

Ontology View Query Manager

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Introduction:

Knowledge driven software applications often require application specific derivatives of existing ontologies. When such derivatives are expressed via a query we refer to this as an ontology view (conceptually a virtual graph composed of the query results). To enhance the reusability of such views, the view Query Manager application allows queries to be composed, executed, saved, discovered, and shared. The Query Manager also supports the storage of materialized view results which can act as sources for further queries.

Motivation:

In the Ontology Views project, a collaborative effort between the University of Washington Structural Informatics Group and the National Center for Biomedical Ontologies (NCBO), views are expressed in semantic web query languages such as SPARQL, vSPARQL [1], and IML [2]. In any of these query languages, including SPARQL, defining a meaningful view requires a significant degree of expertise. In previous work with DXBrain [3] we learned that, by starting with a template query, similar to the desired query, users were able to create sophisticated queries by performing relatively minor edits. The Query Manager extends this lesson to ontology views.



Figure 1: Query composition and editing interface.

Composing:

The Query Manager includes a text-based environment for composing and editing queries (Figure 1).

Executing:

The Query Manager delegates query processing to appropriate web services according to the query language. Figure 2 shows partial results of the query from Figure 1.

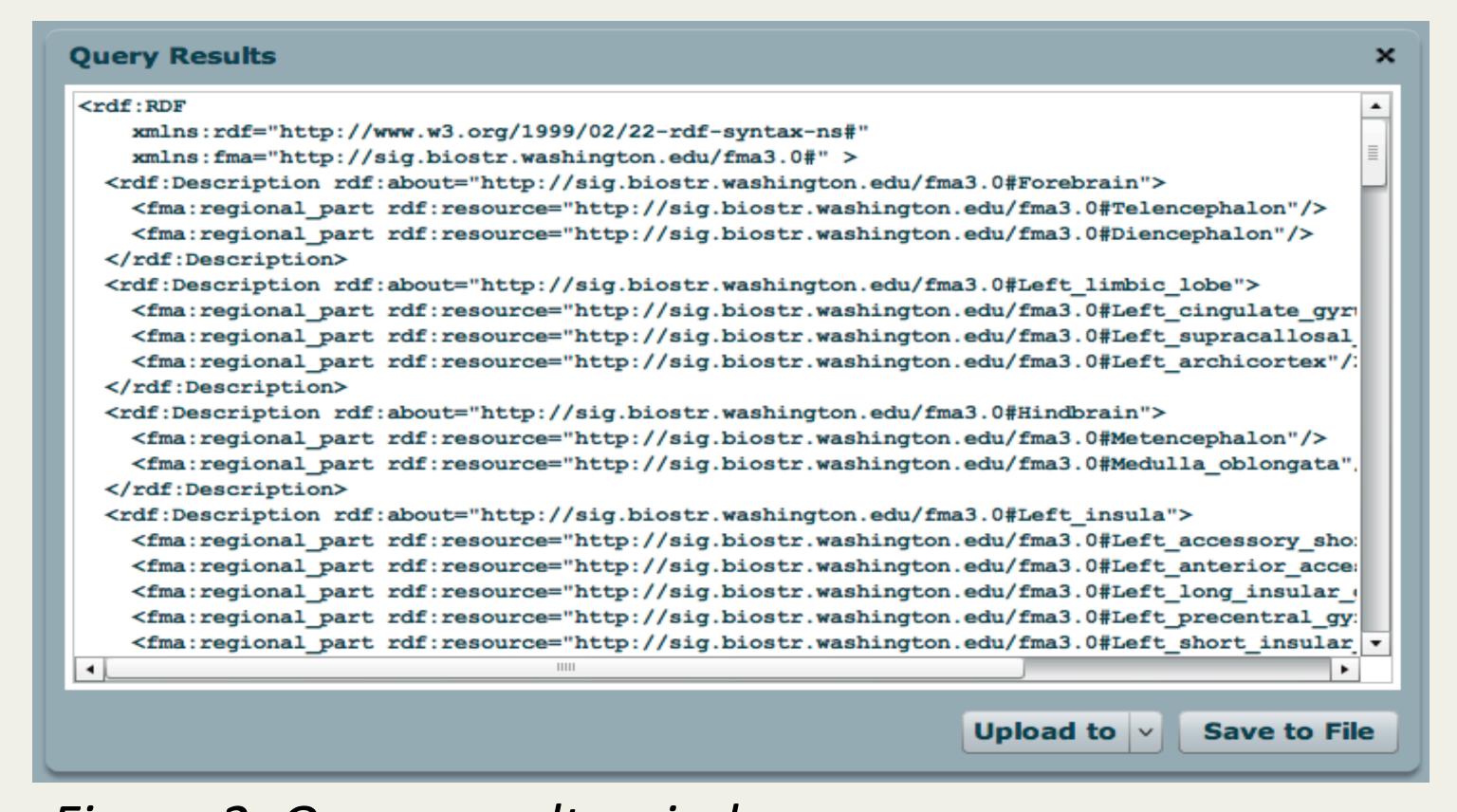


Figure 2: Query results window.

Saving:

To enable query reuse, the Query Manager provides facilities for saving queries. Several metadata fields may be associated with a query including title, description, and language (Figures 1 and 3).

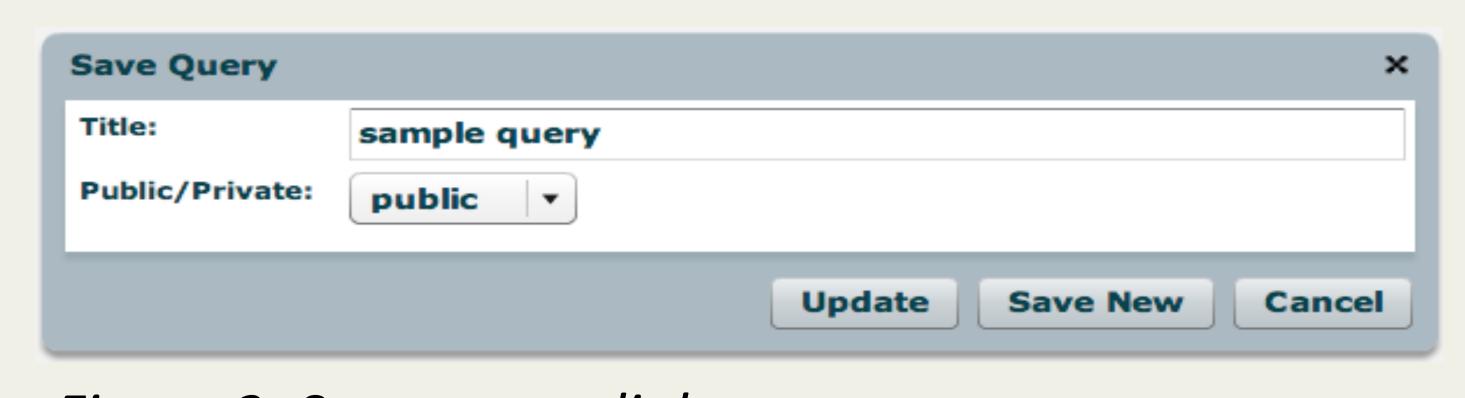


Figure 3: Save query dialog.

Discovering:

Saved views may be reused as templates, to aid users in the creation of new, similar views. But first the user must find a similar query. The Query Manager allows

users to search on any of the associated metadata fields as well as within the query itself (Figure 4).

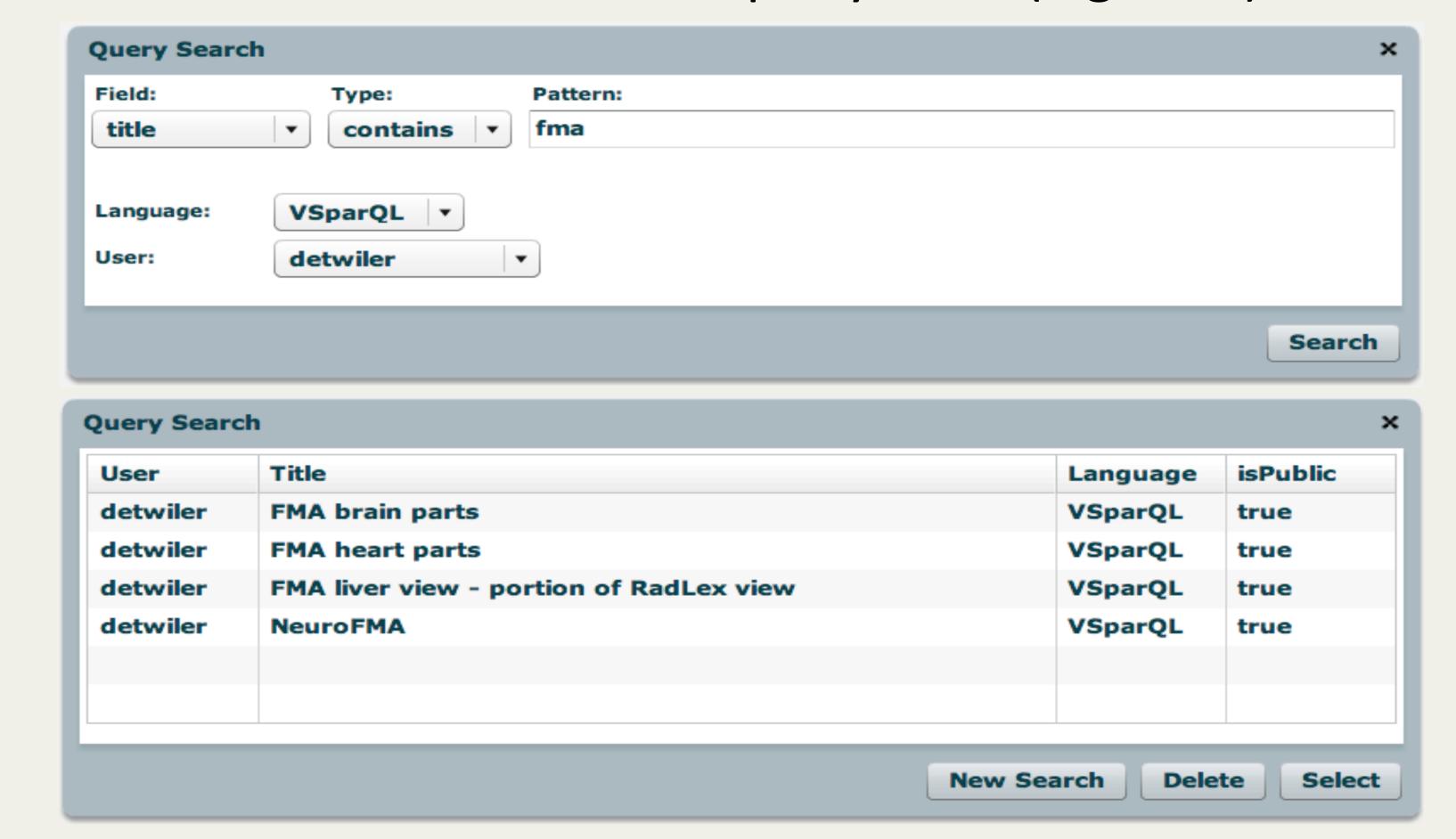


Figure 4: Query search dialog.

Sharing:

When saving a query, users decide which queries should be shared with others by choosing to make them either public or private (Figure 3).

Materialized Views:

In addition to saving view queries, users can also save the results of those queries. Results can be saved to a file, for embedding in knowledge driven applications, or they can be uploaded to the Query Manager (Figure 5) where they can then be used as a source for subsequent queries (enabling users to query a view).

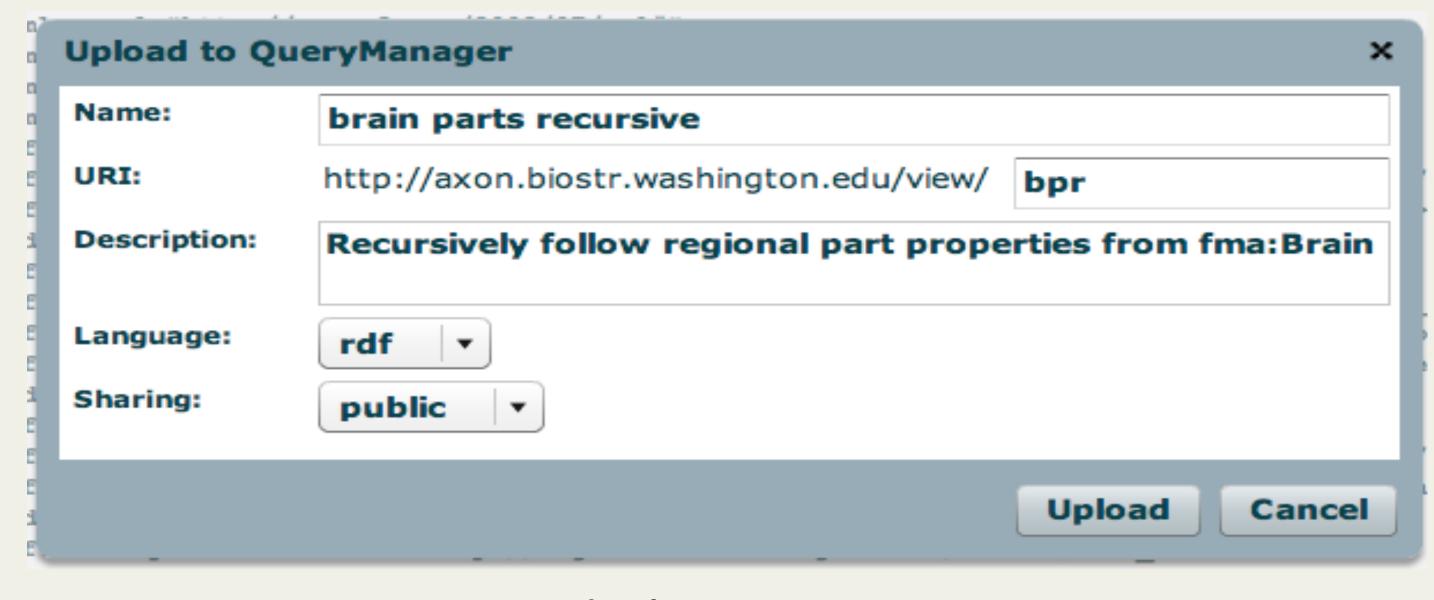


Figure 5: View save dialog.

BioPortal:

BioPortal, at the NCBO, is an ontology repository

containing more than 200 biomedical ontologies. While BioPortal supports basic query functionality, such as term search, it lacks a general declarative query interface. The Query Manager supports querying of all RDF/OWL ontologies, available for download through the BioPortal rest services. Ontology mirrors are created and stored in a relational database for efficient querying.

Content Assist:

To help users select query sources, a context menu extension aids users in discovering the ontologies/views that have been uploaded to or registered with the Query Manager, such as the BioPortal ontologies (Figure 6). A similar extension helps users discover the prefixes defined within the source ontologies selected (Figure 7).

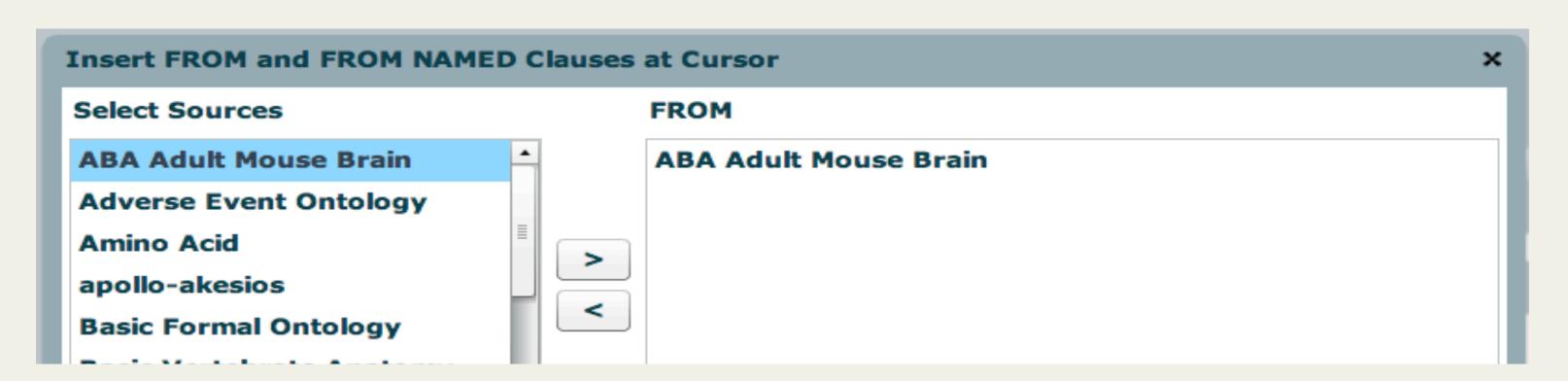


Figure 6: Source content assistance.



Figure 7: Prefix content assistance.

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- http://trac.biostr.washington.edu/trac/wiki/ IntermediateLanguage
- 3. Detwiler LT, Suciu D, Franklin JD, Moore EB, Poliakov AV, Lee ES, Corina DP, Ojemann GA, Brinkley JF. Distributed XQuery-Based Integration and Visualization of Multimodality Brain Mapping Data. Front Neuroinformatics. 2009;3:2. Epub 2009 Jan 30.