional or alternative titles of the described olm:InteractionPackage can be given using repeated statements.
Pica field for mapping	
LOM field for mapping	

Label	**Language**	
URI	http://purl.org/dc/terms/language	
Min occurrence	1	
Max occurrence	0	
Literal	No	
Definition in LiLa AP	Languages in which the olm:InteractionPackage is available.	
Comments and best practice examples	More than one language is only defined if more than one language is used in the described InteractionPackage. All languages given at this point are assumed to be natively (i18n) supported by the InteractionPackage. If an interaction package requires a translation to support additional languages, an additional interaction package connected using olm:Translation needs to be used.	
Pica field for mapping		
LOM field for mapping	general.language	
Value (Non-Literal)	**Value URI Constraint**	
	Occurrence	disallowed
	Vocabulary Encoding Scheme Constraint	
	Occurrence	Disallowed
	Value String Constraint:	
	Max occurrence	1
	Syntax Encoding Syntax Constraint	
	Occurrence	Mandatory
	Option	http://purl.org/dc/terms/RFC3066
	Language Constraint:	
	Occurrence	disallowed

Label	Contributor
URI	http://purl.org/dc/terms/contributor
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	An agent that contributed to the creation of the interaction package.
Comments and best practice examples	Examples of a contributor include a person, an organization, or a service. This field catches persons, organizations, or services other than the creator that were involved in the creation of the described resource.
Pica field for mapping	
LOM field for mapping	lifecycle.contribute with the type of contribution specified in lifecycle.contribute.role.
Value (Non-Literal)	Description: olm:Agent **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed *Language Constraint:* Occurrence: optional

Label	Publisher
b	http://purl.org/dc/terms/publisher
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	An olm:Agent responsible for making the interaction package available.
Comments and best practice examples	In most cases, the agent creating this package will also be the agent publishing it. But in case a working group would create an interaction package, an agent representing this working group might be the creator and the agent uploading it to the portal will be the publisher.
Pica field for mapping	
LOM field for mapping	lifecycle.contribute when lifecycle.contribute.role has a value of "Publisher"
Value (Non-Literal)	Description: olm:Agent **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed *Language Constraint:* Occurrence: optional

Label	Contact
URI	http://online-lab.org/terms/contact

Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	The contact of an interaction package is an agent that can be contacted inc case of technical problems, usage conditions or conceptual ideas of an interaction package.
Comments and best practice examples	
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	Description: olm:Agent **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed *Language Constraint:* Occurrence: optional

Label	**Rights Holder**
URI	http://purl.org/dc/terms/rightsHolder
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	An agent owning or managing rights over the resource, especially the rights for multiplying and distributing the content.
Comments and best practice examples	The creative commons license suggested in LiLa grants the right to copy and distribute the interaction package (by-nc-nd). Still, the rights for altering and transforming the access package and for commercial use are not given. For this the right holders have to be contacted.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	Description:`olm:Agent` **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed *Language Constraint:* Occurrence: optional

Label	**Access Rights**
URI	http://purl.org/dc/terms/accessRights
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Information about who can access the interaction package

Comments and best practice examples	This element indicates access restrictions to the described interaction package, for example: “Requires registration”, “Requires agreement with rights holder” For common cases, there will be predefined resources, with the possibility to add custom access rights.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Optional Choose from: http://www.online-lab.org/accessRights/ **Value String Constraint** Max occurrence: 0

Label	**License**
URI	http://purl.org/dc/terms/license
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	Information about rights held in and over the described interaction package.
Comments and best practice examples	A legal document giving official permission to do something with the resource. It informs the user and (potential) mediators about what they can do with the given resource, i.e. read, re-use, cite, etc. For LiLa the Creative Common BY-NC-ND license is proposed for interaction packages (and quoted as URL). A different CC license can be chosen by the content provider. Other licenses (e.g. for commercial content) have to be provided by the content provider by upload of the license text. There will be predefined resources for common licenses like the proposed creative commons license.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Disallowed **Value String Constraint** Max occurrence: 0

Label	**Display Size**
URI	http://purl.org/dc/terms/format
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa DCAP	Size for representation of interaction package in client software

Comments and best practice examples	The size is important for satisfying display of the interaction package, i.e. display without scroll bars. The size is given in pixel for width and height.
Pica field for mapping	
LOM field for mapping	
Value(Literal)	**Syntax Encoding Scheme** Occurrence: Mandatory Choose from: http://www.online-lab.org/encoding/format

Label	**Technical Requirements**
URI	http://purl.org/dc/terms/requires
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	A link to a resource that specifies software requirements, that have to be met at the client side, trying to use this interaction package
Comments and best practice examples	A typical example is a link to resource for Java or Flash. The linked resource contains both additional information as well as a link to the website of the publisher of the software.
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	Description: `olm:Requirement` **Value String Constraint** Max occurrence: 0

Label	**Is Version Of**
URI	http://purl.org/dc/terms/isVersionOf
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	The current interaction package is a technical imporved(e.g stability) but otherwise functional identical version of the referred interaction package
Comments and best practice examples	
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	Description: `olm:InteractionPackage` **Value String Constraint** Max occurrence: 0

Label	**Source**
URI	http://purl.org/dc/terms/source
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	A related resource from which the interaction package is derived.
Comments and best practice	This property can be used to link resources, that where use

examples	during the creation of this interaction package. This could be external websites, e.g. Wikipedia that contained information that were used. Or links to other interaction or media packages that where include in this interaction package.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value String Constraint** Occurrence: Mandatory Choose from: http://purl.org/dc/terms/URI

Label	**Date of Publication**
URI	http://purl.org/dc/terms/issued
Min occurrence	1
Max occurrence	1
Literal	Yes
Definition in LiLa AP	Date on which the described interaction package was published on the portal
Comments and best practice examples	This field should indicate when the described content was issued using the W3C-DTF encoding scheme (in LiLa represented by YYYY-MM-DD-Thh:mmTZD).
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Syntax Encoding Scheme** Ocurrence: Mandatory Choose from: http://purl.org/dc/terms/W3CDTF

Label	**Modification Date**
URI	http://purl.org/dc/terms/modified
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	Date on which the metadata of the interaction package was exchanged. It is not possible to change the content.
Comments and best practice examples	This property indicates when the metadata of the interaction package was changed using the W3C-DTF encoding scheme (in LiLa represented by YYYY-MM-DD-Thh:mmTZD).
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Syntax Encoding Scheme** Ocurrence: Mandatory Choose from: http://purl.org/dc/terms/W3CDTF

Label	**Content Type**
URI	http://www.online-lab.org/terms/interactionPackageType
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	The nature of the described interaction package. As explained in section 3.2.2, there are different kinds of interaction packages. The type is linked using this property.
Comments and best practice	

examples	
Pica field for mapping	
LOM field for mapping	educational.learningresourcetype
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Optional Choose from: http://www.online-lab.org/interactionPackageType/ **Value String Constraint** Max occurrence: 0

Label	**Scientific Field**
URI	http://online-lab.org/terms/scientificField
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	The LiLa AP provides a controlled vocabulary for annotating the scientific field. It is based on the categories from Wikipedia.
Comments and best practice examples	
Pica field for mapping	
LOM field for mapping	
Automatically generated	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Optional Choose from: http://www.online-lab.org/scienticField/ **Value String Constraint** Max occurrence: 0 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed Language Constraint Occurrence: optional

Label	**Subject**
URI	http://purl.org/dc/terms/subject
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Subject and keywords to describe the interaction package
Comments and best practice examples	The topics of the interaction package are specified using key words from different sources like PACS, etc.
Pica field for mapping	
LOM field for mapping	
Automatically generated	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Optional

	Value String Constraint
	Max occurrence: 0
	Syntax Encoding Syntax Constraint
	Occurrence: Disallowed
	Language Constraint
	Occurrence: Optional

Label	**Uses Rig**
URI	http://online-lab/terms/usesRig
Min occurrence	0
Max occurrence	1
Literal	No
Definition in LiLa AP	In case an InteractionPackage requires a Rig to be usable, this will be noted here.
Comments and best practice examples	
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	Description: `olm:Rig` **Value URI Constraint** Occurrence: Mandatory

5.6 Class "olm:MediaPackage" and the description set profile properties

Label	**MediaPackage**
URI	http://online-lab.org/terms/MediaPackage
subClassOf	olm:BaseMetaData
Type of term	Class
Definition in LiLa AP	The media package class represents a media package as described in section 3.2.1. This class is a subclass of the olm:BaseMetaData and contains additional information like access rights, licenses, etc
Comments and best practice examples	A instance of the MediaPackage class is used to store the metadata of a media package

Label	**Type**
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type olm:MediaPackage
Comments and best practice examples	A resource representing an olm:MediaPackage must have this type to be recognized as such.
Pica field for mapping	
LOM field for mapping	

Value(Non-Literal)	**Value URI Constraint**
	Occurrence: Mandatory
	Choose from: http://www.online-lab.org/entityType/MediaPackage
	Vocabulary Encoding Scheme Constraint
	Occurrence: Mandatory
	Choose from: http://www.online-lab.org/entityType
	Value String Constraint
	Max occurrence: 0

Label	**Alternative Title**
URI	http://purl.org/dc/terms/alternative
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	An alternative name for the MediaPackage.
Comments and best practice examples	In this field, subtitles, additional or alternative titles of the described olm:MediaPackage can be given using repeated statements.
Pica field for mapping	
LOM field for mapping	

Label	**Language**
URI	http://purl.org/dc/terms/language
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	Language of the described media package.
Comments and best practice examples	More than one language is only defined if more than one language is used in the described media package (e.g. Multiple audio tracks in movie). Translated media packages are linked using olm:Translation.
Pica field for mapping	
LOM field for mapping	general.language
Value (Non-Literal)	**Value URI Constraint**
	Occurrence: disallowed
	Vocabulary Encoding Scheme Constraint
	Occurrence: Disallowed
	Value String Constraint:
	Max occurrence: 1
	Syntax Encoding Syntax Constraint
	Occurrence: Mandatory
	Option: http://purl.org/dc/terms/RFC3066
	Language Constraint:
	Occurrence: disallowed

Label	**Contributor**
URI	http://purl.org/dc/terms/contributor
Min occurrence	0

Max occurrence	0
Literal	No
Definition in LiLa AP	An olm:Agent responsible for making contributions to the media package.
Comments and best practice examples	Examples of a contributor include a person, an organization, or a service. This field catches persons, organizations, or services other than the creator that were involved in the creation of the described resource.
Pica field for mapping	
LOM field for mapping	lifecycle.contribute with the type of contribution specified in lifecycle.contribute.role
Value (Non-Literal)	Description: `olm:Agent` **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed *Language Constraint:* Occurrence: optional

Label	**Publisher**
URI	http://purl.org/dc/terms/publisher
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	An olm:Agent responsible for making the media package available.
Comments and best practice examples	In most cases, the agent creating this package will also be the agent publishing it. But in case a working group would create an media package, an agent representing this working group might be the creator and the agent uploading it to the portal will be the publisher.
Pica field for mapping	
LOM field for mapping	lifecycle.contribute when lifecycle.contribute.role has a value of "Publisher"
Value (Non-Literal)	Description: `olm:Agent` **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed *Language Constraint:* Occurrence: optional

Label	**Rights Holder**
URI	http://purl.org/dc/terms/rightsHolder
Min occurrence	1
Max occurrence	0
Literal	No

Definition in LiLa AP	A person or organization owning or managing rights over the resource, especially the rights for multiplying and distributing it.
Comments and best practice examples	The creative commons license suggested in LiLa will grant the right to copy, distribute, alter and build on the media package, but make the user redistribute it under the same conditions (by-nc-sa). The rights for commercial use are not given. For this the right holders have to be contacted.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	Description: `olm:Agent` **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed *Language Constraint:* Occurrence: Optional

Label	**Access Rights**
URI	http://purl.org/dc/terms/accessRights
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Information about who can access the media package
Comments and best practice examples	This element indicates access restrictions to the described media package, for example: “Requires registration”, “Requires agreement with rights holder” For common cases, there will be predefined resources, with the possibility to add custom access rights This element indicates access restrictions to the described media package. If not commercial content, media packages should be free and there should be no access restrictions.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Optional Choose from: http://www.online-lab.org/accessRights/ **Value String Constraint** Max occurrence: 0

Label	**License**
URI	http://purl.org/dc/terms/license
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	Information about rights held in and over the described media

	package.
Comments and best practice examples	A legal document giving official permission to do something with the resource. It informs the user and (potential) mediators about what they can do with the given resource, i.e. read, re-use, cite, etc. For LiLa a Creative Common BY-NC-SA license is taken (and quoted as URL). A different CC licence can be chosen by the content provider. Other licences (e.g. for commercial content) have to be provided by the content provider as text document. There will be predefined resources for common licenses like the proposed creative commons license.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Disallowed **Value String Constraint** Max occurrence: 0

Label	**File Format**
URI	http://purl.org/dc/terms/format
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	The file format of the media package.
Comments and best practice examples	Recommended best practice is to use a controlled vocabulary such as the list of Internet Media Types [MIME].
Pica field for mapping	
LOM field for mapping	technical.format
Value (Non-Literal)	**Value URI Constraint** Occurrence: disallowed **Vocabulary Encoding Scheme Constraint** Occurrence: Disallowed **Value String Constraint** Max occurrence: 1 **Syntax Encoding Syntax Constraint** Occurrence: Mandatory Option: http://purl.org/dc/terms/IMT **Language Constraint:** Occurrence: Disallowed

Label	**Technical Requirements**
URI	http://purl.org/dc/terms/requires
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	A link to a resource that specifies software requirements, that have to be met at the client side, trying to use this media package

Comments and best practice examples	A typical example is a link to resource for Java or Flash. The linked resource contains both additional information as well as a link to the website of the publisher of the software.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	Description: requirement **Value String Constraint** Max occurrence: 0

Label	**Is Version Of**
URI	http://purl.org/dc/terms/isVersionOf
Min occurrence	0
Max occurrence	1
Literal	No
Definition in LiLa AP	New versions of the document which is provided by the creator. It contains the same content as old version, but like in the case of a movie provide better quality
Comments and best practice examples	
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	Description: MediaPackage **Value String Constraint** Max occurrence: 0

Label	**Source**
URI	http://purl.org/dc/terms/source
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	A related resource from which the media package is derived.
Comments and best practice examples	This property can be used to link resources, that where use during the creation of this media package. This could be external websites, e.g. Wikipedia that contained information that were used. Or links to other interaction or media packages that where include in this interaction package. It could be a screenshot of an interaction package available on the platform
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Value String Constraint** Occurrence: Mandatory Choose from: http://purl.org/dc/terms/URI

Label	**Date of Publication**
URI	http://purl.org/dc/terms/issued
Min occurrence	1
Max occurrence	1
Literal	Yes
Definition in LiLa AP	Date on which the described media package was published on the portal

Comments and best practice examples	This field indicates when the described content was issued using the W3C-DTF encoding scheme (in LiLa represented by YYYY-MM-DD-Thh:mmTZD).
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Syntax Encoding Scheme** Occurrence: Mandatory Choose from: http://purl.org/dc/terms/W3CDTF

sLabel	**Modification Date**
URI	http://purl.org/dc/terms/modified
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	Date on which the metadata of the media package was altered.
Comments and best practice examples	This field indicates when the metadata describing the media package was updated by the creator using the W3C-DTF encoding scheme (in LiLa represented by YYYY-MM-DD-Thh:mmTZD).
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Syntax Encoding Scheme** Ocurrence: Mandatory Choose from: http://purl.org/dc/terms/W3CDTF

Label	**Scientific Field**
URI	http://online-lab.org/terms/ScientificField
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	The LiLa AP provides a controlled vocabulary for annotating the scientific field. It is based on the categories from Wikipedia.
Comments and best practice examples	
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Optional Choose from: http://www.online-lab.org/scienticField/ **Value String Constraint** Max occurrence: 0 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed Language Constraint Occurrence: optional

Label	Subject
URI	http://purl.org/dc/terms/subject
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Subject and keywords to describe the media package
Comments and best practice examples	The topics of the interaction package are specified using key words from different sources like PACS, etc.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 0 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed Language Constraint Occurrence: optional

Label	Duration
URI	http://purl.org/dc/terms/duration
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Can be used to denote e.g. the time of a video file
Comments and best practice examples	
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Syntax Encoding Scheme** Occurrence: Mandatory Choose from: http://www.online-lab.org/terms/ISO8061

Label	Prerequisites
URI	http://purl.org/gem/qualifiers/prerequisites
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	Prerequisites like already gather knowledge a user should have to make use of this media package.
Comments and best practice examples	An example is an assignment that is available in two parts as two different media packages. In this case, the creator could add a prerequisite to the second part that the first part should be done first.
Pica field for mapping	
LOM field for mapping	

5.7 Class “olm:Rig” and the description set profile properties

Label	Rig
URI	http://online-lab.org/terms/Rig
Type of term	Class
subClassOf	olm:BaseMetadata
Definition in LiLa AP	Metadata class for a Rig
Comments and best practice examples	A description of Rig and its relation to the LiLa Portal is given in section 3.2.2

Label	type
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type olm:Rig
Comments and best practice examples	A resource representing an olm:Rig must have this type to be recognized as such.
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: Mandatory Choose from: http://www.online-lab.org/entityType/Rig **Vocabulary Encoding Scheme Constraint** Occurrence: Mandatory Choose from: http://www.online-lab.org/entityType **Value String Constraint** Max occurrence: 0

Label	booking System URL
URI	http://online-lab.org/terms/bookingSystemURL
Min Occurrence	0
Max Occurrence	1
Literal	Yes
Definition in LiLa AP	With rigs being a spares resource, the creator can add a link to a booking system using this property. A user who wants to use this rig, has to book it first.
Comments and best practice examples	The LiLa Portal will support using the LiLa booking system directly and will be able to interact with it. But other systems can be linked her, to tell the user, where to go for booking.
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Value String Constraint** Occurrence: Mandatory Choose from: http://purl.org/dc/terms/URI

5.8 Class “olm:Requirement” and the description set profile properties

Label	Requirement
URI	http://online-lab.org/terms/Requirement
Type of term	Class
subClassOf	olm:BaseMetadata
Definition in LiLa AP	A class for storing the requirements of an interaction or media package. This can either be certain software or other resources like the resolution of the screen
Comments and best practice examples	Using interaction or media packages requires certain software to be installed on the computer of the user. These requirements can be stored using the olm:Requirements.

Label	Type
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type olm:Requirement
Comments and best practice examples	A resource representing an olm:Requirement must have this type to be recognized as such.
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: Mandatory Choose from: http://www.online-lab.org/entityType/Requirement **Vocabulary Encoding Scheme Constraint** Occurrence: Mandatory Choose from: http://www.online-lab.org/entityType **Value String Constraint** Max occurrence: 0

Label	resourceLocation
URI	http://online-lab.org/terms/resourceLocation
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	The URL where the user can find the software mentioned in this requirement
Comments and best practice examples	For the requirement Flash Player version 10, this property can be used to store the download URL of the flash player.
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Value String Constraint** Occurrence: Mandatory Choose from: http://purl.org/dc/terms/URI

5.9 Class “olm:Translation” and the description set profile properties

Label	Translation
URI	http://online-lab.org/terms/Translation
Type of term	Class
subClassOf	
Definition in LiLa AP	This class links to resources, where one resource is the translation of the other.
Comments and best practice examples	It may happen, that one interaction package can be provided in two different languages, but it is not possible to integrate the two languages into one package. In this case two different packages have to be uploaded. To enable the platform to show the user that the package is available in several languages, the packages have to be linked by a olm:Translation

Label	Type
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type olm:Translation
Comments and best practice examples	A resource representing an olm:Translation must have this type to be recognized as such.
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: Mandatory Choose from: http://www.online-lab.org/entityType/Translation **Vocabulary Encoding Scheme Constraint** Occurrence: Mandatory Choose from: http://www.online-lab.org/entityType **Value String Constraint** Max occurrence: 0

Label	translatedTo
URI	http://online-lab.org/terms/translatedTo
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	The translated resource.
Comments and best practice examples	The resource that stores the translated version of the original package.
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	Description: olm:BaseMetaData **Vocabulary Encoding Scheme Constraint**

	Occurrence	Optional
	Value String Constraint	
	Max occurrence	1
	Syntax Encoding Syntax Constraint	
	Occurrence	Disallowed
	Language Constraint:	
	Occurrence	optional

Label	**Source**
URI	http://purl.org/dc/terms/source
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	The resource that gets translated by this translation
Comments and best practice examples	The resource that stores that original version of the package
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	Description: olm:BaseMetaData

Vocabulary Encoding Scheme Constraint	
Occurrence	Optional
Value String Constraint	
Max occurrence	1
Syntax Encoding Syntax Constraint	
Occurrence	Disallowed
Language Constraint:	
Occurrence	optional

5.10 Class "lila:BaseMetaData"

Label	**BaseMetaData**
URI	http://www.lila-project.org/terms/Translation
Type of term	Class
subClassOf	olm:BaseMetaData
Definition in LiLa AP	The extended version of the olm:BaseMetaData containing all properties common to the LiLa project specific properties
Comments and best practice examples	In section 4.1 the reasons for split up the profiles are given. This class contains all properties that the classes belong to the namespace http://www.lila-project.org/.

Label	**Type**
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type lila:BaseMetaData
Comments and best practice examples	A resource representing an lila:BaseMetaData must have this type to be recognized as such.
Pica field for mapping	

LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: Mandatory Choose from: http://www.lila-project.org/entitiyType/BaseMetaData **Vocabulary Encoding Scheme Constraint** Occurrence: Mandatory Choose from: http://www.lila-project.org/entitiyType/ **Value String Constraint** Max occurrence: 0

Label	**Identifier**
URI	http://purl.org/dc/terms/identifier
Min occurrence	1
Max occurrence	0
Literal	Yes
Definition in LiLa AP	An unambiguous reference to the defined resource.
Comments and best practice examples	The identifier should be used to provide an externally resolvable link to the resource. Examples are links in library catalogs that can require certain types of links.
Pica field for mapping	
LOM field for mapping	general.catalogentry. general.identifier is currently a RESERVED term, as there is no specified method for creation of a GUID
Value(Literal)	**Syntax Encoding Scheme** Occurrence: Mandatory Choose from: http://purl.org/dc/terms/URI

5.11 Class "lila:InteractionPackage"

Label	**InteractionPackage**
URI	http://www.lila-project.org/terms/InteractionPackage
Type of term	Class
subClassOf	olm:InteractionPackage lila:BaseMetaData
Definition in LiLa AP	The metadata extension of an olm:InteractionPackage for the LiLa project
Comments and best practice examples	The lila:InteractionPackage contains additional properties that are used to managed the package in LiLa portal.

Label	**Type**
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type lila:BaseMetaData.
Comments and best practice	A resource representing an lila:InteractionPackage must have

examples	this type to be recognized as such.
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: Mandatory Choose from: http://www.lila-project.org/entitiyType/InteractionPackage **Vocabulary Encoding Scheme Constraint** Occurrence: Mandatory Choose from: http://www.lila-project.org/entitiyType/ **Value String Constraint** Max occurrence: 0

Label	**Deployment Path**
URI	http://www.lila-project.org/terms/deploymentPath
Min occurrence	1
Max occurrence	1
Literal	Yes
Definition in LiLa AP	Information where the package is deployed
Comments and best practice examples	The deployment path denotes a local path, where the data of the interaction package is stored on the system.
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Syntax Encoding Scheme** Occurrence: Mandatory Choose from: http://purl.org/dc/terms/URI

Label	**Price code**
URI	http://purl.org/gem/qualifiers/priceCode
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	Information whether the access package is “free”, “not free” or “partially free”
Comments and best practice examples	This element indicates a quick information for the user how the access package is available. The controlled vocabulary suggested by GEM is used. The default is “free”.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory Choose from: • http://www.lila-project.org/priceCode/free • http://www.lila-project.org/priceCode/pratialyFree • http://www.lila-project.org/priceCode/notFree

	Vocabulary Encoding Scheme Constraint
	Occurrence: Mandatory
	Choose from: http://www.lila-project.org/priceCode
	Value String Constraint
	Max occurrence: 0

Label	**Supporting Material**
URI	http://www.lila-project.org/terms/hasSupportingMaterial
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Supporting material of a resource
Comments and best practice examples	Supporting material such as technical documentation that is not included in the interaction package. There can be language and format versions of the supporting material.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	Description: `lila: SupportingMaterial` **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed *Language Constraint:* Occurrence: optional

5.12 Class "lila:MediaPackage"

Label	**MediaPackage**
URI	http://www.lila-project.org/terms/MediaPackage
Type of term	Class
subClassOf	olm:MediaPackage lila:BaseMetaPackages
Definition in LiLa AP	The metadata extension of an olm:MediaPackage for the LiLa project
Comments and best practice examples	The lila:MediaPackage contains additional properties that are used to managed the package in LiLa portal.

Label	**Type**
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type lila:MediaPackage
Comments and best practice examples	A resource representing an lila:MediaPackage must have this type to be recognized as such.

Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: Mandatory Choose from: http://www.lila-project.org/entitiyType/MediaPackage **Vocabulary Encoding Scheme Constraint** Occurrence: Mandatory Choose from: http://www.lila-project.org/entitiyType/ **Value String Constraint** Max occurrence: 0

Label	**Deployment Path**
URI	http://www.lila-project.org/terms/deploymentPath
Min occurrence	1
Max occurrence	1
Literal	Yes
Definition in LiLa AP	Information where the package is deployed
Comments and best practice examples	The deployment path denotes a local path, where the data of the media package is stored on the system
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Syntax Encoding Scheme** Occurrence: Mandatory Choose from: http://purl.org/dc/terms/URI

Label	**Price code**
URI	http://purl.org/gem/qualifiers/priceCode
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	Information whether the media package is “free”, “not free” or “partially free”
Comments and best practice examples	This element indicates a quick information for the user how the media package is available. The controlled vocabulary suggested by GEM is used. The default is “free”.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory Choose from: • http://www.lila-project.org/priceCode/free • http://www.lila-project.org/priceCode/pratialyFree • http://www.lila-

		project.org/priceCode/notFree
	Vocabulary Encoding Scheme Constraint	
	Occurrence	Mandatory
	Choose from	http://www.lila-project.org/priceCode
	Value String Constraint	
	Max occurrence	0

5.13 Class "lila:SupportingMaterial" and the description set profile properties

Label	**SupportingMaterial**
URI	http://www.lila-project.org/terms/SupportingMaterial
Type of term	Class
subClassOf	lila:BaseMetaData
Definition in LiLa AP	The SupportingMaterial class is used to store metadata of supporting material of an interaction package.
Comments and best practice examples	Typical supporting materials of an interaction package are manuals and howtos.

Label	**Type**
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type lila:SupportingMaterial.
Comments and best practice examples	A resource representing an lila:SupportingMaterial must have this type to be recognized as such.
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint**
	Occurrence: Mandatory
	Choose from: http://www.lila-project.org/entitiyType/SupportingMaterial
	Vocabulary Encoding Scheme Constraint
	Occurrence: Mandatory
	Choose from: http://www.lila-project.org/entitiyType/
	Value String Constraint
	Max occurrence: 0

Label	**Deployment Path**
URI	http://www.lila-project.org:/terms/deploymentPath
Min occurrence	1
Max occurrence	1
Literal	Yes
Definition in LiLa AP	Information where the package is deployed
Comments and best practice examples	The deployment path denotes a local path, where the data of the supporting material is stored on the system

Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Syntax Encoding Scheme** Occurrence: Mandatory Choose from: http://purl.org/dc/terms/URI

Label	**Language**
URI	http://purl.org/dc/terms/language
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	Languages in which the lila:SupportingMaterial is available.
Comments and best practice examples	More than one language is only defined if more than one language is used in the described supporting material. All languages given at this point are assumed to be natively (i18n) supported by the supporting material. If an supporting package requires a translation to support additional languages, an additional supporting material resource connected using olm:Translation needs to be used. In this case, both lila:SupportingMaterial resources can be added to the interaction package.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Disallowed **Vocabulary Encoding Scheme Constraint** Occurrence: Disallowed **Value String Constraint:** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Mandatory Option: http://purl.org/dc/terms/RFC3066 Language Constraint: Occurrence: Disallowed

5.14 The class Lila:Agent

Label	**Agent**
URI	http://www.lila-project.org/terms/Agent
Type of term	Class
subClassOf	olm:Agent lila:BaseMetaData
Definition in LiLa AP	An extended version of the olm:Agent
Comments and best practice examples	The lila:Agent class contains additional properties that are required for the management inside the LiLa portal.

Label	**Type**
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No

Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type lila:Agent.
Comments and best practice examples	A resource representing an lila:Agent must have this type to be recognized as such.
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: Mandatory Choose from: http://www.lila-project.org/entitiyType/Agent **Vocabulary Encoding Scheme Constraint** Occurrence: Mandatory Choose from: http://www.lila-project.org/entitiyType/ **Value String Constraint** Max occurrence: 0

Label	**Identifier**
URI	http://purl.org/dc/terms/identifier
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	An unambiguous reference to this lila:Agent
Comments and best practice examples	The identifier should be used to provide an externally resolvable link to the resource. Examples are links in library catalogs that can require certain types of links.
Pica field for mapping	
LOM field for mapping	
Value(Literal)	**Syntax Encoding Scheme** Occurrence: Mandatory Choose from: http://purl.org/dc/terms/URI

5.15 The class: lila:Translation

Label	**Translation**
URI	http://www.lila-project.org/terms/Translation
Type of term	Class
subClassOf	olm:Translation lila:BaseMetaData
Definition in LiLa AP	An extended version of the olm:Translation.
Comments and best practice examples	The lila:Translation contains additional properties used for managing the metadata on LiLa Portal.

Label	**Type**
URI	http://purl.org/dc/terms/type
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type

	lila:Translation.
Comments and best practice examples	A resource representing an lila:Translation must have this type to be recognized as such.
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: Mandatory Choose from: http://www.lila-project.org/entitiyType/Translation **Vocabulary Encoding Scheme Constraint** Occurrence: Mandatory Choose from: http://www.lila-project.org/entitiyType/ **Value String Constraint** Max occurrence: 0

Label	**identifier**
URI	http://purl.org/dc/terms/identifier
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	An unambiguous reference identifying this resource
Comments and best practice examples	The identifier should be used to provide an externally resolvable link to the resource. Examples are links in library catalogs that can require certain types of links.
Pica field for mapping	
LOM field for mapping	
Value(Literal)	**Syntax Encoding Scheme** Occurrence: Mandatory Choose from: http://purl.org/dc/terms/URI

5.16 The class lila:Activity

Label	**Activity**
URI	http://www.lila-project.org/terms/Activity
Type of term	Class
SubClassOf	http://www.lila-project.org/terms/BaseMetaData
Definition in LiLa AP	The Activity class stores the metadata for an activity as described in section 3.2.3
Comments and best practice examples	The Activity class contains property for managing the metadata of an activity.

Label	**type**
URI	http://purl.org/dc/terms/types
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type lila:Activity
Comments and best practice	A resource representing an lila:Activitys must have this type

examples	to be recognized as such.
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: mandatory Choose from: http://www.online-lab.org/entityType/Activity **Vocabulary Encoding Scheme Constraint** Occurrence: mandatory Choose from: http://www.online-lab.org/entityType **Value String Constraint** Max occurrence: 0

Label	**Language**
URI	http://purl.org/dc/terms/language
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	Languages in which the lila:Activity is available.
Comments and best practice examples	More than one language is only defined if more than one language is used in the described Activity. All languages given at this point are assumed to be natively (i18n) supported by the activity. If an activity requires a translation to support additional languages, an additional activity connected using olm:Translation needs to be used.
Pica field for mapping	
LOM field for mapping	general.language
Value (Non-Literal)	**Value URI Constraint** Occurrence: Disallowed **Vocabulary Encoding Scheme Constraint** Occurrence: Disallowed **Value String Constraint:** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Mandatory Option: http://purl.org/dc/terms/RFC3066 Language Constraint: Occurrence: Disallowed

Label	**Rights Holder**
URI	http://purl.org/dc/terms/rightsHolder
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	A person or organization owning or managing rights over the resource, especially the rights for multiplying and distributing it.
Comments and best practice examples	The creative commons license suggested in LiLa will grant the right to copy, distribute, alter and build on the activity, but make the user redistribute it under the same conditions (by-

	nc-sa). The rights for commercial use are not given. For this the right holders have to be contacted.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	Description: olm:Agent **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed *Language Constraint:* Occurrence: Optional

Label	**Access Rights**
URI	http://purl.org/dc/terms/accessRights
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Information about who can access the interaction package
Comments and best practice examples	This element indicates access restrictions to the described interaction package, for example: “Requires registration”, “Requires agreement with rights holder” For common cases, there will be predefined resources, with the possibility to add custom access rights.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Optional Choose from: http://www.online-lab.org/accessRights/ **Value String Constraint** Max occurrence: 0

Label	**License**
URI	http://purl.org/dc/terms/license
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	Information about rights held in and over the described activity.
Comments and best practice examples	A legal document giving official permission to do something with the resource. It informs the user and (potential) mediators about what they can do with the given resource, i.e. read, re-use, cite, etc. For LiLa the Creative Common BY-NC-SA license is proposed for activities (and quoted as URL). A different CC license can be chosen by the content provider. Other licenses (e.g. for commercial content) have to be

	provided by the content provider by upload of the license text. There will be predefined resources for common licenses like the proposed creative commons license.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Disallowed **Value String Constraint** Max occurrence: 0

Label	**Scientific Field**
URI	http://online-lab.org/terms/scientificField
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	The LiLa AP provides a controlled vocabulary for annotating the scientific field. It is based on the categories from Wikipedia.
Comments and best practice examples	
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Optional Choose from: http://www.online-lab.org/scienticField/ **Value String Constraint** Max occurrence: 0 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed Language Constraint Occurrence: optional

Label	**Subject**
URI	http://purl.org/dc/terms/subject
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Subject and keywords to describe the activity.
Comments and best practice examples	The topics of the activity are specified using key words from different sources like PACS, etc.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint**

	Occurrence	Optional
	Value String Constraint	
	Max occurrence	0
	Syntax Encoding Syntax Constraint	
	Occurrence	Disallowed
	Language Constraint	
	Occurrence	Optional

Label	**Education Level**
URI	http://purl.org/dc/terms/educationLevel
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Describes the suggested educational level for a user to be able to make use of this activity
Comments and best practice examples	The LiLa AP provides 4 different levels to education: school, undergraduate, graduate and scientific.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint**
	Occurrence: Mandatory
	Vocabulary Encoding Scheme Constraint
	Occurrence: Mandatory
	Choose from: http://www.online-lab.org/educationLevel/
	Value String Constraint
	Max occurrence: 0

Label	**Duration**
URI	http://purl.org/gem/elements/duration
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	The recommended time needed to effectively use the entity being described.
Comments and best practice examples	Is not necessarily useful for media packages, but could be. It should be encoded using ISO 8061
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Syntax Encoding Scheme**
	Occurrence: Mandatory
	Choose from: http://www.online-lab.org/terms/ISO8061

Label	**Prerequisites**
URI	http://purl.org/gem/qualifiers/prerequisites
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	The designation of learning perquisites.
Comments and best practice	Perquisites a learner should have before using this lesson

examples	
Pica field for mapping	
LOM field for mapping	

Label	**Learning Objectives**
URI	http://online-lab.org/terms/learningObjective
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	The objectives a learner should have achieved after using the lesson.
Comments and best practice examples	
Pica field for mapping	
LOM field for mapping	

Label	**Teaching Method**	
URI	http://purl.org/gem/qualifiers/teachingMethod	
Min occurrence	0	
Max occurrence	0	
Literal	No	
Definition in LiLa AP	The teaching method used in this lesson.	
Comments and best practice examples	This properties denotes the teaching methods used in this lesson	
Pica field for mapping		
LOM field for mapping		
Value(Non-Literal)	**Value URI Constraint**	
	Occurrence	mandatory
	Vocabulary Encoding Scheme Constraint	
	Occurrence	mandatory
	Choose from	http://purl.org/gem/instance/GEM-TM/
	Value String Constraint	
	Max occurrence	0

Label	**Grouping**	
URI	http://purl.org/gem/qualifiers/grouping	
Min occurrence	0	
Max occurrence	0	
Literal	Yes	
Definition in LiLa AP	The group size which can use this lesson.	
Comments and best practice examples		
Pica field for mapping		
LOM field for mapping		
Value(Non-Literal)	**Value URI Constraint**	
	Occurrence	mandatory
	Vocabulary Encoding Scheme Constraint	
	Occurrence	mandatory
	Choose from	http://purl.org/gem/instance/GEM

		-GRO/
	Value String Constraint	
	Max occurrence	0

5.17 The class Lila:Lesson

Label	**Activity**
URI	http://www.lila-project.org/terms/Lesson
Type of term	Class
SubClassOf	http://www.lila-project.org/terms/BaseMetaData
Definition in LiLa AP	The Lesson class stores the metadata for a lesson as described in section 3.2.3
Comments and best practice examples	The Lesson class contains property for managing the metadata of lesson.

Label	**type**	
URI	http://purl.org/dc/terms/types	
Min occurrence	1	
Max occurrence	1	
Literal	No	
Definition in LiLa AP	A fixed resource which is associated by the property dc:type. This is used to indicate that this instance is of the type lila:Lessson	
Comments and best practice examples	A resource representing an lila:Lesson must have this type to be recognized as such.	
Pica field for mapping		
LOM field for mapping		
Value(Non-Literal)	**Value URI Constraint**	
	Occurrence	mandatory
	Choose from	http://www.lila-project.org/entityType/Lesson
	Vocabulary Encoding Scheme Constraint	
	Occurrence	mandatory
	Choose from	http://www.lila-project.org/entityType
	Value String Constraint	
	Max occurrence	0

Label	**Language**
URI	http://purl.org/dc/terms/language
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	Languages in which the lila:Lesson is available.
Comments and best practice examples	More than one language is only defined if more than one language is used in the described lesson. All languages given at this point are assumed to be natively (i18n) supported by the Lesson. If a lesson requires a translation to support

	additional languages, an additional lesson connected using olm:Translation needs to be used.
Pica field for mapping	
LOM field for mapping	general.language
Value (Non-Literal)	**Value URI Constraint** Occurrence: Disallowed **Vocabulary Encoding Scheme Constraint** Occurrence: Disallowed **Value String Constraint:** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Mandatory Option: http://purl.org/dc/terms/RFC3066 Language Constraint: Occurrence: Disallowed

Label	**Rights Holder**
URI	http://purl.org/dc/terms/rightsHolder
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	A person or organization owning or managing rights over the resource, especially the rights for multiplying and distributing it.
Comments and best practice examples	The creative commons license suggested in LiLa will grant the right to copy, distribute, alter and build on the media package, but make the user redistribute it under the same conditions (by-nc-sa). The rights for commercial use are not given. For this the right holders have to be contacted.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	Description: lila:Agent **Vocabulary Encoding Scheme Constraint** Occurrence: Optional **Value String Constraint** Max occurrence: 1 *Syntax Encoding Syntax Constraint* Occurrence: Disallowed *Language Constraint:* Occurrence: optional

Label	**Access Rights**
URI	http://purl.org/dc/terms/accessRights
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Information about who can access the interaction package
Comments and best practice examples	This element indicates access restrictions to the described interaction package, for example: “Requires registration”, “Requires agreement with rights holder” For common cases, there will be predefined resources, with

	the possibility to add custom access rights.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Optional Choose from: http://www.online-lab.org/accessRights/ **Value String Constraint** Max occurrence: 0

Label	**License**
URI	http://purl.org/dc/terms/license
Min occurrence	1
Max occurrence	1
Literal	No
Definition in LiLa AP	Information about rights held in and over the described lesson.
Comments and best practice examples	A legal document giving official permission to do something with the resource. It informs the user and (potential) mediators about what they can do with the given resource, i.e. read, re-use, cite, etc. For LiLa the Creative Common BY-NC-SA license is proposed for lessons (and quoted as URL). A different CC license can be chosen by the content provider. Other licenses (e.g. for commercial content) have to be provided by the content provider by upload of the license text. There will be predefined resources for common licenses like the proposed creative commons license.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint** Occurrence: Mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: Disallowed **Value String Constraint** Max occurrence: 0

Label	**Scientific Field**
URI	http://online-lab.org/terms/scientificField
Min occurrence	1
Max occurrence	0
Literal	No
Definition in LiLa AP	The LiLa AP provides a controlled vocabulary for annotating the scientific field. It is based on the categories from Wikipedia.
Comments and best practice examples	
Pica field for mapping	

LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint**
	Occurrence: Mandatory
	Vocabulary Encoding Scheme Constraint
	Occurrence: Optional
	Choose from: http://www.online-lab.org/scienticField/
	Value String Constraint
	Max occurrence: 0
	Syntax Encoding Syntax Constraint
	Occurrence: Disallowed
	Language Constraint
	Occurrence: optional

Label	**Subject**
URI	http://purl.org/dc/terms/subject
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Subject and keywords to describe the interaction package
Comments and best practice examples	The topics of the interaction package are specified using key words from different sources like PACS, etc.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal	**Value URI Constraint**
	Occurrence: Mandatory
	Vocabulary Encoding Scheme Constraint
	Occurrence: Optional
	Value String Constraint
	Max occurrence: 0
	Syntax Encoding Syntax Constraint
	Occurrence: Disallowed
	Language Constraint
	Occurrence: Optional

Label	**Education Level**
URI	http://purl.org/dc/terms/educationLevel
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	Describes the suggested educational level for a user to be able to make use of this lesson
Comments and best practice examples	The LiLa AP provides 4 different levels to education: school, undergraduate, graduate and scientific.
Pica field for mapping	
LOM field for mapping	
Value (Non-Literal)	**Value URI Constraint**
	Occurrence: Mandatory
	Vocabulary Encoding Scheme Constraint
	Occurrence: Mandatory

	Choose from	http://www.online-lab.org/educationLevel/
	Value String Constraint	
	Max occurrence	0

Label	**Duration**
URI	http://purl.org/gem/elements/duration
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	The recommended time needed to effectively use the entity being described.
Comments and best practice examples	Is not necessarily useful for media packages, but could be. It should be encoded using ISO 8061
Pica field for mapping	
LOM field for mapping	
Value (Literal)	**Syntax Encoding Scheme**
	Occurrence: Mandatory
	Choose from: http://www.online-lab.org/terms/ISO8061

Label	**Prerequisites**
URI	http://purl.org/gem/qualifiers/prerequisites
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	The designation of learning perquisites.
Comments and best practice examples	Perquisites a learner should have before using this lesson
Pica field for mapping	
LOM field for mapping	

Label	**Learning Objectives**
URI	http://online-lab.org/terms/learningObjective
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	The objectives a learner should have achieved after using the lesson.
Comments and best practice examples	
Pica field for mapping	
LOM field for mapping	

Label	**Teaching Method**
URI	http://purl.org/gem/qualifiers/teachingMethod
Min occurrence	0
Max occurrence	0
Literal	No
Definition in LiLa AP	The teaching method used in this lesson.

Comments and best practice examples	This properties denotes the teaching methods used in this lesson
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: mandatory Choose from: http://purl.org/gem/instance/GEM-TM/ **Value String Constraint** Max occurrence: 0

Label	**Grouping**
URI	http://purl.org/gem/qualifiers/grouping
Min occurrence	0
Max occurrence	0
Literal	Yes
Definition in LiLa AP	The group size which can use this lesson.
Comments and best practice examples	
Pica field for mapping	
LOM field for mapping	
Value(Non-Literal)	**Value URI Constraint** Occurrence: mandatory **Vocabulary Encoding Scheme Constraint** Occurrence: mandatory Choose from: http://purl.org/gem/instance/GEM-GRO/ **Value String Constraint** Max occurrence: 0

6 LiLa Portal Specific Information

The Lila Portal uses the gives additional information about the different fields. This information describes which properties get automatically generated, which are editable by the user and shows if a property must be set(mandatory), using it is recommend or may be provided optionally.

6.1 Olm classes

Table 21: Properties of the olm:Agent Class (Details see section 5.3)

Property Name	Auto. Gene.	Edit-able	Obligation
dcterms:type	yes	no	mandatory
foaf:name	yes	yes	mandatory
foaf:mbox	yes	yes	recommended

Table 22: Properties of the olm:BaseMetaData class(Details see section 5.4)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
dcterms:title	no	yes	mandatory
dcterms:description	no	yes	recommended
dcterms:creator	yes	yes	mandatory

Table 23: Properties of the olm:InteractionPackage Class(Details see section 5.5)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
dcterms:alternative	no	yes	optional
dcterms:language	yes	yes	mandatory
dcterms:contributor	no	yes	optional
dcterms:publisher	yes	yes	mandatory
olm:contact	yes	yes	mandatory
dcterms:rightsHolder	yes	yes	mandatory
dcterms:accessRights	no	yes	recommended
dcterms:license	yes	yes	mandatory
dcterms:format	yes	yes	recommended
dcterms:requires	no	yes	recommended
dcterms:isVersionOf	no	yes	recommended
dcterms:source	no	yes	optional
dcterms:issued	yes	no	mandatory
dcterms:modified	yes	no	mandatory
olm:interactionPackageType	no	yes	mandatory
olm:scientificField	no	yes	mandatory
dcterms:subject	no	yes	recommended
olm:usesRig	no	yes	mandatory

Table 24: Properties of the olm:MediaPackage Class(Details see section 0)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory

dcterms:alternative	no	yes	optional
dcterms:language	yes	yes	mandatory
dcterms:contributor	0	yes	optional
dcterms:publisher	yes	yes	mandatory
dcterms:rightsHolder	yes	yes	mandatory
dcterms:accessRights	no	yes	recommended
dcterms:license	yes	yes	mandatory
dcterms:format	yes	yes	recommended
dcterms:requires	yes	yes	recommended
dcterms:isVersionOf	no	yes	recommended
dcterms:source	no	yes	optional
dcterms:issued	yes	no	mandatory
dcterms:modified	yes	no	mandatory
olm:scientificField	no	yes	mandatory
dcterms:subject	no	yes	recommended
dcterms:educationLevel	no	yes	recommended
dcterms:duration	no	yes	recommended

Table 25: Properties of the olm:Rig Class (Details see section 5.7)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
olm:bookingSystemURL	no	yes	mandatory

Table 26: Properties of the olm:Requirement Class (Details see section 5.8)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
olm:resourceLocation	no	yes	optional

Table 27: Properties of the olm:Translation Class (Details see section 5.9)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
olm:translatedTo	no	yes	mandatory
dcterms:source	no	yes	mandatory

6.2 Lila Classes

Table 28: Properties of the lila:BaseMetaData Class (Details see section 5.10)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
dcterms:identifier	no	yes	mandatory

Table 29: Properties of the lila:InteractionPackage Class (Details see section 5.11)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
lila:deploymentPath	yes	no	mandatory
gemq:priceCode	yes	yes	mandatory
lila:hasSupportingMaterial	no	yes	recommended

Table 30: Properties of the lila:MediaPackage Class (Details see section 5.12)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
lila:deploymentPath	yes	no	mandatory
gemq:priceCode	yes	yes	mandatory

Table 31: Properties of the lila:SupportingMaterial Class (Details see section 5.13)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
lila:deploymentPath	yes	no	mandatory
dcterms:language	yes	yes	mandatory

Table 32: Properties of the lila:Agent Class (Details see section 5.14)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
dcterms:identifier	no	yes	recommended

Table 33: Properties of the lila:Translation Class (Details see section 5.15)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
dcterms:identifier	no	yes	recommended

Table 34: Properties of the lila:Activity Class (Details see section 5.16)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
dcterms:language	yes	yes	mandatory
dcterms:rightHolder	yes	yes	mandatory
dcterms:accessRights	no	yes	recommended
dcterms:licence	yes	yes	mandatory
olm:scientificField	no	yes	mandatory
dcterms:subject	no	yes	recommended
dcterms:educationLevel	no	yes	recommended
gem:duration	no	yes	recommended
gem:prerequisites	no	yes	recommended
olm:learningObjective	no	yes	recommended
gemq:teachingMethod	no	yes	recommended
gemq:grouping	no	yes	recommended

Table 35: Properties of the lila:Lesson Class (Details see section 0)

Property Name	Auto. Gene.	Edit-able	Has Value Constraints
dcterms:type	yes	no	mandatory
dcterms:language	yes	yes	mandatory
dcterms:rightHolder	yes	yes	mandatory
dcterms:accessRights	no	yes	recommended
dcterms:licence	yes	yes	mandatory
olm:scientificField	no	yes	mandatory
dcterms:subject	no	yes	recommended
dcterms:educationLevel	no	yes	recommended

gem:duration	no	yes	recommended
gem:prerequisites	no	yes	recommended
olm:learningObjective	no	yes	recommended
gemq:teachingMethod	no	yes	recommended
gemq:grouping	no	yes	recommended