NAISC-L: An Authoritative Linked Data Interlinking Approach for the Library Domain

November 26th at SWIB 2019

Lucy McKenna, Christophe Debruyne & Declan O’Sullivan

ADAPT Centre, Trinity College Dublin, Ireland
Presentation Plan

• What is Linked Data interlinking?

• Quick recap of SWIB 2018 presentation
  • NAISC-L framework

• Discuss progress with NAISC-L
  • Usability Testing
  • Updates to GUI
  • Implementation of NAISC-L Provenance Model

• Next steps
What is Linked Data Interlinking?

- Interlinking: Linking related entities across datasets.
- Different degrees of relatedness e.g. owl:sameAs, skos:closeMatch, schema:isSimilarTo, dcterms:relation, rdfs:seeAlso
- 5 Star Linked Data
- Data enrichment
- Knowledge discovery

Linked Data:
- On the web, open license
- Machine-readable data
- Non-proprietary format
- RDF standards
- Linked RDF

Is your data 5★?
What is NAISC-L?

- **Novel Authoritative Interlinking for Semantic Web Cataloguing in Libraries.**

- Approach encompasses a LD interlinking framework and a provenance model

- Developed a process and a graphical user-interface (GUI) to allow users to interact with the approach.
  - Reduce the need for expert technical/LD knowledge.

- Focused on the specific requirements of IPs e.g. access to authorities, use of library vocabularies, link to other library datasets, provision of provenance data.
NAISC-L GUI - First Iteration - 2018

Collection: 19th Century Social History

How are the resources related?
Closely Related To

When two entities are related:

[Diagram showing connections between resources]

- Ulysses
  - https://data.bnf.fr/ark:/12148/cb1943692j
  - http://open.vocab.org/terms/similarTo

- Ulysses Audiobook
  - https://www.worldcat.org/title/ulysses/.oclc/1020792874
  - http://www.w3.org/2000/01/rdf-schema#label

- Ulysses 1988 Theatre Production
  - https://www.abbeytheatre.ie/archives/production_detail/2930/
  - http://www.w3.org/2000/01/rdf-schema#label

- http://purl.org/dc/terms/relation

- http://www.w3.org/2000/01/rdf-schema#label
Usability Testing - 2019

• Conducted usability testing in January 2019
  • Evaluated the framework process, RDF output, usability of the GUI and a provenance data demo

• Participants – 15 Information Professionals
  • Academic libraries, national library, archive

• Four parts:
  1. Pre-Test Questionnaire
  2. Think-Aloud Observation
  3. Post-Test Interview
  4. PSSUQ Questionnaire
Pre-Test Questionnaire

<table>
<thead>
<tr>
<th>Knowledge Ratings</th>
<th>Semantic Web</th>
<th>Linked Data</th>
<th>RDF</th>
<th>URIs</th>
<th>Ontologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all Knowledgeable</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Slightly Knowledgeable</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Moderately Knowledgeable</td>
<td>13</td>
<td>14</td>
<td>10</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Very Knowledgeable</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Extremely Knowledgeable</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Five of the participants indicated that they had previous experience implementing a LD project
## Results

### Think-Aloud Test

<table>
<thead>
<tr>
<th>Task</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Create New Project/Linkset</td>
<td>Clearer descriptions of the information required in each field in the form</td>
</tr>
<tr>
<td>2. Add Internal Entity</td>
<td>Unclear on which button to click in order to add an entity</td>
</tr>
<tr>
<td>3. Add External Entity</td>
<td>Links to external authorities were not always noticed by participants as they were at the bottom of the page.</td>
</tr>
<tr>
<td>4. Create 6 Interlinks</td>
<td>Some participants initially found it difficult to identify which two entities they were interlinking – suggested colour coding.</td>
</tr>
<tr>
<td>5. Generate Interlink RDF</td>
<td>Participants suggested adding natural language labels to make the graphs more readable</td>
</tr>
<tr>
<td>6. Review Provence Graph demo</td>
<td>Suggested having different levels for viewing the visualisation</td>
</tr>
</tbody>
</table>

- Participants were 100% successful in following the framework process.
Results

Interviews

- **Overall Impression:** NAISC-L was easy and pleasant to use and that, as they became used to the system, the ease and speed of use increased.

- **Positives:** RDF graphs of the interlink data added to their understanding of the interlinking process.

- **Link-Type Selection:** The participants indicated that the definitions for each of the link-types were useful for deciding on how to express the relation between two URIs.

- **Usefulness:** All participants stated that NAISC-L would be useful for creating interlinks between internal and external LD resources.

<table>
<thead>
<tr>
<th>PSSUQ</th>
<th>System Usefulness</th>
<th>Information Quality</th>
<th>Interface Quality</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Score</td>
<td>2.45 Mild</td>
<td>2.45 Mild</td>
<td>2.65 Mild</td>
<td>2.07 Mild</td>
</tr>
</tbody>
</table>
James Joyce Resources

Internal Resources

The Dead 1987
https://data.bptt.re/wlort/t/1491273664

Add a Related Entity

Label
Enter a label to name the entity. This could be a copy of the label already given to identify the entity in the dataset. This data will not be added to the graphs, it will only be visible to NAISC-L users to aid in interlinking the entity.

URI
Paste the entity URI/URL/Permalink here. This data will be added to the graphs.

Description
Add a brief description of the entity. This data will not be added to the graphs, it will only be visible to NAISC-L users to aid in interlinking the entity.

FRBR (optional)
Identify the entity type as per the Functional Requirements for Bibliographic Records (FRBR) Model. This information will not be added to the graph, it will only be visible to NAISC-L users to aid in interlinking the entity.

Endeavour:
- Work
- Expression
- Manifestation
- Item

Responsible Entity:
- Person
- Family
- Corporate Body
- Event
- Place

Subject:
- Concept
1. **Relationship Selection**

2. **Link-Type Selection**

3. **Justification**

**Preview of new Interlink:**

- James Joyce - BnF
  
  `skos:exactMatch`
  
  James Joyce - VIAF

**Why did you interlink these entities?**

Provide a justification for why the above interlink was created. Information entered here could include a description of the relationship between the two entities, the purpose of creating the link, and/or the rationale behind the chosen link-type.
NAISC-L GUI – Interlink Output

http://viaf.org/viaf/44300643/  rdfs:label  James Joyce - VIAF

skos:exactMatch  <http://viaf.org/viaf/44300643/>

<http://naiosc.adaptcentre.ie/linkset/53>  
<http://naiosc.adaptcentre.ie/linkset/53>  
<https://data.bnf.fr/ark:/12148/cb11909158m>  
<https://data.bnf.fr/ark:/12148/cb11909158m>  

<http://naiosc.adaptcentre.ie/linkset/1909158m>  rdfs:label  James Joyce - BnF

Generated using GoJS software
## Provenance Model

<table>
<thead>
<tr>
<th>Interlink Graphs</th>
<th>(&lt;i_1&gt;)</th>
<th>(&lt;i_2&gt;)</th>
<th>(&lt;i_3&gt;)</th>
</tr>
</thead>
</table>

| Relationship Graph | \(<relations>\) | i1 \(\rightarrow\) p1 | i2 \(\rightarrow\) p2 | i3 \(\rightarrow\) p3 |

| Provenance Graphs | \(<p_1>\) | \(<p_2>\) | \(<p_3>\) |


<http://naisc.adaptcentre.ie/linkset/53/provenance/32> {
  <http://naisc.adaptcentre.ie/linkset/53> a prov:Collection ;
  prov:hadActivity _:b0 ;
  prov:hadMember <http://naisc.adaptcentre.ie/linkset/53/interlink/90> ;
  prov:qualifiedAttribution [ a prov:Attribution ;
    prov:agent <http://naisc.adaptcentre.ie/person/53> ;
    prov:hadRole "Created the linkset" ] ;
  prov:wasAttributedTo <http://naisc.adaptcentre.ie/person/53> .
  _:b1 a prov:Attribution , prov:Association ;
  prov:agent <http://naisc.adaptcentre.ie/person/53> ;
  prov:hadRole "Created the interlink" .

  rdf:object <http://viaf.org/viaf/44300643/> ;
  rdf:predicate skos:exactMatch ;
  rdf:subject <https://data.bnf.fr/ark:/12148/cb11909158m> ;
  naiscProv:hasJustification "Skos concepts for the same person" ;
  prov:qualifiedAttribution _:b1 ;
  prov:wasAttributedTo <http://naisc.adaptcentre.ie/person/53> ;
  prov:wasGeneratedBy _:b0 .}
• Links the interlink named graph with the provenance named graph.

```
```
In the process of evaluating the second iteration of NAISC-L (100+ participants)

In the process of conducting a field test of NAISC-L in the Irish Traditional Music Archive (6 Information Professionals)

Provide feedback on results
Finally!

I need your feedback!

Participate in an evaluation of NAISC-L!

https://scsstcd.qualtrics.com/jfe/form/SV_cJ9VBQ2BuNbvbc
Thank you!

- Lucy McKenna
  - PhD student, ADAPT Centre, Trinity College Dublin

- Email: lucy.mckenna@adaptcentre.ie

- NAISC-L interface demo: [https://www.scss.tcd.ie/~mckennl3/naisc](https://www.scss.tcd.ie/~mckennl3/naisc)

References

• L. Moreau, P. Groth, J. Cheney, T. Lebo, and S. Miles. 2015. The rationale of PROV.