PlanetDR: a multi-interoperable content repository

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Outline

• Introduction: Planet Digital Repository (PlanetDR)
• Interoperability Mechanisms and their Development in PlanetDR
  – Standards: IMS DRI and the ECL, LORI SQI
  – Repository Federation
• PlanetDR Search Services
• Conclusion
Introduction: Planet Digital Repository

- Ubiquity of computing networks is making distance learning and accessibility to high quality materials possible.
- Appearance of different standards for interoperability between organizations. Implementations come later.
  - Content labeling – LOM
  - Packaging and browsing of contents – SCORM
  - Remote search – LORI SQI
  - Remote search and content gathering – IMS Digital Repositories
Introduction (2): Planet Digital Repository

• Current scenario:
  – Most implementations are proprietary.
  – Need for a common mechanism for repository federation.

• Planet Digital Repository’s objectives:
  – Implement an open source repository for digital educational content.
  – Support of representative interoperability standards and educational content types.
  – Federation of repository servers to enhance the interoperability and content reusability.
Interoperability Standards

- **Educational Content Standards**
  - Learning Object Metadata (**LOM**)
  - IMS Content Packaging (**IMS CP**)  

- **Content Repositories Interoperability Standards**
  - IMS Digital Repository Interoperability (**IMS DRI**)  
  - Learning Object Resources Interoperability Simple Query Interface (**LORI SQI**)
Interoperability Standards – IMS DRI & ECL

- **IMS DRI** provides recommendations for interoperating between the most common repository functions.

- IMS DRI functions defined as **web services**:
  - Search/Expose (XQuery), Submit/Store (not FTP), Request/Deliver, Gather/Expose.

- **ECL** (eduSource Communication Language) is an implementation of IMS DRI
  - Provided by means of an **eduSource connector**
  - It provides a **standard API** to connect an existing repository to the eduSource network.
Interoperability Standards – LORI SQI

- **LORI SQI** is an open, collaborative effort to achieve interoperability between learning object repositories.
  - Official CEN/ISSS Workshop Agreement.
  - Collaboration of excellence network ProLearn.
- Provides a very simple specification to become rapidly implemented and deployed, that enables to perform very simple keyword-like searches.
  - Increasing interest in Europe because of its simplicity.
  - Keyword search example:
- Defined as web services.

```xml
<simplequery>
  <term>keyword1</term>
  <term>keyword2</term>
  ...
</simplequery>
```
PlanetDR: Interoperability Standards

- Educational object types: LOM, IMS CP
- Interoperability standards:
  - IMS DRI by means of ECL implementation. Interoperation with other IMS DRI implementations and with eduSource repository network. Query syntax: XQuery; Result syntax: LOM
  - LORI SQI. Stateless and synchronous services are supported. Query syntax: VSQL; Result syntax: LOM
    http://ariadne.cs.kuleuven.be/SqIInterop/free/SQIImpIementationsRegistry.jsp
- Development effort:
  - IMS DRI. Long time and with collaboration of eduSourceCanada.
  - LORI SQI. Few time and easily implemented.
Interoperability & Repository Federation

• Features:
  – **Content discovery.** Any available content throughout the federation.
  – **Content sharing and retrieval.** According to the local repository authorization and rights.
  – **Flexibility.** Different implementations coexisting with current systems.

• Alternatives:
  – **Central Directory Service** *(bottleneck!).*
  – **Distributed Directory Service** *(repository awareness).*

• Problematic federation scenarios:
  – Repositories follow **different standards**.
  – Repositories follow the same standard but with **different query and result syntaxes**.
We need mechanisms to effectively interconnect these repositories!

Remarkable initiatives:
- CORDRA
- GLOBE
  - ARIADNE (Europe)
  - Education.au (Australia)
  - eduSource Canada
  - MERLOT (US)
  - NIME (Japan)
- FIRE
PlanetDR: Repository Federation

- Later: a pure peer-to-peer repository federation.
  - **Federation mode.** Employ **DERMI**, a middleware based on FreePastry peer-to-peer protocol. DERMI services:
    - Decentralized naming service.
    - Remote object notification mechanism.
  - Provided **repository awareness**.
  - **Plug & play decentralized management** of PlanetDR compatible servers.
    Join/Add, Leave/Remove, List.
Another interesting alternative: a p2pWeb repository federation.

- **p2pWeb:**
  - Bring all the benefits and unused resources of edges of the Internet to the mature and standard world of Web applications and services.
  - Although the web scenario is more complex and decoupled than in a traditional peer-to-peer scenario.
  - Web servers would be peers: stability, reliability, availability.

- We believe that our p2pWeb model could be suitable to create enhanced repository federations.

- Proof of concept: Moodle Share, to interconnect Moodle servers around the world. [http://planet.urv.cat/p2pweb/](http://planet.urv.cat/p2pweb/)

- Repository federation is still an open problem!
PlanetDR Search Services

- PlanetDR includes the following search services
  - Quick search
    - Keyword found in any metadata field
  - Advanced search
    - Search by main meta-data category. Any LOM meta-data field can be specified.
    - Accumulated search. Searching for any field, linking together conditions of different LOM categories.
  - Federated search
    - Results are gathered from all active compatible content servers (it acts as a simulated Gather service).
Conclusions

• We have presented the Planet Digital Repository.
• A result from Planet research project: Augmented Collaborative Platform for content distribution and advanced training.
• Internationalization, different educational object types and interoperability standards supported.
• Repository federation to enhance this interoperability.
• p2pWeb model as new scenario for enhanced server federation.
• Fully downloadable source code (LGPL License)
  – http://sourceforge.net/projects/planetdr
• Interested parties
  – eduSource Canada, Colombia, Ecuador, Mexico
  – Spain: MOREA (Santiago de Compostela), UCAM (Murcia), URV
Thank you very much!

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