# E-Learning and the Digital Library:

# Opportunities for Collaboration

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# Presentation Overview

- Why should E-Learning standards matter to the Library?
- Strategic Issues/Opportunity
- About IMS
  - Organization
  - Specifications
  - Collaborators
- IMS and Digital Library Convergence Points
- Q&A

# Why should e-learning standards matter to the library?

Case of MIT:

MIT's Open Courseware Initiative needs a digital repository for their course materials.

Should they use IMS specs to interoperate with LMS vendors, or METS to interoperate with library digital repositories, both, neither?

# Strategic Issues and Opportunity

Issues

- E-learning systems are expanding across the enterprise.
- Interoperability with the library is a requirement.
- Content scaling issues (archival access, large collection access, cataloging etc.) will become critical.

Opportunity

- Collaboration between E-learning and Digital Library groups creating specifications for interoperability can
  - Leverage expertise
  - Increase interoperability
  - Provide greater value to shared constituencies

# About IMS

Non-profit worldwide consortium

- 54 contributing members
- 75 developers network members
- Sectors represented: Standards bodies, Domain consortia, Learning providers, Government agencies, Content providers, Technology vendors, Researchers, Labs & Test beds

Creates e-learning specifications

Fosters collaboration between e-learning constituencies focused on specific segments of the market (K-12, HE, Training)

# IMS Contributing Members
## (a partial list)

- ADL, UKeUniversities, Ufi, U-Cal Berkeley
- Industry Canada, MIT, Giunti Interactive Labs, Fretwell-Downing, Thomson Learning
- Apple, Microsoft, Oracle, Cisco, IBM, Sun
- Saba, NetG, Can Studios, Question-Mark
- Blackboard, WebCT, CIC
- SCT, Eduprise, EDUCAUSE, PeopleSoft
- BECTa, JISC, DEST, Open University, ETS
- Texas Instruments, Boeing… and more.

# E-Learning Specifications

*Completed Specifications*

**Content Packaging**

**Meta-Data**

**Enterprise**

**Learner Information**

**Question and Test**

*Specifications in Progress*

**Simple Sequencing**

**Digital Repositories**

**Learning Design**

**Accessibility**

# Content Packaging (v1.1.2)

Provides a way to package learning information and meta-data:

- Packaged Learning Objects
- Bundled Question and Test Objects
- Learning Information Packages
- Sequencing Information
- Learning Design Support

# Meta-Data (v1.2.1)

A structured way to add information to content to facilitate search and delivery:

- Organized into 13 types of information
- Extensible to include new elements
- Now standardized by the IEEE's Learning Object Metadata standard

# Enterprise (v1.1)

Facilitates the transfer of organizational information about students and groups:

- Support for record synchronization
- Defines a person and group membership
- Demographics
- Growing international support

# Learner Information (v1.0)

Used to manage  a learner's profile (and as such it complements the IMS Enterprise specification).

Provides a means to describe a person and collect information about them:

- Can also describe content developers, etc.
- Specify affiliations and groups
- Manage identity and identifiers
- Future support for accessibility-based preferences

# Question and Test (v1.2)

Comprehensive support for the description and delivery of online tests:

- Support for question banks and random tests
- Strong multimedia support
- Selection and ordering
- Scoring calculations
- Result reporting

# Simple Sequencing

A means to specify the sequencing of learning content:

- Support for flow and choice
- Limited support for adaptive learning
- Score rollups
- Integrates with content packaging
- Final Release due January 2003

# Digital Repositories Interoperability (DRI)

Provides a basic interface recommendation to allow the following operations:

- Federated data-base architecture
- Search / Retrieve / Update
- Based on XQuery and Z39.50
- Final specification due by end of 2002

# RDCEO v1.0

The ‘Reusable Definitions for Competency and Education Objectives (RDCEO)’ specification was issued in October 2002. It supports:

- A package for competencies
- Portable competency definitions
- Relationships to taxonomies
- Prerequisites and conditionals
- Separating completion from evaluation

# Learning Design

Provides a means to specify:

- Roles and participants
- Resources needed
- Instructional design approach
- Integrates with content packaging
- Final specification due by end of 2002

# Accessibility

Work is now complete on the “Guidelines to Developing Accessible Learning Applications” - see IMS website

http://www.imsglobal.org/accessibility/index.cfm

Currently working on Accessibility issues in the IMS LIP specification.

Investigating new work on Accessibility Meta-data.

# DRI Spec: Use Cases Categories

Create and Modify Resources

Discover Resources

Notification of Modification of Resources

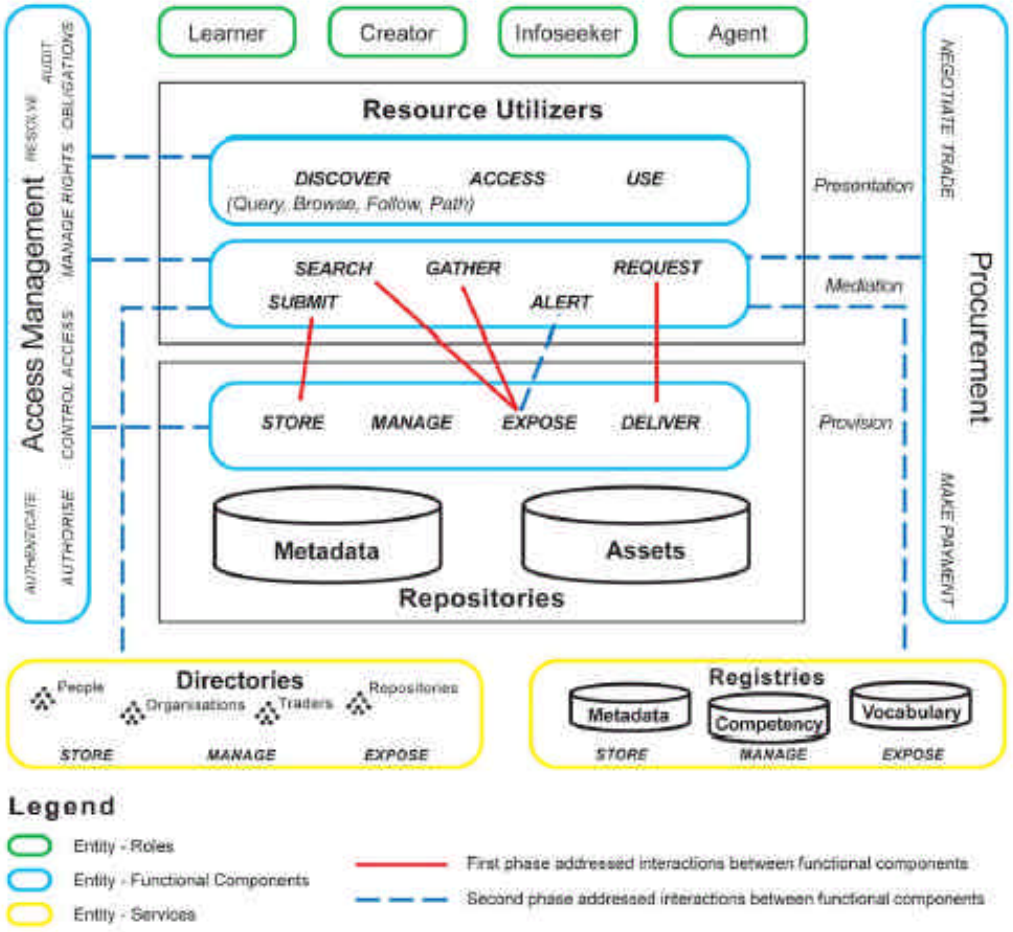
# DRI Spec: Discovery Scenarios

A user (or software agent) searches a repository directly

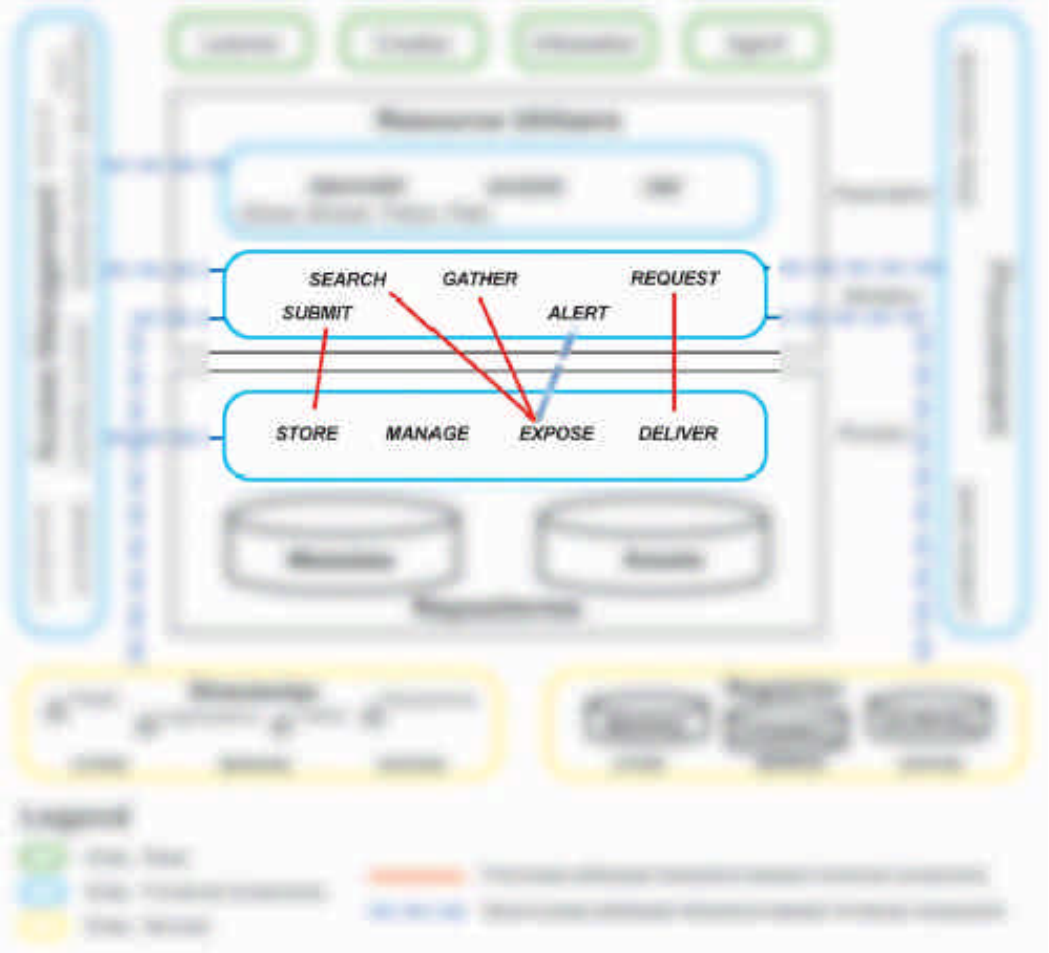
A user conducts a search across repositories via a search gateway intermediary (acting as a translator)

A user conducts a search across repositories via an intermediary (acting as an aggregator)

# Functional Architecture



# Phase 1 Scope



# Key Decisions Since DRI Base Doc Approval

- Alert/Expose out-of-scope
- Submit/Store addresses only content packaged learning objects
- Request/Deliver addresses only electronic access

# IMS DRI Public Draft v1.0

- Integration of online information services with e-Learning provision
- Define interface to next-generation repositories for Learning Objects

# DRI Spec: Proposed Future Work

Development of a cross-domain minimal search grammar (e.g. subset of XQuery)

Alert/Expose – define service

Request/Deliver - extend service

# Future IMS Specs

Possible future work being discussed in IMS right now includes:

- Digital Rights Management
- Adaptive Testing
- Expanded Competency Management
- Accessibility Preferences

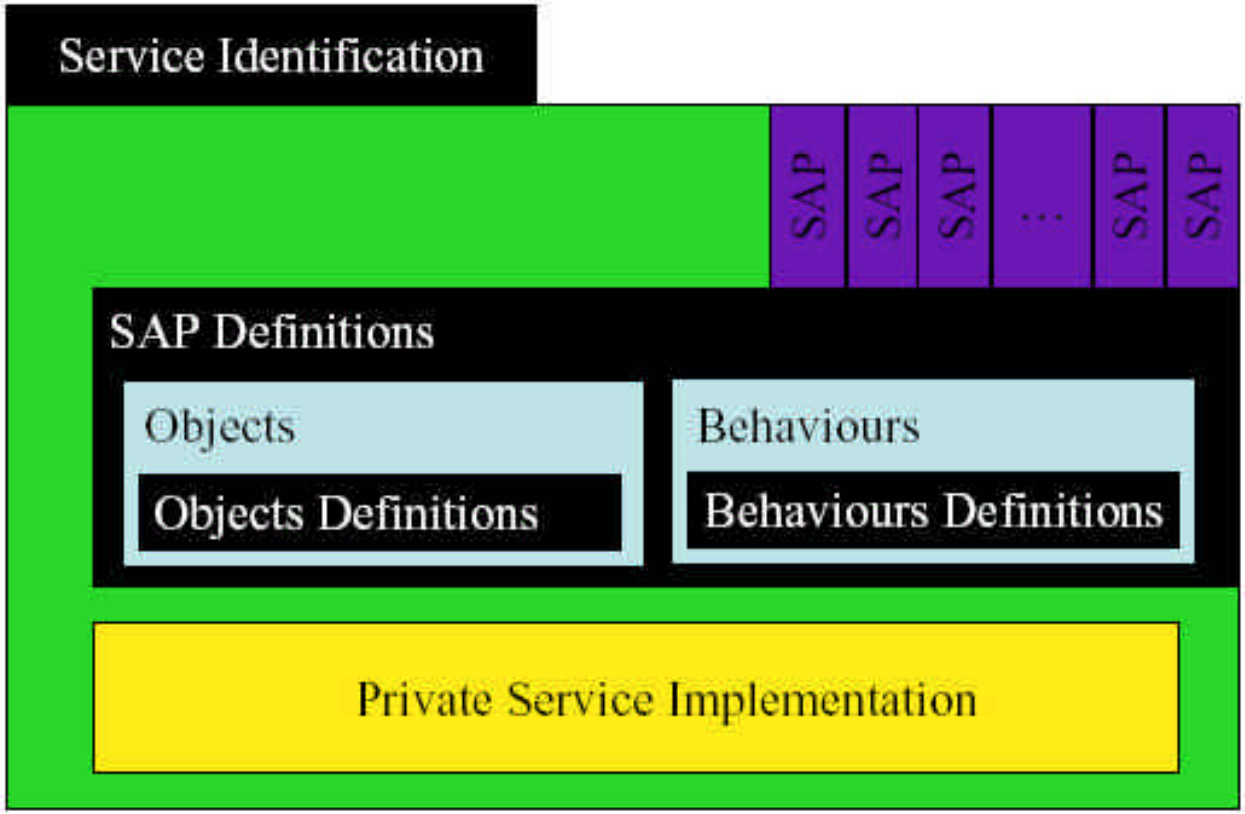
# Future IMS Specs (cont'd)

Going beyond "data interoperability"

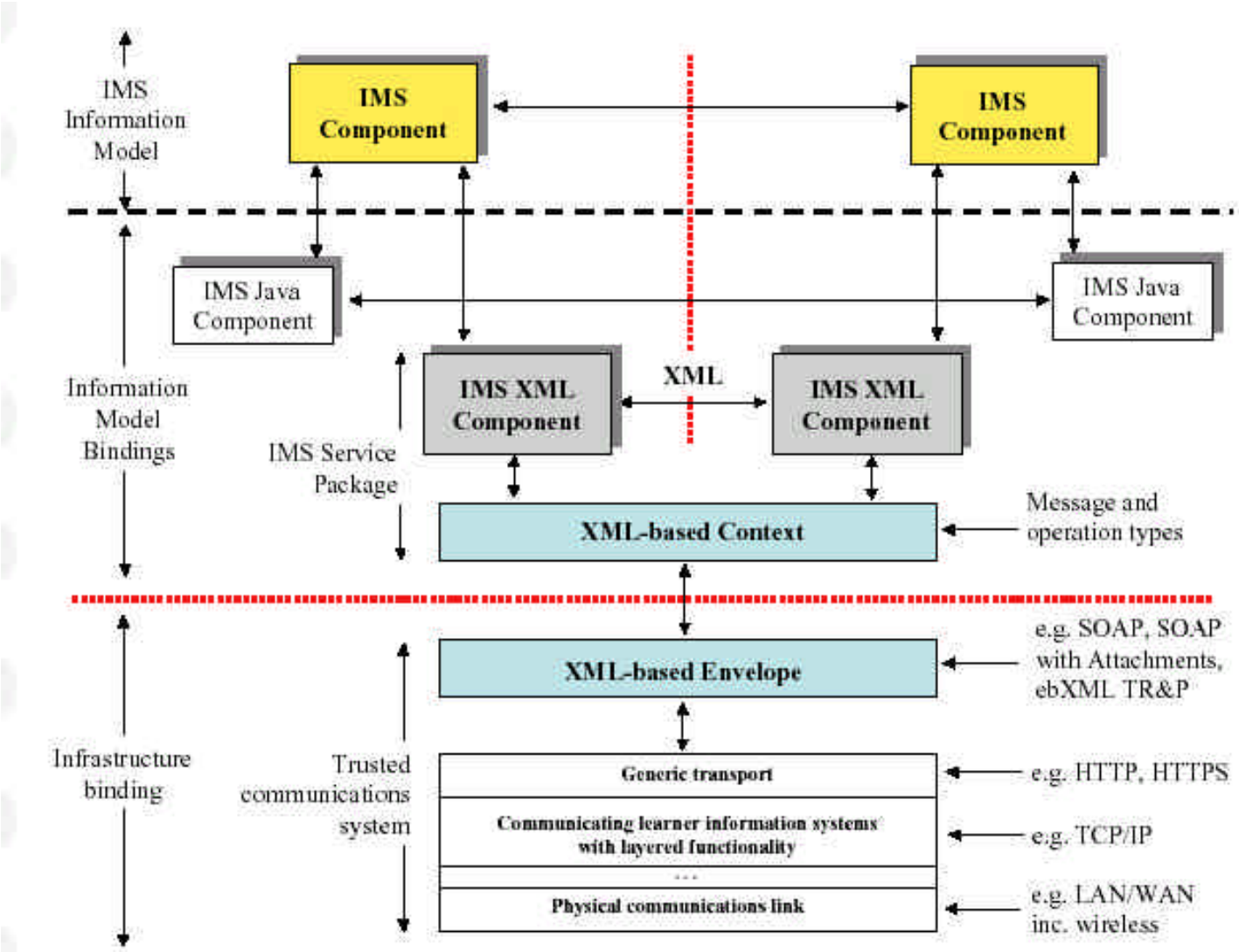
Supporting interoperable behaviors via interfaces, such as Java, Javascript, Web Services, etc.

Guided by a strategic technical plan based on a service model and abstract framework

# IMS Service Access Point (SAP) Model



# IMS Abstract Framework Layers



# Current Collaborators

Advanced Distributed Learning Initiative (ADL)

Schools Interoperability Framework (SIF)

Open Knowledge Initiative (OKI)

# ADL

Joint White House/Department of Defense initiative

Shareable Content Object Reference Model (SCORM) is ADL's primary focus

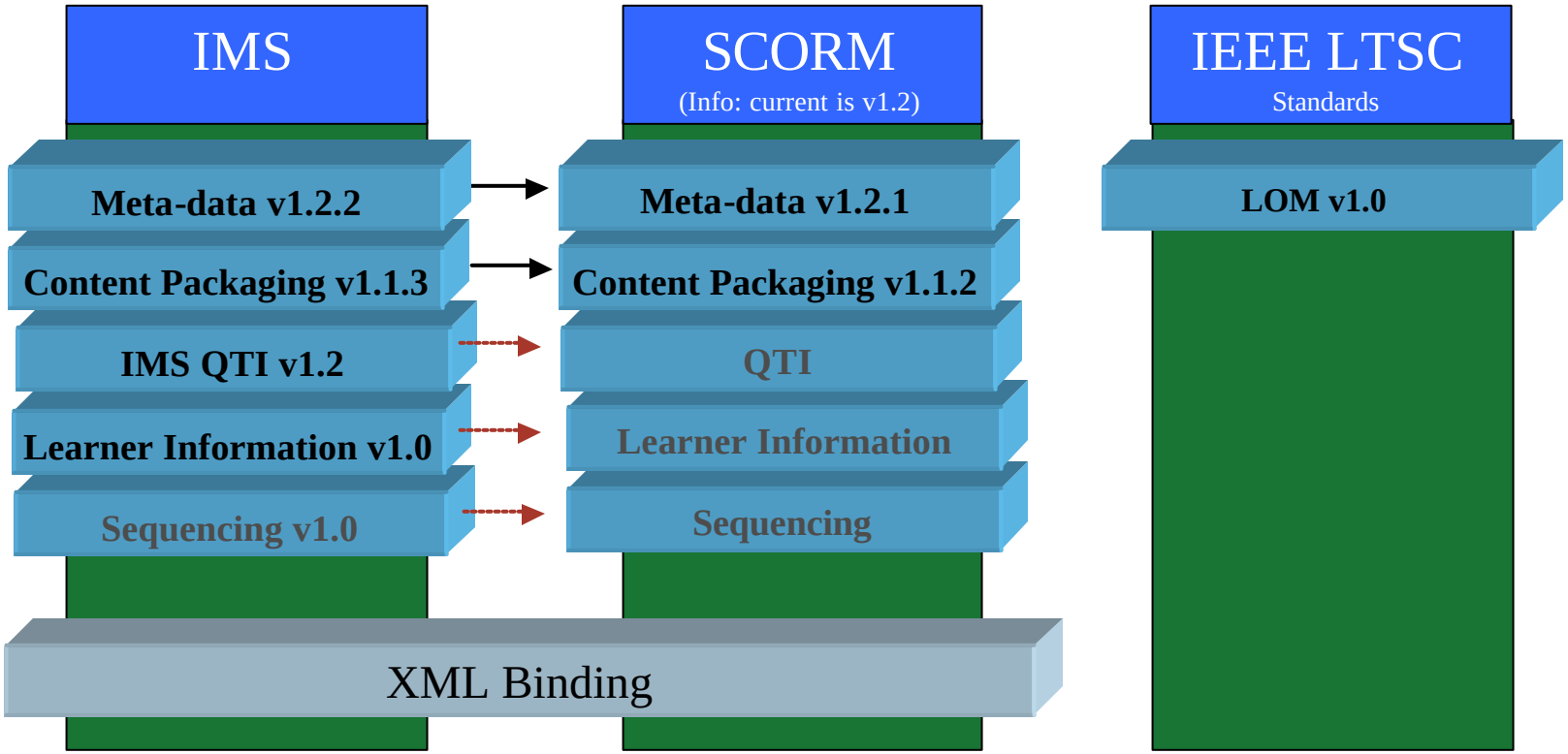
SCORM defines a model for packaging learning content and a Javascript-based API to enable communication between learning content and the system that delivers it

# ADL and IMS

ADL uses the following IMS Specs:

- Content Packaging
- IMS Meta-Data binding
- IMS Simple Sequencing

# ADL and IMS

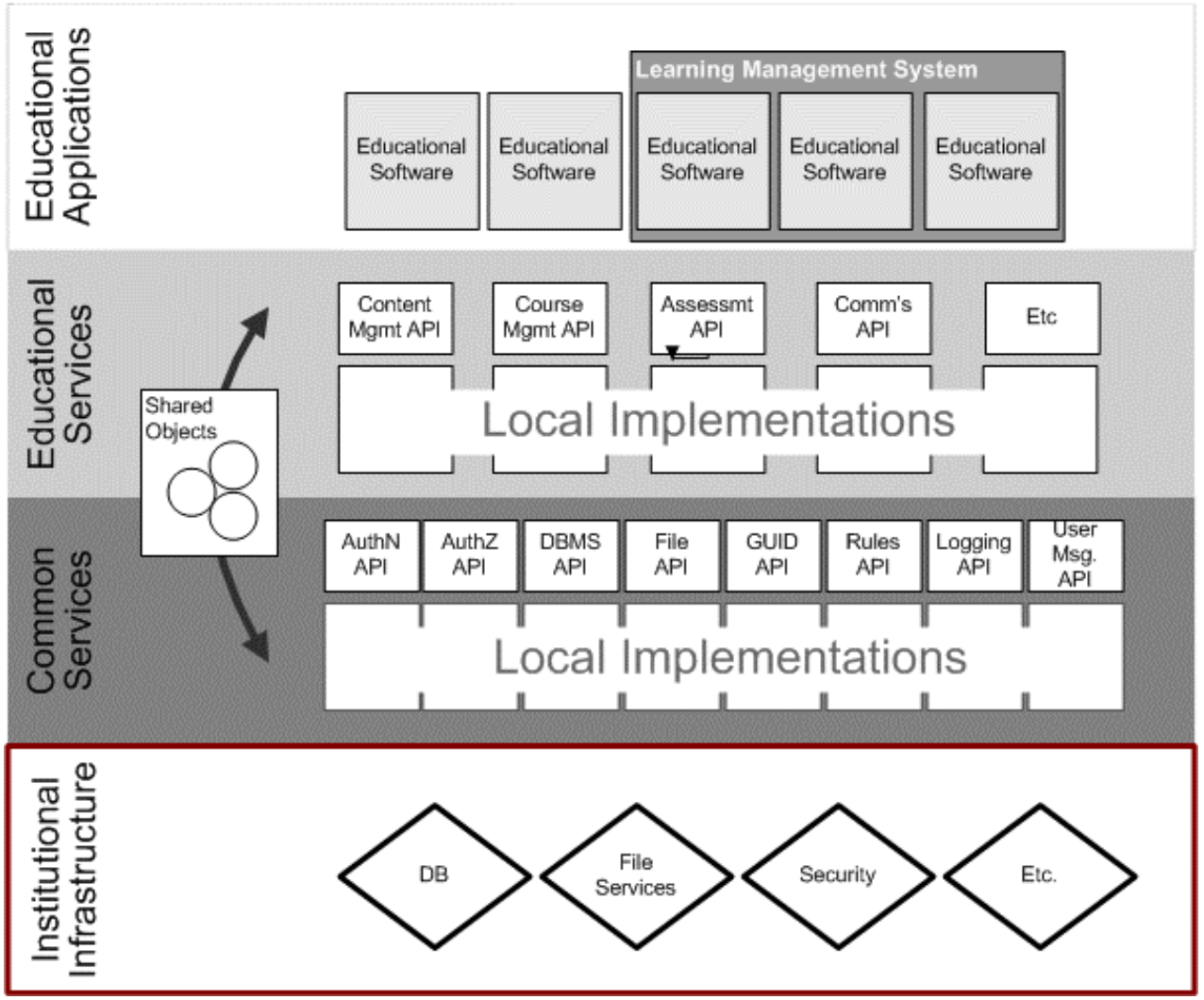


# OKI

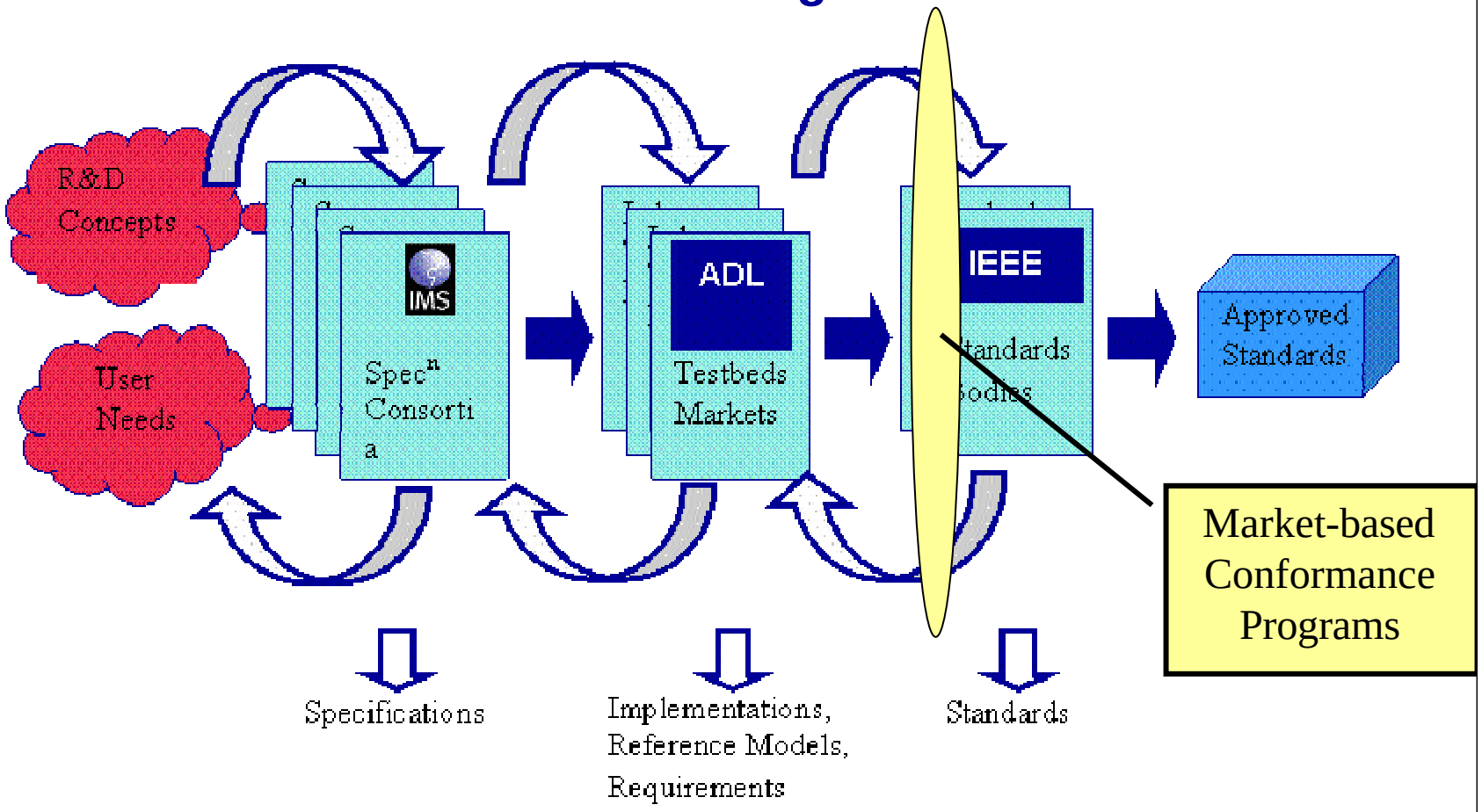
OKI is defining an open and extensible architecture for learning technology that is specifically targeted for higher education

OKI provides detailed specifications for interfaces among components of a learning management environment, and open source examples of how these interfaces work

# OKI Architecture



# A Collaborative Development Model for Formal Learning Standards



# IMS and Digital Library Convergence Points

Items for Discussion:

Viewing e-learning specs as  a special purpose use case.

How might IMS specs intersect with Library efforts, and how might we collaborate to mutual benefit?

# IMS and Digital Library Convergence Points

Libraries have a tradition of collaborating with specialized groups (e.g. meta-data for geospatial data, video data, image data)

Should the library view e-learning as a special purpose use case?

# IMS and Digital Library Convergence Points

Unique needs of e-learning community:

- Content Sequencing
- Discovery Meta-data
- Digital Rights

# IMS and Digital Library Convergence Points

Common needs of e-learning and library communities:

- Web Service based Query Mechanisms
- Long-term Preservation
- Infrastructure Frameworks

# IMS and Digital Library Convergence Points

Example of content packaging strategies:

- Wrap one specification package with another
- Translate one specification package into another

Remember: Internal data structure not same as transmission package structure

# Q & A / Discussion

Both the E-Learning and Library Communities can benefit from interoperability with one another.

What are the options for collaboration?

- Appoint Liaisons
- Exchange Requirements
- Organize Strategy Sessions
- Initiate Joint Projects