Building a Heterogeneous Network of Digital Libraries on the Semantic Web

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Presentation outline

• Motivations
• What are Semantic Digital Libraries
• JeromeDL – a Semantic Digital Library
• MarcOnt Initiative
  – MarcOnt Ontology
  – MarcOnt Mediation Services
• Extensible Library Protocol
• Conclusions
• Future Work
Motivations
What is a Semantic Digital Library?

Semantic digital libraries

– integrate information based on different metadata, e.g.: resources, user profiles, bookmarks, taxonomies

– provide interoperability with other systems (not only digital libraries) on either metadata or communication level or both

– delivering more robust, user friendly and adaptable search and browsing interfaces empowered by semantics
Different Kind of Libraries (Evolution of Libraries)

- Classic libraries
- Scientific libraries
- Digital libraries
- Semantic libraries
How are Semantic Digital Libraries different?

Semantic digital libraries extend digital libraries by:

– describing and exposing its resources in a machine ‘understandable’ way

– resources can be
  • contents, digital artefacts
  • organization of objects (e.g. collections)
  • users, user communities
  • controlled vocabularies, thesauri, taxonomies

– expose the semantics of their metadata in terms of an ontology
  • defined using a formal language

– deliver mediation services for communication with other systems
The two main benefits of Semantic Digital Libraries

• new search paradigms for the information space
  – Ontology-based search / facet search
  – Community-enabled browsing

• providing interoperability on the data level
  – integrating metadata from various heterogeneous sources
  – Interconnecting different digital library systems
JeromeDL - Introduction

- Joint effort of DERI International and Gdansk University of Technology (GUT)
- Distributed under BSD Open Source license
- Digital library build on semantic web technologies to answer requirements from: librarians, scientists and everyone.
- A successor for prototype semantic digital library – Elvis-DL build at GUT
JeromeDL – Semantic Digital Library

- Digital Library build with semantics and communities in mind
- Build to reflect requirements of:
  - Librarians
  - Researchers
  - Average users
- Ultimate goal – accessibility achieved through
  - Interface design
  - Search and browsing technologies
  - In-depth internationalization effort
These all can be represented in RDF

@InProceedings { jeromedexa2005,
  author = "Sebastian Ryszard Kruk and … ",
  title = "{JeromeDL - Adding Semantic Web Technologies to DLs}"
}
MarcOnt Initiative – Overview

- Goal: utilize the existing, legacy metadata in semantically enabled libraries
- Delivers ontology that covers concepts from MARC21, BibTeX and DublinCore
- Provides interoperability services to communicate with other entities using legacy metadata
MarcOnt Ontology – Main Concepts

Material

- hasCreator
- hasDomain
- hasKeyword

Marc21Description

Domain

foaf:Agent

wnet:LexicalConcept
MarcOnt Mediation Services for Legacy Metadata
Extensible Library Protocol (ELP)

- Query among semantic digital libraries
- Maintain as much of bibliographic information as possible
- MarcOnt ontology for resources annotations
- MarcOnt Mediation Services for mediation with other metadata standards
- HyperCuP protocol for communication between libraries
Extensible Library Protocol (ELP)

Diagram showing relationships between OAI, ELP, Bibster, DublinCore MMS Rules, MarcOnt Ontology, BibTeX MMS Rules, OAI Adapter, ELP, Bibster Adapter, and HyperCuP.
Conclusions and Future Work

• Interoperability mechanisms of semantic digital libraries:
  – ontologies (e.g. MarcOnt ontology)
  – mediation services (e.g. MMS)

• Building bridges between heterogeneous networks of digital libraries with ELP

• Future work:
  – deliver research prototypes to the stable version of JeromeDL
  – Implement support for DIENST and Z39.50
Getting your own copy of JeromeDL

- JeromeDL is distributed under **BSD-style open source license**
- You can get it though:
- You can also get JeromeDL 2.0 Box on CD – please contact us for further information
Semantic Web 2.0 Components Framework

- JeromeDL™
  - semantic digital library

- SSCF™
  - knowledge sharing

- MarcOnt™
  - mediation ontology & services

- DIDASKON™
  - on-demand e-learning

- FOAFRealm™
  - social networks based DRM

- HyperL uP
  - scalable P2P infrastructure
Interoperability between heterogeneous networks of digital libraries can be achieved with semantic digital libraries and related technologies

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