Open Archives Initiative Object Reuse &Exchange

Abstract Data model

Carl Lagoze [1]

Pete Johnston, Michael Nelson, Robert Sanderson, Herbert Van de Sompel, Simeon Warner
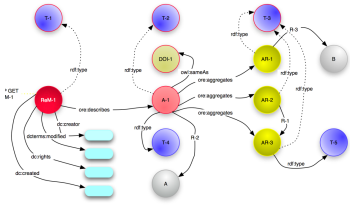
[1]Computing and Information Science

Cornell University

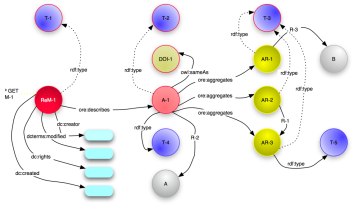lagoze@cs.cornell.edu

http://www.cs.cornell.edu/lagoze

Abstract Data Model
Why and What?

- Separation of concerns
  - Design
  - Implementation
- Provide basis for future implementations
  - Technology of the web (e.g. HTTP) will change over time
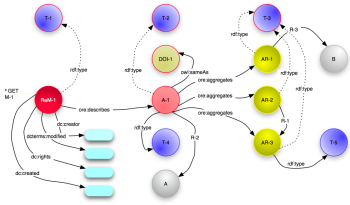 - Other implementations are possible

Requirements of the Model

- Aggregations
  - Both simple hierarchical and inter/intra related
  - Identification via URI
  - Metadata

- Resource Maps
  - Description of aggregations
  - Identification via URI – independent of aggregation
  - Metadata
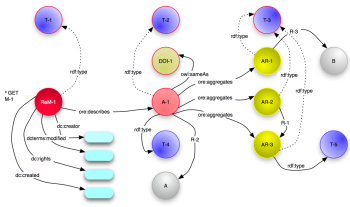
- Conformance to web architecture

W3C Web Architecture

URI

Identifies

Resource

Represents

Representation 2

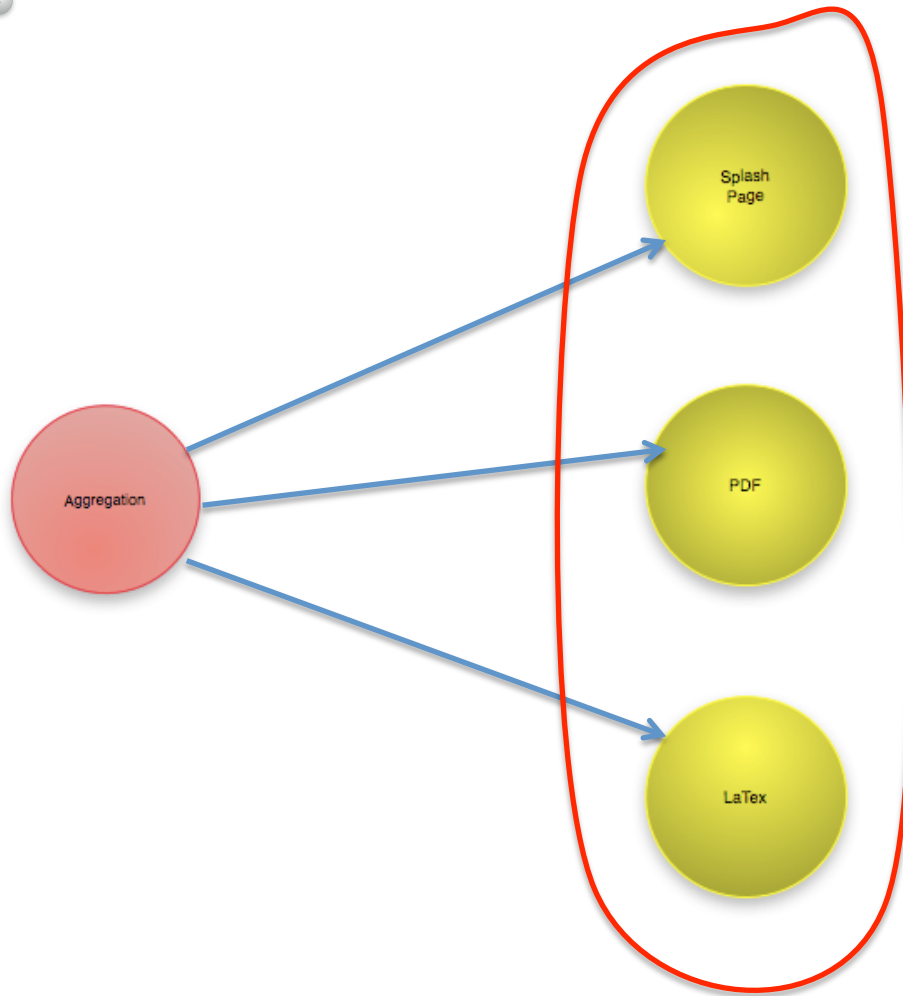Content Negotiation

Represents
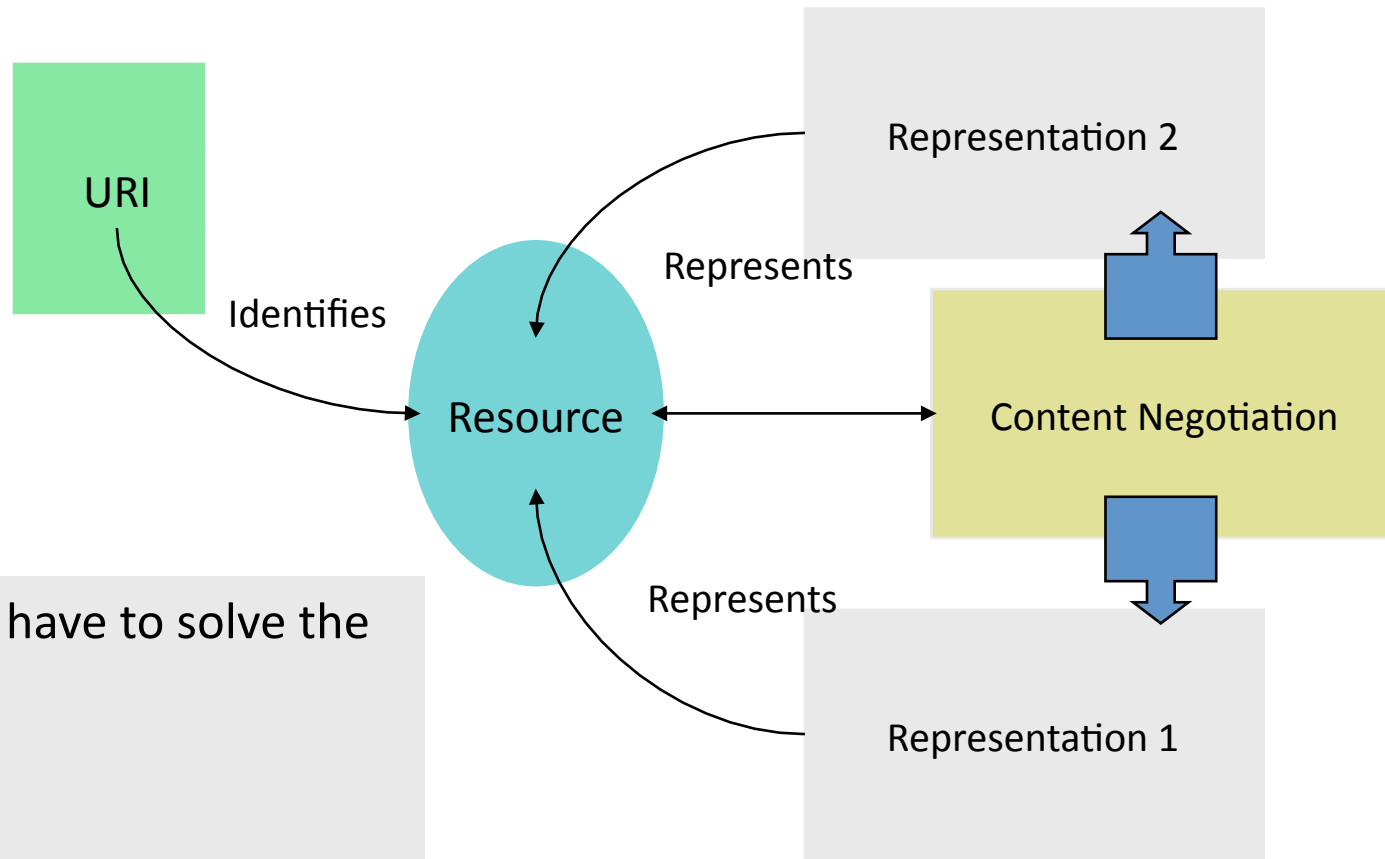
Representation 1

So, the tools we have to solve the problem are:
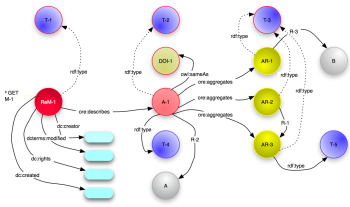- Resource
- URI
- Representation

Simple Aggregation

Describe a splash page, PDF, and Latex as an aggregation
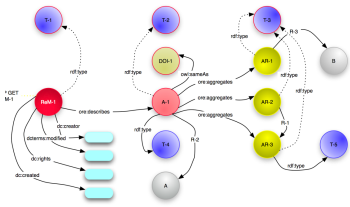
Hierarchical or *Tree* Structure

Hierarchical Models and XML
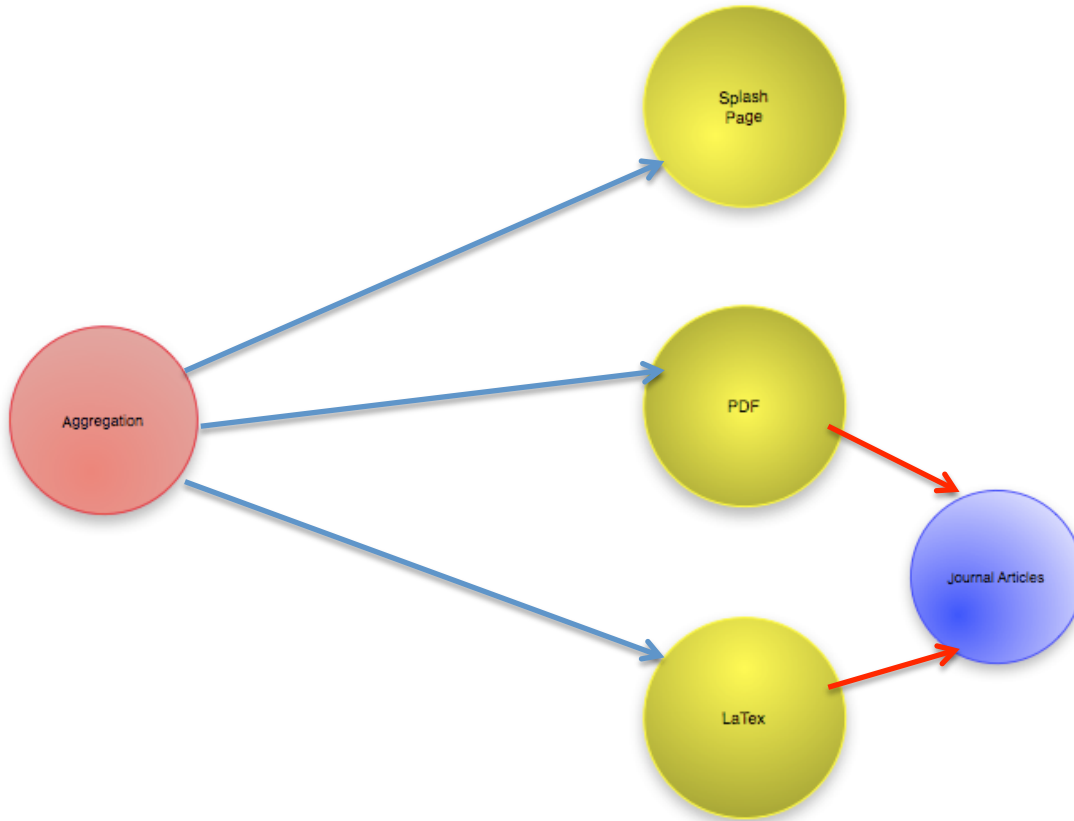


```xml
1   <?xml version="1.0" encoding="UTF-8"?>
2   <Memo xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
3   xsi:schemaLocation="http://mynames.com/mine memo.xsd"
4   xmlns="http://mynames.com/mine"
5   language="en">
6   <to>George Bush</to>
7   <from>Carl Lagoze</from>
8   <date>2005-02-21</date>
9   <keywords>Greetings</keywords>
10  <body length="8">Hi There</body>
11  </Memo>
12
```

Document - memo.xml

- Memo
  - language   en
  - xmlns   http://mynames.com/mine
  - xmlns:xsi   http://www.w3.org/2001/XMLSchema-instance
  - xsi:schemaLocation http://mynames.com/mine memo.xsd
  - to
    - George Bush
  - from
    - Carl Lagoze
  - date
    - 2005-02-21
  - keywords
    - Greetings
  - body
    - length   8
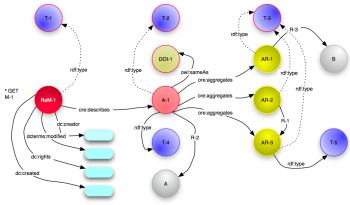   - Hi There

More Complexity
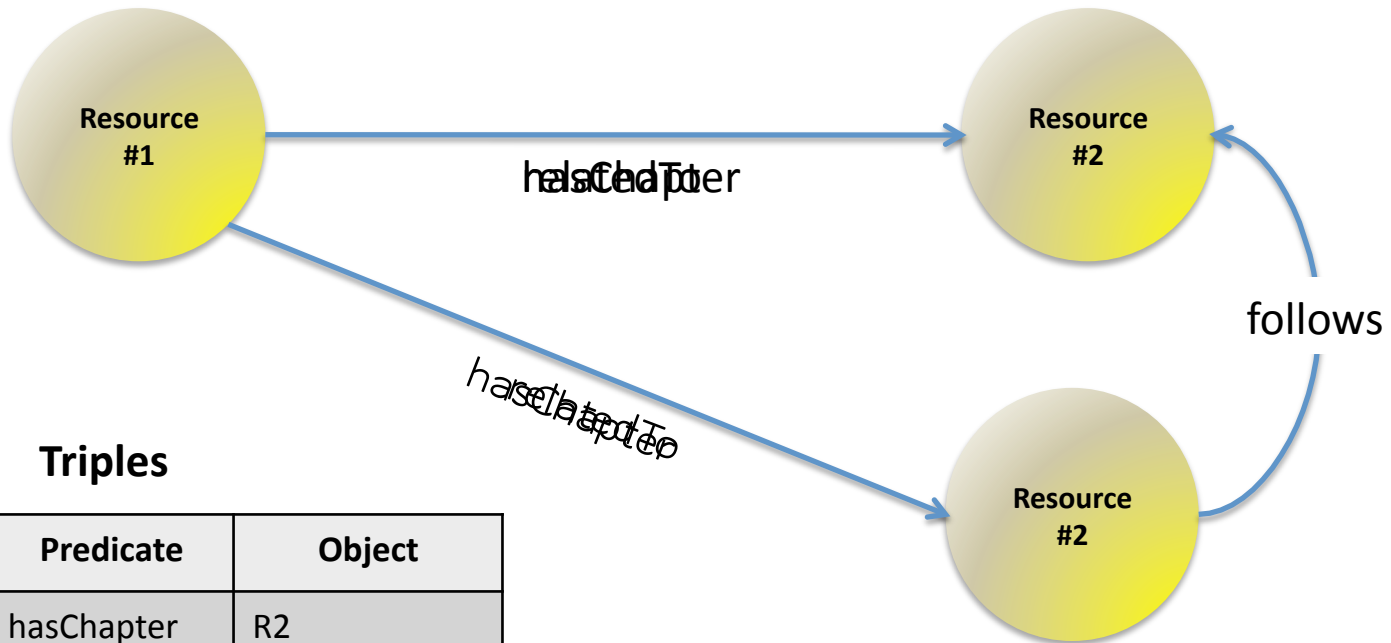

Describe a splash page, PDF, and Latex as an aggregation.

Assert that the PDF and LateX are journal articles

Graph Structure, Typed Relationships
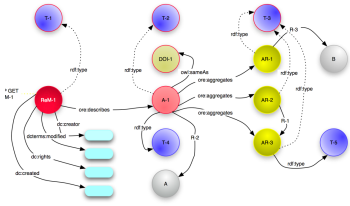
Resource Description Framework (RDF)

Resource #1 → hasChapter / isCreatedBy → **Resource #2**

hasChapter / isCreatedTo → **Resource #2**

follows

Triples

Subject	Predicate	Object
R1	hasChapter	R2
R1	hasChapter	R3
R3	follows	R2
R1	createdBy	"Carl Lagoze"

Open Archives Initiative
Object Reuse and Exchange

ORE Specification - Abstract Data Model
26 February 2008

Editors (OAI Executive)
Carl Lagoze, Cornell University Information Science
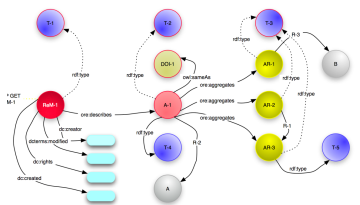Herbert Van de Sompel, Los Alamos National Laboratory
Editors (ORE Technical Committee)
Pete Johnston, Eduserv Foundation
Michael Nelson, Old Dominion University
Robert Sanderson, University of Liverpool
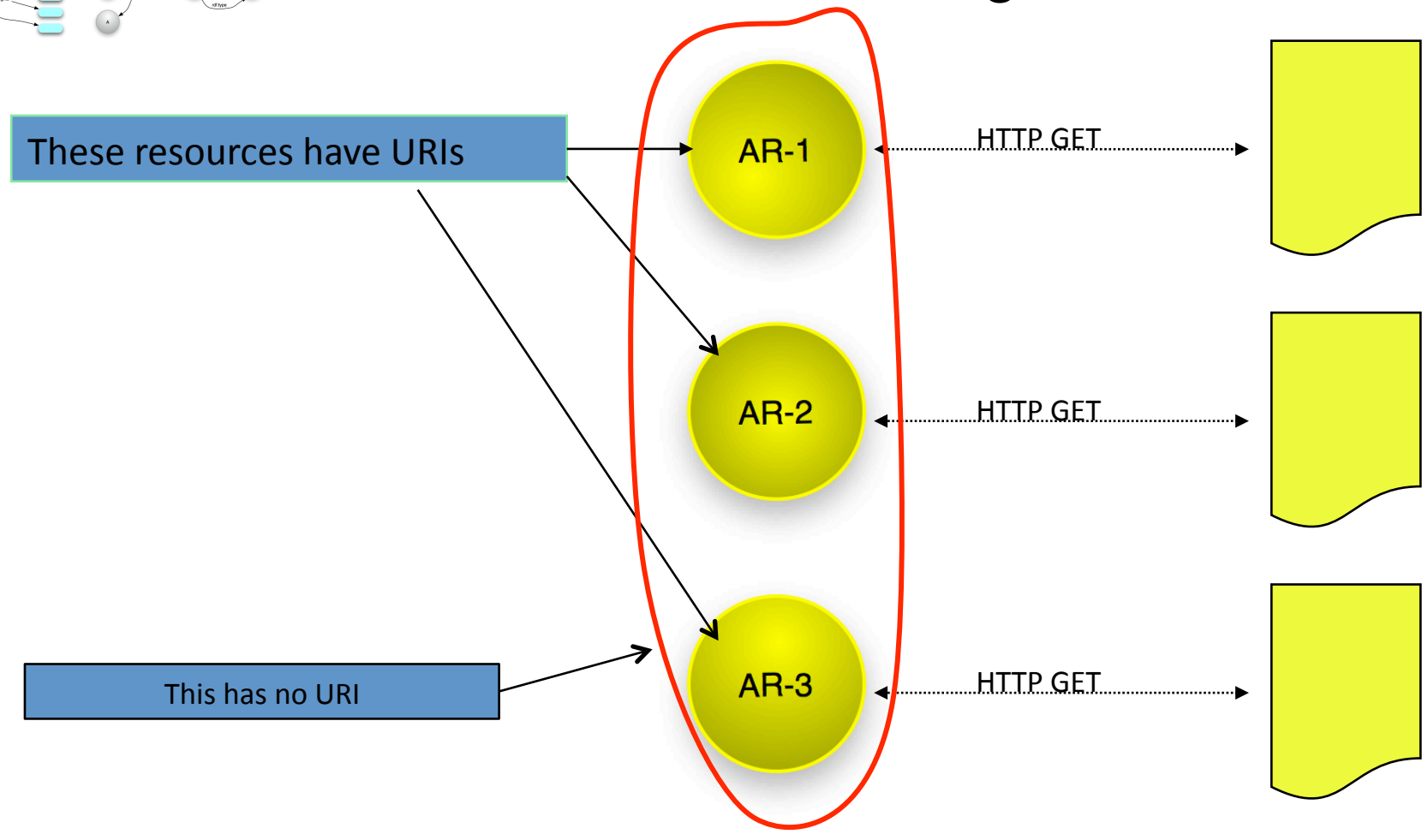Simeon Warner, Cornell University Information Science

The starting point: bringing some resources together

These resources have URIs

AR-1

HTTP GET

AR-2

HTTP GET

This has no URI

AR-3

HTTP GET

The resource have representations

Aggregation: a resource that brings together other
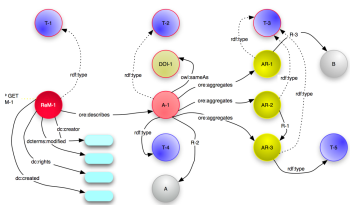
This resource is an Aggregated Resource → AR-1

A-1 — ore:aggregates → AR-1

A-1 — ore:aggregates → AR-2

A-1 — ore:aggregates → AR-3
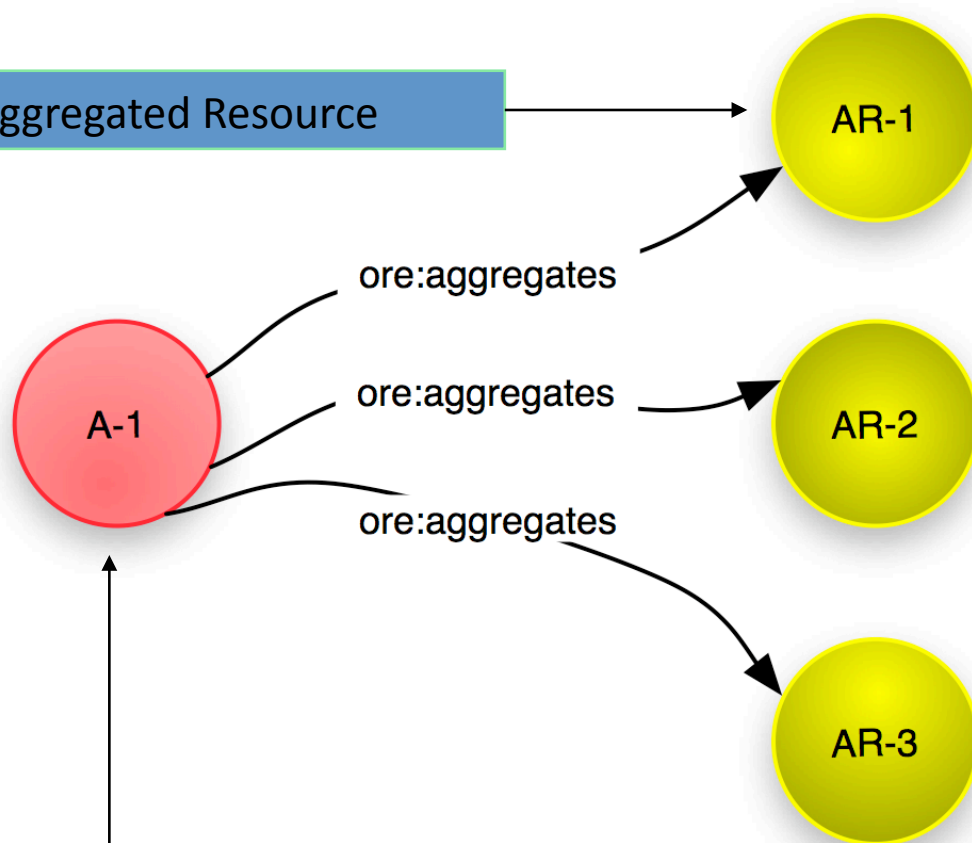
This resource is an Aggregation

Describe this Aggregation: Resource Map

Resource Map Document
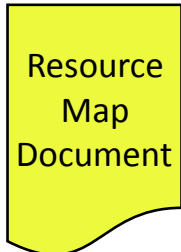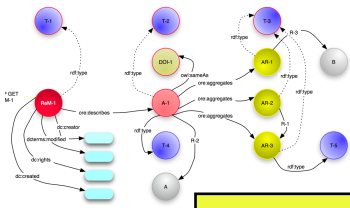
The resource has a representation

HTTP GET

ReM-1 → ore:describes → A-1
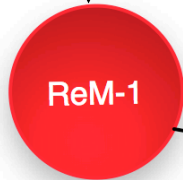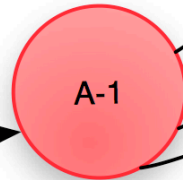
A-1 → ore:aggregates → AR-1
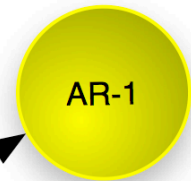
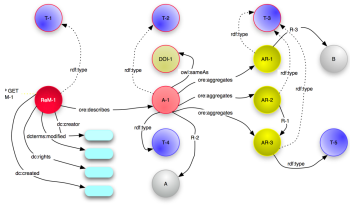A-1 → ore:aggregates → AR-2
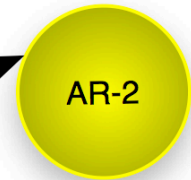
A-1 → ore:aggregates → AR-3

This resource is a Resource Map

OPEN ARCHIVES

# Relationship between Aggregation and Resource Map

- Each Aggregation exists due to its assertion and description in a single Resource Map.

- Each Resource Map instantiates (identifies) and describes a unique Aggregation

- Relationship of Aggregation URI and Resource Map URI in HTTP
  - http://example.org/rem
  - http://example.org/rem#aggregation
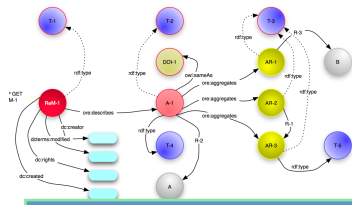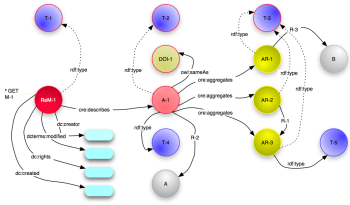
The Resource Map can describe more

The resource with URI A-1 is a journal article
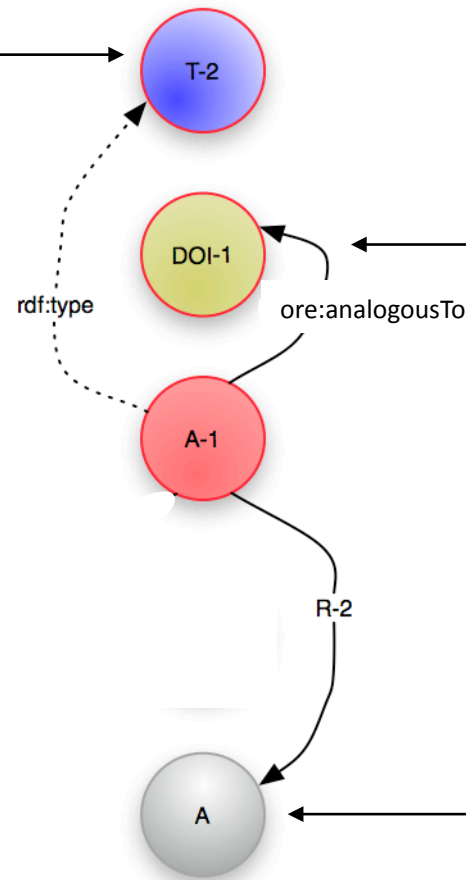
The resource A-1 is also known as DOI-1

The resource A-1 isPartOf a journal issue with the resource A
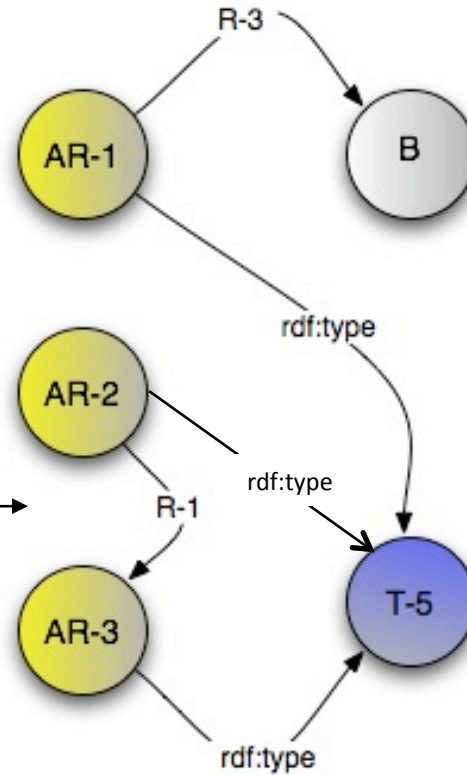
T-2

DOI-1

rdf:type

ore:analogousTo
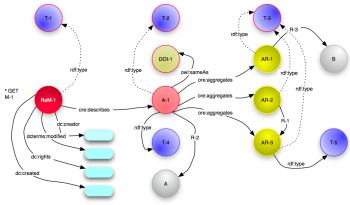
A-1

R-2

A

The Resource Map can describe more

The resource AR-1 references resource B

The resource AR-2 hasTranslation resource AR-3

The resources AR-1, AR-2, and AR-3 are chapters
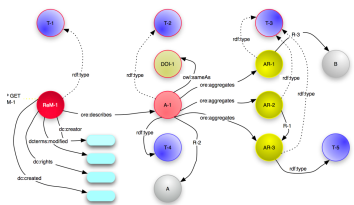
R-3

AR-1

B

rdf:type

AR-2

rdf:type

R-1

AR-3

T-5

rdf:type

The Resource Map can describe more

The resource ReM-1 is a Resource Map

rdf:type

ReM-1

dc:creator

dcterms:modified

dc:rights

dc:created

About the Resource Map:
- creator
- modification datetime
- creation datetime
- rights
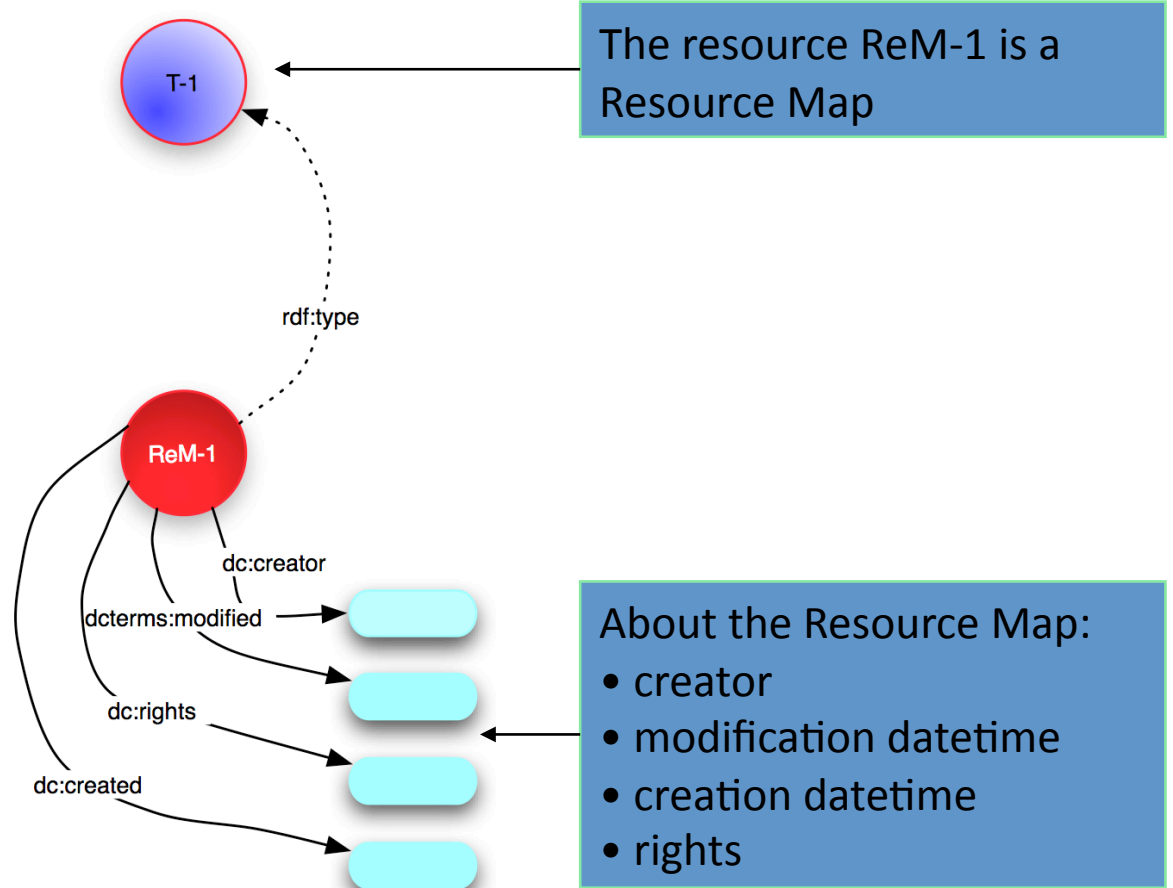
So, the Resource Map can describe a lot …
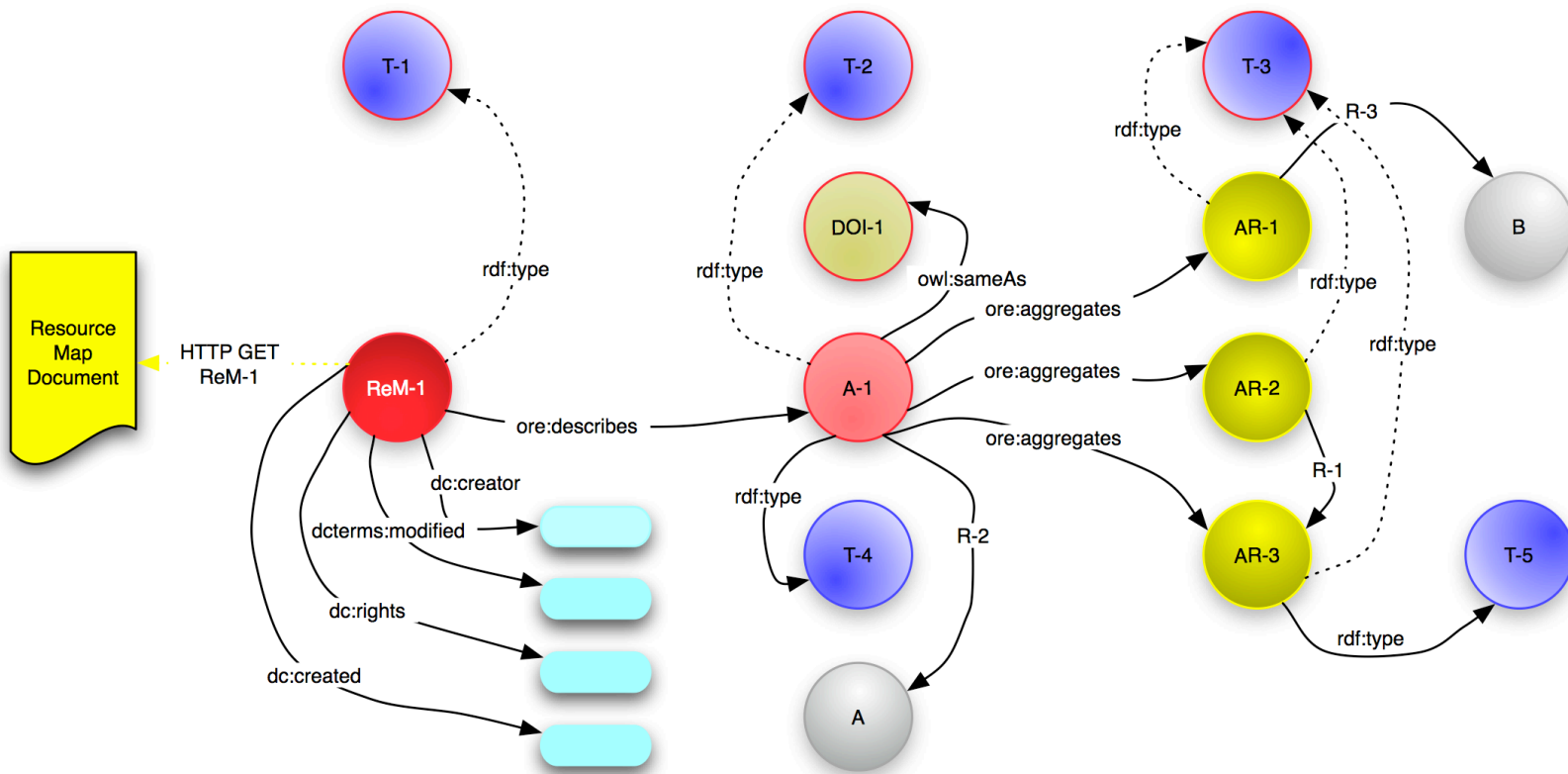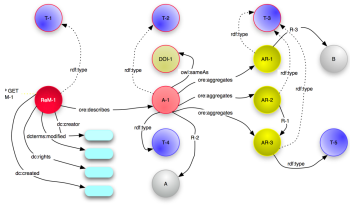
But minimally it describes this ...

Resource Map Document

HTTP GET ReM-1

ReM-1

ore:describes

dc:creator

dcterms:modified

A-1

ore:aggregates → AR-1

ore:aggregates → AR-2

ore:aggregates → AR-3
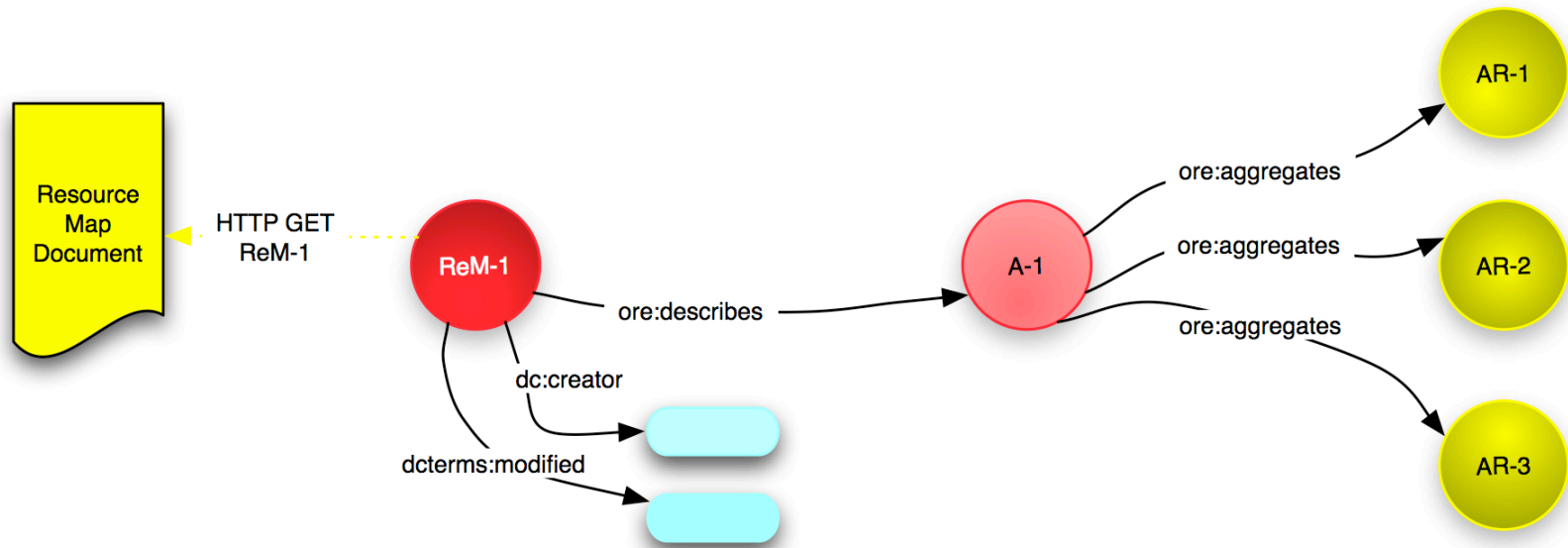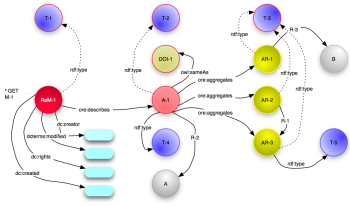
Open Archives Initiative
Object Reuse and Exchange

ORE Specification - Representing Resource Maps Using RDF Syntaxes

29 February 2008

RDF/XML


```xml
<?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/"
        xmlns:dc="http://purl.org/dc/elements/1.1/"
        xmlns:dcterms="http://purl.org/dc/terms/"
        xmlns:marcrel="http://www.loc.gov/loc.terms/relators/"
        xmlns:owl="http://www.w3.org/2002/07/owl#"
        xml:base="http://dlib.org/dlib/february06/smith/02smith/rem/">
 <rdf:Description rdf:about="">
   <ore:describes rdf:resource="#aggregation" />
   <rdf:type rdf:resource="http://www.openarchives.org/ore/terms/ResourceMap" />
   <dc:creator rdf:resource="http://example.org/agents/AgencyX" />
   <dcterms:modified rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2008-02-12</dcterms:modified>
   <dc:rights rdf:resource="http://example.org/docs/doc123/" />
   <dcterms:created rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2008-02-07</dcterms:created>
   <marcrel:OWN rdf:resource="http://example.org/agents/AgencyY" />
 </rdf:Description>
 <rdf:Description rdf:about="http://example.org/docs/doc456/">
   <dcterms:requires rdf:resource="http://dlib.org/dlib/february06/smith/02smith/rem/" />
   <dcterms:references rdf:resource="http://dlib.org/dlib/february06/smith/02smith/rem/" />
 </rdf:Description>
 <rdf:Description rdf:about="#aggregation">
   <ore:aggregates rdf:resource="http://dlib.org/dlib/february06/smith/02smith.html" />
   <ore:aggregates rdf:resource="http://dlib.org/dlib/february06/smith/pg1-13.html" />
   <ore:aggregates rdf:resource="http://dlib.org/dlib/february06/smith/pg1-13.pdf" />
   <rdf:type rdf:resource="http://www.openarchives.org/ore/terms/Aggregation" />
   <owl:sameAs rdf:resource="http://example.org/rem/12345/#aggregation" />
   <ore:analogousTo rdf:resource="info:doi/10.1045/february-2006-smith" />
   <rdf:type rdf:resource="http://purl.org/eprint/type/JournalArticle" />
 </rdf:Description>
 <rdf:Description rdf:about="http://example.org/docs/doc/789/">
   <dcterms:references rdf:resource="http://dlib.org/dlib/february06/smith/02smith/rem/#aggregation" />
 </rdf:Description>
</rdf:RDF>
```