DELOS WP5 – Task 5.4
Interoperability of eLearning applications with digital libraries
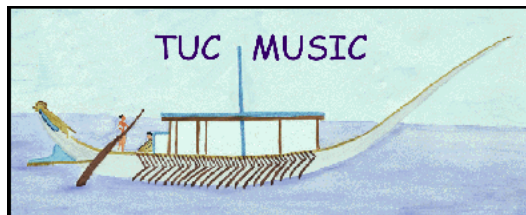
Polyxeni Arapi
xenia@ced.tuc.gr

Technical University of Crete/
Laboratory of Distributed Multimedia Information Systems and Applications (TUC/MUSIC)
http://www.music.tuc.gr

Partners involved

Technical University of Crete/
Laboratory of Distributed Multimedia
Information Systems & Applications
(**TUC/MUSIC**)

University of Bath
(**UKOLN**)

Ionian University
(I**U**)

DELOS WP5 Task 5.4 Interoperability of
eLearning Applications with Digital Libraries

Task objective

- Study the architectures, standards involved, and the interoperability requirements for the integration of eLearning applications on top of digital libraries

Motivation

- eLearning and eScience applications are very important applications that have to be supported on top of digital libraries.

- Implementation questions:
  - What are the major architectural requirements and the workflows for supporting effectively those classes of applications on top of digital libraries?
  - Design and implement appropriate tools.

- Digital library standards and eLearning/eScience standards have been developed independendly.
  - What are the major interoperability requirements?
  - Design and implement appropriate tools.

- In eLearning and eScience the audiovisual material and the 3D object representations are major resources for these applications.
  - What are the management requirements and tools for those kinds of objects?
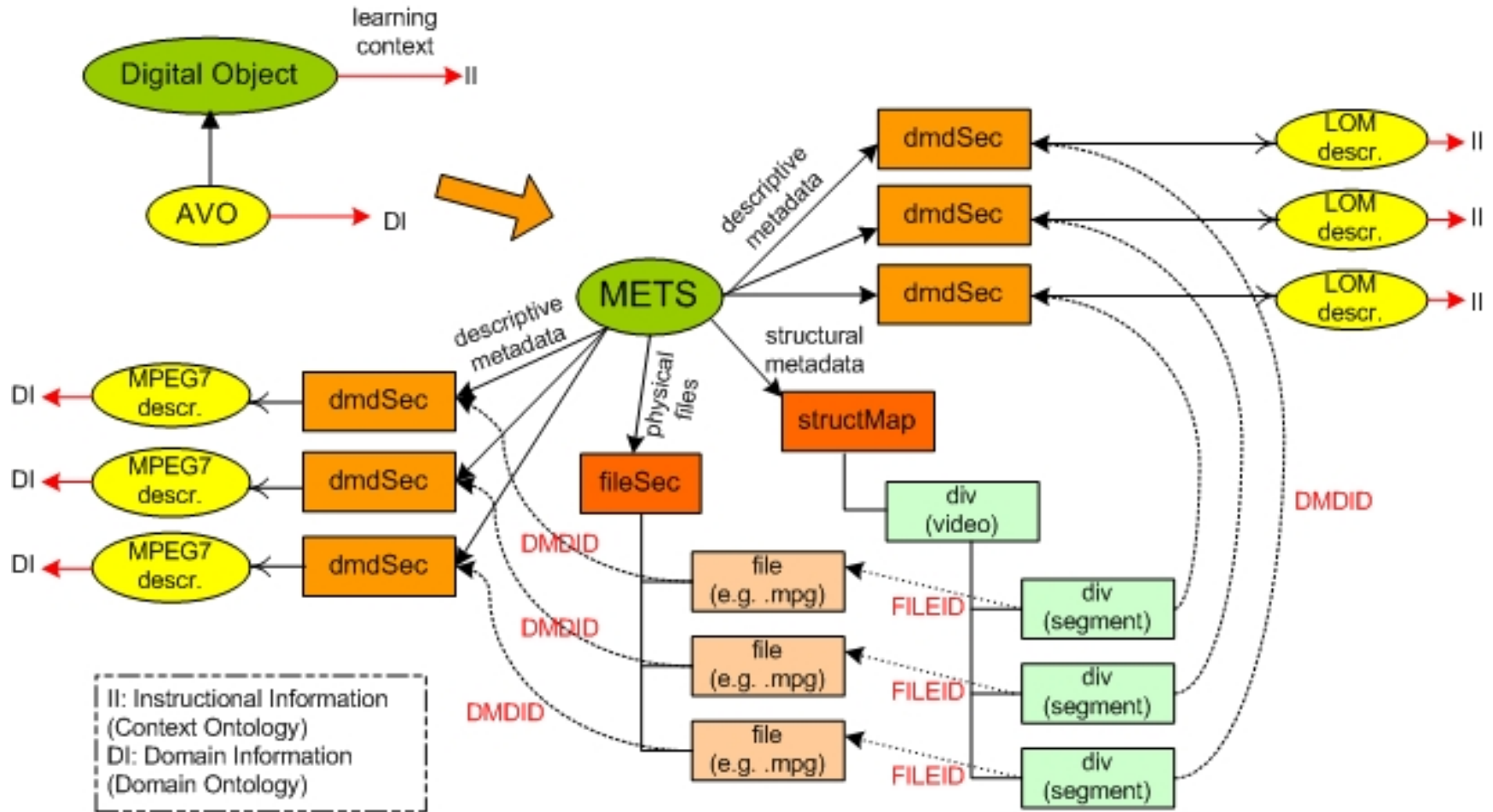
Motivation
The multilevel problem of interoperability
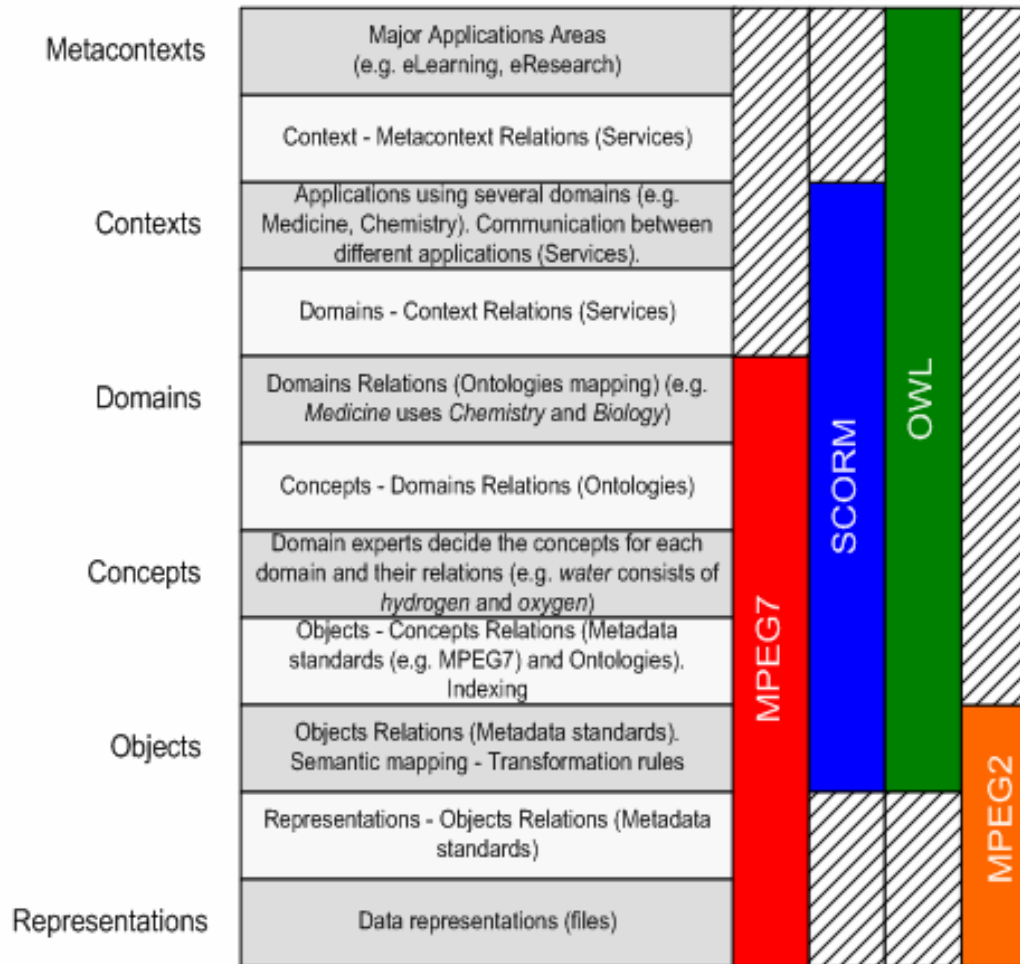
Supporting multiple-contexts views of digital objects
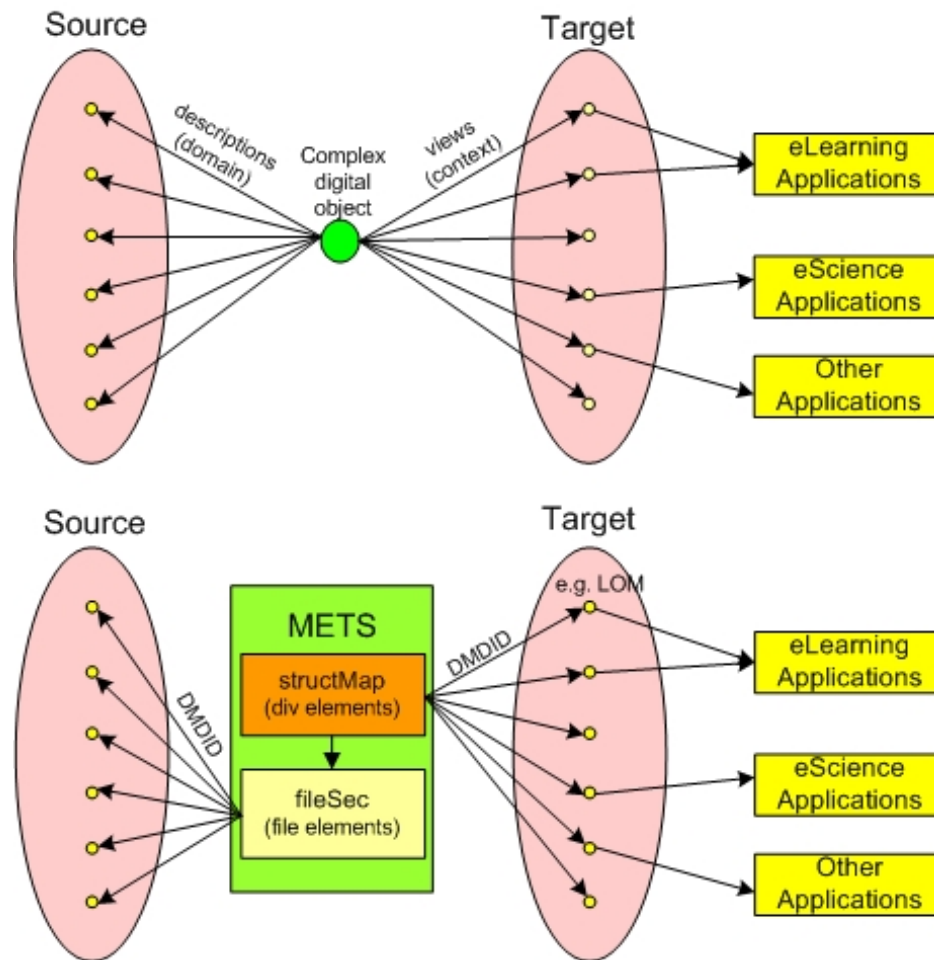
Supporting multiple-contexts views of digital objects (audiovisual learning objects)

[<<Back]

Interoperability architecture

DELOS All Tasks Meeting,
Paris, 30-31 Jan 2006
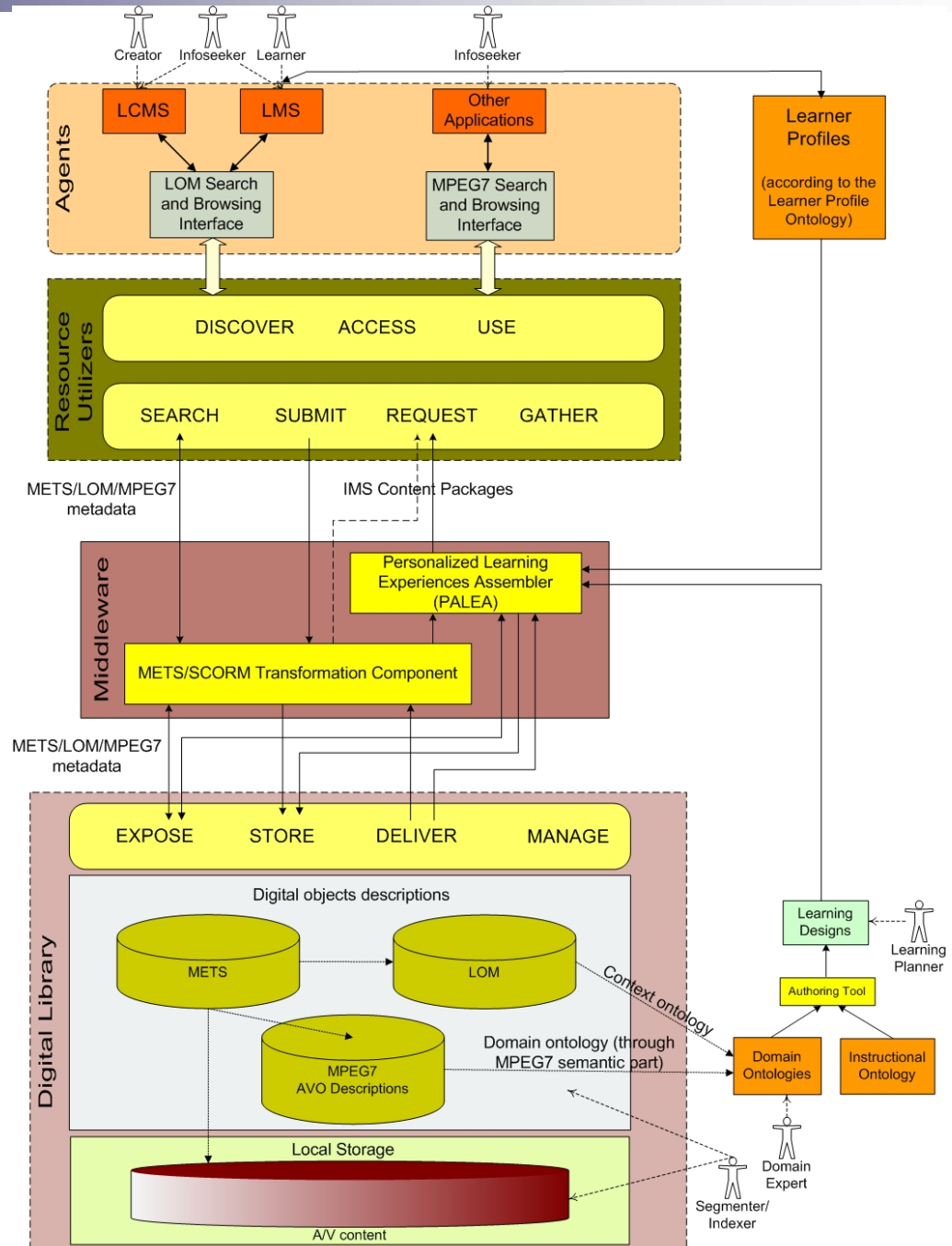
The instructional ontology
A model for the construction of abstract training scenarios
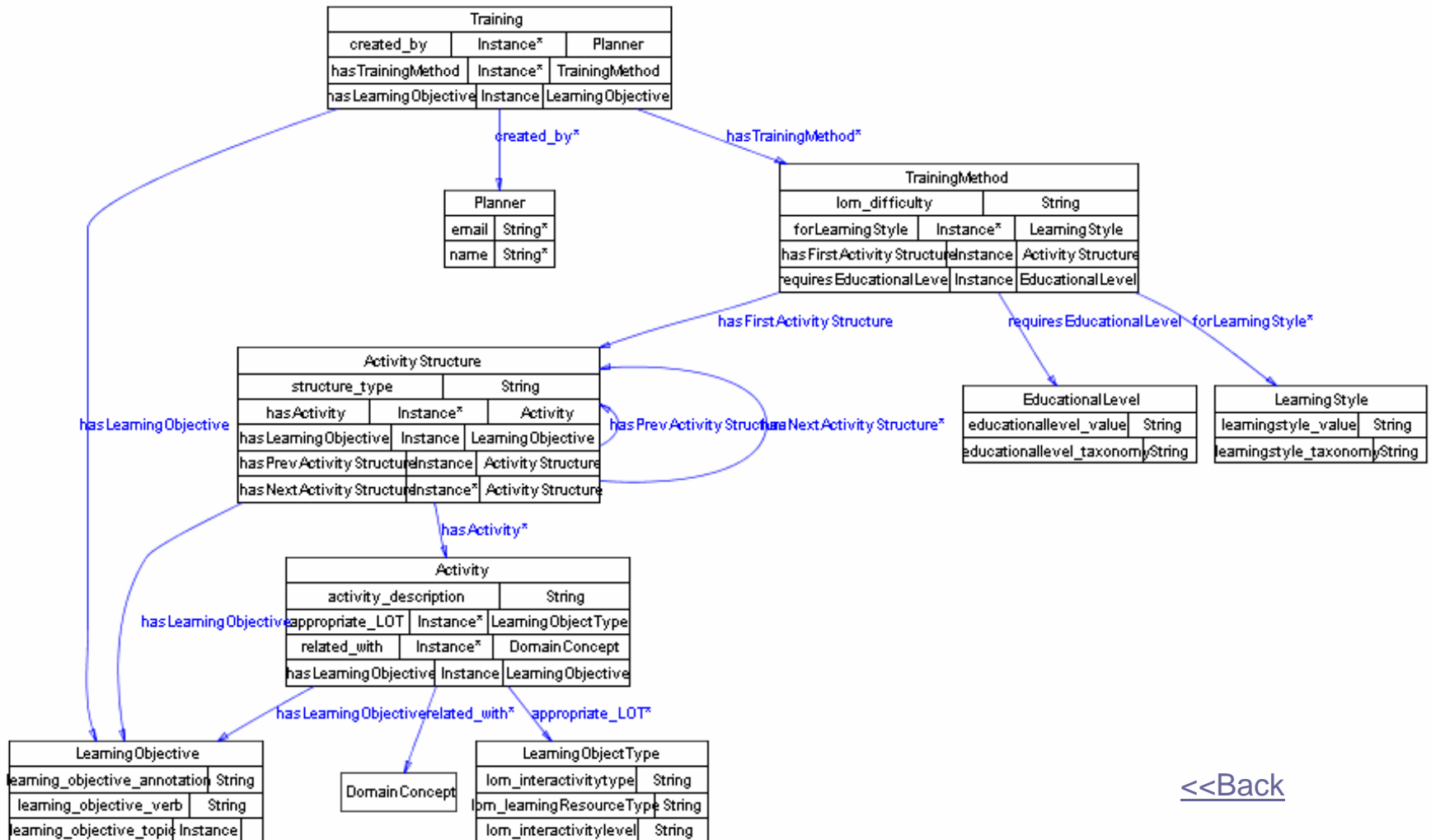
The Learner Information Model (LIM)

Identification — Identifier, Name, Content

Preference — Language, Learning Style, Learning Provider, Technical

WP5 T5.4 LIM

Goals — Goal, Learning Objective, Domain Taxonomy, Annotation, Priority, Status

Accomplishments, Previous Knowledge, Portfolio — QCL, Competency, Interest, Affiliation
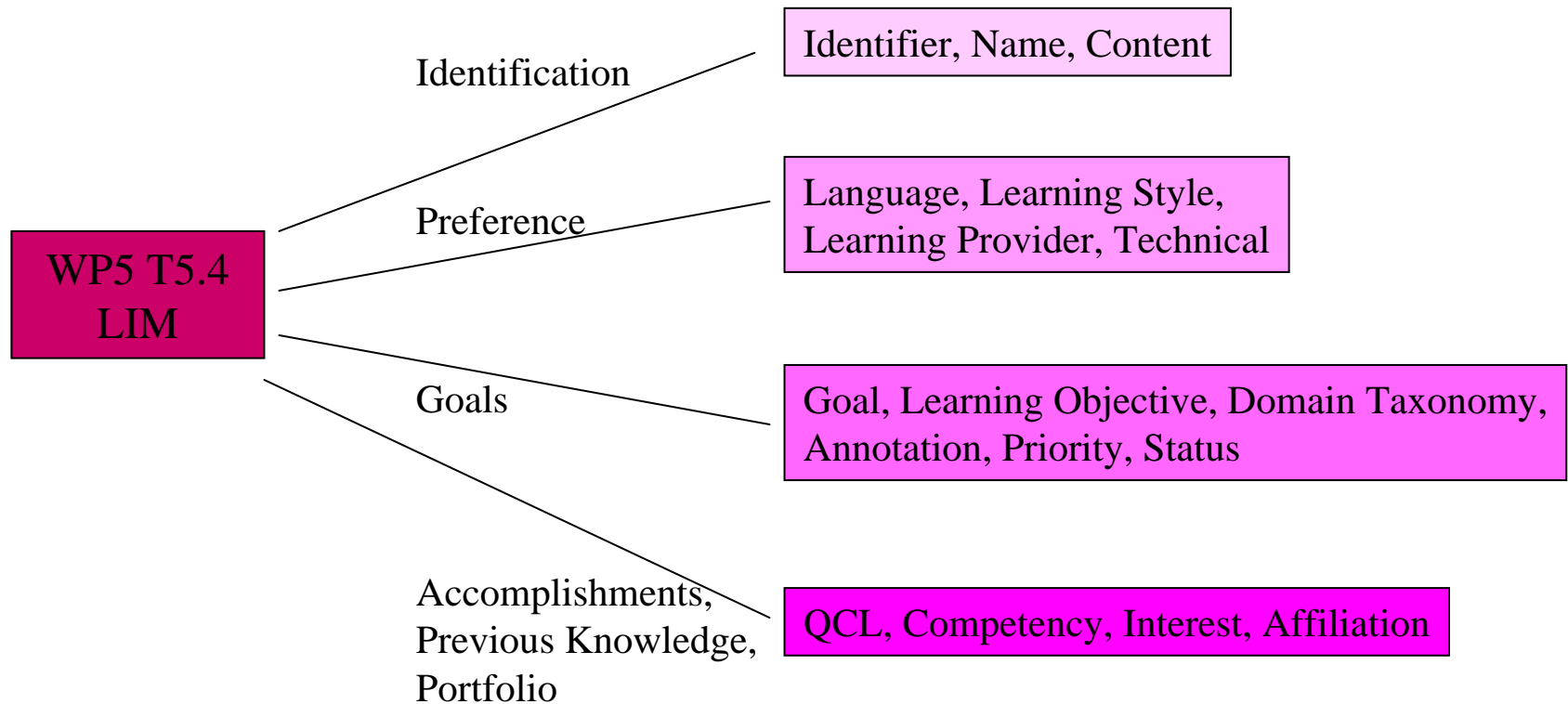
Results

- <u>Interoperability architectural framework and workflows</u> for integrating eLearning applications on top of digital libraries.

- It is an innovative architecture that provides:
  - □ An <u>interoperability model</u> based on the major digital libraries standards and eLearning standards for the support of those applications.
  - □ A workflow model for the construction of abstract training scenarios (learning designs)- <u>instructional ontology</u> (OWL). (pedagogy separated from content)
    - Reusability of learning designs.
    - Provision of "real" personalized learning experiences.

- Development of specific mappings for interoperability of audiovisual standards (MPEG7) with eLearning standards (SCORM).

- Development of a <u>Learner Information Model</u> taking into account the eLearning standards of learner profiles.

- The components of the demonstrator architecture are being implemented (METS/SCORM TC already implemented).

- Proposal IU,TUC to Greek National TV (ERT) has been approved.
  - □ Using selected material to provide eLearning experiences.

Results (cont'd)

- An IST EU STREP Project (LOGOS) based on the architectural concepts developed in this task has been approved.

- An interactive ontology editor and ontology mappings tool for OWL has been implemented (GraphOnto).
  - Used in several DELOS tasks (in WP3 and WP5)
  - It is offered through the DELOS Web site (Universities outside DELOS have also obtained it).
  - It is being extended to provide full ontology mappings and query mappings.

- Models for supporting semantic 3D information to be used in a variety of eScience applications have been derived and functionality requirements investigated (paper).
  - Development of two ontologies for 3D scenes, based on formal and de facto standards.
  - Available on DELOS WP3 testbeds and demonstrators site for downloading: http://atlas.ced.tuc.gr/delos/

Results – Publications (2005-2006)

- Arahova, A., Kapidakis, S.: Empowering Our Libraries, *Empowering Our Education System: Using the Research Results for Implementing Not the best, but the Most Effective Policy for School Libraries*. IFLA (International Federation of Libraries Associations) Conference, August 14-18, 2005, Oslo, Norway.

- Christodoulakis, S., Arapi, P., Moumoutzis, N., Patel, M., Kapidakis, S., Arahova, A., Bountouri, L.: *Interoperability of eLearning Applications with Audiovisual Digital Libraries*. DELOS poster session in conjunction with ECDL 2005, September 2005, Vienna, Austria.

- Tsinaraki, C., Polydoros, P., Christodoulakis, S.: *GraphOnto: A Component and a User Interface for the Definition and Use of Ontologies in Multimedia Information Systems*. In Proc. of AvivDiLib 2005, pp. 99-102.

- Kalogerakis, V., Christodoulakis, S., Moumoutzis, N.: *Coupling Ontologies with Graphics Content for Knowledge Driven Visualization.* IEEE Virtual Reality International Conference, March 2006, Virginia, USA (to appear)

Integration activities

- Two T5.4 coordination meetings have taken place:
  - ☐ Crete-Heraklion (on 13/5/2005) hosted by FORTH, and
  - ☐ Vienna (on 23/9/2005) hosted by TUV.
- Several other informal meetings have taken place between the Greek partners (TUC/MUSIC and Ionian University).
- A researcher exchange has been realized in the scope of the project.
- A number of internal deliverables have been produced covering the objectives of the task, achieving better collaboration between the partners, better organization and flexibility.

Next steps

- Provide an integrated demonstrator based on the architecture of the eLearning applications and evaluate its functionality.

- Extend the functionality of GraphOnto and provide query mappings.

- Evaluate the editor.

- Study the architectures and tools needed to support semantic 3D objects in digital libraries in order to support eLearning and eScience applications.

JPA3

- Development of an Earth Sciences' digital library according to the T5.4 eLearning environment for the provision of eLearning in Geography.
  - Geography domain ontology
  - Population of the classes of the geography domain ontology, based on the courses to be developed.
  - Creation of a digital library of geography learning material, based on the interoperability architecture developed in JPA2,
    - Digitizing and segmenting selected material from the Greek National TV archives.
    - Indexing of the material using the enriched geography domain ontology.
  - Abstract training scenarios for geography teaching (based on secondary school curricula) based on the instructional ontology of T5.4.

- Semantic description and interoperability of 3D objects and 3D scenes with eLearning and other digital library applications.
  - As hardware and software capabilities in graphics are continuously improving, the number of 3D models available in online repositories is growing dramatically.
  - These objects may be associated with domain semantics and then used in elearning experiences in various fields such as science, culture, history etc.

Thank you for your attention!!

Questions??

DELOS WP5 Task 5.4 Interoperability of
eLearning Applications with Digital Libraries

The SCORM Content Aggregation Model/ Content Packaging