

Chapter 11 Supplement

Metadata, Linked Data, and the Semantic Web

Questions for Review, Study, or Discussion

1. What are Linked Data and the Semantic Web and why care about them?
2. What connections do the DCMI, the Library of Congress, and RDA have with Linked Data and the Semantic Web?
3. What is the difference between a web of linked documents and a web of linked data?
4. What is the Resource Description Framework? How does it make use of metadata *statements* consisting of a *resource*, a *property*, and a *value*. Recall that this was the approach to the basic building blocks of metadata taken in Chapters 1 and 2. How does RDF structure these into a *subject*, *predicate*, and an *object*? What are a *graph*, *node*, and *arc* in RDF?
5. What is a *URI*, and what is the relationship of a *URL* to a URI in general? What form of URI does RDF specify must be used to unambiguously identify resources and properties, as well as values whenever possible? Must URLs always be *dereferenceable* in RDF?
6. Links may be created among resources, properties, and values by matching text strings or by matching URIs. What is the difference between the two and why are URIs preferred and often required in RDF?
7. Where will most of the real linking power of RDF and of the Linked Open Data environment come from? How do registries come into play in this context?
8. Are the Dublin Core metadata terms formally registered with URIs on the Web? How about any Library of Congress controlled vocabularies and code lists?
 - Try exploring <http://id.loc.gov/>, including the “Visualization” tab when viewing the information for a controlled term; for example: <http://id.loc.gov/vocabulary/graphicMaterials/tgm001333.html>.
9. What is the difference between *strings* and *things* (or resources) in RDF? How does this tie in with the concept of a *literal*?
10. What example is used to demonstrate one simple case of the power of linking and querying in the linked data cloud in Section 11.2.4?
11. What is DBpedia? RDF/XML? SKOS and OWL?
12. How might RDF and Linked Data apply to metadata for digital collections? What are two options for converting current metadata into RDF triples and exposing them to RDF applications? What kinds of links and queries could be made possible thereby?
13. What does it mean to say that Dublin Core has gradually changed “from a ‘core metadata element set’ for the web to a ‘core vocabulary’ for Linked Data.”?
14. What is the *DCMI Abstract Model*? What are the components of the DCMI Resource Model (the first of the three component parts of the complete Abstract Model)? Do the basic concepts seem familiar to you by now? What is a *description set* in this model?
15. Within the DCMI, an increasingly more rigorous framework has been developed for designing a formal Dublin Core Application Profile (DCAP) that follows the DCMI Abstract Model with the intent of promoting metadata that will integrate with a Semantic Web of Linked Data. The *Guidelines for Dublin Core Application Profiles* are based on the Singapore Framework for Dublin Core Application Profiles. This chapter does no more than mention these facts and give one graphical illustration. To explore further, consult the documents by Coyle and Baker, 2009, and by Nilsson, Baker, and Johnston, 2008, given in the References at the end of the chapter.

16. What is a metadata registry? Where can you find the Dublin Core Metadata Registry? Where are the RDA elements and subelements (properties and subproperties) and associated vocabularies being registered in RDF/SKOS?
17. What might all of the topics discussed in this chapter have to do with most current implementers of metadata for digital collections? Have you had any prior exposure to these concepts? Have you worked with them in any capacity? What do you think about all of this?

Recommended Readings and Resources for Reference or Further Study

Readings

- Coyle, Karen. 2010. *Understanding the Semantic Web: Bibliographic Data and Metadata*. Library Technology Reports, vol. 46, no. 1. Chicago: American Library Association.
- Dunshire, Gordon. 2011. "Web Resource Management and Semantic Web." 8th International CALIBER - 2011, Goa University, Goa, March 02-04, 2011. Ahmadabad: INFLIBNET Centre. <http://shodhganga.inflibnet.ac.in/dxmi/handle/1944/1605>
- Coyle, Karen. 2010. *RDA Vocabularies for a Twenty-first Century Data Environment*. Library Technology Reports, vol. 46, no. 2. Chicago: American Library Association.
- Hillmann, Diane, Karen Coyle, Jon Phipps, and Gordon Dunsire. 2010. "RDA Vocabularies: Process, Outcome, Use." *D-Lib Magazine* 16, no. 1/2 (January/February). <http://www.dlib.org/dlib/january10/hillmann/01hillmann.html>.
- Tauberer, Joshua. [2005]. "Quick Intro to RDF." <http://www.rdfabout.com/quickintro.xpd>
- Tauberer, Joshua. 2008. "What Is RDF and What Is It Good For?" RDF: About. Last modified January. <http://www.rdfabout.com/intro/>.

Videos: highly recommended!

- Manu Sporny. 2007. "Introduction to the Semantic Web." YouTube. <http://www.youtube.com/watch?v=OGg8A2zfWKg>
- Manu Sporny. 2008. "RDFa Basics." YouTube. <http://www.youtube.com/watch?v=ldl0m-5zLz4&feature=related>

Presentations

- ALCTS. 2010. "Linked Data: Making Library Data Converse with the World." Presentations at ALCTS Preconference, June 24, 2010, Washington, DC. http://presentations.ala.org/index.php?title=Thursday%2C_June_24.
- Dekkers, Max. 2010. "Dublin Core in the Early Web Revolution." Presentation at Joint NISO/DCMI Webinar, August 25. http://dublincore.org/resources/training/NISO_Webinar_20100825/dcmi-webinar-01.pdf.
- NISO/DCMI. 2010. "Dublin Core: The Road from Metadata Formats to Linked Data." Joint NISO/DCMI Webinar, August 25. Presentation slides by Max Dekkers and Thomas Baker. <http://www.dublincore.org/resources/training/>.

Wikipedia Articles

- Wikipedia. 2011. "Linked Data." http://en.wikipedia.org/wiki/Linked_data.
- Wikipedia. 2011. "Metadata Registry." http://en.wikipedia.org/wiki/Metadata_registry.
- Wikipedia. 2011. "Semantic Web." http://en.wikipedia.org/wiki/Semantic_Web.

Technical Documents

- Powell, Andy, Michael Nilsson, Ambjörn Naeve, Pete Johnston, and Thomas Baker. 2007. "DCMI Abstract Model." June 4. <http://dublincore.org/documents/abstract-model/>.
- Coyle, Karen, and Thomas Baker. 2009. "Guidelines for Dublin Core Application Profiles." May 18. <http://dublincore.org/documents/profile-guidelines/index.shtml>.
- Joint Steering Committee for Development of RDA. 2009a. "RDA Element Analysis." Rev/3, July 1. <http://www.rda-jsc.org/docs/5rda-elementanalysisrev3.pdf>.
- Joint Steering Committee for Development of RDA. 2009b. "RDA—Resource Description and Access: Scope and Structure." Rev/4, July 1. <http://www.rda-jsc.org/docs/5rda-scoperev4.pdf>.
- Nilsson, Mikael, Thomas Baker, and Pete Johnston. 2008. "The Singapore Framework for Dublin Core Application Profiles." Issued January 14. <http://dublincore.org/documents/2008/01/14/singapore-framework/>

Registries and Vocabularies in RDF/SKOS

- DCMI. 2011. "The Dublin Core Metadata Registry." <http://dcmi.kc.tsukuba.ac.jp/dcregistry/>.
- Open Metadata Registry. 2011. <http://www.metadataregistry.org/>.
- Open Metadata Registry. 2011. "The RDA (Resource Description and Access) Vocabularies." <http://metadataregistry.org/rdabrowse.htm>.
- Library of Congress. 2011. "Authorities and Vocabularies: About." Accessed February 2. <http://id.loc.gov/authorities/about.html>.

Websites

- DBpedia. <http://www.dbpedia.org/>.
- Cyganiak, Richard, and Anja Jentzsch. 2010. "The Linking Open Data Cloud Diagram." Last modified September 22. <http://richard.cyganiak.de/2007/10/lod/>.
- W3C Semantic Web: <http://www.w3.org/2001/sw/>
- RDF: <http://www.w3.org/RDF/>
- OWL: <http://www.w3.org/2004/OWL/>
- SKOS: <http://www.w3.org/2004/02/skos/>

Exercises

Recommended Exercises

1. Take a selection of metadata elements and values from an existing metadata record or one that you have created and identify which components are the properties, which are the values, and what statement they are making about what resource. Formulate your response in a three-column table with columns labeled Subject/Resource, Predicate/Property, and Object/Value. Alternatively, draw these in the form of a graph. These are triples. How can your set of triples, which make statements about the same resource (subject), be taken together as constituting a "record," "description," or "description set?"
2. Take the triples from above, and/or find new ones, and substitute URIs for as many of the components as you can. Recommended sources:
 - For the subject/resource either invent your own imaginary URI or use the URI for an actual digital resource on the Web.

- For the properties: use the URIs for the DC elements as established in DCMI Metadata Terms: <http://dublincore.org/documents/dcmi-terms/>.
- For the objects/values:
 - For names: the Virtual International Authority File: <http://viaf.org/>.
 - For subject terms (TGM or LCSH), language and country codes: LC Authorities and Vocabularies: <http://id.loc.gov/>.

You may need to rework your sets of triples and focus primarily on titles, authors, and subjects.

Remember that titles are most often best represented as strings rather than by URIs.

3. Create sets of triples making statements for three or more separate resources, but include URIs for names and subjects that are shared among at least two of the resources, and show how the identical matching URIs create a link between the triples, that is, Linked Data.

Suggestions for Instructors

1. You might supply students with some of all of the resources, properties, and values in their analog forms, and perhaps the URIs for the resources / subjects of the triples, and have the students find the URIs for the properties and especially for the values.