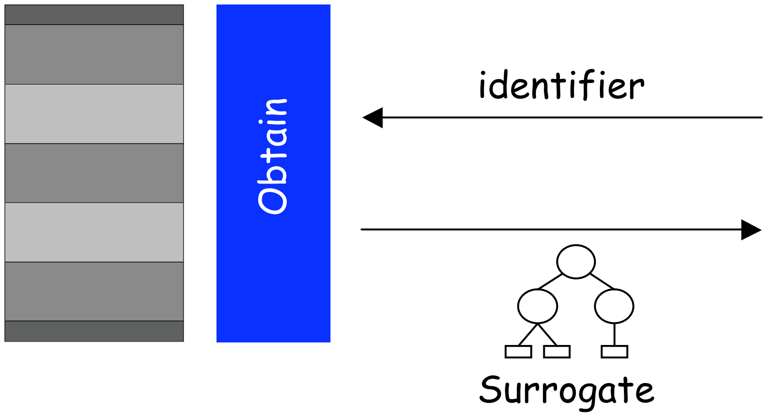
Introduction to THOUGHTS on Persistent Resolution



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- Jeroen Bekaert at Ghent University & the Los Alamos National Laboratory
- Carl Lagoze, Sandy Payette, Simeon Warner at Cornell University
- Xiaoming Liu at the Los Alamos National Laboratory

Context

- An environment consisting of Digital Object Repositories with a Long Life Expectation:
  - Scholarly repositories
    - Institutional repositories
    - Discipline-oriented repositories
    - Publisher’s repositories
    - Dataset repositories
    - …
  - Cultural heritage repositories
  - Preservation archives
  - Educational repositories

Context

- This Long Life Expectation comes with requirements regarding persistence that:
  - are different from those for the overall Web environment
  - go beyond a single generation of technical implementations

- We understand and accept this regarding digital preservation of Digital Objects
- We understand and accept this regarding persistence of identification of Digital Objects
- It also applies to resolution of identifiers of Digital Objects

=> Persistent Resolution

Persistent Resolution

- Need for an Identifier resolution system that we can carry into the future
  - Identifier resolution system needs to be able to deal with all kinds of current and future identifiers:
    - Various namespaces, actionable, non-actionable, resolvable, non-resolvable, …
  - Identifier resolution system must be deployable on the basis of current and future technologies
- Persistent resolution means ***something*** needs to come back in response to a resolution request

=> The Persistent Resolution environment proposed here is supposed to exists in parallel to resolution mechanisms for those existing identifier schemes that have built-in resolution.

THOUGHT 1 : Persistence is a matter of policy

- Persistence of identification of a Digital Object is not guaranteed by picking a specific technology; it can be achieved on the basis of several identification systems (http, purl, urn, ark, info, …)
- Persistence of identification of a Digital Object is a matter of policy of the custodian of a Digital Object ~ policy of the Repository
- Persistence of identification Of a Digital Object is kind of a hollow concept without an associated persistence of resolution of that identifier into ***something***

=> Make the Repository responsible for persistent resolution of the identifier into that ***something***

⇒ Make the Repository express the commitment to persistence of identification/resolution

⇒ **Repository centric resolution environment**

THOUGHT 2 : Identifier Resolution to ***something***

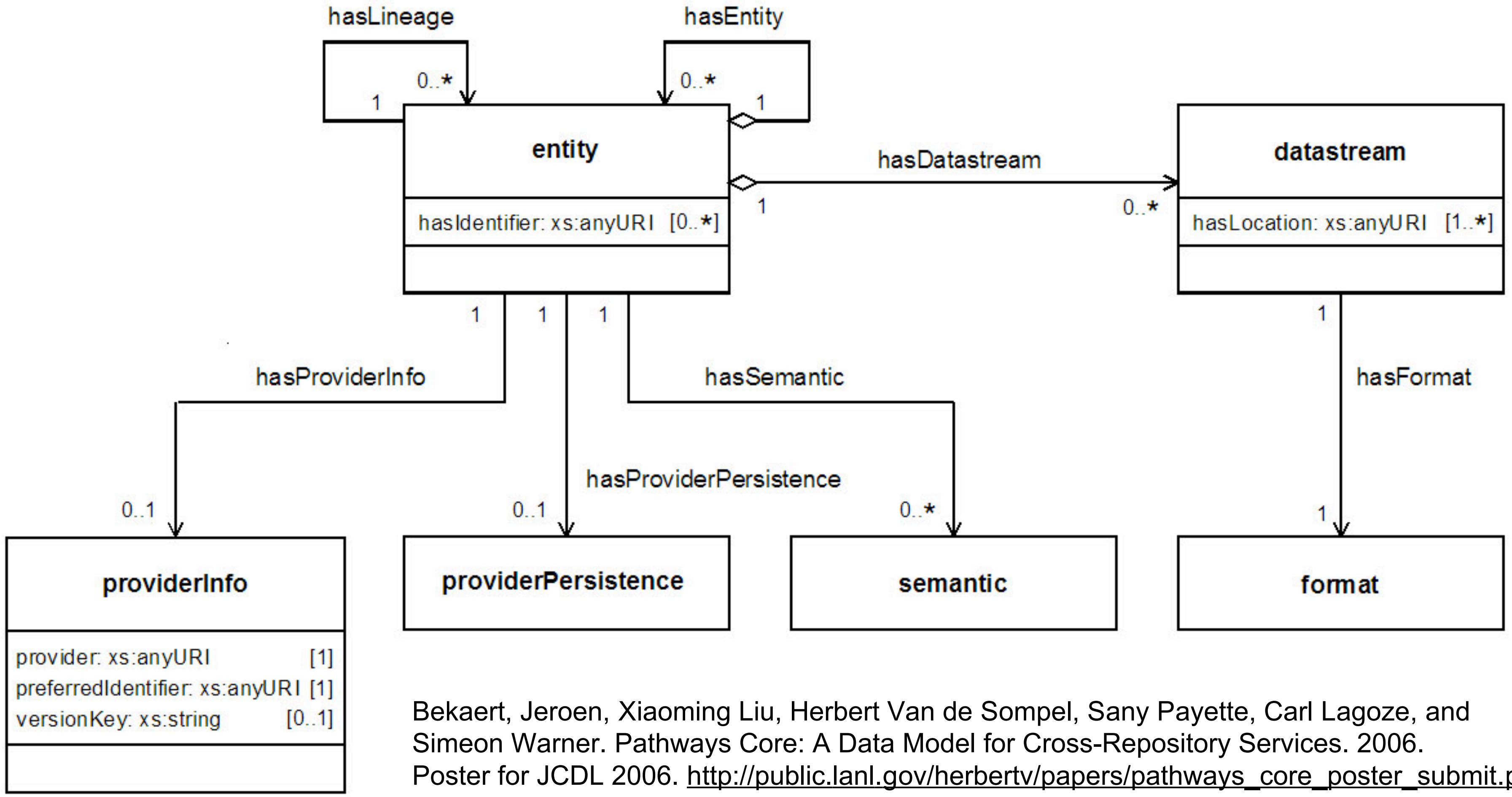
- Resolution to the identified Digital Object does not make sense
- Resolution to a *Surrogate* for the identified Digital Object
- Commitment to persistence of identification/resolution by a Repository means commitment to bringing a *Surrogate* back

THOUGHT 2 (CONTND.) : Identifier Resolution to ***something***

- *Surrogate*:
  - A representation of a Digital Object
  - Expresses properties and access points for the Digital Object
  - Uniform across the repositories: not tied to identifier-type & not tied to specific application domain
  - Would be great if it were not encumbered by IP issues
  - *Surrogate* expresses (level of) commitment to persistence
  - *Surrogate* contains the necessary information (providerInfo) to get a *Surrogate* back at a later point in time
  - the *Surrogate* that is returned at a later point in time may very well be very different

- Long-term perspective:
  - need an abstract Data Model for the representation of Digital Objects across Repositories
  - Data Model can be serialized into different *Surrogate* formats (all compliant with the Data Model) as technologies evolve

Candidate technology: Pathways Core Data Model for Surrogates



Bekaert, Jeroen, Xiaoming Liu, Herbert Van de Sompel, Sany Payette, Carl Lagoze, and Simeon Warner. Pathways Core: A Data Model for Cross-Repository Services. 2006. Poster for JCDL 2006. http://public.lanl.gov/herbertv/papers/pathways_core_poster_submit.pdf

THOUGHT 3 : Where is that resolution interface?

- Given an identifier, where can it be resolved into a *Surrogate*?
- Introduce providerInfo (part of the *Surrogate*)

identifier version location of resolution interface

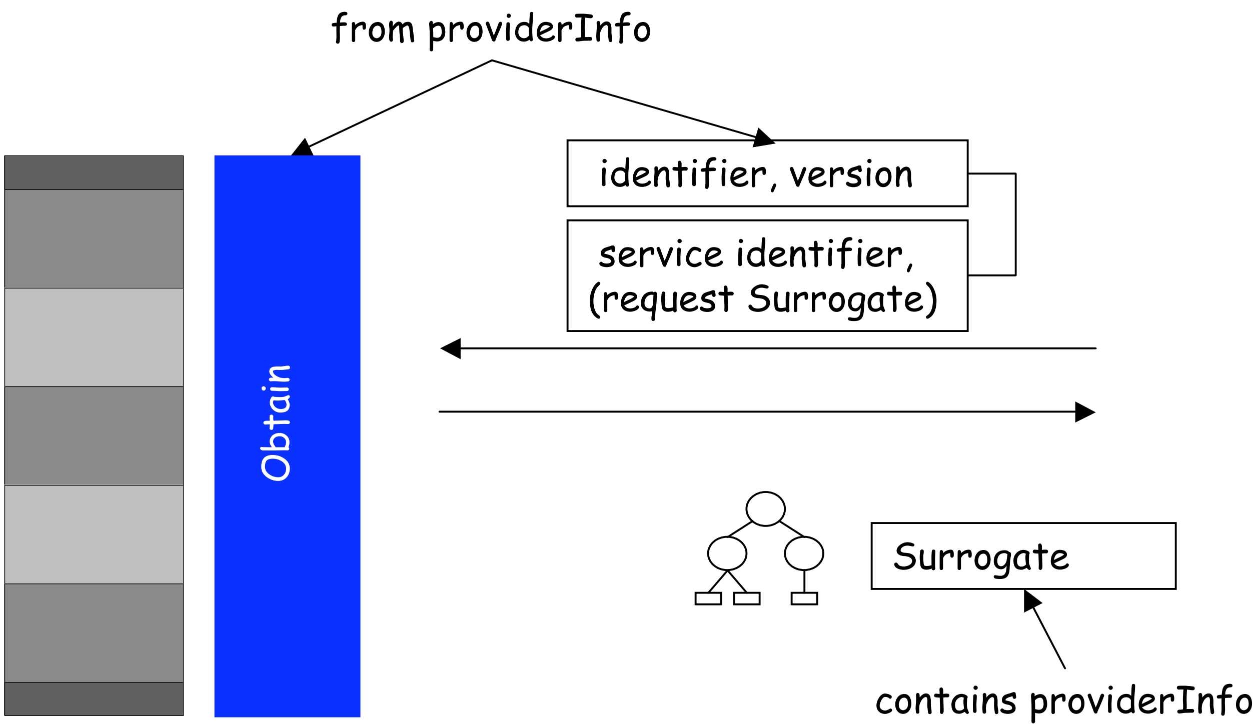
- Long-term perspective: need indirection, i.e need Registry of "identifiers of provider" listing actual locations of resolution interfaces

identifier version identifier of provider

- About providerInfo:
  - An *identifier* for Persistent Resolution purposes
  - Long term machine actionable citation
  - Variation on the theme "Digital Objects carry their own identifiers" => "Surrogates carry their own providerInfo == the way in which to obtain a(nother) *Surrogate* over time"

THOUGHT 4 : Resolution protocol

- Need abstract definition of identifier resolution protocol
    - Instantiate abstract protocol using different technologies as time goes by



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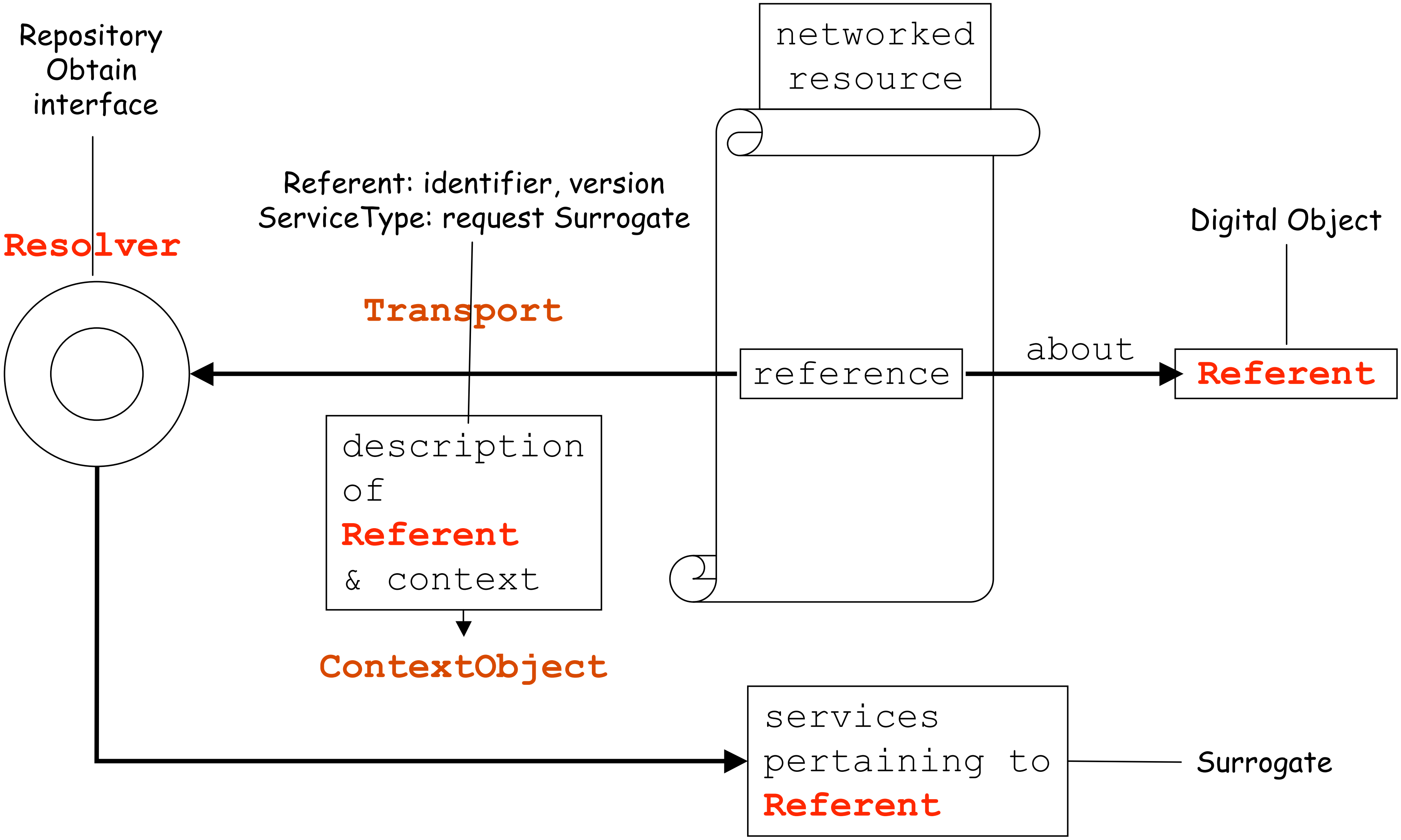
Candidate technology: OpenURL Framework Standard

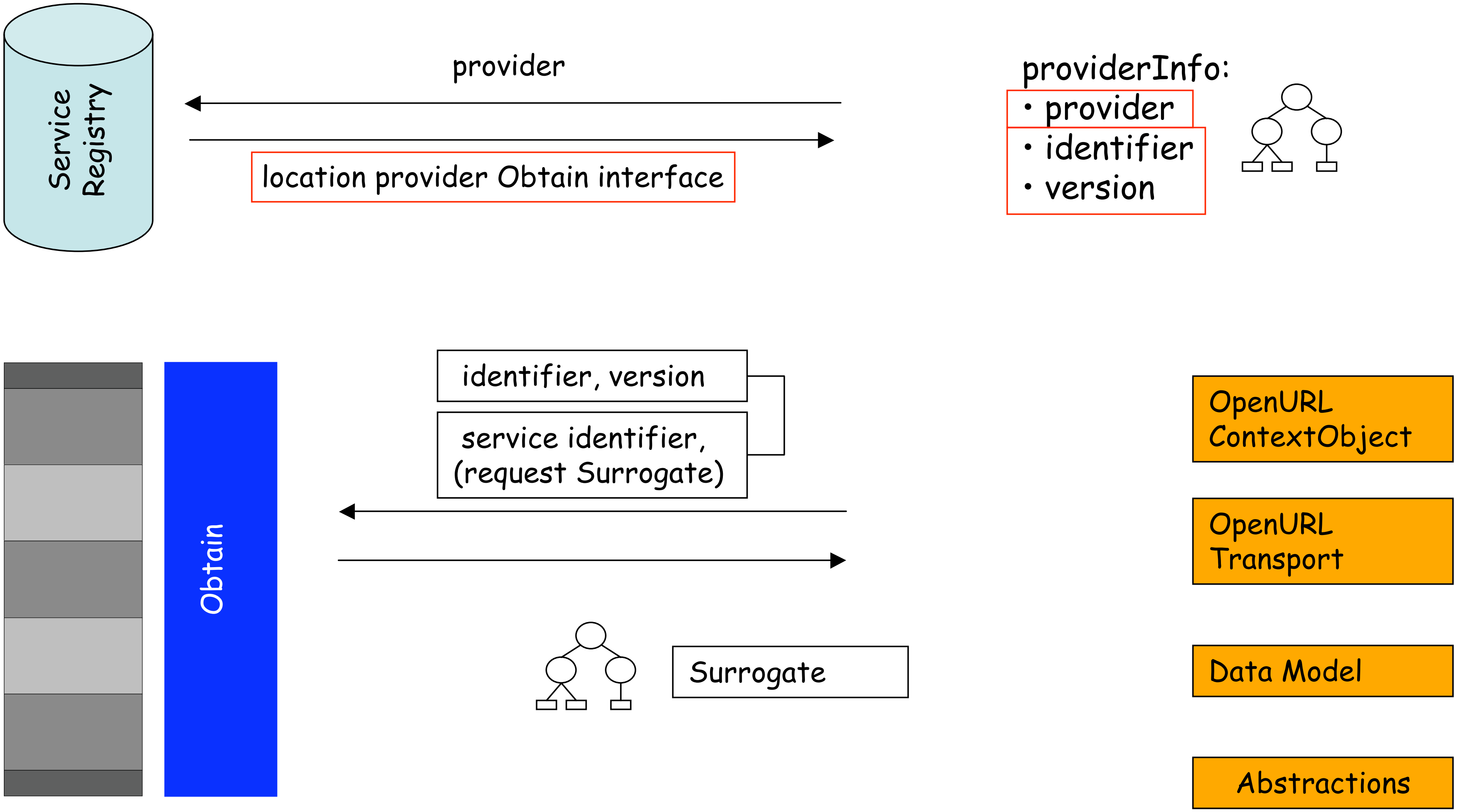
- ANSI/NISO Z39.88-2004 OpenURL Framework Standard (http://www.niso.org/standards/resources/Z39_88_2004.pdf&std_id=783):

An OpenURL Application is a networked service environment in which packages of information are transported over the network. These descriptions have a description of a referenced resource at their core, and they are transported with the intent of obtaining context-sensitive services pertaining to the referenced resource.

Candidate technology: OpenURL Framework Standard



SUMMARY : Abstract Persistent Resolution protocol



Service Registry

provider

location provider Obtain interface

providerInfo:

- provider
- identifier
- version

Obtain

identifier, version

service identifier, (request Surrogate)

Surrogate

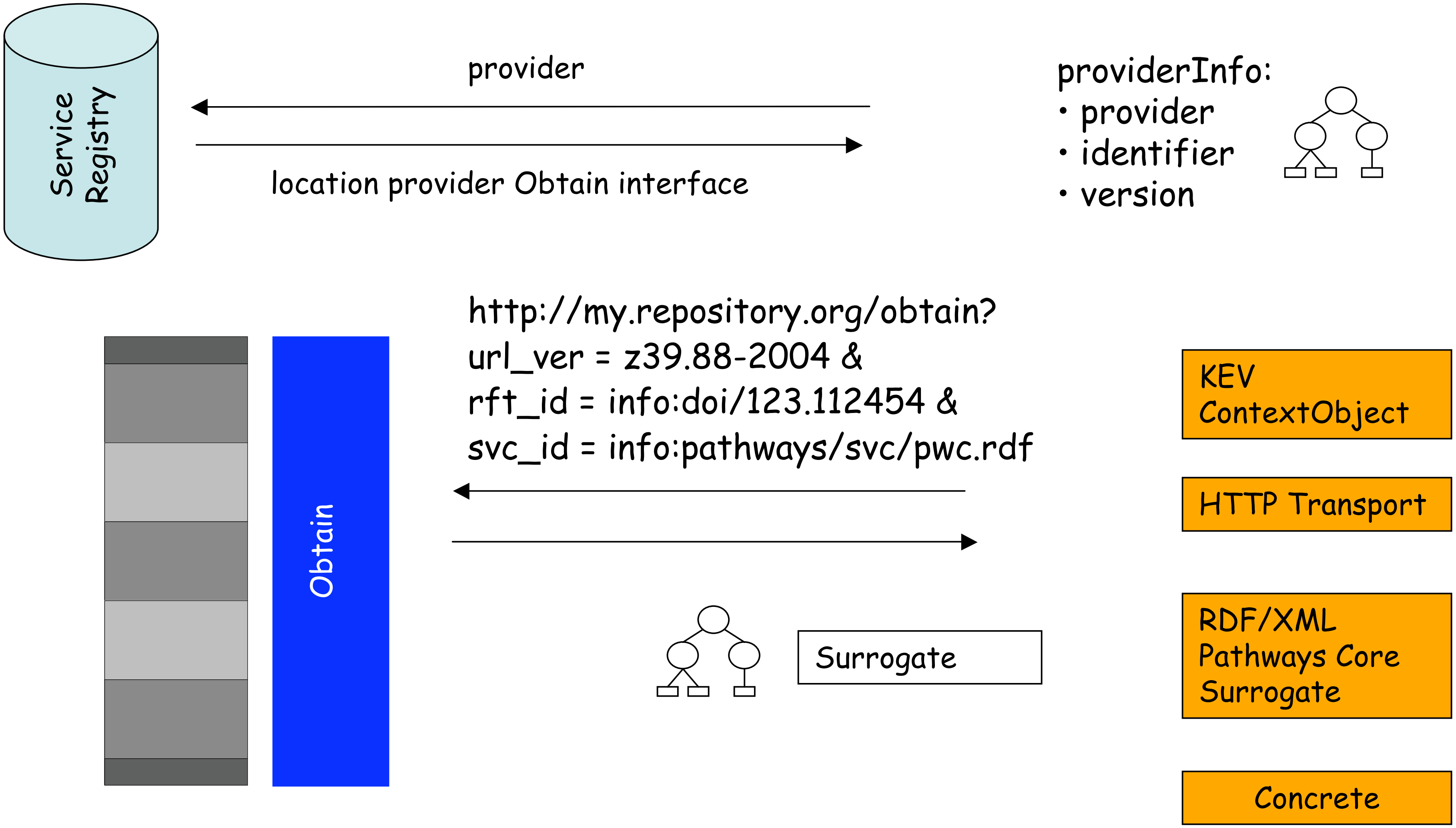
OpenURL ContextObject

OpenURL Transport

Data Model

Abstractions

SUMMARY : Concrete instantiation



Service Registry

provider

location provider Obtain interface

providerInfo:
- provider
- identifier
- version

http://my.repository.org/obtain?
url_ver = z39.88-2004 &
rft_id = info:doi/123.112454 &
svc_id = info:pathways/svc/pwc.rdf

Obtain

Surrogate

KEV ContextObject

HTTP Transport

RDF/XML Pathways Core Surrogate

Concrete

```
<rdf:RDF xmlns:core="info:pathways/core#" xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-
ns#">
  <core:entity
rdf:about="info:pathways/entity/info%3Asid%2Foverlay.org/info%3Adoi%2F10.9999%2F2006.02.001/1
.0">
    <core:hasSemantic rdf:resource="info:pathways/semantic/journal-article"/>
    <core:hasIdentifier>info:doi/10.9999/2006.02.001</core:hasIdentifier>
    <core:hasProviderPersistence rdf:resource="info:pathways/persistence/persistent"/>
    <core:hasProviderInfo>
      <core:providerInfo>
          <core:preferredIdentifier>info:doi/10.9999/2006.02.001</core:preferredIdentifier>
          <core:versionKey>1.0</core:versionKey>
          <core:provider>info:sid/overlay.org</core:provider>
      </core:providerInfo>
    </core:hasProviderInfo>

    <core:hasLineage>
      <core:entity
rdf:about="info:pathways/entity/info%3Asid%2FarXiv.org/info%3Aarxiv%2Fcs.DL%2F0502057">
        <core:hasIdentifier>info:arxiv/cs.DL/0502057</core:hasIdentifier>
          <core:hasProviderPersistence rdf:resource="info:pathways/persistence/persistent"/>
          <core:hasProviderInfo>
            <core:providerInfo>
              <core:preferredIdentifier>info:arxiv/cs.DL/0502057</core:preferredIdentifier>
              <core:provider>info:sid/arXiv.org</core:provider>
            </core:providerInfo>
          </core:hasProviderInfo>
      </core:entity>
    </core:hasLineage>

    <core:hasDatastream>
      <core:datastream>
          <core:hasFormat rdf:resource="info:lanl-repo/fmt/pdf"/>
          <core:hasLocation>http://www.overlay.org/files/2006.02.001/pdf</core:hasLocation>
      </core:datastream>
    </core:hasDatastream>
  </core:entity>
</rdf:RDF>
```

Questions, comments, flames