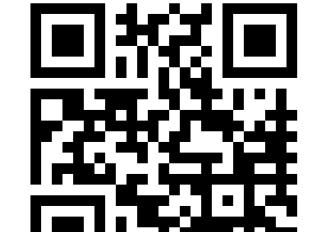


Comprehensive data annotation and findable data: Mapping odML to RDF





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Overview

Annotation of research data with metadata is vital to provide context for analysis and data re-use. The odML[1] format enables collecting metadata from different sources in an organized, flexible, human and machine-readable fashion[2] and is easy to use for the scientist. odML specifies the format, not the content, so any metadata necessary to describe a given dataset can be stored.

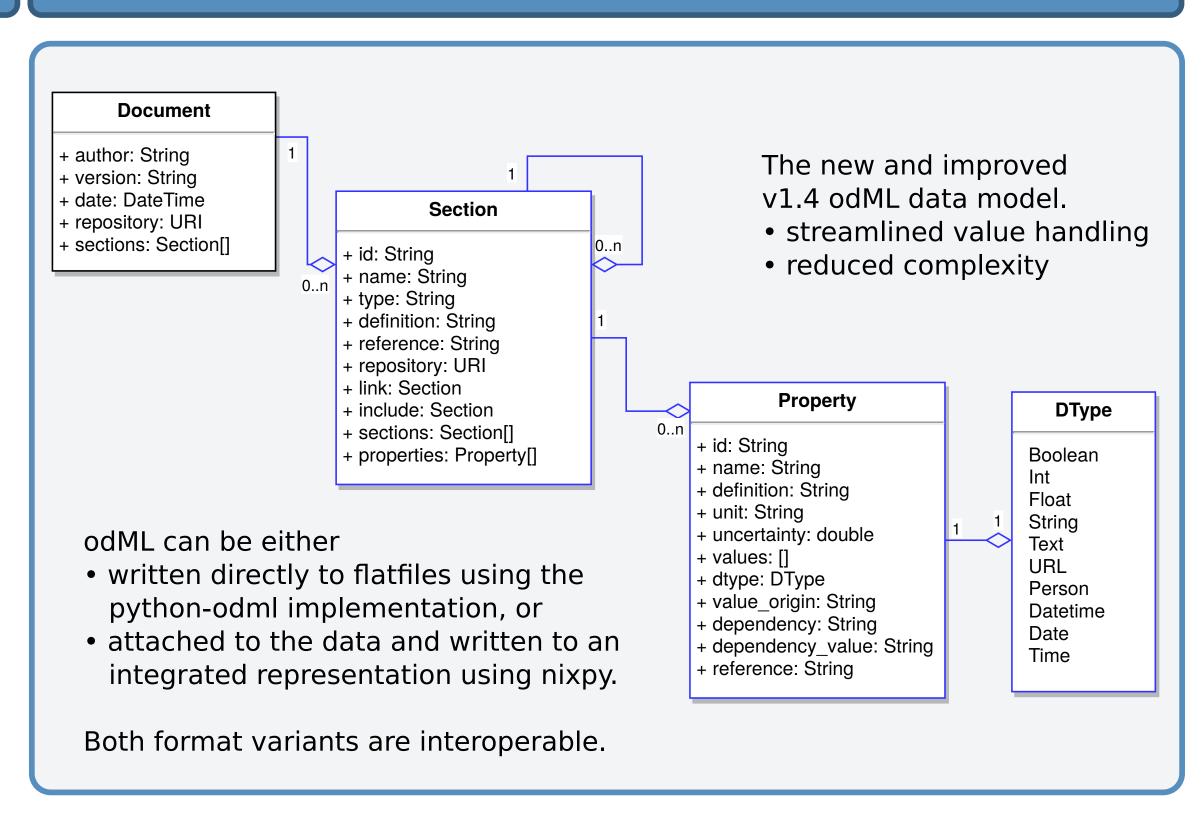
Building on the odML format we present an approach utilizing Semantic Web technologies to effortlessly make even diverse metadata interoperable, findable and accessible according to the FAIR principles[3]. With a small set of terms derived from the odML format we defined a mapping from the odML data model to a general repesentation in RDF[4] and developed a straightforward conversion pipeline.

Thus, metadata collected via the convenient odML format can be fed to a single local or distributed searchable RDF graph. Taking advantage of the powerful OWL language[5], each distinct set of metadata can be subclassed further to the benefit of maintaining the original relations without losing the common structure, achieving interoperability without sacrificing findability. To enable easy access to large collections of metadata, we developed a custom "fuzzy search" feature and further introduce an augmented SPARQL server based on Apache Jena Fuseki[6] that offers a convenient search interface for the scientist by using the powerful SPARQL query language.

Data / Metadata acquisition workflow using odML

Data Data Aquisition Annotation Storage NIX manual nixpy Data + Metadata Data ÷ ÷ ÷ ÷ odML Data automated and Metadata Metadata py-odml Metadata py-odml

odML data model

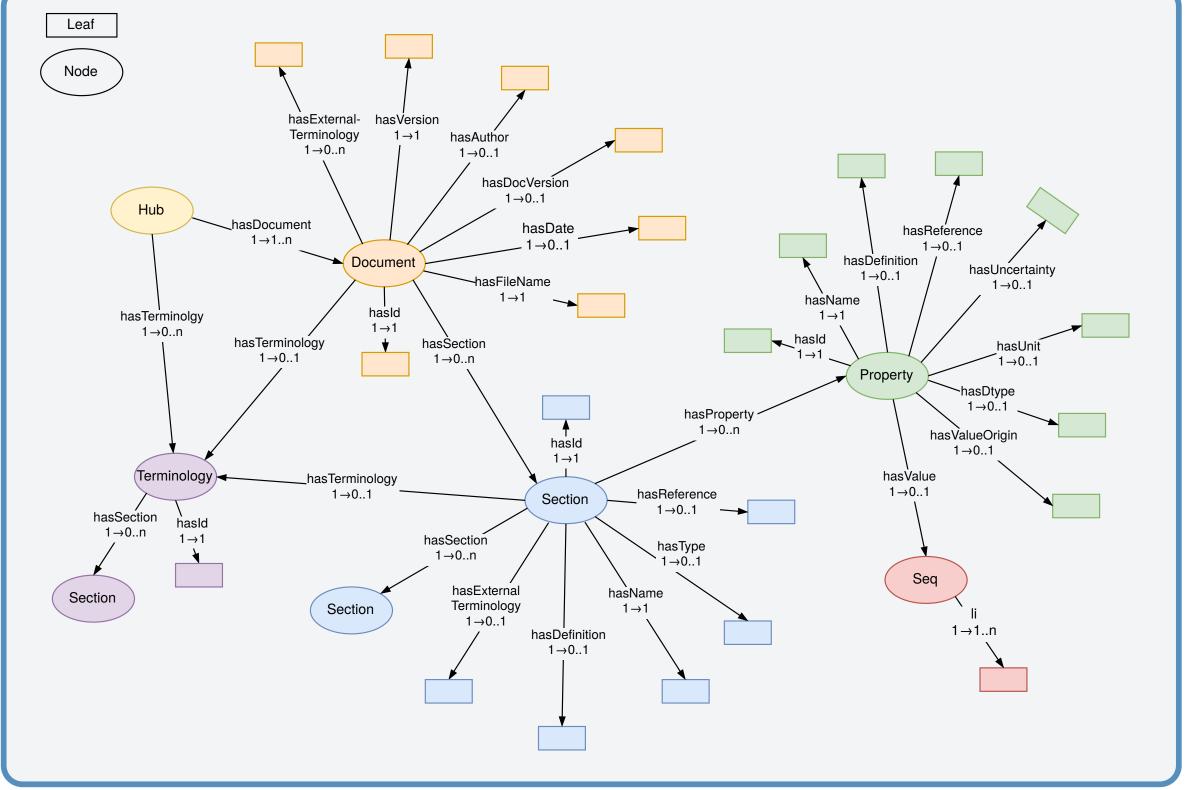


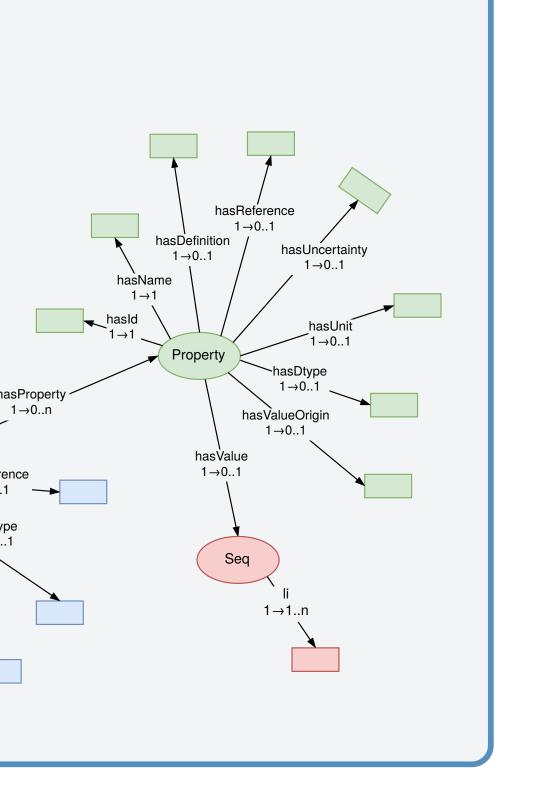
G-Node formats

RDF representation of odML data model

Opening Metadata to the Semantic Web via odML

odML





Using OWL to fine-tune RDF Metadata

Extend the basic odML OWL ontology by subclassing

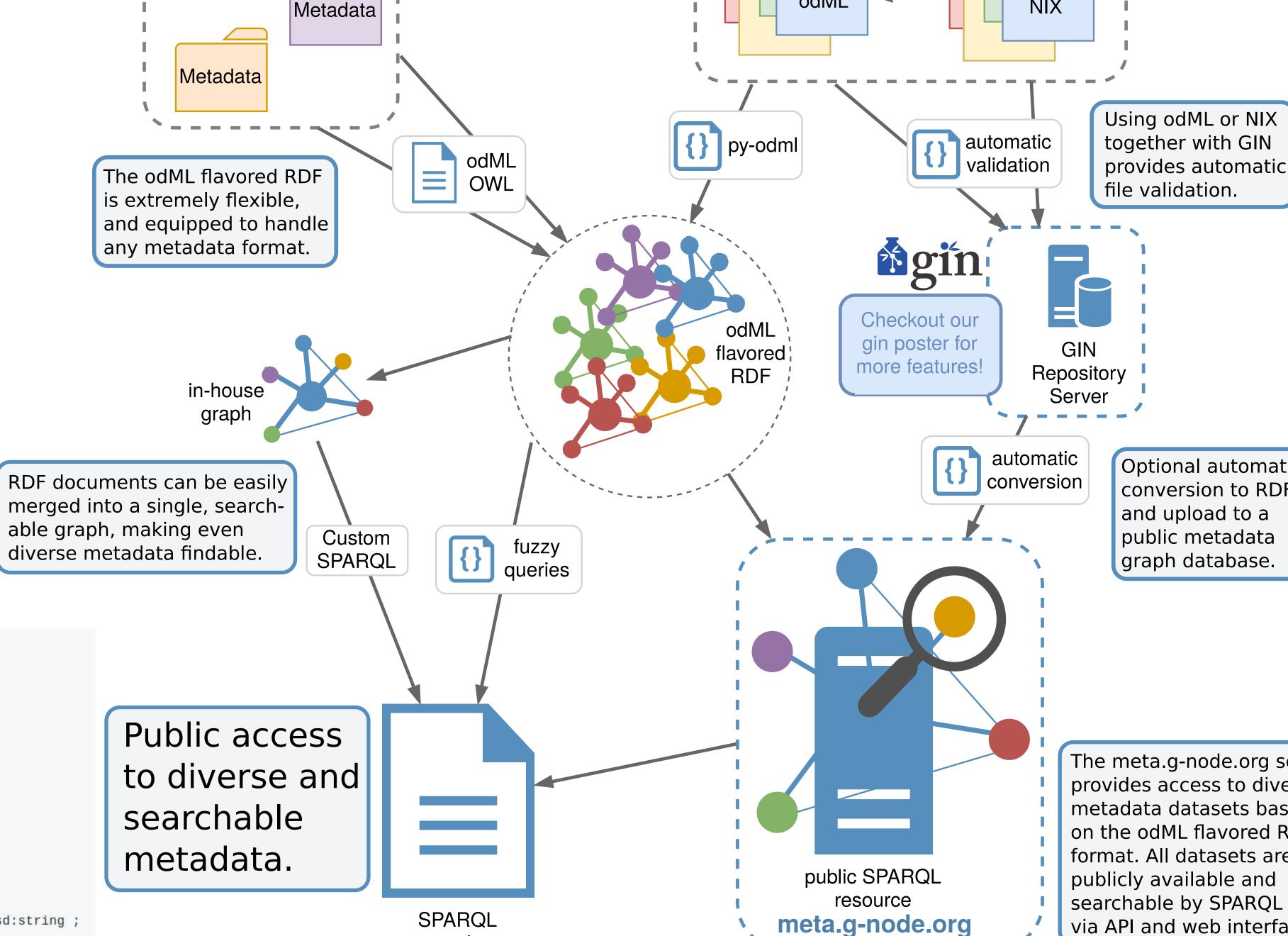
 retain your own metadata structure and terms even in RDF.

the basic odML flavored RDF to

 enable more specific SPARQL queries for your needs while enabling general searches through odML terms.



rdfs:label "Electrode" . ### https://g-node.org/projects/odml-rdf#Stimulus :Stimulus rdf:type owl:Class; rdfs:subClassOf :Section ; rdfs:comment "Description of the Stimulus."^^xsd:string;



The meta.g-node.org server provides access to diverse metadata datasets based on the odML flavored RDF format. All datasets are publicly available and searchable by SPARQL via API and web interface.

Optional automatic

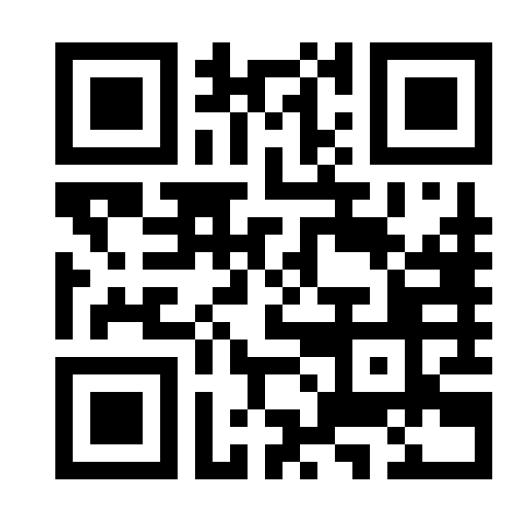
conversion to RDF

and upload to a

public metadata

graph database.

Resources and references



Find the odML, NIX and GIN projects at

rdfs:label "Stimulus"

http://meta.g-node.org https://github.com/G-Node/python-odml https://github.com/G-Node/nixpy https://gin.g-node.org

Find out about more G-Node projects at https://g-node.github.io

Contact: dev@g-node.org

References

[1] Grewe et al (2011); doi:10.3389/fninf.2011.00016 [2] Zehl et al (2016); doi:10.3389/fninf.2016.00026

results

- [3] Wilkinson et al (2016); doi:10.1038/sdata.2016.18
- [4] https://www.w3.org/RDF/

External

formats

[5] https://www.w3.org/TR/owl-features/ [6] https://jena.apache.org/documentation/fuseki2/

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