DataCite meeting
Describe, disseminate, discover:
metadata for effective data citation
British Library, 6 July 2 2012

DataCite meets Linked Data

- **DataCite metadata mapping to RDF – 'DataCite2RDF'**
- **A Web entry form for DataCite metadata**
- **Data citations in the Open Citations Corpus**

This presentation available at http://bit.ly/LChj1H

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***"It is a very sad thing
that nowadays there is
so little useless information"***

Oscar Wilde

An introduction to RDF and linked data

- The principles are quite simple
  - All entities (classes) and their relationships (properties) are identified and defined by unique URIs
  - UIRs reference publicly available and commonly accepted structured vocabularies (ontologies)
  - Each relationship is expressed as a subject – predicate – object ‘triple’
  - The syntax defined by W3C’s Resource Description Framework (RDF)
- Examples:

```
:my-dataset rdf:type fabio:Dataset .
:my-dataset dc:creator "Shotton, David" .
:my-dataset dc:title “Data citations, 2012” .
```

- Such statements can be combined into interconnected information networks (RDF graphs) – forming ‘linked data’
  - the truth content of each original statement is maintained
  - thereby creating a web of knowledge, the Semantic Web

Inadequacies of Dublin Core for DataCite metadata

Dublin Core Mapping

The table below provides a mapping of the DataCite properties to the Dublin Core Simple elements and Qualified terms.[7]

ID	DataCite-Property	Dublin Core Simple Mapping (elements namespace)	Dublin Core Qualified Mapping (terms namespace)
1	Identifier	dc:identifier	dcterms:identifier
1.1	identifierType	dc:identifier	dcterms:identifier
2	Creator	dc:creator	dcterms:creator
2.1	creatorType	dc:creator	dcterms:creator
2.2	nameIdentifier	Not present in Dublin Core	Not present in Dublin Core
2.2.1	nameIdentifierScheme	Not present in Dublin Core	Not present in Dublin Core

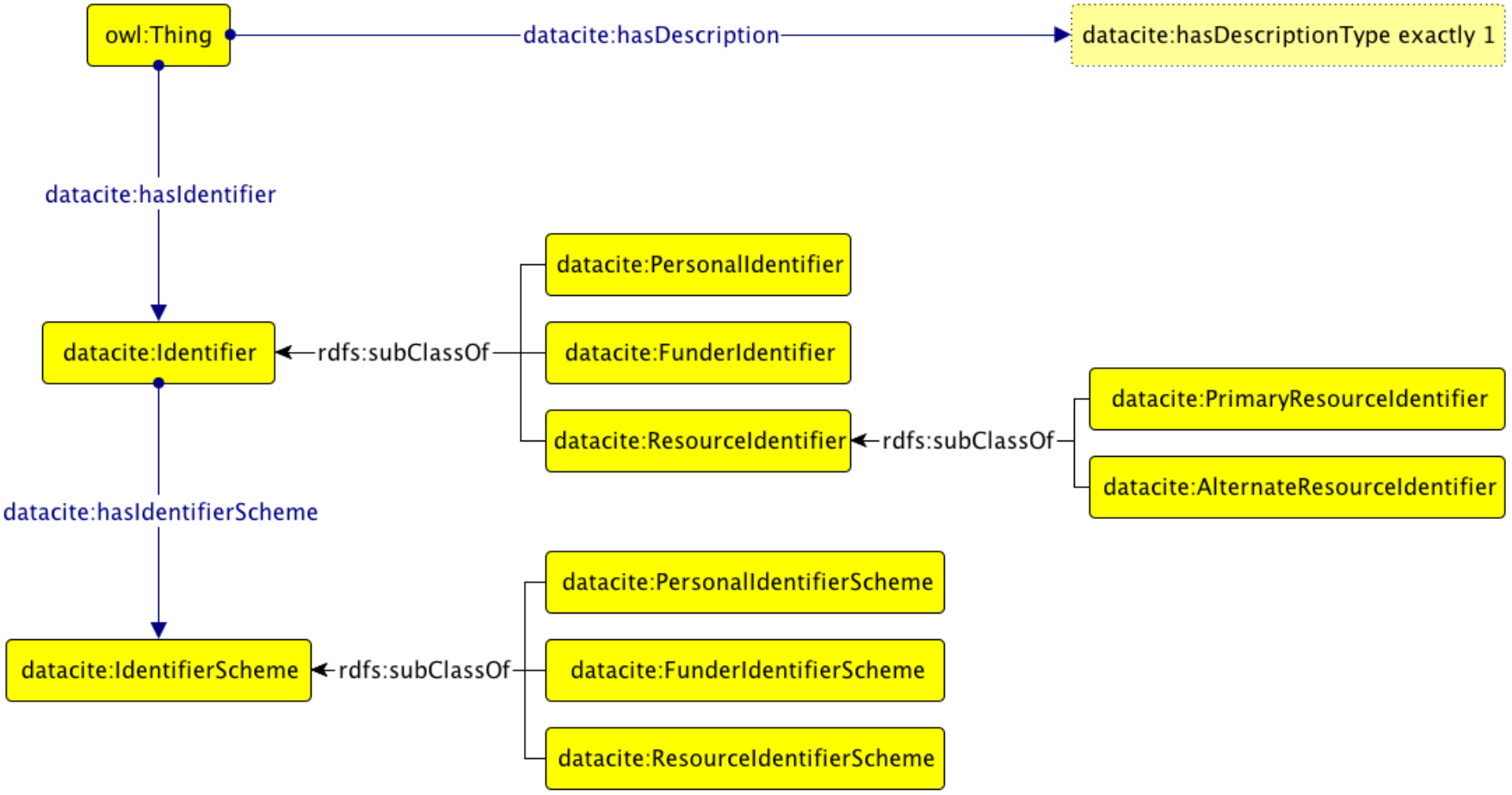
The classes and properties of the DataCite Ontology

- The DataCite Ontology is designed to cover those aspects not well covered by other ontologies – particularly to permit the specification of various types of identifier required by the DataCite Metadata Kernel Scheme

DataCite Classes	DataCite Object Properties
datacite:AlternateResourceIdentifier	datacite:hasDescription
datacite:DescriptionType	datacite:hasDescriptionType
datacite:FunderIdentifier	datacite:hasGeneralResourceType
datacite:FunderIdentifierScheme	datacite:hasIdentifier
datacite:Identifier	datacite:usesIdentifierScheme
datacite:IdentiferScheme	
datacite:PersonalIdentifier	
datacite:PersonalIdentifierScheme	
datacite:PrimaryResourceIdentifier	
datacite:ResourceIdentifier	
datacite:ResourceIdentifierScheme	

- Available from http://purl.org/spar/datacite/, visualized as a human-readable web page using LODE, the Live OWL Documentation Environment (http://www.essepuntato.it/lode)

Relationships between the DataCite Identifier and Identifier Scheme classes

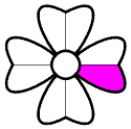


SPAR (Semantic Publishing and Referencing) Ontologies

- The SPAR ontologies are described at http://purl.org/spar/ and in my blog Open Citations and Semantic Publishing at http://opencitations.wordpress.com
  - Of these, six are relevant to what I will say today:

The DataCite Ontology http://purl.org/spar/datacite/

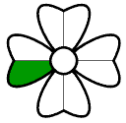
CiTO, the Citation Typing Ontology http://purl.org/spar/cito/, that enable characterization of the existence and the nature of citations



FaBiO, the FRBR-aligned Bibliographic Ontology http://purl.org/spar/fabio/, an ontology for describing bibliographic entities (books, articles, etc.)

PRO, the Publishing Roles Ontology http://purl.org/spar/pro/, an ontology for the roles of agents (e.g., author, editor, publisher, librarian) in the publication process, and the times during which those roles are held

SCORO, the Scholarly Contributions and Roles Ontology http://purl.org/spar/scoro/



FRAPO, the Funders, Research Administration and Projects Ontology, a CERIF-compliant ontology http://purl.org/cerif/frapo/

An example of citation metadata in RDF

<http://dx.doi.org/10.1371/journal.pntd.0000228>

dcterms:bibliographicCitation "Reis RB, Ribeiro GS, Felzemburgh RDM, Santana FS, Mohr S, et al. (2008) Impact of environment and social gradient on Leptospira infection in urban slums. PLoS Negl Trop Dis 2(4): e228."

rdf:type **fabio:JournalArticle** ; # expression

frbr:realizationOf [a **fabio:ResearchPaper**] ; # work

cito:cites <http://dx.doi.org/10.1016/S0140-6736(99)80012-9> # Reference [6];

cito:obtainsBackgroundFrom
<http://dx.doi.org/10.1016/S0140-6736(99)80012-9> ;

cito:sharesAuthorsWith <http://dx.doi.org/10.1016/S0140-6736(99)80012-9> .

Mapping the DataCite Metadata Schema to RDF

- Starting data: DataCite Metadata Scheme Terms (v2.2)
  http://test.datacite.org/schema/meta/kernel-2.2/index.html
- Using the DataCite Ontology, other specialist SPAR ontologies, and standard vocabularies - Dublin Core, FOAF, and PRISM (Publishing Requirements for Industry Standard Metadata)
- Includes exemplar RDF usages
- Currently available as a Word document from

http://sempublishing.svn.sourceforge.net/viewvc/sempublishing/DataCite/DataCiteMetadata2.2_mapping_to_RDF_09-07-2012.docx

A sample from the DataCite2RDF document

ID	*DataCite property*	*Equivalent ontology class or property*
1	Identifier	datacite:Primary ResourceIdentifier (A sub-class of datacite:ResourceIdentifier that uses a datacite:IdentiferScheme that is restricted to datacite:doi, an individual in the datacite:ResourceIdentifierScheme) *Exemplar usage:* :my-dataset rdf:type fabio:Dataset ; datacite:hasIdentifier [rdf:type datacite:PrimaryResourceIdentifier ; literal:hasLiteralValue "doi:10.1371/journal.pntd.0000228.g002.x001"] .
1.1	IdentifierType	Restricted to datacite:doi, an individual in the datacite:ResourceIdentifierScheme *Exemplar usage:* :my-dataset rdf:type fabio:Dataset ; datacite:hasIdentifier [rdf:type datacite:PrimaryResourceIdentifier ; literal:hasLiteralValue "doi:10.1371/journal.pntd.0000228.g002.x001" ; datacite:usesIdentifierScheme datacite:doi] .

Mapping the DataCite Metadata Schema to RDF

- Currently available as a Word document from

http://sempublishing.svn.sourceforge.net/viewvc/sempublishing/DataCite/DataCiteMetadata2.2_mapping_to_RDF_09-07-2012.docx

- Feedback and comments welcome !

- Problem: Poor understanding of how DataCite wants to use
  - 17 Description
  - 17.1 Description type

  since in the XML example it related not to the dataset that was the target of all the other metadata, but to the XML example itself.

A fragment from the DataCite XML example

XML Example

This XML example conforms to the XML schema. More examples for various object types can be found at http://schema.datacite.org/meta/kernel-2.2/index.html.

```
<resource xmlns="http://datacite.org/schema/kernel-2.2"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://datacite.org/schema/kernel-2.2
http://schema.datacite.org/meta/kernel- 2.2/metadata.xsd">
<identifier identifierType="DOI">10.1594/WDCC/CCSRNIES_SRES_B2</identifier>
<creators>
<creator> <creatorName>Miller, John</creatorName>
</creator> <creator>
<creatorName>Smith, Jane</creatorName> <nameIdentifier
nameIdentifierScheme="ISNI">1422 4586 3573
0476</nameIdentifier> </creator>
</creators> <titles>
<title>National Institute for Environmental Studies and Center for Climate System Research
Japan</title>
<title titleType="Subtitle">A survey</title>
```

The same bit of the XML example mapping to RDF

```
<http://dx.doi.org/10.1594/WDCC/CCSRNIES_SRES_B2>
     rdf:type fabio:Dataset ;
     datacite:hasIdentifier [ rdf:type datacite:PrimaryResourceIdentifier ;
          literal:hasLiteralValue "10.1594/WDCC/CCSRNIES_SRES_B2" ;
          datacite:usesIdentifierScheme datacite:doi ] ;
# Note: fictitious names.  Real author: Nozawa, Toru.
     dcterms:creator [rdf:type foaf:Person ; foaf:name "Miller, John" ] ;
     dcterms:creator [rdf:type foaf:Person ; foaf:name "Smith, Jane" ;
         datacite:hasIdentifier
           [rdf:type datacite:PersonalIdentifier ;
           literal:hasLiteralValue "1422 4586 3573 0476" ;
           datacite:usesIdentifierScheme datacite:isni ] ] ;
     dcterms:title "National Institute for Environmental Studies and Center
for Climate System Research Japan" ;
     fabio:hasSubtitle "A survey" ;
```

- Note now simple and compact the RDF representation is
- This RDF version of the DataCite XML example is available on-line in Turtle format at http://sempublishing.svn.sourceforge.net/viewvc/sempublishing/DataCite/RDF_mapping_of_DataCitev2.2_XML_example.ttl

A Web form for entry of DataCite metadata

http://www.miidi.org:8080/datacite/

DataCite Mandatory Properties

[1] Identifier *A persistent identifier that identifies a resource. Currently, only DOI is allowed.*

[1.1] Identifier type

1. **[2] Creator of Data Collection** *Name the creator(s) of the dataset being annotated, in priority order, or the corporate/institutional name or a personal name. Use + to add additional names if there are multiple authors.*

[2.1] Creator name *Format for personal names: FamilyName, GivenName.*

1. **[2.2] Personal identifier** *(text string, e.g. 0137-1963-7688-2319)*

[2.2.1] Personal identifier scheme

1. **[3] Title** *A name or title by which a resource is known.*

[3.1] Title type *Select from the drop down list*

- Title
- AlternativeTitle
- Subtitle
- TranslatedTitle

[4] Publisher *(including archives as appropriate) or institution which submitted the work. Any others citation, so co e of the role. Examples: World Data Center for Climate (WDCC); GeoForschungsZentru of datasets, " to mean making the data available to the community of researchers.*

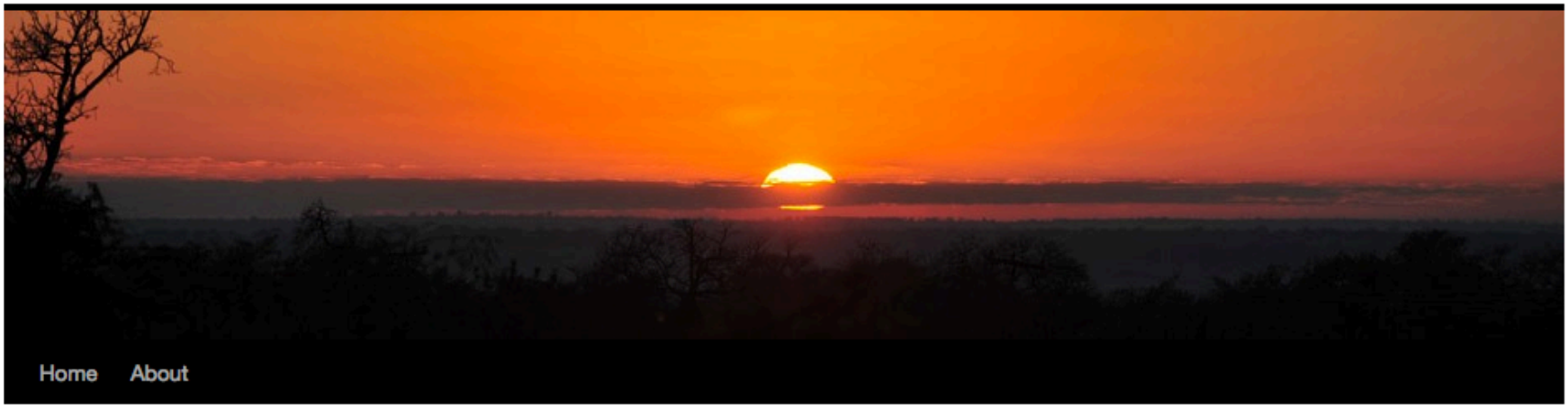
[5] Publication year *Year when the data is made publicly available. If an embargo period has been in effect, use the date*

How to cite data

Open Citations and Semantic Publishing

http://opencitations.wordpress.com/2011/06/30/how-to-cite-data/

Enhancing scholarly communication, publishing research data, and exposing bibliographic citations as Open Linked Data – tools, ontologies and recommendations.



← Questions of granularity – Dryad's use of DataCite DOIs for data citation, and the Annotation Ontology

Pensoft Journals policy and author guidelines on data publication and citation →

How to cite data

Posted on June 30, 2011 by davidshotton

As an approach towards developing best practice for data citation, I recently wrote a **Data Citation Best Practice Discussion Document** that is available on Google Docs, and that I have now slightly revised to Version 2 [1].

Search

Recent Posts

- Oxford University Press to support Open Citations
- Open Citations and Semantic Publishing
- Science joins Nature in opening reference citations
- Access to Citation Data
- Nature to open its reference

How to cite data

- Proper data citations require *both* an in-text citation and reference pointer, *and* a proper data reference in the reference list

- **Example in-text citation and reference pointer**:

  "The raw data underpinning this analysis are deposited in the Dryad Data Repository at http://dx.doi.org/10.5061/dryad.8684 (Vijendravarma et al., 2011).

- **Example data reference in reference list**:

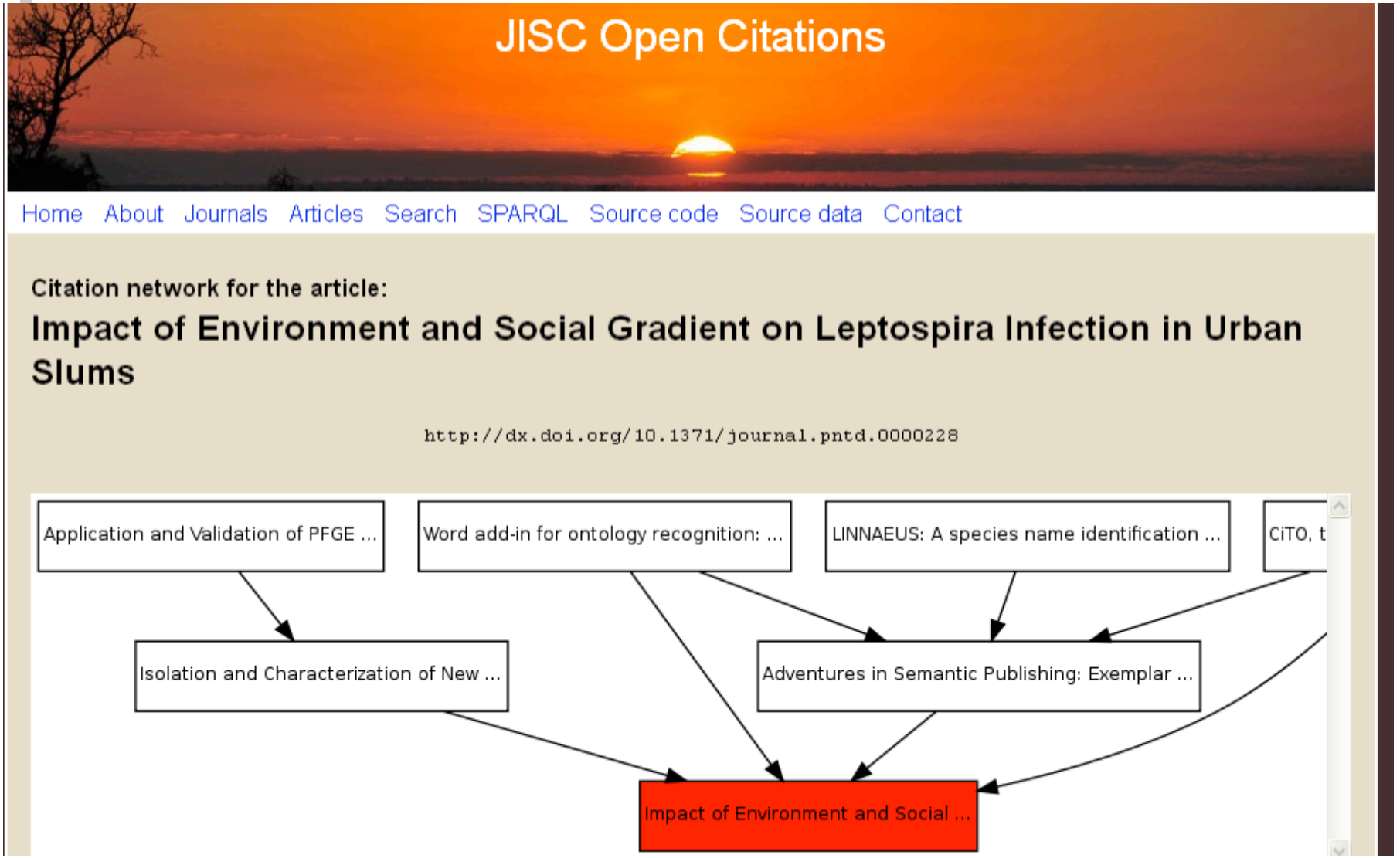
  [32] Vijendravarma RK, Narasimha S, Kawecki TJ (2011) Data from: Plastic and evolutionary responses of cell size and number to larval malnutrition in Drosophila melanogaster. Dryad Digital Repository. doi:10.5061/dryad.8684. http://dx.doi.org/10.5061/dryad.8684."

The Open Citations Corpus

JISC

- The reference lists from all **204,637 articles** in the Open Access Subset of PMC on 24 January 2011, encoded in RDF using the SPAR ontologies
- These lists contain **6,325,178 individual references**, some unique, but many from different citing articles to highly cited papers
- These references cite **3,373,961 papers** outside the Open Access Subset
  - **~ 20% of all PubMed Central papers** (approx. 3,200,000 papers)
  - includes **ALL** the highly cited papers in every biomedical field
- Each reference list is maintained as a distinct unit, by encoding it as a Named RDF Graph with a unique URI
- Encoded these bibliographic records and the citations between them in RDF, creating **236,499,781 quads** occupying 2.1 gigabytes of compressed storage
- Freely available under a CC0 waiver from **http://opencitations.net/data/**
- The complete corpus can be downloaded, or can be queried via a SPARQL endpoint

Viewing citation networks at http://opencitations.net



Expanding the OCC to include data citations

- With new funding from the JISC, and in partnership with CrossRef, we now wish to
  - expand the Open Citations Corpus to include references from articles in subscription access journals, in addition to open access journals
  - harvest these on an on-going basis
  - *Nature*, *Science* and Oxford University Press are already signed up

- As part of this expansion, we would also like to partner with DataCite, to include within the corpus all DataCite citation metadata of datasets citing journal articles, and of journal articles citing datasets
  - We would like to harvest these as XML on a monthly basis,
  - transform the citations to RDF using the DataCite2RDF mapping
  - and include the DataCite citations in the Open Citations Corpus

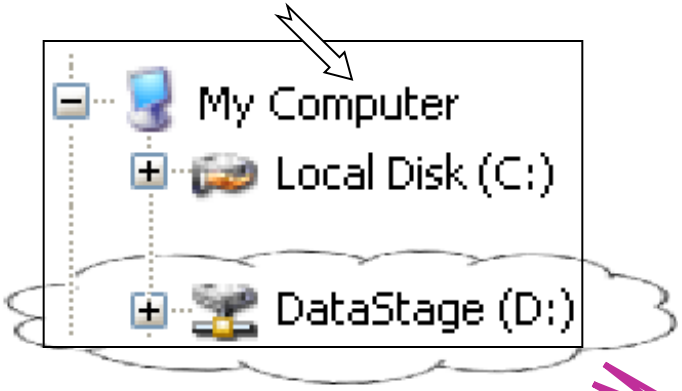
DataFlow data management services

DataFlow

Datastage

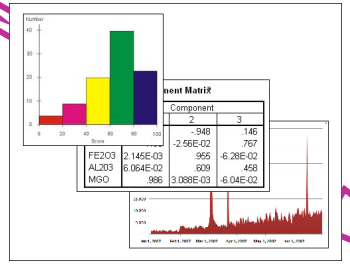
Researchers

http://www.dataflow.ox.ac.uk/



DataStage file system

Zipped BagIt Data Package with
RDF metadata manifest

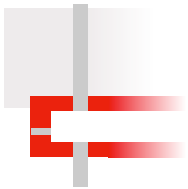


SWORD deposit protocol

Researchers, other users

Databank

DataBank repository



end