

Combining Content, Semantic Relationships, and Web Services - Fedora (2)

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Acknowledgements:

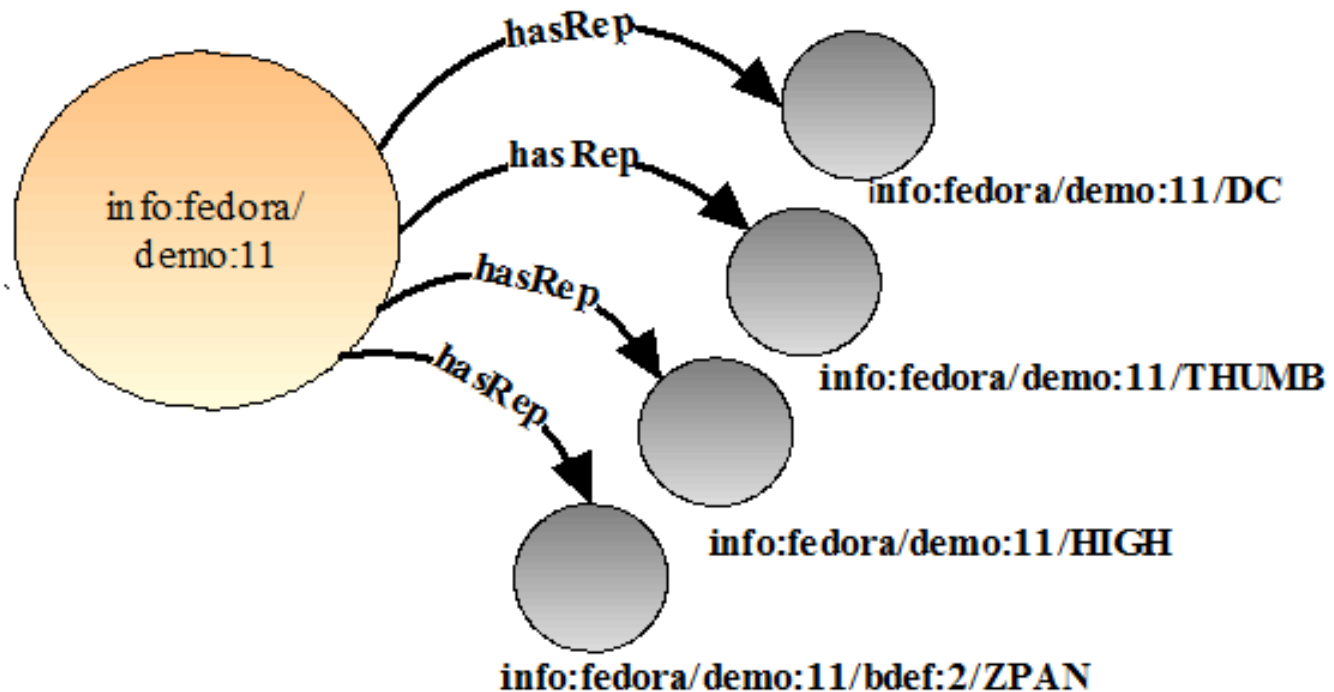
Sandy Payette (Cornell)

Compound Information Objects

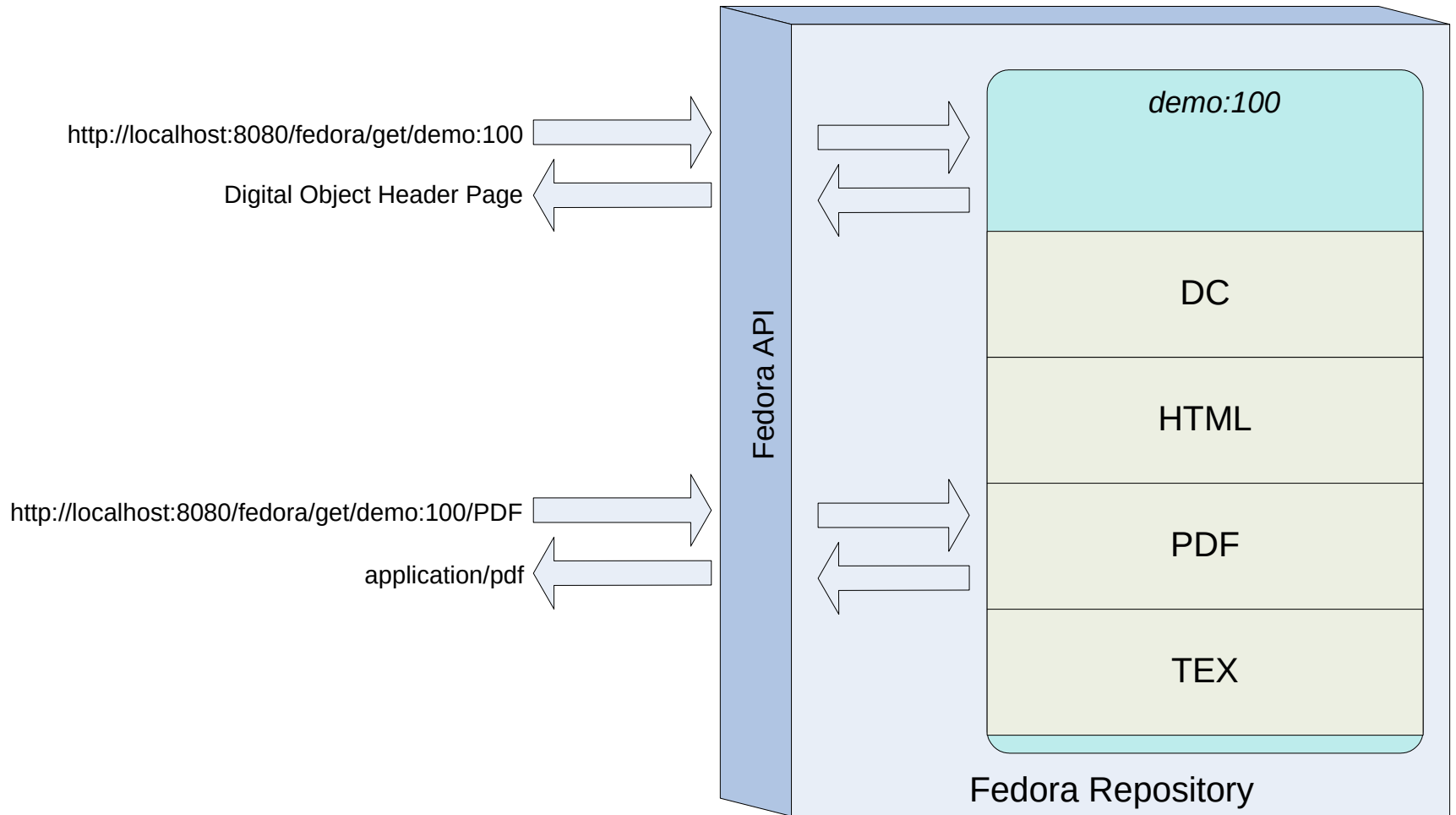
- Aggregations of distinct information units that when combined form a logical whole.
- Examples
 - digitized book that is an aggregation of chapters, where each chapter is an aggregation of scanned pages;
 - a CD that is the aggregation of several audio tracks;
 - an image object that is the aggregation of a high quality master, a medium quality derivative and a low quality thumbnail;
 - a scholarly publication that is aggregation of text and supporting materials such as datasets, software tools, and video recordings of an experiment;
 - a multi-page web document with an HTML table of contents that points to multiple interlinked HTML individual pages.

Digital Object Model

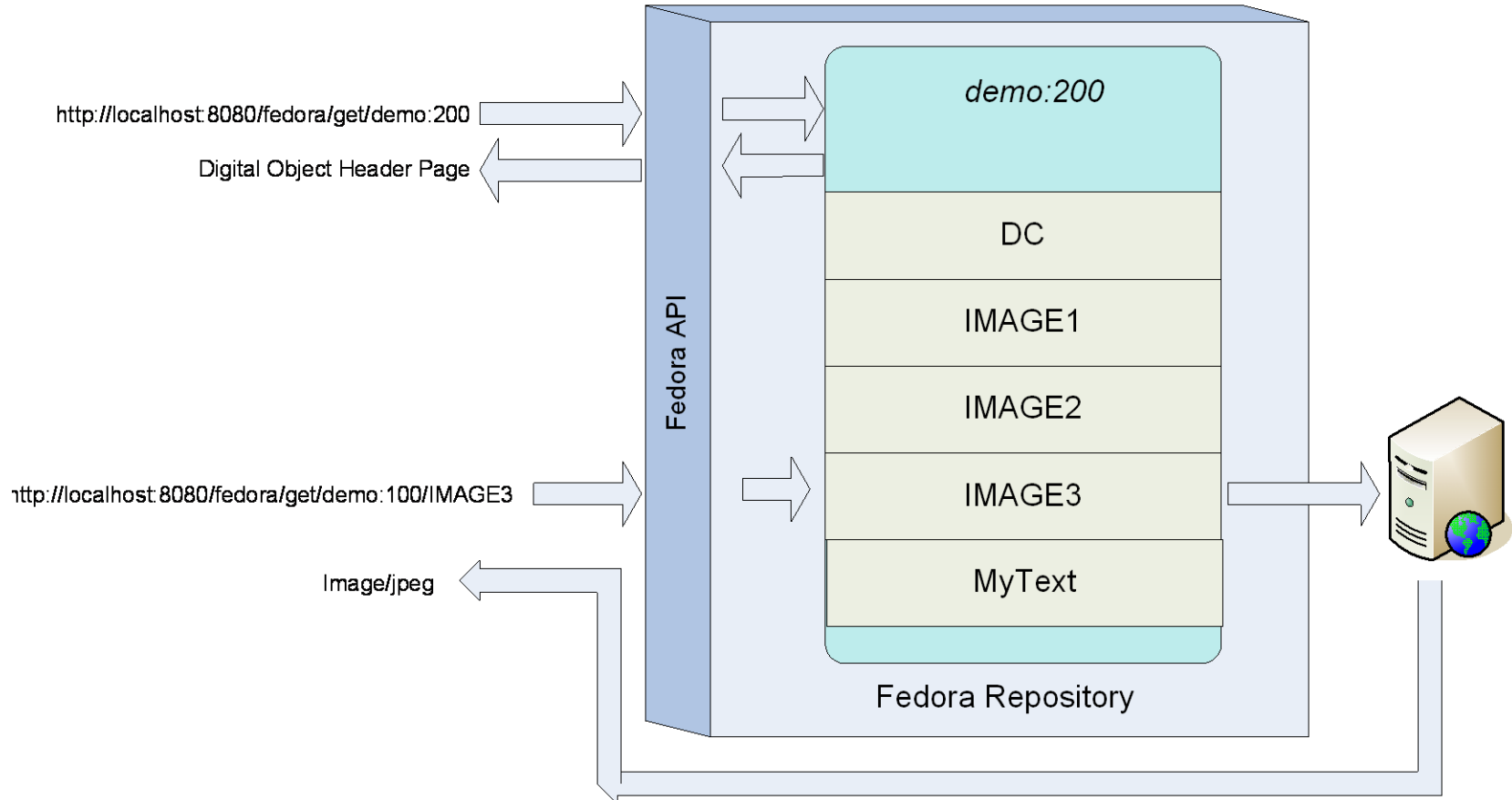
"Graph" View of Fedora Objects



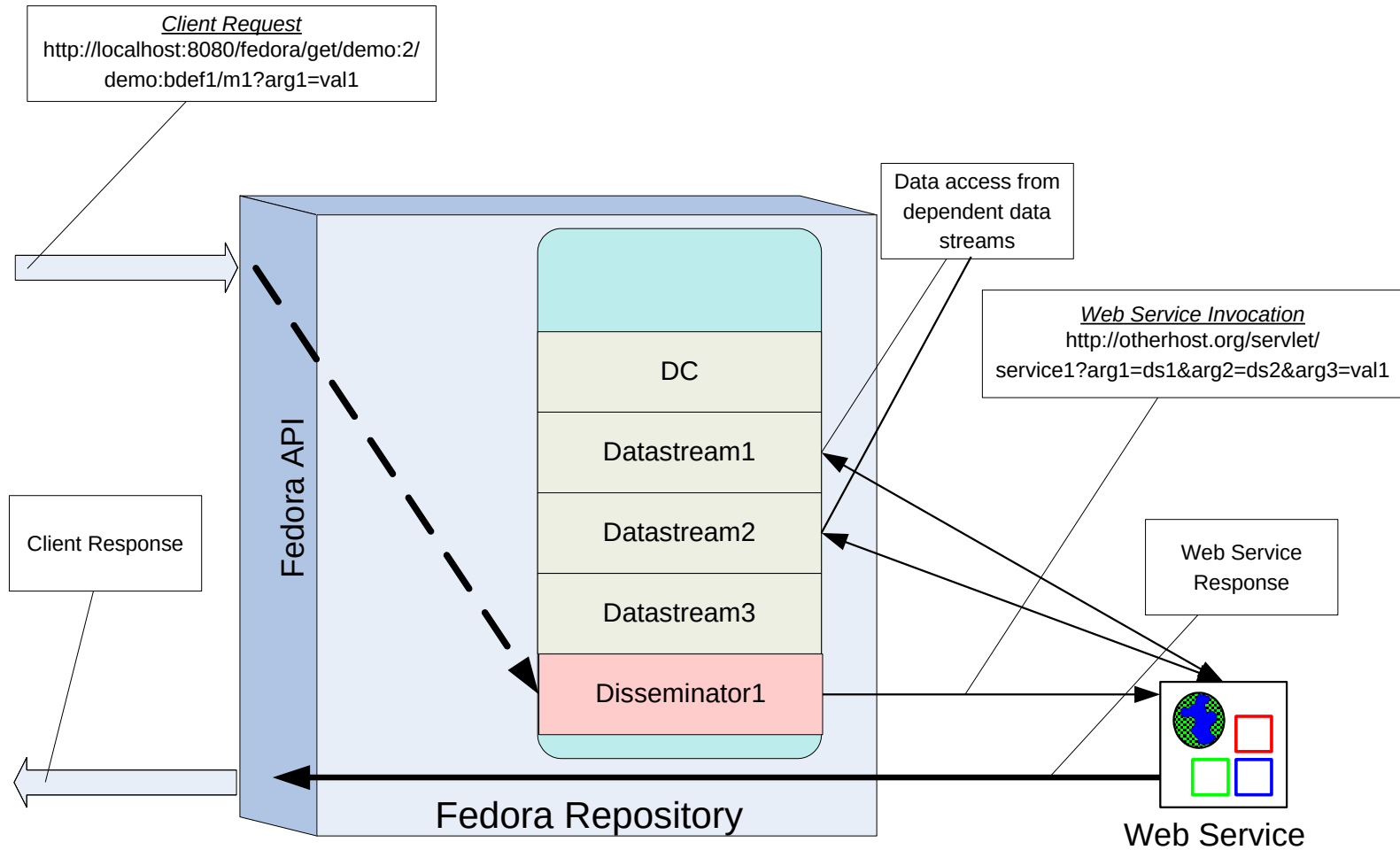
Digital Object Aggregating Local Content



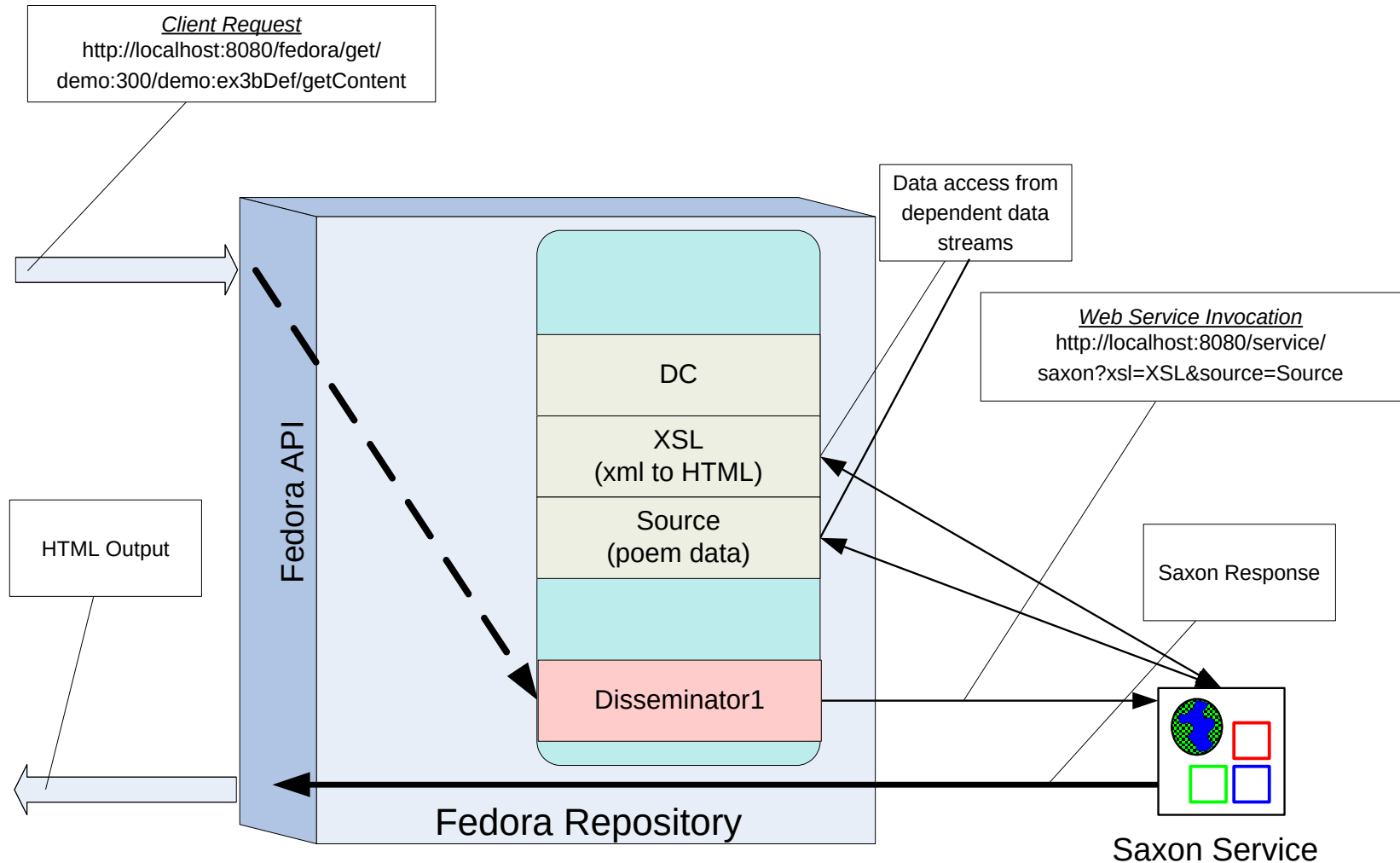
Digital Object for Local and Remote Content



Dynamic Dissemination Access



Dynamic Dissemination Example

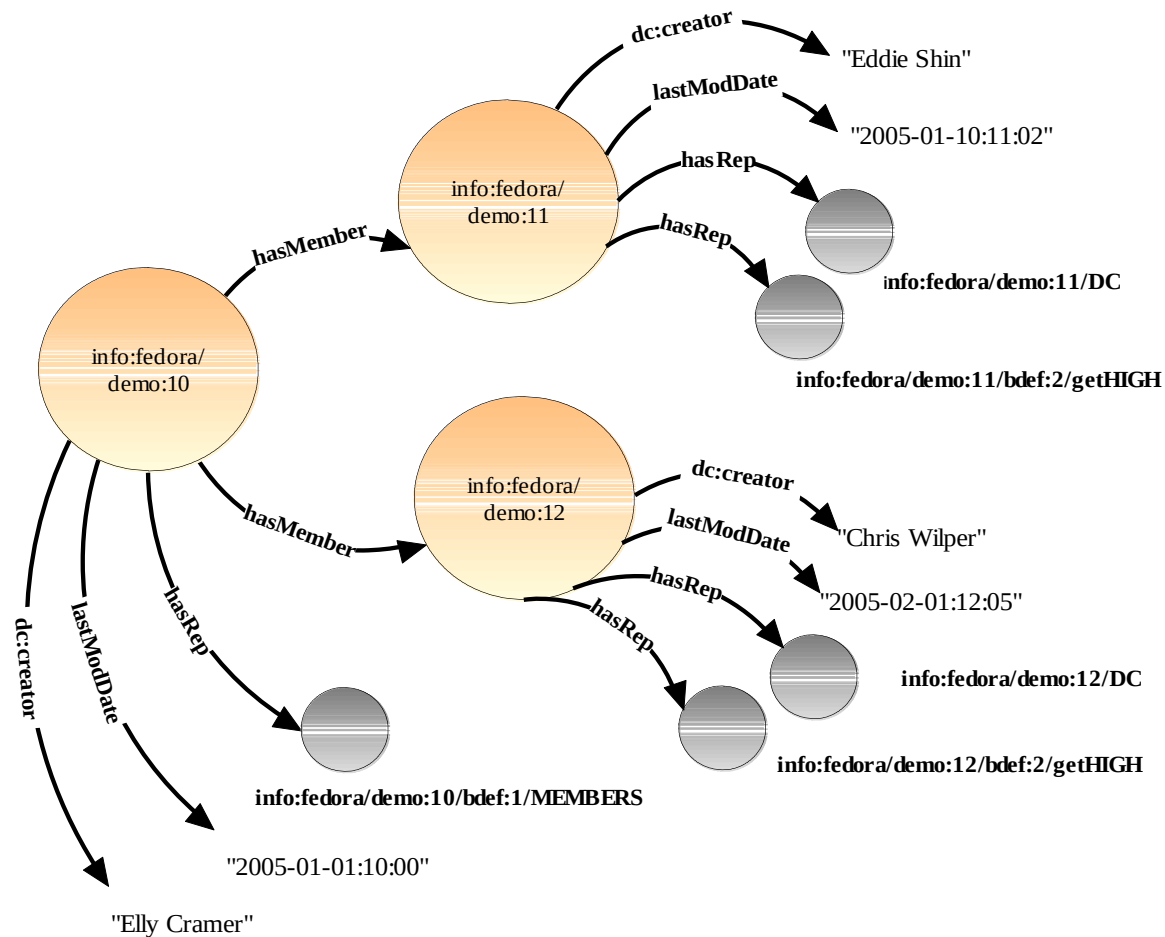


Fedora and Semantic Web: Resource Index

Using RDF and ontologies

Fedora Digital Objects

Resource Index View



Uses of Object Relationships

- Define collections (e.g., collection objects)
- Assert critical relationships among object for management purposes
- Enable network overlay
 - Surrogate objects referring to external entities
 - Assert relationships among them
 - Assert other relationships (e.g., annotations)
- Enable navigation of repository (as tree or graph)

Fedora and RDF

- **Object-to-object and object-to-literal Relationships**
 - Ontology of common relationships (RDF schema)
 - Relationships stored in special datastream (RELS-EXT)
- **Resource Index (RI)**
 - RDF-based index of repository (Kowari triple-store)
 - Graph-based index includes:
 - Object properties and Dublin Core
 - Object Relationships
 - Object Disseminations
- **RI Search**
 - Powerful querying of graph of inter-related objects
 - REST-based query interface (using RDQL or ITQL)
 - Results in different formats (triples, tuples, sparql)

Fedora Relationship Ontology (RDFS)

- isPartOf / hasPart
- isMemberOf / hasMember
- isDescriptionOf / hasDescription
- hasEquivalent
- ... others

Storing and querying RDF-based models

- Persistent storage implementations
 - Jena 2 - <http://jena.sourceforge.net/>
 - Relational databases (mysql , postgres, oracle)
 - Kowari - <http://www.kowari.org>
 - Mapped files
 - Mulgara - <http://www.mulgara.org/>
 - Mapped files
 - Sesame - <http://www.openrdf.org/>
 - Relational databases (mysql, postgres, oracle)
- Query languages
 - RDQL (Kowari, Jena)
 - SPARQL
 - W3C working draft
 - <http://www.w3.org/TR/rdf-sparql-query/>

RDQL-by-example

- RDF source

- <http://www.cs.cornell.edu/courses/cs431/2007sp/examples/RDQL/vc-db-3.rdf>

- Queries

- <http://www.cs.cornell.edu/courses/cs431/2007sp/examples/RDQL/vc-q1>
- <http://www.cs.cornell.edu/courses/cs431/2007sp/examples/RDQL/vc-q2>
- <http://www.cs.cornell.edu/courses/cs431/2007sp/examples/RDQL/vc-q3>
- <http://www.cs.cornell.edu/courses/cs431/2007sp/examples/RDQL/vc-q4>
- <http://www.cs.cornell.edu/courses/cs431/2007sp/examples/RDQL/vc-q5>
- <http://www.cs.cornell.edu/courses/cs431/2007sp/examples/RDQL/vc-q6>
- <http://www.cs.cornell.edu/courses/cs431/2007sp/examples/RDQL/vc-q7>
- <http://www.cs.cornell.edu/courses/cs431/2007sp/examples/RDQL/vc-q8>

Demo:

Collection - Member Relationships

- Collection Object [[smiley](#)]
 - Datastream containing a query to Resource Index for all members of collection
- Image Objects [[brush](#)]
 - Use RELS-EXT datastream to assert relationship to collection object