



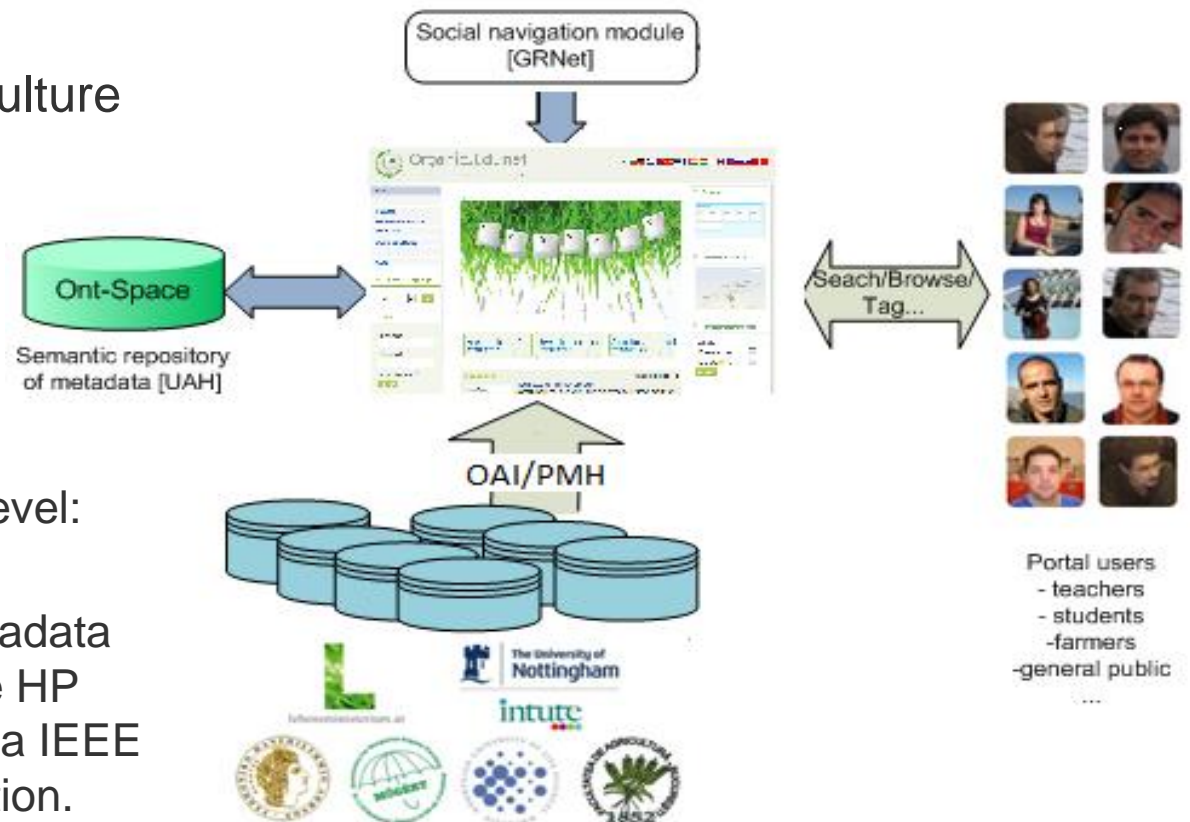
Navigating learning resources through linked data

a preliminary report on the re-design of Organic.Edunet

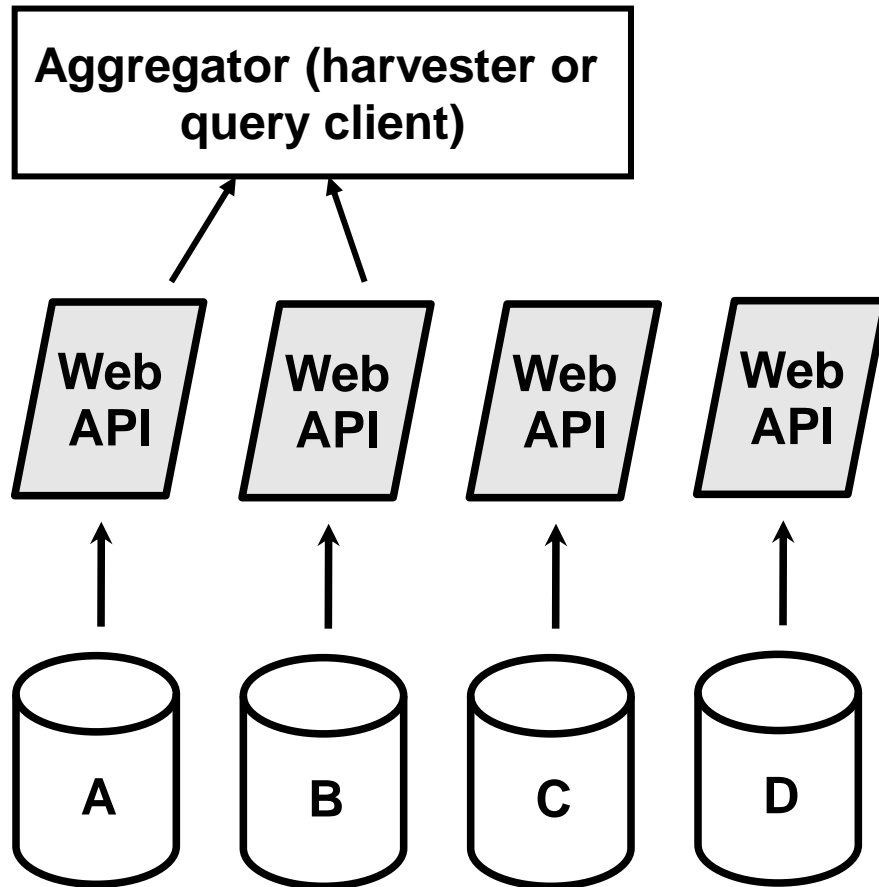
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Organic.Edunet

- A federation of repositories of learning resources covering organic agriculture and agroecology.
- Using OAI-PMH
- Two level storage of metadata:
 - At the repository tool level: Confolio
 - At the portal level: metadata integrated into a single HP Jena RDB store using a IEEE LOM OWL representation.



Limitations (from a linked data perspective)

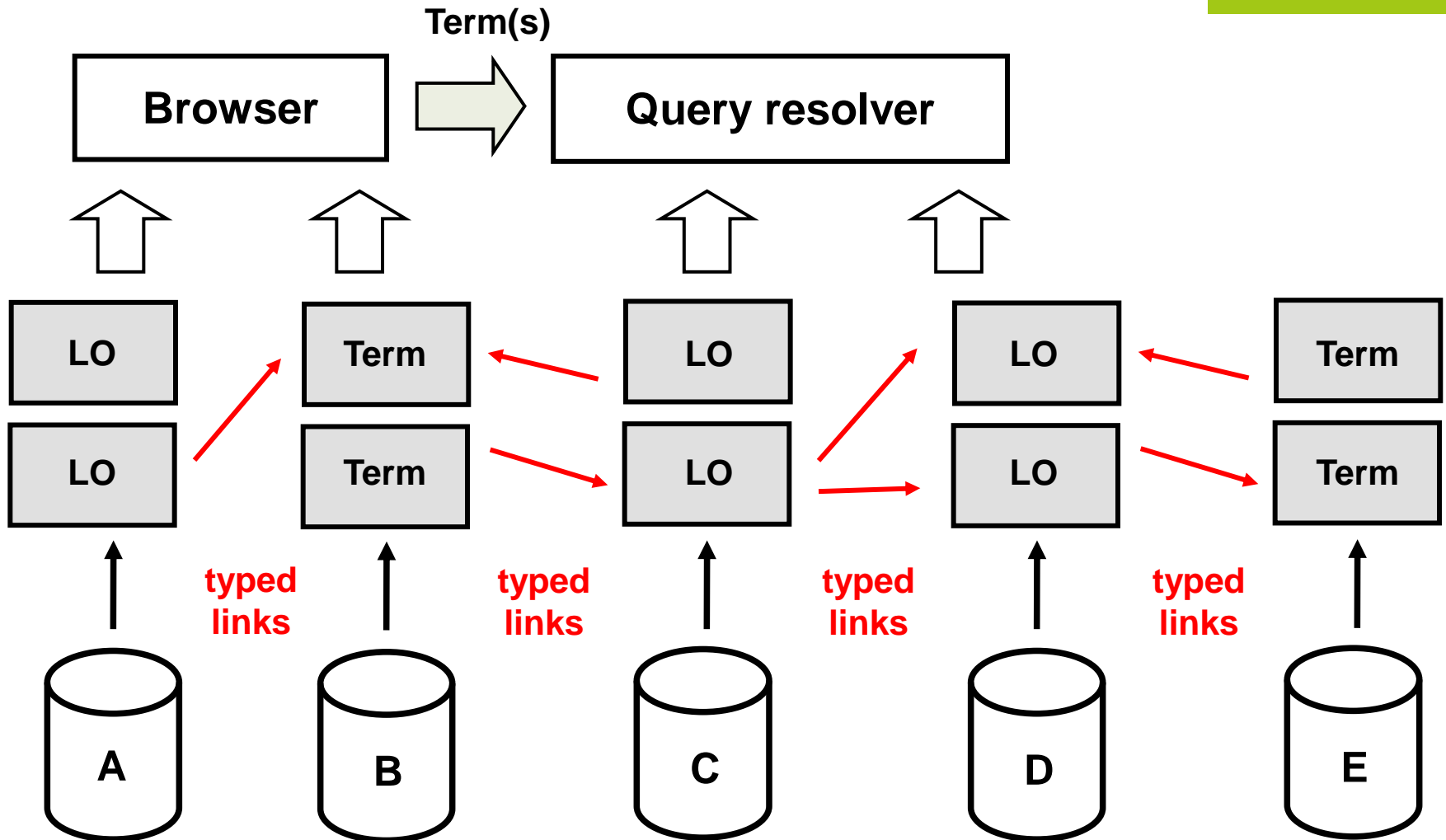


Shortcomings

1. ~~APIs provide proprietary interfaces~~
2. ~~Aggregators are based on a fixed set of data sources.~~ (not necessarily, but require some **registry of providers**)
3. You can **not** set hyperlinks **neither** between learning object descriptions **nor from them to other data or terminologies**



Browsing & querying



Current browsing & searching interface

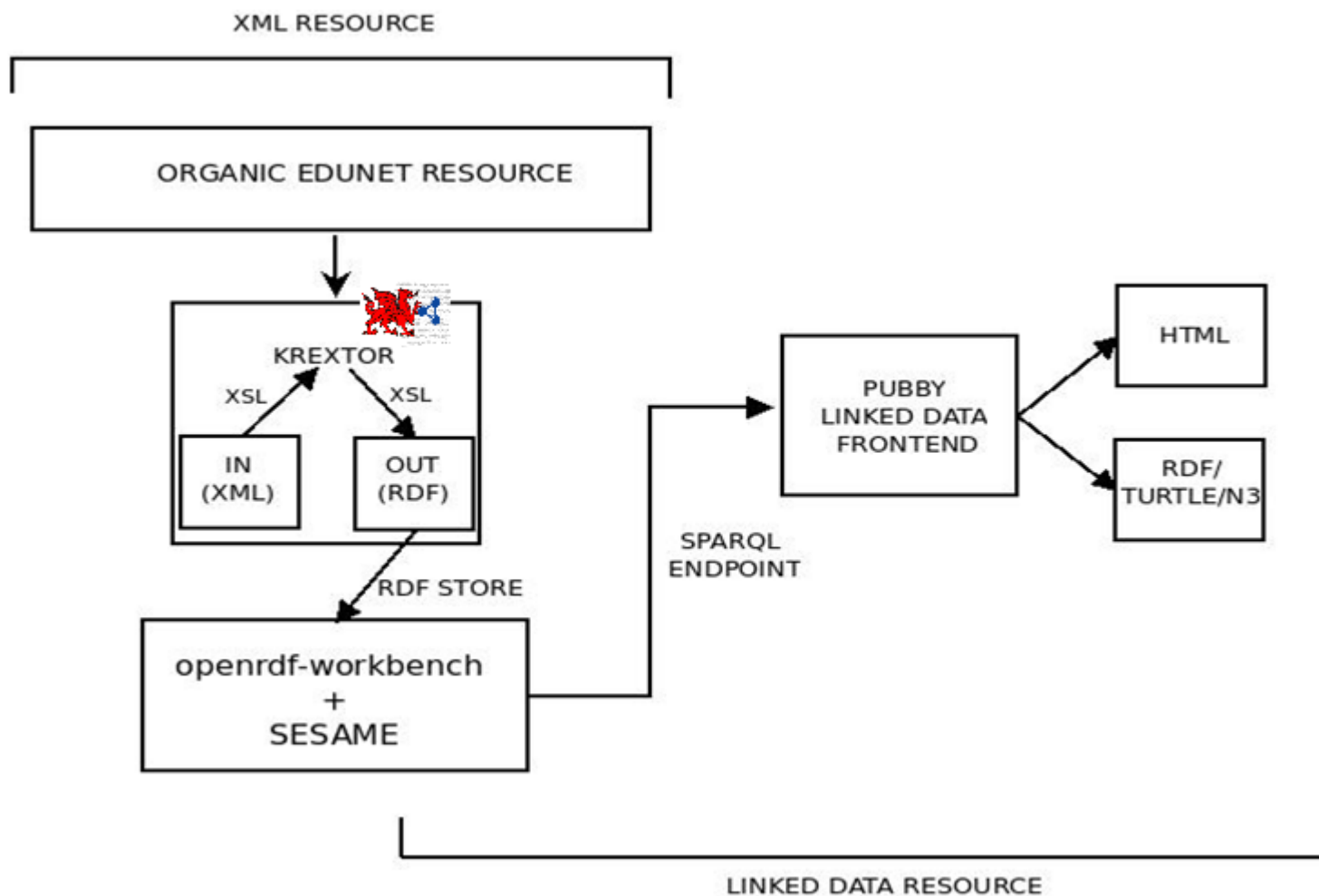
The screenshot displays a web interface for searching and browsing. At the top, there is a search bar with a magnifying glass icon. Below it is a hierarchical tree diagram showing the relationship between various terms. The root node is 'fertilizer', which branches into 'biological fertilizer' and 'mineral fertilizer'. 'biological fertilizer' further branches into 'manure', 'manure-animal', 'peat', and 'manure'. 'manure' branches into 'compost'. 'mineral fertilizer' branches into 'chemical compound'. The diagram is rendered in a light green and brown color scheme.

Below the diagram is an 'Advanced options' section. It contains a 'Relation type:' dropdown menu with the selected option 'describe a methodology about'. To the right is a 'Keep the following terms in the query:' section with a checkbox labeled 'compost'.

Below the advanced options, it states '2 resources describe a methodology about the term **compost**'. A 'Reset' button is located to the right of this text.

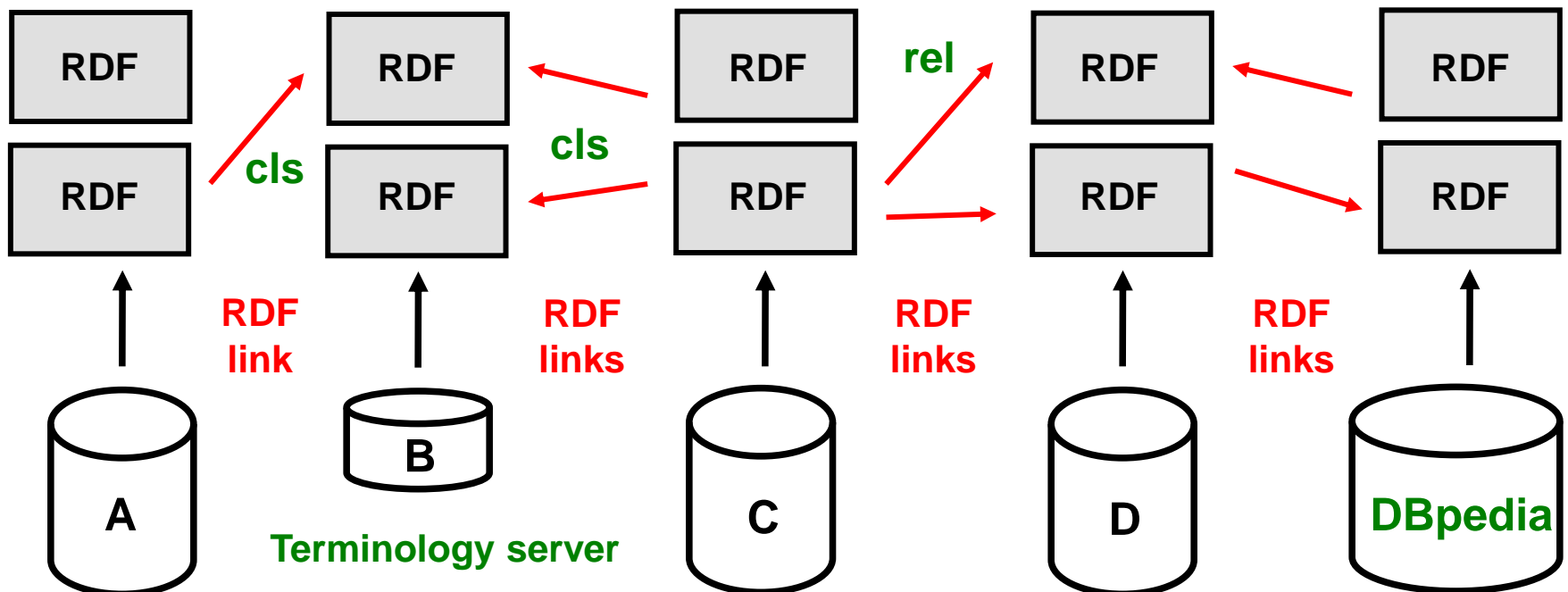
The main content area shows a search result for 'ON-FARM COMPOSTING METHODS'. The title is in blue with a small icon. The text below the title reads: 'Growing concerns relating to land degradation, threat to eco-systems from over and inappropriate use of inorganic fertilizers, atmospheric pollution, soil health, soil biodiversity and sanitation have rekindled the global interest in organic recycling practices like composting. The potential of comp...'. To the right of the text, there is a 'Date: Friday, 21 August 2009' and a 'Classification: manure-animal, compost, green manure, learning, soil fertility'.

Metadata translation process



The linked data approach

- Use RDF to provide IEEE LOM/DC metadata based on the DCMI/IEEE mapping
- Add links using **Relation**.
- Connect to terminologies using **Classification**.
- Link to other LOD datasets using other elements (**coverage**, **contributor**, etc.)



Exporting IEEE LOM metadata to LOD



- Links to other LOD sites:
 - Language of metadata → link to a DBPedia resource
 - vCard (e.g. in `lifecycle.validator`) → FOAF sentence linking to organizations
 - coverage → DBPedia / Other LD datasets with geopolitical information
- Links to ontologies/terminologies
 - Ontologies / terminologies must be exposed as linked data
 - OE ontology: <http://www.organic-edunet.eu/ont/term>
- Links to other resources: `relation.kind` element used to include information extracted from other parts of the portal

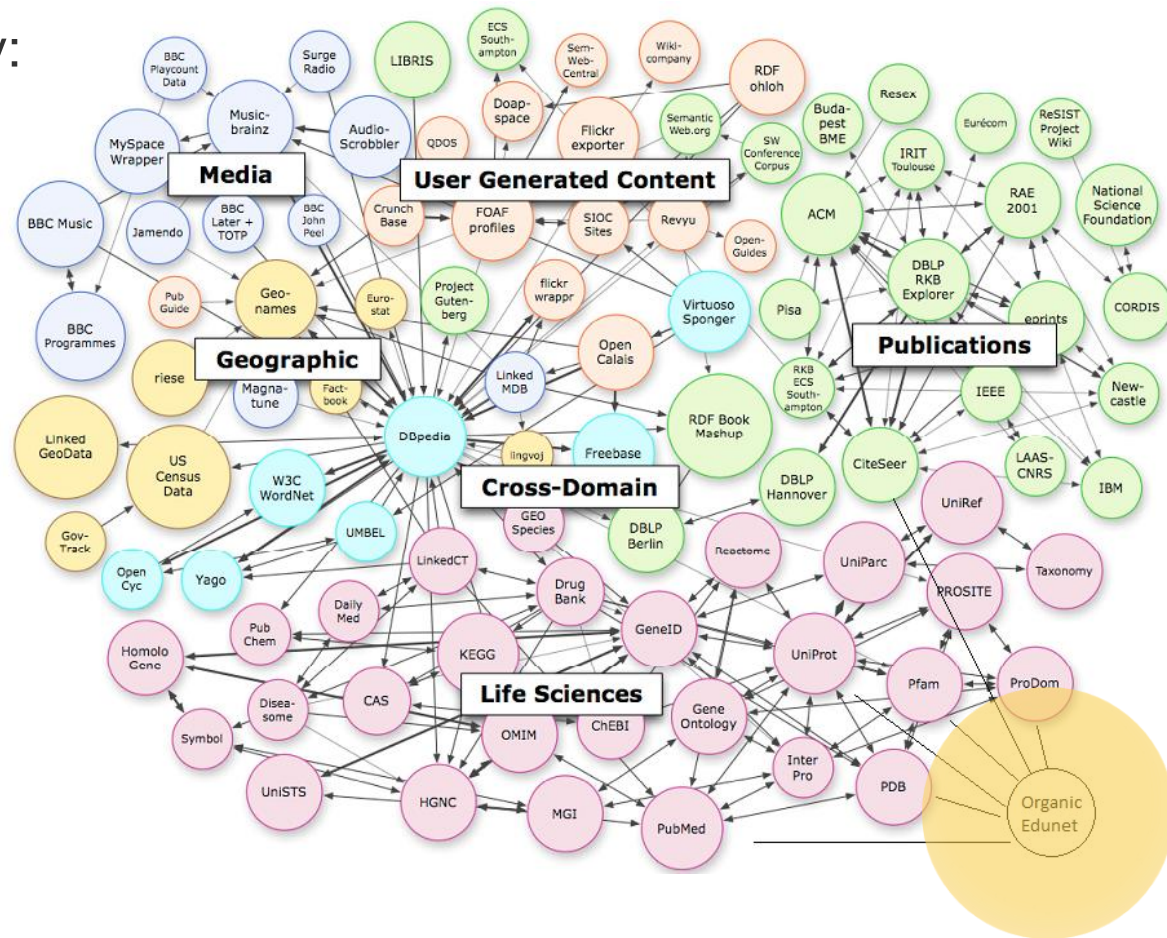
How would redesign affect existing systems?



- Need to implement the LOD exposure
- [Need / Recommend] to enrich the metadata
- OAI-PMH federated repositories may become the LOD providers for their repositories, enriching the metadata
- SQL can still be used as a common query mechanism, it might return a list of resources that are de-referenceable
- Need shared linked data exposure conventions for repositories on the DCM/IEEE mapping draft
 - E.g. LOM-compliant coverage information can not be a link

What are the benefits to current navigational search systems?

- Browsing independency: external linked data browsers will automatically be able to browse the repository contents.
- Other linked data sets will potentially link Organic.Edunet contents, allowing browsing across repositories



Situation today



- Linked data support in Organic.Edunet is currently in a prototype stage and in ongoing development
- Support for distributed browsing based on pilot prototypes
 - No other learning object repositories exposing linked data ready for integration testing
- The redesign of the browsing interface shows that our approach is feasible to implement

Future work

- Evaluation and refinement of the conventions used to provide semantic relations between learning resources and their metadata
 - Towards a formal specification for all repositories exposing IEEE LOM metadata through OAI/PMH?
- The success of Organic.Edunet approach relies on a shared linked data exposure conventions for repositories
 - This asks for community consensus

