OAI-ORE : Object Reuse and Exchange

an introduction

(www.openarchives.org/ore/)

UKOLN staff seminar

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Order of things

- Acknowledgements
- ORE overview, background, structure
- Aims and objectives, scope
- ORE – a summary of work/thinking to date
  - compound information objects
  - publishing on the Web
  - using named graphs and resource maps
- Resource maps – requirements, serialisation, discovery
- Other issues
- Next steps for ORE

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Preamble

acknowledgements and overview

Acknowledgements

- This presentation is ***heavily*** based on documents produced by Carl Lagoze and Herbert van de Sompel. Notably:
- Report of the Technical Committee Meeting, May 2007
- Compound Information Objects white paper
- Herbert van de Sompel's presentation at JCDL 2007 (particularly for the images!)

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

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ORE overview

- ORE …
  - commenced October 2006
  - stands for 'Object Reuse and Exchange'
  - falls in the remit of the Open Archives Initiative (creators of OAI-PMH)
  - funded by the Mellon Foundation, with support from the National Science Foundation in the U.S.
  - has an international focus and lots of interest
  - is a 2 year project, not the answer to all our problems
  - ends September 2008

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Relationship to OAI-PMH

- OAI-ORE is NOT a replacement for OAI-PMH
- OAI-PMH will continue to exist as one approach to interoperability
  - OAI-PMH *metadata-centric*
- OAI-ORE will complement with richer functionality, when this is desirable
  - OAI-ORE is *resource centric*

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Relationship to Pathways

- Pathways is about 'rethinking scholarly communications'
- It proposes an 'interoperability infrastructure' comprising a shared data model, surrogate format and 3 shared services
- Pathways provides much of the 'thinking' for OAI-ORE and involves the same key players; there is much crossover between the two projects
- OAI-ORE is evolving its own models, concepts and definitions
- Current OAI-ORE work is focussing less on the idea of surrogates and lineage, keys concept in Pathways

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ORE project organisation

- Coordinators:
  - Carl Lagoze (Cornell)
  - Herbert Van de Sompel (LANL)
- ORE Advisory Committee
  - UK representatives: Liz Lyon (UKOLN) and Peter Murray-Rust (Cambridge)
- ORE Technical Committee
  - 6 out of 14 members from the UK: Pete Johnston, Rob Sanderson (Liverpool), Richard Jones (Imperial), Les Carr (Soton), Leigh Dodds (Ingenta), Tony Hammond (Nature)
- ORE Liaison Group
  - UK representatives: me (sitting in for Rachel) and Andy Powell

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What is ORE *doing*?

aims and objectives

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Single-slide version

"Facilitate Use and Re-Use of Compound Information Objects (and of their component parts)"

- OAI-ORE presentation at JCDL 2007

- Adhering to the first and second principles of
  - enriching the web graph with boundary information
  - adding meaning to the web graph through relationships and links

- Currently OAI-ORE is doing a lot of thinking … about the scope, the problem space, the requirements, the abstract model

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Aims and objectives

- Overall objective:
  - Identify, profile and develop extensible standards and protocols to allow repositories, agents, and services to interoperate in the context of use and reuse of *compound digital objects* beyond the boundaries of the holding repositories.

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Specific aims (1)

- To provide effective and consistent ways:
  - to facilitate ***discovery*** of objects,
  - to ***reference*** (link to) objects (and their parts),
  - to ***obtain*** a variety of disseminations of objects,
  - to aggregate and disaggregate objects,
  - to **harvest** and ***deposit*** (register, put) objects
  - to enable processing by automated agents

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Specific aims (2)

- To establish the basis for a digital scholarly communication system composed of:
  - systems that manage content such as institutional repositories
  - systems and applications that leverage managed content such as search engines, productivity tools, and data and text analysis services
- In other words, to establish the basis of an 'interoperability layer'

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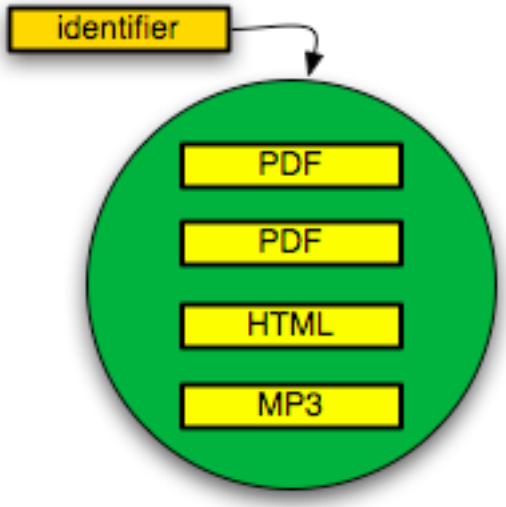
Where ORE is at

a summary of current work and thinking

Compound Information Objects



- Identified, bounded aggregations of distinct information units that when combined form a logical whole
- Examples vary according to:
  - Semantic type: book, article, software, dataset, simulation, …
  - Media type: text, image, audio, video, mixed
  - Media format: PDF, HTML, JPEG, MP3, …
  - Network location
  - Relationships: internal, external

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Some examples

- Scholarly:
  - Scholarly publication with an article and supporting information including dataset, video, etc.
  - Digitized book with multiple chapters, each chapter containing multiple scanned pages.
  - Archaeological assemblies of images, maps, charts, and find lists.
  - An ARTstor image object that is the aggregation of various renderings of the same source image.

- Not-so scholarly
  - Flickr ‘sets’, comments/annotations etc.

- OAI-ORE presentation at JCDL 2007

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Doing it on the Web

- information systems already share compound object components using the web architecture
- but the notion of *boundary* and *typed relationships* is lost
- enriching the web with this kind of additional information is a fundamental principle for OAI-ORE

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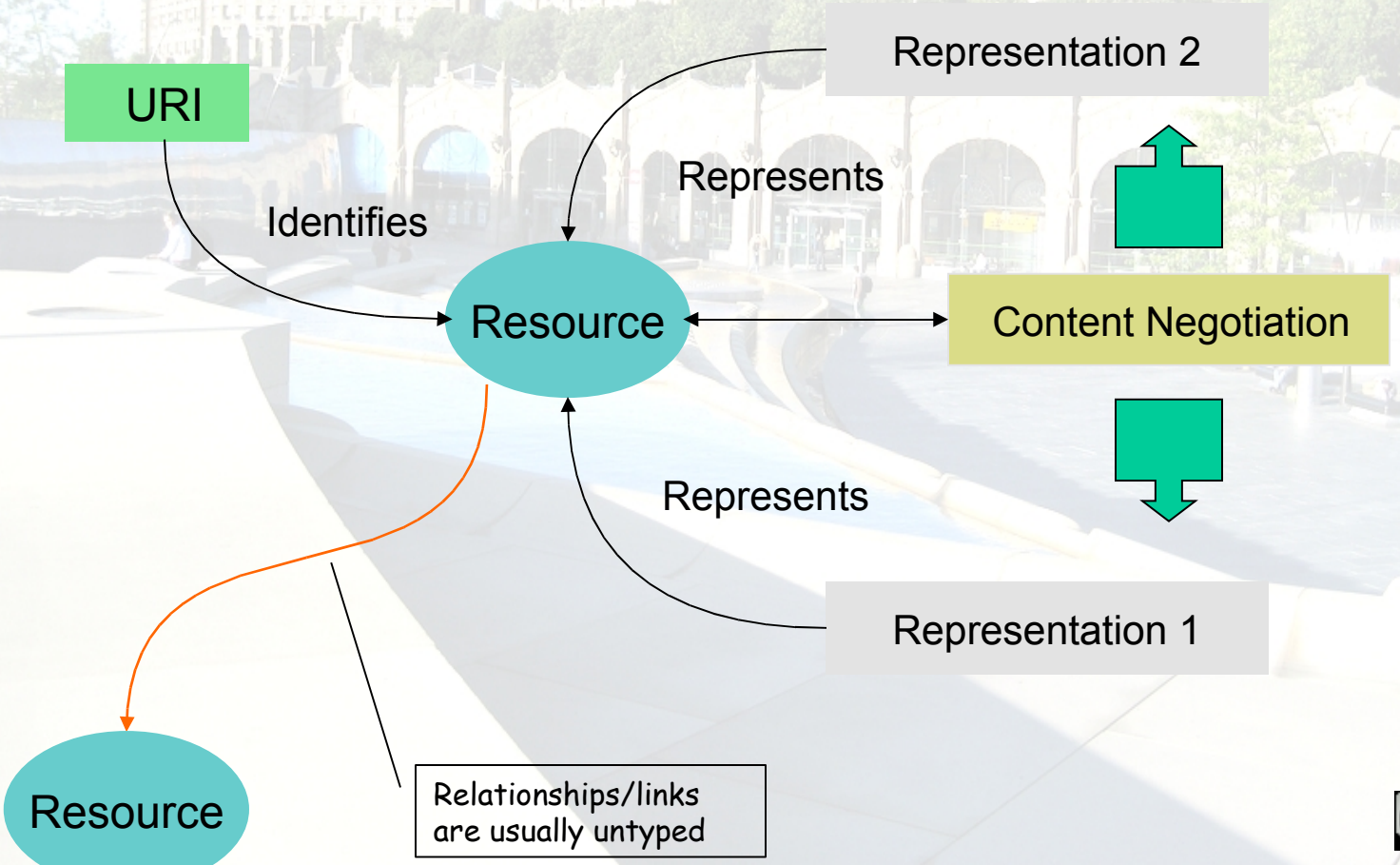
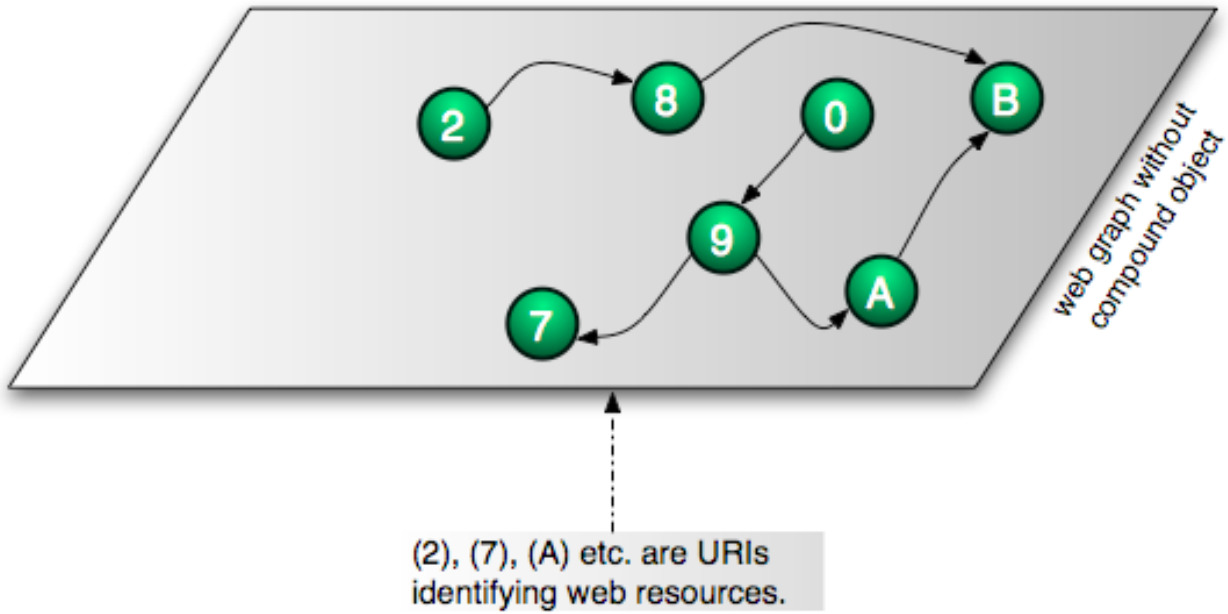
Web architecture

- OAI-ORE is agreed that it must leverage the Web Architecture, through:
  - *(HTTP) URIs* that identify
  - *resources*, which are "items of interest", that,
  - when accessed through *standard protocols* such as HTTP, return
  - *representations* of current resource state
  - and which are linked via *URI references*
  - content negotiation allows multiple representations to be served up from the same HTTP URI

Web architecture in pictures

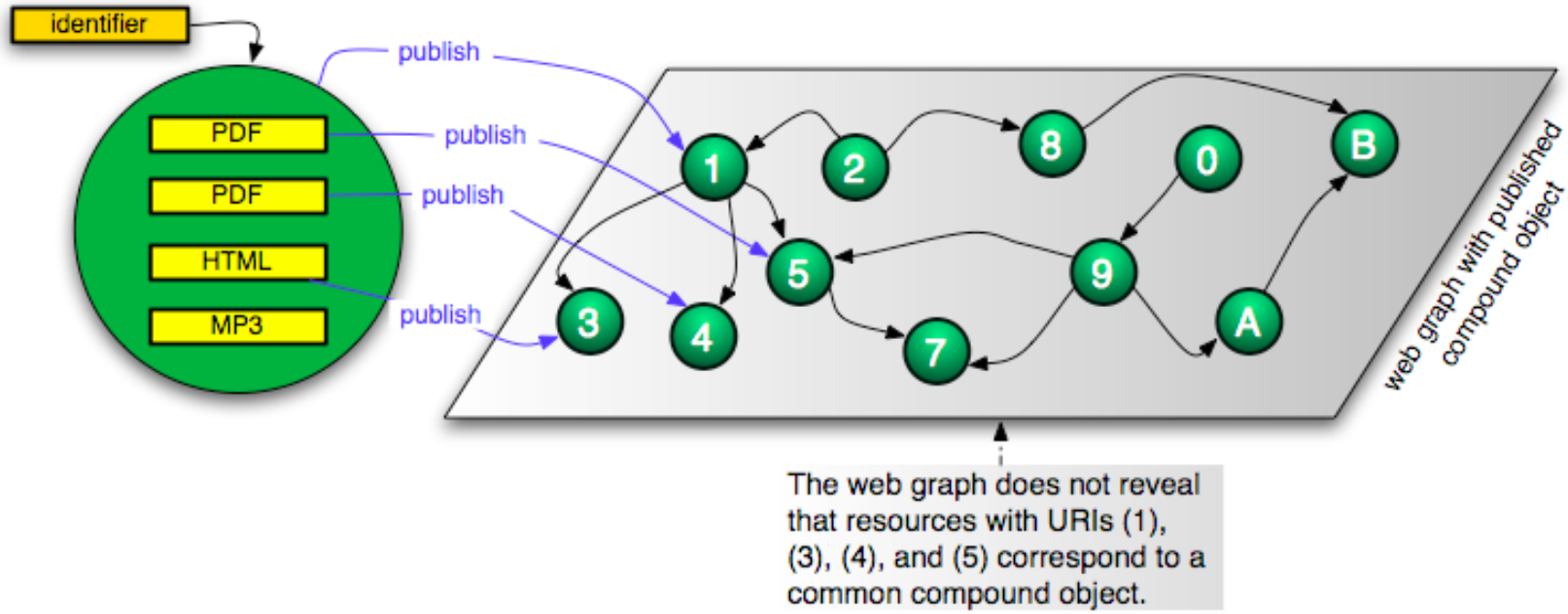


Publishing compound objects to the Web (1)



- Web graph without any explicit compound objects
- each information object identified with a URI
- and there are links between them

Publishing compound objects to the Web (2)



- Compound object and its parts are published to the Web with URIs
- Links indicate relationships but cannot show boundaries and true structure in a machine context

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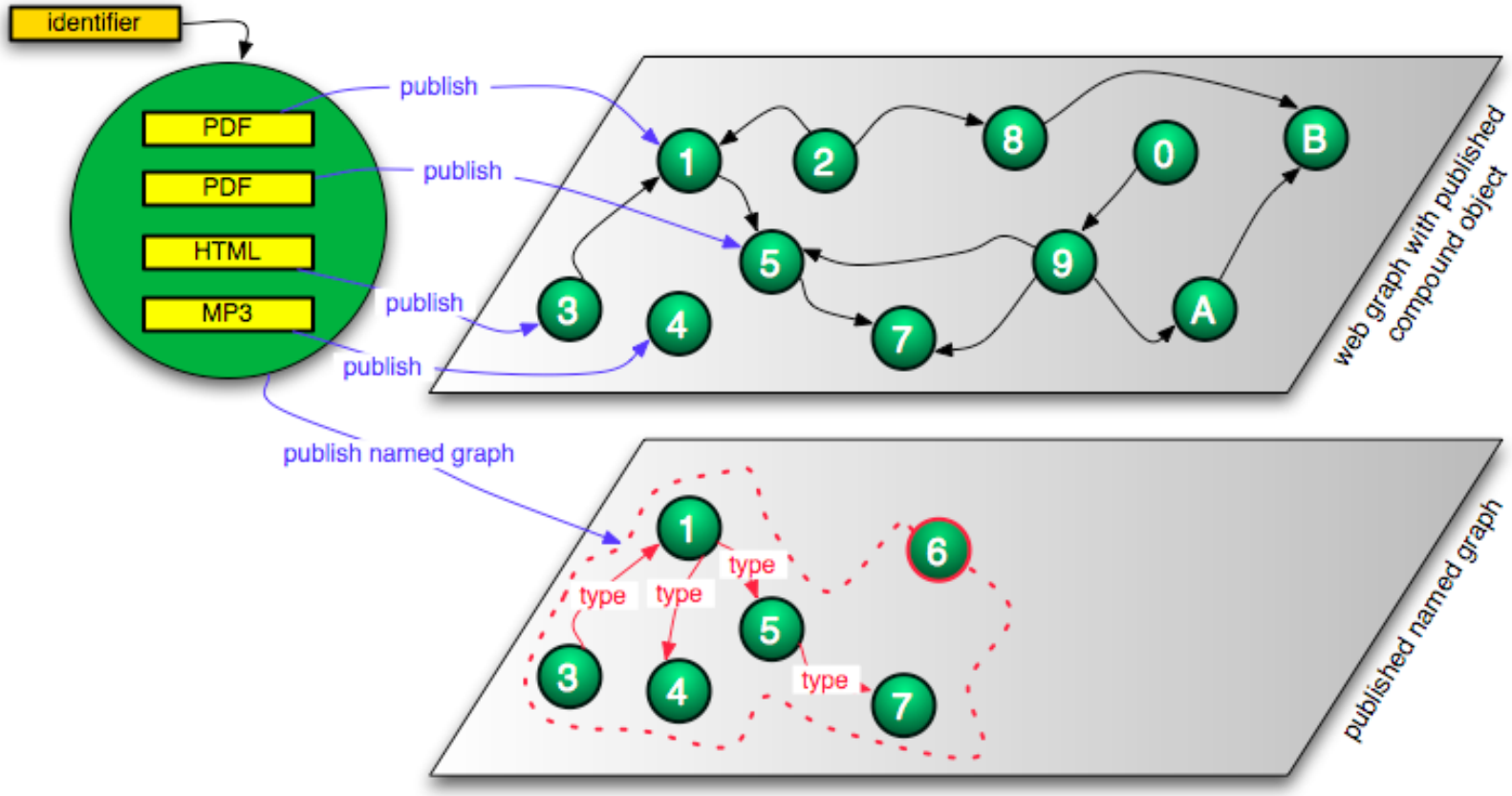
Publishing compound objects to the Web (3)



- This time … added layer is publishing the compound object and its parts with relationships and boundary as a 'named graph'

The named graphs approach

- A named graph describes the compound object
- it consists of nodes and arcs where nodes are resources and arcs are typed relationships
- it is a web resource and can be referenced by any resource on the web
- it is not the compound object itself
- it is identified by a HTTP URI
- which points to the Resource Map (ReM) - an encoded description (serialization) of the named graph

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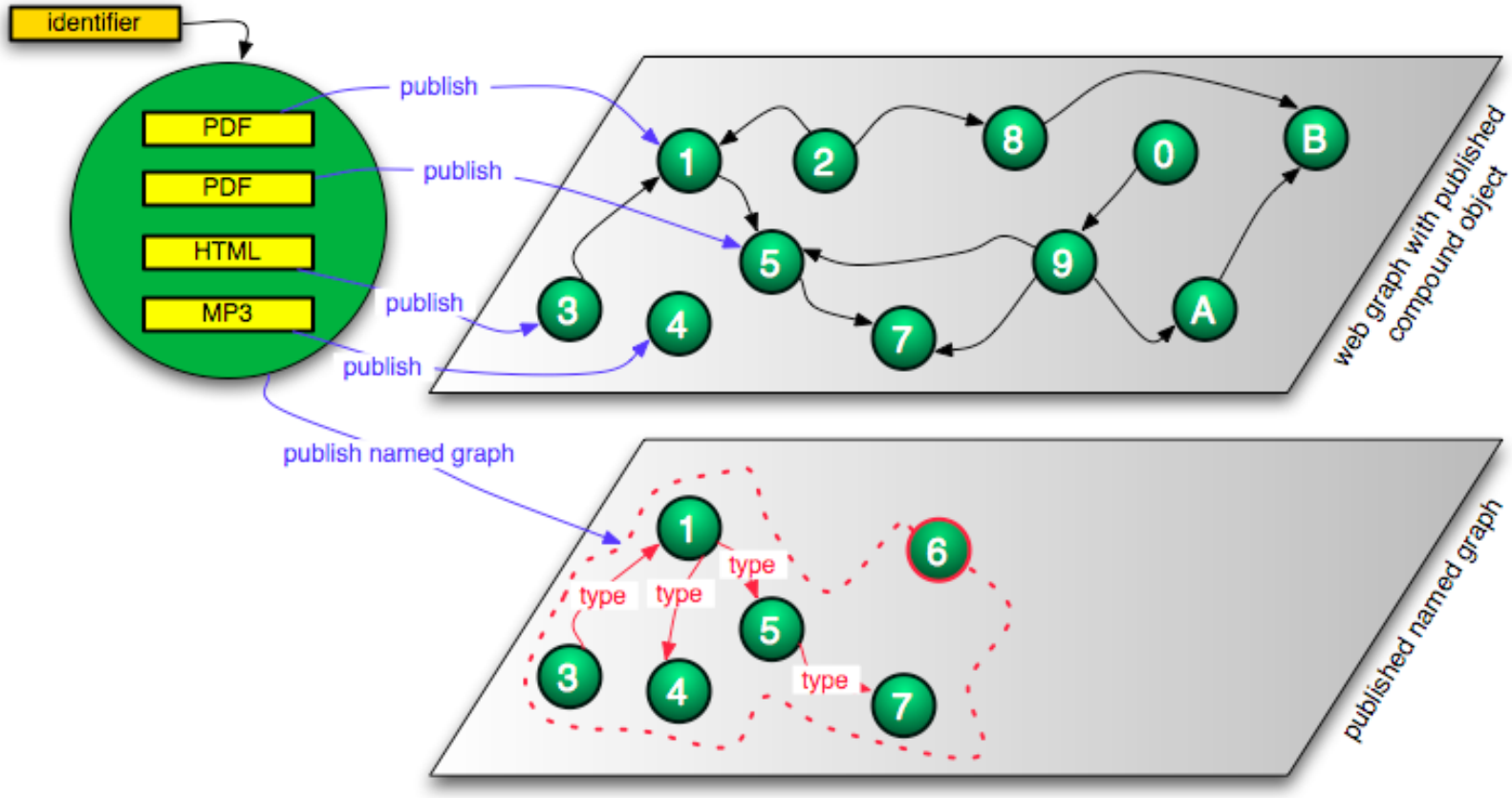
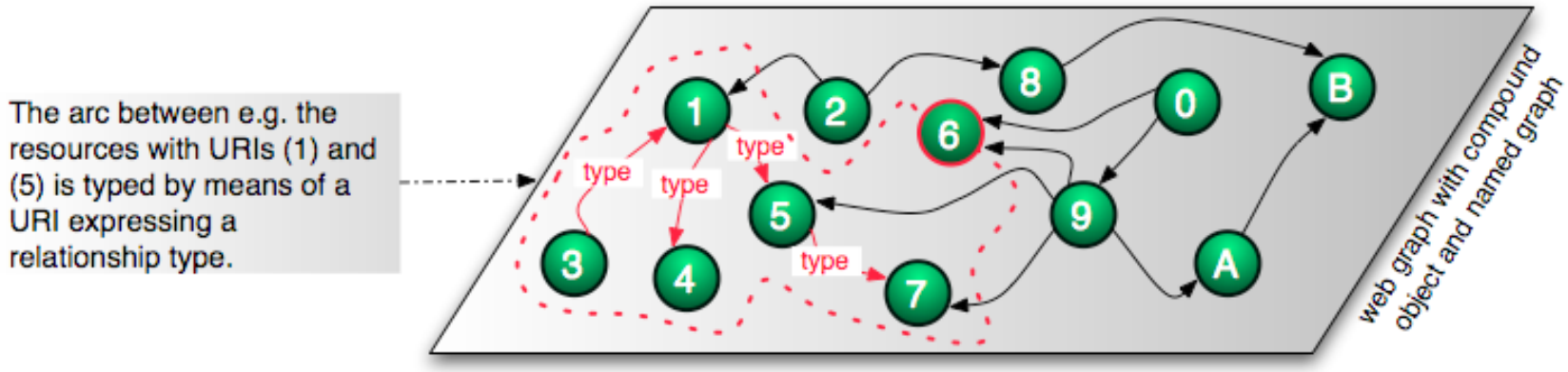
Named graph publishing (with added déjà vu)



- Named graph is published at a HTTP URI
- Resource Map is available from that HTTP URI

Named graph publishing on the Web



- Notice the compound object node (6)
- Typed relationships, e.g. between (1) and (5)
- Untyped relationships to other stuff on the Web

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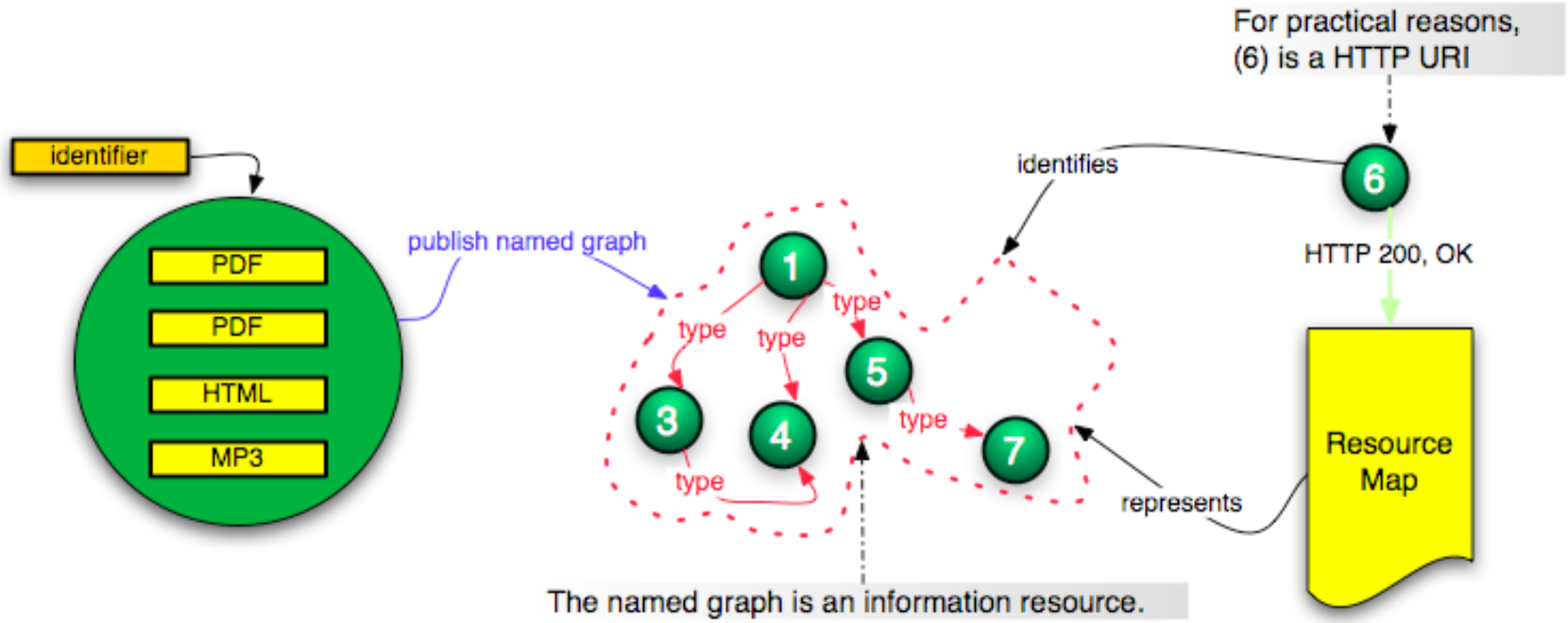
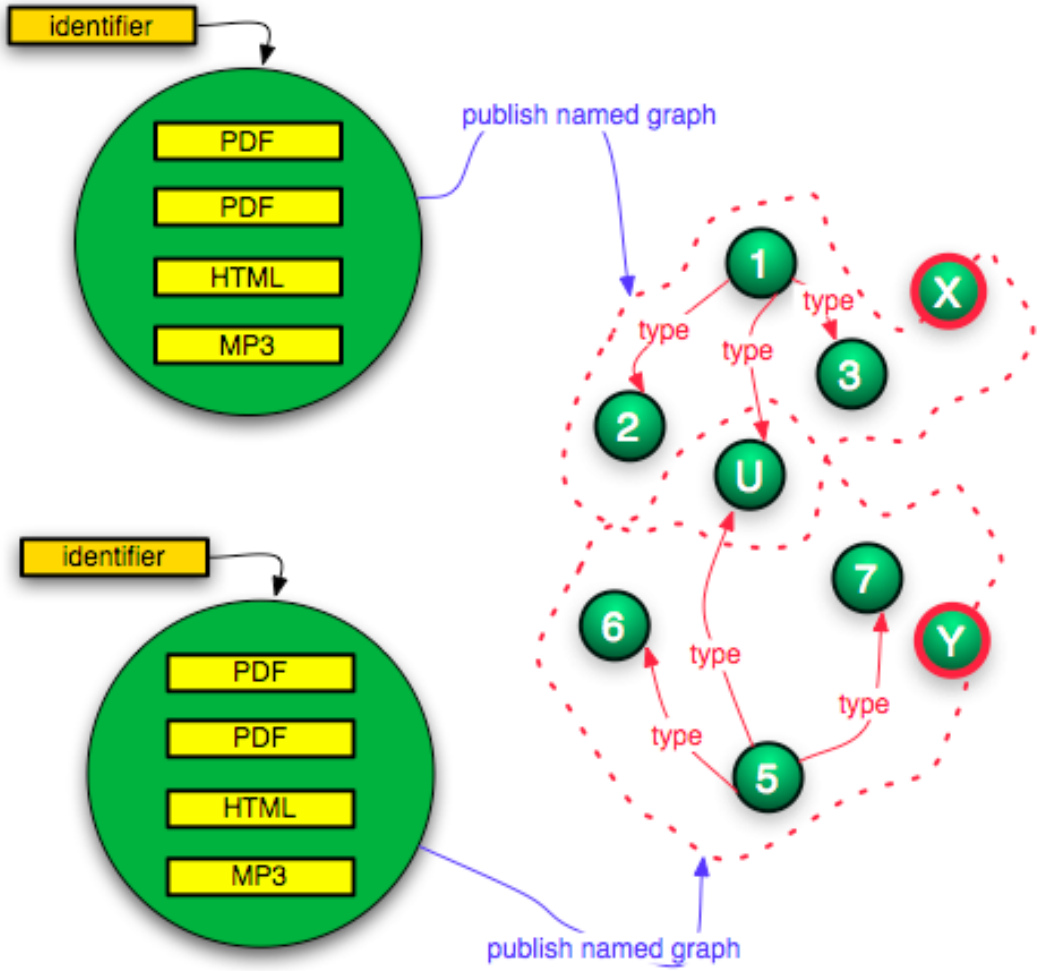
Everything together



- Compound object is published as a 'named graph' identified by a HTTP URI
- Represented by a Resource Map

Re-use and context



Can reference (i.e. re-use) as follows:

(U) : just the resource identified by (U)

(X) : just the named graph identified by (X)

(U) in the context of (X): the resource identified by (U), but as it exists in the context of named graph (X)

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Resource maps

the what and the how

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Resource map (ReM) requirements

- Resource Maps **must** allow for simply expressing the resources that are considered part of a compound object.
- Resource Maps **may**
  - Express resources that are not part of a compound object.
  - Distinguish between resources that are part of the compound object and those that are not.
  - Express the relationships among the resources referenced by the named graph.
  - Express the types of the relationships among the resources referenced by the named graph, i.e. label the arcs.
  - Express other information related to the named graph and to the resources that it references such as metadata, etc.

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Serialising the ReM

- The ReM can be viewed as a splash page for machine consumption
- Work on a draft specification and serialisation for the ReM is imminent
- Candidate specifications include
  - RDF/XML
  - TriX
  - ATOM
  - YADS

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Discovering the ReM

- Harvest discovery
  - e.g. by exposing via OAI-PMH, sitemaps or ATOM collections lists
- GET discovery
  - using an ORE-specific HTTP header, e.g.
    - X-ORE-Named-Graph:
- Linked data discovery
  - using HTTP link headers
  - embedding context information into link attributes

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Almost finished

the what else and the what next

Recap

- ORE is …
  - working towards facilitating a scholarly communications interoperability layer through
  - the publication of named graphs which describe compound objects, their boundaries and relationships
  - and in so doing make them re-usable
  - and discoverable

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Outstanding issues

- Rootedness and connectedness – the need for a 'containment' or 'compound object' node
- More work needed on the scope and requirements
  - authored objects vs arbitrary 'bags' of resources
  - inclusion of non-information resources
- Defining an abstract model
- Thinking about the services that need to be supported, e.g. harvest, obtain (GET), but also deposit (PUT)
- Authority and ownership, assessment of trustworthiness of Named Graphs
- Development of vocabularies for expressing types of links between resources contained in a named graph
- Development of vocabularies for expressing properties of resources in a named graph, e.g. semantic type, media type and media format

not all are in scope for ORE!

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Next steps

- ORE Acceleration Project will produce an alpha specification by 30 September 2007
- For use in an (almost funded) eChemistry project

and that's it

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