Open Archives Initiative
Object Reuse & Exchange

Resource Map Discovery

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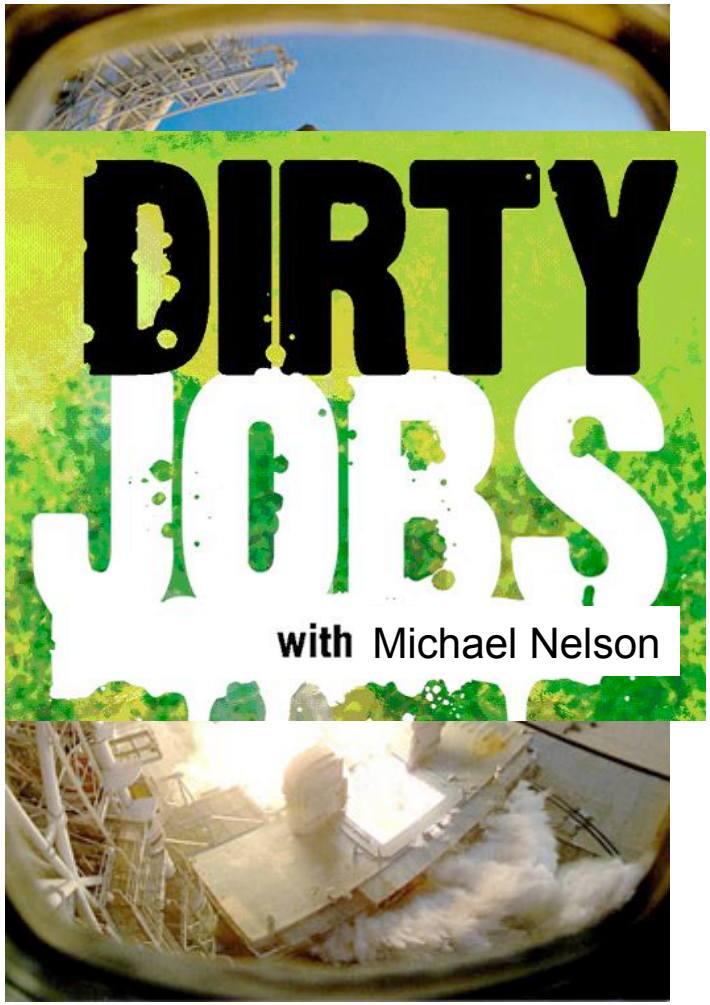
Discovery…



Resource Map Discovery Outline

- Batch
  - OAI-PMH, SiteMaps, RSS/Atom
- Embedding
  - *ReMs in HTML (open issues)*
  - ReMs in non-HTML
- How not to do it
  - ReMs are not for humans
  - *URI conflation (open issues)*

Batch Discovery

- ReMs are resources and we already know how to expose large batches of resources:
  - OAI-PMH
  - SiteMaps
  - RSS/Atom

Batch :: ReMs in OAI-PMH

http://www.foo.edu/oai?verb=ListRecords&metadataPrefix=oai_rem

```
<?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">
        http://foo.edu/oai2</request>
  <ListRecords>
   <record>
    <header>
      <identifier>oai:foo.edu:object1</identifier>
      <datestamp>2007-01-06</datestamp>
    </header>
    <metadata>
        <!-- Insert object1 ReM here -->
    </metadata>
  </record>
  . . .
 </ListRecords>
</OAI-PMH>
```

MUST NOT
equal either ReM Atom /feed/id or
/feed/link[@rel="self"]/@href

MUST be equal to ReM Atom /feed/updated

OAI-PMH GetRecord Processing

http://www.foo.edu/oai?verb=GetRecord&identifier=oai:foo.edu:object1&metadataPrefix=oai_rem

http://some.gateway.org/pmh2ore?=http://foo.edu/oai2?verb=GetRecord&metadataPefix=oai_rem&identifier=oai:foo.edu:object1

```
<?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">http://foo.edu/oai2</request>
  <GetRecord>
   <record>
    <header>
      <identifier>oai:foo.edu:object1</identifier>
      <datestamp>2007-01-06</datestamp>
    </header>
    <metadata>
        <!-- Insert Object1 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)

Batch :: ReMs in 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 /feed/link[@rel="self"]/@href for corresponding ReM, but MUST NOT equal /feed/id

MUST be equal to ReM Atom /feed/updated

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

Batch :: ReMs in RSS

http://www.foo.edu/all-rems.rss

```
<?xml version="1.0"?>
<rss version="2.0">
  <channel>
    <title>ReMs at www.foo.edu</title>
    <link>http://www.foo.edu/</link>
    <description>All of the Resource Maps for resources at www.foo.edu</description>

    <item>
      <title>ReM for Object 1</title>
      <link>http://www.foo.org/objects/object1.atom</link>
      <description>ReM for Object 1</description>
      <pubDate>Sat, 06 Jan 2007 00:00:00 GMT</pubDate>
    </item>

    <item>
      <title>ReM for Object 2</title>
      <link>http://www.foo.org/objects/object2.atom</link>
      <description>ReM for Object 2</description>
      <pubDate>Sat, 11 Aug 2007 00:00:00 GMT</pubDate>
    </item>
</channel>
</rss>
```

MUST NOT equal ReM Atom /feed/id;
MUST equal ReM Atom
/feed/link[@rel="self"]/@href

MUST equal ReM Atom /feed/updated
(after conversion from RFC-822 format to ISO 8601 format)

Batch :: ReMs in Atom

http://www.foo.edu/all-rems.atom

```
<feed xmlns="http://www.w3.org/2005/Atom">
 <title>ReMs at www.foo.edu</title>
 <link href="http://www.foo.edu/" />
 <link href="http://www.foo.edu/all-rems.atom" rel="self"/>
 <updated>2007-08-15T18:30:02Z</updated>
 <author>
   <name>John Doe</name>
   <email>johndoe@foo.edu</email>
 </author>
 <id>urn:uuid:60a76c80-d399-11d9-b91C-0003939e0af6</id>

 <entry>
   <title>ReM For Object1</title>
   <link href="http://www.foo.org/objects/object1.atom"/>
   <id>urn:uuid:1225c695-cfb8-4ebb-aaaa-80da344efa6a</id>
   <updated>2007-01-06T00:00:00Z</updated>
 </entry>

 <entry>
   <title>ReM For Object2</title>
   <link href="http://www.foo.org/objects/object2.atom"/>
   <id>urn:uuid:9a2cc699-ccba-9e8b-132e-91da394e9a5c</id>
   <updated>2007-08-11T00:00:00Z</updated>
 </entry>
</feed>
```

MUST equal ReM Atom /feed/link[@rel="self"]/@href

MUST NOT equal ReM Atom /feed/id;

MUST equal ReM Atom /feed/updated

Embedding ReMs into Resources

- Starting with a resource, how to find the associated ReM(s)?
  - HTML `<link>`
  - HTTP `<A>` & `<IMG>`
  - HTTP Response Headers
  - ReM Transparency
- 4 levels to describe resources' knowledge of their ReMs

Embedding :: Knowledge Levels

- Full knowledge
  - the ReM is linked to by all resources in the aggregation.
- Indirect knowledge
  - all but one of the resources in the aggregation link to a single, unique resource in the aggregation, which in turn links to the ReM.
  - functionally the same as full knowledge, but likely to be useful in actual deployment
- Limited knowledge
  - only a subset of the resources in the aggregation (typically just a single resource) link to the ReM, and the remainder of the resources have no links at all.
- Zero knowledge
  - none of the resources in the aggregation link to a ReM.

HTML <link> :: Full Knowledge

```
<html>
<head>
<title>Hello World.</title>
<link href="http://example.net/hw.atom"
      type="application/atom+xml" rel="resourcemap" >
</head>
<body>
<img src="hello.jpeg">
<img src="world.jpeg">
</html>
```

HTML <link> :: Indirect Knowledge

```
<html>
<head>
<title>Chapter Twelve.</title>
<link href="http://mybook.com/toc.html"
      type="text/html" rel="indirectresourcemap" >
</head>
<body>
Welcome to chapter twelve...
</body>
</html>
```

HTML `<link>` vs. `<A>` & `<IMG>`

- `link` is from “this” document to its 1 or more corresponding ReMs
- `A` & `IMG` capabilities are proposed to provide “hints” about the context of the disaggregated resources
  - problem: HTML does not support statements of the form “I got this from there”
  - example: “I got this JPEG from ReM1, the PDF from ReM2 and this quoted text section from ReM3.”

HTML Option #1: `resourcemap` attribute

```
<html>
...
Here is a helpful reference for distinguishing
<a href="http://example.org/pics/f-t.pdf"
resourcemap="http://example.org/amphibians.atom">frogs vs. toads</a>.
<p>
Here is a frog
<img src="http://weluvfrogs.org/imgs/frog12.jpeg"
resourcemap="http://frogs.org/frogs.atom">
and here is a toad <img src="http://toadsrule.org/toad.gif"
resourcemap="http://toadsrule.org/toads.atom">.
...
</html>
```

Pro: very simple, human readable
Con: invalid HTML

HTML Option #2: <A> rel attribute

```
<html>
...
Here is a helpful reference for distinquishing
<a href="http://example.org/pics/f-t.pdf"
rel="resourcemap=http://example.org/amphibians.atom">frogs vs. toads</a>.
<p>
Here is a frog
<a rel="resourcemap=http://frogs.org/frogs.atom">
<img src="http://weluvfrogs.org/imgs/frog12.jpeg">
</a> and here is a toad
<a rel="resourcemap=http://toadsrule.org/toads.atom">
<img src="http://toadsrule.org/toad.gif">
</a>.
...
</html>
```

Pro: Valid HTML

Con: Not uniform (<A> and <IMG> do not (yet) support the same elements)

HTML Option #3: elements

```
<html>
...
Here is a helpful reference for distinguishing
<span class="resourcemap=http://example.org/amphibians.atom">
<a href="http://example.org/pics/f-t.pdf" frogs vs. toads</a>.
</span>
<p>
Here is a frog
<span class="resourcemap=http://frogs.org/frogs.atom">
<img src="http://weluvfrogs.org/imgs/frog12.jpeg">
</span> and here is a toad
<span class="resourcemap=http://toadsrule.org/toads.atom">
<img src="http://toadsrule.org/toad.gif">
</span>.
...
</html>
```

Pro: Valid HTML, Uniform Approach

Con: No longer simple?

HTML Option #4: `class` attribute

```
<html>
...
Here is a helpful reference for distinguishing
<a href="http://example.org/pics/f-t.pdf"
class="resourcemap=http://example.org/amphibians.atom">frogs vs. toads</a>.
<p>
Here is a frog
<img src="http://weluvfrogs.org/imgs/frog12.jpeg"
class="resourcemap=http://frogs.org/frogs.atom">
and here is a toad <img src="http://toadsrule.org/toad.gif"
class="resourcemap=http://toadsrule.org/toads.atom">.
...
</html>
```

Pro: very simple, human readable, valid HTML

Con: stretches, but does not break, "`class`"*

* http://www.w3.org/TR/REC-html40/struct/global.html#adef-class

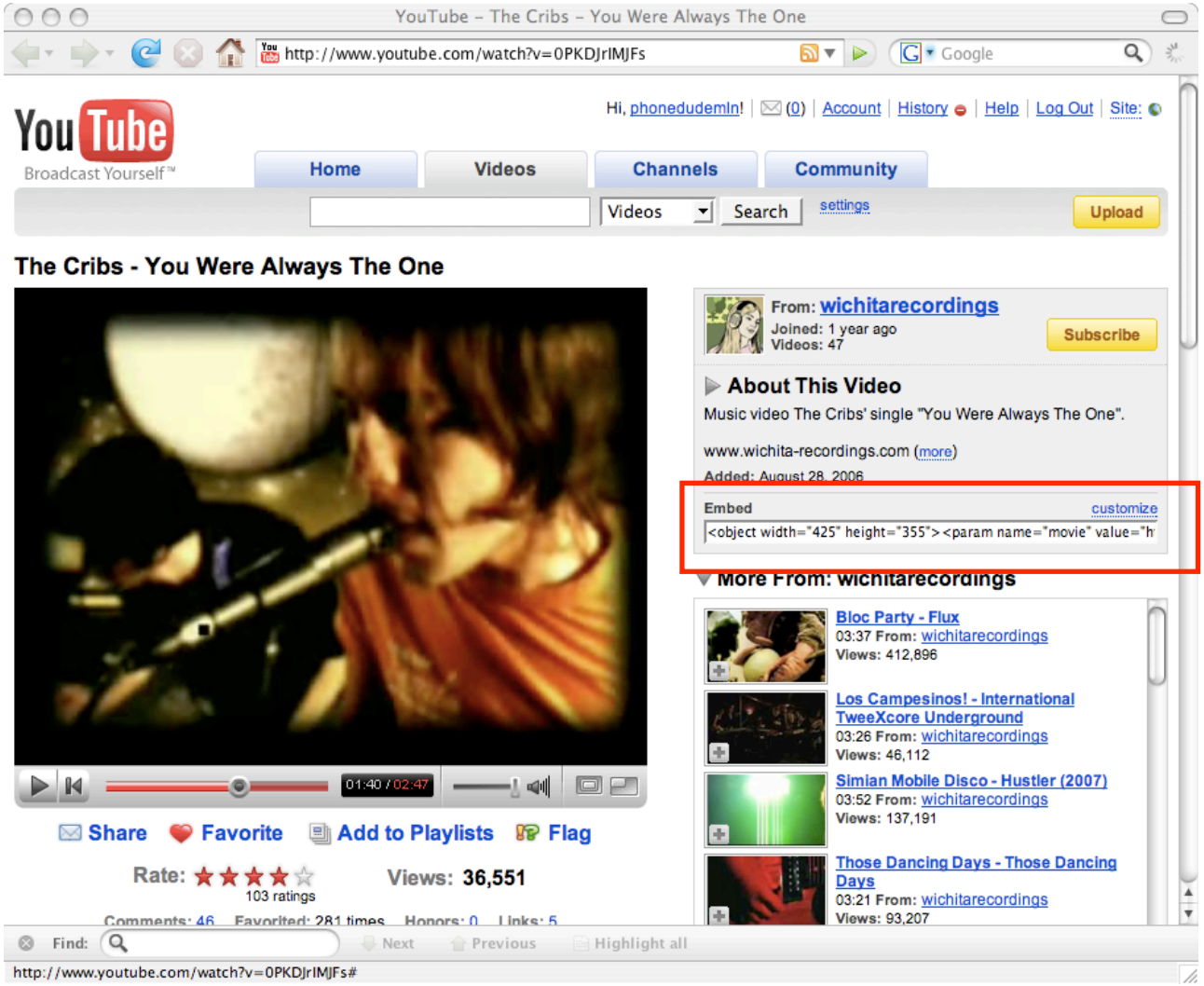
The class attribute has several roles in HTML:

* As a style sheet selector (when an author wishes to assign style information to a set of elements).
* For general purpose processing by user agents.

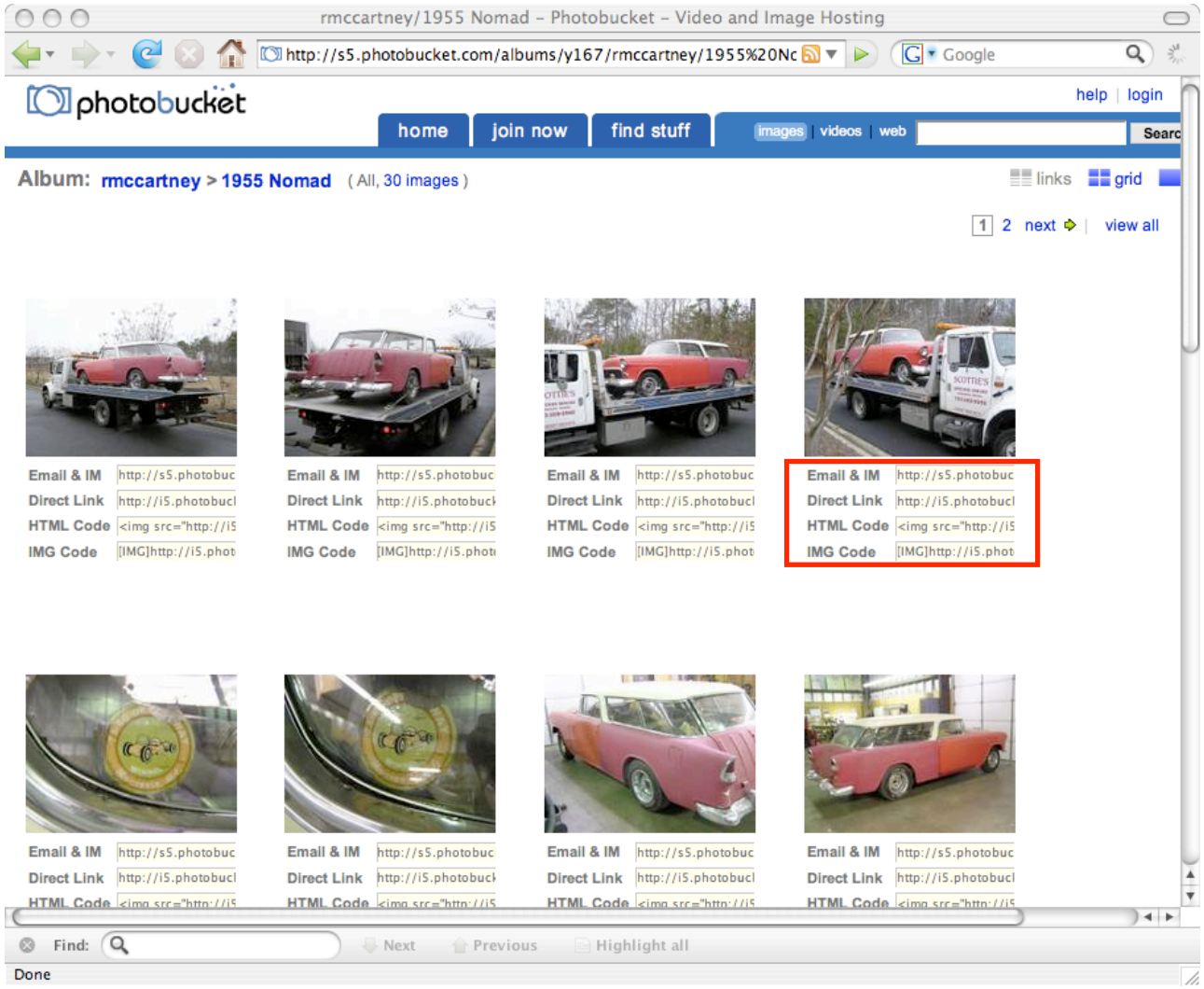
Embedding :: ReM Transparency

- There is precedent for exposing URIs, JavaScript, etc. as opaque strings to users to paste into other applications
- This is not the same as creating a hypertext link to the scripts…

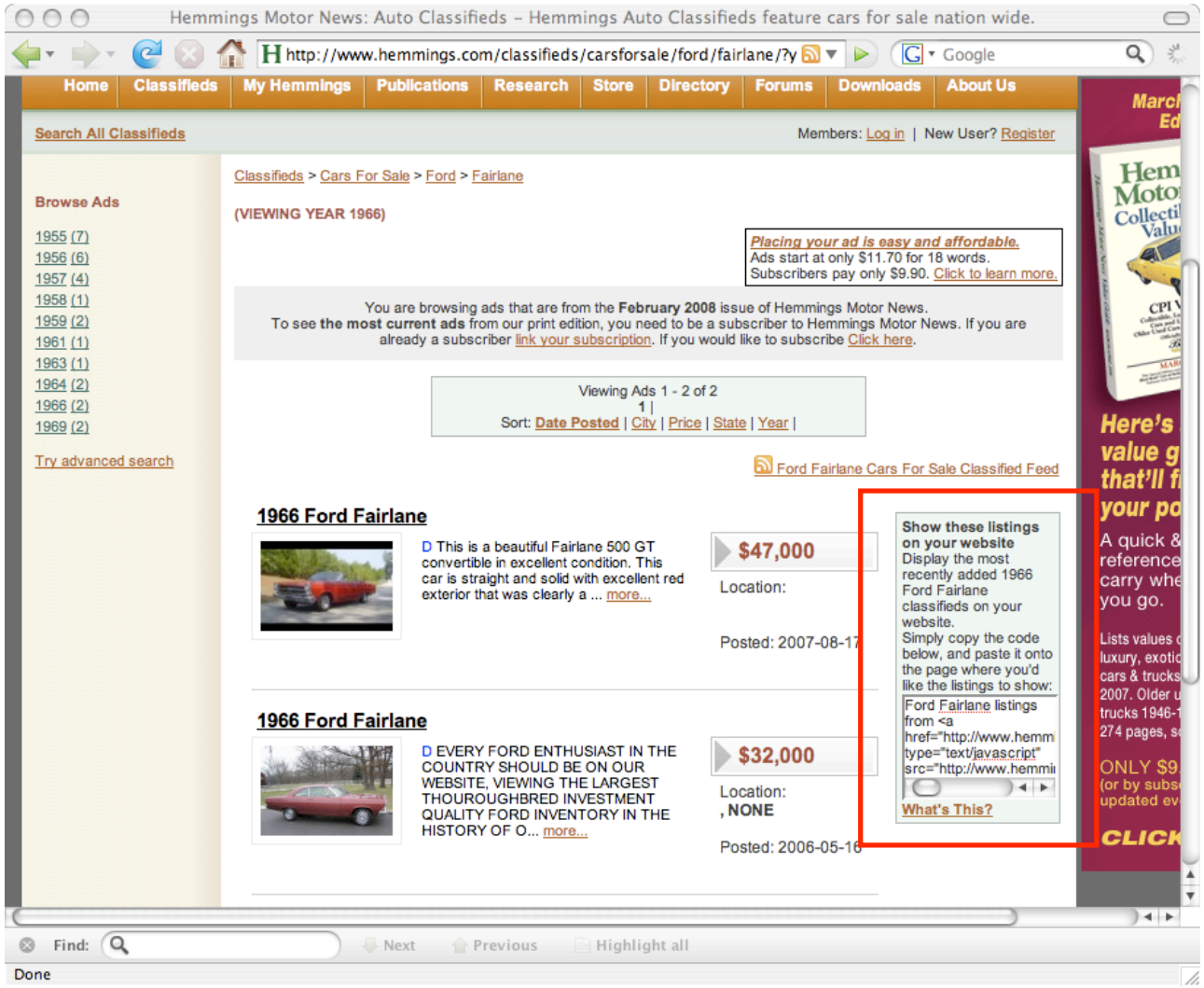
Embedding :: ReM Transparency



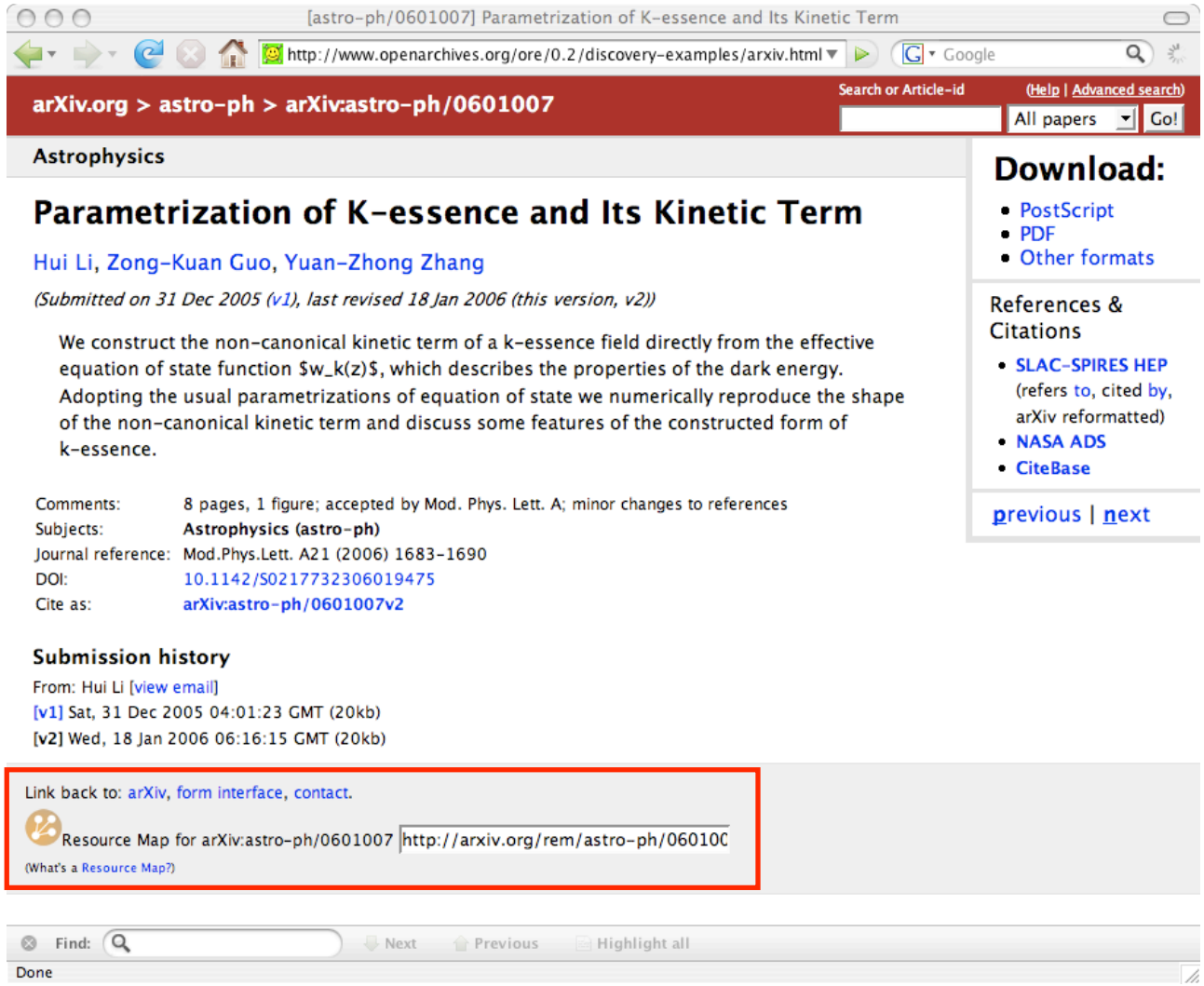
Embedding :: ReM Transparency



Embedding :: ReM Transparency



Embedding :: ReM Transparency



Embedding :: HTTP Response

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


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"; rel="resourcemap"
Content-Type: image/jpeg
Connection: close
```

Nottingham's IETF Draft establishing semantic equivalence between HTML `<link>` and HTTP `Link:`

How Not to Do It

- Proscriptive as well as prescriptive…
  - ReMs are for machines, not humans
  - avoiding URI ambiguity

Bad :: ReMs not for Humans

```
<html>

...

<h1>Welcome to my happy page of ReMs!</h1>

<a href="http://www.foo.edu/objects/object1.atom">ReM 1</a>
<a href="http://www.foo.edu/objects/object2.atom">ReM 2</a>
<a href="http://www.foo.edu/objects/object3.atom">ReM 3</a>
...


</html>
```

Danger: You can end up confusing your users.
Yes, ReMs are 1st class resources, but normal people (present company excluded, of course) do not enjoy reading raw XML.

Bad :: URI Conflation

RFC 2295 Style Content Negotiation:

(ReM)	http://www.foo.edu/objects/object1.atom
(Splash Page)	http://www.foo.edu/objects/object1.html
(Conflated URI)	http://www.foo.edu/objects/object1

HTTP 303 Redirection:

(ReM)	http://www.foo.edu/data/objects/object1
(Splash Page)	http://www.foo.edu/page/objects/object1
(Conflated URI)	http://www.foo.edu/resource/objects/object1

danger 1: `<a href="Conflated-URI">Report 12</a>`
danger 2: `Conflated-URI somePredicate someObject`
Is the HTML link or triple about the ReM or the Splash Page?
Depends on who is asking…

URI Conflation :: Open Issue

Allowed: Splash Page = ReM + XSLT
Why: URI-R is still returning only a ReM

> From Section 5.2:
> Note that these restrictions do not prevent a ReM from being used as a the basis or "ingredient" of a splash page. Servers MAY choose to include stylesheets with ReMs to make them suitable for use by human agents. Although this is an option, clients should note that there is no requirement for ReMs and splash pages to be transformable from one to another; a ReM may not have the same URIs as a splash page and vice versa.

Open Issue: ReMs in RDFa/Microformats in Splash Pages
Why Maybe Bad: URI-R is returning 2 things mixed together
Why Maybe OK: Every client gets the same 2 things from URI-R

weird but not wrong triple:

```
index.html#aggregation ore:aggregates index.html
```

don’t lose the “#aggregation”, or you get:

```
index.html ore:aggregates index.html
```

Discovery is a Dirty Job

- Frequently a trade-off between “cleanliness” and “utility”
- Multiple discovery methods, possibly more evolving over time
- Each method has caveats and multiple opportunities to get it wrong
- At least 2 open issues, perhaps more that we have yet to uncover