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Linked Open Graph: browsing multiple SPARQL entry points to build your own LOD views

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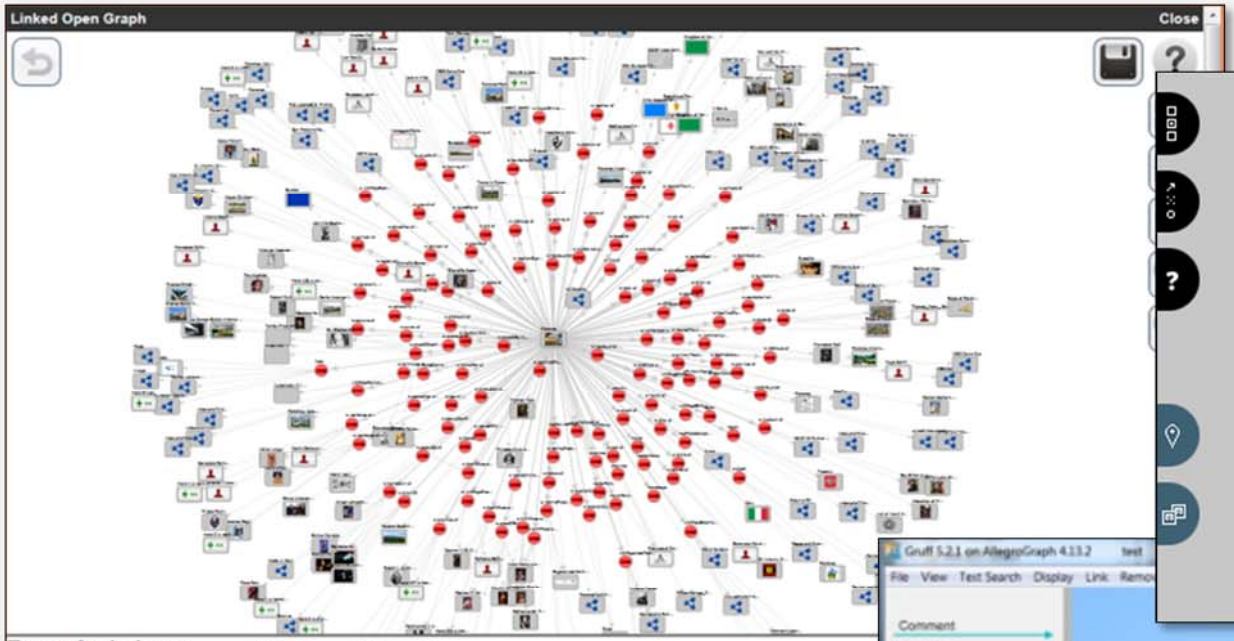
Proc. of the 20th International Conference on Distributed Multimedia Systems,
Pittsburgh, USA, August 2014

Context and motivations

- **Open Data vs Linked Data / Linked Open Data**
  - OD → hundreds of formats
  - Linked Data URI as a large network of definitions: triples, not quereable
- **Linked Open Data towards RDF Stores + SPARQL entry point**
  - RDF Stores as Knowledge base storing, quereable
  - Huge number of OD, limited of LD, a few RDF-SPARQL entry point services
  - SPARQL entry points services present many dialects and maturity (versions)

Grow-up Knowledge base

- **Developing knowledge base**, distributed knowledge base
  - Reusing: Definitions, Ontologies, SKOS, vocabularies,..
  - Reusing / linking: LD triples, RDF Stores + SPARQL
  - A unique storage by copying ←→ linking:
  - Distributing RDF segments →SPARQL queries
- ***→ Exploiting the KB***
  - ***Integrating multiple RDF Stores & LD***
  - ***Understanding and browsing: RDF Stores, LD***
  - ***Enriching KB with other triples, LD / URI***


Linked Open Graph
Close
Type of relations
Select all
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is cityServed of
is deathPlace of
is end of
is headquarter of
depiction
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is birthPlace of
is cityofbirth of
is deathPlace of
is foundation of
is headquarters of
is hometown of
hasPhotoCollection
is battle of
is body of
is cityofdeath of
is destination of
is foundationPlace of
homepage
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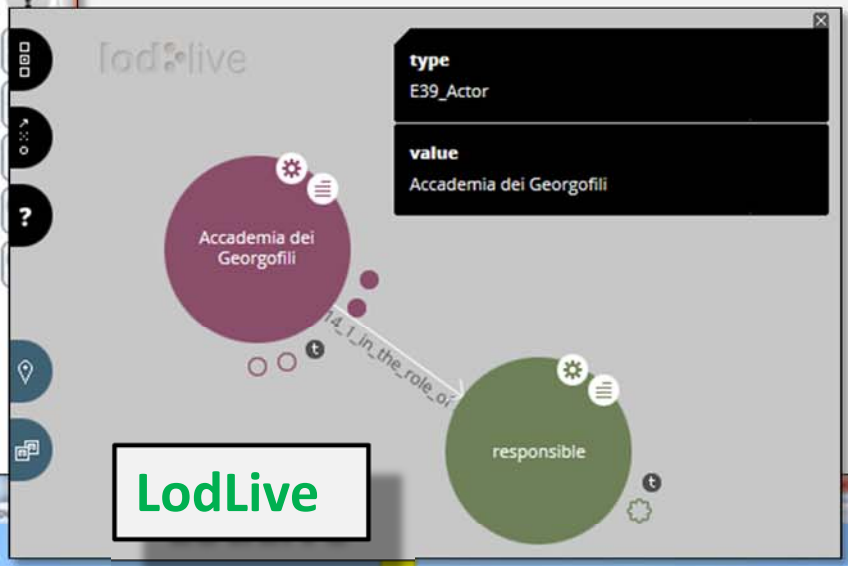
lodlive
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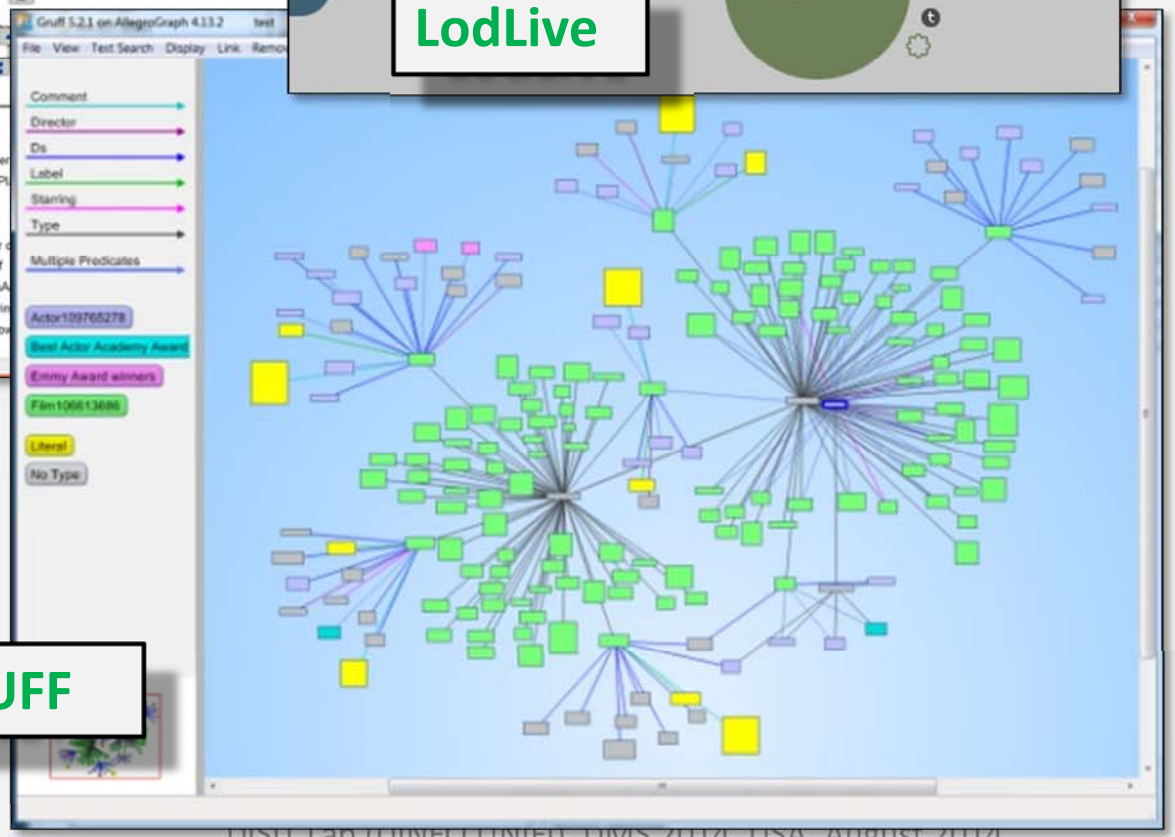
Comment
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Starring
Type
Multiple Predicates
Literal
No Type
GRUFF

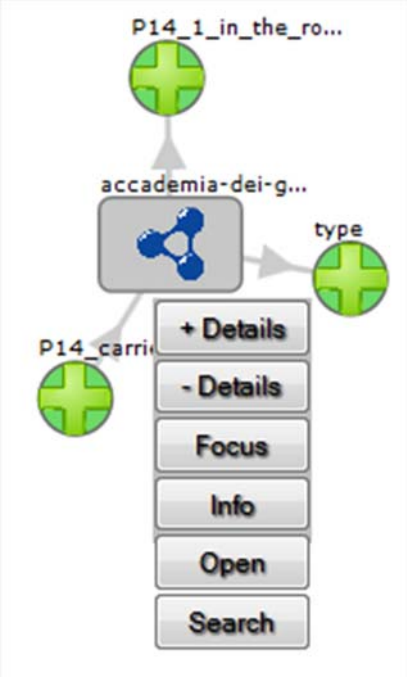
Major Features categories

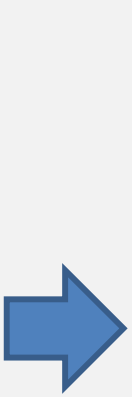
- **Access and Query**
  - Access to multiple distributed LD, browsing, searching, etc.
- **Relationships vs Entities**
  - Establishing links, showing, discovering, etc.
- **General Manipulation** of the elements
  - Manipulating the graph elements and the graph
- **URI Details**
  - Showing and exploiting attributes and values
- **Non Functional**
  - Scalability, removing duplicates, working via WEB

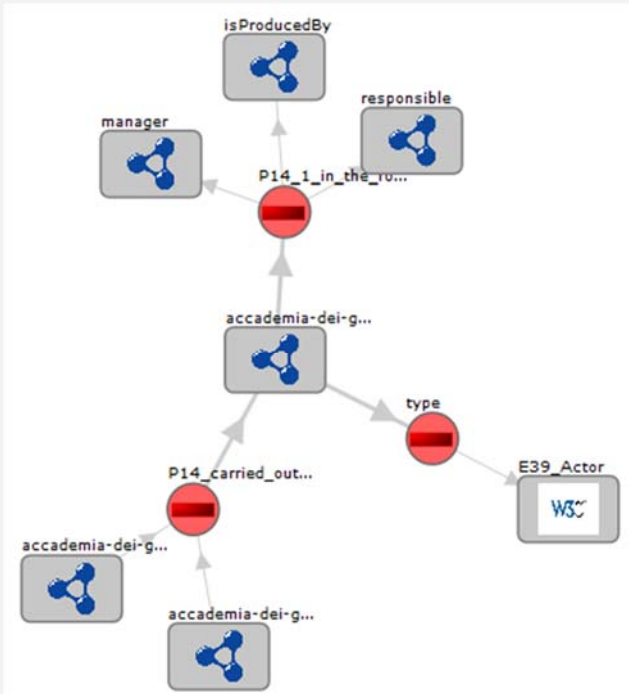
	LOG	LodLive	Gruff
Access and Query			
Access and rendering of LD	Y	Y	N
Access and rendering URI from SPARQL entry point	Y	Y	Y
Managing Entry Points with different URL in URI.	Y	N	Y
Multiple SPARQL entry points	Y(10)	N	N
Making keyword based query	Y	Y	Y
Inspecting entry point for searching classes	Y	Y	Y
Relationships vs entities			
Showing relationships, turning on/off, singularly or globally	Y(3)	Y(2)	Y(2)
Representing relationships (managing complexity)	Y	Y(4)	Y(4)
Discovering inbound/outbound relationships, URI and queries	Y	Y	Y(7)
Discovering /searching single element from 1:N relation , or samples	Y	N	N
Discover paths between URI	N	N	Y
Creating triples/relationships	N	N	Y
Expand all relationships	Y	Y	N
Close all relationships	Y	N	N
Counting number of elements	Y	Y	Y
"sameAs" management	Y	Y	Y
Blank nodes rendering	Y	Y	Y
General Manipulation			
Undo actions performed, "back"	Y	N	Y
Save and Load LOD graphs	Y	N	(Y)
Share and collaborative LOD graphs	Y	N	N
Export of RDF graph triples	N	N	N
Re-layouting the graph	Y(6)	N	Y
Focusing on an URI	Y	Y	N
Zooming the graph	Y	N	Y(8)
Centering the graph	Y	N	N
Panning the graph with mouse/finger	Y	Y	Y
URI Details			
URI attributes (showing info or an URI)	Y	Y	Y(1)
Map allocation of URI	Y(9)	Y(9)	N
URL to resources	Y	Y	N
Open play resources	Y	Y	Y
Representing entities	Y	Y(5)	Y(5)
Non Functional			
Web based tool	Y	Y	N
Embed in web pages of third party service: ECLAP	Y	N	N

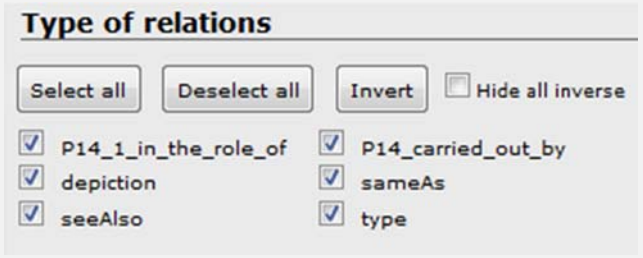
Access and rendering

- Several kinds of relationships, same direction, etc.: type, sameAs, blank nodes, subject,
- Access and rendering of LD
- Access and rendering URI from a SPARQL entry point









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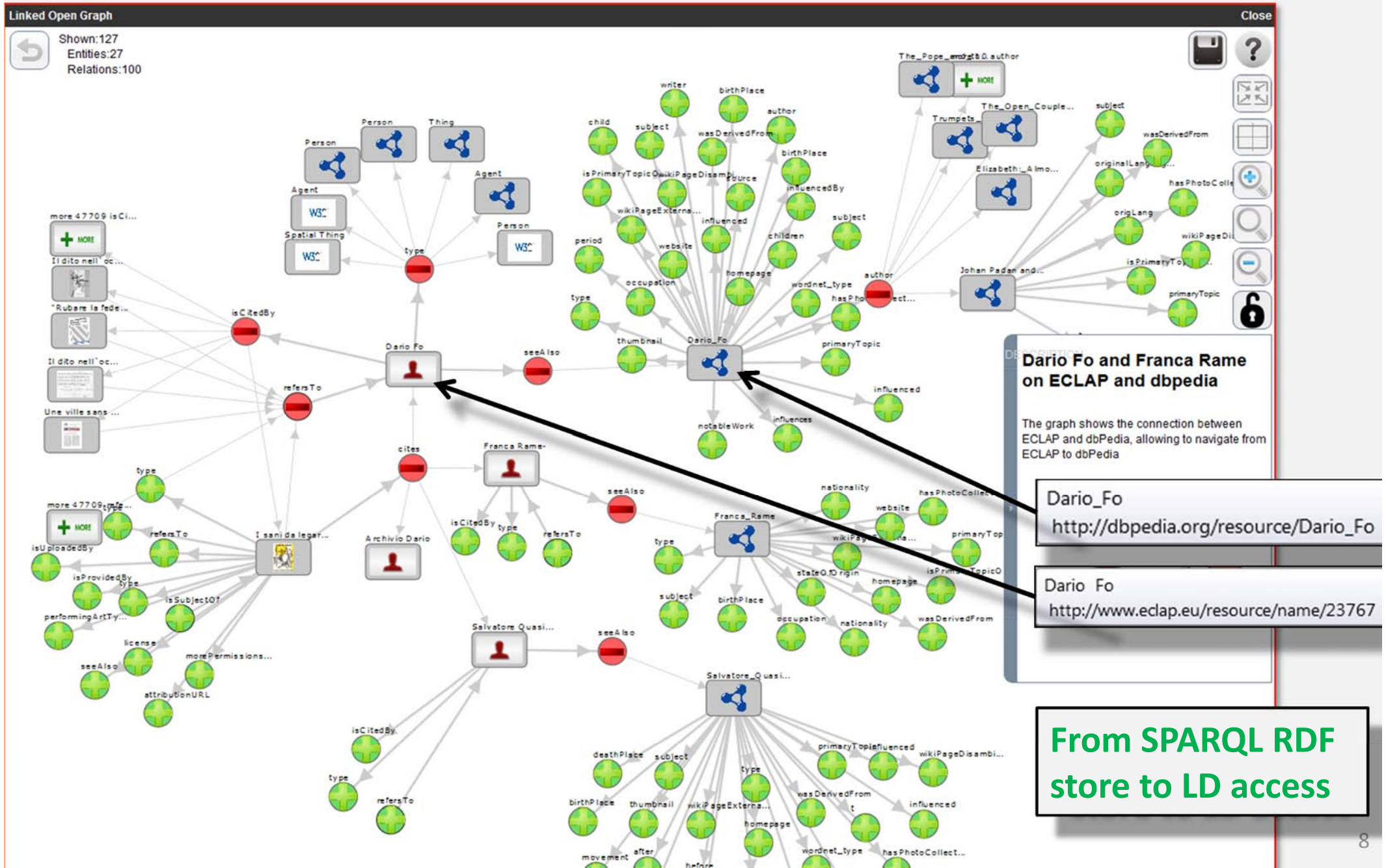
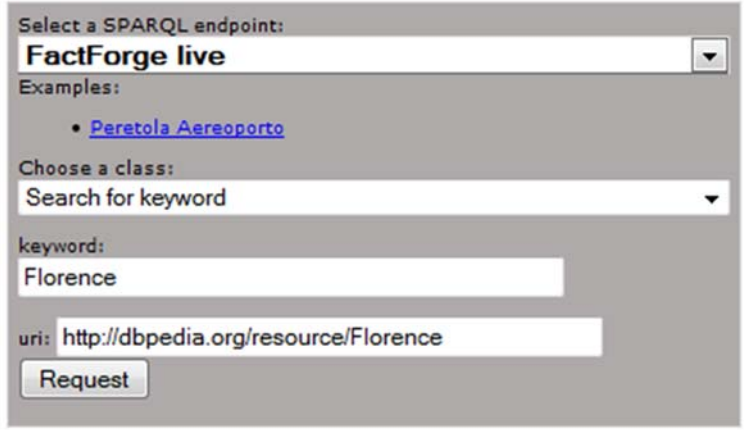
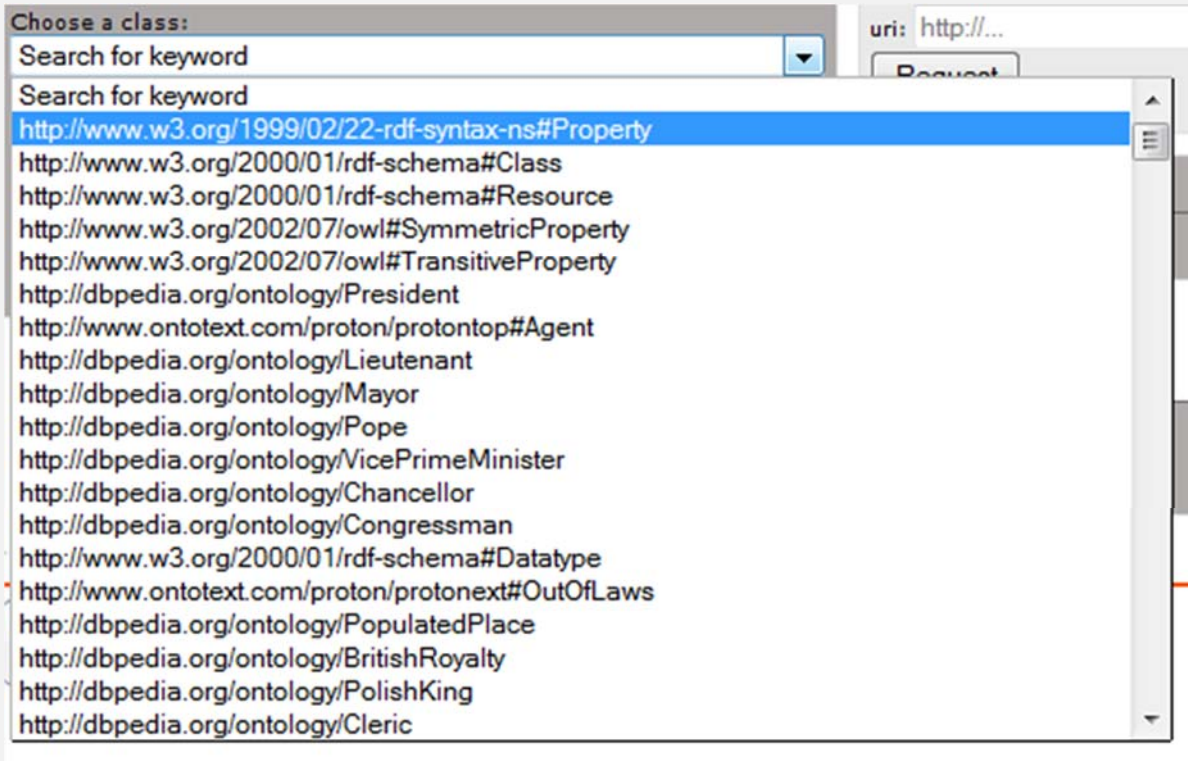


Access and Rendering

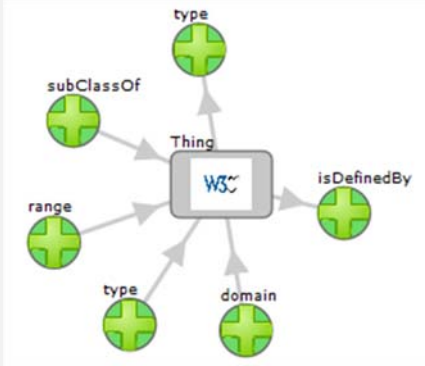
- **Managing Entry Points with different URLs in URI**
  - **Multiple ontologies, entities, sources…**
- **Inspecting entry point for searching classes**
- **Making keyword based query**
- → Multiple SPARQL entry points

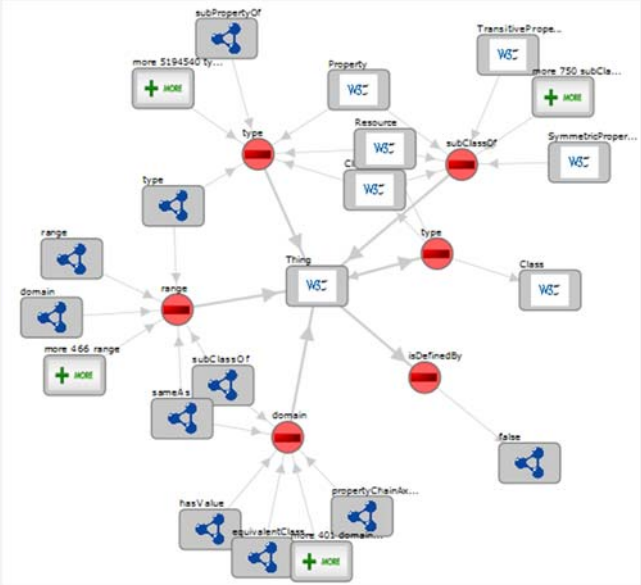




Relationships vs entities

- Showing relationships, turning on/off, singularly or globally
  - Expand all relationships
  - Close all relationships
  - “sameAs” management
  - Blank nodes rendering
- Counting number of elements
- **Discovering inbound/outbound relationships, URI and queries**
- *Discovering /searching single element from relation*
- *Representing relationships (managing complexity*)

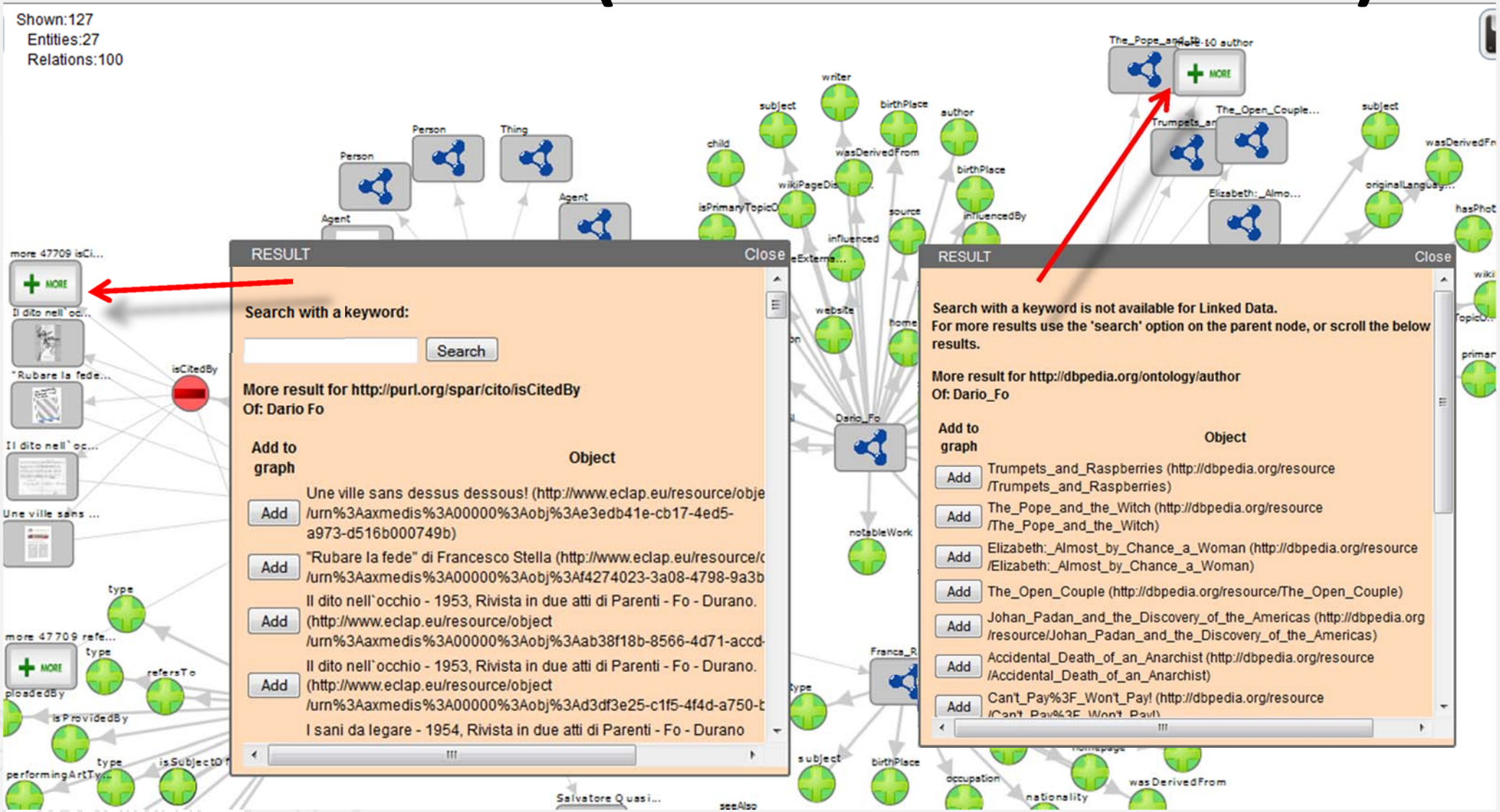




From local stores

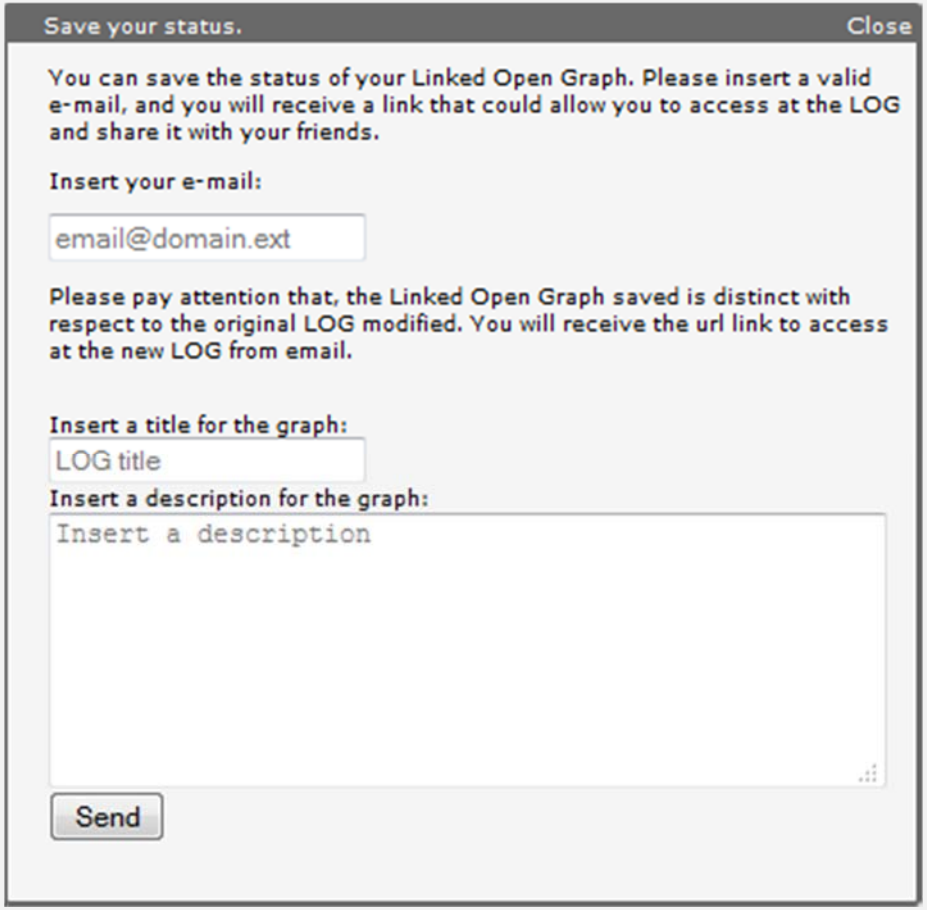
- Discover paths between URI
- Creating triples/relationships

Discovering /searching single element from relation **(RDF store -vs- LD URI)**



General Manipulation

- Undo actions performed, “back”
- **Save and Load LOD graphs**
- **Share and collaborative LOD graphs**



Classical features

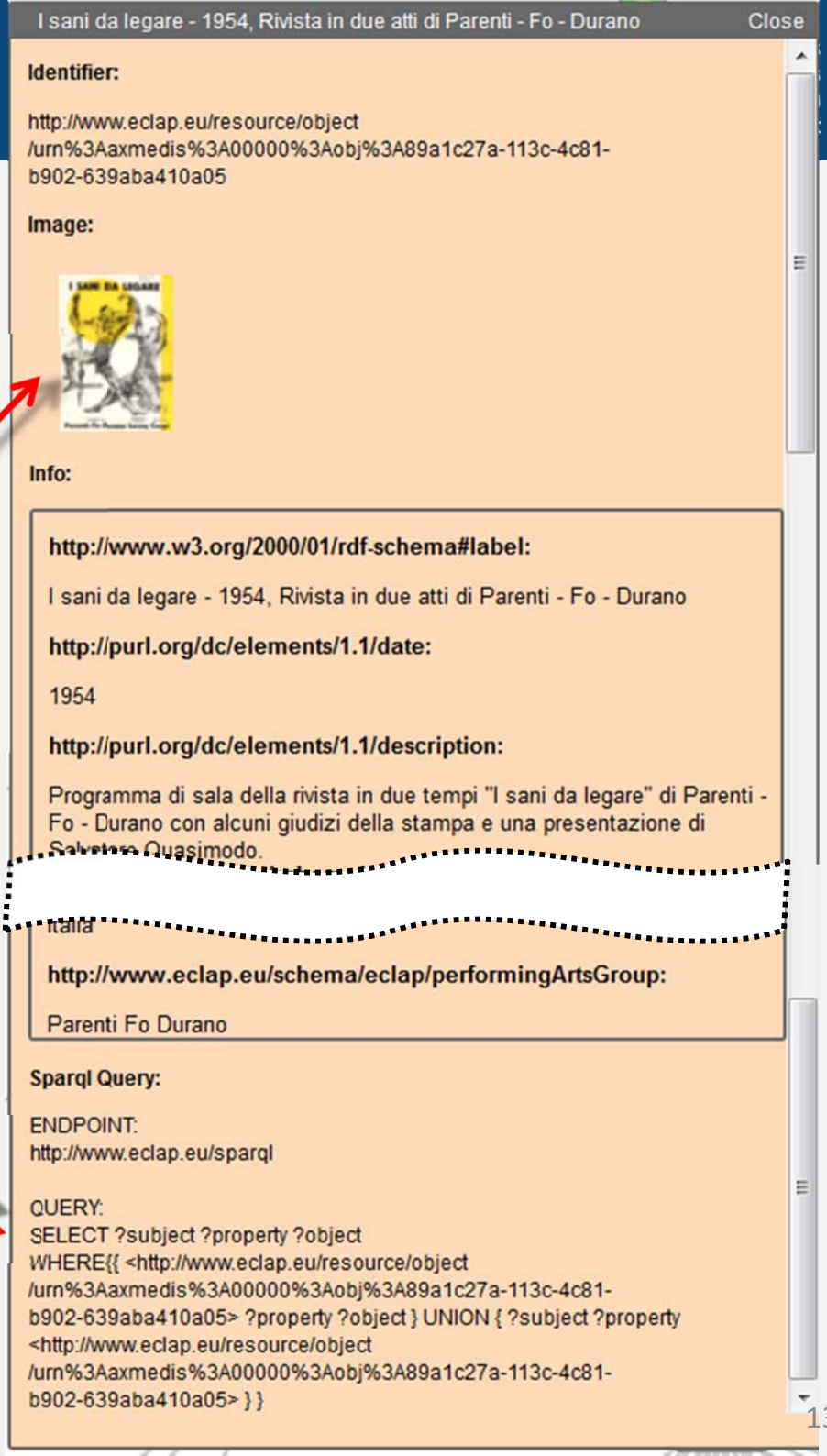
- Re-layouting the graph
- Focusing on an URI
- Zooming the graph
- Centering the graph
- Panning the graph with mouse/finger

Not yet

- Export of RDF graph triples

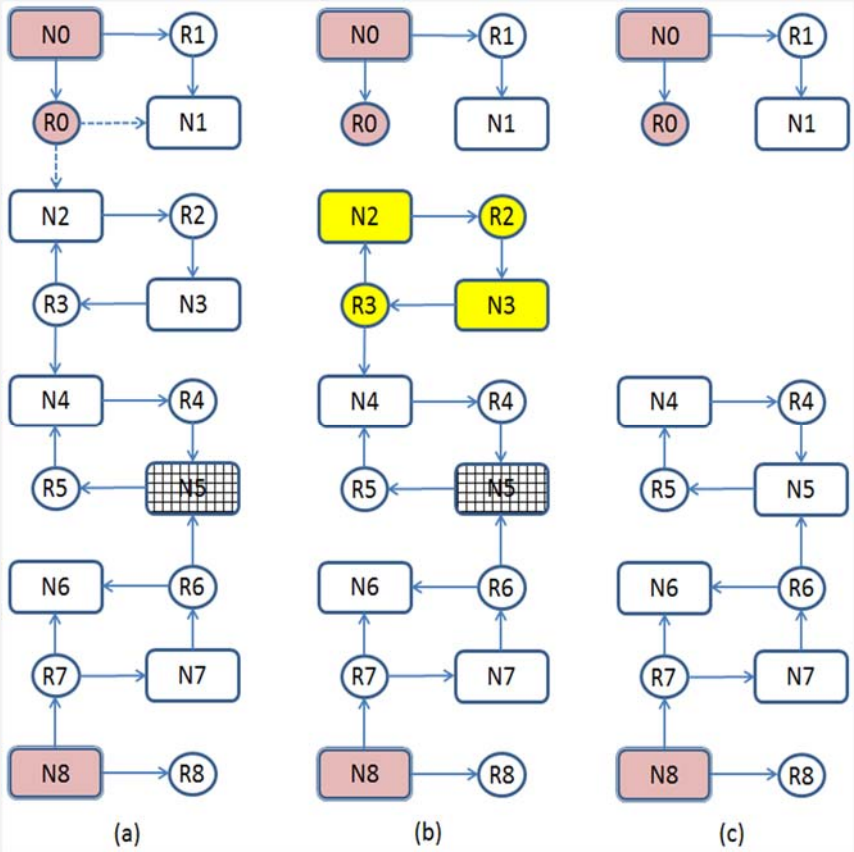
URI Details

- URI attributes (showing info or an URI)
- Map allocation of URI
- URL to resources
- **Open play resources**
  - **Images in local**
  - **Video in remote**
  - **etc.**
- ***Learning how to compose queries***
- Representing entities

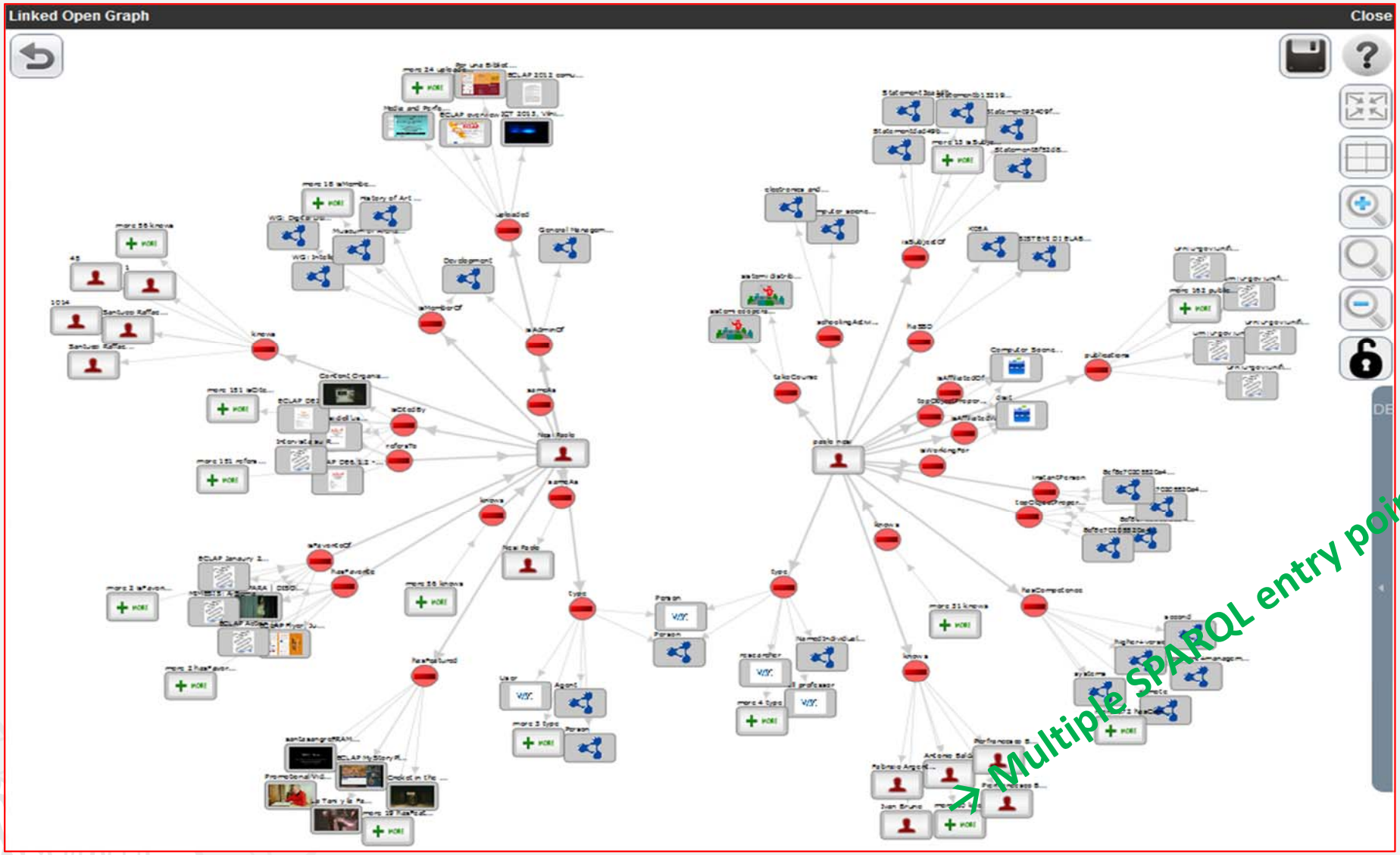


LOG.disit.org computing

- A) **LOG case with two roots**: N0 and N8, share node N5 that holds a double multiplicity (belonging to two graphs).
  - **user closes R0** (double click on it): 2 relationships related arcs dotted are deleted.
  - According to that action, a graph **analysis is needed**.
- B) **performing a labeling process** from both roots N0 and N8.
  - identifying all nodes that are connected from some root (all except N2, N3) in the graph.
    - elements which are not connected have to be removed (see B): N2, N3, R3 and R2.
    - shared nodes, such as node N5 lose their multiplicity.
- C) **final results** after the application of the above described "closure" algorithm
  - some elements passed from one root to the other.
- complementary operation is needed when an inbound link of a node is opened
  - Example: N3 request the opening of R3, then a situation similar to B can be reached.



A LOG RDF graph analysing connection and structures of the same user on ECLAP and OSIM RDF stores



Applications

- **With the aim of exploiting available knowledge sources**
  - Integrating multiple sources for KB building
  - Via: SPARQL entry points, ontologies/LD, LD, vocabularies/LD, etc.
- **Understanding, browsing, simulating: RDF Stores, LD**
  - Discovering connections among RDF Stores and LD
  - Comparing Ontologies and representation
- **Building and Exploiting merged KB!!**
- **Applications:**
  - **ECLAP**: CH representation, multiple ontologies, links with dbPedia, Geonames
  - **Europeana**: Ch representation, multiple ontologies, links with ECLAP
  - **Sii-Mobility**: as a support for defining rules about smart city conditions and for developers to identify viable query for advanced smart applications
  - **OSIM**: for Cloud model browsing and understanding.
  - ***Add yours!!!***

dbpedia live
British Museum
FactForge live
LinkedGeoData
Europeana
Cultura Italia
Comune Firenze
Senato, Italiano
Camera dei deputati, Italiano
Getty Vocabularies
Open Link SW
IEEE Video Stanford representation
SiiMobility (by DISIT)
ICARO cloud (by DISIT)
MyStoryPlayer (by DISIT)
OSIM (by DISIT)
ECLAP (by DISIT)

Conclusions

- **LOG.DISIT, a new Model and Tool**
  - **as a support for KB development in the advanced semantic web era.**
  - **advanced and more complete features with respect to the state of the art tools, solving and enabling**
    - collaborative work, and sharing
    - progressive browsing of the graphs
    - graph composition: multiple SPARQL entry, plus LD, ..
    - support to pose specific queries
    - progressive discovering/selection of instances
- **currently used in a number of projects and activities in the area of semantic web. *Add yours!!!***

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Thank you!

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