Increasing interoperability in Edutella: Simple Query Interface and Semantic Mappings

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Outline

- Motivation
- Simple Query Interface
- Mapping
- Current status
- Further Work
Motivation
Simple Query Interface (I)

Open and collaborative effort to achieve interoperability between (learning objects) repositories

- Simple and Easy to implement
- No assumptions on query language, schema or results format
- Supports synchronous and asynchronous scenarios

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

Contributions from, among others, the following initiatives:
- Ariadne, Educanext, Celebrate, Edutella, Elena, EduSource, ProLearn, Universal, Zing
SQL Interaction

Learning Repository A (Source)

Simple Query Interface Component

Common Query Language

Results in Common Format

Simple Query Interface Component

Learning Repository B (Target)

Local Query Language

Results in Local Format

Learning Object Metadata
SQI Methods

- Session & authentication management
  - User/password authentication
  - Anonymous

- Query methods
  - Synchronous
  - Asynchronous

- Query configuration
  - Query language, timeout, maximum number of results, results format, ...

- Results retrieval
Limitations

- No support for search status management
  - E.g. cancellation of search, query status reporting
- The specification does not address any issues related to mappings of different metadata schemas besides allowing the provision of a schema according to which results shall be formatted.
- Data types should be specified at a higher level of detail.
- The only type of credential supported by session management is currently username/password.
Edutella

- Proprietary java interface
- Providers cannot provider content without implementing it
- Consumers cannot query without implementing it
- Providers that want to provide their content in several networks will not implement each one of the proprietary interfaces
Bringing SQI to Edutella
Interaction Diagram
Semantic Mappings

- Edutella and SQI are schema free
  - No common schema is assumed

- Data integration
  - Global As View (GAV): \( V(s) = f(s_1, s_2, \ldots, s_n) \)
  - Local As View (LAV): \( V(s) = f(s_1) + f(s_2) + \ldots + f(s_n) \)
  - Both As View (BAV) / GLAV

- Edutella mappings are LAV / Query reformulation
Global as view

3 movie sources
- S1(title, dir, year, genre) from until 1980.
- S2(title, dir) since 1970
- S3(title, year, genre) all movies

A global view of the sources: S1 union (S2 join S3)
- SELECT * FROM S1
  UNION
  SELECT S2.title, S2.dir, S3.year, S3.genre
  FROM S2, S3 WHERE S2.title = S3.title

Global view is created as a function of the sources
Local as view

3 movie sources
- S1(title, dir, year, genre) from until 1980.
- S2(title, dir) since 1970
- S3(title, year, genre) all movies

Global schema exist: global(title, dir, year, genre)
- Create view V1 as
  \textbf{SELECT} title, dir, year, genre \textbf{FROM} S1 \textbf{WHERE} year >= 1980.
- Create view V2 as
  \textbf{SELECT} title, dir \textbf{FROM} S2 \textbf{WHERE} year >= 1970
- Create view V3 as
  \textbf{SELECT} title, year, genre \textbf{FROM} S3

Global schema is defined independently of the sources
Given a query, it must be reformulated in terms of the sources
GAV vs LAV

Given a query reformulating it in terms of the sources
- Is easier in GAV (just needs unfolding of the query)
- Is harder in LaV

Adding a new source
- Supposedly easier in LaV (just need to express the new source as a view of the global schema)
- Harder in GaV (as the global schema needs to be revised)
Edutella mappings

- Single property mappings
  - Property
    `system1:s(X,dc:contributor,Y) → system2:s(X,dc:creator,Y)`
  - Property + Value
    `system1:s(X,dc:language,"de") → system2:s(X,dc:language,"ger")`

- Double mappings
  `system1.s(X,dc:creator,Y), system1.s(Y,vcard:FN,Z) → system1.s(X,dc:creator,Y)`

- Default values
  `lom:cost = "No"`
Property Mapping

- HCD Suite Schema
  - Title, Language, Contributor
- ULI Schema
  - Title, Language, Creator
- Mapping Needed: \((R, \text{dc:contributor}, X) \rightarrow (R, \text{dc:creator}, X)\)
Default values

- HCD Suite Schema
  - Title, Language, Cost
- ULI Schema
  - Title, Language
- Default value needed: (lom:cost = ‘No’)

Diagram:

1. HCD Suite
   - Title = X?
   - Cost = Y?
   - X = ‘Java’
   - Y = ‘No’
2. Mediator
3. ULI
   - Title = X?
   - X = ‘Java’
References

- Bringing SQI to Edutella
  [http://www.l3s.de/~olmedilla/projects/edutella/bringingSQI2Edutella.pdf](http://www.l3s.de/~olmedilla/projects/edutella/bringingSQI2Edutella.pdf)

- LORInteroperability site
  [http://www.prolearn-project.org/lori](http://www.prolearn-project.org/lori)

- SQI Implementation Registry
Questions?