

Simple Query Interface



Interoperability of Learning Object Repositories

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<http://www.prolearn-project.org/lori/>

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- Stefan Sobernig, Wirtschaftsuniversität Wien
- Tomaz Klobučar, Institute “Jozef Stefan”
- Theo van Veen, Koninklijke Bibliotheek
- Zoltán Miklós, Vienna University of Economics and Business Administration

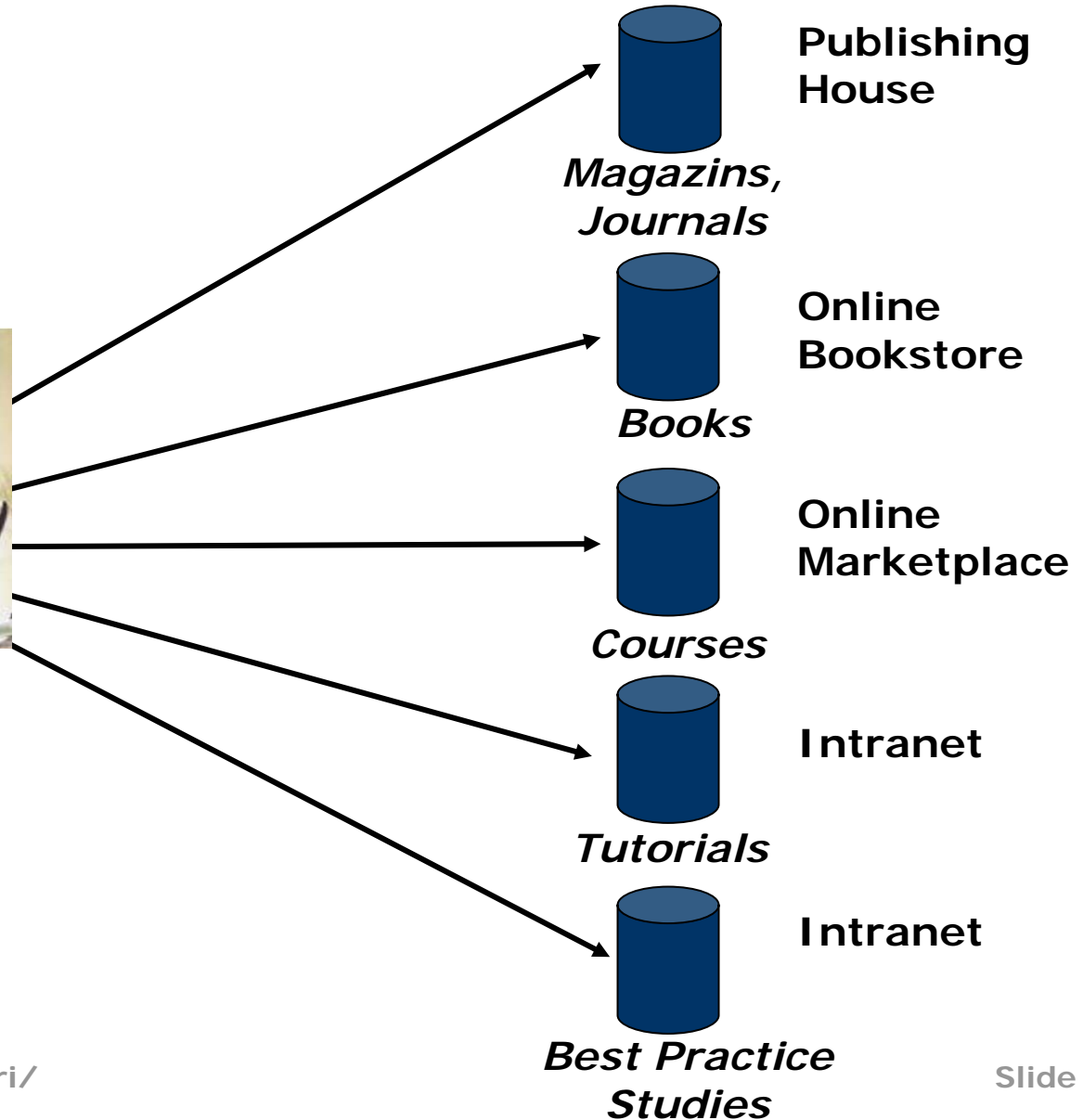
Acknowledgements



Motivation for Interoperability: Workplace Learning



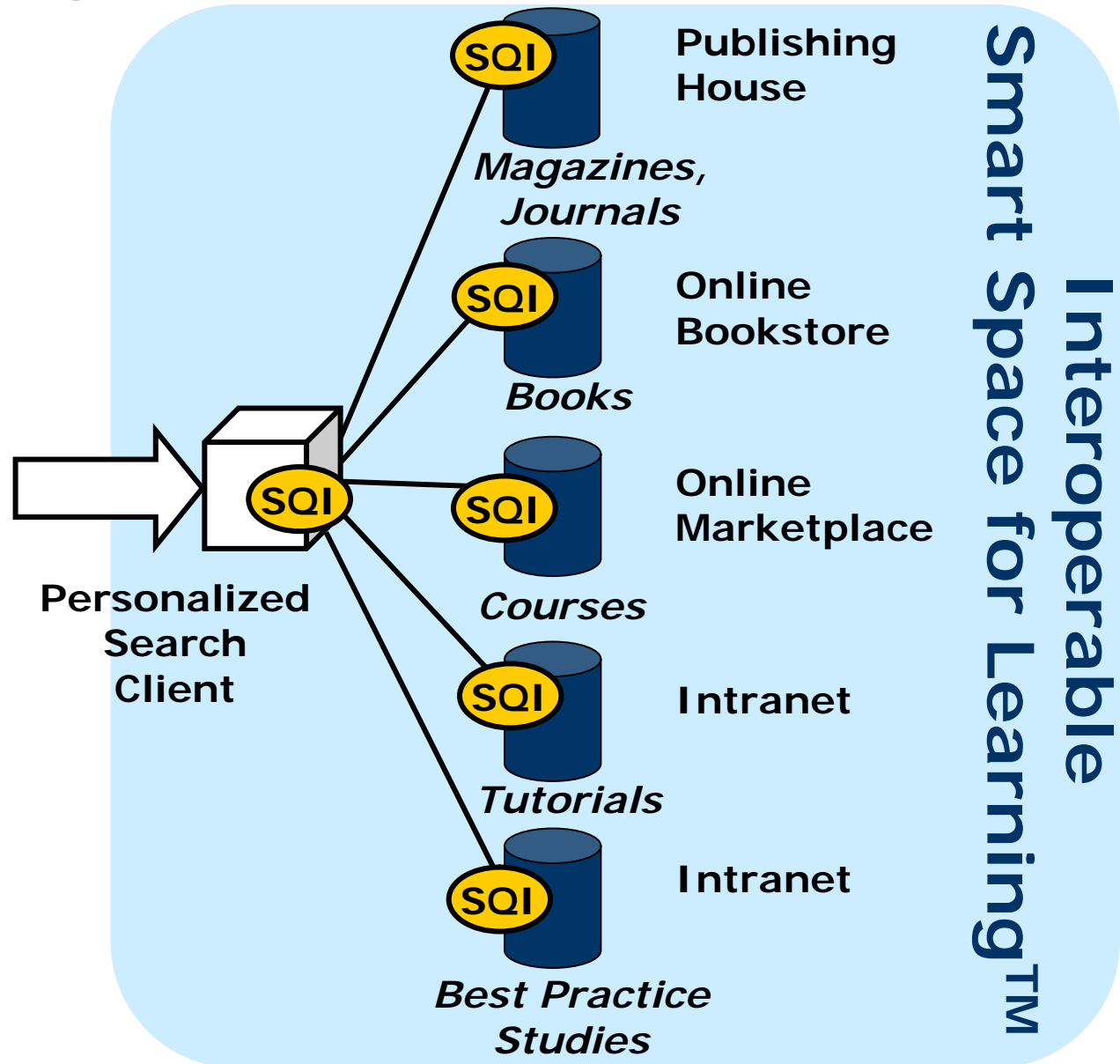
Tool:
Web Browser
+ Many Proprietary
Web Applications



Motivation for Interoperability: Workplace Learning



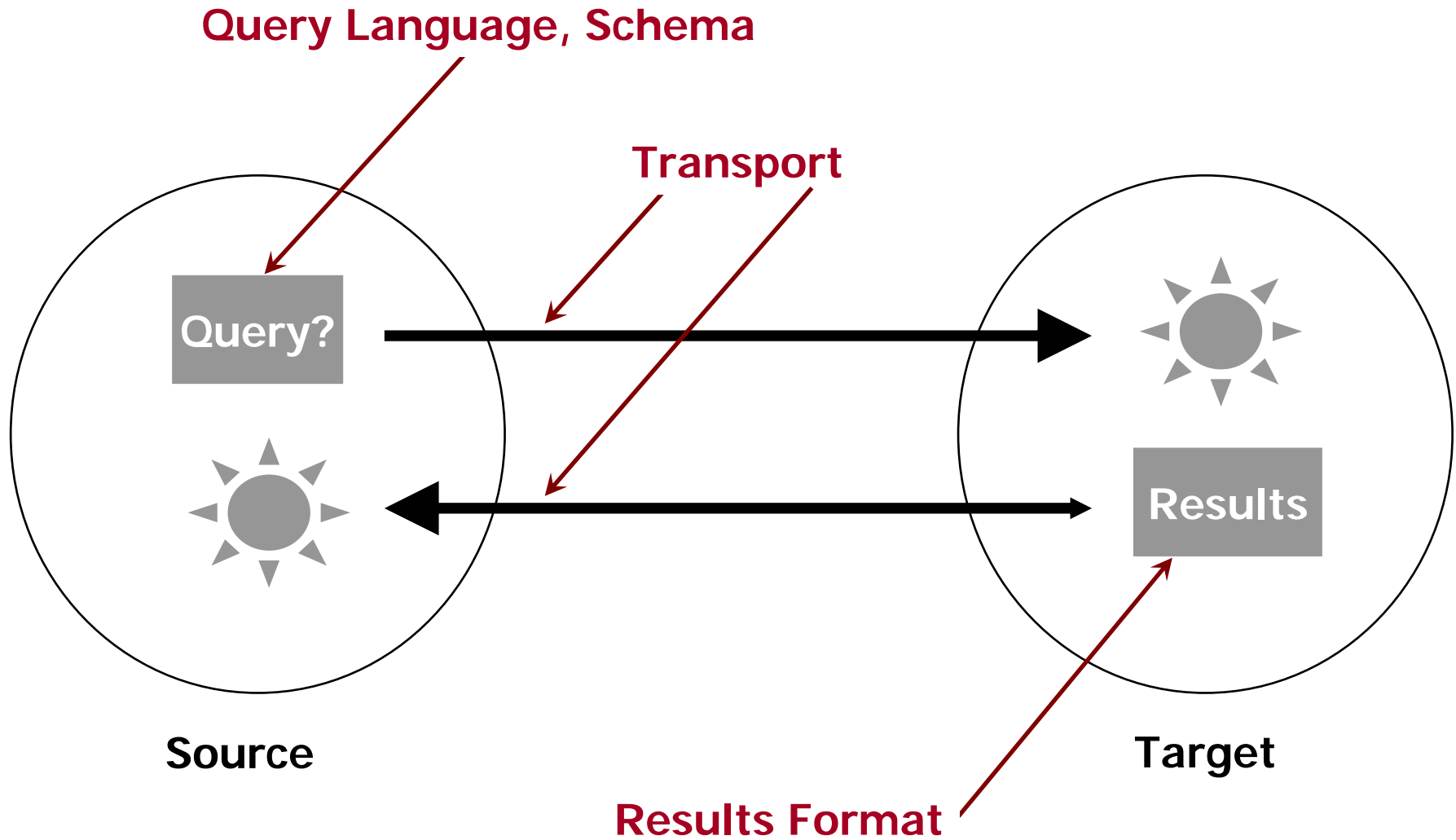
Tool:
Web Browser
+ *Personalized
Search Client*
+ *Educational
Semantic
Network*



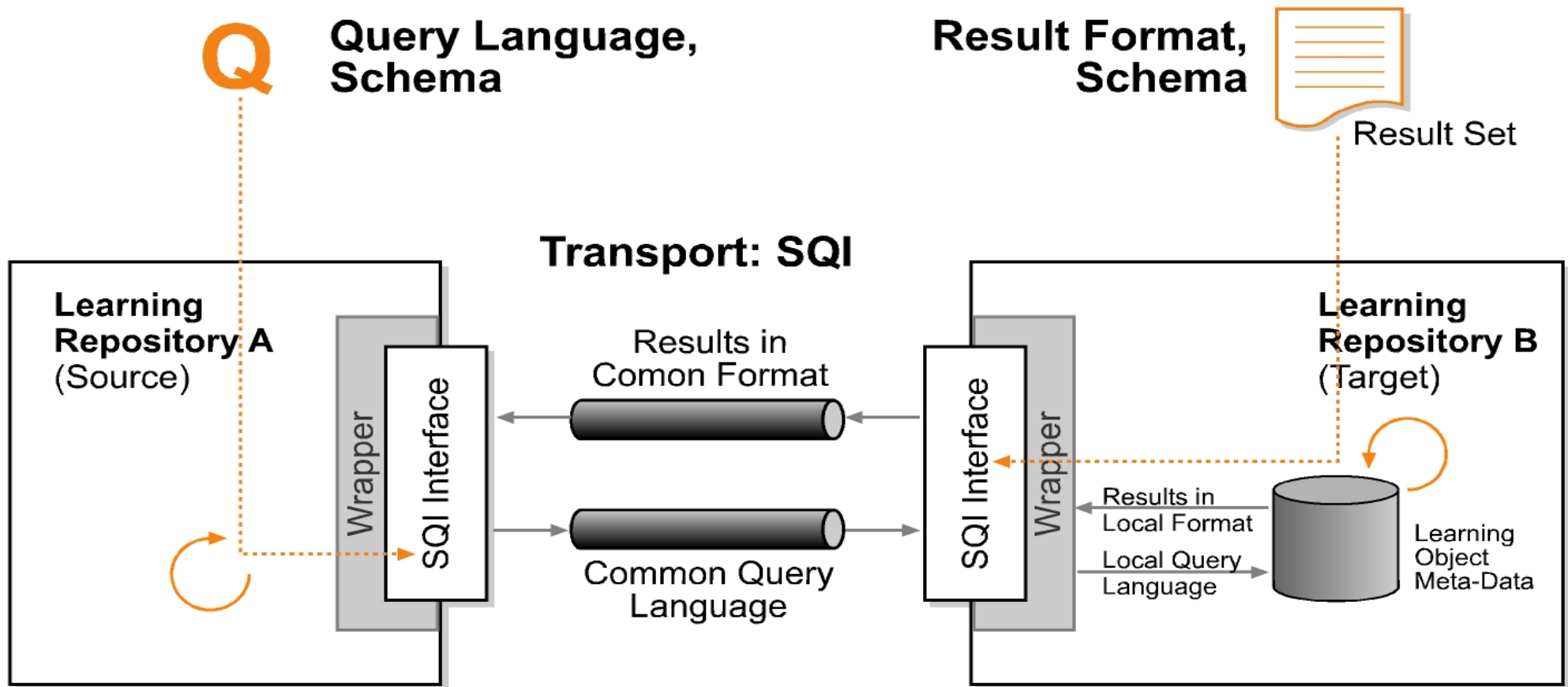
Why a Network Service?

- Collaboration and interoperation adds more visibility and usage of Learning Resources.
- The global system is more than the individual sum of the parts
- We want to have a flexible way of interoperation for different systems: no assumptions/constraints on the systems.
- This may help adoption of E-learning systems across Europe: bridge over each country differences.
- May help the acquisition and assimilation of e-learning
- Service Oriented Architecture is the way to go for actual Information Systems.

Basic Problem



Architecture of a Solution: Based on a Simple Query Interface



Interoperability Stack

Semantic Model

(e.g. Common Query Schema)

Applications

(e.g. Query, Harvesting)

Core Service

(e.g. Session Management)

Messaging Service

(e.g. SOAP, XML RPCs, RMI)

Network Architecture

(e.g. HTTP, SMTP, TCP/IP)

Design Rationales for SQI

- Overall Objective:
 - Light-weight design → Easy adoption (like the Web)
- Flexible:
 - Synchronous and asynchronous mode
 - Centralized and Peer-to-Peer
 - Stateful - Stateless
- Open:
 - Query Language (CQL, QEL, XQuery...)
 - Result Format (Complete records or not)
 - Metadata Schema (LOM, DC, ...)

SQI Methods

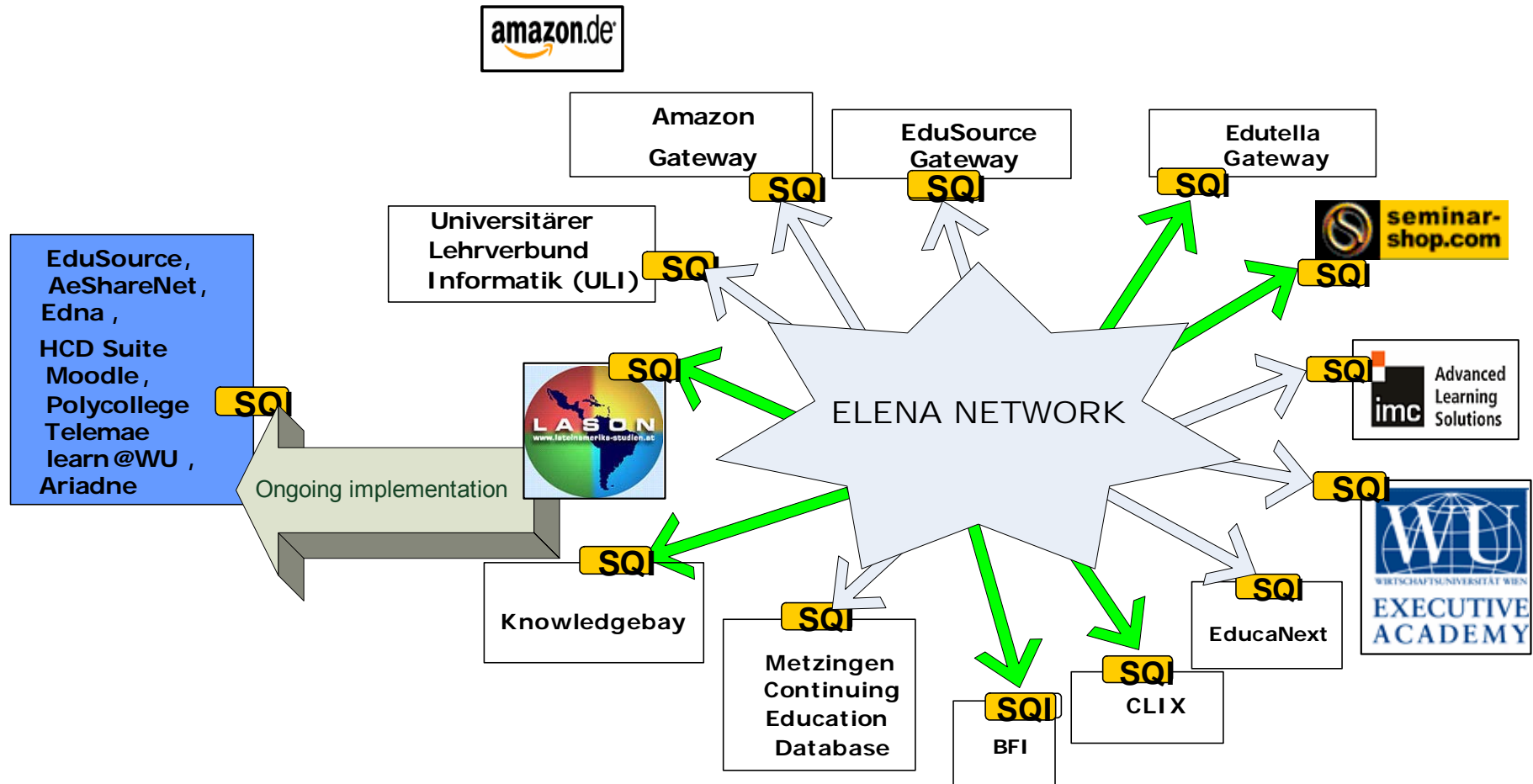
<i>Session Management</i>
createSession
createAnonymousSession
destroySession
<i>Query Parameter Configuration</i>
setResultsFormat
setMaxQueryResults
setMaxDuration

<i>Synchronous Query Interface</i>
setResultsSetSize
synchronousQuery
getTotalResultsCount
<i>Asynchronous Query Interface</i>
asynchronousQuery
setSourceLocation
queryResultsListener

Uptake of SQI

- **Implementation:**
 - 15 SQI nodes registered at <http://www.prolearn-project.org/lori> | SQI Registry
- **Standardization:**
 - SQI is about to be endorsed as an CEN/ISSS Workshop Agreement (CWA)
 - SQI is part of the IMS Query Service Specification
 - SQI is a candidate of being fast-tracked as an IEEE LTSC standard
 - Preliminary talks with CORDRA (→ SCORM)
- **Publications:**
 - 5+ papers on SQI and SQI-related issue (in last 6 months)
 - 1st International Workshop on Interoperability of Web-based Educational Systems held in conjunction with WWW2005

ELENA SQI Network



The access to the network

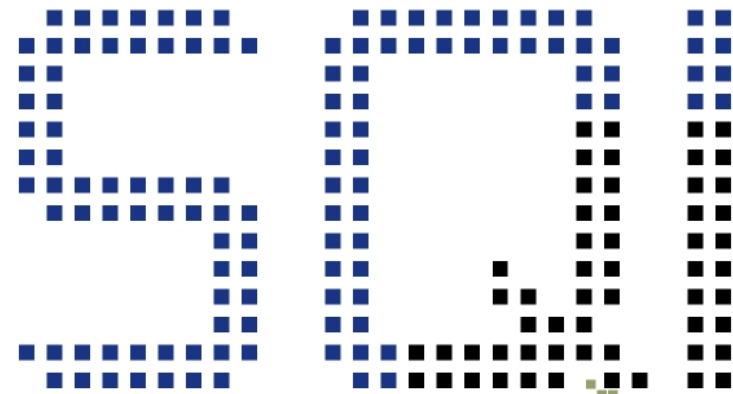
<http://www.hcd-online.com/networksearch/> and www.hcd-online.com/HCDExp | Network search for personalized search using Lucene

The screenshot shows the 'Network Search Results' page. The search term is 'network'. The results table is as follows:

Select	Relevance	Title / Description	Price	Remote service status:
<input type="radio"/>	100. (1)	Packet Switching & Internetworking: the Global Internet Presentation slides for the topic "Global Internet" in the context of the course "Communication Networks"	No	Executive Academy (WBZ): ✓ ARIADNE: ✓ LASON: ✓ Educella: ✓ Seminarshop.com: ✓ CLIX: ✓ ULI: ✓
<input type="radio"/>	81.8 (2)	Networking Technologies -Introducing computer networking -Network services -Transmission media -Connectivity devices -Network protocols and models -OSI layers -Lower layer protocols -Bridging, switching and routing -IP address ...	Yes	Knowledgebay: ✓ Metzigen VHS-Kursdatenbank: ✓ Amazon: ✓ bfi-vienna: ✓ EducaNext-UPM: ✓
<input type="radio"/>	67.2 (3)	Ethernet and Its Applications in Broadband Access Networks - thesis In this thesis work, the Ethernet technology is presented with a special emphasis on its applications in the broadband access network of Landssimi Islands hf. (Iceland Telecom Ltd.). Two vendor sp ...	No	EducaNext-UPM
<input type="radio"/>	67.2 (4)	Ethernet and Its Applications in Broadband Access Networks The Ethernet technology is presented with a special emphasis on its applications in the broadband access network of Landssimi Islands hf. (Iceland Telecom Ltd.). Two vendor specific networking ...	No	EducaNext-UPM English
<input type="radio"/>	62.7 (5)	Introduction to Cisco Networking Technologies Sie lernen die Grundlagen der Cisco Networking Technologien kennen.	Yes	Seminarshop.com German
<input type="radio"/>	56.5 (6)	Broadband Networks - DQDB Lecture notes for course in Broadband Networks.	No	EducaNext-UPM English
<input type="radio"/>	56.5 (7)	Broadband Networks - FDDI Lecture notes for course in Broadband Networks.	No	EducaNext-UPM English
<input type="radio"/>	56.5 (8)	Broadband Networks - LPOA Lecture notes for course in Broadband Networks.	No	EducaNext-UPM English
<input type="radio"/>	56.5 (9)	Broadband Networks - Ethernet Lecture notes for course in Broadband Networks.	No	EducaNext-UPM English
<input type="radio"/>	56.5 (10)	Broadband Networks - Local Loop Lecture notes for course in Broadband Networks.	No	EducaNext-UPM English
<input type="radio"/>	56.5 (11)	Broadband Networks - ATM Lecture notes for course in Broadband Networks.	No	EducaNext-UPM English
<input type="radio"/>	56.5 (12)	Broadband Networks - LAN	No	EducaNext-UPM English

Trial it out!
Send us your comments!
Join us!

bsimon@wu-wien.ac.at



Simple Query Interface



ELENA Network Implementation

Zoltán Miklós

**Vienna University of Economics and
Business Administration**

Content

- Overview of the implementations of connected nodes
- Similarities & differences
- Further information:
 - <http://www.prolearn-project.org/lori/>
 - Frequently updated, also after the Elena project

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- Stefan Brantner, BearingPoint
- Thomas Zillinger, BearingPoint
- Stefaan Ternier, Katholieke Universiteit Leuven
- Tomaz Klobucar, Jozef Stefan Institute
- Sascha Markus, IMC

The Semantic Model of the ELENA Network 1/2

- Based on Standards: IEEE LOM, Dublin Core, Open-Q, Vcard
- Mandatory Query Elements:
 - Search Term
 - Learning Resource Language
 - Learning Resource Category
 - Price Flag
 - Restrictions Flag
- Mandatory Result Elements:
 - Identifier
 - Title
 - Additional Information
 - Contributor
 - Description
 - Learning Resource Language
 - Learning Resource Category
 - Price Flag
 - Restrictions Flag

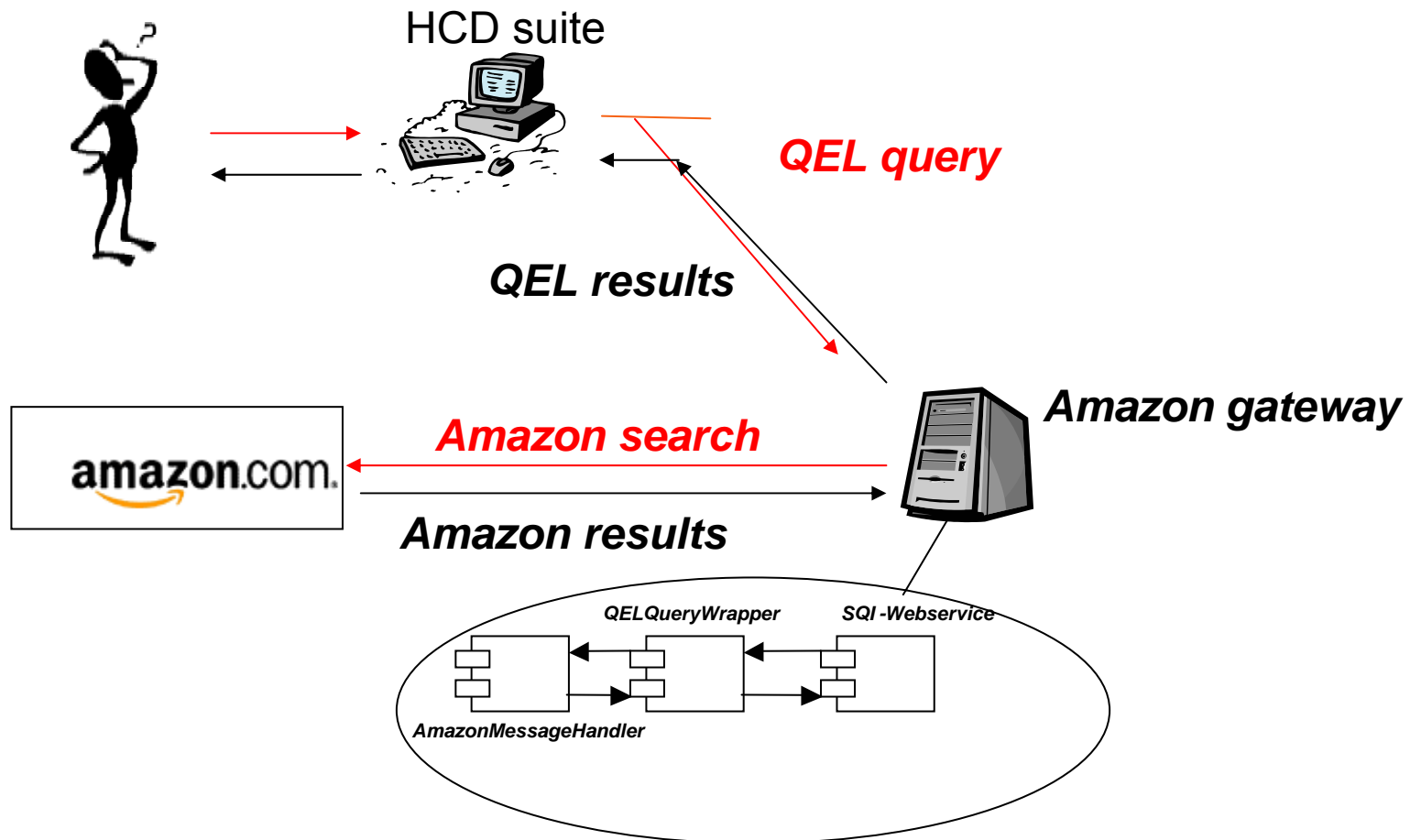
The Semantic Model of the ELENA Network 2/2

- Optional Elements:
 - Organization Name
 - Provider Person
 - Learning Goal
 - Subject
 - Learning Material Type
 - Learning Activity Type
 - Price Amount
 - Price Currency

Implementation of the nodes

- Common aspects:
 - Implementation in java
 - Common schema expressed in RDF
 - Query language used for mediation: QEL (edutella)
 - Query management protocol: SQI
- Differences:
 - Data integration
 - Individual solutions (with similar/reusable components)
- Main questions:
 - Mapping to common schema
 - Answering QEL queries of not RDF data

Gateway: Amazon gateway



Gateway

- Gateway
- Nodes: Amazon Gateway (with caching)
- Mapping of Amazon data into Elena common schema
 - Amazon uses proprietary schema
 - Problem: language
- Translation of QEL queries into Amazon specific search format
 - Large fragment of QEL queries can be translated (also logical operations like OR, AND, NOT)
 - Slightly different semantics

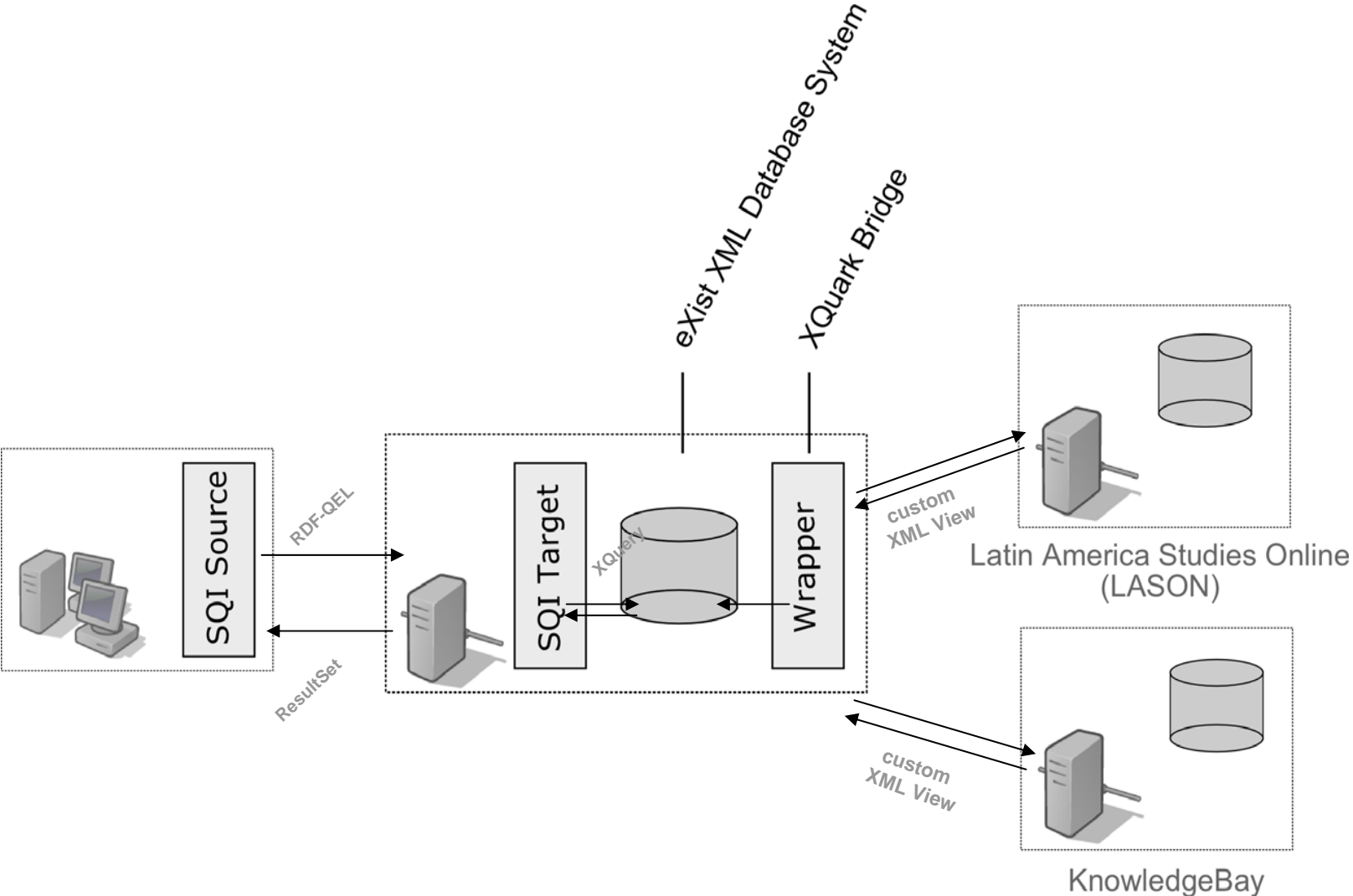
Relational database

- Nodes:
 - CLIX
 - WU Executive Academy (formerly WBZ)
 - EducaNext-UPM
 - HCD-suite local repository
 - Ariadne (with QEL)
- Mapping: Each system provided a mapping from their local database schema into the Elena common schema
- Mapping module of Daniel Olmedilla
- QEL queries: Nodes add a new table in their database with all possible RDF triples (in Elena common schema)

RDF and XML files

- RDF file
 - Nodes: ULI
 - Answering QEL queries: straightforward (edutella file-base provider)
 - Mapping: mapping module
- XML file
 - Nodes: Metzingen
 - Translation of QEL queries into XQuery developed
 - Mapping: QEL- XQuery query translation can handle mappings

XML database

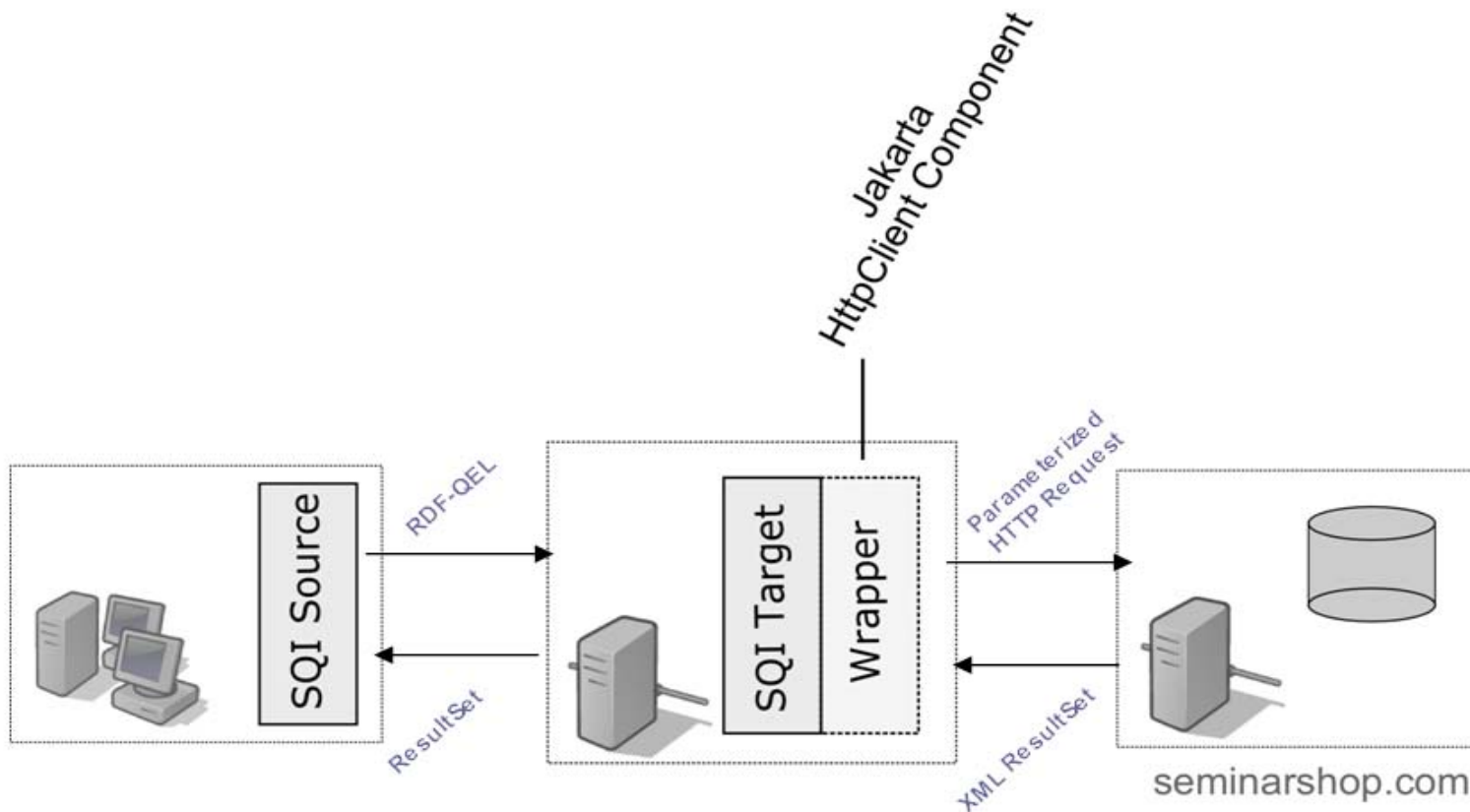


XML database

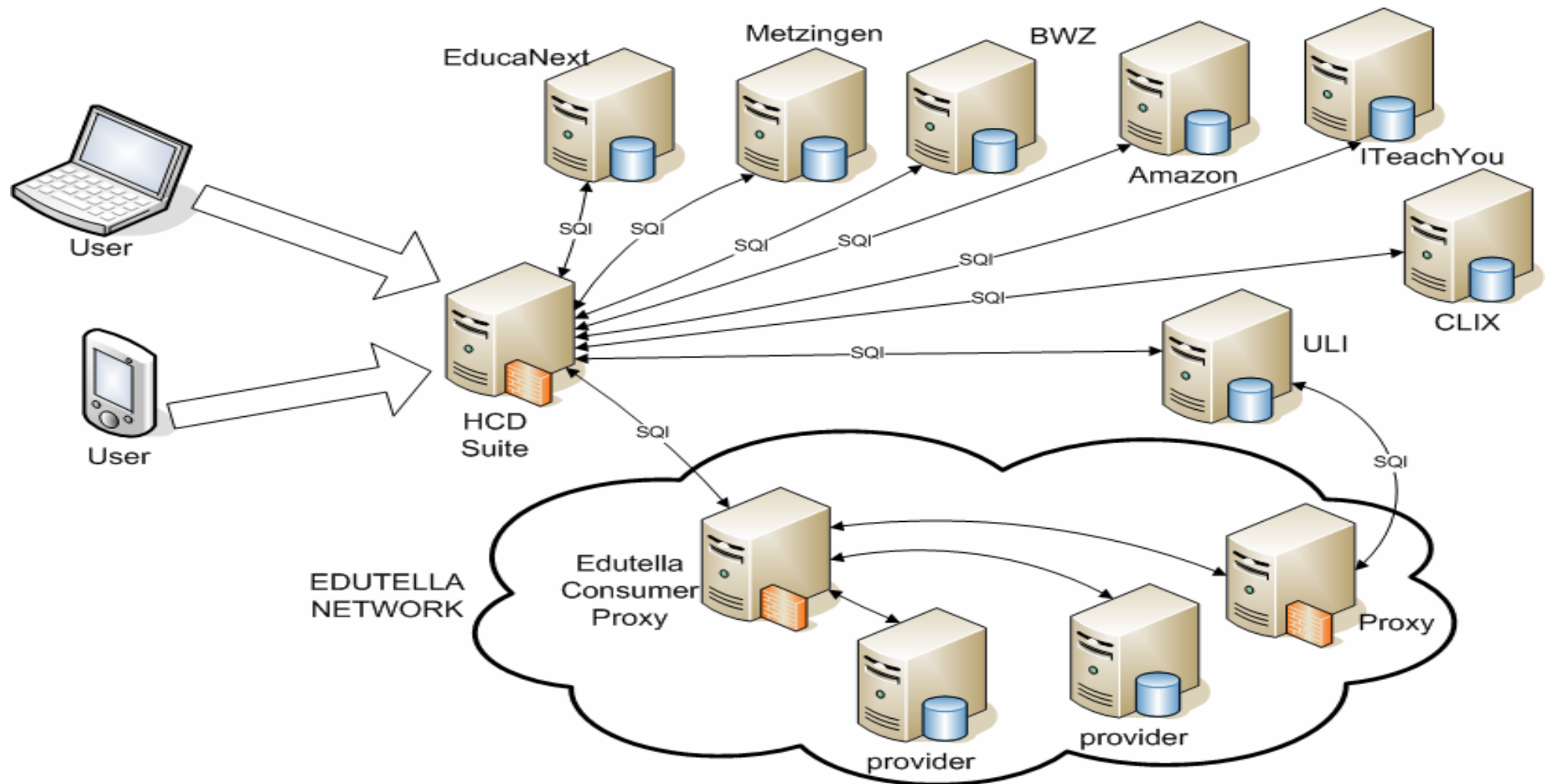
- Store XML data or metadata from relational databases in an XML database
- Nodes:
 - Relational databases: LASON, Knowledgebay
 - XML data: BFI Vienna
- Answering QEL queries
 - Reuse of QEL – XQuery translation
 - XML schema of the XML database closely related to Elena common schema
- Mappings
 - Expressed in XQuery
- Update
 - Continuous update of the XML database (eXist)
 - Relational database to XML: XQuarkBridge (open source component)

HTTP Proxy

- Nodes: seminarshop.com
- Seminarshop.com implemented a HTTP-based interface + mapping
- Answering QEL: adaptation of QEL- XQuery translation



Integration of edutella



P2P network

- P2P network
- Nodes: Edutella
- Asynchronous SQI interface added to edutella

Work in progress

- Implementation of SQL in script languages
 - Learn@WU: xoTcl
 - Moodle: PHP
- Almost ready implementations:
 - EduSource
 - Polycollege (Vienna)
- Publications (work in progress)
- „How to ...“ paper (within PROLEARN, for prospective partners)
- Integration architectures/patterns