Building a Heterogeneous Network of Digital Libraries on the Semantic Web

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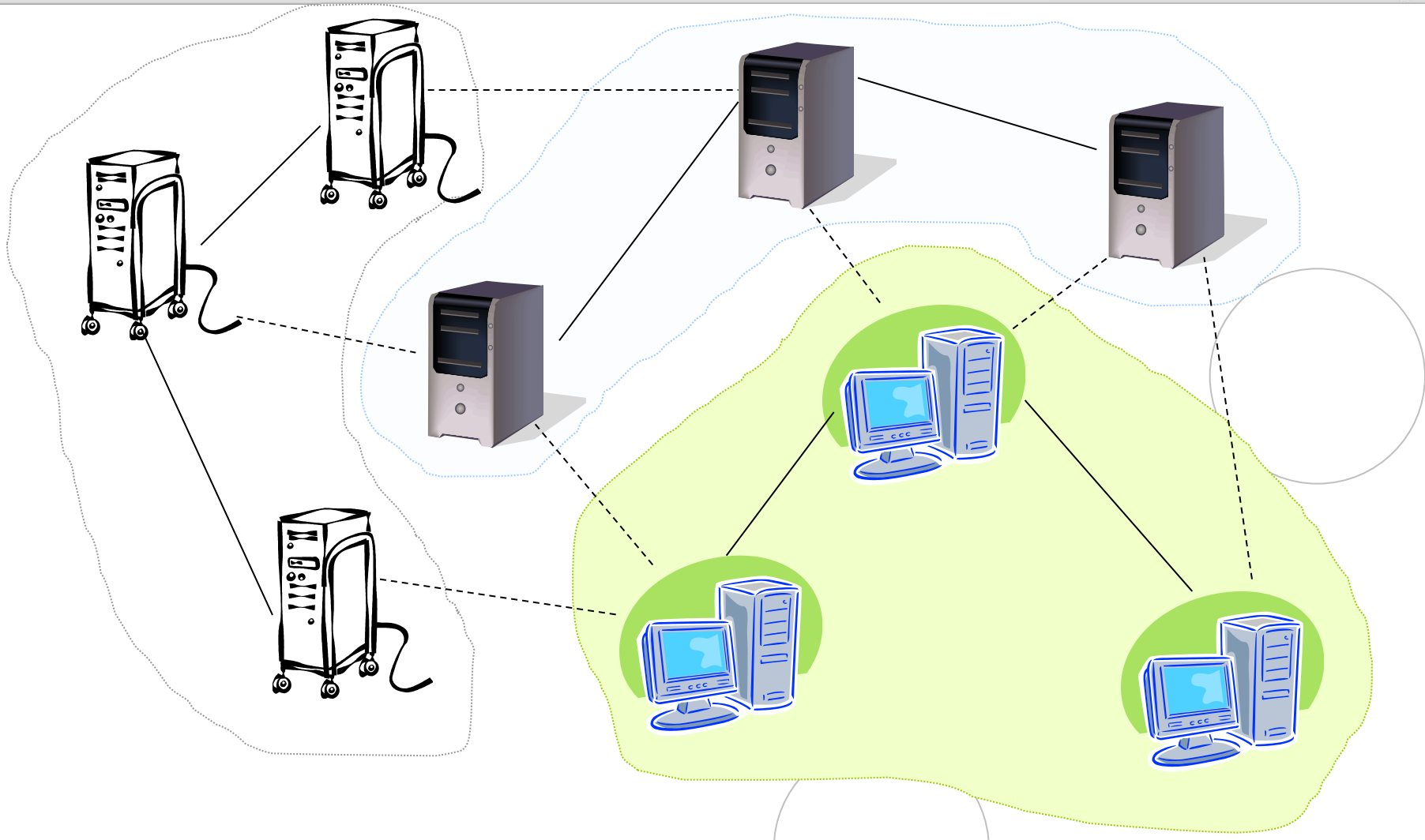
Presentation outline

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

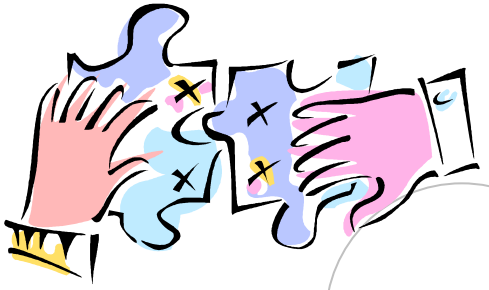
Motivations

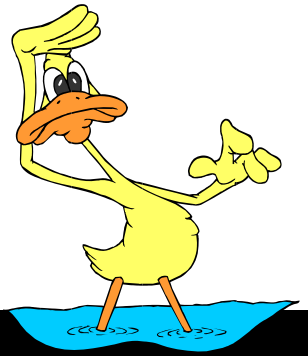


What is a Semantic Digital Library?

Semantic digital libraries

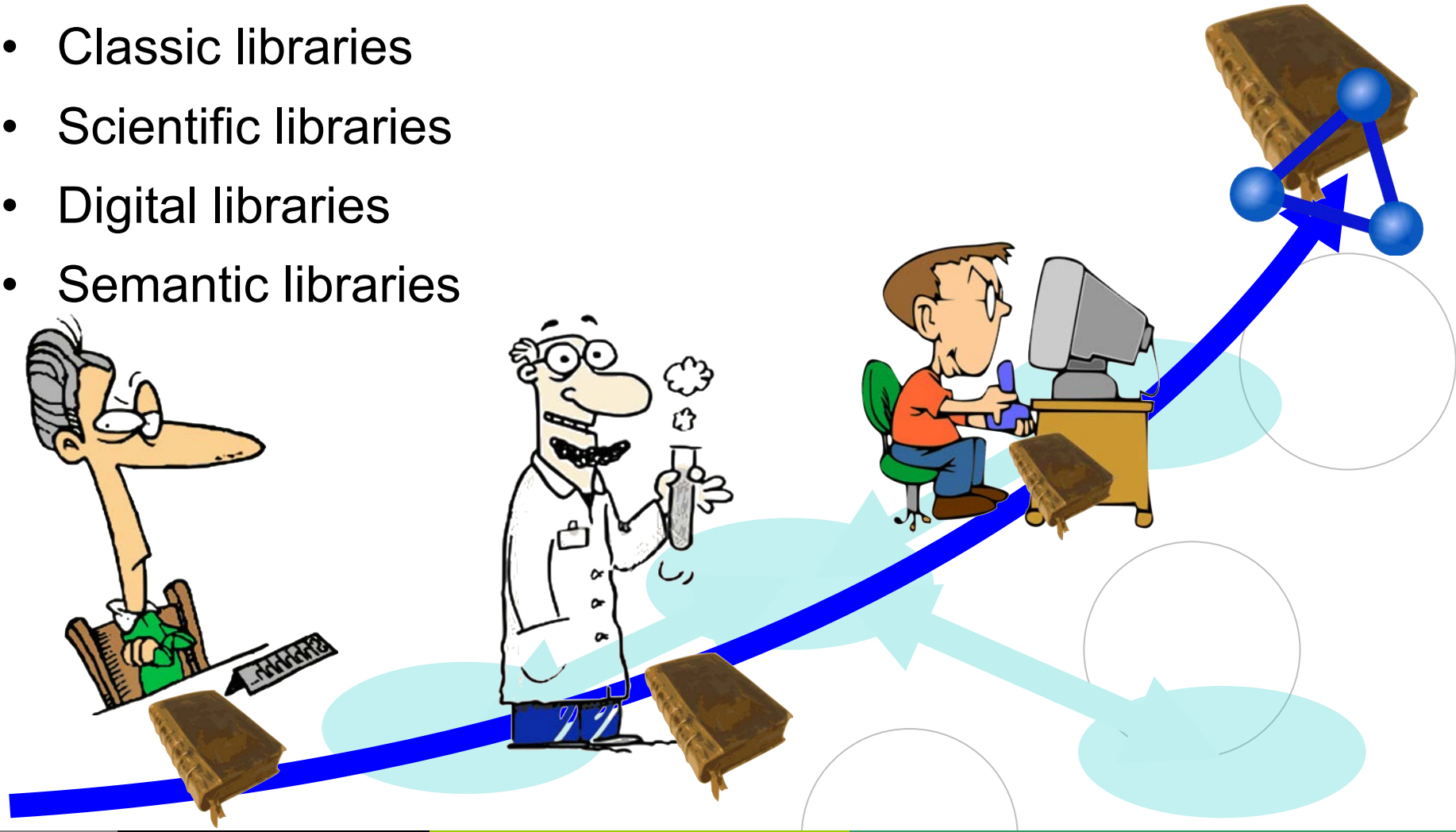
- integrate information based on different metadata, e.g.: resources, user profiles, bookmarks, taxonomies
- provide interoperability with other systems (not only digital libraries) on either metadata or communication level or both
- delivering more robust, user friendly and adaptable search and browsing 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

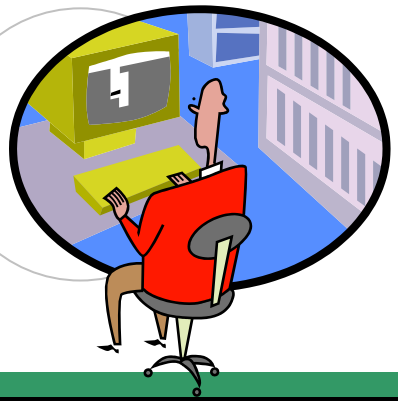
Benefits of Semantic Digital Libraries

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

Bibliographic Description in JeromeDL

01450cas 922004331i
450000100...019c19329999gw
qr|p| ||||0 |0ger | a0044-2992
9a200412140219bVLOADc200404071
525dvkulc200310071018dvbjc20030
3101205dkopumky200209211341zVL
OAD aGD U/MPcGD
U/MPdGD U/MFdGD U/KKsdWR
O/EJ0 ager1 aZ. Kunstgesch.
0aZeitschrift für
Kunstgeschichte.8aZeitschrift für
Kunstgeschichte.18aZfK
aMünchen ;aBerlin :bDeutscher
Kunstverlag,c1932-. c26-29 cm.
aKwart.0 a1 Bd. (Juni 1932)-.
aOpis na podst.: LCC. aW 1932
założycielami czasopisma byli
Wilhelm Waetzoldt i Ernst Gall....

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<?xml version="1.0" encoding="UTF-8" ?>
<rdf:Description
rdf:about="http://...id=828374765">
<dc:title>JeromeDL - Adding Semantic Web
Technologies to DLs</dc:title>
<dc:creator>Sebastian Kruk</dc:creator>
<dc:description>In recent
years ...</dc:description>
</rdf:Description>
```

These all can be represented in RDF

```
@InProceedings { jeromedexa2005,
  author = "Sebastian Ryszard Kruk and ... ",
  title = "{JeromeDL - Adding Semantic ...}",
  booktitle = "{In Proceedings to DEXA 2005}",
  year = 2005}
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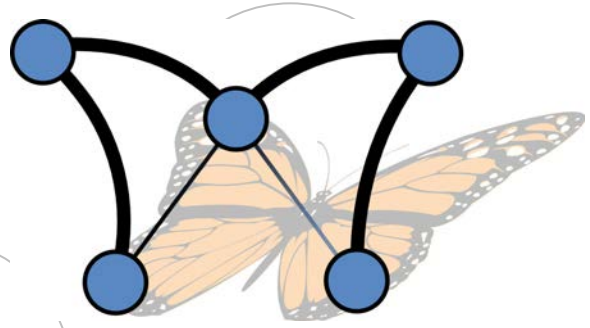
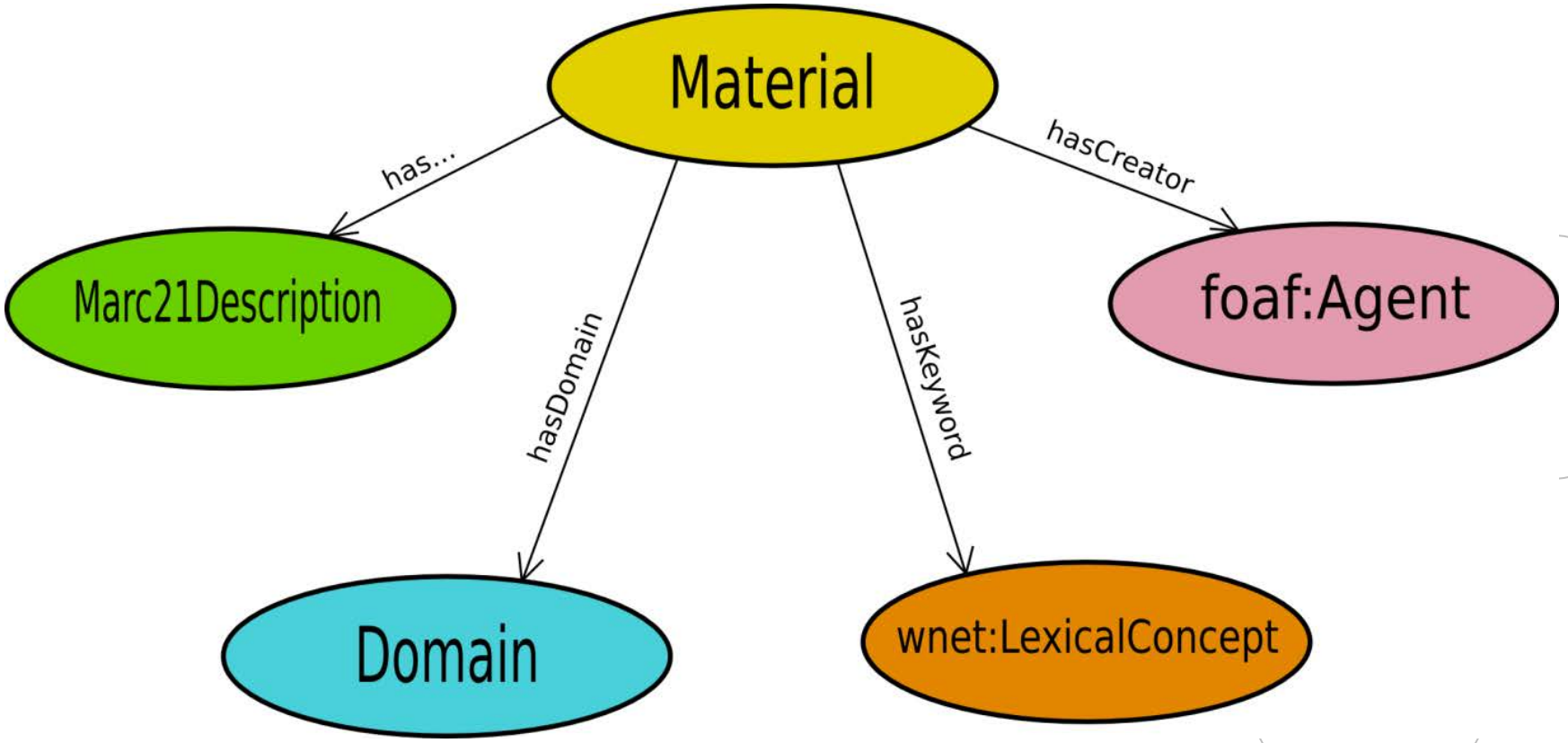
MarcOnt Initiative – Overview

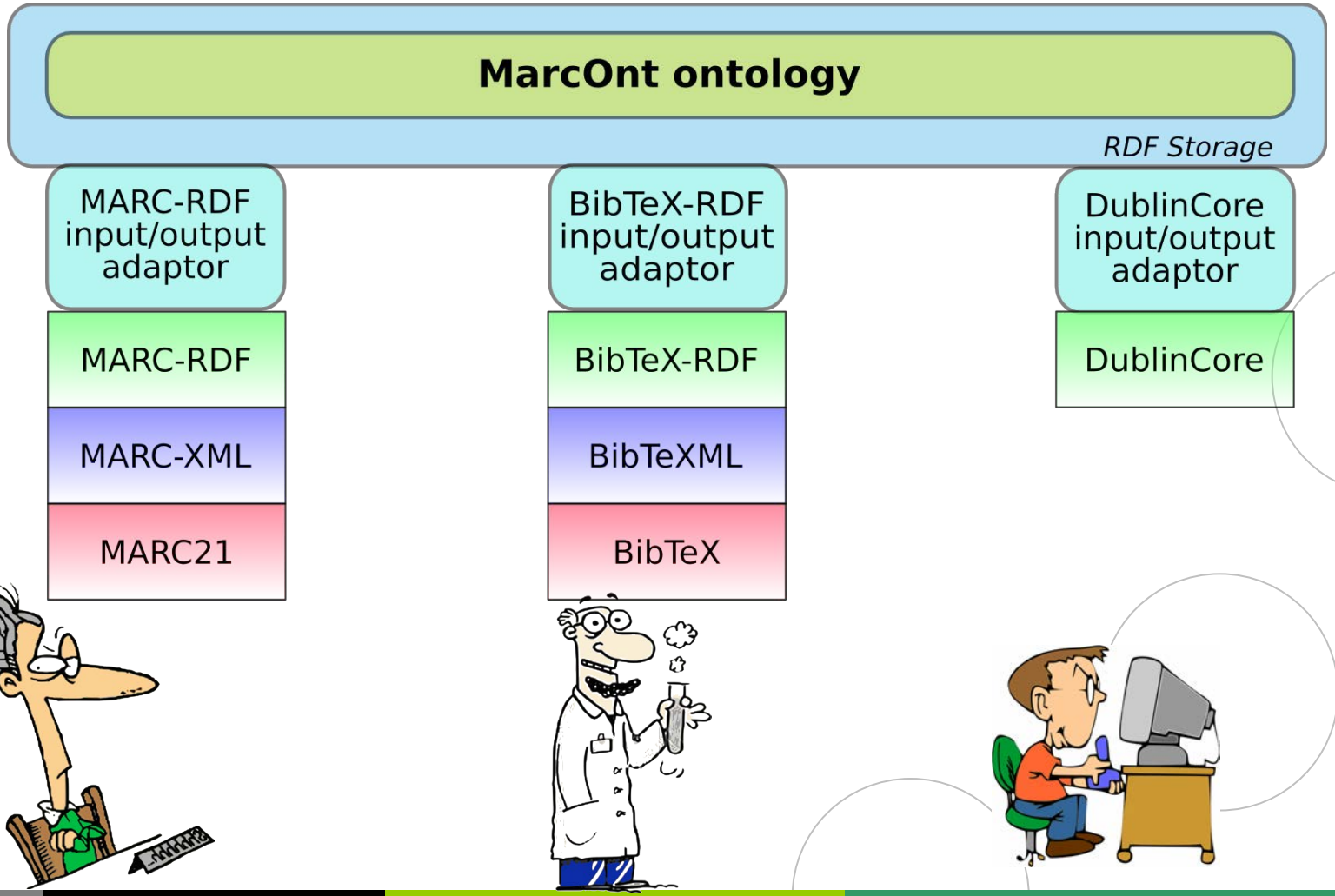
- Goal: utilize the existing, legacy metadata in semantically enabled libraries
- Delivers ontology that covers concepts from MARC21, BibTeX and DublinCore
- Provides interoperability services to communicate with other entities using legacy metadata



MarcOnt Ontology – Main Concepts



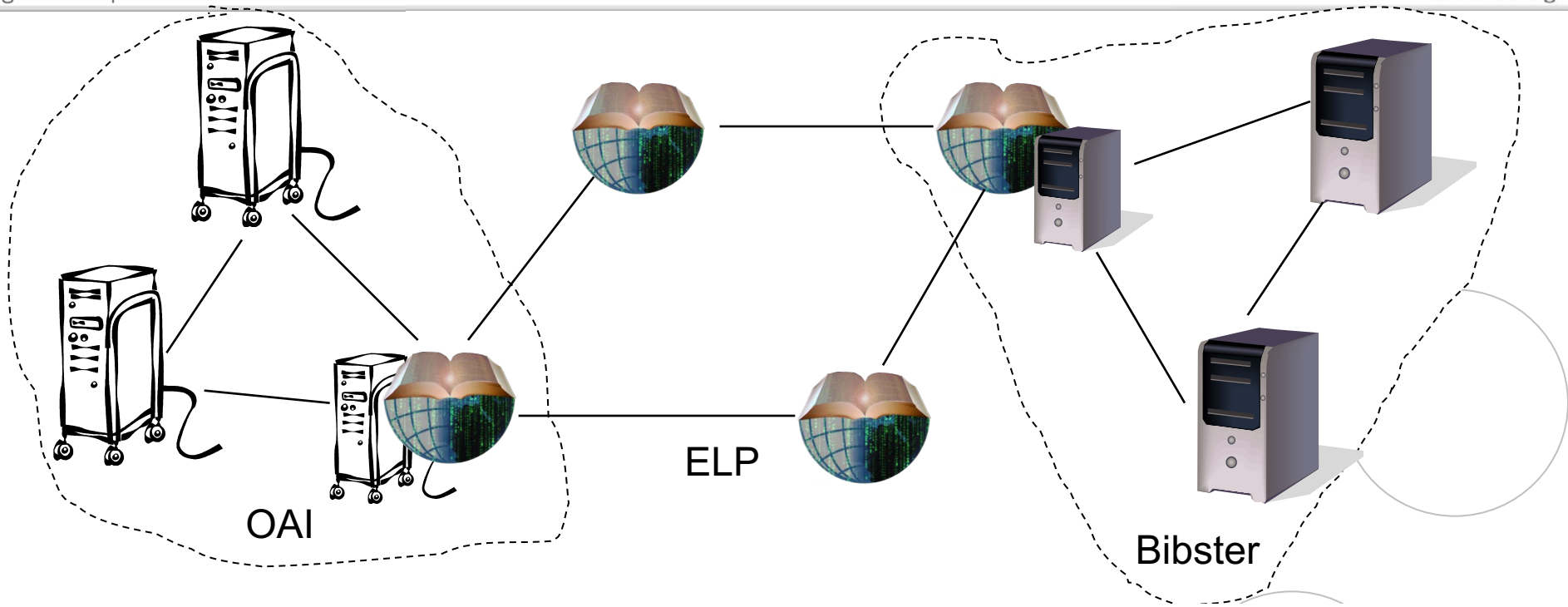
MarcOnt Mediation Services for Legacy Metadata

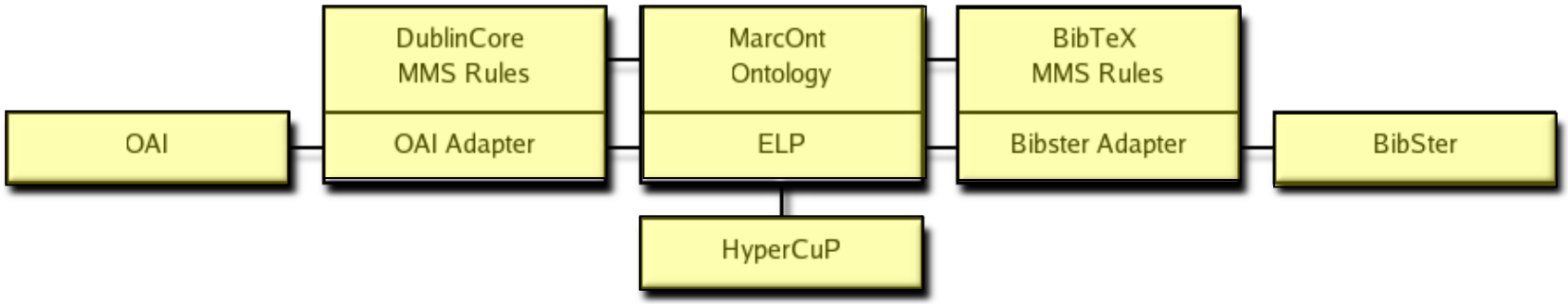


Extensible Library Protocol (ELP)

- 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)





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:
  - Home page: http://www.jeromedl.org/
  - SourceForge.net page: http://sf.net/projects/jeromedl/
  - A guide to JeromeDL: http://www.jeromedl.org/guide/
- 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

DIDASKON™

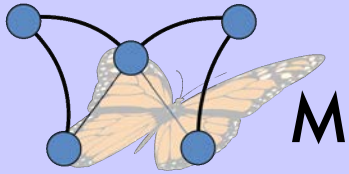
on-demand e-learning

SSCF™

knowledge sharing

FOAFRealm™

social networks based DRM



MarcOnt™

mediation ontology & services

Hyper 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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