

<http://www.slideshare.net/hvdsomp/an-overview-of-the-oai-object-reuse-and-exchange-interoperability-framework>



# An Overview of the OAI Object Reuse and Exchange Interoperability Framework

<<http://www.openarchives.org/ore/toc>>

Herbert Van de Sompel - [herbertv@lanl.gov](mailto:herbertv@lanl.gov)

Digital Library Research & Prototyping Team  
Research Library  
Los Alamos National Laboratory, USA

OAI-ORE was funded  
by the Andrew W. Mellon Foundation, the National  
Science Foundation, JISC, and Microsoft

The ORE Editors are: Carl Lagoze (Cornell U.), Herbert Van de Sompel (LANL), Pete Johnston (Eduserv Found.), Michael Nelson (Old Dominion University), Robert Sanderson (U. of Liverpool), Simeon Warner (Cornell U.)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# OAI Object Reuse and Exchange: Support

- The Andrew W. Mellon Foundation
- The Coalition for Networked Information
- Joint Information Systems Committee
- Microsoft Corporation
- The National Science Foundation

**Microsoft®**



**JISC**



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# OAI Object Reuse and Exchange: Technical Experts

## ORE Technical Committee

Chris Bizer  
Les Carr  
Tim DiLauro  
Leigh Dodds  
David Fulker  
Tony Hammond  
Pete Johnston  
Richard Jones  
Carl Lagoze  
Peter Murray  
Michael Nelson  
Ray Plante  
Rob Sanderson  
Herbert Van de Sompel  
Simeon Warner  
Jeff Young

Freie Universität Berlin  
University of Southampton  
Johns Hopkins University  
Ingenta  
UCAR  
Nature Publishing Group  
Eduserv Foundation  
HP Labs  
Cornell University  
OhioLINK  
Old Dominion University  
NCSA and National Virtual Observatory  
University of Liverpool  
Los Alamos National Laboratory  
Cornell University  
OCLC

## ORE Liaison Group

Leonardo Candela  
Tim Cole  
Julie Allinson  
Jane Hunter  
Savas Parastatidis  
Sandy Payette  
Thomas Place  
Andy Powell  
Robert Tansley

Consiglio Nazionale delle Ricerche - DRIVER  
University of Illinois Urbana-Champaign - Aquifer  
JISC  
University of Queensland - DEST  
Microsoft Corporation  
Fedora Commons  
University of Tilburg - DARE  
Eduserv Foundation - DCMI  
Google, Inc. - DSpace



# OAI Object Reuse and Exchange

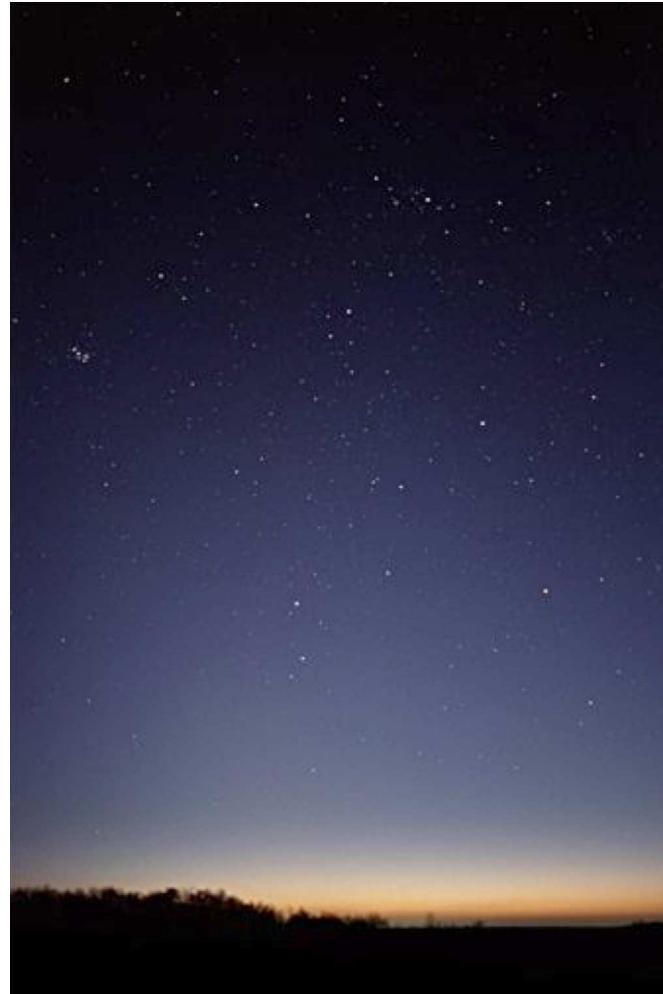
Subject: **Aggregations** of Web resources

Approach: Publish **Resource Maps** to the Web that  
Instantiate, Describe, and Identify Aggregations



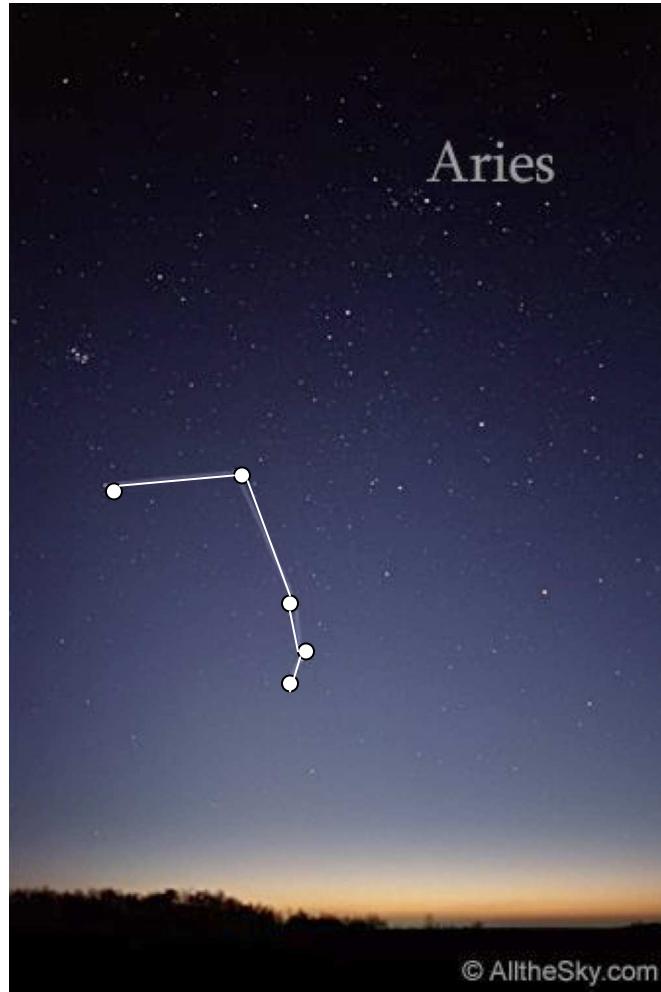
OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland





OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland





## Instantiate, Describe, and Identify Aggregations



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Aggregations

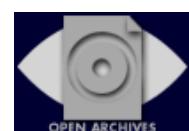
The screenshot shows a web browser displaying an arXiv.org document. The URL in the address bar is highlighted with a red box and labeled 1. The title of the document is "Parametrization of K-essence and Its Kinetic Term" (labeled 3). The authors listed are Hui Li, Zong-Kuan Guo, Yuan-Zhong Zhang (labeled 4). A note at the bottom indicates the document was submitted on 31 Dec 2005 (v1) and last revised on 18 Jan 2006 (this version, v2) (labeled 5). The abstract discusses the construction of a non-canonical kinetic term of a k-essence field directly from the effective equation of state function  $Sw_k(z)$ , which describes the properties of the dark energy. It also mentions adopting usual parametrizations of the equation of state to numerically reproduce the shape of the non-canonical kinetic term and discuss some features of the constructed form of k-essence. The document has 8 pages and 1 figure, was accepted by Mod. Phys. Lett. A, and has minor changes to references. The DOI is 10.1142/S021773230619475 and the arXiv identifier is arXiv:astro-ph/0601007v2 (labeled 6). The submission history shows two versions: v1 on Sat, 31 Dec 2005 04:01:23 GMT (20kb) and v2 on Wed, 18 Jan 2006 06:16:15 GMT (20kb) (labeled 7). The right sidebar contains links for download (PostScript, PDF, Other formats) (labeled 2), current browse context (astro-ph) with navigation links (labeled 8), references & citations (SLAC-SPIRES HEP, NASA ADS, CiteBase) (labeled 9), and a bookmark section.

1. The URI of the human start page for the arXiv document.
2. The formats in which the document is available: constituents of the aggregation.
3. The title of the document.
4. The authors of the document.
5. The creation and last modification date of the document.
6. Identifiers of entities that are in some manner equivalent to this document. For example, the DOI of a peer-reviewed article.
7. The versions of this document.
8. Links to other arXiv documents in the same collection.
9. Citations made by this document, and citations it received from other documents.

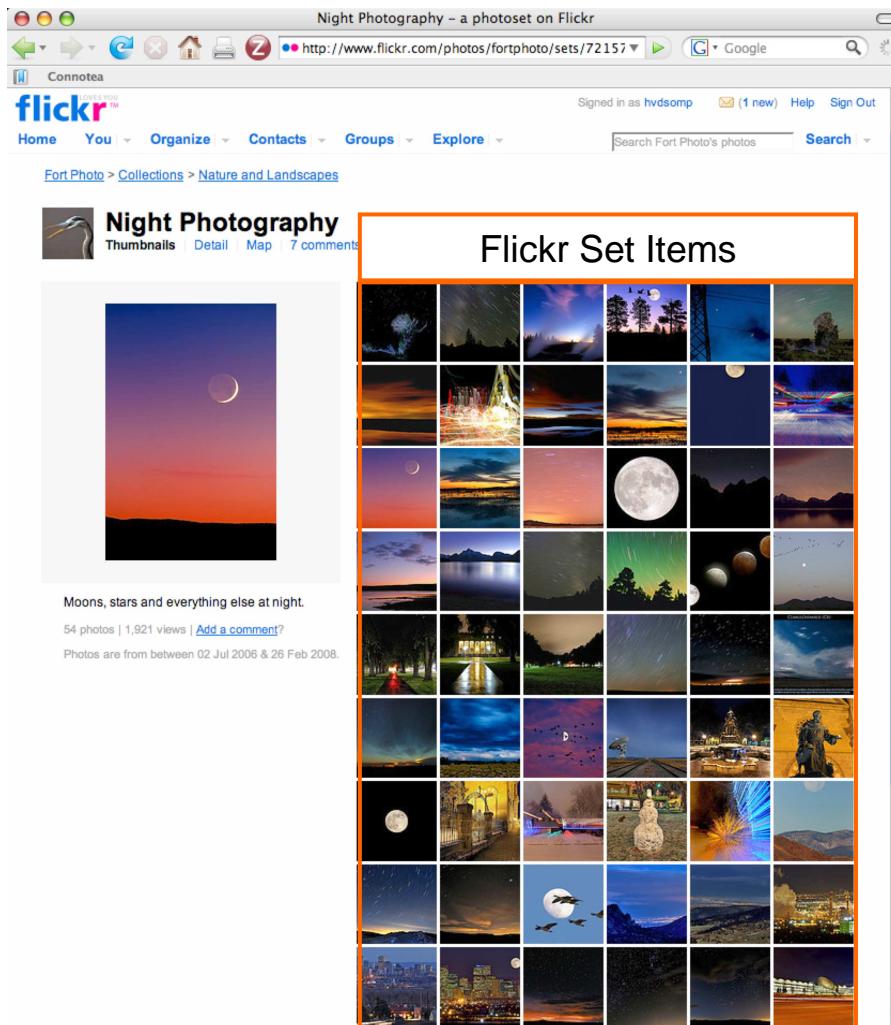


OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

 Los Alamos  
NATIONAL LABORATORY



# Aggregations!



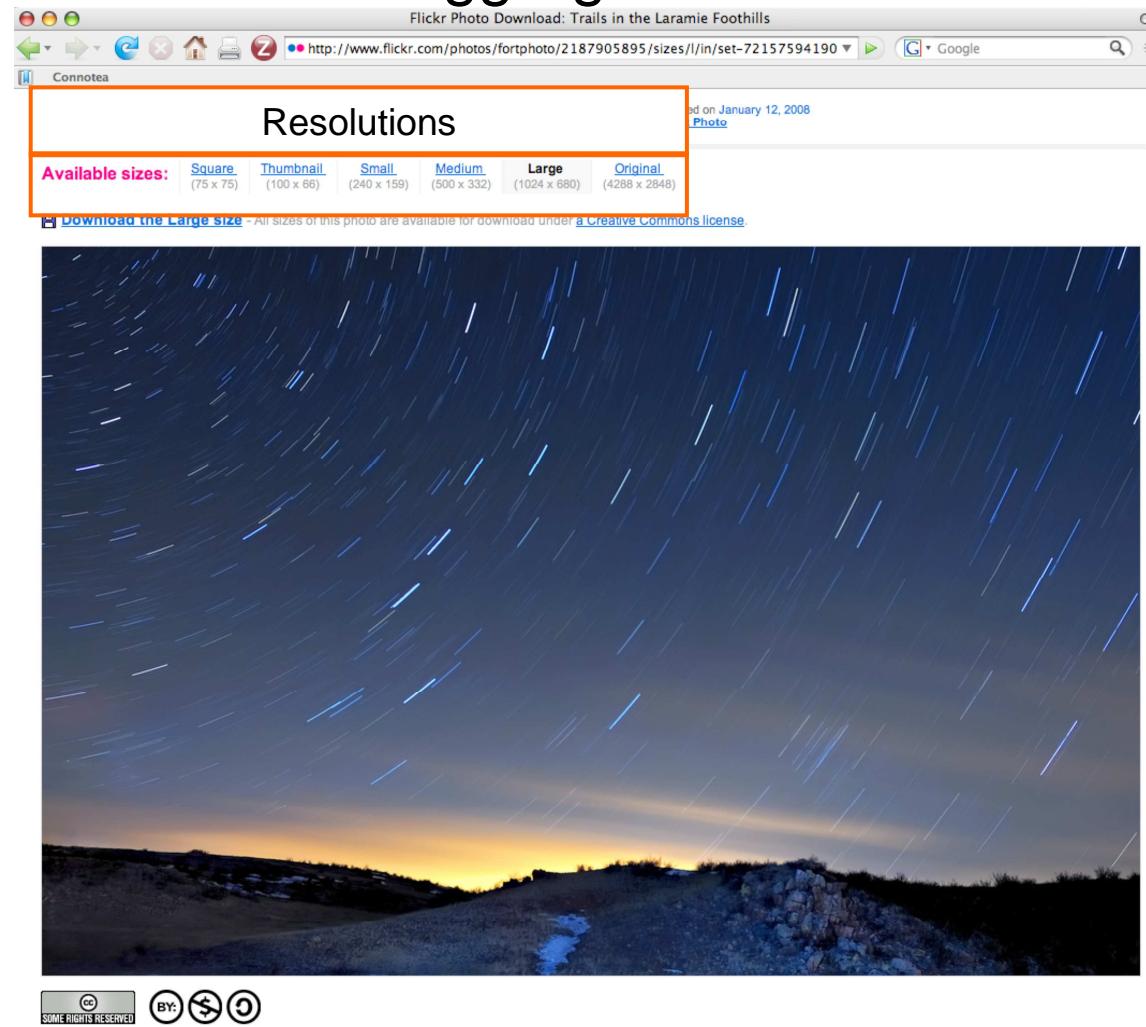
<http://www.flickr.com/photos/fortphoto/sets/72157594190371016/>



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Aggregations!!



<http://www.flickr.com/photos/fortphoto/sets/72157594190371016/>

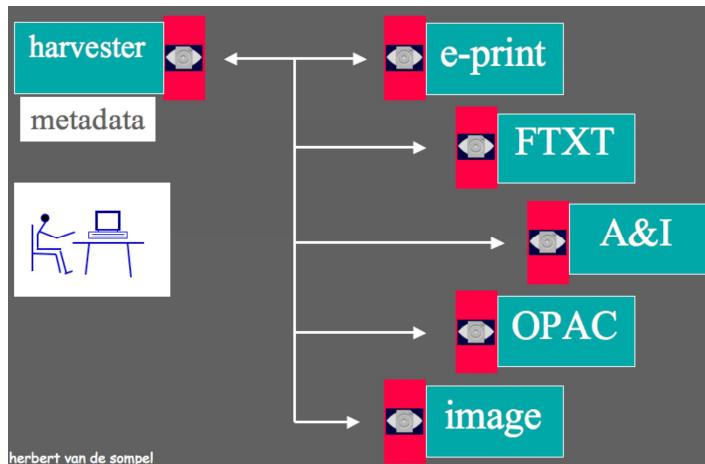


OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

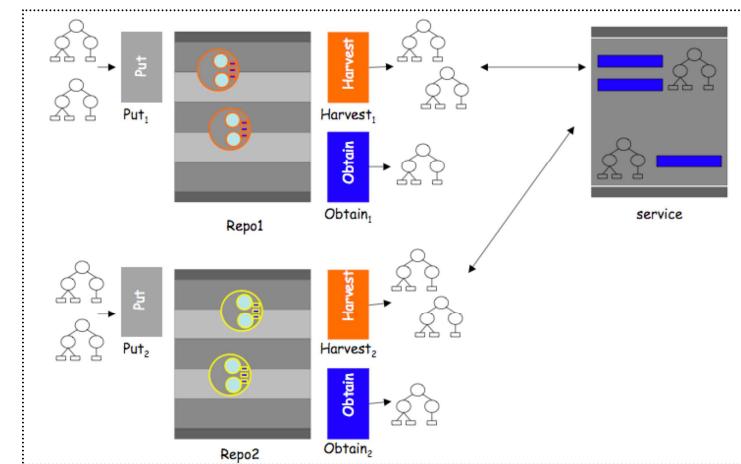


# Object Reuse and Exchange: A Resource-Centric Approach

- Prior efforts had the *repository* and *metadata records* as the center of the interoperability thinking:
  - Including OAI-PMH
  - Including initial OAI-ORE thinking cf. “Augmenting Interoperability across Scholarly Repositories”
  - Unclear what the metadata records were about ...
- This approach does not vibe well with the Web:
  - The Web Architecture knows resources and URIs
  - Requires special treatment by applications that dominate the Web.



Keep dreaming!

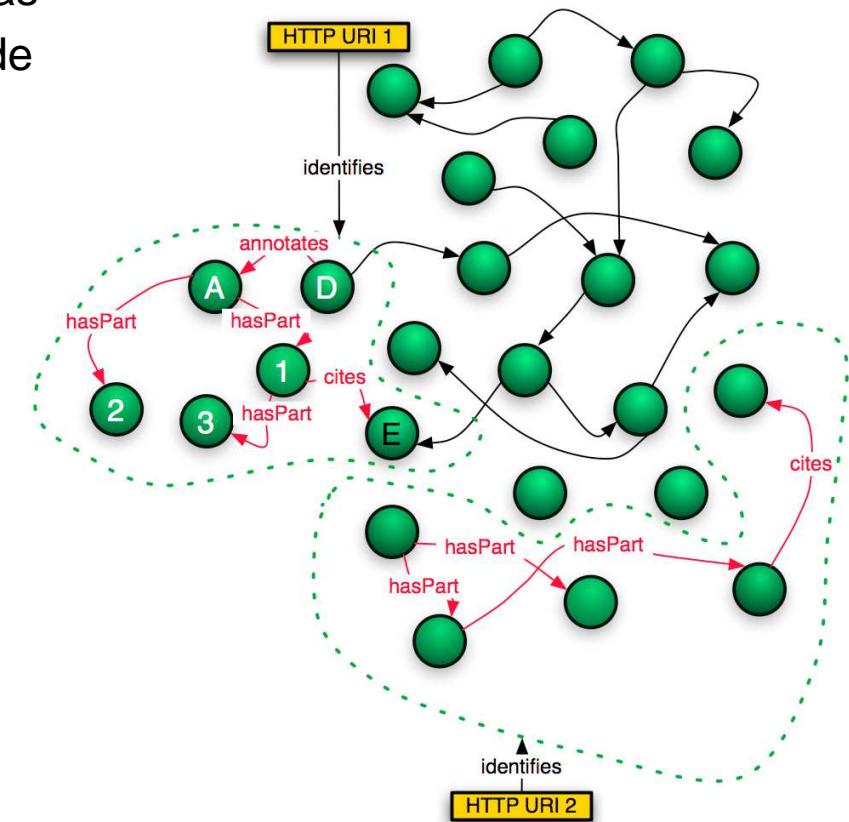


OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Object Reuse and Exchange: A Resource-Centric Approach

- Fundamental shift in the chosen approach towards interoperability
- The Web Architecture as the platform for interoperability
- Resources, URIs, and representations as the tools of the ORE interoperability trade
- De-facto integration with existing Web applications
- Potential of adoption by other communities
- Potential of tools created by other communities
- ....



# Foundations of the OAI-ORE solution to handle Aggregations

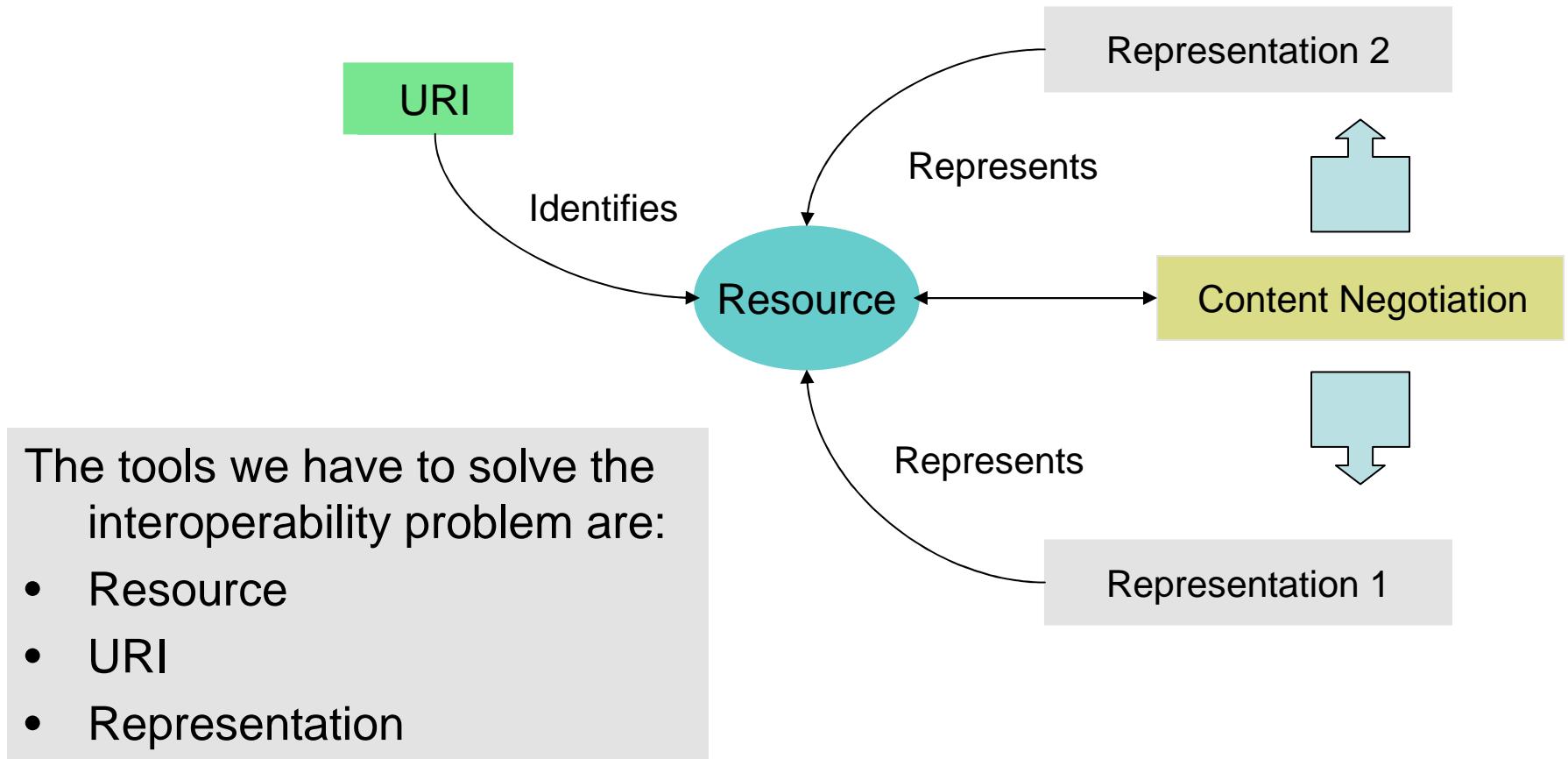
- Web Architecture
  - [◦ <http://www.w3.org/TR/webarch/>](http://www.w3.org/TR/webarch/)
- Semantic Web, Resource Description Framework (RDF)
  - [◦ <http://www.w3.org/TR/rdf-primer/>](http://www.w3.org/TR/rdf-primer/)
- Semantic Web, Linked Data, Cool URIs for the Semantic Web
  - [◦ <http://linkeddata.org/>](http://linkeddata.org/)
  - [◦ <http://www4.wiwiss.fu-berlin.de/bizer/pub/LinkedDataTutorial/>](http://www4.wiwiss.fu-berlin.de/bizer/pub/LinkedDataTutorial/)
  - [◦ <http://www.w3.org/TR/cooluris/>](http://www.w3.org/TR/cooluris/)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



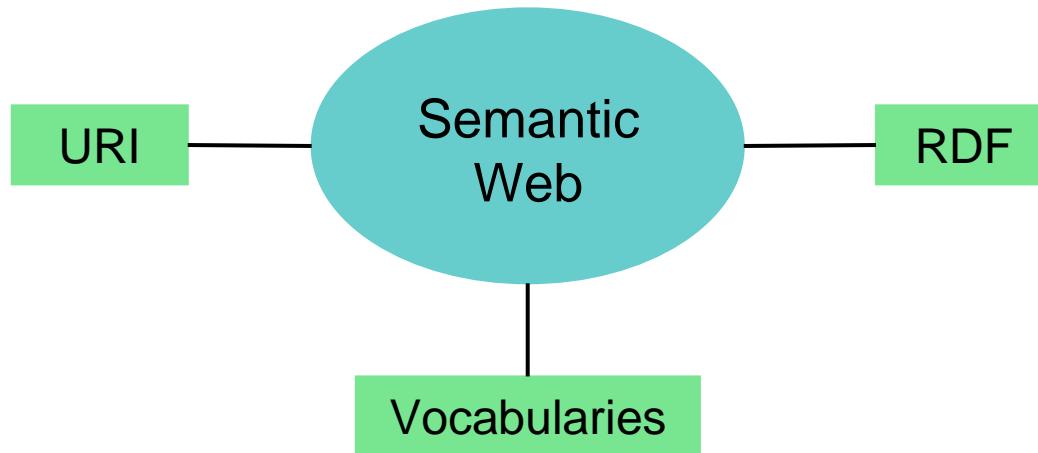
# W3C Web Architecture



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Semantic Web, Resource Description Framework (RDF)

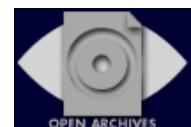


The tools we have to solve the interoperability problem are:

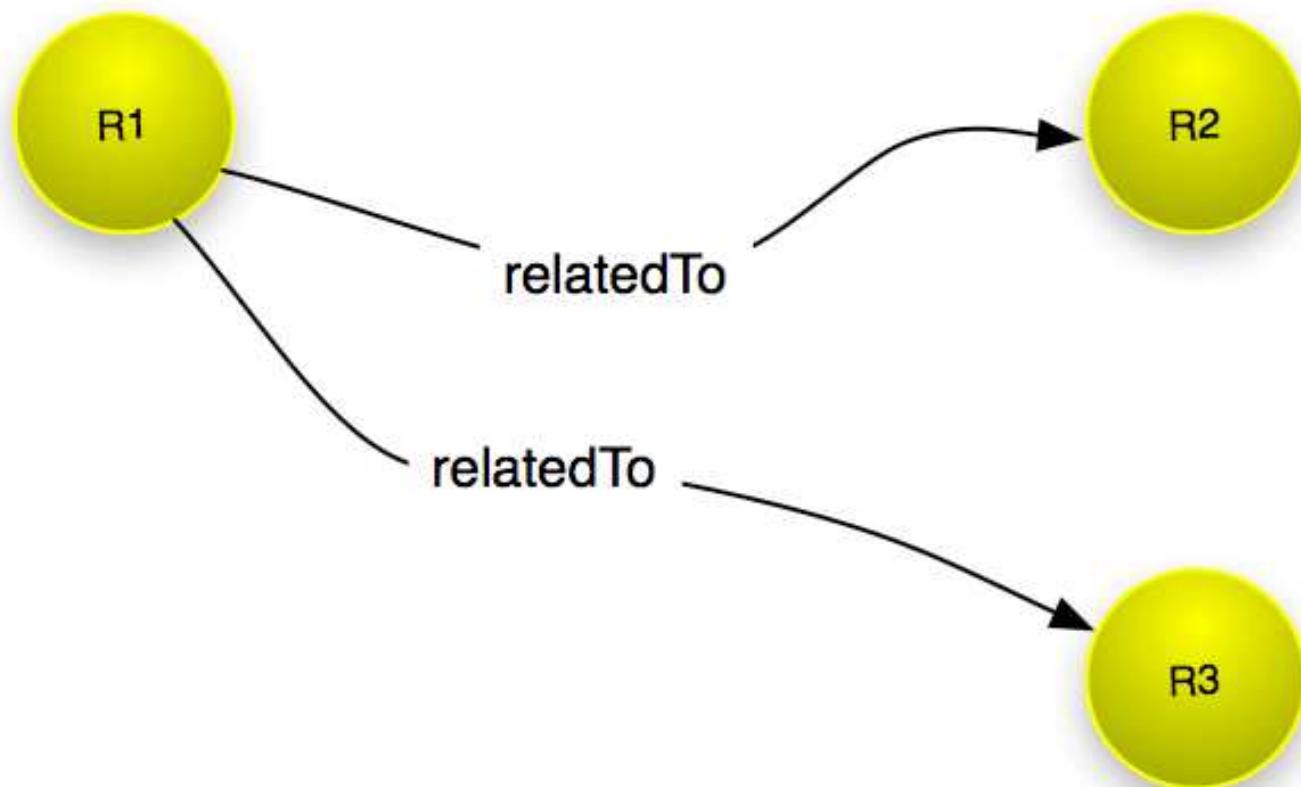
- URI
- RDF
- Vocabularies



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



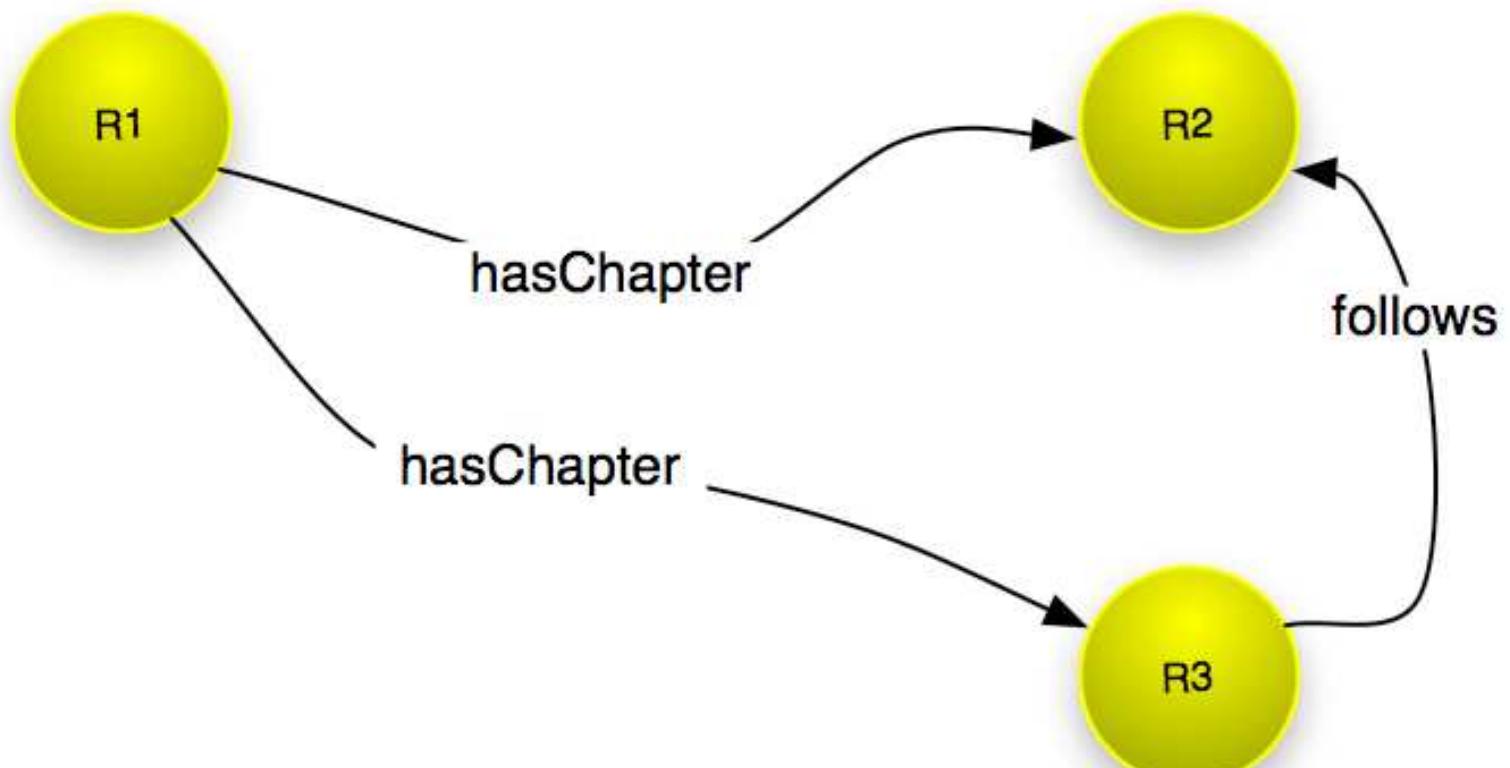
# Resource Description Framework (RDF)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



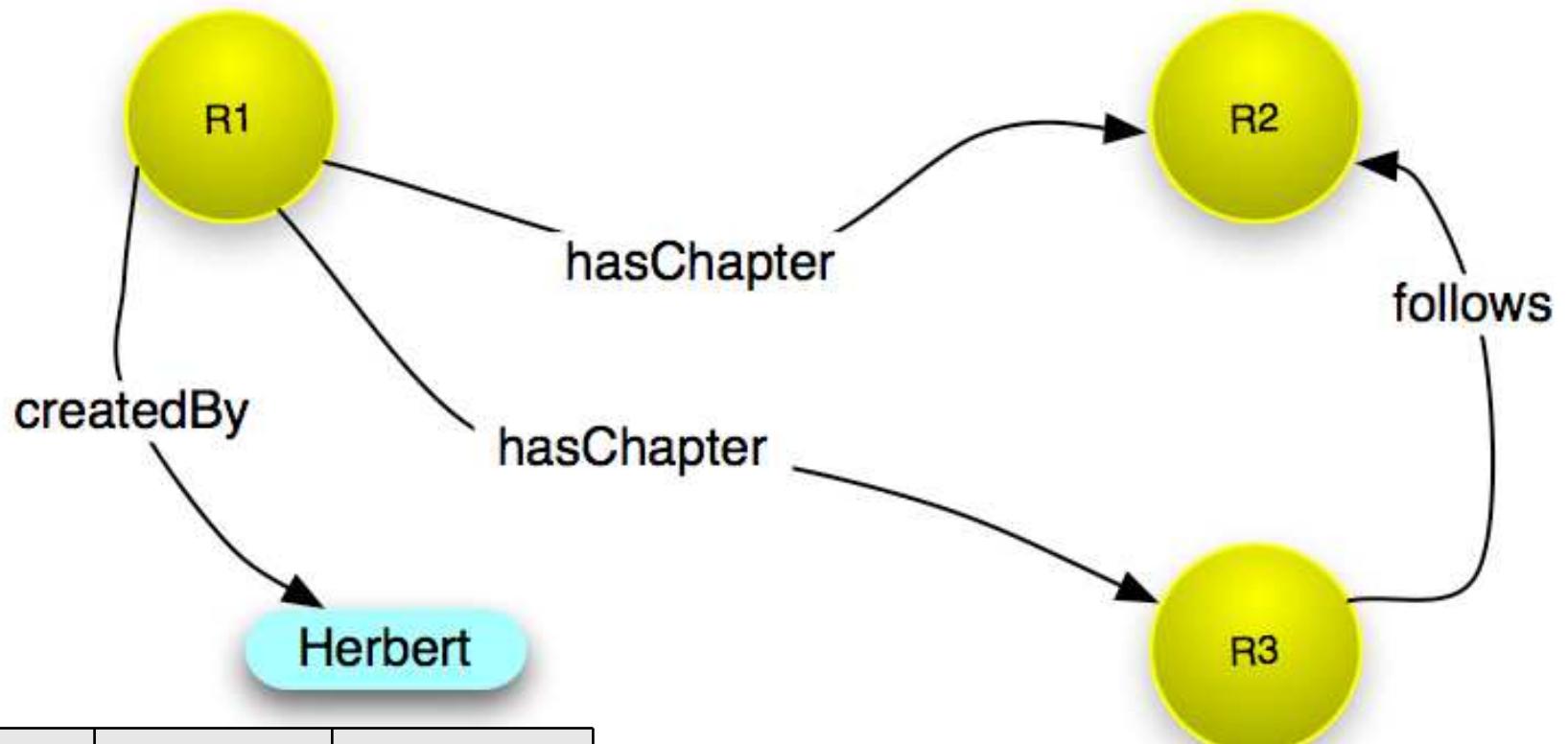
# Resource Description Framework (RDF)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Resource Description Framework (RDF)



Subject	Predicate	Object
R1	hasChapter	R2
R1	hasChapter	R3
R3	follows	R2
R1	createdBy	"Herbert"

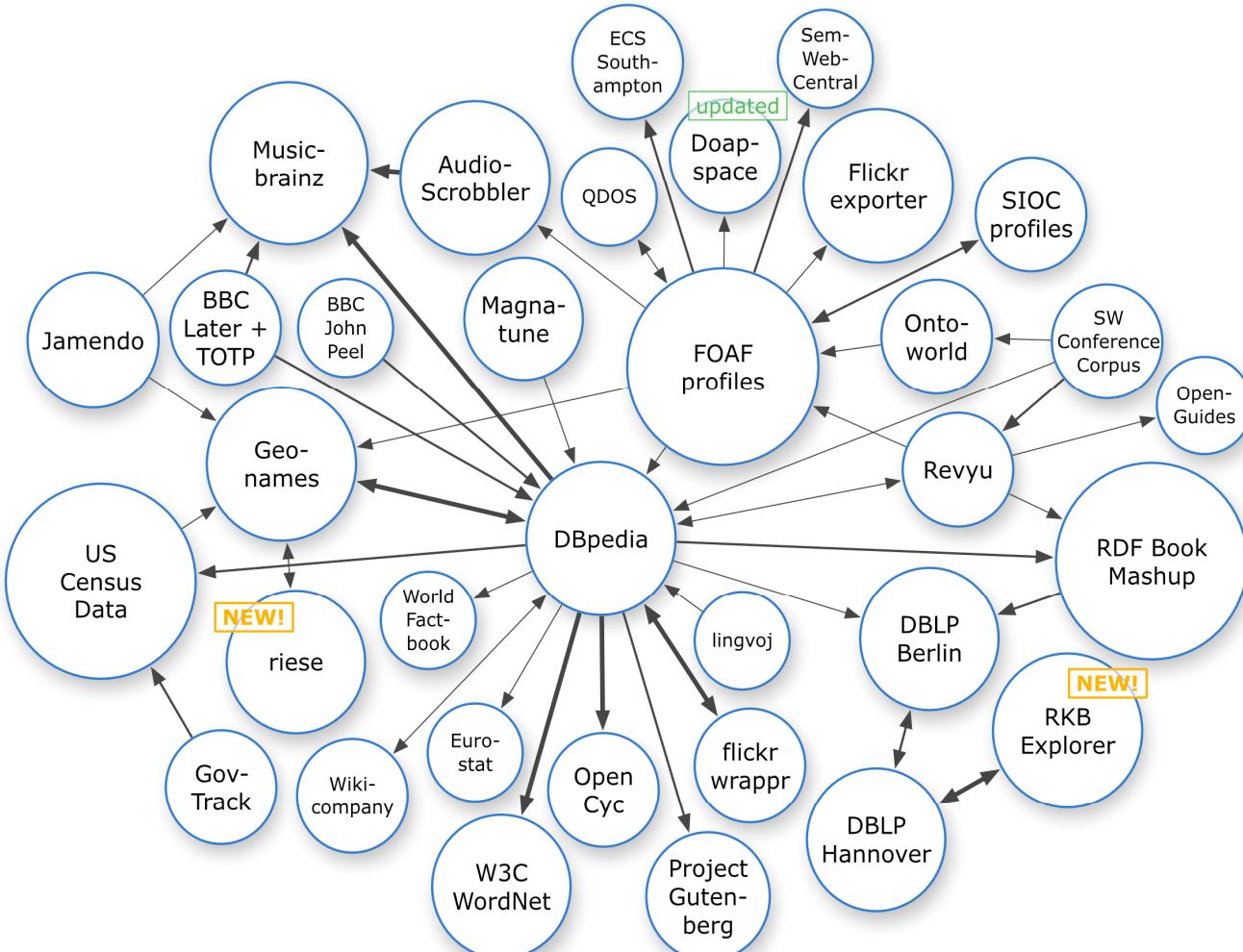
**Triples**



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Semantic Web, Linked Data



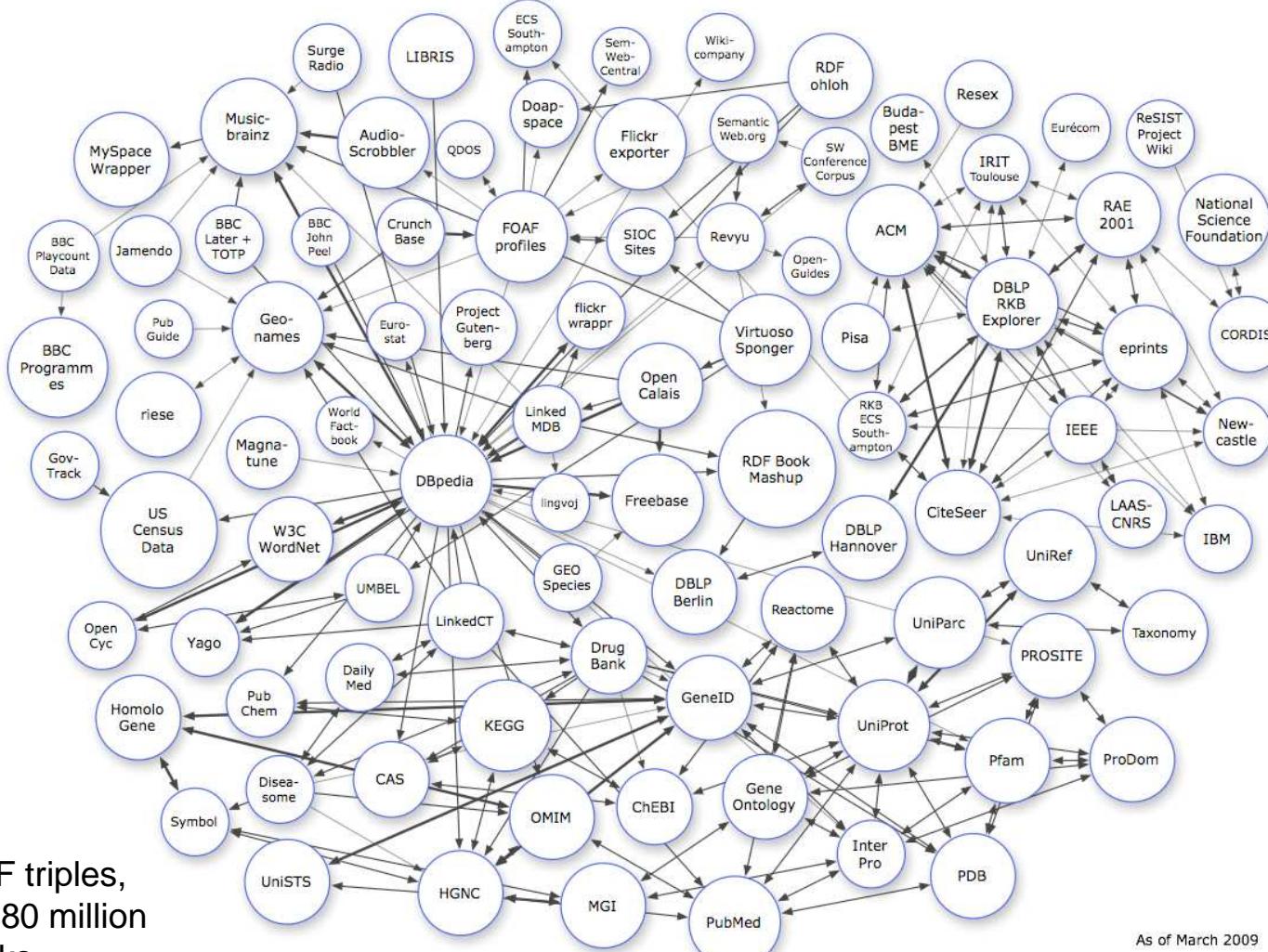
~ March 2008



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



## Semantic Web, Linked Data



4.5 billion RDF triples,  
interlinked by 180 million  
RDF links

As of March 2009

March 2009



# Semantic Web

- On the Web as we know it, URLs are for documents.
- On the Semantic Web, *things* are also given URLs:
  - Real world objects, e.g. a person, a star, a car, ...
  - Concepts, ideas, abstractions, ...



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Semantic Web, Linked Data

- In order to allow distinguishing between URIs that identify documents and URIs that identify *things*, a convention is introduced:
  - The document-URI has a Representation (the document)
  - The thing-URI has no Representation
- So how do we ever find out what the *thing* is about?
  - Publish a document **about** the *thing* at a URI different than the thing-URI;
  - In that document, describe the *thing*;
  - Use a network mechanism to point from the thing-URI to its describing document-URI.
  - This means using HTTP URIs for both the thing-URI and its describing document-URI.



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Cool URIs for the Semantic Web

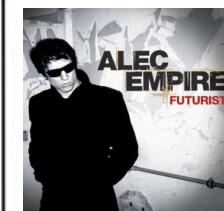
**URI-1**

**[http://dbpedia.org/resource/Alec\\_Empire](http://dbpedia.org/resource/Alec_Empire)**



**URI-1**

has no Representation



***real-world object***



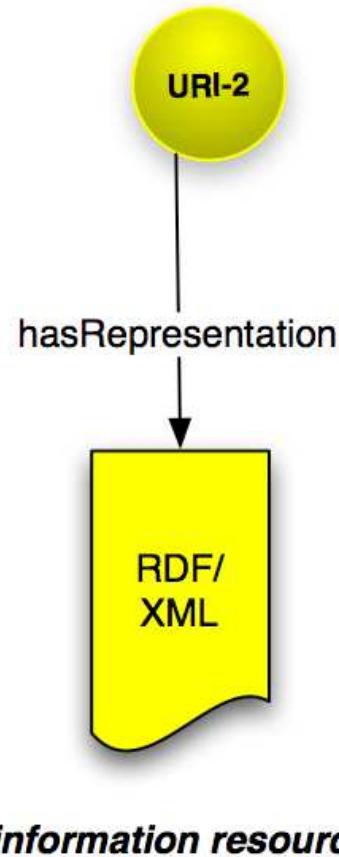
OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

 **Los Alamos**  
NATIONAL LABORATORY

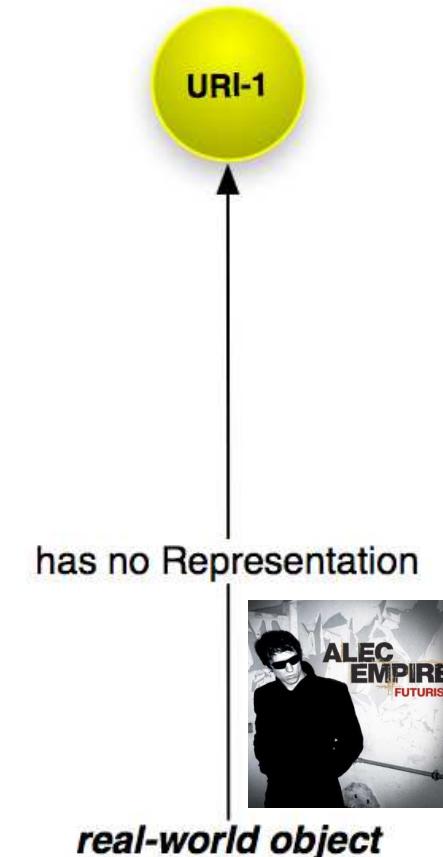


# Cool URIs for the Semantic Web

**URI-2**  
[http://dbpedia.org/data/Alec\\_Empire](http://dbpedia.org/data/Alec_Empire)



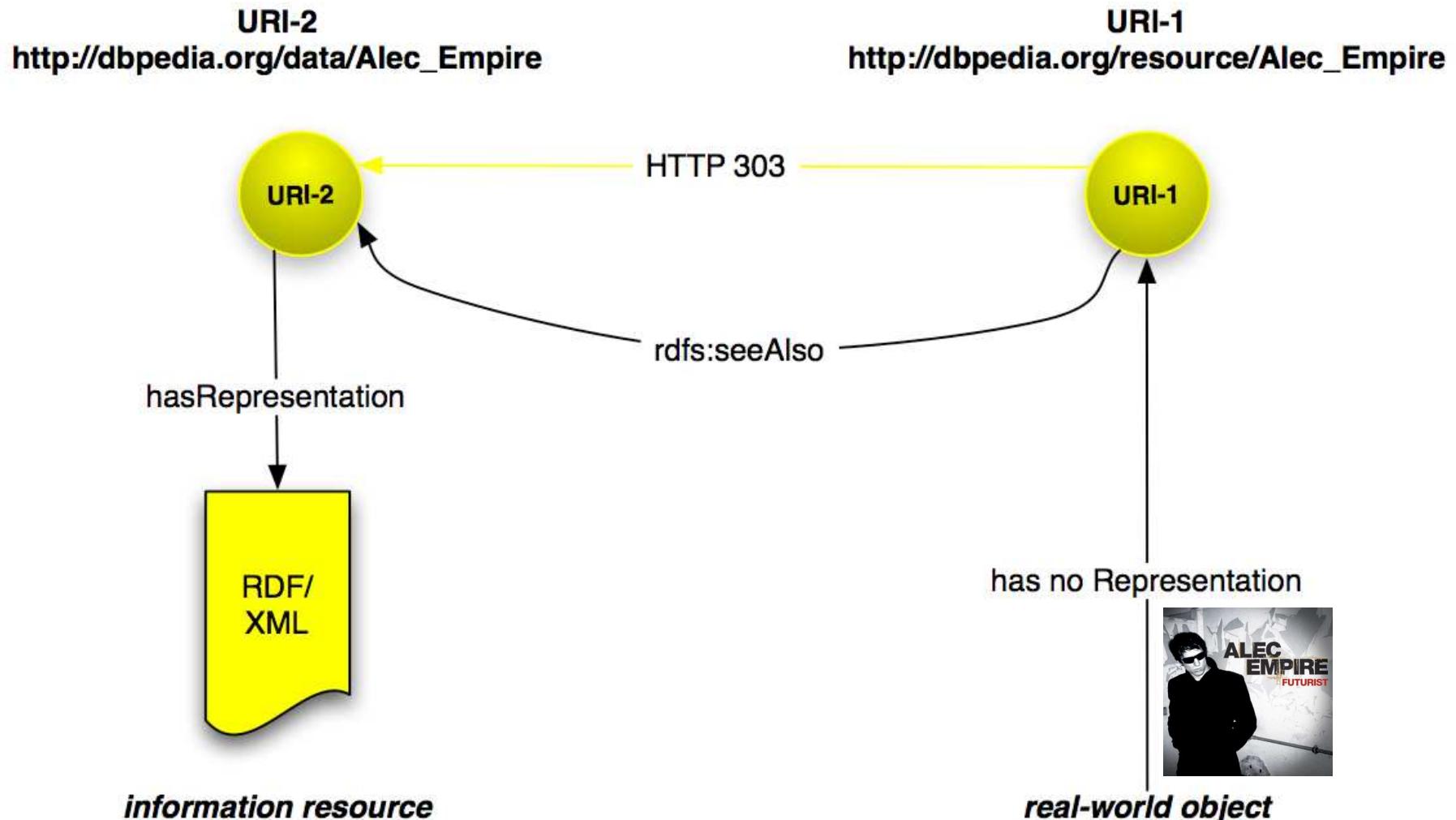
**URI-1**  
[http://dbpedia.org/resource/Alec\\_Empire](http://dbpedia.org/resource/Alec_Empire)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



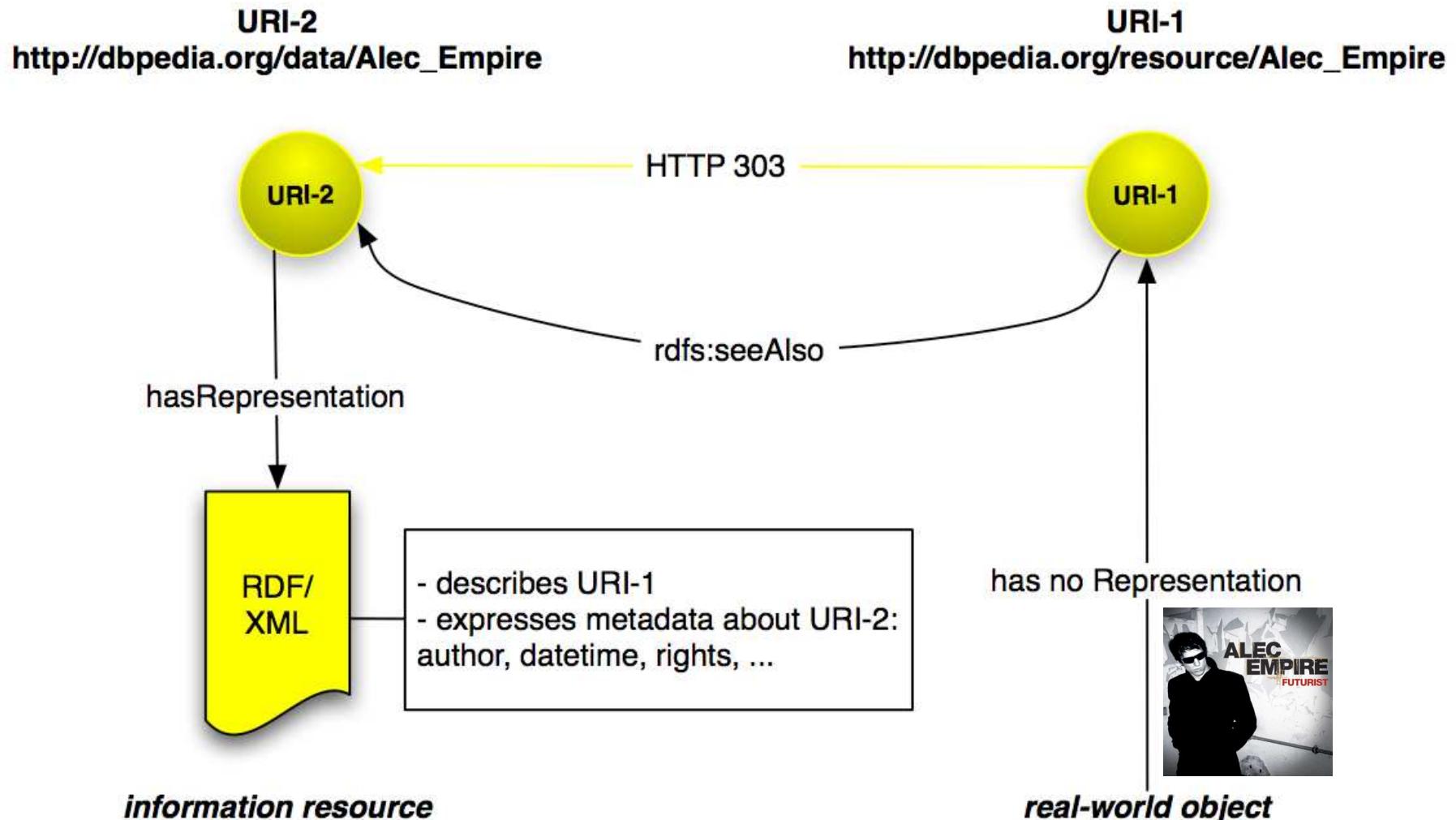
# Cool URIs for the Semantic Web



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Cool URIs for the Semantic Web



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Semantic Web, Linked Data (again)

- The Linked Data Tutorial has recommendations regarding the useful information to return about a *thing* resource:
  - The description: all triples with the thing-URI as subject
  - Backlinks: all triples with the thing-URI as object (sometimes redundant but allows bidirectional traversal)
  - Related descriptions: triples about resources related to the *thing* resource
  - Metadata: information about the document that contains all of the above: e.g. authorship, rights, publication datetime, etc.
  - Syntax: at least RDF/XML
- Linked Data Tutorial also has recommendations about which RDF features not to use for Linked Data publishing.



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# OAI Object Reuse and Exchange: The Approach

Subject: How to handle an **Aggregation** of Web resources?

Approach: Publish **Resource Maps** to the Web that Instantiate, Describe, and provide an Identity for the **Aggregation**

**Aggregation:** a *thing* resource

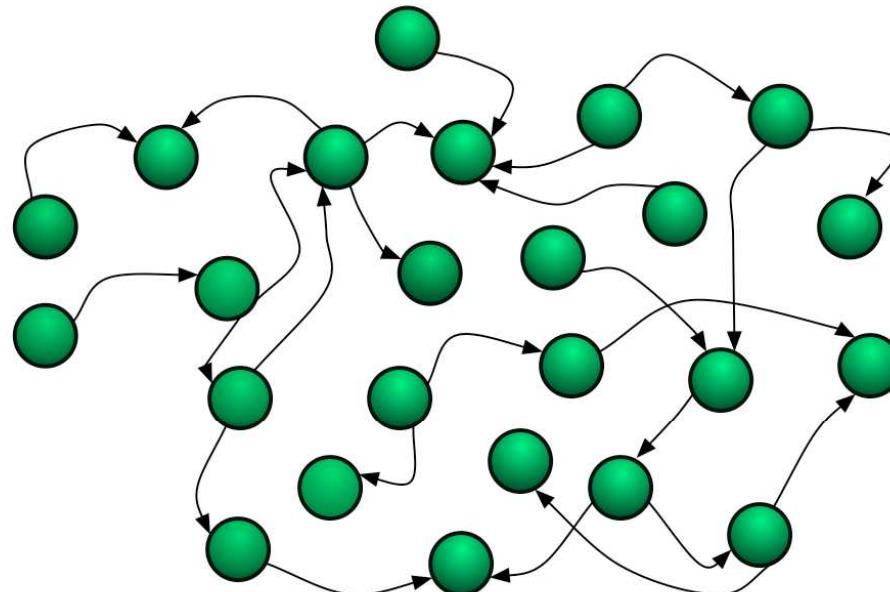
**Resource Map:** a document resource  
that describes an Aggregation



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# The Web

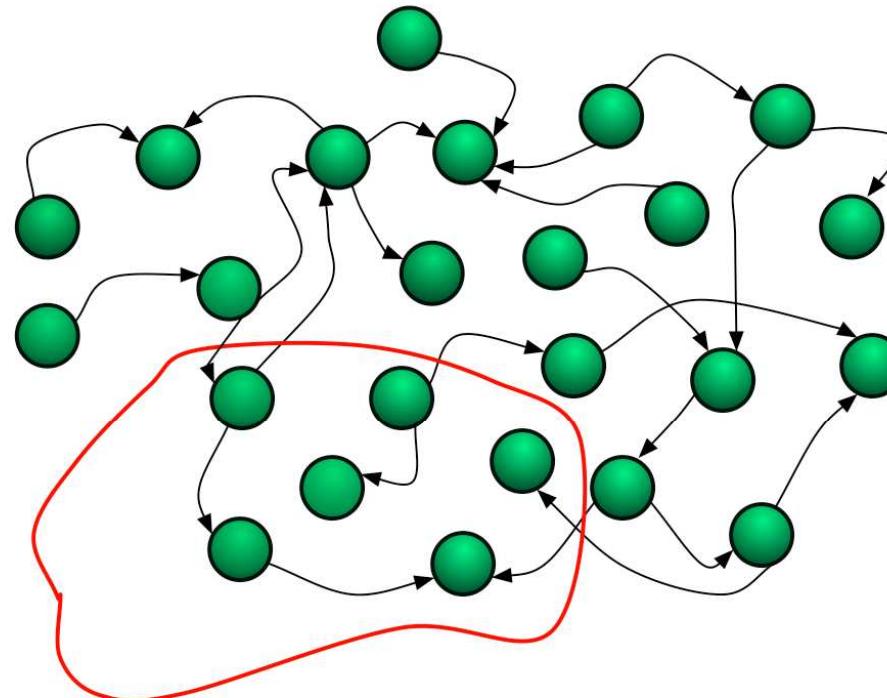


OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

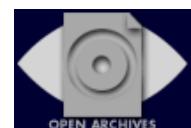


# An Aggregation and the Web

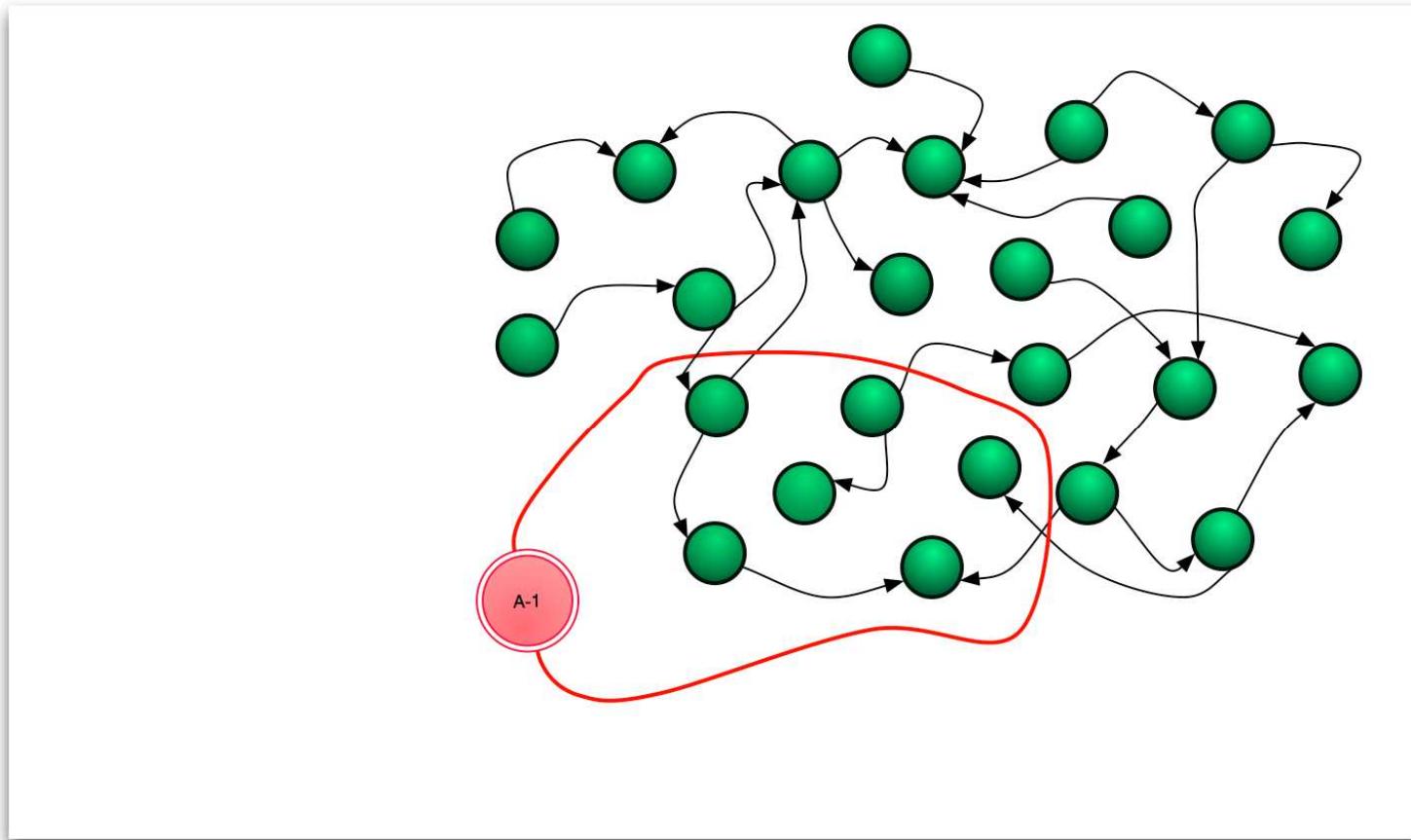
- Resources of an aggregation are distinct URI-identified Web resources
- To handle aggregations, missing are:
  - The boundary that delineates the aggregation in the Web
  - An identity (URI) for the aggregation



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



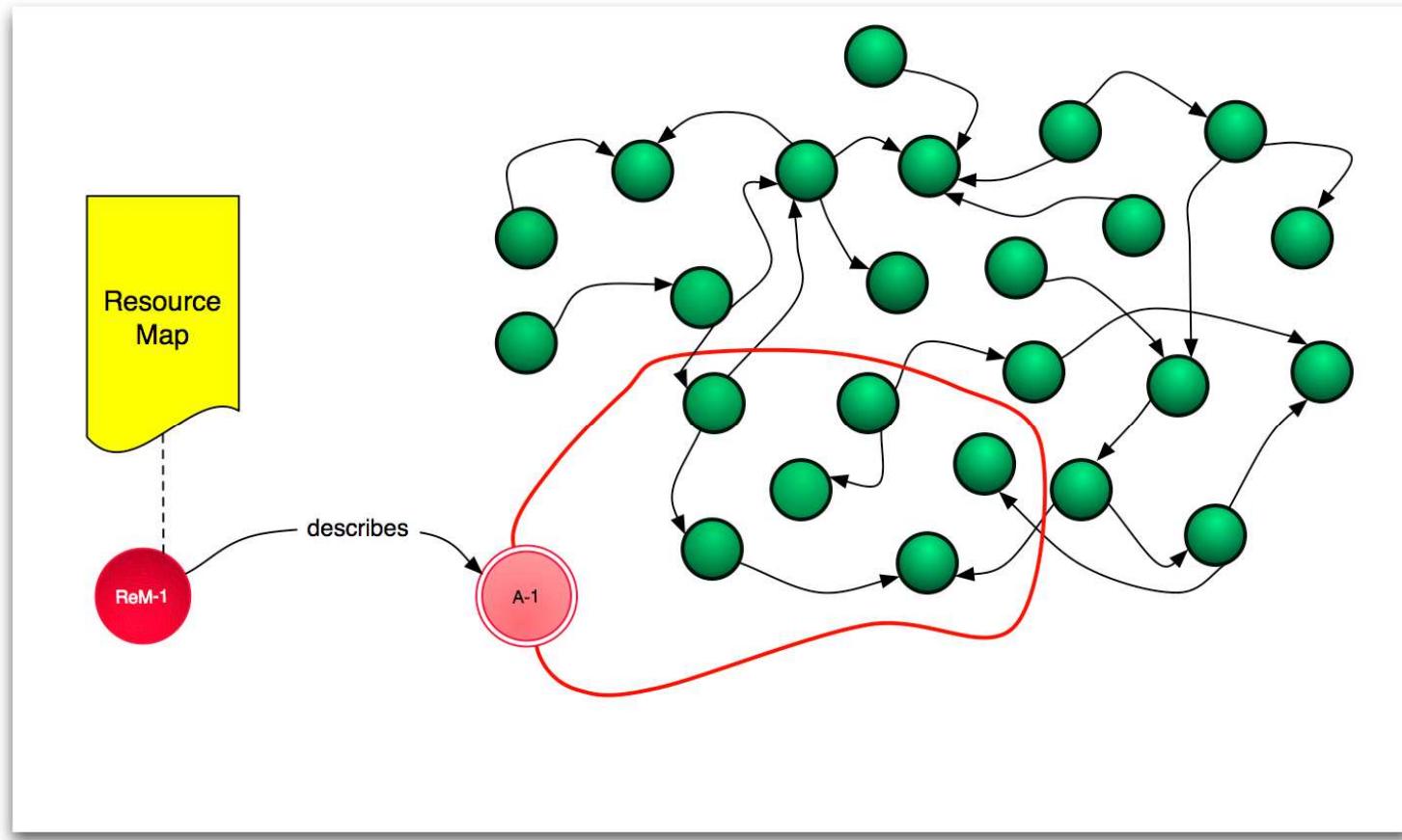
# Introduce a Resource that stands for the Aggregation



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



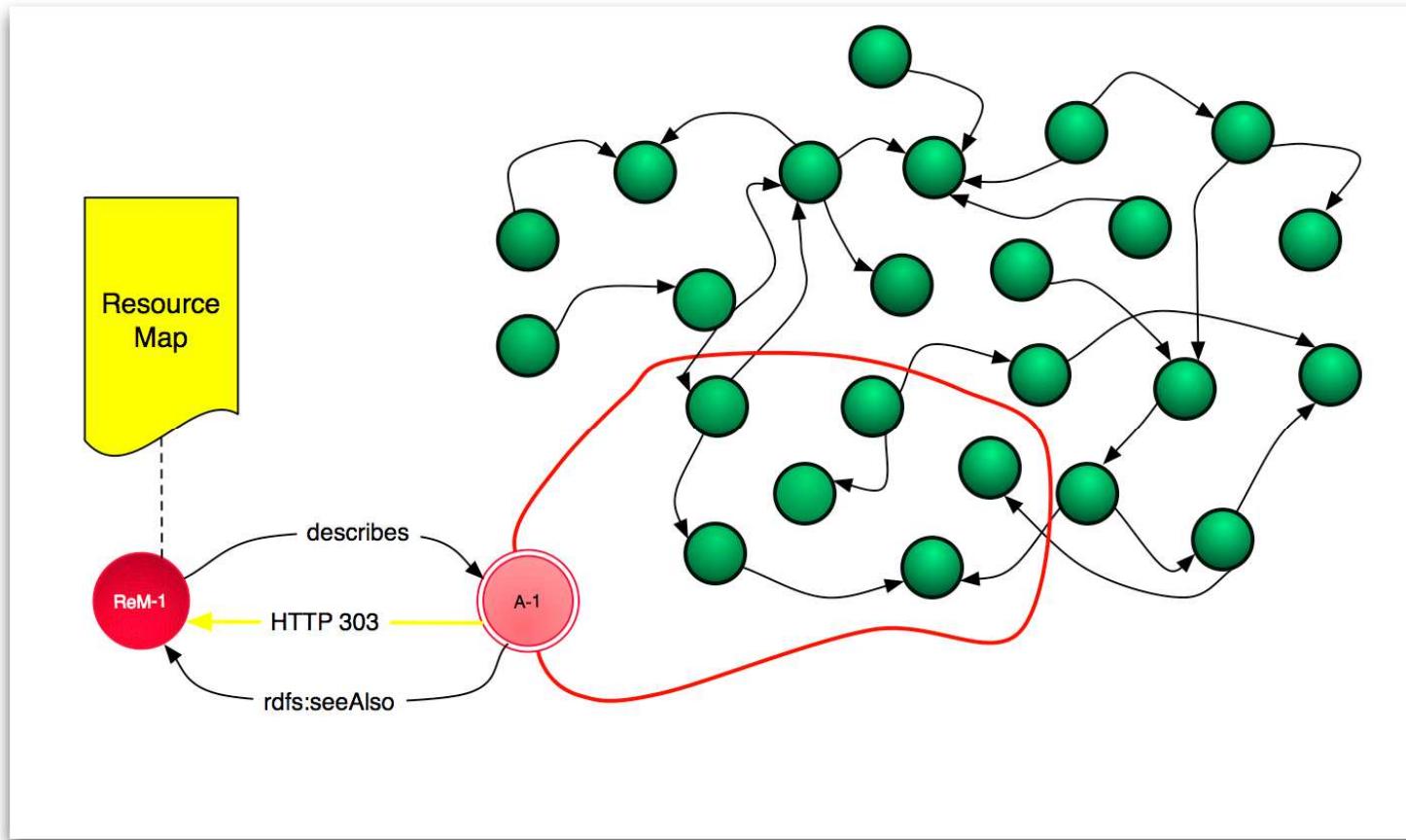
# Publish a Resource Map that describes the Aggregation



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Discover the Resource Map via the Aggregation

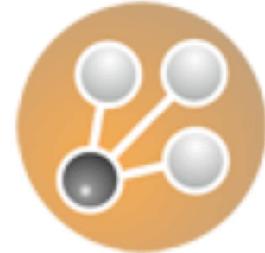


OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland





# Open Archives Initiative Object Reuse and Exchange



## ORE Specification - Abstract Data Model

17 October 2008

**This version:**

<http://www.openarchives.org/ore/1.0/datamodel>

**Latest version:**

<http://www.openarchives.org/ore/datamodel>

**Previous version:**

<http://www.openarchives.org/ore/0.9/datamodel>

**Editors (OAI Executive)**

Carl Lagoze, Cornell University Information Science

Herbert Van de Sompel, Los Alamos National Laboratory

**Editors (ORE Technical Committee)**

Pete Johnston, Eduserv Foundation

Michael Nelson, Old Dominion University

Robert Sanderson, University of Liverpool

Simeon Warner, Cornell University Information Science

# OAI Object Reuse and Exchange: The Basics

Aggregation  
Aggregated Resources  
ore:aggregates

Resource Map  
ore:describes

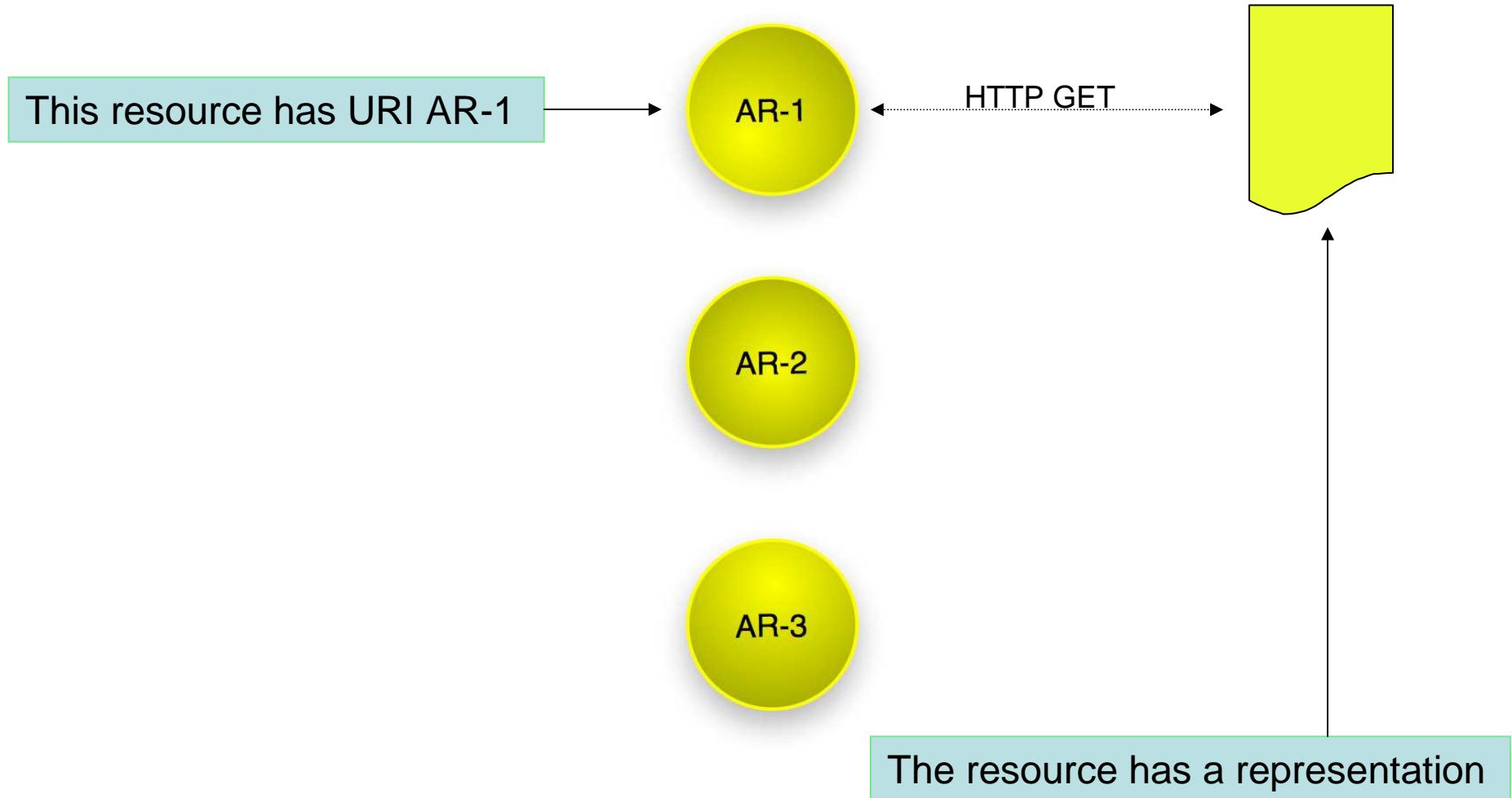
Relationships and Types



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



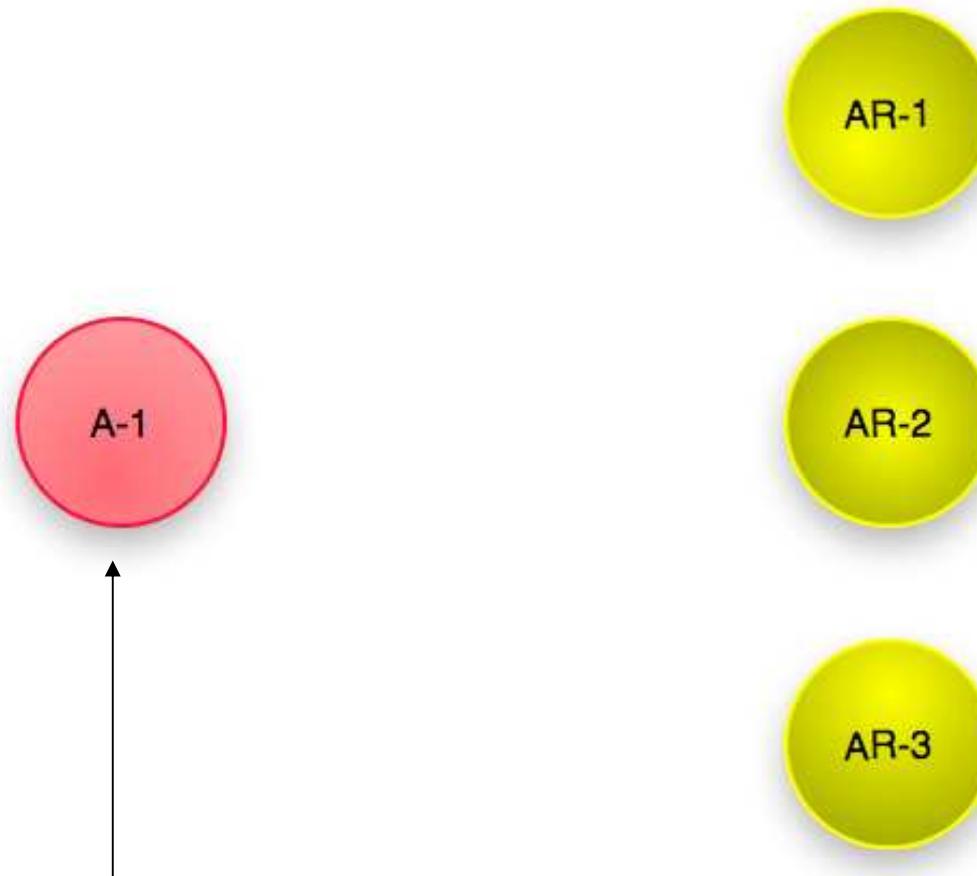
It starts with some resources that belong together



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Introduce the Aggregation



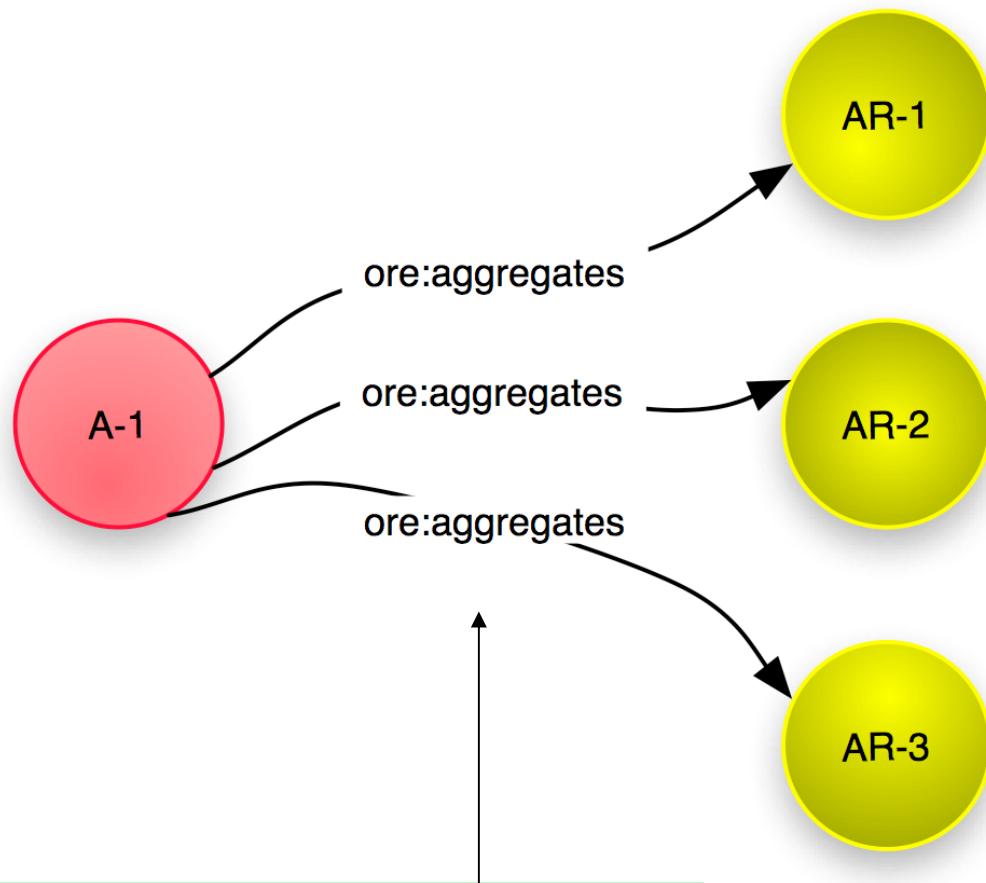
This resource is an Aggregation



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



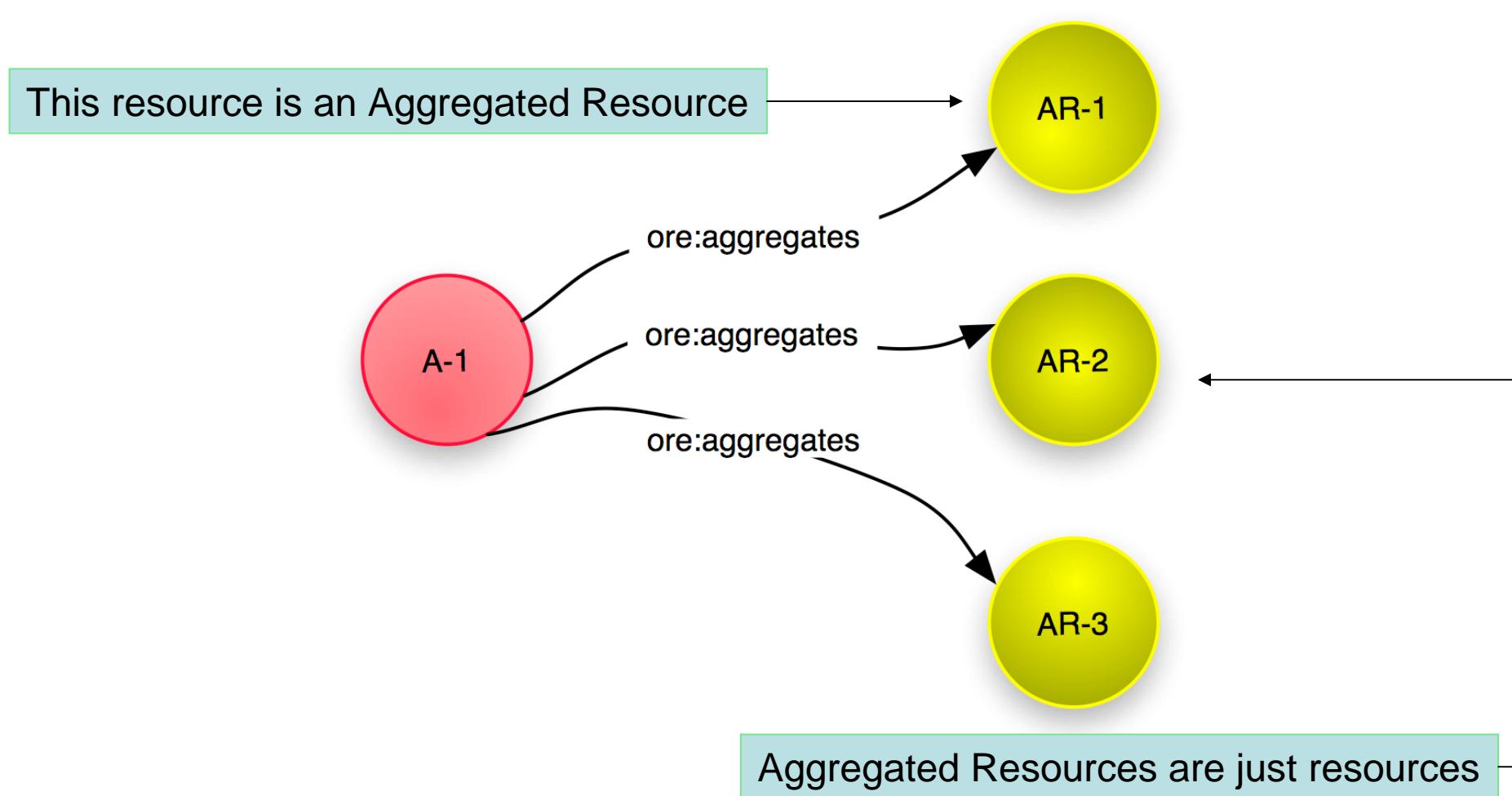
## Express the ore:aggregates relationship



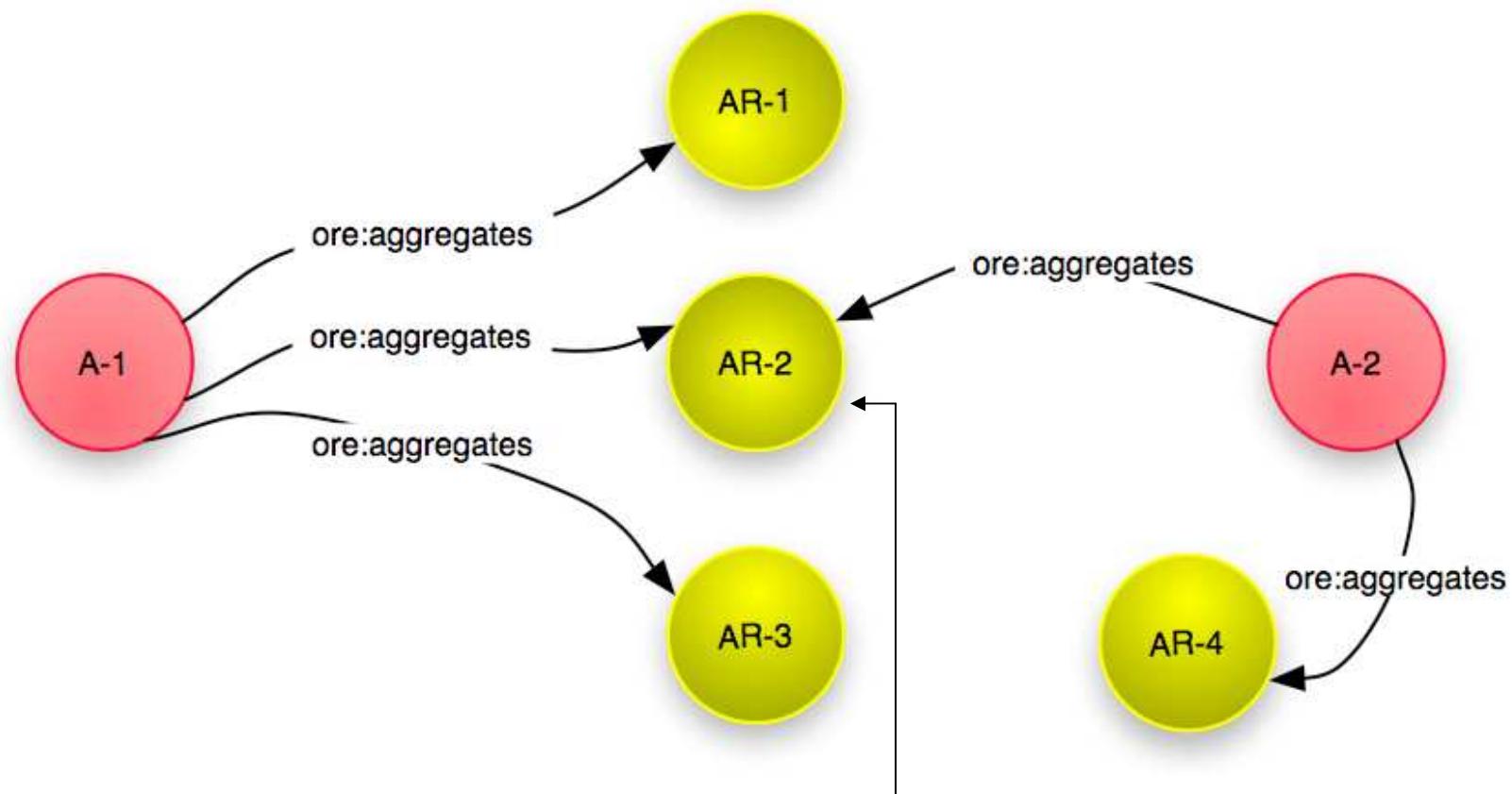
The inverse is ore:isAggregatedBy



# The ore:aggregates relationship



# The ore:aggregates relationship



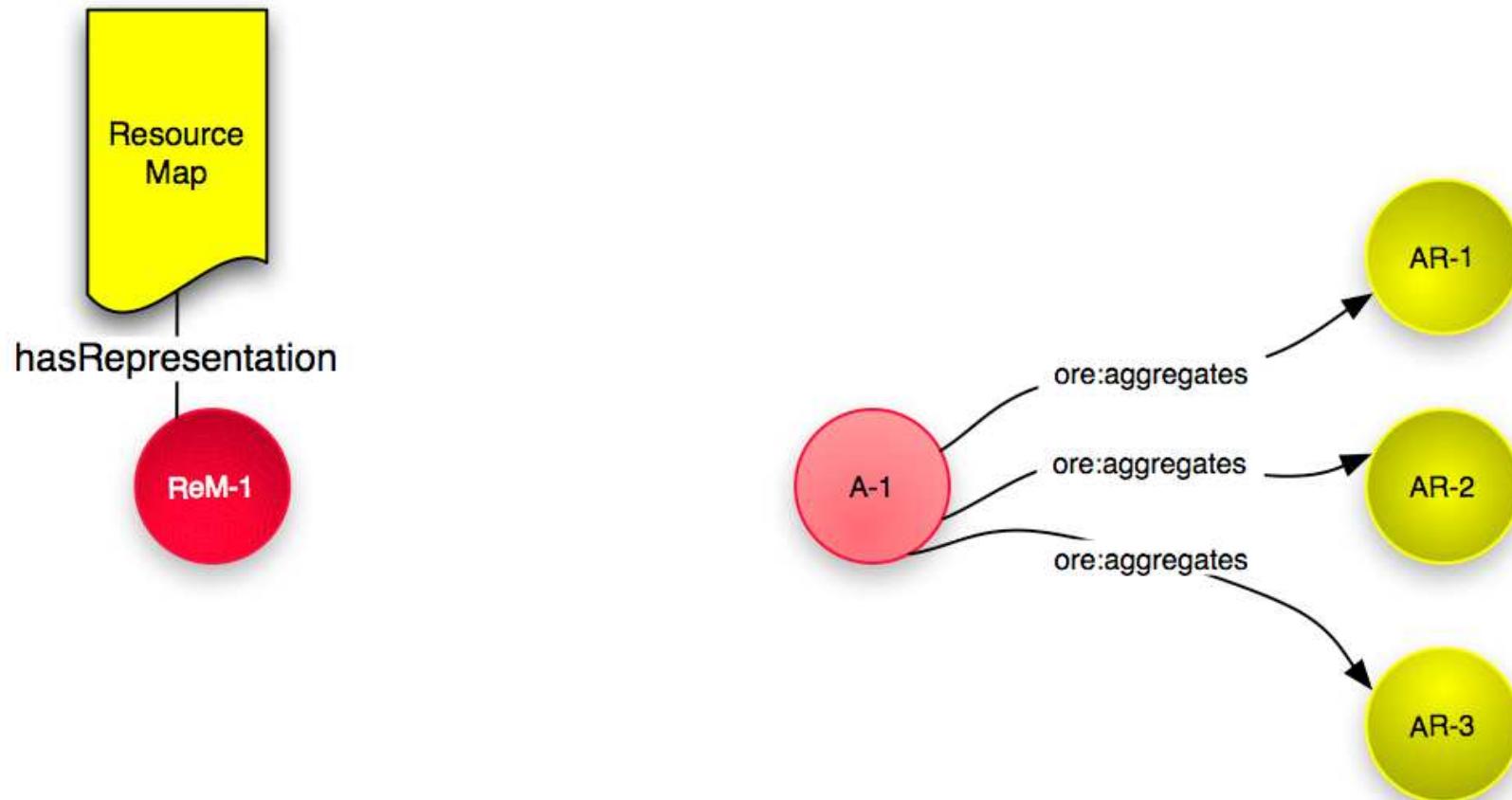
Aggregated Resources can be aggregated by multiple Aggregations



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



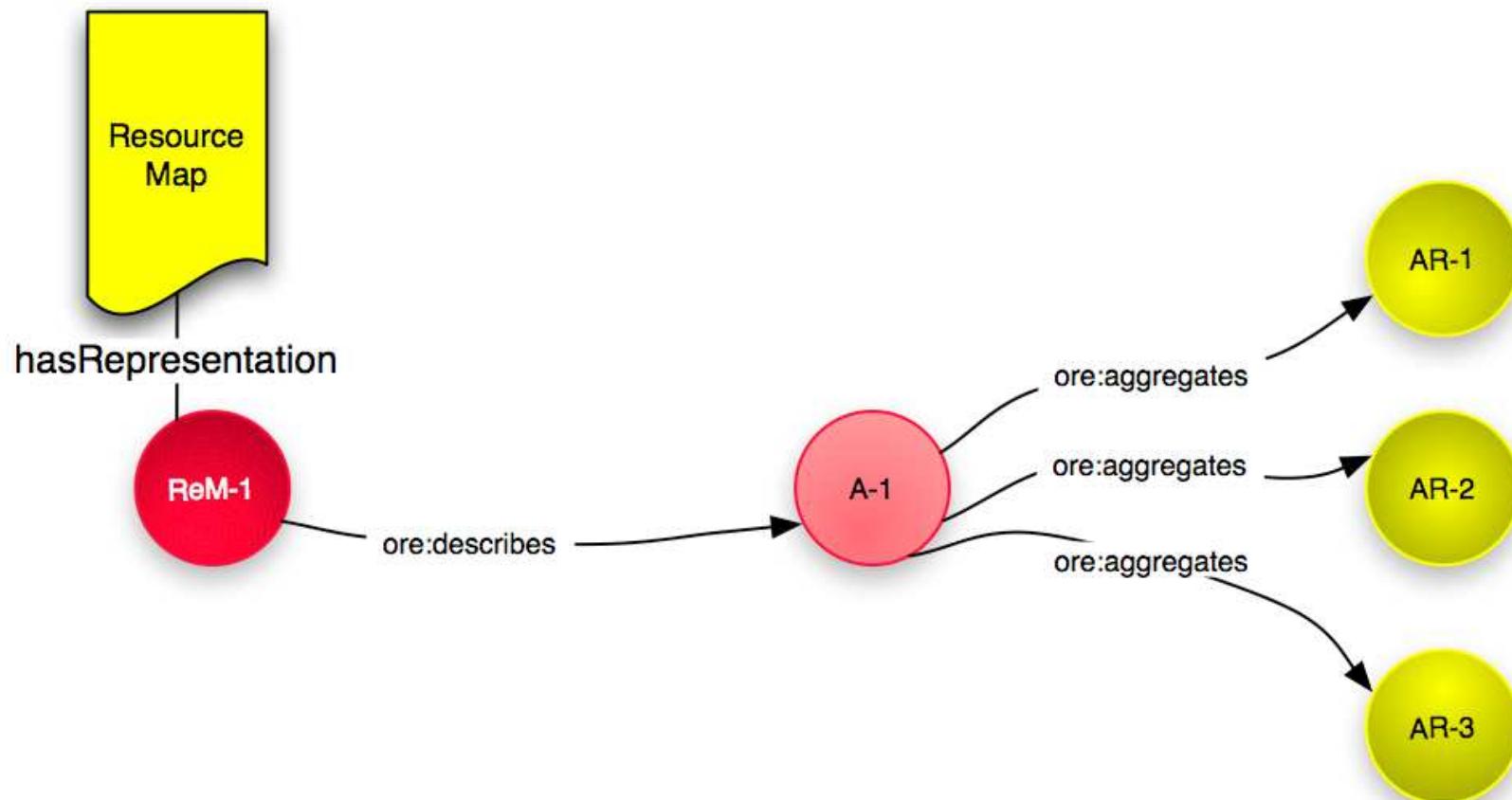
# Introduce the Resource Map



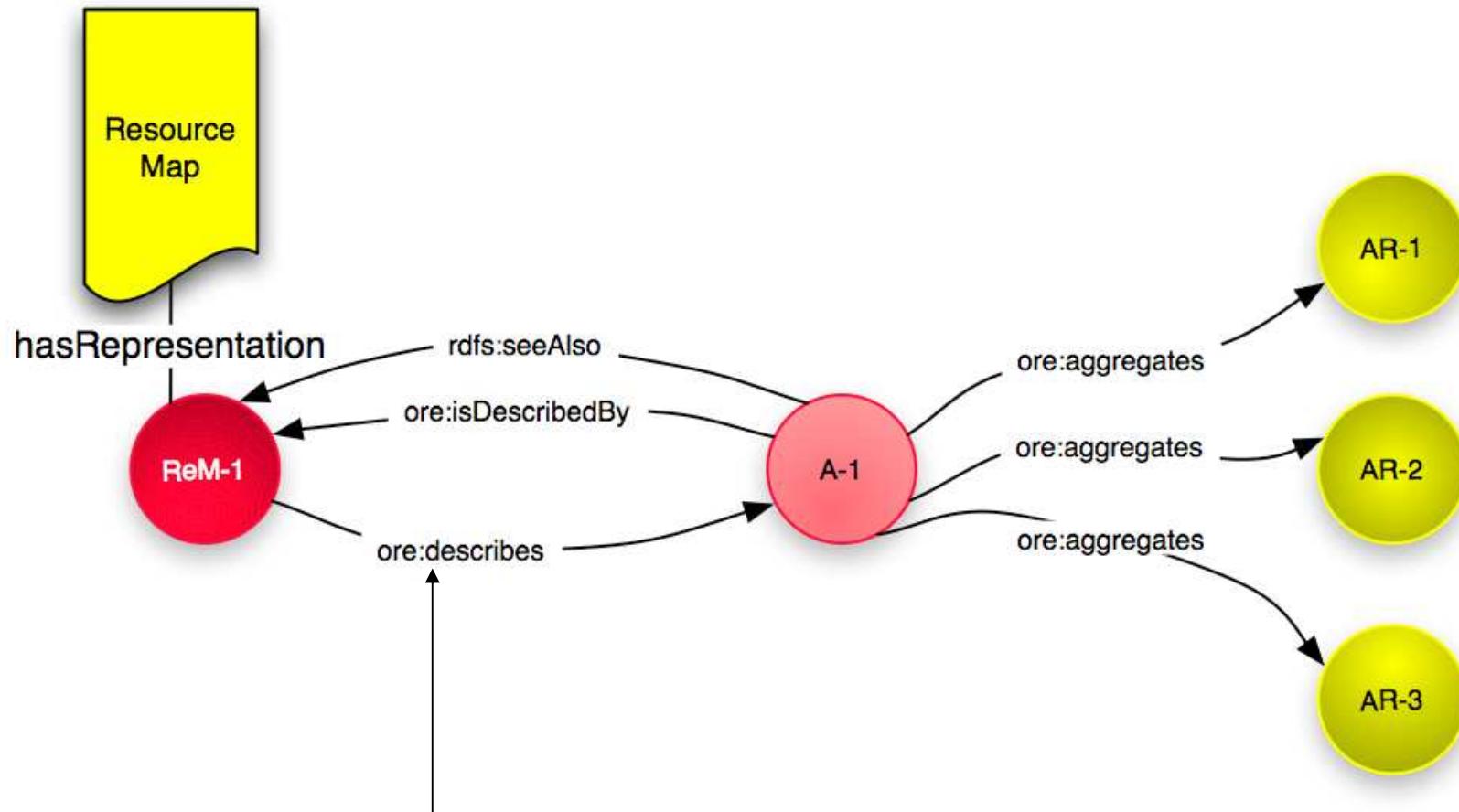
OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



## Express the ore:describes relationship



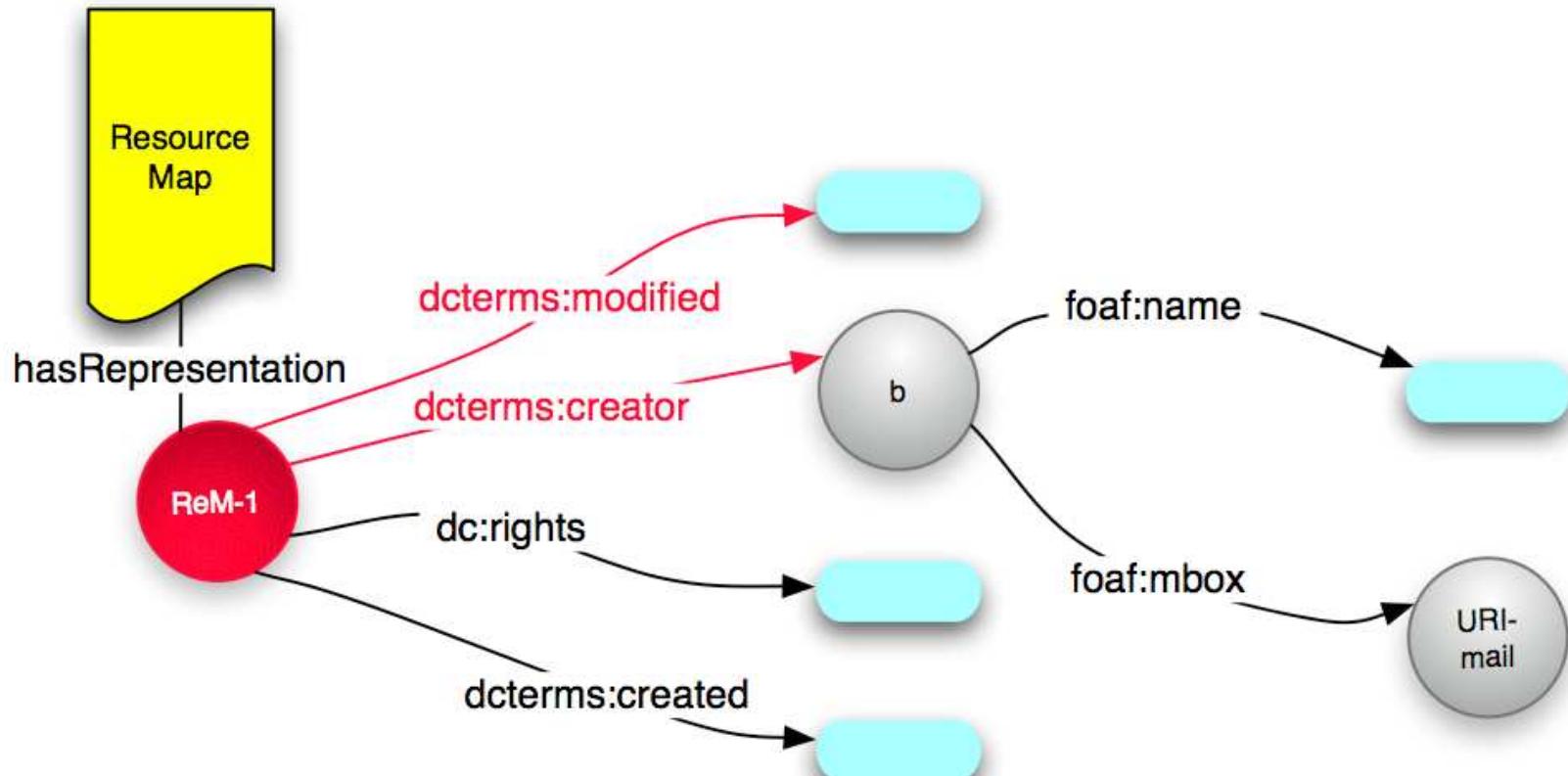
# The ore:isDescribedBy relationship



The inverse is **ore:isDescribedBy**; subproperty of **rdfs:seeAlso**



# Express metadata about the Resource Map



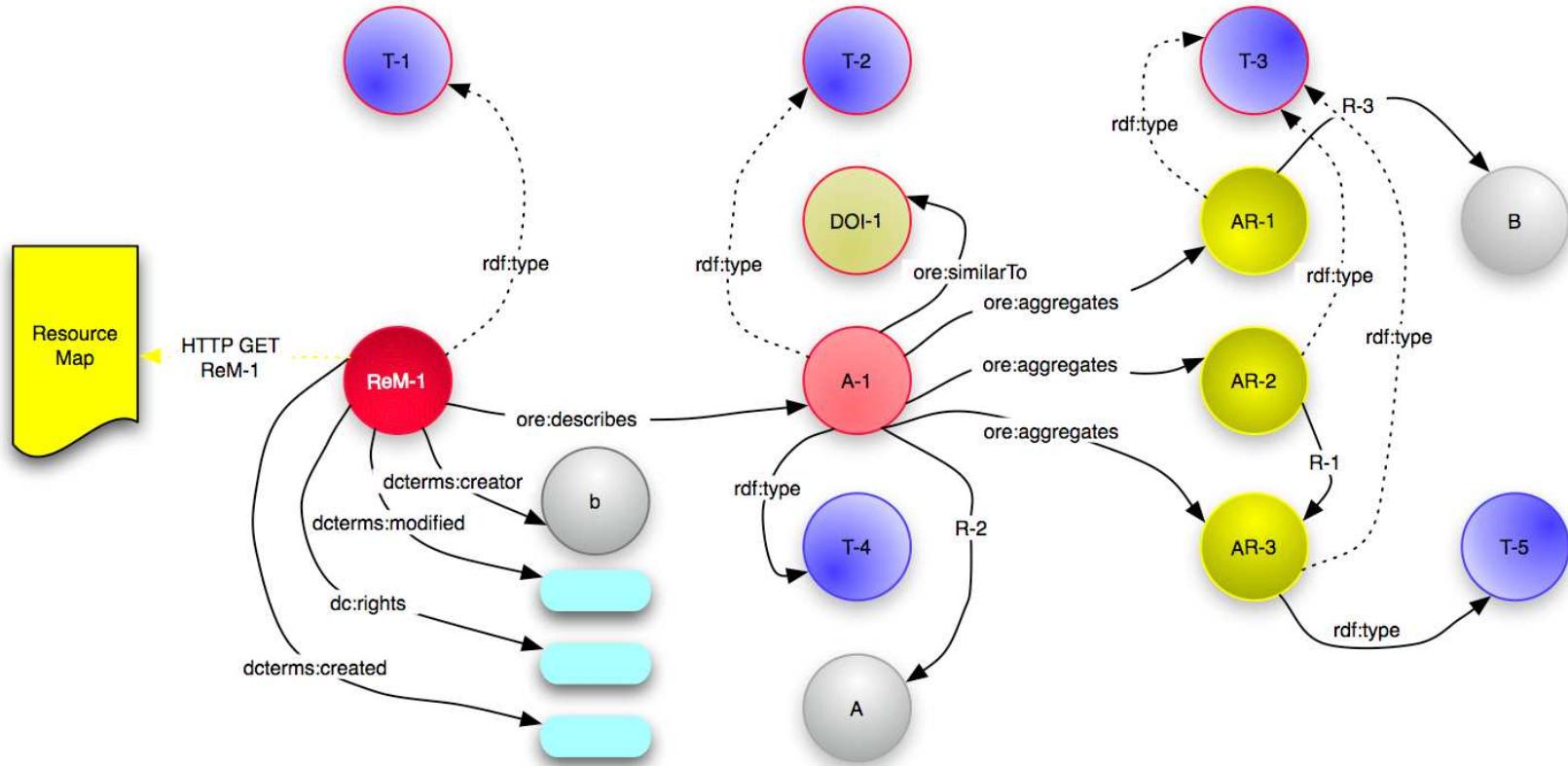
This corresponds to **metadata** from the Linked Data recommendations



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



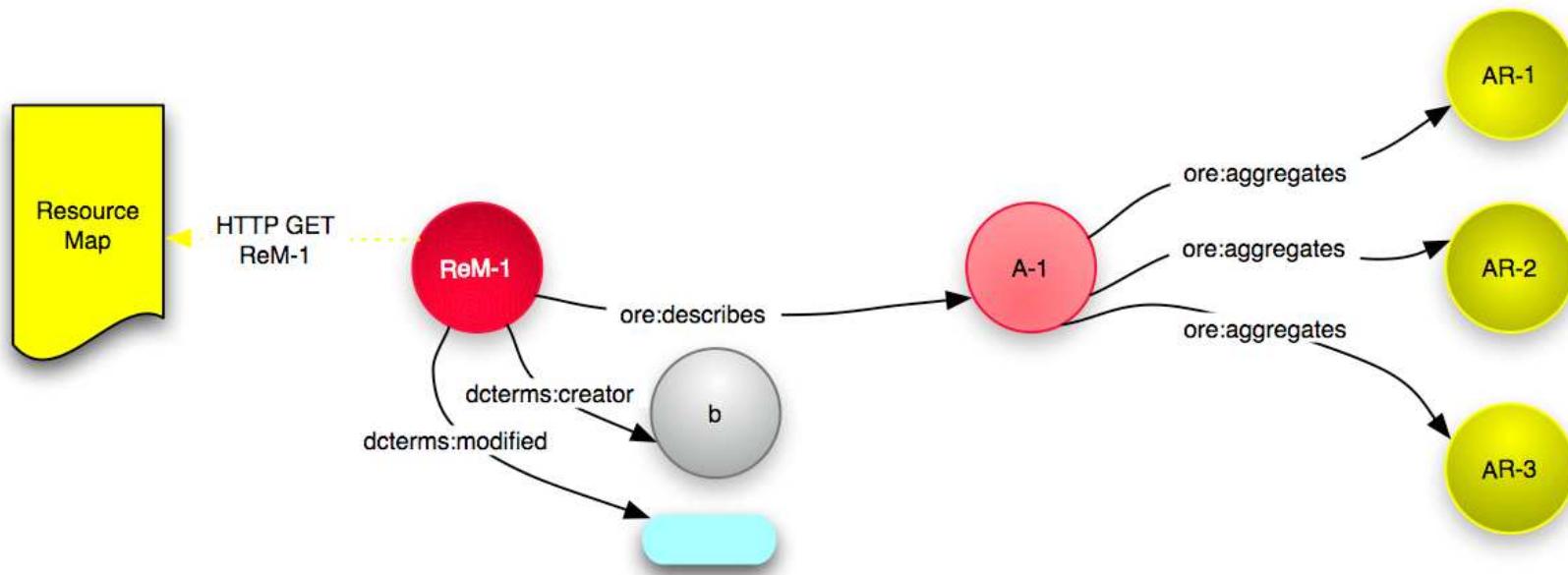
# A Resource Map can describe a lot ...



This corresponds to the **description, related descriptions, backlinks, metadata** from the Linked Data recommendations



# But minimally it describes this ...



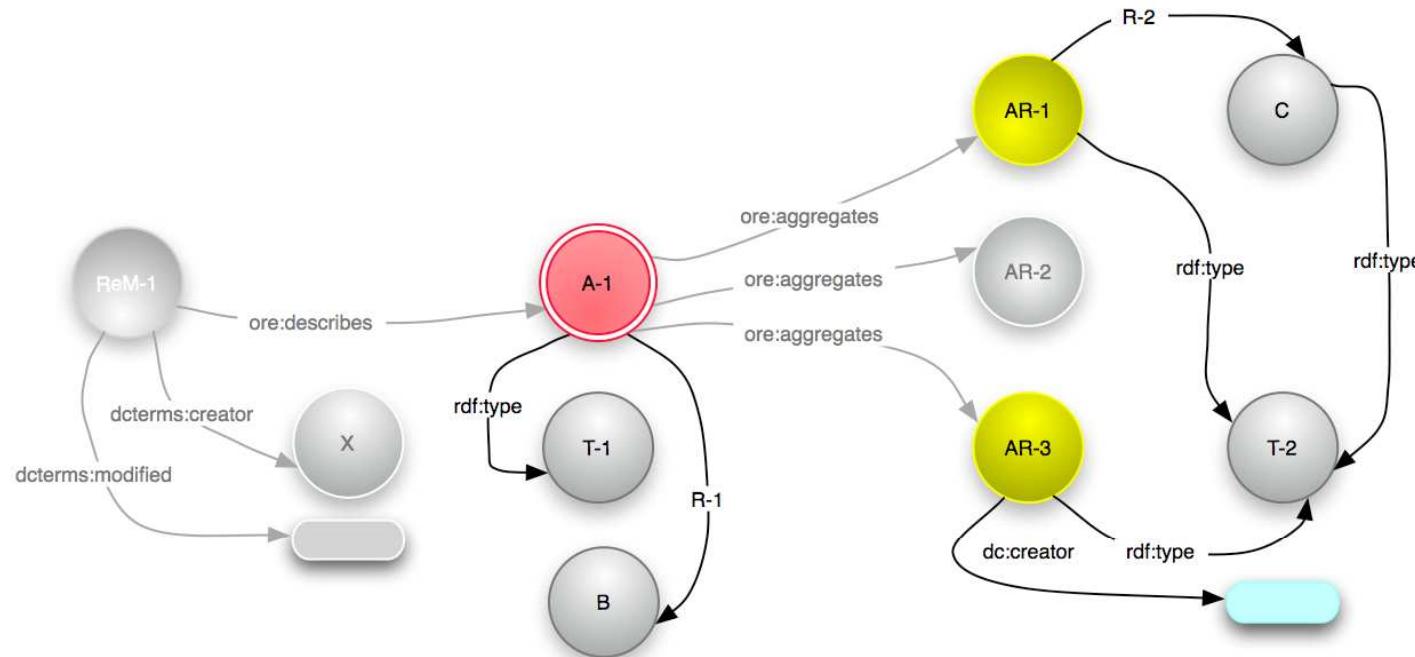
This corresponds to the **description** (minimal), and **metadata** from the Linked Data recommendations



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# A lot about the Aggregation and the Aggregated Resources

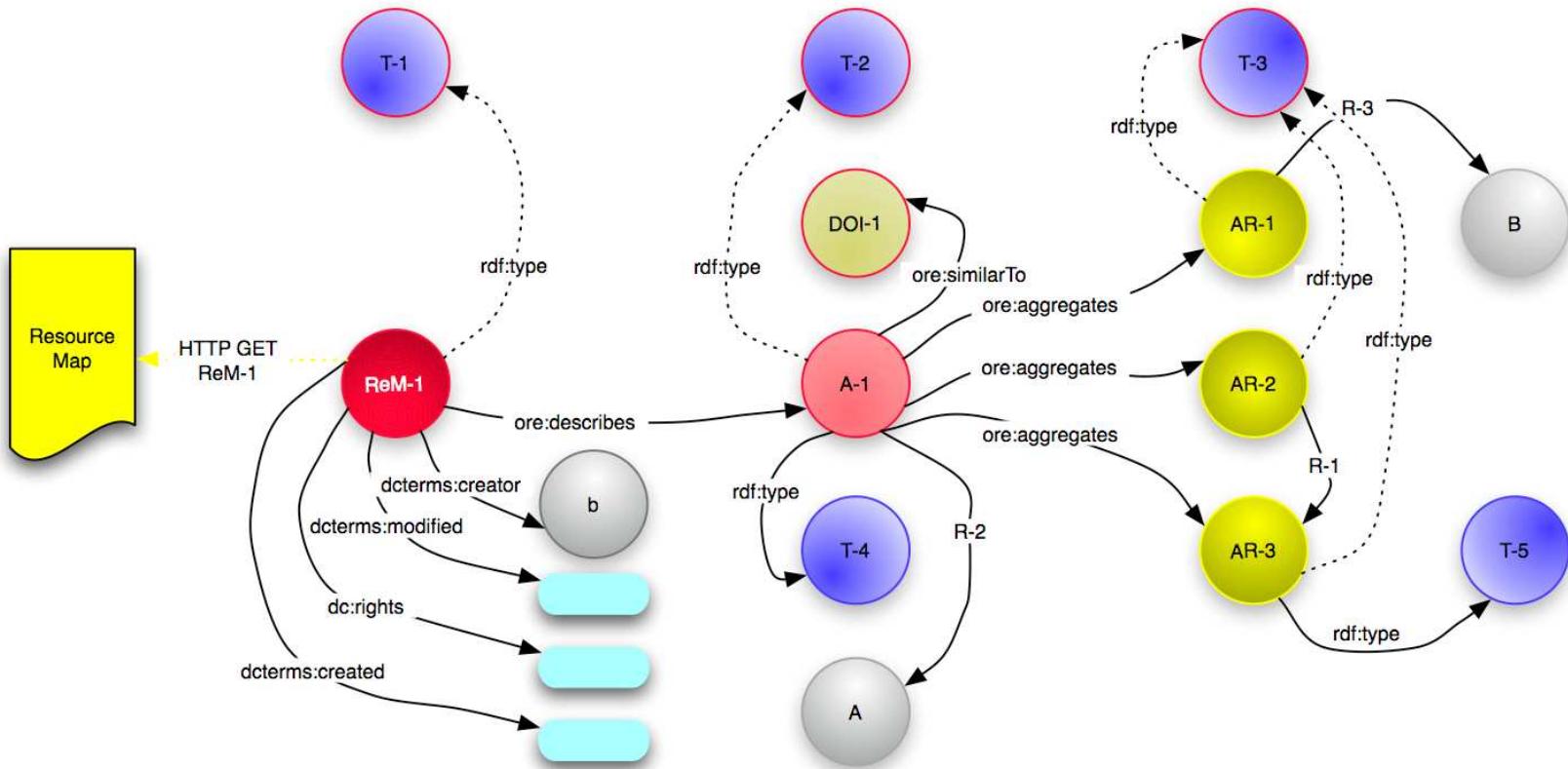


<A-1>	<rdf:type>	<T-1>
<A-1>	<R-1>	<B>
<AR-1>	<rdf:type>	<T-2>
<AR-1>	<R-2>	<C>
<AR-3>	<rdf:type>	<T-2>
<C>	<rdf:type>	<T-2>

B	<a href="http://www.dlib.org">http://www.dlib.org</a>
C	<a href="http://dx.doi.org/10.1023/A.1019213109274">http://dx.doi.org/10.1023/A.1019213109274</a>
A-1	<a href="http://www.dlib.org/dlib-february06smith/aggregation">http://www.dlib.org/dlib-february06smith/aggregation</a>
AR-1	<a href="http://www.dlib.org/dlib-february06smith/02smith.html">http://www.dlib.org/dlib-february06smith/02smith.html</a>
AR-3	<a href="http://www.dlib.org/dlib-february06smith/pg1-13.pdf">http://www.dlib.org/dlib-february06smith/pg1-13.pdf</a>
R-1	<a href="http://purl.org/dc/dcterms/isPartOf">http://purl.org/dc/dcterms/isPartOf</a>
R-2	<a href="http://purl.org/dc/dcterms/references">http://purl.org/dc/dcterms/references</a>
T-1	<a href="http://purl.org/eprint/type/JournalArticle">http://purl.org/eprint/type/JournalArticle</a>
T-2	<a href="http://purl.org/dc/dcmitype/Text">http://purl.org/dc/dcmitype/Text</a>



# A Resource Map can describe a lot ...



but the graph expressed by the Resource Map must be **connected**



# OAI Object Reuse and Exchange: Advanced Concepts

Aggregated Resource is member of another Aggregation ; is itself an Aggregation

ore:isAggregatedBy ; ore:isDescribedBy

Expressing non-protocol-based URIs

ore:similarTo

Proxy: Aggregated Resource in Context of an Aggregation

ore:isProxyFor ; ore:isProxyIn

Authoritative Resource Maps

Lineage of an Aggregated Resource

ore:lineage



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# OAI Object Reuse and Exchange: Advanced 1

Aggregated Resource member of another Aggregation  
ore:isAggregatedBy

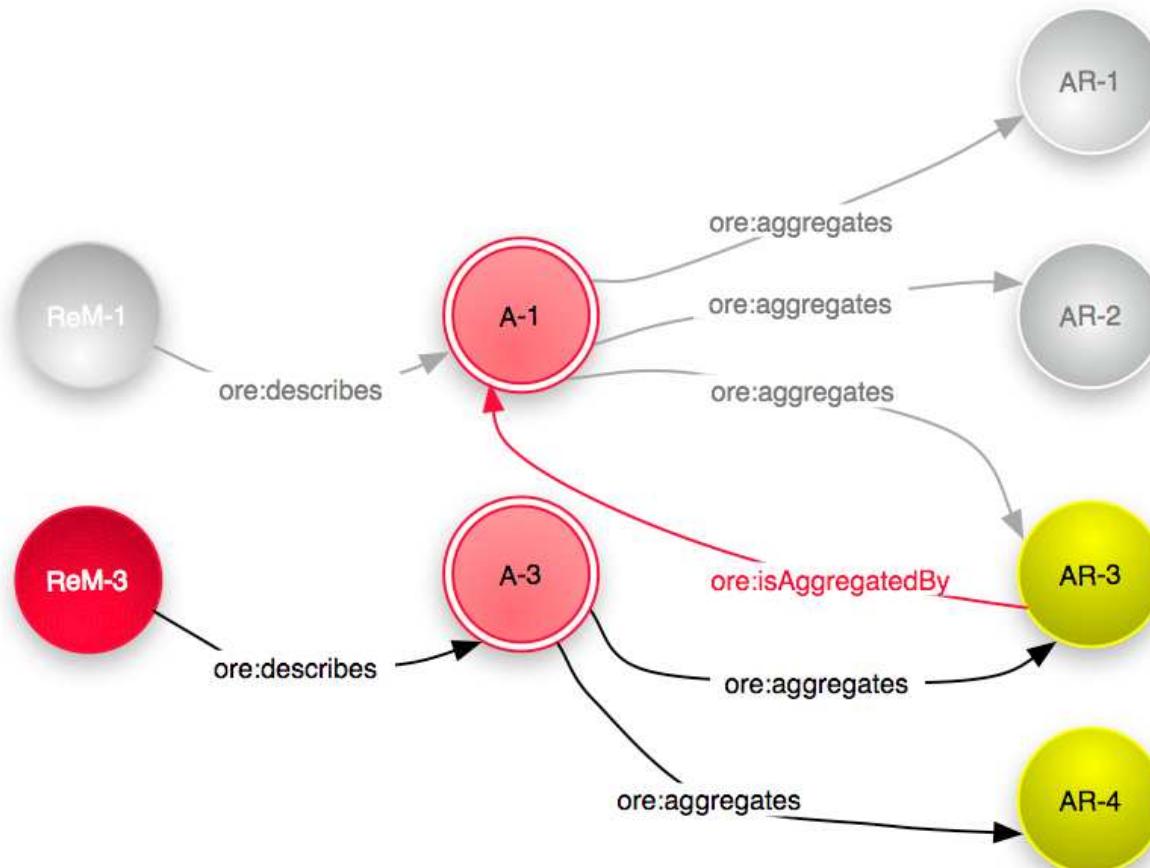
Aggregated Resource is an Aggregation  
ore:isDescribedBy



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



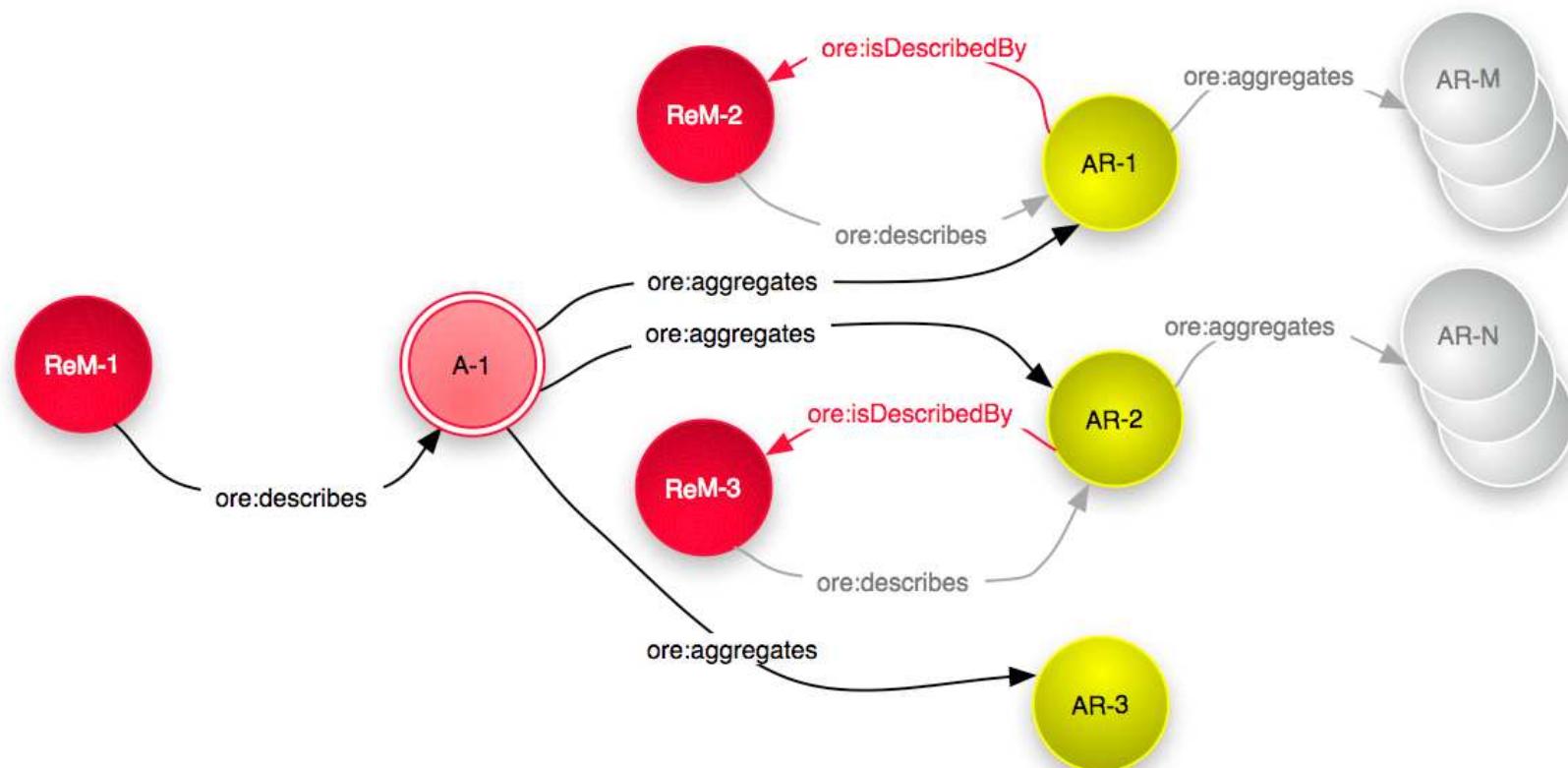
# A resource is an Aggregated Resource is another Aggregation



Use `ore:isAggregatedBy` to express membership of another Aggregation



# An Aggregated Resource is itself an Aggregation



Use `ore:isDescribedBy` to point at a Resource Map that describes that Aggregation



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# OAI Object Reuse and Exchange: Advanced 2

## Expressing non-protocol-based URIs ore:similarTo

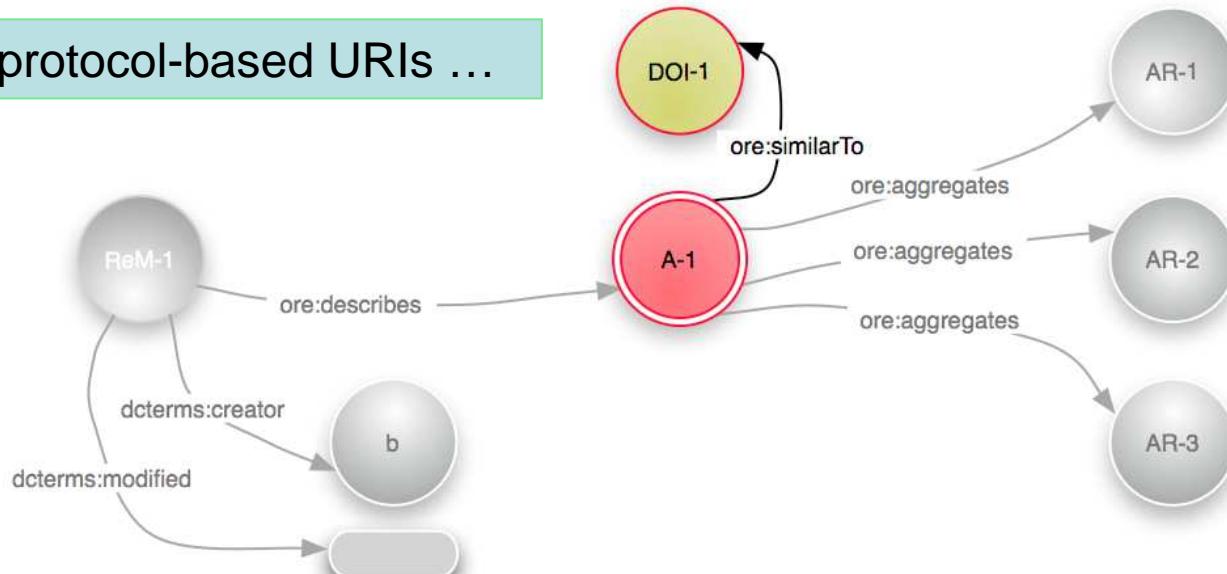


OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# The ore:similarTo relationship

To express non-protocol-based URIs ...



<A-1>      <ore:similarTo>      <DOI-1>

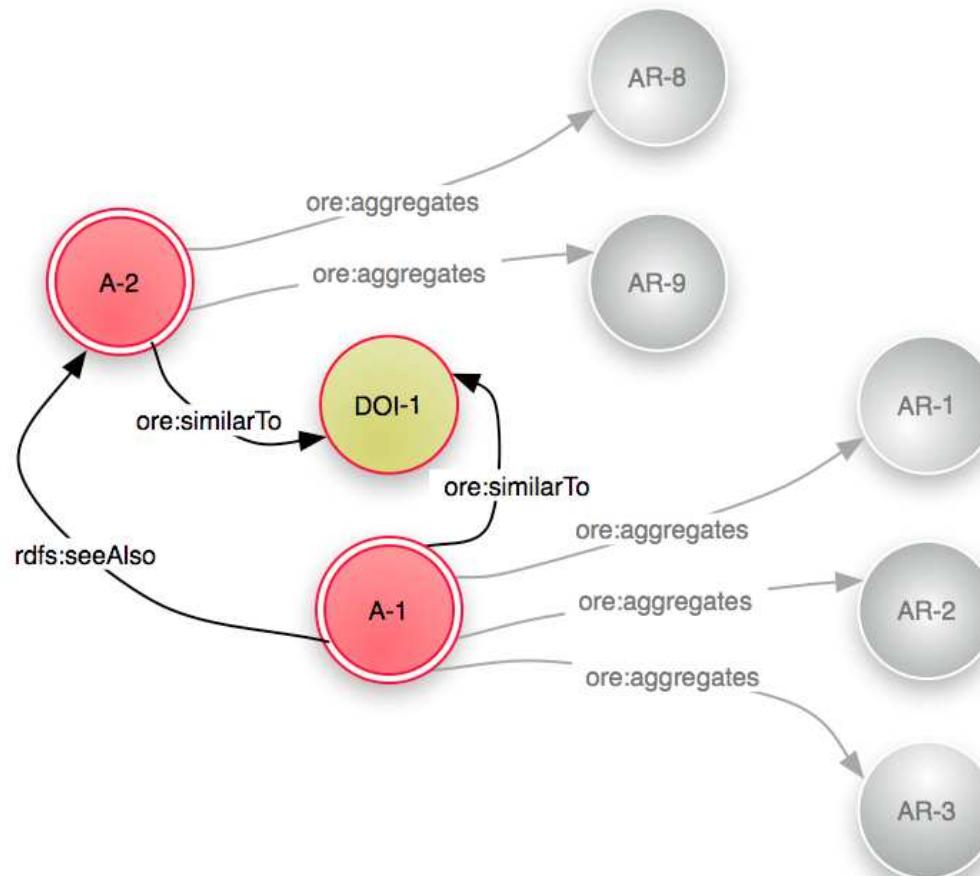
A-1	http://www.dlib.org/dlib/february06smith/aggregation
DOI-1	info:doi/10.1045/february-2006-smith
ore:similarTo	http://www.openarchives.org/ore/terms/similarTo



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# The ore:similarTo relationship



DOI-1 connects the graphs



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

 Los Alamos  
NATIONAL LABORATORY



# OAI Object Reuse and Exchange: Advanced 3

Proxy: Aggregated Resource in Context of an  
Aggregation

ore:isProxyFor

ore:isProxyIn



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



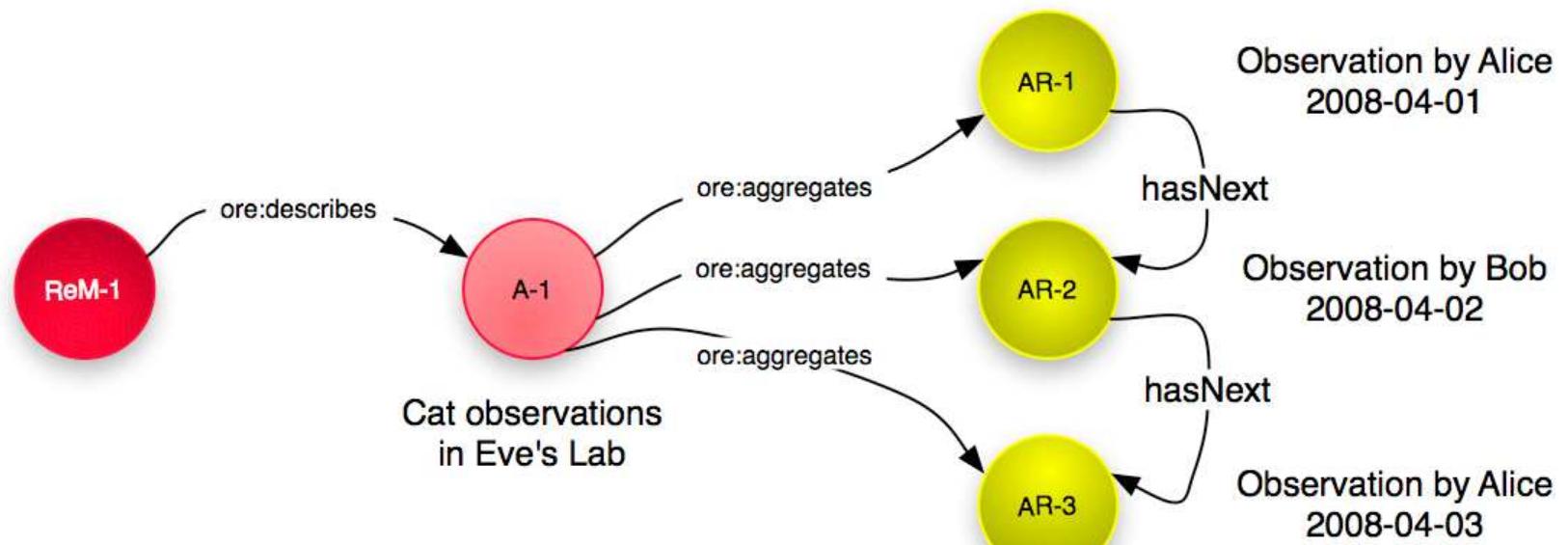
# Alice and Bob observe cats in Eve's Lab



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



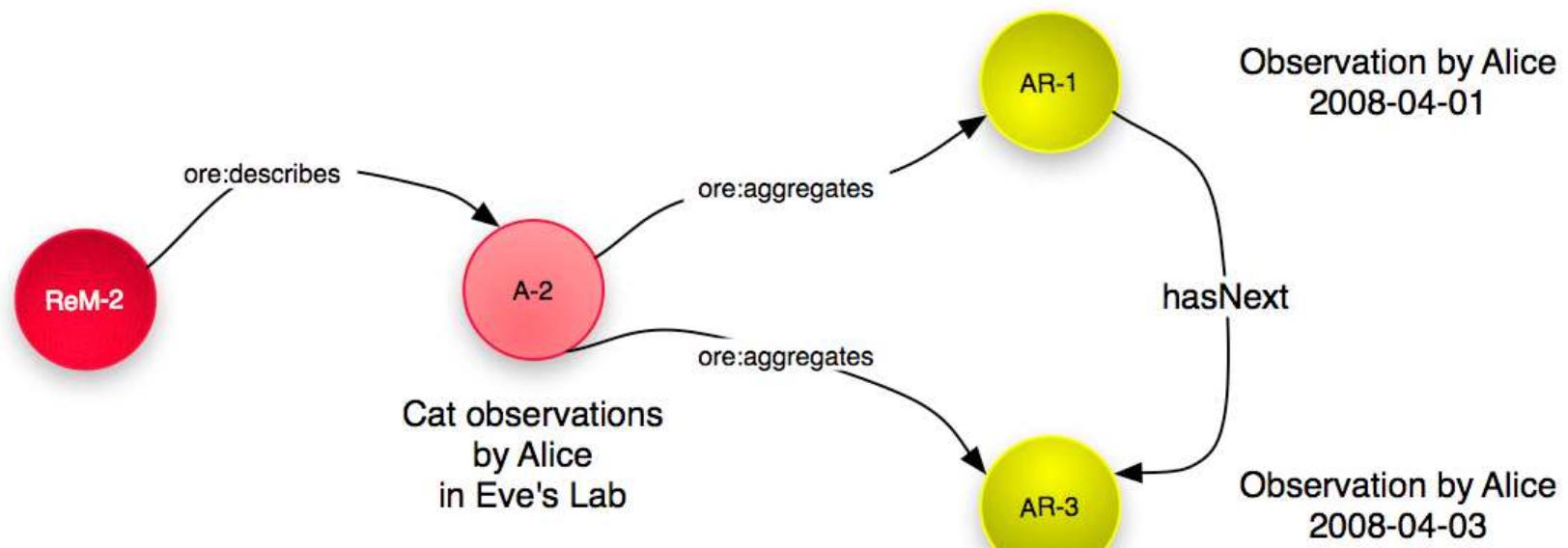
# Alice and Bob observe cats in Eve's Lab



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



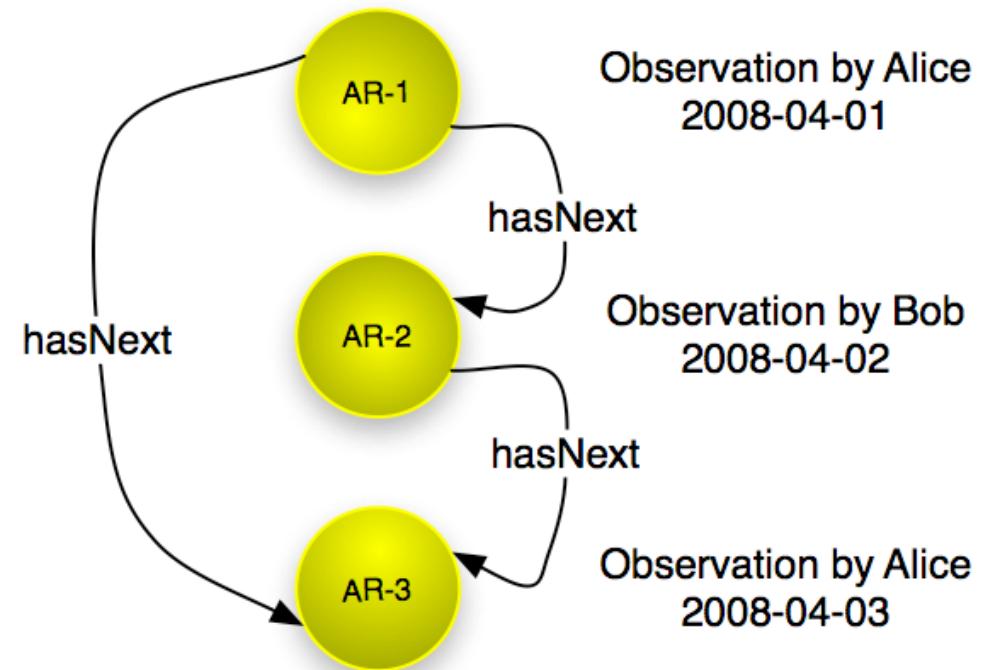
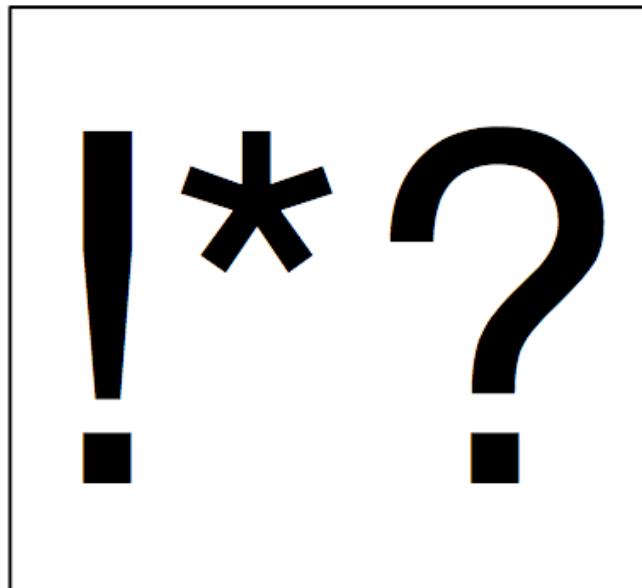
# Alice observes cats in Eve's Lab



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# An agent merges information and gets confused



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



## What did we mean by hasNext?

- Resource Map 1: Bob's observation on 2008-04-02 is the next observation after Alice's observation on 2008-04-01 **in the sequence of observations in Eve's Lab**
- Resource Map 2: Alice's observation on 2008-04-03 is the next observation after her observation on 2008-04-01 **in the sequence of Alice's observations in Eve's Lab**



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

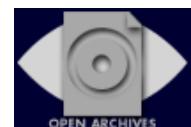


# Modeling a Resource in the Context of an Aggregation: Proxy

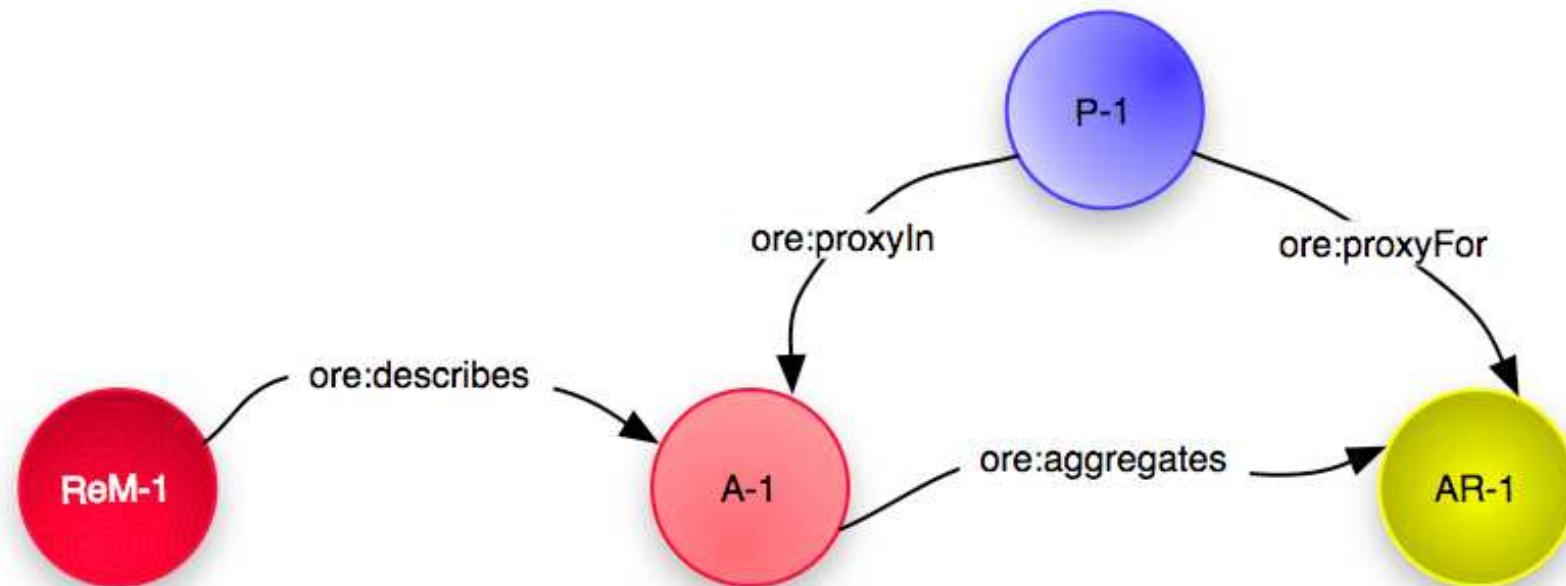
- Two components:
  - The (Aggregated) Resource
  - The context in which it is aggregated, i.e. the Aggregation
- In the Web Architecture, a new concept needs a new resource (and hence URI): we named it the Proxy



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Modeling a Resource in the Context of an Aggregation: Proxy



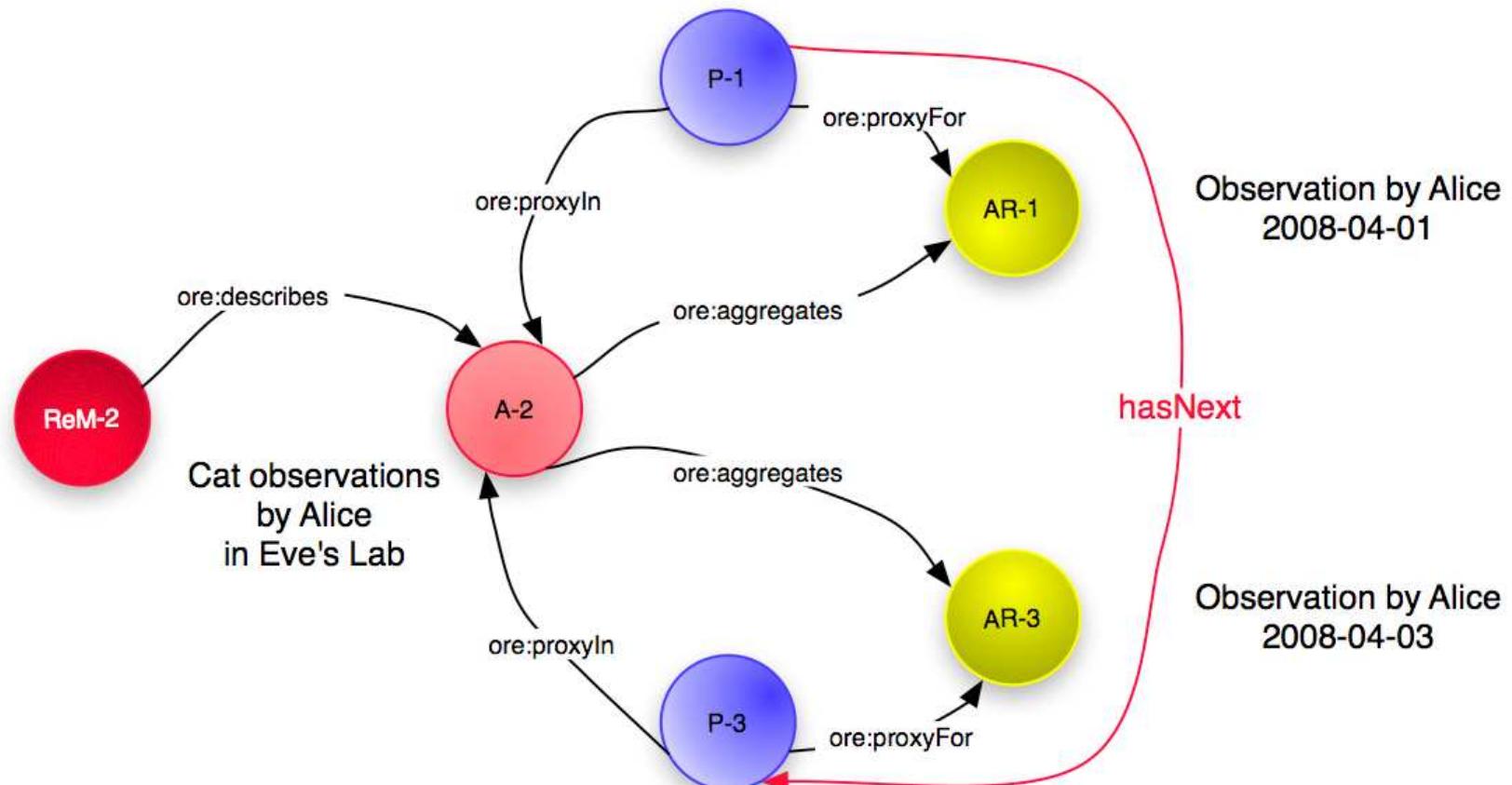
`ore:proxyFor` and `ore:proxyIn` to introduce a Proxy for an Aggregated Resource



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Alice's observations in context



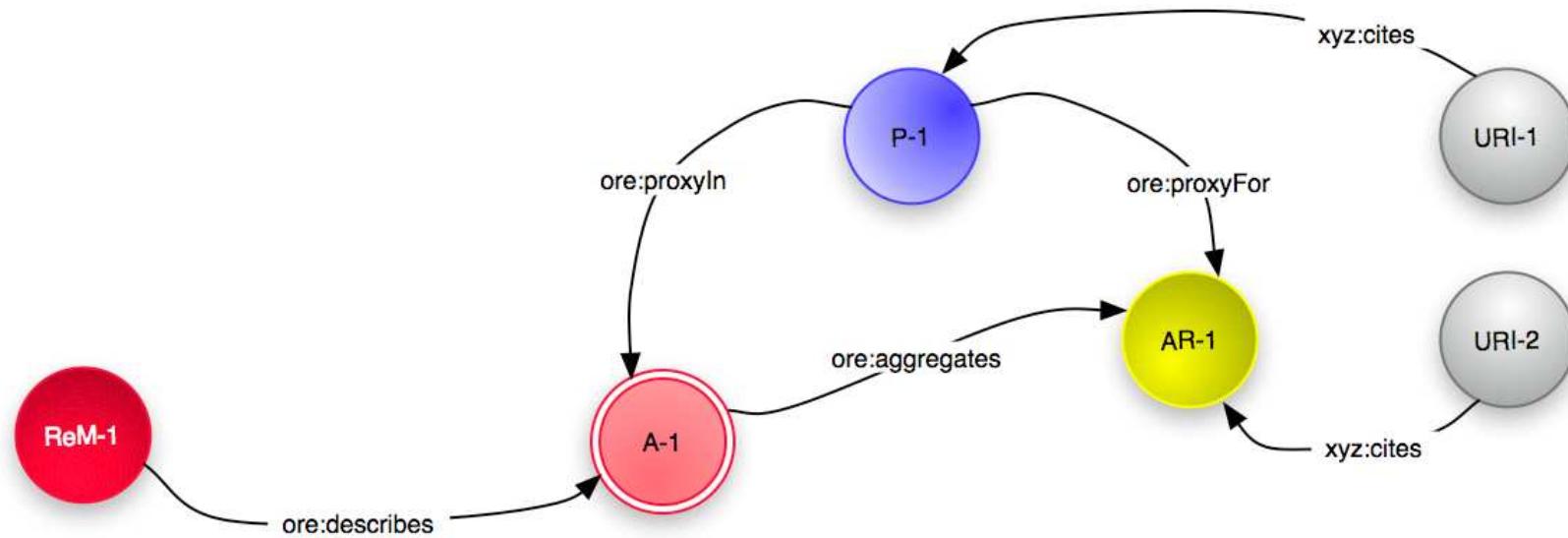
hasNext expressed as a relationship between Proxies



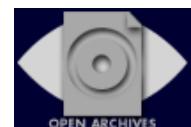
OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Citation to a resource in a specific context



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# OAI Object Reuse and Exchange: Advanced 4

## Multiple Resource Map Serializations

Authoritative Resource Maps

e.g. HTTP 303

Discovery of Resource Maps

ore:isDescribedBy



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

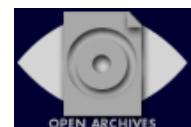


# Relationship between Aggregation and Resource Map

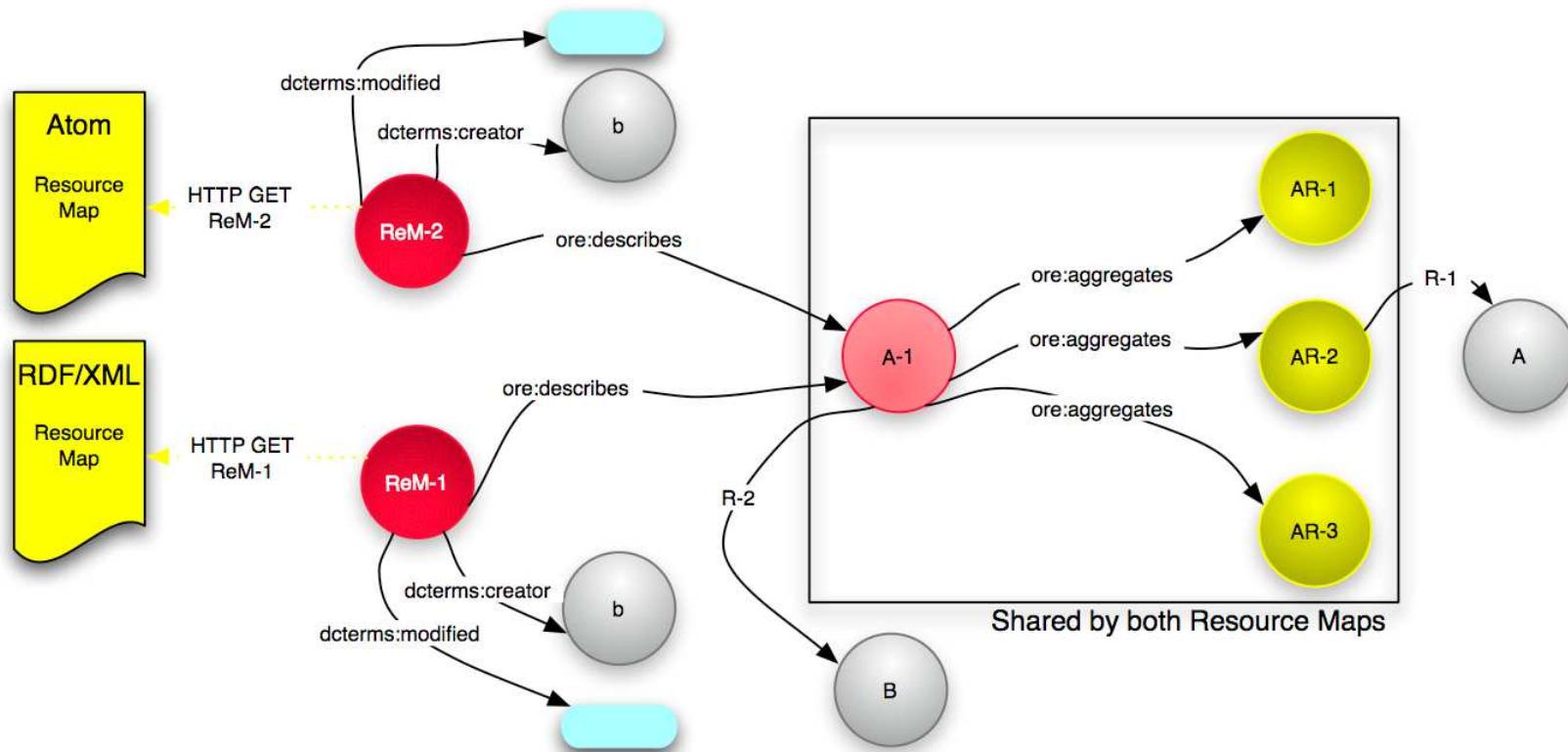
- An Aggregation is a Resource with a URI
- A Resource Map is a Resource with a URI
- A Resource Map asserts (identifies) and describes **one** Aggregation
  - A Resource is an Aggregation due to an assertion by (at least) one Resource Map
  - A Resource Map must have **one** representation



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



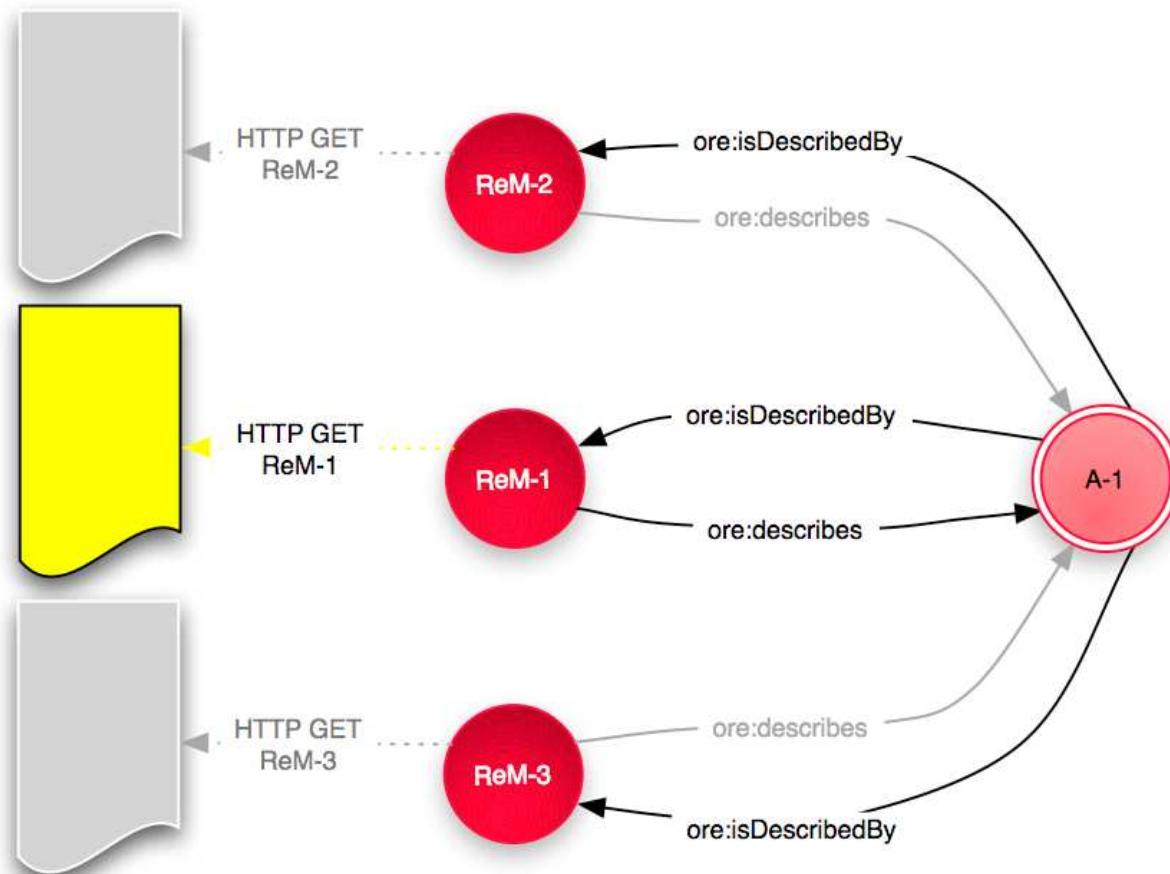
# Multiple Resource Maps for an Aggregation; serializations



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Multiple Resource Maps for an Aggregation; discovery



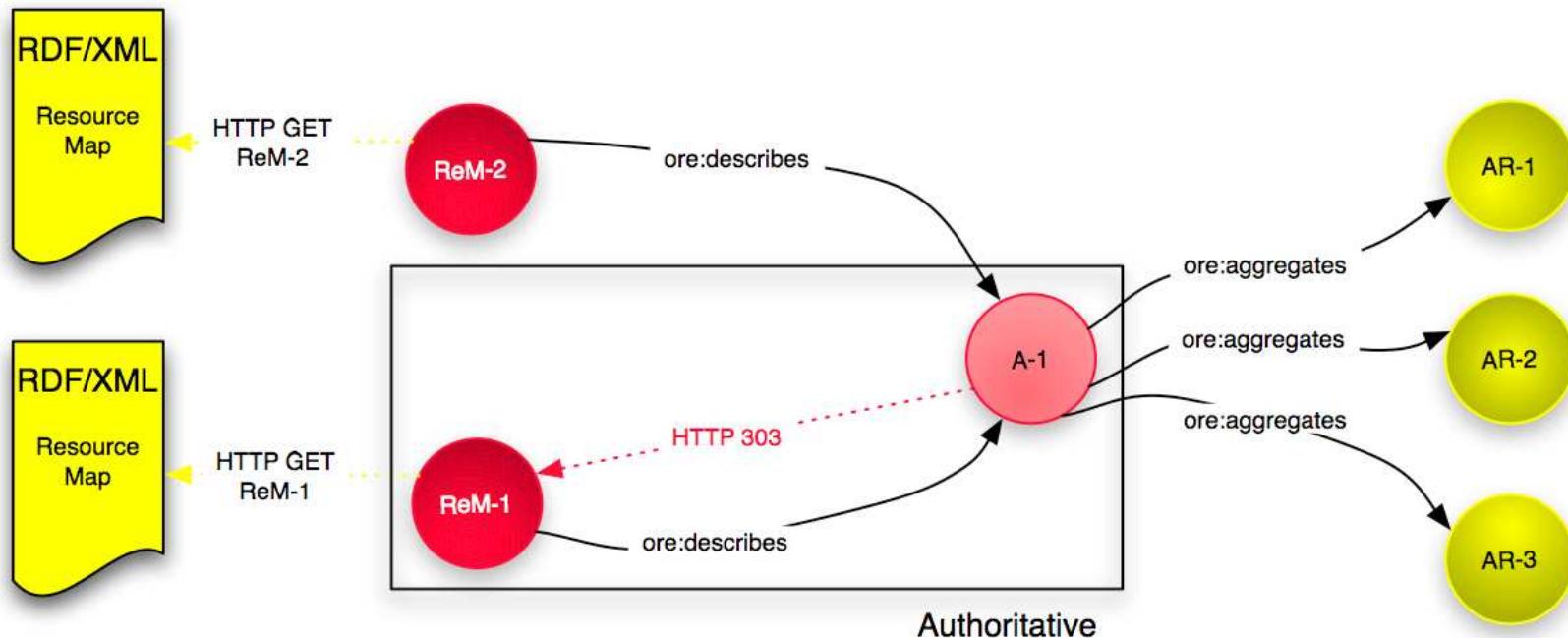
Use `ore:isDescribedBy` to facilitate discovery of other Resource Maps



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Multiple Resource Maps for an Aggregation; authoritative



Authoritative: dereference of URI of Aggregation leads to Resource Map



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Authoritative and Non-Authoritative Resource Maps

- Authoritative
  - Created by same authority (usually)
  - Must be minimally equivalent (same Aggregated Resources and Proxies)
  - Should assert mutual existence (`ore:isDescribedBy`)
- Non-authoritative
  - Best practice is to not create them
  - Assert your own Aggregation instead
  - Use `rdfs:seeAlso` to assert relationship between two Aggregations



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# OAI Object Reuse and Exchange: Advanced 5

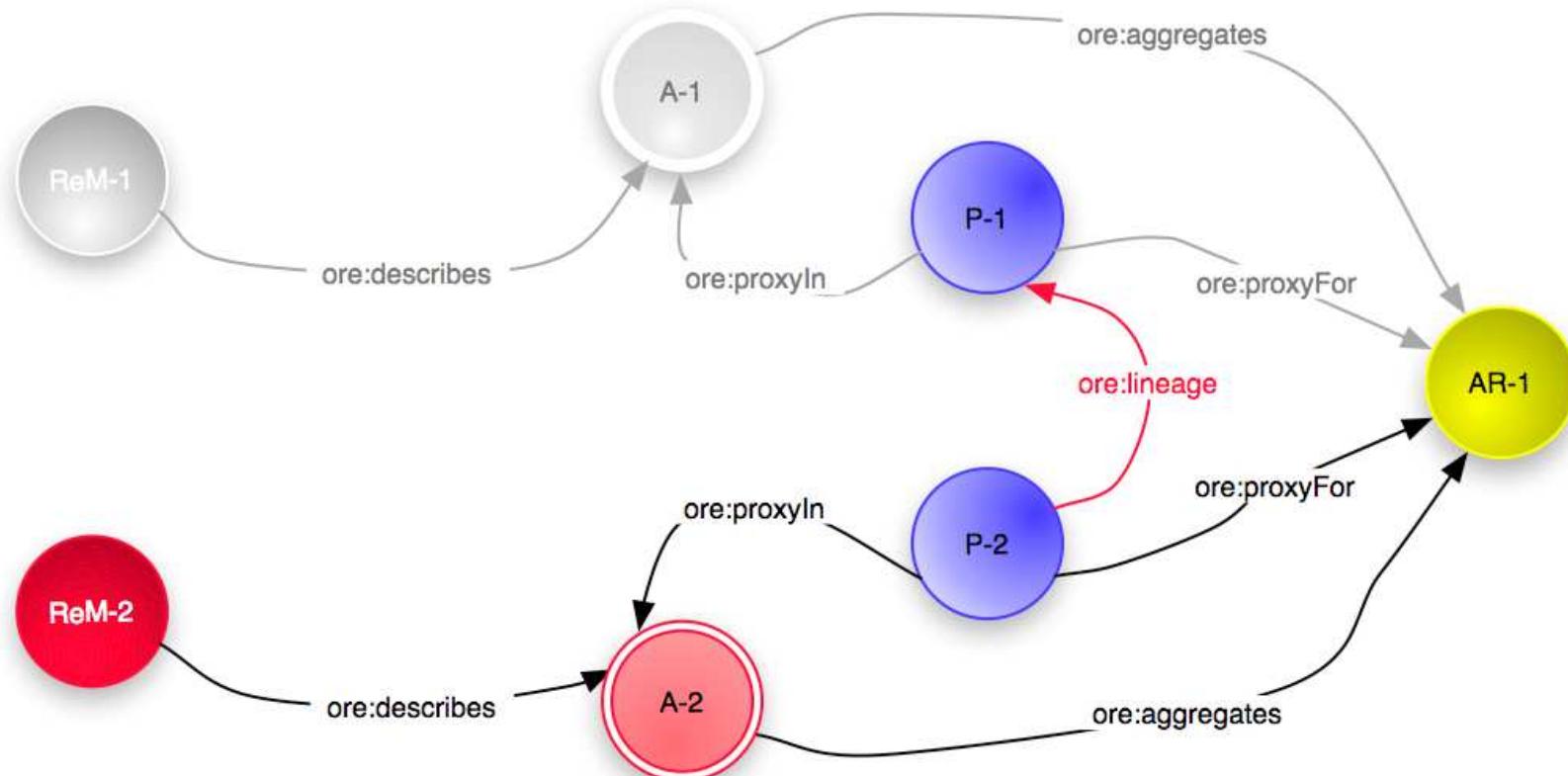
Lineage of an Aggregated Resource  
ore:lineage



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# An Aggregated Resource *originated* in another Aggregation



**ore:lineage** is a relationship between Proxies

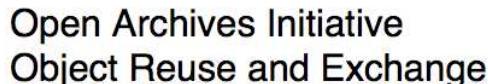


- Version 1.0 released October 17th 2008

- **ORE Primer**

- Atom Resource Maps
- RDF/XML Resource Maps
- RDFa Resource Maps
- HTTP implementation
- Discovery of Resource Maps
- Data Model
- Vocabulary
- Tools and Resources
- OAI-ORE Google Group

ORE Specifications and User Guides – Table of Contents  
<http://www.openarchives.org/ore/1.0/toc>


**ORE Specifications and User Guides - Table of Contents**  
17 October 2008

---

**Start Here** if you are new to OAI-ORE. The [Primer](#) introduces basic concepts and describes the OAI-ORE specifications at a high level.

- [Primer](#)

**User Guides** provide instructions creating Resource Maps in various formats and describe the mechanisms to make them available on the Web. These include:

- [Resource Map Implementation in Atom](#)
- [Resource Map Implementation in RDF/XML](#)
- [Resource Map Implementation in RDFa](#)
- [HTTP Implementation](#)
- [Resource Map Discovery](#)

**Specifications** define the underlying OAI-ORE data model and the vocabulary for the entities and properties in that model. These include:

- [Abstract Data Model](#)
- [Vocabulary](#)

**Build OAI-ORE-based applications** with the help of these tools and resources:

- [Tools and Additional Resources](#)
- Comment and discuss on the [OAI-ORE Google Group](#)

zotero

<http://www.openarchives.org/ore/toc>



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

  
**Los Alamos**  
NATIONAL LABORATORY



# OAI Object Reuse and Exchange

## Playing ORE in two worlds



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Interoperability Stacks

Atom profiles, APP, Special-purpose APIs	Vocabularies, SPARQL
Feed technologies, RSS, Atom	RDF, RDF serializations
HTTP URI	HTTP URI
<b>Web 2.0</b>	<b>Semantic Web; Linked Data</b>



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Interoperability Stacks

ORE add-ons for Atom	Atom profiles, APP, special-purpose APIs	Vocabularies, SPARQL	ORE terms, dcterms, foaf
Atom ReM	Feed technologies, RSS, Atom	RDF, RDF serializations	RDF-based data model; HTTP 303; RDF/XML ReM, RDFa ReM
HTTP URI for Aggregation, Resource Map, Proxies	HTTP URI	HTTP URI	HTTP URI for Aggregation, Resource Map, Proxies
<b>ORE</b>	<b>Web 2.0</b>	<b>Semantic Web; Linked Data</b>	<b>ORE</b>

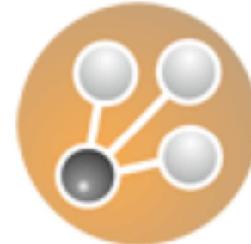


OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland





# Open Archives Initiative Object Reuse and Exchange



## ORE User Guide - Resource Map Implementation in Atom

17 October 2008

**This version:**

<http://www.openarchives.org/ore/1.0/atom>

**Latest version:**

<http://www.openarchives.org/ore/atom>

**Previous version:**

<http://www.openarchives.org/ore/0.9/atom>

<http://www.openarchives.org/ore/0.9/atom-implementation>

**Editors (OAI Executive)**

Carl Lagoze, Cornell University Information Science

Herbert Van de Sompel, Los Alamos National Laboratory

**Editors (ORE Technical Committee)**

Pete Johnston, Eduserv Foundation

Michael Nelson, Old Dominion University

Robert Sanderson, University of Liverpool

Simeon Warner, Cornell University Information Science

# Interoperability Stacks



ORE extensions for Atom	Atom profiles, APP, special-purpose APIs	Vocabularies, SPARQL	ORE terms, dcterms, foaf
Atom ReM	Feed technologies, RSS, Atom	RDF, RDF serializations	RDF-based data model; HTTP 303; RDF/XML ReM, RDFa ReM
HTTP URI for Aggregation, Resource Map, Proxies	HTTP URI	HTTP URI	HTTP URI for Aggregation, Resource Map, Proxies
<b>ORE</b>	<b>Web 2.0</b>	<b>Semantic Web; Linked Data</b>	<b>ORE</b>



# Atom

- Feed technology
- Attempt to rationalize RSS 1.x, 2.x divergence
- IETF FRC 4287
  - <http://www.ietf.org/rfc/rfc4287>
- Encoding is up-to-date with current XML standards
  - namespaces
  - Relax-NG schema
- Content model
  - Distinguishes between metadata and content (plain text, HTML, base-64 binary, linked content)
- Relationship types defined in IESG Atom Link Relations registry
  - <http://www.iana.org/assignments/link-relations.html>
- Well-defined extensibility model
  - Elements from external namespaces
  - Relationships from external namespaces



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Atom Feed/Entry Structure



Feed

Entry

Entry



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# An Atom Feed in XML

```
<?xml version="1.0" encoding="utf-8"?>
<feed xmlns="http://www.w3.org/2005/Atom"> _____
<title>Dan's Blog</title> _____
<link @rel="self" href="http://netzoid.com/blog/" /> _____
<updated>2007-11-07T18:30:02Z</updated> _____
<author> _____
  <name>Dan Diephouse</name> _____
</author> _____
<id>urn:uuid:60a76c80-d399-11d9-b91C-0003939e0af6</id> _____
<entry> _____
  ...
<entry> _____
</feed>
```

Feed

Feed  
Meta



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# An Atom Entry in XML

```
<?xml version="1.0" encoding="utf-8"?>
<feed xmlns="http://www.w3.org/2005/Atom">
...
<entry>
```

```
    <title>Building services with AtomPub</title>
    <link @rel="self" href="http://netzoid.com/blog/122c"/>
    <link @rel="alternate"
          href="http://netzoid.com/blog/building_atompublish.htm"/>
    <id>urn:uuid:1225c695-cfb8-4ebb-aaaa-80da344efa6a</id>
    <updated>2007-11-07T18:30:02Z</updated>
```

```
        <content>
            (optional. by-value or by-reference. Must provide
            a <summary> if by-reference or by-value is base64)
        </content>
```

```
    </entry>
```

Entry

Entry  
Meta

Entry  
Content



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

 Los Alamos  
NATIONAL LABORATORY



# Using Atom Extensibility: GData Example

[Click Here](#)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# ORE Atom Serialization

- Result must be valid Atom
- Don't distort Atom semantics
- Indicate this is an ORE Atom Entry by specifying a <category term="http://www.openarchives.org/ore/terms/Aggregation">
- Convey as much information as possible about the Aggregation using native Atom elements
  - But /entry/id, /entry/updated, /entry/published, /entry/rights are about the Entry/ResourceMap
- Use Atom extensibility:
  - Express relationships of ORE model by means of special purpose ORE URIs
  - Use <ore:triples> extension element to convey information about Aggregated Resources (and some about Aggregation)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# ORE Atom Example

arXiv.org > astro-ph > arXiv:astro-ph/0601007

Search or Article-id (Help | Advanced search) All papers Go!

Astrophysics

## Parametrization of K-essence and Its Kinetic Term

Hui Li, Zong-Kuan Guo, Yuan-Zhong Zhang

(Submitted on 31 Dec 2005 (v1), last revised 18 Jan 2006 (this version, v2))

We construct the non-canonical kinetic term of a k-essence field directly from the effective equation of state function  $w_k(z)$ , which describes the properties of the dark energy. Adopting the usual parametrizations of equation of state we numerically reproduce the shape of the non-canonical kinetic term and discuss some features of the constructed form of k-essence.

Comments: 8 pages, 1 figure; accepted by Mod. Phys. Lett. A; minor changes to references  
Subjects: Astrophysics (astro-ph)  
Journal reference: Mod.Phys.Lett. A21 (2006) 1683–1690  
DOI: 10.1142/S0217732306019475  
Cite as: arXiv:astro-ph/0601007v2

**Submission history**  
From: Hui Li [view email]  
[v1] Sat, 31 Dec 2005 04:01:23 GMT (20kb)  
[v2] Wed, 18 Jan 2006 06:16:15 GMT (20kb)

Which authors of this paper are endorsers?

Link back to: arXiv, form interface, contact.

**Download:**

- PostScript
- PDF
- Other formats

Current browse context:  
astro-ph  
< prev | next >  
new | recent | 0601

References & Citations

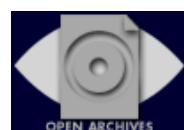
- SLAC-SPIRES HEP (refers to | cited by)
- NASA ADS
- CiteBase

Bookmark (what is this?)

Click Here



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# ORE Atom Example

The screenshot shows a Mac OS X desktop with a web browser window titled "ArXiv.org Atrophysics Feed". The URL in the address bar is [http://gws/ore/arXiv\\_feed\\_20080910](http://gws/ore/arXiv_feed_20080910). The browser's toolbar includes icons for back, forward, search, and print.

The main content area displays an "ArXiv.org Atrophysics Feed" page. On the left, there is a sidebar with a "Subscribe to this feed using" section featuring an RSS icon and a "Live Bookmarks" dropdown, along with a checkbox for "Always use Live Bookmarks to subscribe to feeds" and a "Subscribe Now" button. A large orange arrow points from the text "`<link rel="alternate" ...>`" to this sidebar area.

The right side of the screen shows the details of a specific paper entry. The title is "Parametrization of K-essence and Its Kinetic Term" by Hui Li, Zong-Kuan Guo, Yuan-Zhong Zhang. It was submitted on Dec 31, 2005 (v1) and revised on Jan 18, 2006 (v2). The abstract discusses the construction of a non-canonical kinetic term of a k-essence field directly from the effective equation of state function  $S_{w_k}(z)$ , which describes the properties of dark energy. The paper has 8 pages and is accepted by Mod. Phys. Lett. A.

On the far right, a box labeled "Entry" contains the following text:

```
Comments: 8 pages, 1 figure, accepted by Mod. Phys. Lett. A; minor changes to references
Subjects: Astrophysics (astro-ph)
Journal reference: Mod. Phys. Lett. A21 (2006) 1683-1690
DOI: 10.1143/MOLPHYS.21.1683
Cite as: arXiv:astro-ph/0601007v2

Submission history
From: Hui Li (view email)
[v1] Sat, 31 Dec 2005 04:01:23 GMT (20kb)
[v2] Wed, 18 Jan 2006 06:16:15 GMT (20kb)

Which authors of this paper are endorsers?
Link back to: arXiv, form interface, contact.
```



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



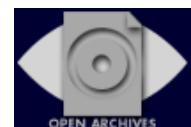
# Entry URI

```
- <atom:entry grddl:transformation="http://www.openarchives.org/ore/atom/atom-grddl.xsl">
    <!-- Information about the Atom entry -->
    <!-- -->
    <atom:id>tag:arxiv.org,2008:astro-ph:0601007</atom:id>
```

atom:id mandatory (atom)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# URI-A of Aggregation

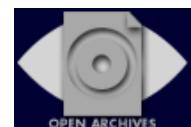
```
<atom:id>tag:arxiv.org,2008:astro-ph:0601007</atom:id>
<!-- Information about the Aggregation -->
<!-- -->
<!-- Express URI-A: This Atom entry is about URI-A -->
<atom:link href="http://arxiv.org/aggregation/astro-ph/0601007"
rel="http://www.openarchives.org/ore/terms/describes"/>
```

URI-A

## mandatory (ORE)

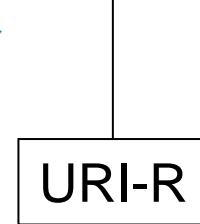


OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# URI-R of Resource Map

```
<!-- Express URI-R, the URI of the Atom Resource Map -->
<atom:link href="http://arxiv.org/rem/atom/astro-ph/0601007" rel="self"
type="application/atom+xml"/>
```



mandatory (ORE)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# URIs of Aggregated Resources

```
<!-- The Aggregated Resources -->
<!-- -->
<atom:link href="http://arxiv.org/abs/astro-ph/0601007"
rel="http://www.openarchives.org/ore/terms/aggregates" title="[astro-ph/0601007]
Parametrization of K-essence and Its Kinetic Term" type="text/html"
hreflang="en"/>
<atom:link href="http://arxiv.org/ps/astro-ph/0601007"
rel="http://www.openarchives.org/ore/terms/aggregates" title="Parametrization of
K-essence and Its Kinetic Term" type="application/postscript" hreflang="en"/>
<atom:link href="http://arxiv.org/pdf/astro-ph/0601007"
rel="http://www.openarchives.org/ore/terms/aggregates" title="Parametrization of
K-essence and Its Kinetic Term" type="application/pdf" hreflang="en"/>
<atom:link href="http://arxiv.org/ps/astro-ph/0601007&dpi=600&
font=bitmapped" rel="http://www.openarchives.org/ore/terms/aggregates"
title="Parametrization of K-essence and Its Kinetic Term (600 DPI Bitmapped
Fonts PostScript)" type="application/postscript" hreflang="en"/>
```

URI-AR

mandatory (ORE)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# URI of Splash Page

```
<!-- Express Atom relationships for the Aggregation -->  
<atom:link href="http://arxiv.org/abs/astro-ph/0601007" rel="alternate"/>
```

URI-S

atom:link@rel="alternate": mandatory if no atom:content (atom)  
recommended (ORE)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Title and Summary for the Aggregation

```
<!-- Aggregation Title -->
<atom:title>Parametrization of K-essence and Its Kinetic Term</atom:title>
<!-- Aggregation Summary -->
```

- <atom:summary>

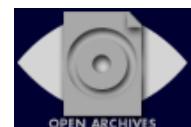
We construct the non-canonical kinetic term of a k-essence field directly from the effective equation of state function  $w_k(z)$ , which describes the properties of the dark energy. Adopting the usual parametrizations of equation of state we numerically reproduce the shape of the non-canonical kinetic term and discuss some features of the constructed form of k-essence.

</atom:summary>

atom:title mandatory (atom)  
atom:summary mandatory if no content (atom)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



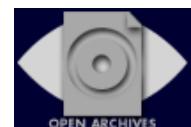
# Authors for the Aggregation

```
<!-- Aggregation Author (repeatable) -->
- <atom:author>
  <atom:name>Hui Li</atom:name>
  <atom:email>lihui@itp.ac.cn</atom:email>
</atom:author>
- <atom:author>
  <atom:name>Zong-Kuan Guo</atom:name>
</atom:author>
- <atom:author>
  <atom:name>Yuan-Zhong Zhang</atom:name>
</atom:author>
```

mandatory (ORE). To prevent author-inheritance from Feed.



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# ORE Relationships for the Aggregation

```
<!-- Resources somehow equivalent to the Aggregation -->
<atom:link href="info:arxiv/astro-ph/0601007"
rel="http://www.openarchives.org/ore/terms/similarTo"/>
<atom:link href="info:doi/10.1142/S0217732306019475"
rel="http://www.openarchives.org/ore/terms/similarTo"/>
```

recommended (ORE)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# ORE Relationships for the Aggregation

```
--<!--  
      Discovery pointer to a mirrored version of the Aggregation  
-->  
<atom:link href="http://jp.arxiv.org/aggregation/astro-ph/0601007"  
rel="related"/>  
<!-- Other versions of the Aggregation -->  
<atom:link href="http://arxiv.org/aggregation/astro-ph/0601007v1"  
rel="http://purl.org/dc/terms/hasVersion"/>  
<atom:link href="http://arxiv.org/aggregation/astro-ph/0601007v2"  
rel="http://purl.org/dc/terms/hasVersion"/>
```

optional: say what you can and say it right (ORE)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Types for the Aggregation

```
<!-- Categories for the Aggregation (rdf:type) -->
<atom:category term="http://www.openarchives.org/ore/terms/Aggregation"
scheme="http://www.openarchives.org/ore/terms/" label="Aggregation"/>
<atom:category term="http://purl.org/eprint/type/JournalArticle"
scheme="http://purl.org/eprint/type/" label="Journal Article"/>
<atom:category term="http://purl.org/ontology/bibo/WebPage"
scheme="http://purl.org/ontology/bibo/" label="Web Page"/>
```

.../Aggregation mandatory (ORE)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Dates for the Aggregation

```
- <!--  
    Aggregation Creation and Modification date/time (rdf literals)  
-->  
<atom:category term="2005-12-31T04:01:23Z"  
scheme="http://www.openarchives.org/ore/terms/datetime/created"/>  
<atom:category term="2006-01-18T06:16:15Z"  
scheme="http://www.openarchives.org/ore/terms/datetime/modified"/>
```

optional: say what you can and say it right (ORE)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Dates for the Resource Map

```
<!-- Information about the Resource Map -->
<!--                                         -->
<!-- Resource Map Creation and Modification date/time -->
<atom:published>2008-10-01T18:30:02Z</atom:published>
<atom:updated>2008-10-03T07:30:34Z</atom:updated>
```

atom:updated mandatory (atom)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



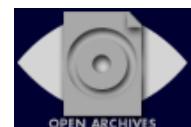
# Rights pertaining to the Resource Map

```
- <!--  
    Express rights pertaining to the Atom Resource Map  
-->  
<atom:link href="http://creativecommons.org/licenses/by-nc/2.5/rdf"  
rel="license" type="application/rdf+xml"/>  
- <atom:rights>  
    This Resource Map is available under the Creative Commons Attribution-  
    Noncommercial 2.5 Generic license  
</atom:rights>
```

recommended (ORE)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Authorship of the Resource Map

```
- <!--  
    Express authorship of Resource Map using atom:source  
    -->  
- <!--  
    Also express additional child elements of atom:source that are re  
    -->  
- <atom:source>  
  - <atom:author>  
    <atom:name>arXiv.org e-Print Repository</atom:name>  
    <atom:uri>http://arXiv.org</atom:uri>  
  </atom:author>  
  <atom:id>tag:arxiv.org,2008:astro-ph</atom:id>  
  <atom:link href="http://arxiv.org/feed/astro-ph" rel="self"  
  type="application/atom+xml"/>  
  <atom:updated>2008-10-03T07:30:34Z</atom:updated>  
  <atom:title>ArXiv.org Astrophysics Feed</atom:title>  
</atom:source>
```

Of feed that encompasses the entry

atom:author mandatory (ORE)  
other elements shown: recommended (atom)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



## And all the rest ...

```
- <ore:triples>
  <!-- About the Aggregation -->
  - <rdf:Description rdf:about="http://arxiv.org/aggregation/astro-ph/0601007">
    <dcterms:audience>OCLC audience level 1: research</dcterms:audience>
  </rdf:Description>
  - <!--
    Aggregated Resource http://arxiv.org/abs/astro-ph/0601007
  -->
  - <rdf:Description rdf:about="http://arxiv.org/abs/astro-ph/0601007">
    <rdf:type rdf:resource="info:eu-repo/semantics/humanStartPage"/>
  </rdf:Description>
  - <rdf:Description rdf:about="info:eu-repo/semantics/humanStartPage">
    <rdfs:label>humanStartPage</rdfs:label>
    <rdfs:isDefinedBy>info:eu-repo/semantics/</rdfs:isDefinedBy>
  </rdf:Description>
  - <!--
    Proxy for Aggregated Resource http://arxiv.org/abs/astro-ph/0601007
  -->
```

optional: say what you can and say it right (ORE)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Validating ORE Atom Entries

- ORE validator
  - <http://www.openarchives.org/ore/atom-validator>

---

**ORE Atom Resource Map Validator** 

based on ISO Schematron v.1.6 validation  
validation of ORE-Atom Profile version 0.9 beta  
[HELP](#) [FAQ](#)

**Input Resource Map source code or its URL:**

try: [http://african.lanl.gov/ovalnet/testfiles/0.9/atom\\_dlib\\_mini.xml](http://african.lanl.gov/ovalnet/testfiles/0.9/atom_dlib_mini.xml)  
or: [http://african.lanl.gov/ovalnet/testfiles/0.9/atom\\_dlib\\_mini\\_problem.xml](http://african.lanl.gov/ovalnet/testfiles/0.9/atom_dlib_mini_problem.xml)

**View evaluation results as:**

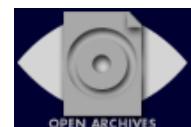
HTML  IsoSchematron Report as HTML

**Evaluate ReM:**

 validate  reset



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

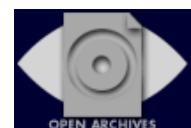


# Extracting RDF triples from ORE Atom Entries

- ORE GRDDL
  - <http://www.openarchives.org/ore/atom-grddl>
- Insert this in ORE entries:  
`<atom:entry ...  
 xmlns:grddl="http://www.w3.org/2003/g/data-view#"  
 grddl:transformation="http://www.openarchives.org/ore/atom-grddl"`



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



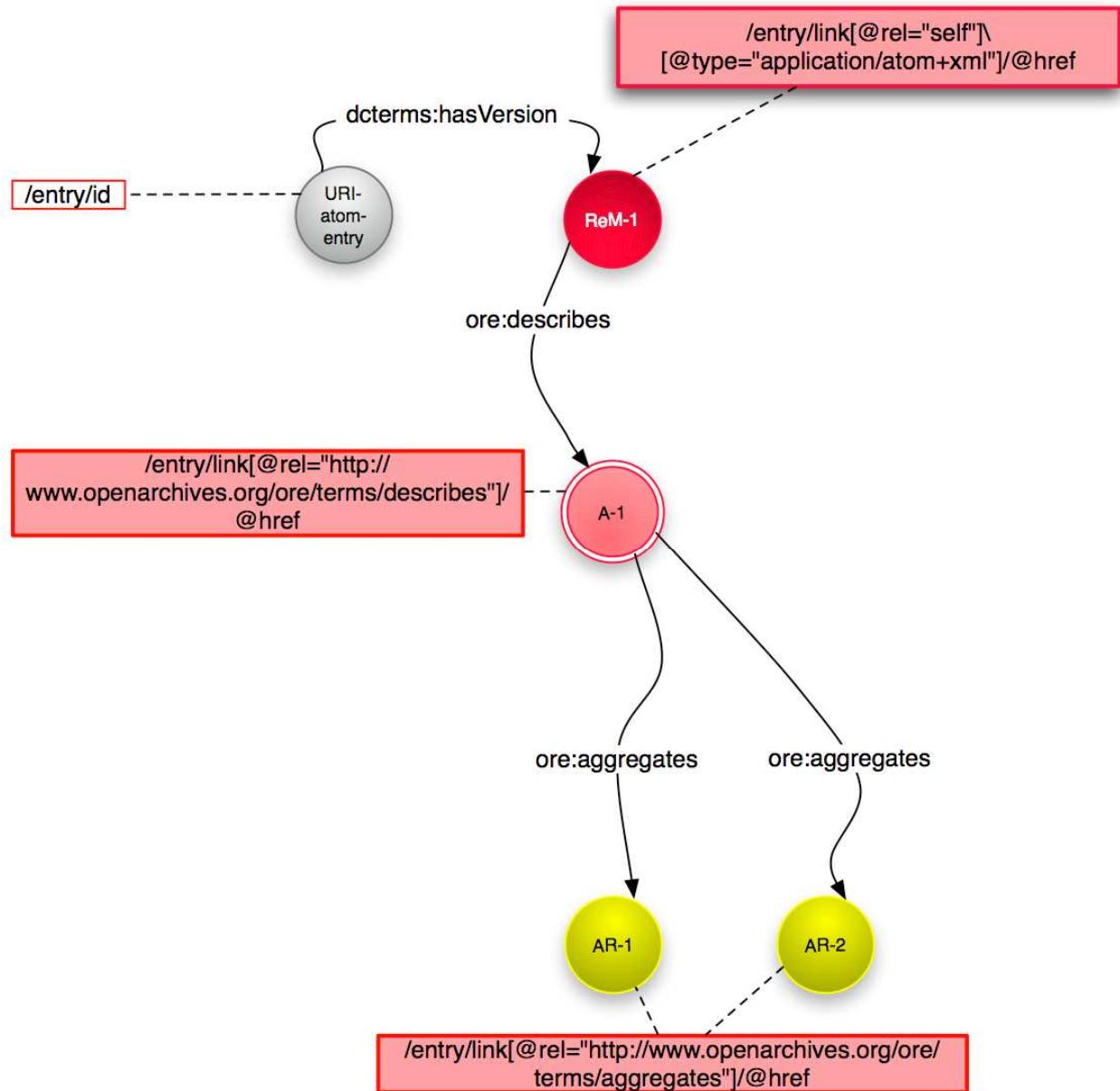
/entry/id

URI-  
atom-  
entry



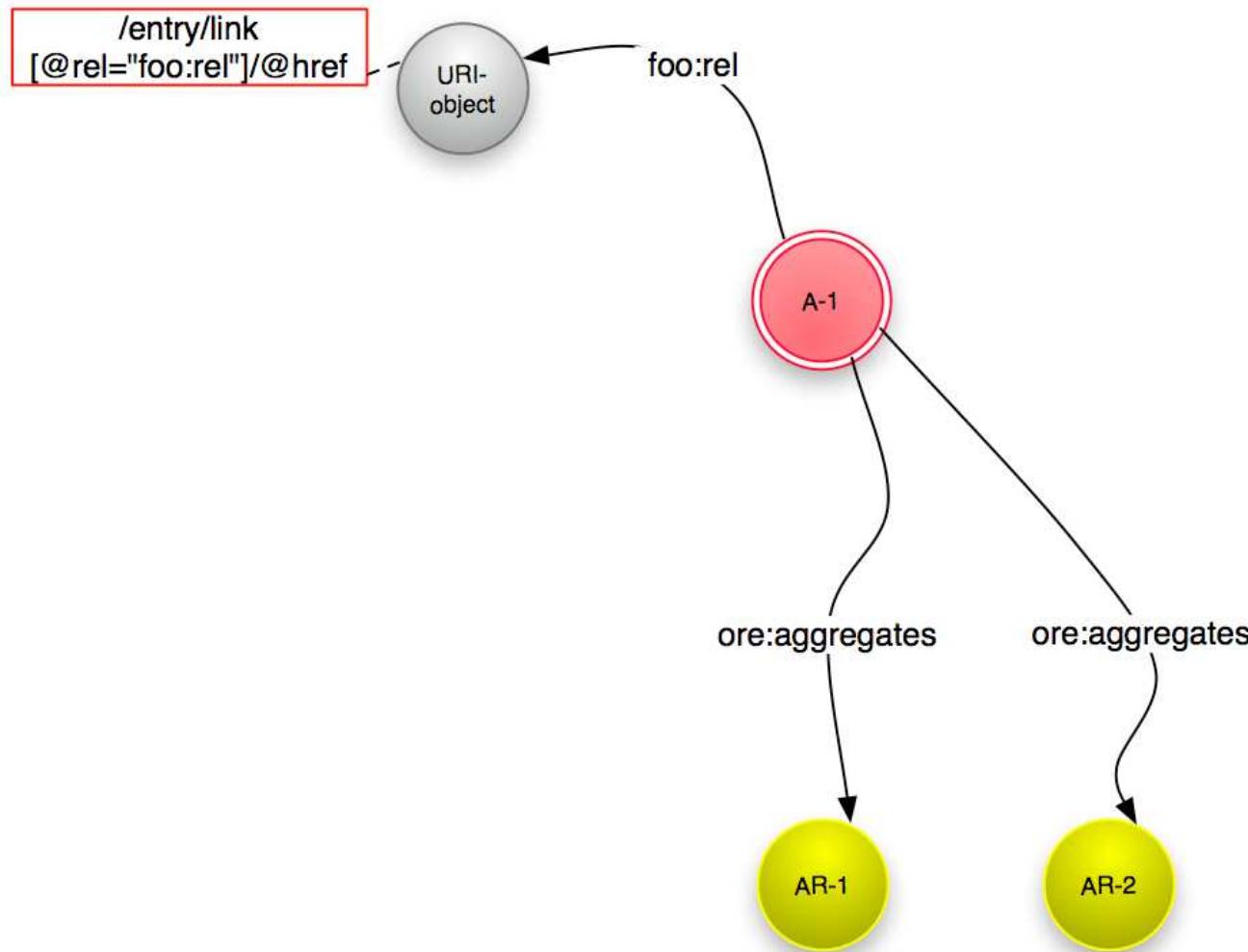
OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



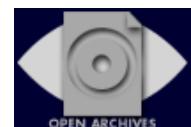


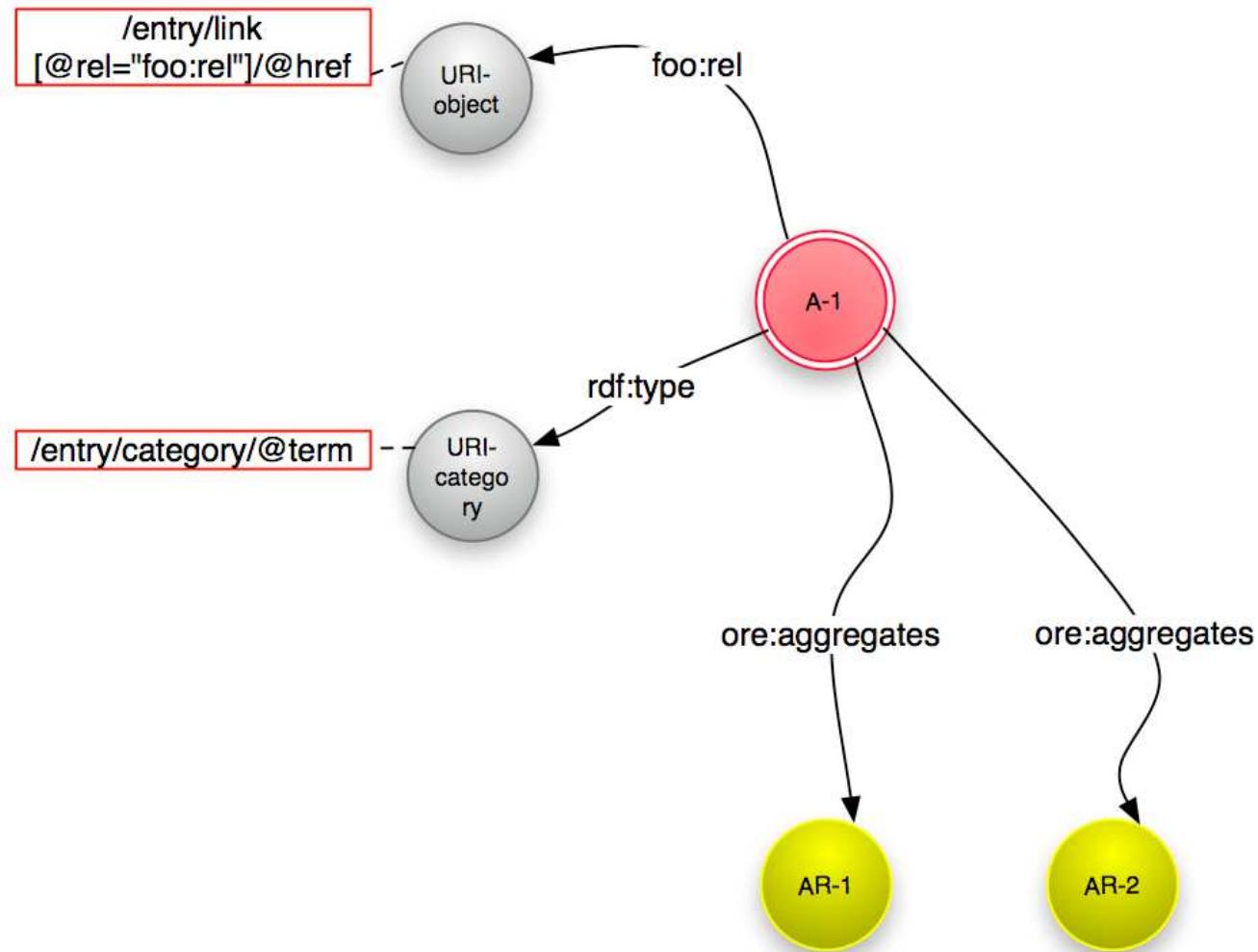
OAI Object Reuse & Exchange  
 Herbert Van de Sompel  
 OAI6, June 17 2009, Geneva, Switzerland





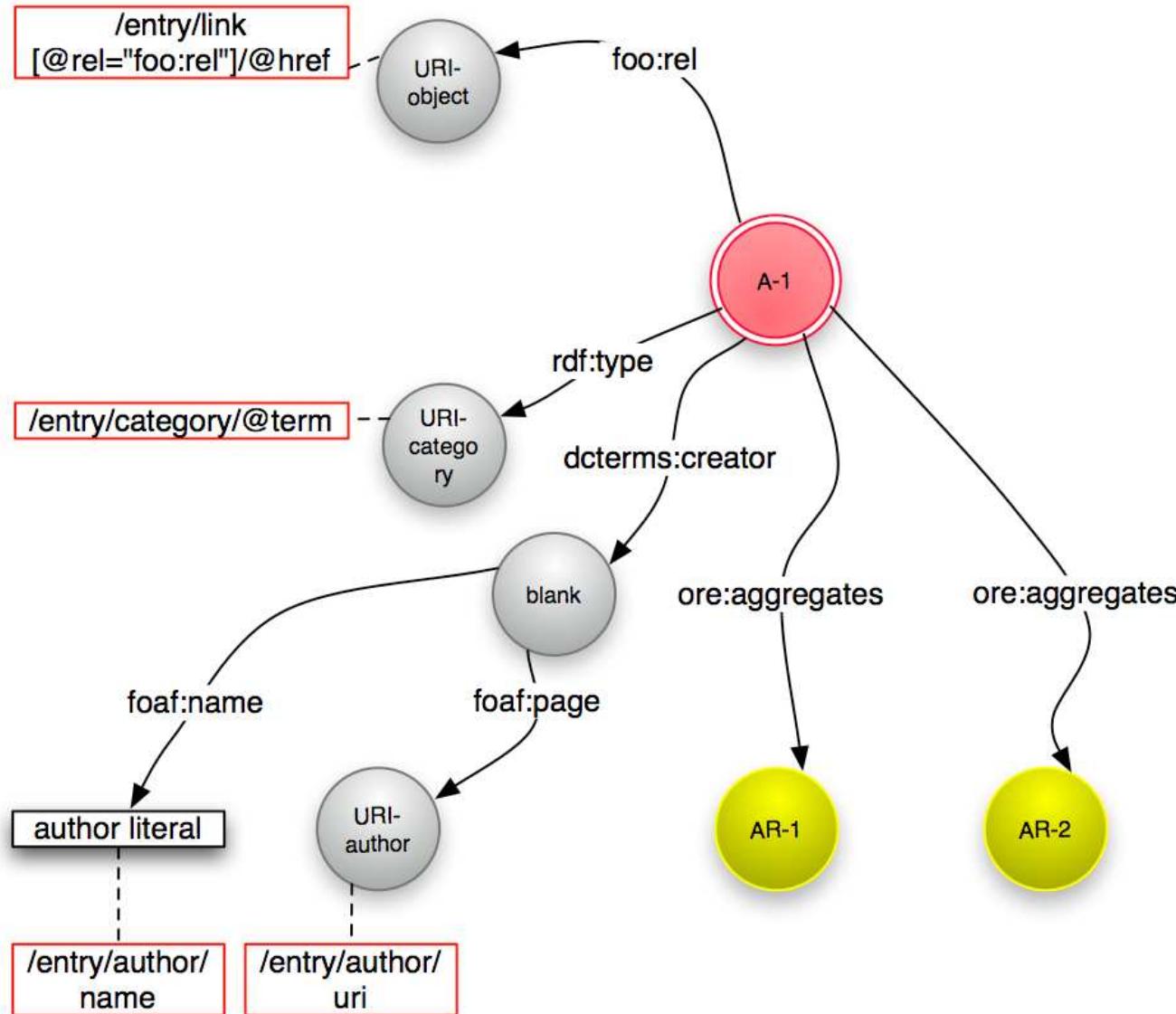
OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland





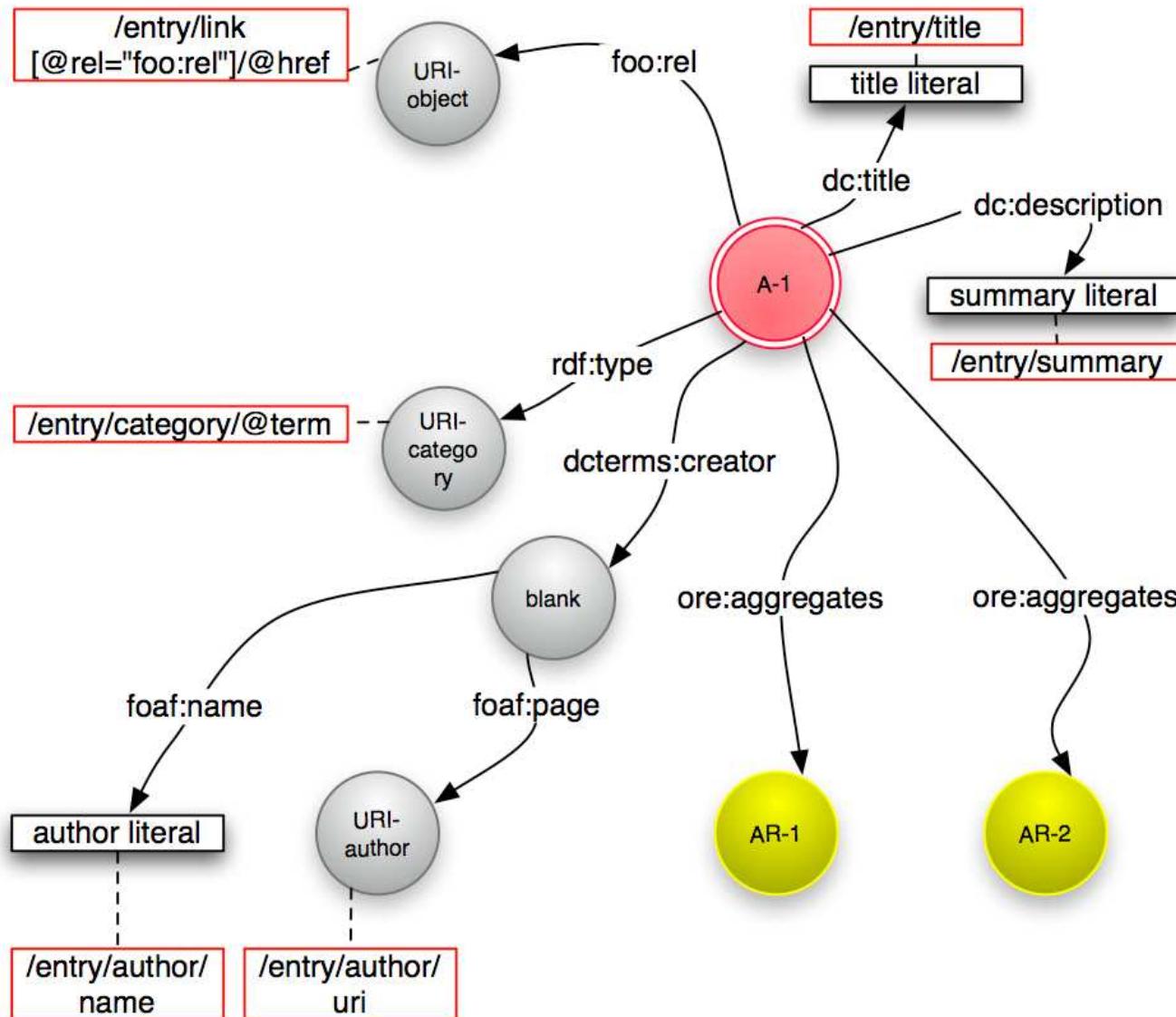
OAI Object Reuse & Exchange  
 Herbert Van de Sompel  
 OAI6, June 17 2009, Geneva, Switzerland

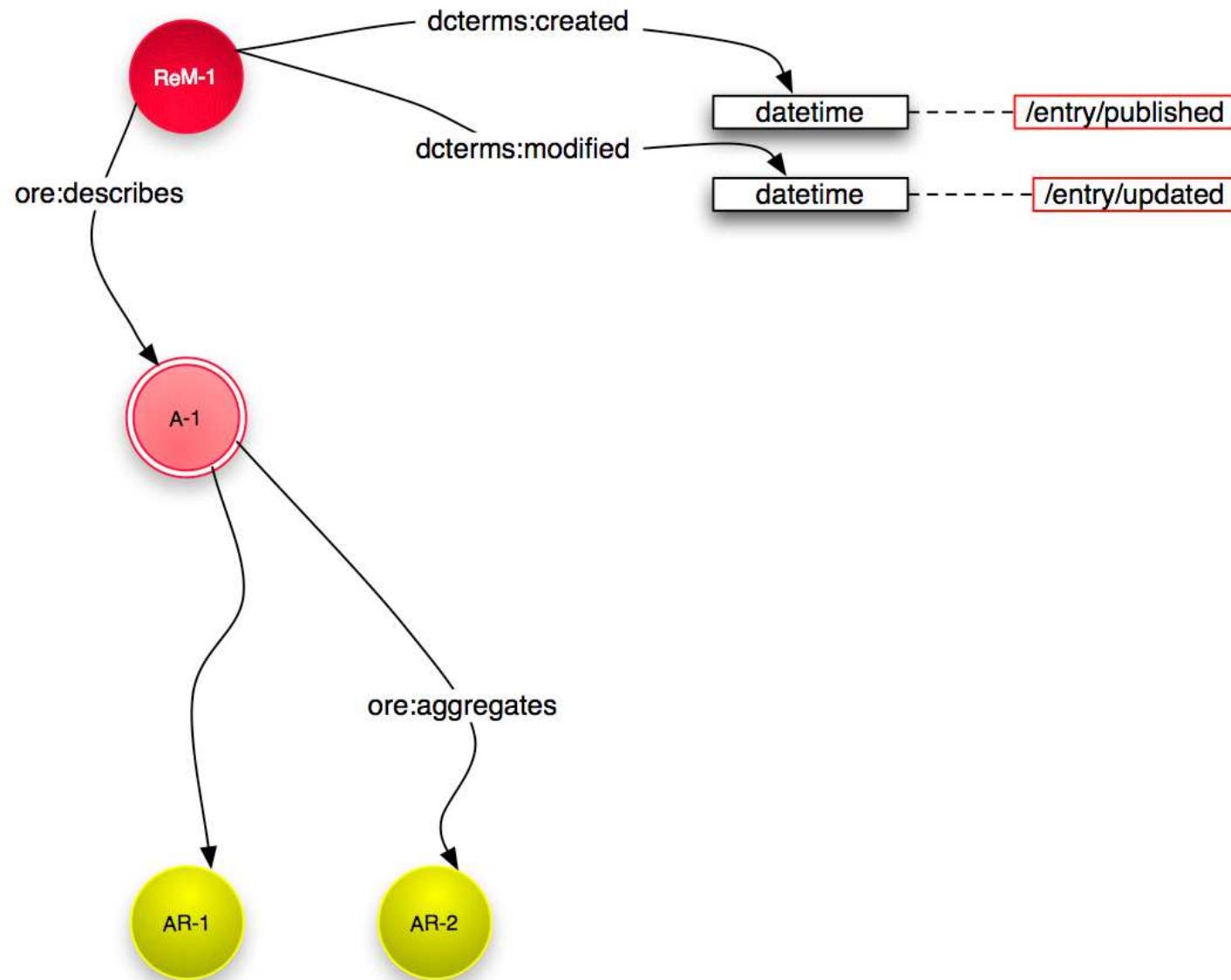




OAI Object Reuse & Exchange  
 Herbert Van de Sompel  
 OAI6, June 17 2009, Geneva, Switzerland

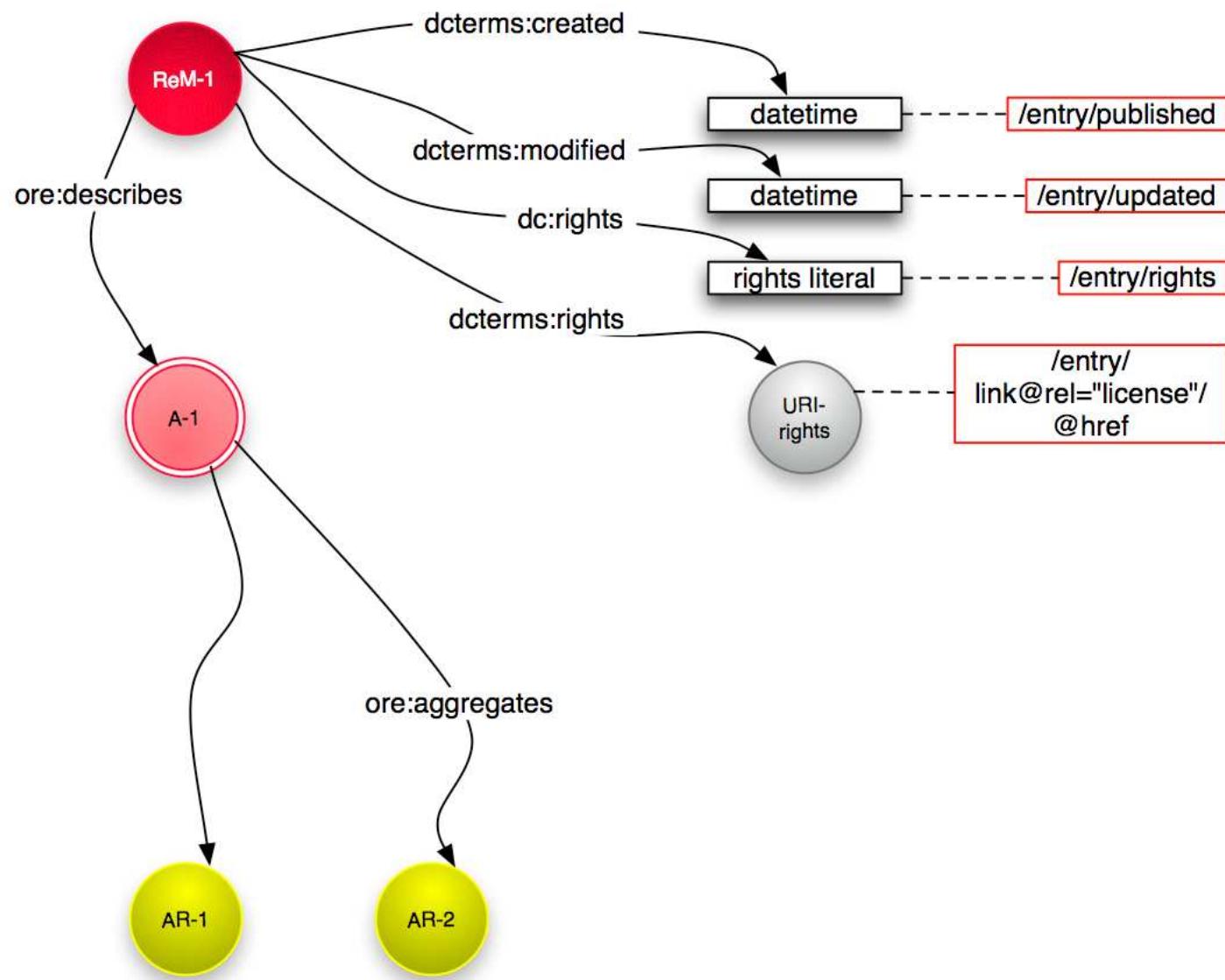






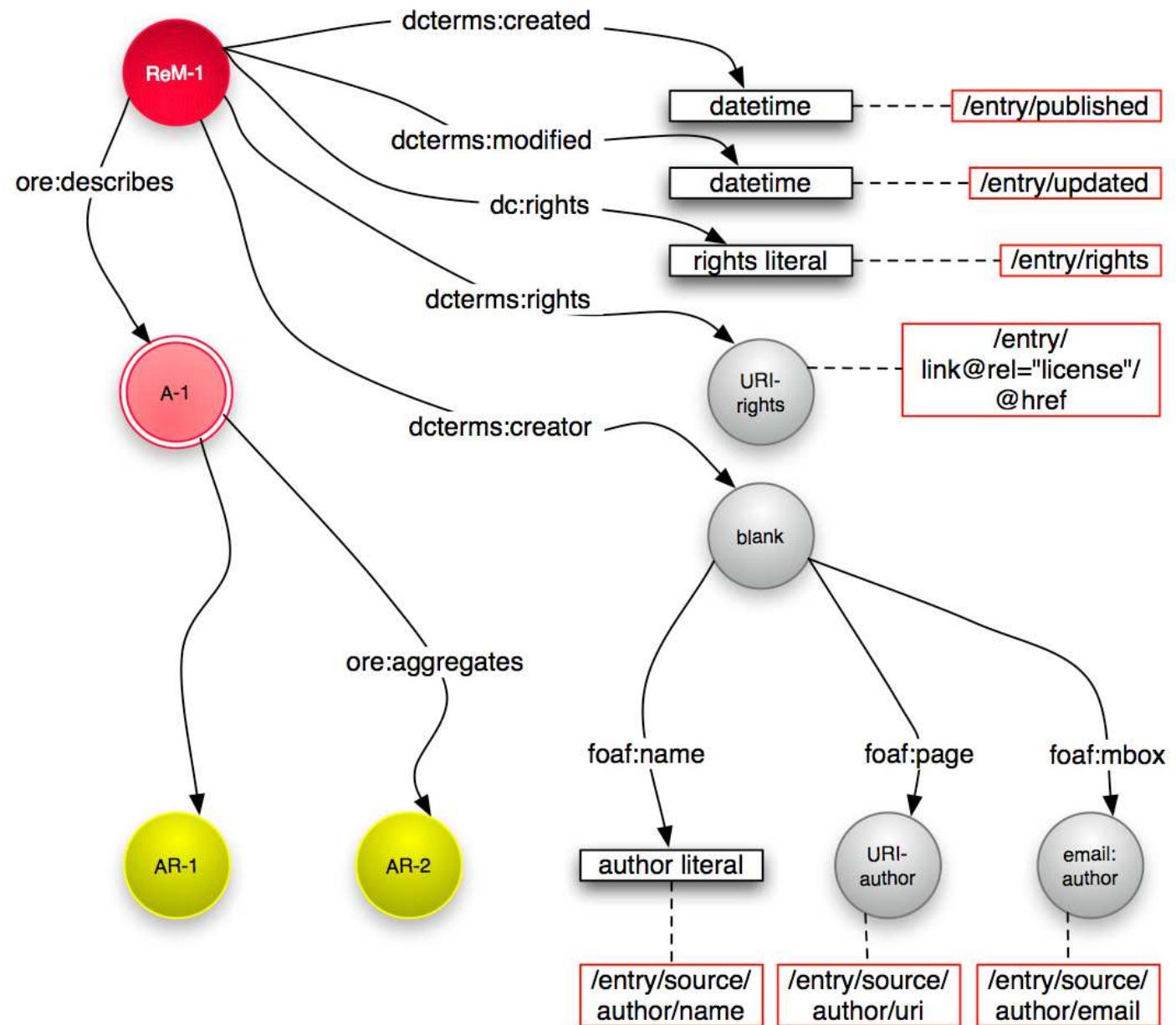
OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland





OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



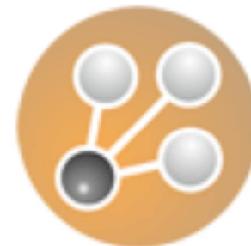


OAI Object Reuse & Exchange  
 Herbert Van de Sompel  
 OAI6, June 17 2009, Geneva, Switzerland





# Open Archives Initiative Object Reuse and Exchange



## ORE User Guide - HTTP Implementation

17 October 2008

**This version:**

<http://www.openarchives.org/ore/1.0/http>

**Latest version:**

<http://www.openarchives.org/ore/http>

**Previous version:**

<http://www.openarchives.org/ore/0.9/http>

**Editors (OAI Executive)**

Carl Lagoze, Cornell University Information Science

Herbert Van de Sompel, Los Alamos National Laboratory

**Editors (ORE Technical Committee)**

Pete Johnston, Eduserv Foundation

Michael Nelson, Old Dominion University

Robert Sanderson, University of Liverpool

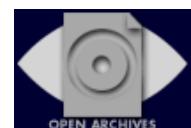
Simeon Warner, Cornell University Information Science

# OAI Object Reuse and Exchange

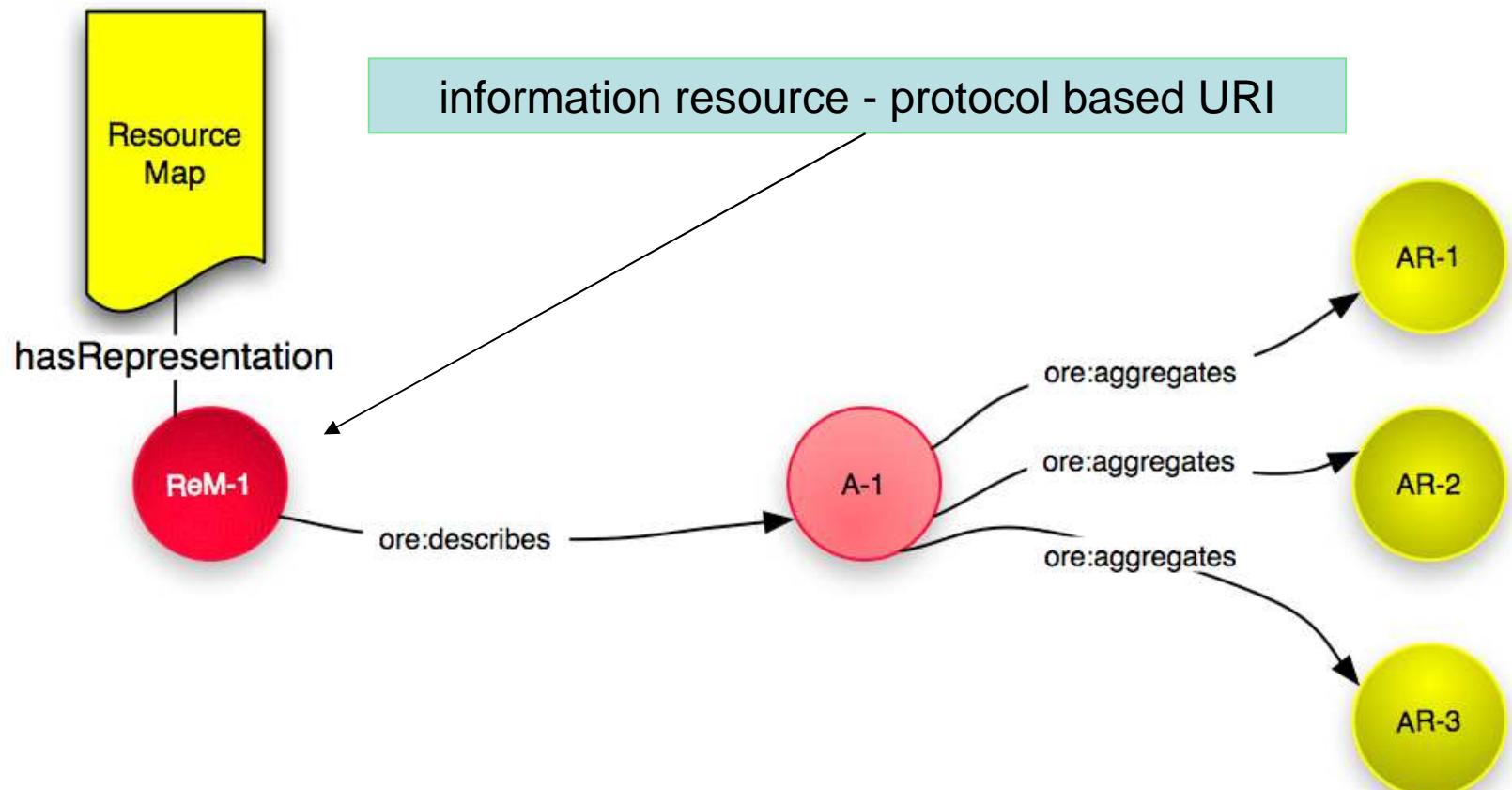
HTTP Implementation  
Aggregation URI  
Resource Map URI  
Splash Page URI  
Proxy URI



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



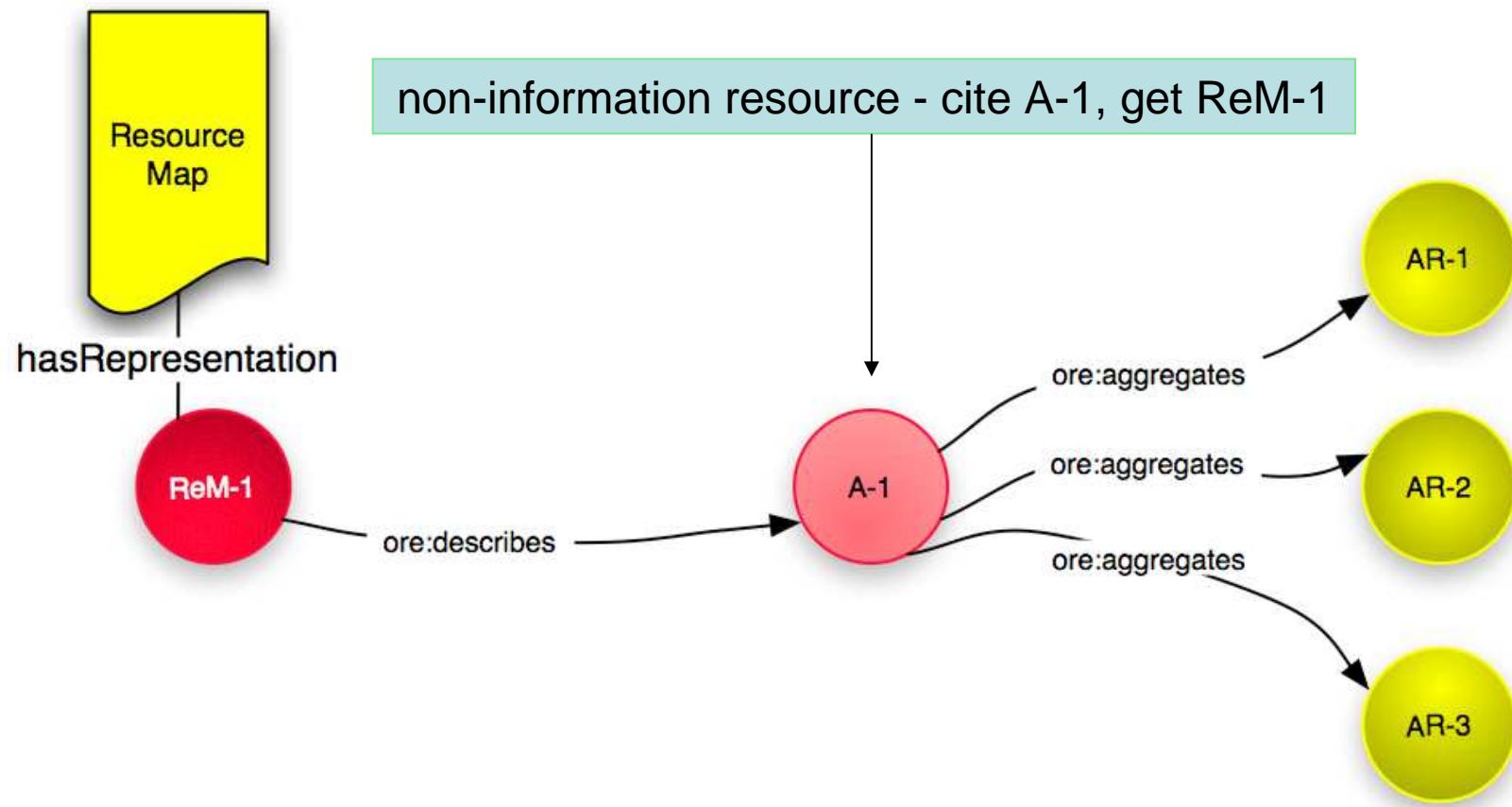
# HTTP implementation



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# HTTP implementation



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Cool URIs

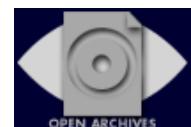
- Want simple, stable, manageable URIs
  - stability important for citation
- Certainly no technology baggage (.php, .asp etc.)
- Aggregation URI not tied to format of ReM

A-1 = <http://example.org/foo>

Re M-1 = <http://example.org/foo.atom>



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# HTTP 303 & Content Negotiation

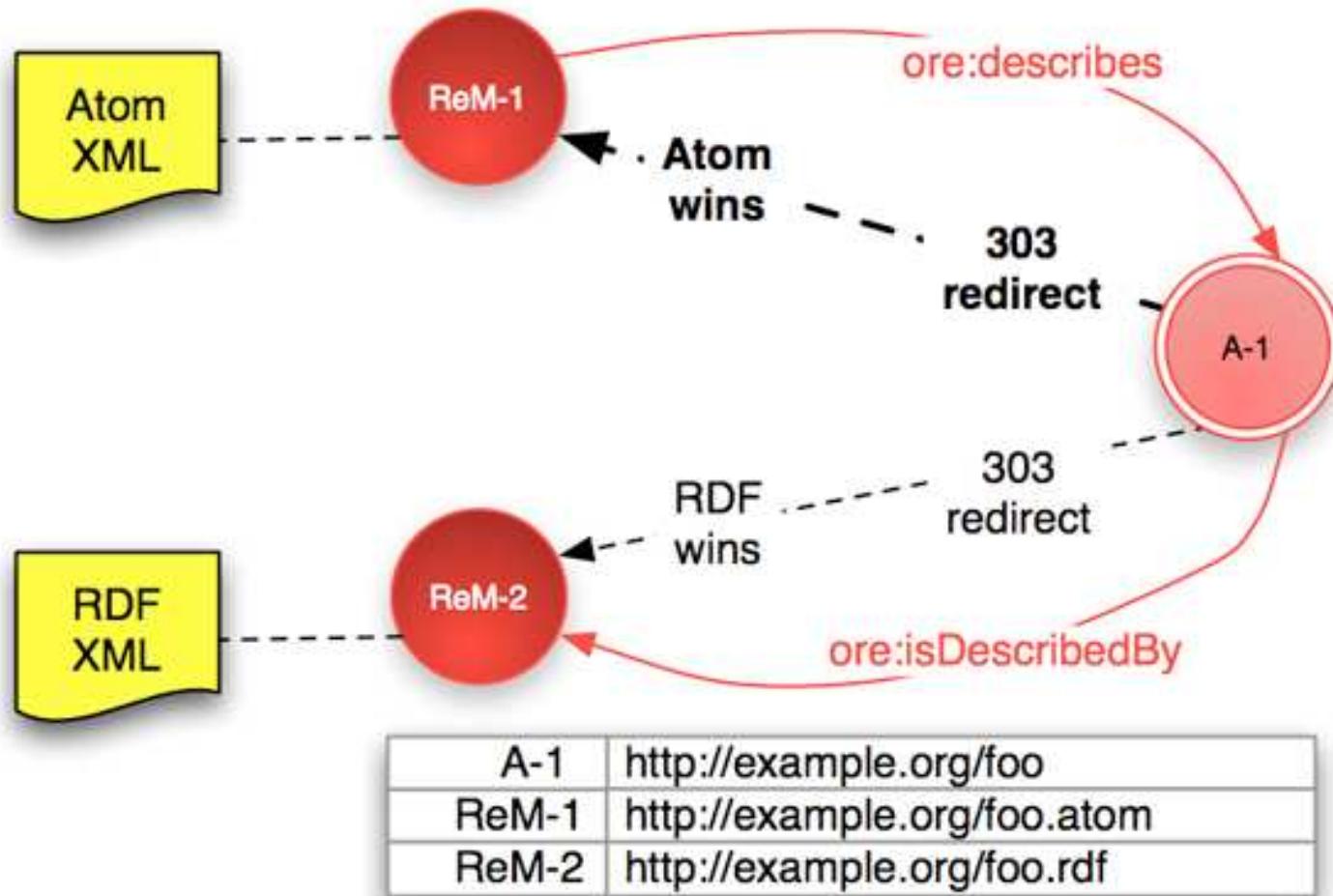
- Web server support for 303 redirection is available.
- Web server support for content negotiation is available.
- Support multiple Resource Maps is required.
- Desire to integrate Splash Pages into the solution.
- Desire to allow easy extensibility to additional Resource Maps and/or Splash Pages



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# HTTP 303 & Content Negotiation



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# HTTP 303 & Content Negotiation

```
(request)  GET /foo HTTP/1.1
           Host: example.org
           Accept: application/rdf+xml, application/atom+xml;q=0.5
```

```
(response) HTTP/1.1 303 See Other
           Location: http://example.org/foo.rdf
           Vary: Accept
```

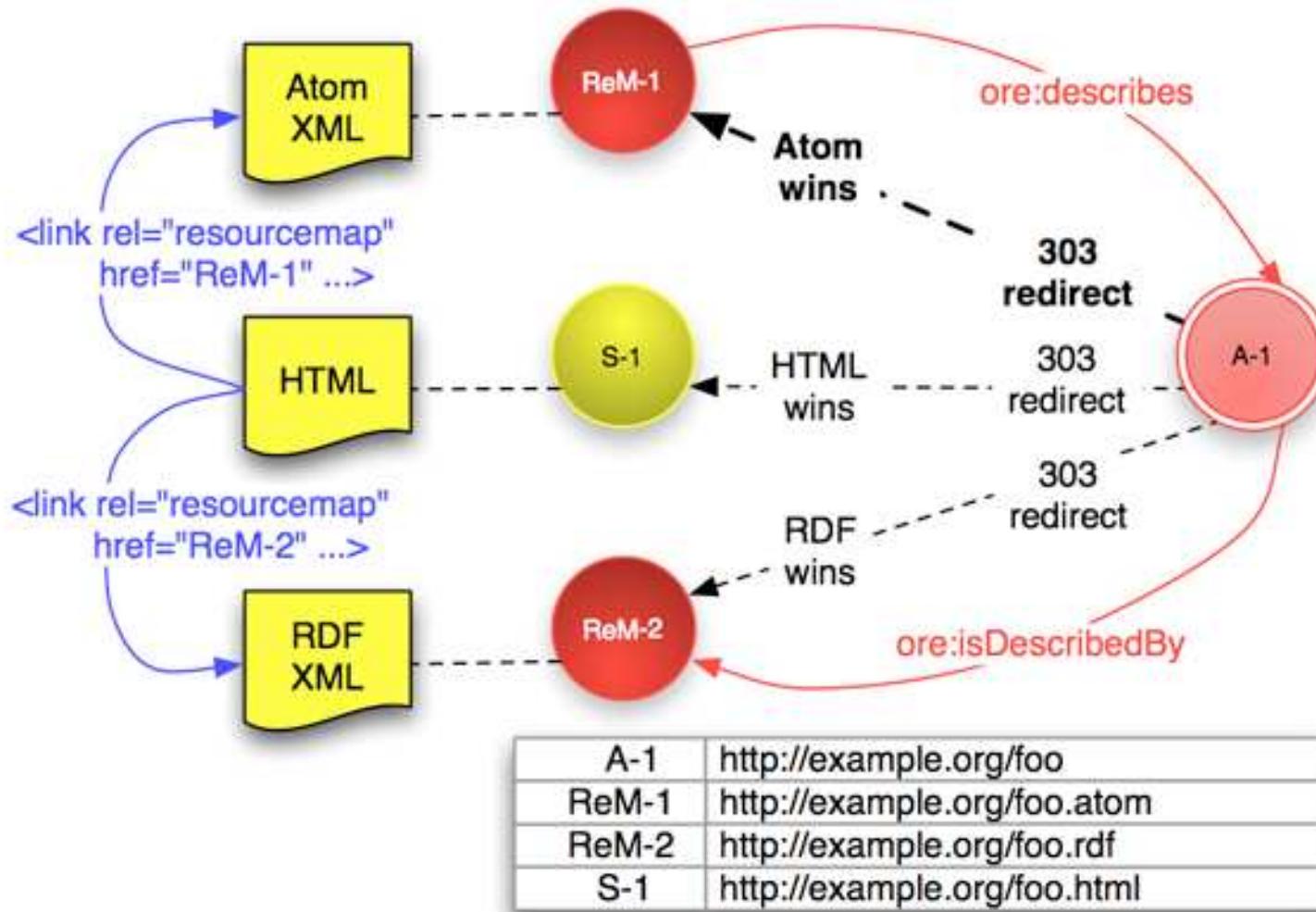
```
(request)  GET /foo.rdf HTTP/1.1
           Host: example.org
```

```
(response) HTTP/1.1 200 OK
           Content-Type: application/rdf+xml
           Length: 2345
```

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
           xmlns:ore="http://www.openarchives.org/ore/terms/">
    ...
</rdf:RDF>
```



# HTTP 303 & Content Negotiation

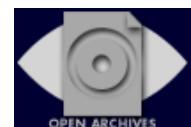


# HTTP 303 without Content Negotiation

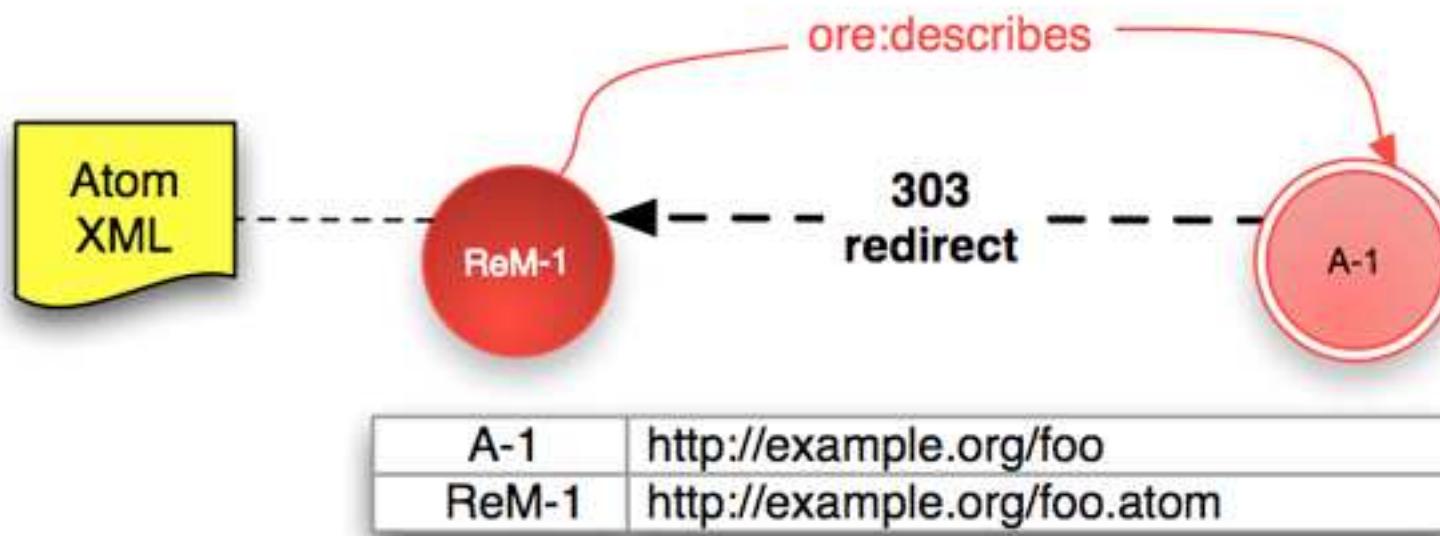
- There is just one Resource Map for each Aggregation
  - Web server support for content negotiation is not available
  - Web server support for HTTP 303 redirection is available



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# HTTP 303 without Content Negotiation



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# HTTP 303 without Content Negotiation

```
(request)  GET /foo HTTP/1.1
           Host: example.org

(response) HTTP/1.1 303 See Other
           Location: http://example.org/foo.atom
```

```
(request)  GET /foo.atom HTTP/1.1
           Host: example.org

(response) HTTP/1.1 200 OK
           Content-Type: application/atom+xml
           Length: 1234

           <?xml version="1.0" encoding="UTF-8"?>
           <entry xmlns="http://www.w3.org/2005/Atom">
               ...
           </entry>
```



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



## Simple Implementation using Hash URIs

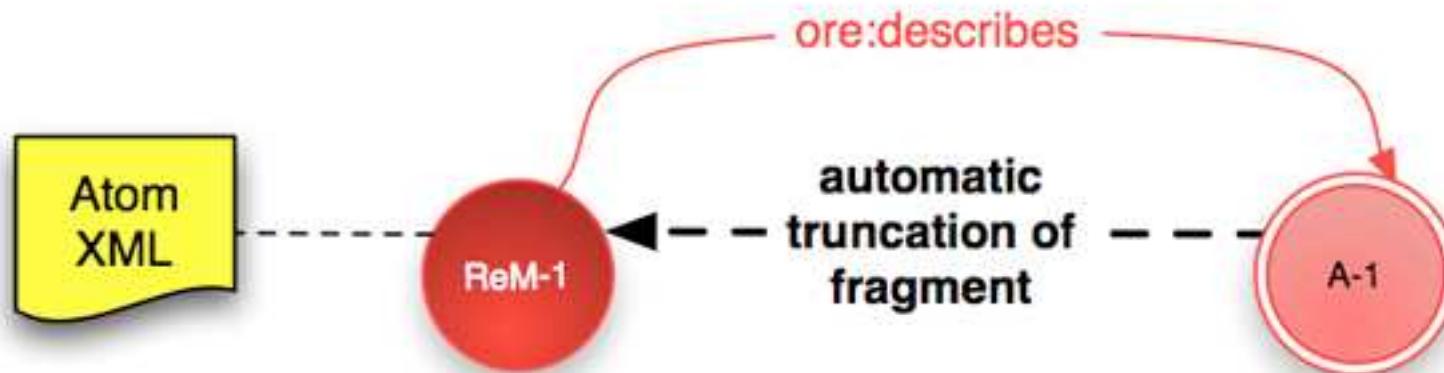
- There is just one Resource Map for each Aggregation
- Web server support for 303 redirection is not available



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



## Simple Implementation using Hash URIs



A-1	<a href="http://example.org/foo.atom#aggregation">http://example.org/foo.atom#aggregation</a>
ReM-1	<a href="http://example.org/foo.atom">http://example.org/foo.atom</a>



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Simple Implementation using Hash URIs

```
(request)  GET /foo.atom HTTP/1.1
           Host: example.org

(response) HTTP/1.1 200 OK
           Content-Type: application/atom+xml
           Length: 1234

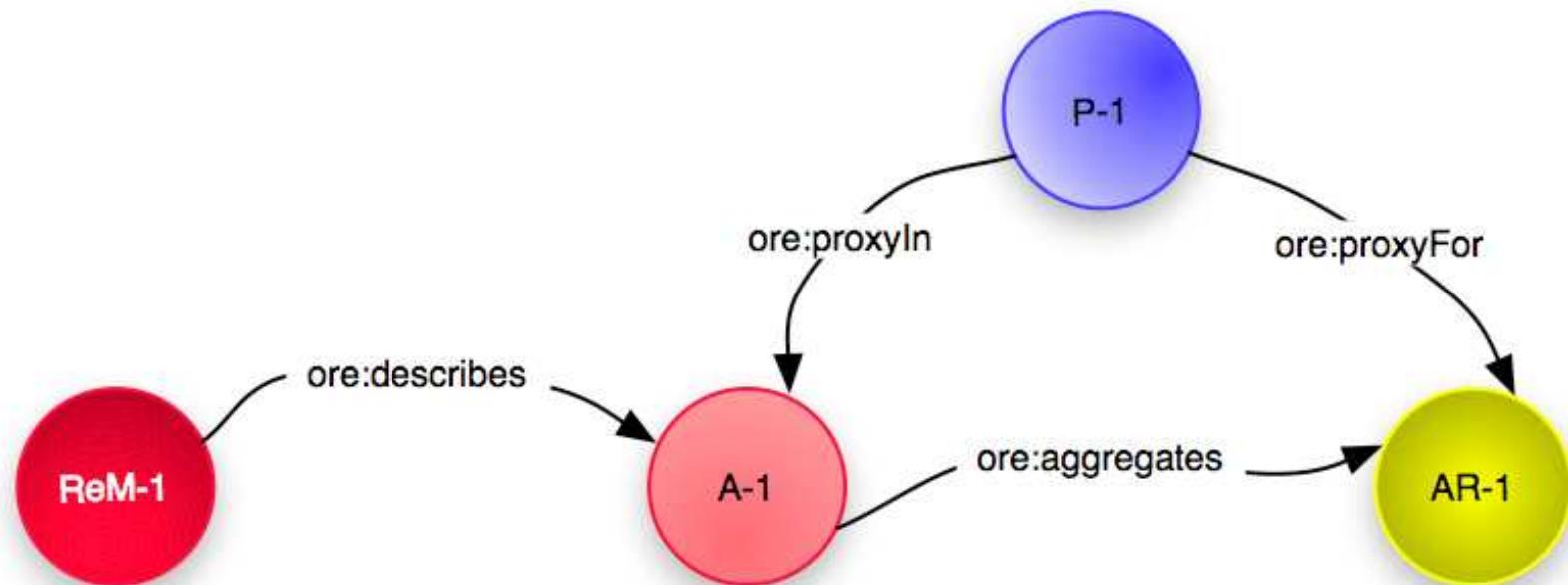
           <?xml version="1.0" encoding="UTF-8"?>
           <entry xmlns="http://www.w3.org/2005/Atom">
               ...
           </entry>
```



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# HTTP Proxy URIs



ore:proxyFor and ore:proxyFor to introduce a Proxy for an Aggregated Resource



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Requirements for HTTP URIs for Proxies

1. Redirect to the Aggregated Resource with:  
HTTP status code "303 See Other" and Location: URI-AR
2. Indicate the Aggregation context with:  
HTTP Link header Link: <URI-A>; rel="aggregation"
3. No restriction on URI syntax, but...



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# ORE Proxy URI resolver

- Operated by OCLC (thanks!)
- Simple construction syntax:  
`http://oreproxy.org/r?what=URI-AR&where=URI-A`
  - > parameter order important
  - > careful to URI encode (potentially doubly)
- Resolver is compliant with required behaviour
- Allows the use of Proxy URIs at no extra cost

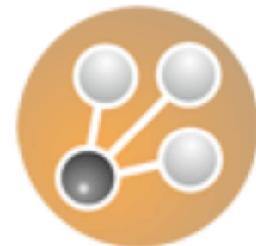


OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland





# Open Archives Initiative Object Reuse and Exchange



## ORE User Guide - Resource Map Discovery

17 October 2008

**This version:**

<http://www.openarchives.org/ore/1.0/discovery>

**Latest version:**

<http://www.openarchives.org/ore/discovery>

**Previous version:**

<http://www.openarchives.org/ore/0.9/discovery>

**Editors (OAI Executive)**

Carl Lagoze, Cornell University Information Science

Herbert Van de Sompel, Los Alamos National Laboratory

**Editors (ORE Technical Committee)**

Pete Johnston, Eduserv Foundation

Michael Nelson, Old Dominion University

Robert Sanderson, University of Liverpool

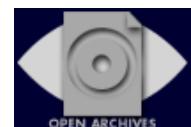
Simeon Warner, Cornell University Information Science

# Resource Map Discovery: Outline

- Batch Discovery
  - Atom Feeds, OAI-PMH, SiteMaps,
- Embedding Discovery Links
  - With HTML “link” element
  - With HTTP “Link” response header



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Batch Discovery

- There are several techniques to expose batches of Resource Maps:
  - Atom Feed in which Entries are Resource Maps serialized in Atom
  - OAI-PMH in which records are Resource Maps (Atom and/or RDF/XML)
  - SiteMaps in which URLs point at Resource Maps (Atom and/or RDF/XML)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Atom Feed

ArXiv.org Atrophysics Feed

Most Visited ▾

Subscribe to this feed using [Live Bookmarks](#)

Always use Live Bookmarks to subscribe to feeds.

[Subscribe Now](#)

**ArXiv.org Atrophysics Feed**

[Parametrization of K-essence and Its Kinetic Term](#)  
Fri, Oct 3, 2008 1:30 AM

We construct the non-canonical kinetic term of a k-essence field directly from the effective equation of state function  $S_{w_k(z)}$ , which describes the properties of the dark energy. Adopting the usual parametrizations of equation of state we numerically reproduce the shape of the non-canonical kinetic term and discuss some features of the constructed form of k-essence.

ReM



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Atom Feed

```
<?xml version="1.0" encoding="UTF-8"?>
<atom:feed xmlns:atom="http://www.w3.org/2005/Atom">
  <atom:author>
    <atom:name>arXiv.org e-Print Repository</atom:name>
    <atom:uri>http://arXiv.org</atom:uri>
  </atom:author>
  <atom:id>tag:arxiv.org,2008:astro-ph</atom:id>
  <atom:updated>2008-10-03T07:30:34Z</atom:updated>
  <atom:title>arXiv.org Atrophysics Feed</atom:title>
  <atom:entry>
    <atom:id>tag:arxiv.org,2008:astro-ph:0601007</atom:id>
    <atom:link href="http://arxiv.org/aggregation/astro-ph/0601007" rel="http://www.openarchives.org/ore/terms/describes"/>
    <atom:category term="http://www.openarchives.org/ore/terms/Aggregation" scheme="http://www.openarchives.org/ore/terms/" />
    <atom:link href="http://arxiv.org/abs/astro-ph/0601007" rel="alternate"/>
    <atom:author>
      <atom:name>Hui Li</atom:name>
    </atom:author>
    <!-- ... -->
  </atom:entry>
  <atom:entry>
    <atom:id>tag:arxiv.org,2008:astro-ph:0601008</atom:id>
    <atom:link href="http://arxiv.org/aggregation/astro-ph/0601008" rel="http://www.openarchives.org/ore/terms/describes"/>
    <atom:category term="http://www.openarchives.org/ore/terms/Aggregation" scheme="http://www.openarchives.org/ore/terms/" />
    <atom:link href="http://arxiv.org/abs/astro-ph/0601008" rel="alternate"/>
    <atom:author>
      <atom:name>Renyue Cen</atom:name>
    </atom:author>
    <!-- ... -->
  </atom:entry>
</atom:feed>
```

Feed

ReM

ReM



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# OAI-PMH

[http://www.foo.edu/oai?verb=ListRecords&metadataPrefix=oai\\_rem\\_atom](http://www.foo.edu/oai?verb=ListRecords&metadataPrefix=oai_rem_atom)

```
<?xml version="1.0" encoding="UTF-8"?>
<OAI-PMH xmlns="http://www.openarchives.org/OAI/2.0/"
           xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
           xsi:schemaLocation="http://www.openarchives.org/OAI/2.0/
           http://www.openarchives.org/OAI/2.0/OAI-PMH.xsd">
    <responseDate>2007-02-08T08:55:46Z</responseDate>
    <request verb="ListRecords" metadataPrefix="oai_rem_atom">
        http://foo.edu/oai2</request>
    <ListRecords>
        <record>
            <header>
                <identifier>oai:foo.edu:object1</identifier> ←
                <datestamp>2007-01-06</datestamp>
            </header>
            <metadata>
                <!-- Insert ReM here -->
            </metadata>
        </record>
        . . .
    </ListRecords>
</OAI-PMH>
```

MUST NOT  
equal ReM /entry/id

MUST be equal to ReM  
modification time ( /entry/updated in Atom)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

 Los Alamos  
NATIONAL LABORATORY



# OAI-PMH GetRecord points at ReM ... almost

[http://www.foo.edu/oai?verb=GetRecord&identifier=oai:foo.edu:object1&metadataPrefix=oai\\_rem\\_atom](http://www.foo.edu/oai?verb=GetRecord&identifier=oai:foo.edu:object1&metadataPrefix=oai_rem_atom)

```
<?xml version="1.0" encoding="UTF-8"?>
<OAI-PMH xmlns="http://www.openarchives.org/OAI/2.0/"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.openarchives.org/OAI/2.0/
        http://www.openarchives.org/OAI/2.0/OAI-PMH.xsd">
<responseDate>2007-02-08T08:55:46Z</responseDate>
<request verb="GetRecord" identifier="oai:foo.edu:object1"
    metadataPrefix="oai_rem_atom">http://foo.edu/oai2</request>
<GetRecord>
    <record>
        <header>
            <identifier>oai:foo.edu:object1</identifier>
            <datestamp>2007-01-06</datestamp>
        </header>
        <metadata>
            <!-- Insert ReM here --> ←
        </metadata>
    </record>
</GetRecord>
</OAI-PMH>
```

need a gateway to:  
1. strip off OAI-PMH wrappers  
2. return just what is inside <metadata>  
3. reset the MIME type (e.g., from  
application/xml to application/atom+xml )



# SiteMaps

<http://www.foo.edu/sitemap-rem.xml>

```
<?xml version="1.0" encoding="UTF-8"?>
<urlset xmlns="http://www.sitemaps.org/schemas/sitemap/0.9">
  <url>
    <loc>http://www.foo.edu/objects/object1.atom</loc>
    <lastmod>2007-01-06</lastmod>
  </url>
  <url>
    <loc>http://www.foo.edu/objects/object2.atom</loc>
    <lastmod>2007-08-11</lastmod>
    <changefreq>weekly</changefreq>
  </url>
  <url>
    <loc>http://www.foo.edu/objects/object3.atom</loc>
    <lastmod>2007-03-15T18:30:02Z</lastmod>
    <priority>0.3</priority>
  </url>
  ...
</urlset>
```

MUST equal URI-R  
( /entry/link[@rel="self"]/@href  
in Atom)

MUST be equal to ReM  
modification time ( /entry/updated in Atom)

remember SiteMap path limitation: <http://www.foo.edu/a/b/sitemap-rem.xml> can list  
<http://www.foo.edu/a/b/bar2.atom> but not <http://www.foo.edu/bar1.atom>



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

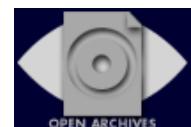


# Embedding Discovery Links

- Starting with a Web resource (say a splash page), how to find the associated Aggregations(s)?
  - HTML <link> element
  - HTTP Response Headers
  - Display it ...



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# HTML <link>: one ReM

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
<title>[astro-ph/0601007] Parametrization of K-essence and Its Kinetic
Term</title>
<link rel="shortcut icon" href="/favicon.ico" type="image/x-icon" />
<link rel="stylesheet" type="text/css" media="screen" href="/css/arXiv.css" />
<link rel="resourcemap" type="application/atom+xml"
      href="http://arxiv.org/rem/atom/astro-ph/0601007" />
</head>
<body>
<div id="header">
<h1><a href="/">arXiv.org</a> &gt; <a href="/list/astro-ph/recent">astro-ph</a>
&gt; arXiv:astro-ph/0601007</h1>
...
</body>
```



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# HTML <link>: two ReMs

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
<title>[astro-ph/0601007] Parametrization of K-essence and Its Kinetic
Term</title>
<link rel="shortcut icon" href="/favicon.ico" type="image/x-icon" />
<link rel="stylesheet" type="text/css" media="screen" href="/css/arXiv.css" />
<link rel="resourcemap" type="application/atom+xml"
      href="http://arxiv.org/rem/atom/astro-ph/0601007" />
<link rel="resourcemap" type="application/rdf+xml"
      href="http://arxiv.org/rem/rdf/astro-ph/0601007" />
</head>
<body>
<div id="header">
<h1><a href="/">arXiv.org</a> &gt; <a href="/list/astro-ph/recent">astro-ph</a>
&gt; arXiv:astro-ph/0601007</h1>
...
</body>
```



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# HTML <link>: a ReM and a Feed

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
<title>[astro-ph/0601007] Parametrization of K-essence and Its Kinetic
Term</title>
<link rel="shortcut icon" href="/favicon.ico" type="image/x-icon" />
<link rel="stylesheet" type="text/css" media="screen" href="/css/arXiv.css" />
<link rel="resourcemap" type="application/atom+xml"
      href="http://arxiv.org/rem/atom/astro-ph/0601007" />
<link rel="alternate" type="application/atom+xml"
      href="http://arxiv.org/feed/astro-ph" />
</head>
<body>
<div id="header">
<h1><a href="/">arXiv.org</a> &gt; <a href="/list/astro-ph/recent">astro-ph</a>
&gt; arXiv:astro-ph/0601007</h1>
...
</body>
```



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# HTML <link>: an RDFa ReM

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
<title>[astro-ph/0601007] Parametrization of K-essence and Its Kinetic
Term</title>
<link rel="shortcut icon" href="/favicon.ico" type="image/x-icon" />
<link rel="stylesheet" type="text/css" media="screen" href="/css/arXiv.css" />
<link rel="resourcemap self" type="application/xhtml+xml"
      href="http://arxiv.org/abs/astro-ph/0601007#rem" />
</head>
<body>
<div id="header">
<h1><a href="/">arXiv.org</a> &gt; <a href="/list/astro-ph/recent">astro-ph</a>
&gt; arXiv:astro-ph/0601007</h1>
...
</body>
```



# HTTP Link Header

```
(request)      HEAD http://www.example.net/hello.jpeg HTTP/1.1
                Host: www.example.net
                Connection: close

(response)     HTTP/1.1 200 OK
                Date: Sat, 26 May 2007 22:43:10 GMT
                Server: Apache/2.2.0
                Last-Modified: Sat, 26 May 2007 19:32:04 GMT
                ETag: "c3596-816-92123500"
                Accept-Ranges: bytes
                Content-Length: 2070
                Link: <http://example.net/hw.atom>; type="application/atom+xml;type=entry"; rel="resourcemap"
                Link: <http://example.net/hw>; rel="aggregation"
                Content-Type: image/jpeg
                Connection: close
```



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Display the URI

The screenshot shows a web browser displaying an album from Photobucket. The album contains 30 images, and the current view shows four images of a pink 1955 Nomad car being towed. The fourth image in the grid has its details panel highlighted with a red box. The details panel for each image includes:

Action	Link
Email & IM	<a href="http://s5.photobucket.com">http://s5.photobucket</a>
Direct Link	<a href="http://i5.photobucket">http://i5.photobucket</a>
HTML Code	
IMG Code	[IMG]http://i5.photobucket.com/albums/y167/rmccartney/1955%20Nc/1955_Nomad_04.jpg[/IMG]

Below the grid, there is a search bar with the placeholder "Find:" and a "Done" button.



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

 Los Alamos  
NATIONAL LABORATORY



# Display URI-A

[astro-ph/0601007] Parametrization of K-essence and Its Kinetic Term  
arXiv.org > astro-ph > arXiv:astro-ph/0601007

Astrophysics

## Parametrization of K-essence and Its Kinetic Term

Hui Li, Zong-Kuan Guo, Yuan-Zhong Zhang

(Submitted on 31 Dec 2005 ([v1](#)), last revised 18 Jan 2006 (this version, v2))

We construct the non-canonical kinetic term of a k-essence field directly from the effective equation of state function  $w_k(z)$ , which describes the properties of the dark energy. Adopting the usual parametrizations of equation of state we numerically reproduce the shape of the non-canonical kinetic term and discuss some features of the constructed form of k-essence.

Comments: 8 pages, 1 figure; accepted by Mod. Phys. Lett. A; minor changes to references  
Subjects: Astrophysics (astro-ph)  
Journal reference: Mod.Phys.Lett. A21 (2006) 1683–1690  
DOI: [10.1142/S0217732306019475](https://doi.org/10.1142/S0217732306019475)  
Cite as: [arXiv:astro-ph/0601007v2](http://arxiv.org/abs/astro-ph/0601007v2)

Submission history

From: Hui Li [[view email](#)]  
[v1] Sat, 31 Dec 2005 04:01:23 GMT (20kb)  
[v2] Wed, 18 Jan 2006 06:16:15 GMT (20kb)

Link back to: [arXiv](#), [form interface](#), [contact](#).

Resource Map for arXiv:astro-ph/0601007 <http://arxiv.org/rem/astro-ph/0601007>  
(What's a Resource Map?)

Find:  Next Previous Highlight all Done

### Download:

- PostScript
- PDF
- Other formats

### References & Citations

- SLAC-SPIRES HEP  
(refers to, cited by, arXiv reformatted)
- NASA ADS
- CiteBase

[previous](#) | [next](#)



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

 Los Alamos  
NATIONAL LABORATORY

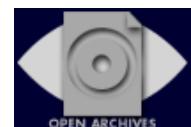


# OAI Object Reuse and Exchange

So what is going to happen with this all?



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Several interesting experiments based on ORE

- Digital preservation of aggregations:
  - [http://www.ctwatch.org/quarterly/multimedia/11/ORE\\_prototype-demo/](http://www.ctwatch.org/quarterly/multimedia/11/ORE_prototype-demo/)
- Social curation of aggregations:
  - <http://african.lanl.gov/preserve/>
- Exchange of compound objects between heterogeneous repository architectures:
  - <http://journal.code4lib.org/articles/1062>
  - <http://blip.tv/file/866653>
- Desktop-based creation of rich aggregations:
  - <http://www.itee.uq.edu.au/~ereshow/papers/2007/IDCC07.pdf>
  - <http://maenad.itee.uq.edu.au/lore/>



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Early signs of adoption (1)

- ORE model is explored/recommended as the core model to deal with multi-resource scholarly and cultural heritage assets in various high-visibility projects:
  - OREchem
  - NSF DataNet
  - EU funded DRIVER 2, Europeana, EDLnet
    - <http://driver2.dans.knaw.nl/demonstrator/html>
- Major institutional repositories (Fedora, DSpace, ePrints) implementing ORE. Oxford Universities' Fedora:
  - HTML splash page: <http://ora.ouls.ox.ac.uk/objects/uuid%3A12790621-14d6-41f1-8df3-0f944cf333e6>
  - HTML splash page has <link rel="resourcemap" ...> to Resource Map: <http://ora.ouls.ox.ac.uk/objects/uuid:12790621-14d6-41f1-8df3-0f944cf333e6/aggregation.xml>

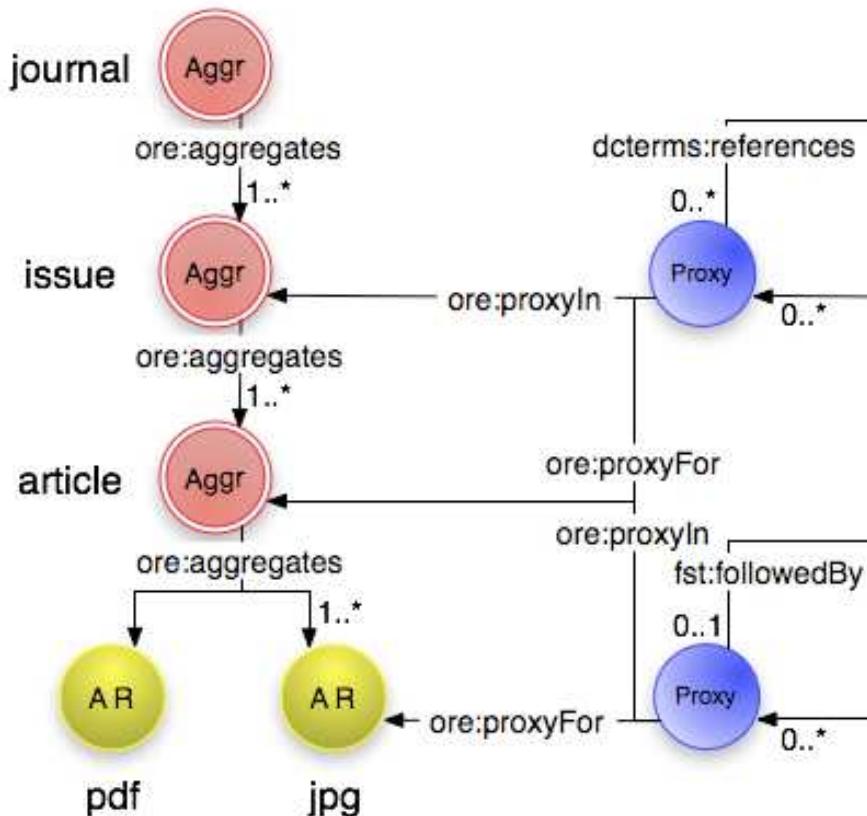


OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



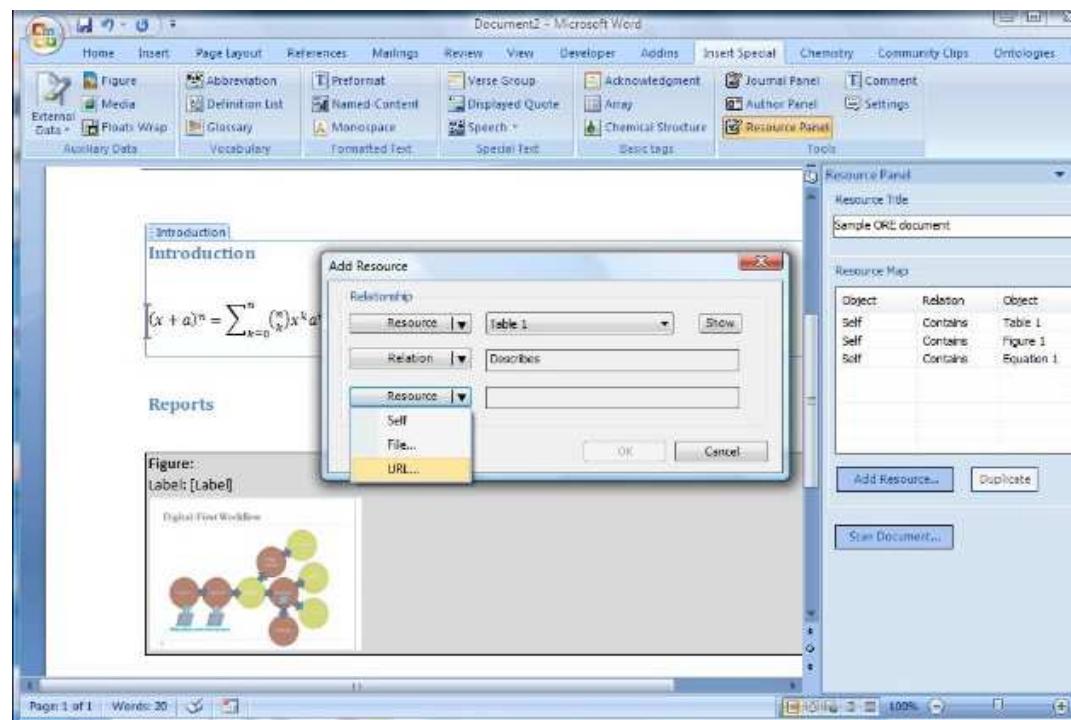
## Early signs of adoption (2)

- JSTOR to bring Resource Map for its entire journal collection in production.

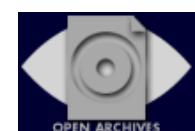


## Early signs of adoption (3)

- Microsoft is developing technology that leverages ORE:
  - ORE Word plug-in
  - Research Output Repository Platform
    - <http://research.microsoft.com/en-us/projects/zentity/>

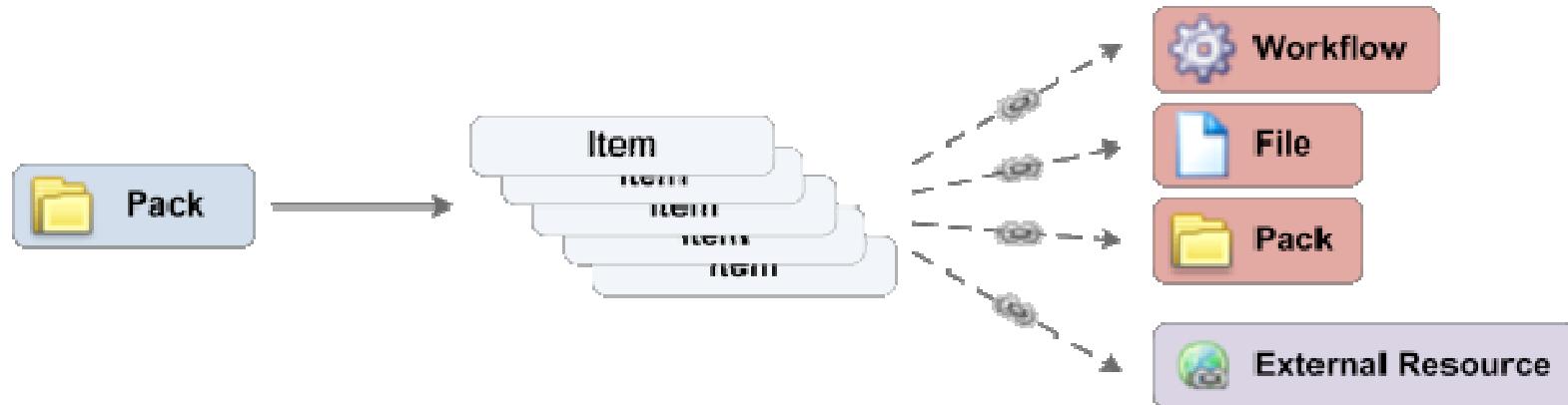


OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



## Early signs of adoption (4)

- Myexperiment.org uses ORE for the description of Packs and Experiments



### Packs

The Packs module provides a way for aggregating myExperiment Contributions and external URLs within a single object and implements the [OAI-ORE Specification](#) (see [example](#)). Packs are a subclass of OAI-ORE schema's Aggregation class. To allow metadata to be associated only with an AggregatedResource when it occurs within a particular Aggregation, the Packs module implements two ORE Proxy classes:

- [LocalPackEntry](#)
- [RemotePackEntry](#)

Remote Pack Entries are pointers to URLs (see [example](#)) whereas Local Pack Entries have a pointer ([mepack:requires](#)) to specify the myExperiment Contribution they represent (see [example](#)). Packs contain the property [ore:isDescribedBy](#) to allow the discovery of the associated [ResourceMaps](#) allowing the Pack to be exported to another repository (see [example](#)).



# OAI Object Reuse and Exchange

A fun experiment by the LANL Digital Library  
Research & Prototyping Team



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Demo: Writing papers (citing) leveraging ORE

The screenshot shows the ACM PORTAL website interface. At the top, there is a navigation bar with links for 'Subscribe (Full Service)', 'Register (Limited Service, Free)', and 'Login'. A search bar is present with options for 'The ACM Digital Library' and 'The Guide', and a 'SEARCH' button. Below the header, a blue bar reads 'THE GUIDE TO COMPUTING LITERATURE'. On the left, there is a sidebar with the title 'Ontologies and the semantic web'. The main content area displays an article record:

**Full text**: [Digital Edition](#), [Html](#) (62 KB), [Pdf](#) (4.88 MB)

**Source**: [Communications of the ACM archive](#)  
Volume 51, Issue 12 (December 2008) [table of contents](#)  
Surviving the data deluge  
SECTION: Contributed articles [table of contents](#)  
Pages 58-67  
Year of Publication: 2008  
ISSN:0001-0782

**Author**: [Ian Horrocks](#) Oriel College, Oxford, U.K.

**Publisher**: [ACM](#) New York, NY, USA

**Bibliometrics**: Downloads (6 Weeks): 297, Downloads (12 Months): 1429, Citation Count: 0

**Additional Information**: [abstract](#) [references](#) [index terms](#) [collaborative colleagues](#)

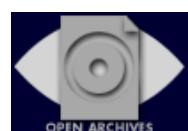
**Tools and Actions**: [Review this Article](#) [Save this Article to a Binder](#) Display Formats: [BibTex](#) [EndNote](#) [ACM Ref](#)

**DOI Bookmark**: Use this link to bookmark this Article: <http://doi.acm.org/10.1145/1409360.1409377>  
[What is a DOI?](#)

A callout box labeled 'Structured bibliographic references' points to the 'Display Formats' link in the 'Tools and Actions' section.



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Set Up

The screenshot shows a search result for the article "Ontologies and the semantic web" from Communications of the ACM archive. The page includes the ACM logo, a search bar, and various links related to the article and its publication.

**Resource Map**

**BibTex**

**EndNote**

**DC**

**Typed as bibliographic description**  
**Indication of bibliographic format**

```
graph LR; A[Resource Map] --> B[BibTex]; A --> C[EndNote]; A --> D[DC]; E["Typed as bibliographic description  
Indication of bibliographic format"] --> B; E --> C; E --> D;
```

Experiment conducted by LANL Digital Library Research & Prototyping Team  
Movie (no vox) at [http://public.lanl.gov/herbertv/images/cite\\_no\\_manager.mov](http://public.lanl.gov/herbertv/images/cite_no_manager.mov)

OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

# Web-based authoring environment

The screenshot shows a web browser window titled "Opening aDORe" at the URL <http://gws.lanl.gov:8080/vqwiki-2.7.91/jsp/Wiki?Opening%20aDORe>. The page is titled "Proto Wiki" and features a sidebar with links like "vqwiki", "RecentChanges", "MyDocs", "TextFormattingRules", etc. The main content area contains the following text:

**Opening aDORe**

Ryan Chute, Lyudmila Balakireva, Herbert Van de Sompel  
rchute@lanl.gov , ludab@lanl.gov , herbertv@lanl.gov ,  
Digital Library Research & Prototyping Team  
Research Library  
Los Alamos National Laboratory

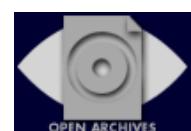
**Abstract:**

By early 2008, the Digital Library Research & Prototyping Team of the LANL Research Library will release a new version of the aDORe Archive software package. As was the case with the previous version, it provides the functionality to ingest and store compound digital objects in a combination of XMLtapes (XML-based representations of compound objects) and ARCFiles (constituent datastreams of compound objects), and to access these content objects from their respective storage repository. The new aDORe Archive version additionally provides components that facilitate accessing the multitude of storage repositories as if only one single repository were involved. These new components are the Identifier Locator, the Service Registry, an OAI-PMH-based front-end for batch collecting XML-based representations of compound objects, and an OpenURL-based front-end for retrieving disseminations of constituent datastreams.

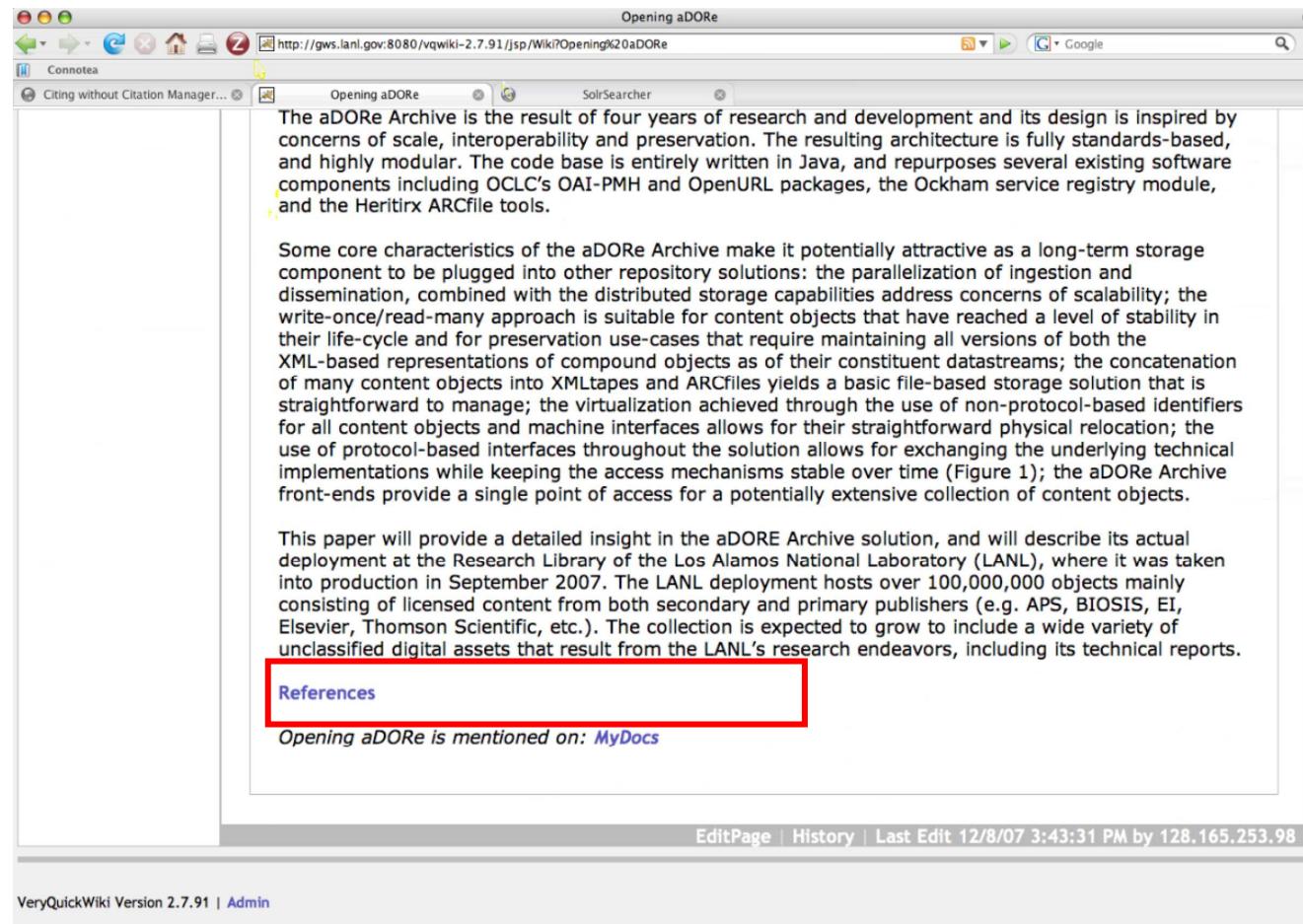
The aDORe Archive is the result of four years of research and development and its design is inspired by concerns of scale, interoperability and preservation. The resulting architecture is fully standards-based, and highly modular. The code base is entirely written in Java, and repurposes several existing software components including OCLC's OAI-PMH and OpenURL packages, the Ockham service registry module.



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Empty References section



The screenshot shows a web browser window titled "Opening aDORe". The URL in the address bar is <http://gws.lanl.gov:8080/vqwiki-2.7.91/jsp/Wiki?Opening%20aDORe>. The page content discusses the aDORe Archive, its design, and deployment at LANL. A red box highlights the "References" section, which is currently empty. Below it, a note says "Opening aDORe is mentioned on: MyDocs". At the bottom of the page, there are links for "EditPage" and "History", along with a timestamp "Last Edit 12/8/07 3:43:31 PM by 128.165.253.98". The footer of the browser window indicates "VeryQuickWiki Version 2.7.91 | Admin".



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Start editing

edit Opening aDORe

Connotea Citing without Citation Manager... SolSearcher

vQwiki edit Opening aDORe

Save Cancel Append this template: --No template-- Append Spaces-to-tabs:

B U Ab A C { } W -

Ryan Chute, Lyudmila Balakireva, Herbert Van de Sompel  
rchute@lanl.gov, ludab@lanl.gov, herbertv@lanl.gov,  
Digital Library Research & Prototyping Team  
Research Library  
Los Alamos National Laboratory

**Abstract:**

By early 2008, the Digital Library Research & Prototyping Team of the LANL Research Library will release a new version of the aDORe Archive software package. As was the case with the previous version, it provides the functionality to ingest and store compound digital objects in a combination of XMLtapes (XML-based representations of compound objects) and ARCfiles (constituent datastreams of compound objects), and to access these content objects from their respective storage repository. The new aDORe Archive version additionally provides components that facilitate accessing the multitude of storage repositories as if only one single repository were involved. These new components are the Identifier Locator, the Service Registry, an OAI-PMH-based front-end for batch collecting XML-based representations of compound objects, and an OpenURL-based front-end for retrieving disseminations of constituent datastreams.

The aDORe Archive is the result of four years of research and development and its design is inspired by concerns of scale, interoperability and preservation. The resulting architecture is fully standards-based, and highly modular. The code base is entirely written in Java, and repurposes several existing software components including OCLC's OAI-PMH and OpenURL packages, the Ockham service

Save Cancel Append this template: --No template-- Append  Minor Edit?

Save contents as a template named instead: Save as Template

Quick Editing Help



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Select area where citation is needed

edit Opening aDORe

http://gws.lanl.gov:8080/vqwiki-2.7.91/jsp/Wiki?topic=Opening+aDORe&action=action\_edit

Citing without Citation Manager... edit Opening aDORe SolSearcher Adore permalink page for: aD...

vqwiki edit Opening aDORe

Save Cancel Append this template: --No template-- Append Spaces-to-tabs:

B U Ab A C { } W -

Ryan Chute, Lyudmila Balakireva, Herbert Van de Sompel  
rchute@lanl.gov, ludab@lanl.gov, herbertv@lanl.gov,  
Digital Library Research & Prototyping Team  
Research Library  
Los Alamos National Laboratory

Abstract:

By early 2008, the Digital Library Research & Prototyping Team of the LANL Research Library will release a new version of the aDORe Archive software package. As was the case with the previous version, it provides the functionality to ingest and store compound digital objects in a combination of XMLtapes (XML-based representations of compound objects) and ARCfiles (constituent datastreams of compound objects), and to access these content objects from their respective storage repository. The new aDORe Archive version additionally provides components that facilitate accessing the multitude of storage repositories as if only one single repository were involved. These new components are the Identifier Locator, the Service Registry, an OAI-PMH-based front-end for batch collecting XML-based representations of compound objects, and an OpenURL-based front-end for retrieving disseminations of constituent datastreams.

The aDORe Archive is the result of four years of research and development and its design is inspired by concerns of scale, interoperability and preservation. The resulting architecture is fully standards-based, and highly modular. The code base is entirely written in Java, and repurposes several existing software components including OCLC's OAI-PMH and OpenURL packages, the Ockham service

Save Cancel Append this template: --No template-- Append  Minor Edit?

Save contents as a template named instead: Save as Template

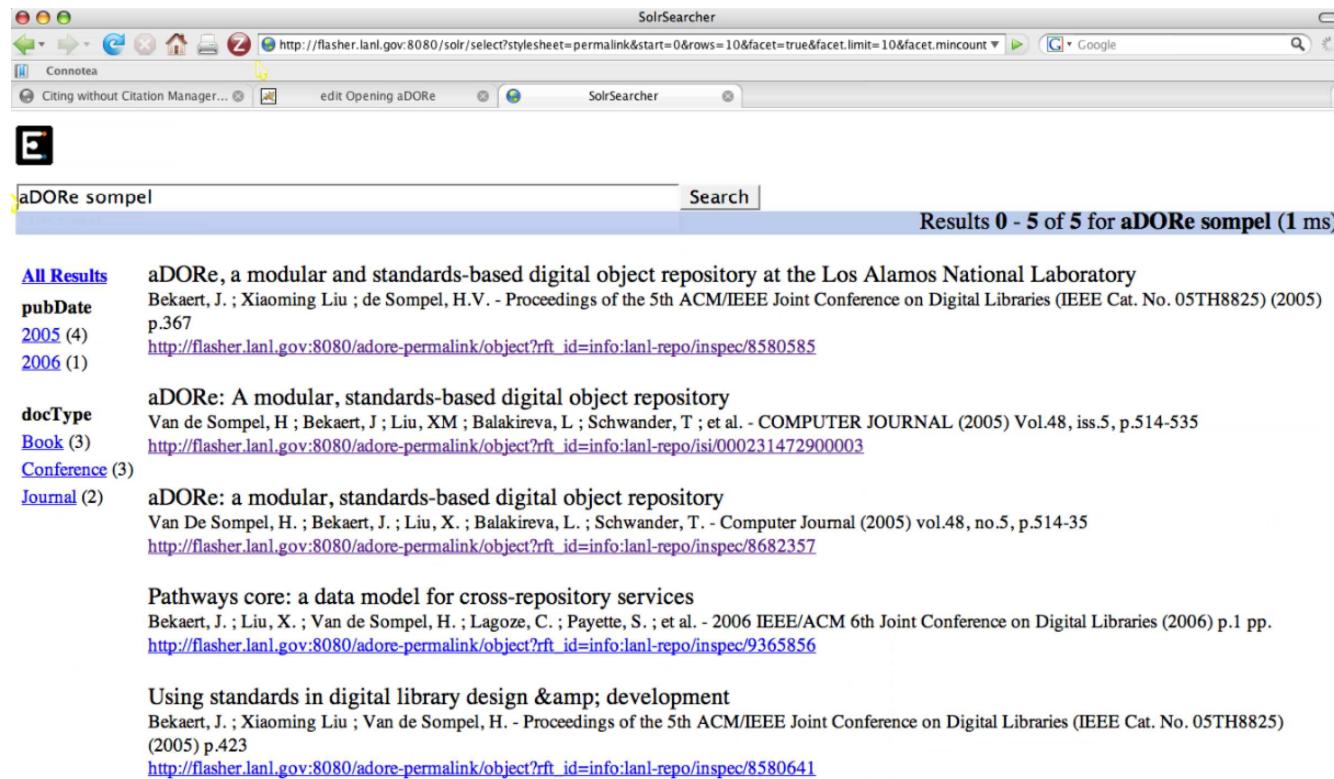
Quick Editing Help



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Use search engine to find to-be-cited paper



The screenshot shows a web browser window titled "SolrSearcher" with the URL <http://flasher.lanl.gov:8080/solr/select?stylesheet=permalink&start=0&rows=10&facet=true&facet.limit=10&facet.mincount=1>. The search bar contains "aDORe sompel". Below the search bar, it says "Results 0 - 5 of 5 for aDORe sompel (1 ms)". The results list includes:

- All Results**: aDORe, a modular and standards-based digital object repository at the Los Alamos National Laboratory  
Bekaert, J. ; Xiaoming Liu ; de Sompel, H.V. - Proceedings of the 5th ACM/IEEE Joint Conference on Digital Libraries (IEEE Cat. No. 05TH8825) (2005)  
**pubDate**  
**2005** (4)  
**2006** (1)
- docType**: aDORe: A modular, standards-based digital object repository  
Van de Sompel, H ; Bekaert, J ; Liu, XM ; Balakireva, L ; Schwander, T ; et al. - COMPUTER JOURNAL (2005) Vol.48, iss.5, p.514-535  
**Book** (3)  
**Conference** (3)  
**Journal** (2)
- Journal** (2): aDORe: a modular, standards-based digital object repository  
Van De Sompel, H. ; Bekaert, J. ; Liu, X. ; Balakireva, L. ; Schwander, T. - Computer Journal (2005) vol.48, no.5, p.514-35  
[http://flasher.lanl.gov:8080/adore-permalink/object?rft\\_id=info:lanl-repo/inspec/8682357](http://flasher.lanl.gov:8080/adore-permalink/object?rft_id=info:lanl-repo/inspec/8682357)
- Pathways core: a data model for cross-repository services**  
Bekaert, J. ; Liu, X. ; Van de Sompel, H. ; Lagoze, C. ; Payette, S. ; et al. - 2006 IEEE/ACM 6th Joint Conference on Digital Libraries (2006) p.1 pp.  
[http://flasher.lanl.gov:8080/adore-permalink/object?rft\\_id=info:lanl-repo/inspec/9365856](http://flasher.lanl.gov:8080/adore-permalink/object?rft_id=info:lanl-repo/inspec/9365856)
- Using standards in digital library design & development**  
Bekaert, J. ; Xiaoming Liu ; Van de Sompel, H. - Proceedings of the 5th ACM/IEEE Joint Conference on Digital Libraries (IEEE Cat. No. 05TH8825) (2005) p.423  
[http://flasher.lanl.gov:8080/adore-permalink/object?rft\\_id=info:lanl-repo/inspec/8580641](http://flasher.lanl.gov:8080/adore-permalink/object?rft_id=info:lanl-repo/inspec/8580641)



# Got it. Remember Splash Page points at Resource Map

Adore permalink page for: aDORe: a modular, standards-based digital object repository

Permalink: [http://flasher.lanl.gov:8080/adore-permalink/object?rft\\_id=info%3Alanl-repo%2Finspec%2F8682357](http://flasher.lanl.gov:8080/adore-permalink/object?rft_id=info%3Alanl-repo%2Finspec%2F8682357)

Title: aDORe: a modular, standards-based digital object repository

Author(s): Van De Sompel, H. Bekaert, J. Liu, X. Balakireva, L. Schwander, T.

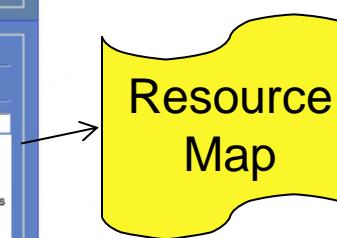
Citation: Van De Sompel, H. Bekaert, J. Liu, X. Balakireva, L. Schwander, T. (2005) in Computer Journal;48,5,514-35;

Abstract: This paper describes the aDORe repository architecture designed and implemented for ingesting, storing, and accessing a vast collection of digital objects at the Research Library of the Los Alamos National Laboratory. The aDORe architecture is highly modular and standards-based. In the architecture, the MPEG-21 Digital Item Declaration Language is used as the XML-based format to represent digital objects that can consist of multiple datastreams as open archival information system archival information packages (OAIS AIPs). Through an ingestion process, these OAIS AIPs are stored in a multitude of autonomous repositories. A repository index keeps track of the creation and location of all the autonomous repositories, whereas an identifier locator reflects in which autonomous repository a given digital object or OAIS AIP resides. A front-end to the complete environment - the OAI-PMH federator - is introduced for requesting OAIS dissemination information packages (OAIS DIPs). These OAIS DIPs can be stored OAIS AIPs themselves, or transformations thereof. This front-end allows OAI-PMH harvesters to recurrently and selectively collect batches of OAIS DIPs from aDORe, and hence to create multiple, parallel services using the collected objects. Another front-end - the OpenURL resolver - is introduced for requesting OAIS result sets. An OAIS result set is a dissemination of an individual digital object or of its constituent datastreams. Both front-ends make use of an MPEG-21 digital item processing engine to apply those services to OAIS AIPs, digital objects, or constituent datastreams that were specified in a dissemination request.

Resources:

<a href="#">FullText</a>	<a href="http://linkseeker.lanl.gov/lanl?url_ver=Z39-88-2004&amp;rft_val_fmt=info%3Aof%2Ffmt%3Akev%3Ambx%3Ajournal&amp;">http://linkseeker.lanl.gov/lanl?url_ver=Z39-88-2004&amp;rft_val_fmt=info%3Aof%2Ffmt%3Akev%3Ambx%3Ajournal&amp;</a>
<a href="#">Bibliographic record - MODS</a>	<a href="http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.mods">http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.mods</a>
<a href="#">Bibliographic record - Dublin Core</a>	<a href="http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.dc&amp;rft">http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.dc&amp;rft</a>
<a href="#">Bibliographic record - MARC21</a>	<a href="http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.marc">http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.marc</a>
<a href="#">Bibliographic Record - Publisher</a>	<a href="http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.or&amp;rft">http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.or&amp;rft</a>
<a href="#">Digital Item Declaration - Display</a>	<a href="http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetDIDL&amp;rft_id=info%3Alanl-repo%2Finspec%2F8682357">http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetDIDL&amp;rft_id=info%3Alanl-repo%2Finspec%2F8682357</a>
<a href="#">Digital Item Declaration - XML</a>	<a href="http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetDIDL.xml&amp;rft_id=info%3Alanl-repo%2Finspec%2F8682357">http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetDIDL.xml&amp;rft_id=info%3Alanl-repo%2Finspec%2F8682357</a>

provided by Los Alamos National Laboratory Research Library Protoleam Dec. 2007



Resource Map



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Copy URI of Splash Page

Adore permalink page for: aDORe: a modular, standards-based digital object repository

http://flasher.lanl.gov:8080/adore-permalink/object?rft\_id=info%3Alanl-repo%2Finspec%2F8682357

Permalink: http://flasher.lanl.gov:8080/adore-permalink/object?rft\_id=info%3Alanl-repo%2Finspec%2F8682357

Title: aDORe: a modular, standards-based digital object repository

Author(s): Van De Sompel, H. Bekaert, J. Liu, X. Balakireva, L. Schwander, T.

Citation: Van De Sompel, H. Bekaert, J. Liu, X. Balakireva, L. Schwander, T. (2005) in Computer Journal;48,5,514-35;

Abstract: This paper describes the aDORe repository architecture designed and implemented for ingesting, storing, and accessing a vast collection of digital objects at the Research Library of the Los Alamos National Laboratory. The aDORe architecture is highly modular and standards-based. In the architecture, the MPEG-21 Digital Item Declaration Language is used as the XML-based format to represent digital objects that can consist of multiple datastreams as open archival information system archival information packages (OAIS AIPs). Through an ingestion process, these OAIS AIPs are stored in a multitude of autonomous repositories. A repository index keeps track of the creation and location of all the autonomous repositories, whereas an identifier locator reflects in which autonomous repository a given digital object or OAIS AIP resides. A front-end to the complete environment - the OAI-PMH federator - is introduced for requesting OAIS dissemination information packages (OAIS DIPs). These OAIS DIPs can be stored OAIS AIPs themselves, or transformations thereof. This front-end allows OAI-PMH harvesters to recurrently and selectively collect batches of OAIS DIPs from aDORe, and hence to create multiple, parallel services using the collected objects. Another front-end \$the OpenURL resolver - is introduced for requesting OAIS result sets. An OAIS result set is a dissemination of an individual digital object or of its constituent datastreams. Both front-ends make use of an MPEG-21 digital item processing engine to apply those services to OAIS AIPs, digital objects, or constituent datastreams that were specified in a dissemination request

Resources:

FullText	http://linkseeker.lanl.gov/lanl?url_ver=Z39-88-2004&rft_val_fmt=info%3Aof%2Ffmt%3Akev%3Ambx%3Ajournal&
Bibliographic record - MODS	http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.mods
Bibliographic record - Dublin Core	http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.dc&rft
Bibliographic record - MARC21	http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.marc&rft
Bibliographic Record - Publisher	http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetBibliographic.or&rft
Digital Item Declaration - Display	http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetDIDL&rft_id=info%3Alanl-repo%2Finspec%2F8682357
Digital Item Declaration - XML	http://flasher.lanl.gov:8080/adore-permalink/object?svc_id=info%3Alanl-repo%2Fsvc%2FgetDIDL.xml&rft_id=info%3Alanl-repo%2Finspec%2F8682357

provided by Los Alamos National Laboratory Research Library Protoleam Dec. 2007



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Hyperlink selected area with Splash Page URI

The page at <http://gws.lanl.gov:8080> says:

Enter a URL

[http://gws.lanl.gov:8080/vqwiki-2/ject?rft\_id=info%3Alanl-repo%2Finspec%2F8682357]

Cancel OK

**vqwiki** edit Opening aDORe

Save Cancel Append this template: --No template-- Append Spaces-to-tabs:

Ryan Chute, Lyudmila Balakireva, Herbert Van de Sompel  
rchute@lanl.gov, ludab@lanl.gov, herbertv@lanl.gov,  
Digital Library Research & Prototyping Team  
Research Library  
Los Alamos National Laboratory

**Abstract:**

By early 2008, the Digital Library Research & Prototyping Team of the LANL Research Library will release a new version of the **aDORe** Archive software package. As was the case with the previous version, it provides the functionality to ingest and store compound digital objects in a combination of XMLtapes (XML-based representations of compound objects) and ARCfiles (constituent datastreams of compound objects), and to access these content objects from their respective storage repository. The new aDORe Archive version additionally provides components that facilitate accessing the multitude of storage repositories as if only one single repository were involved. These new components are the Identifier Locator, the Service Registry, an OAI-PMH-based front-end for batch collecting XML-based representations of compound objects, and an OpenURL-based front-end for retrieving disseminations of constituent datastreams.

The aDORe Archive is the result of four years of research and development and its design is inspired by concerns of scale, interoperability and preservation. The resulting architecture is fully standards-based, and highly modular. The code base is entirely written in Java, and repurposes several existing software components including OCLC's OAI-PMH and OpenURL packages, the Ockham service

Save Cancel Append this template: --No template-- Append Minor Edit?

Save contents as a template named instead: Save as Template

Quick Editing Help



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Repeat for other areas that require a citation

edit Opening aDORe

Connotea Citing without Citation Manager... edit Opening aDORe SolSearcher Adore permalink page for: aD...

vQwiki edit Opening aDORe

Save Cancel Append this template: --No template-- Append Spaces-to-tabs:

B U Ab A C { } W -

Ryan Chute, Lyudmila Balakireva, Herbert Van de Sompel  
rchute@lanl.gov , ludab@lanl.gov , herbertv@lanl.gov ,  
Digital Library Research & Prototyping Team  
Research Library  
Los Alamos National Laboratory

Abstract:

By early 2008, the Digital Library Research & Prototyping Team of the LANL Research Library will release a new version of the [link:[http://flasher.lanl.gov:8080/adore-permalink/object?rft\\_id=info%3Alanl-report](http://flasher.lanl.gov:8080/adore-permalink/object?rft_id=info%3Alanl-report)]. As was the case with the previous version, it provides the functionality to ingest and store compound digital objects in a combination of XMLtapes (XML-based representations of compound objects) and ARCfiles (constituent datastreams of compound objects), and to access these content objects from their respective storage repository. The new aDORe Archive version additionally provides components that facilitate accessing the multitude of storage repositories as if only one single repository were involved. These new components are the Identifier Locator, the Service Registry, an OAI-PMH-based front-end for batch collecting XML-based representations of compound objects, and an OpenURL-based front-end for retrieving disseminations of constituent datastreams.

The aDORe Archive is the result of four years of research and development and its design is inspired by concerns of scale, interoperability and preservation. The resulting architecture is fully standards-based, and highly modular. The

Save Cancel Append this template: --No template-- Append  Minor Edit?

Save contents as a template named instead: Save as Template

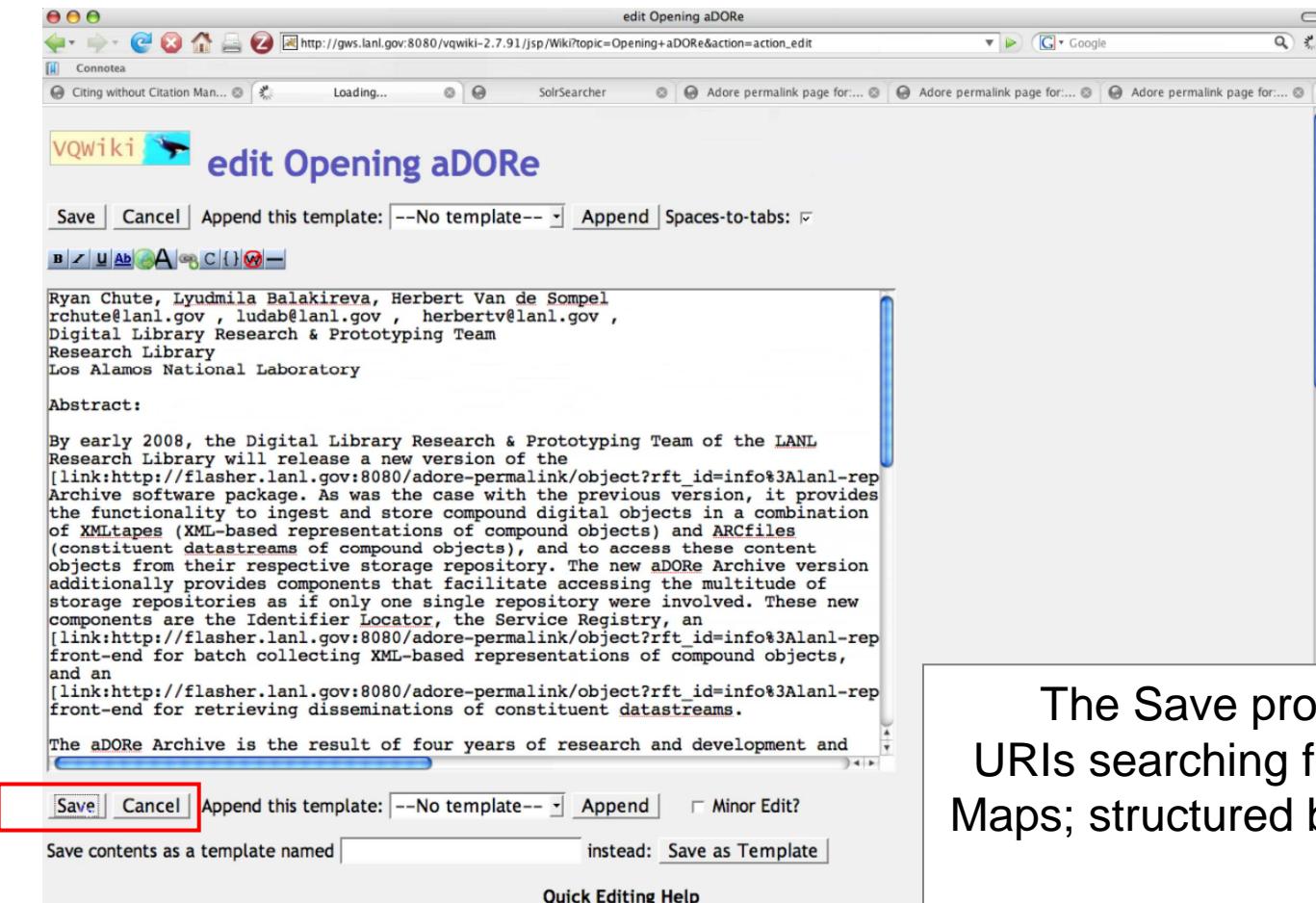
Quick Editing Help



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Save it



Ryan Chute, Lyudmila Balakireva, Herbert Van de Sompel  
rchute@lanl.gov, ludab@lanl.gov, herbertv@lanl.gov,  
Digital Library Research & Prototyping Team  
Research Library  
Los Alamos National Laboratory

**Abstract:**

By early 2008, the Digital Library Research & Prototyping Team of the LANL Research Library will release a new version of the [link:[http://flasher.lanl.gov:8080/adore-permalink/object?rft\\_id=info%3Alanl-repArchive](http://flasher.lanl.gov:8080/adore-permalink/object?rft_id=info%3Alanl-repArchive)] software package. As was the case with the previous version, it provides the functionality to ingest and store compound digital objects in a combination of XMLtapes (XML-based representations of compound objects) and ARCfiles (constituent datastreams of compound objects), and to access these content objects from their respective storage repository. The new aDORe Archive version additionally provides components that facilitate accessing the multitude of storage repositories as if only one single repository were involved. These new components are the Identifier Locator, the Service Registry, an [link:[http://flasher.lanl.gov:8080/adore-permalink/object?rft\\_id=info%3Alanl-repfront-end](http://flasher.lanl.gov:8080/adore-permalink/object?rft_id=info%3Alanl-repfront-end)] for batch collecting XML-based representations of compound objects, and an [link:[http://flasher.lanl.gov:8080/adore-permalink/object?rft\\_id=info%3Alanl-repfront-end](http://flasher.lanl.gov:8080/adore-permalink/object?rft_id=info%3Alanl-repfront-end)] for retrieving disseminations of constituent datastreams.

The aDORe Archive is the result of four years of research and development and

Save Cancel Append this template: --No template-- Append  Minor Edit?

Save contents as a template named instead: Save as Template

Quick Editing Help

The Save process follows URIs searching for Resource Maps; structured bibliographic descriptions



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland



# Links to Splash Pages, References section inserted

The screenshot shows a web browser window with the title bar "Opening aDORe". The address bar displays the URL <http://gws.lanl.gov:8080/vqwiki-2.7.91/jsp/Wiki?Opening+aDORe>. The page content is a wiki entry titled "Opening aDORe". The sidebar on the left contains links such as "vqwiki", "RecentChanges", "MyDocs", "TextFormattingRules", "AllWikiTopics", "OrphanedWikiTopics", "ToDoWikiTopics", "HelloWorld", "SimpleStats", "WikiLockList", "RSS", "Export2HTML", "WikiSearch", "SetUsername", and "VeryQuickWiki". The main content area includes a "To modify this, click: LeftMenu" note, a "RecentChanges" link, and a "Proto Wiki" logo. The "EditPage" and "Attach" buttons are visible in the top navigation bar. The text of the page discusses the release of a new version of the aDORe software package, mentioning its functionality to ingest and store compound digital objects, and its modular architecture involving Identifier Locator, Service Registry, OAI-PMH front-end, and OpenURL front-end. The text also notes the use of XMLtapes and ARCFiles.

**Opening aDORe**

Ryan Chute, Lyudmila Balakireva, Herbert Van de Sompel  
rchute@lanl.gov , ludab@lanl.gov , herbertv@lanl.gov ,  
Digital Library Research & Prototyping Team  
Research Library  
Los Alamos National Laboratory

**Abstract:**

By early 2008 the Digital Library Research & Prototyping Team of the LANL Research Library will release a new version of the aDORe-[1] Archive software package. As was the case with the previous version, it provides the functionality to ingest and store compound digital objects in a combination of XMLtapes (XML-based representations of compound objects) and ARCFiles (constituent datastreams of compound objects), and to access these content objects from their respective storage repository. The new aDORe Archive version additionally provides components that facilitate accessing the multitude of storage repositories as if only one single repository were involved. These new components are the Identifier Locator, the Service Registry, an OAI-PMH-[2]-based front-end for batch collecting XML-based representations of compound objects, and an OpenURL-[3]-based front-end for retrieving disseminations of constituent datastreams.

The aDORe Archive is the result of four years of research and development and its design is inspired by concerns of scale, interoperability and preservation. The resulting architecture is fully standards-based, and highly modular. The code base is entirely written in Java, and repurposes several existing software components including OCLC's OAI-PMH and OpenURL packages, the Ockham service registry module.



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

 Los Alamos  
NATIONAL LABORATORY



# References section completed

Opening aDORe

http://gws.lanl.gov:8080/vqwiki-2.7.91/jsp/Wiki?Opening+aDORe#91

Connotea Citing without Citation Man... SolrSearcher Adore permalink page for... Adore permalink page for... Adore permalink page for... Adore permalink page for...

component to be plugged into other repository solutions: the parallelization of ingestion and dissemination, combined with the distributed storage capabilities address concerns of scalability; the write-once/read-many approach is suitable for content objects that have reached a level of stability in their life-cycle and for preservation use-cases that require maintaining all versions of both the XML-based representations of compound objects as of their constituent datastreams; the concatenation of many content objects into XMLtapes and ARCFiles yields a basic file-based storage solution that is straightforward to manage; the virtualization achieved through the use of non-protocol-based identifiers for all content objects and machine interfaces allows for their straightforward physical relocation; the use of protocol-based interfaces throughout the solution allows for exchanging the underlying technical implementations while keeping the access mechanisms stable over time (Figure 1); the aDORe Archive front-ends provide a single point of access for a potentially extensive collection of content objects.

This paper will provide a detailed insight in the aDORe Archive solution, and will describe its actual deployment at the Research Library of the Los Alamos National Laboratory (LANL), where it was taken into production in September 2007. The LANL deployment hosts over 100,000,000 objects mainly consisting of licensed content from both secondary and primary publishers (e.g. APS, BIOSIS, EI, Elsevier, Thomson Scientific, etc.). The collection is expected to grow to include a wide variety of unclassified digital assets that result from the LANL's research endeavors, including its technical reports.

**References**

[1]Van De Sompel, H.,Bekaert, J.,Liu, X.,Balakireva, L.,Schwander, T.(2005)"aDORe: a modular, standards-based digital object repository".Computer Journal 48(5)  
[2]Lagoze, C.,Van de Sompel, H.(2003)'The making of the Open Archives Initiative Protocol for Metadata Harvesting'.Library Hi Tech 21(2)  
[3]Van de Sompel, H.,Beit-Arie, O.(March 2001)"Open linking in the scholarly information environment using the OpenURL framework".D-Lib Magazine 7(3)

Opening aDORe is mentioned on: [MyDocs](#)

EditPage | History | Last Edit 12/8/07 4:22:44 PM by 128.165.253.98

VeryQuickWiki Version 2.7.91 | Admin  
All contents copyright of the author. (C)2006.



OAI Object Reuse & Exchange  
Herbert Van de Sompel  
OAI6, June 17 2009, Geneva, Switzerland

 **Los Alamos**  
NATIONAL LABORATORY

