Repository Deposit Service Description

OR 2007 : the 2nd International Conference on Open Repositories
San Antonio, Texas, USA, 23-26 Jan 2007

Presenter: Julie Allinson, UKOLN, University of Bath

Co-authors: Rachel Heery (UKOLN), Martin Morrey (Intrallect), Christopher Gutteridge (Southampton), and Jim Downing (Cambridge)

UKOLN is supported by:
JISC
MLA
MUSEUMS LIBRARIES ARCHIVES COUNCIL
UNIVERSITY OF BATH
www.bath.ac.uk

Overview

- Background and context
- Requirements for depositing content in repositories
- Defining a lightweight deposit service
- Developing the service
- Proof-of-concept implementation - update

Context

- Higher (and Further) Education in the United Kingdom
- JISC – the Joint Information Systems Committee
- JISC – considerable investment in UK repositories R&D over the last 5 years, and continuing
  - FAIR Programme (2002-2005)
  - Exchange for Learning (X4L) Programme (2002-2005)
  - Digital Repositories Programme (2005-2007)
  - JISC Capital Programme Repositories and Preservation strand (2006-2009)

Deposit API

- Deposit API activity was brought together
- to find lightweight solution to assist populating repositories within timescales of JISC programmes
- It comprised a group of repository software developers from Eprints.org, DSpace, Fedora, Intrallect and others
- facilitated by the JISC Repositories Research Team
- to address the need for a common Deposit standard

Background motivation

- In general, developers are not creating repository systems and software from scratch
- repositories must interface with each other, with users and with other applications within institutions and the wider information landscape
  - VLEs, authoring tools, packaging tools, name authority services, classification services and research systems
- There is no common deposit API or protocol

Pain points

- no standardised way of transferring existing collections of digital objects and/or metadata from a filesystem or legacy database into a repository
- no standard interface for tagging, packaging or authoring tools to upload catalogued objects into a repository
- no standard interface for transferring digital objects between repositories
- no way of initiating a contribution workflow from outside a repository system
- no way of including deposit into a repository a part of service orientated architecture

for harvesting there is OAI-PMH – this has had a major impact

There is no equivalent mechanism for deposit

Why is deposit *so* important?

- Without it, there is nothing in our repositories
- Ensuring the emerging network of repositories is well populated with content is a PRIORITY
- Encouraging deposit is one of the most difficult cultural issues for repositories
- Technology needs to support culture change and advocacy, through
  - ease of use
  - multiple deposit
  - auto-deposit
  - NOT closed or proprietary mechanisms

Repository

Stores, manages and makes available content and metadata

- Deposit interface
- Delete interface
- Search interface
- Harvest interface
- Obtain interface

From Andy Powell, A 'service oriented' view of the JISC Information Environment:
http://www.ukoln.ac.uk/distributed-systems/jisc-ie/arch/soa/jisc-ie-soa.pdf

- Similarly, the ORE initiative identifies put (deposit), obtain and harvest services

Deposit – abstract service definition

- A Deposit interface: *Provides an interface through which content and metadata can be deposited and initiates ingest process for local storage.*

Summarised from Andy Powell, A 'service oriented' view of the JISC Information Environment: http://www.ukoln.ac.uk/distributed-systems/jisc-ie/arch/soa/jisc-ie-soa.pdf

- Put: *A put service supports the request for ingest of one or more surrogates into a repository, thereby allowing the addition of digital objects to the repositories' collection*

From An interoperable fabric for scholarly value chains: http://www.dlib.org/dlib/october06/vandesompel/10vandesompel.html

A note on terminology

- Add - used by the e-Framework
- Deposit - terminology of choice for this work
- Put - used by ORE
- Submit
- Post - used for blogs

Largely synonymous, with subtle differences, often related to community of use

- **Ingest**
  - deposit, put, add etc. may be part of an ingest process, along with other functions
  - may include both automated and manual procedures including format checking, editorial control, quality assurance mechanisms, etc.
  - defined by OAIS
  - these are out of scope for this activity

User requirements / scenarios

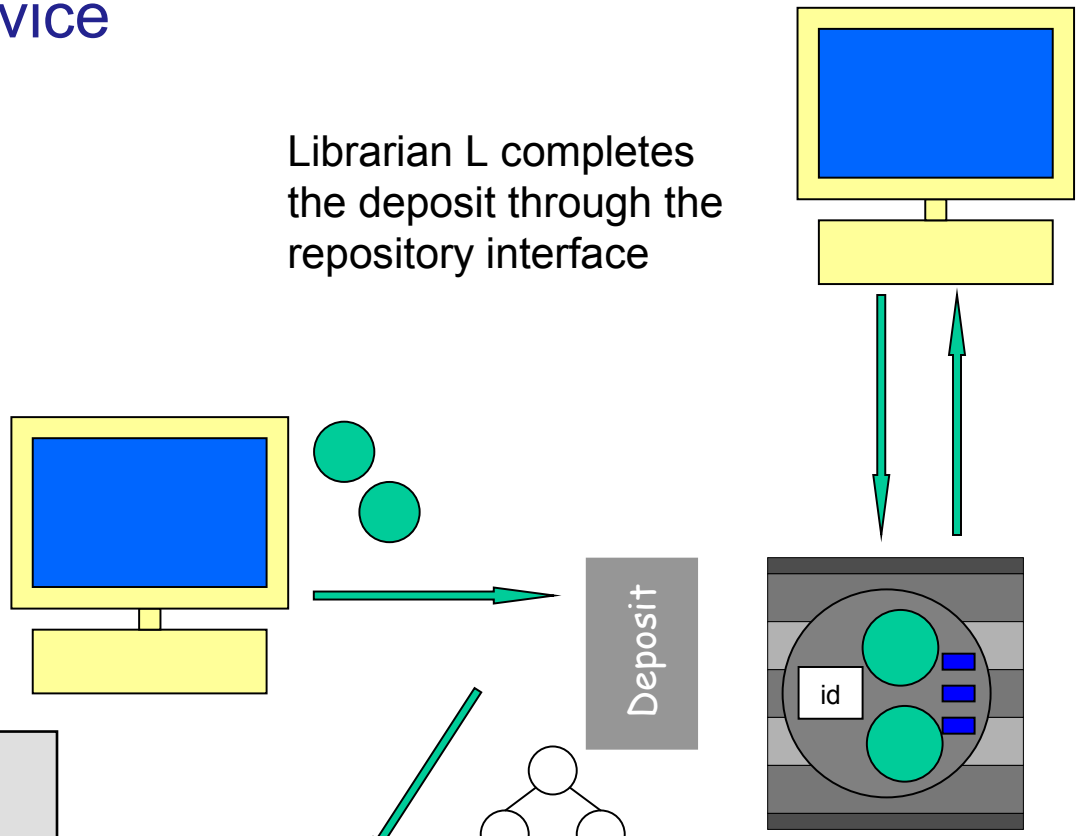
1. Author deposits using a desktop authoring system to a mediated multiple deposit service
2. A user submits an IMS-compliant learning object to a National Repository using a client application
3. Deposit into multiple repositories
4. Transfer between intermediate hosts
5. Repositories share improved metadata
6. Experimental data output from spectrometer is 'saved as' a file and a file containing metadata on operational parameters is also generated. A data capture service is invoked and the files pertaining to the experiment are deposited, along with the necessary metadata, in the laboratory repository.

See more at http://www.ukoln.ac.uk/repositories/digirep/

Scenario 1 : Author deposits using a desktop authoring system to a mediated multiple deposit service

Author A deposits via an easy-deposit desktop application into the institutional repository's mediated deposit queue

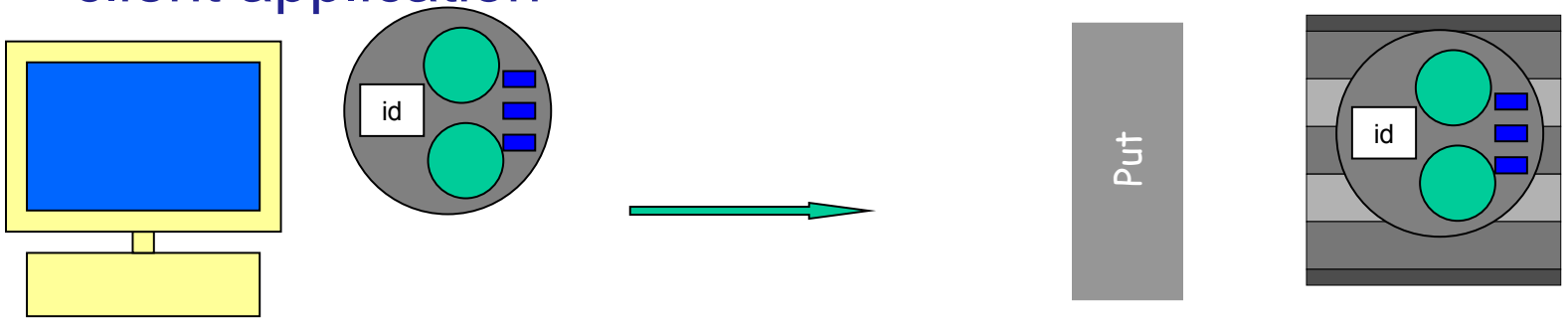
Librarian L completes the deposit through the repository interface



A lightweight deposit web service can facilitate this transfer of object(s)

Librarian L invokes deposit of a surrogate into arxiv.org

Scenario 2 : A user submits an IMS-compliant learning object to a National Repository using a client application

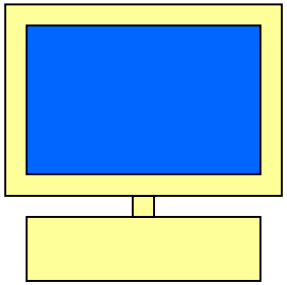


A user wishes to submit an IMS-compliant content package to a repository using a client application

A lightweight deposit web service can facilitate this transfer of object(s)

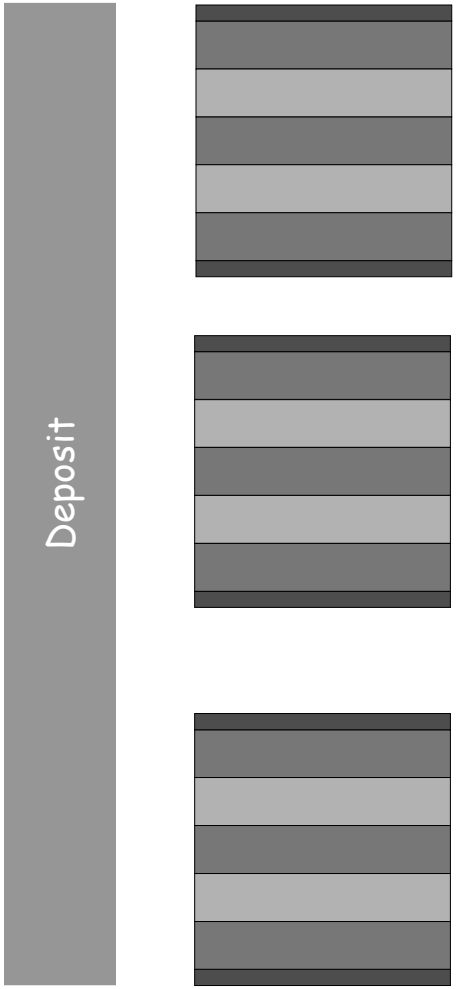
The user can choose from a list of 'groups/collections' to which they are allowed to deposit, in this centralised national LO repository. They are not required to use the repository interface, but can deposit via a decentralised client.

Scenario 3 : Deposit in multiple repositories



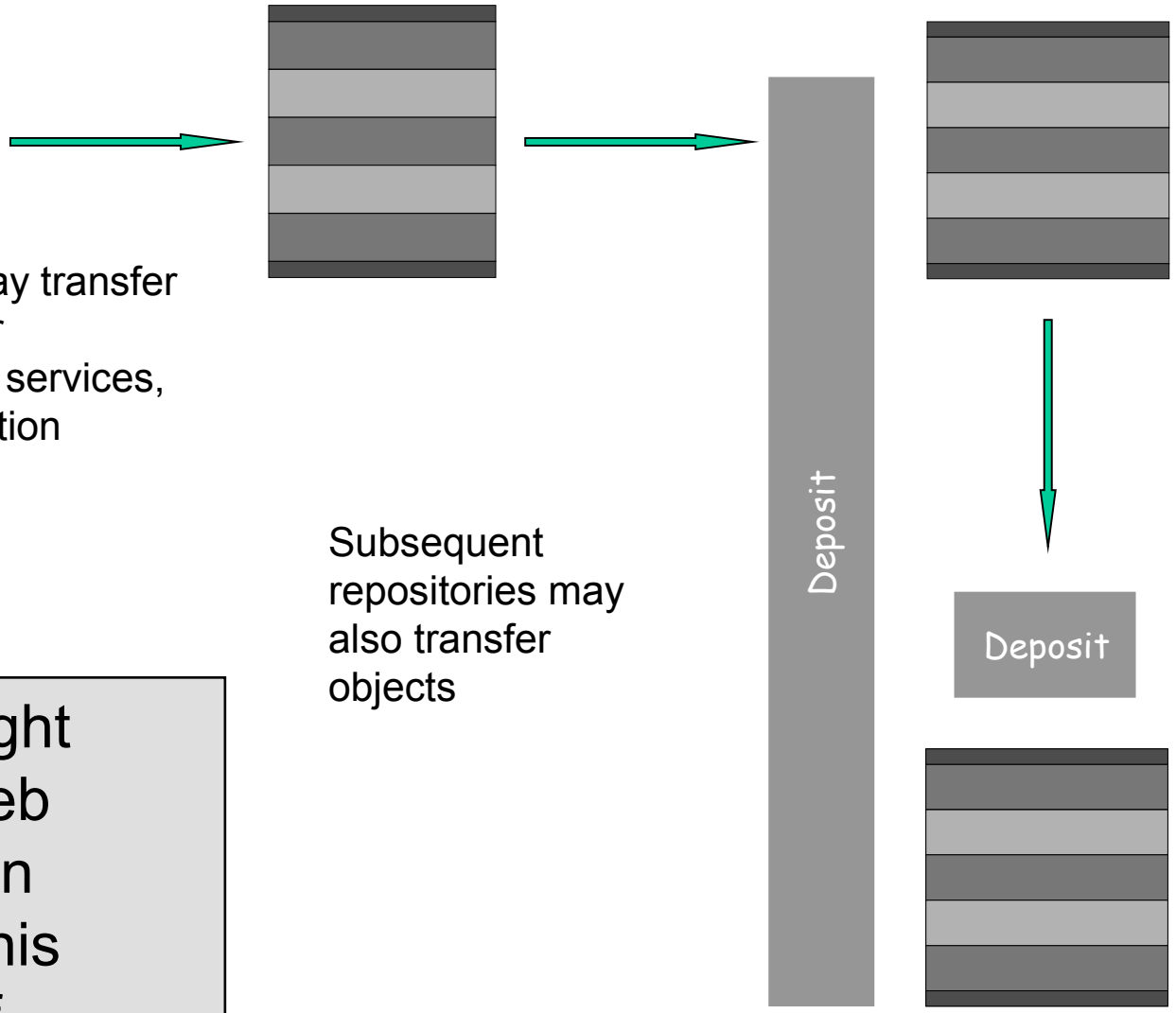
A depositor is required to submit to a Research Council repository, but they also wish to deposit into their institutional repository and a relevant subject repository

The depositor can choose one or more repositories to deposit into



A lightweight deposit web service can facilitate this transfer of object(s)

Scenario 4 : transfer between intermediate hosts

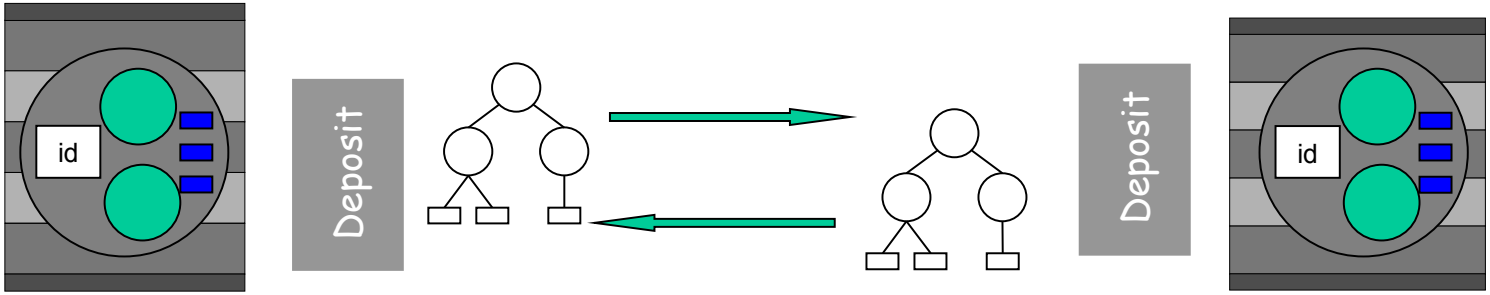


A repository may transfer objects to other repositories, or services, e.g. a preservation service

Subsequent repositories may also transfer objects

A lightweight deposit web service can facilitate this transfer of object(s)

Scenario 5 : Repositories share improved metadata (put both ways)

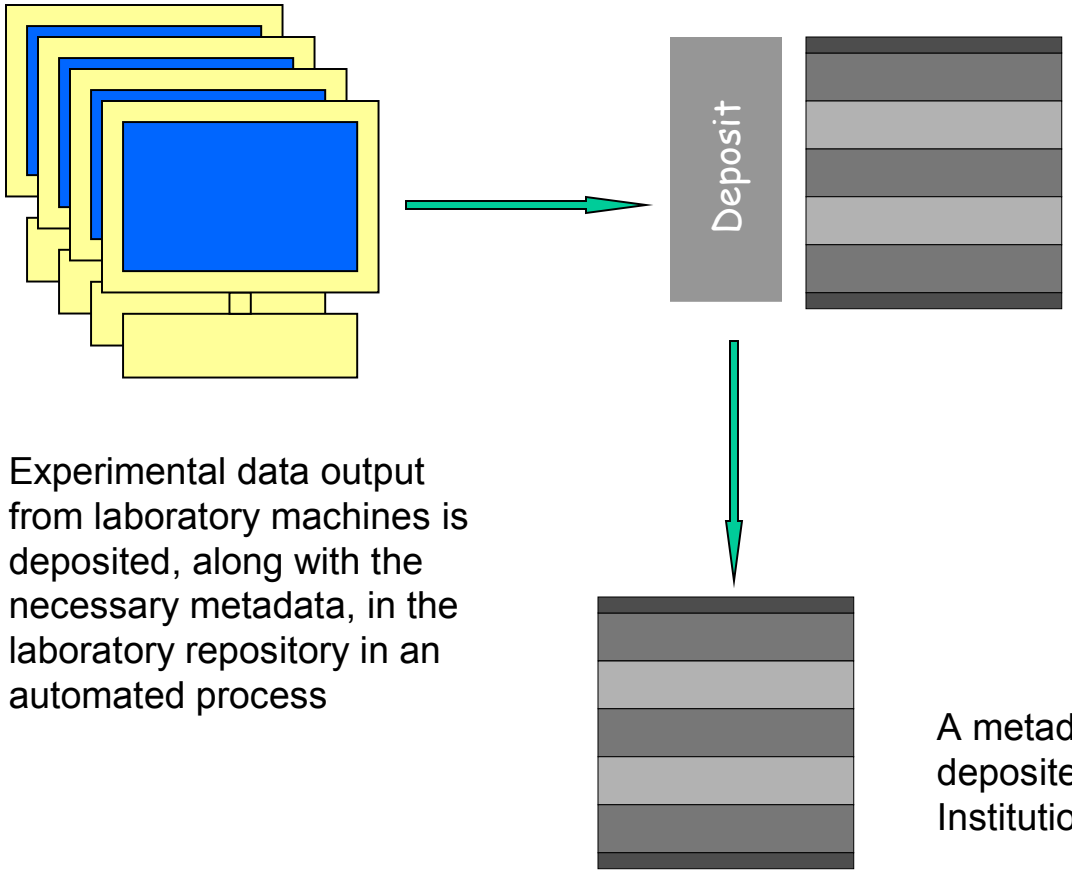


Repository A deposits an object in another repository

A lightweight deposit web service can facilitate this transfer of object(s)

Repository B improves the metadata and deposits the object back into repository A

Scenario 6 : laboratory auto-deposit



A lightweight deposit web service can facilitate this transfer of object(s)

Experimental data output from laboratory machines is deposited, along with the necessary metadata, in the laboratory repository in an automated process

A metadata record is also deposited into the Institutional Repository

Some functional requirements

A Deposit service should:

- be generic enough to support wide range of heterogeneous repositories
  - scholarly publications, data, learning objects, images, etc.
- accept submission of different digital object types in consistent way:
  - data and/or metadata in the form of complex objects or content packages
- support different workflows for deposit, e.g.
  - user to multiple repositories via intermediate client
  - user to repository, repository to additional repositories
  - user-triggered and machine-triggered deposit
- accept large-scale (scientific datasets)
- support statuses, e.g. deposit to different states of a workflow
- support collections and changes in policy and permissions
- support differences in repository policy
- support non-instantaneous processes, e.g. deposit pending mediation
- support validation report and integrity checks
- support anonymous deposit
- support more complex, authenticated deposit
- support acceptance and handling of incomplete records
- support rejection of records (reasons for rejection are out of scope)
- support human-selected targets for deposit
- support different deposit requests

Defining a lightweight deposit service

- Define abstract service scope
  - information models and APIs must be developed in manner neutral to implementation binding

> **Abstract service:** a discrete piece of technical functionality required to fulfil a specific requirement or set of requirements
>
> Synonymous with a 'service genre' in the JISC DEST e-Framework

- Examine existing protocols and specifications
  - could they be used implement the defined abstract service?

- Evaluate and decide whether a new protocol or API is required

Deposit – abstract service definition

- A Deposit interface: *Provides an interface through which content and metadata can be deposited and initiates ingest process for local storage.*

Summarised from Andy Powell, A 'service oriented' view of the JISC Information Environment:
http://www.ukoln.ac.uk/distributed-systems/jisc-ie/arch/soa/jisc-ie-soa.pdf

- Put: *A put service supports the request for ingest of one or more surrogates into a repository, thereby allowing the addition of digital objects to the repositories' collection*

From An interoperable fabric for scholarly value chains:
http://www.dlib.org/dlib/october06/vandesompel/10vandesompel.html

Existing standards

- WebDAV (http://www.webdav.org/)
- JSR 170 (http://www.jcp.org/en/jsr/detail?id=170)
- JSR 283 (http://www.jcp.org/en/jsr/detail?id=283)
- SRW Update (http://www.loc.gov/standards/sru/)
- Flickr Deposit API (http://www.flickr.com/services/api/)
- Fedora Deposit API (http://www.fedora.info/definitions/1/0/api/)
- OKI OSID (http://www.okiproject.org/)
- ECL (http://ecl.iat.sfu.ca/)
- ATOM Publishing Protocol (http://www.ietf.org/html-charters/atompub-charter.html)

Deposit – two components

- **Deposit**: service offered by a repository, allowing remote users (machines or people) to upload data
  - data in:
    - deposit request with optional parameters (e.g.digital object ‘semantics’, metadata formats..)
  - data out:
    - status (success, failure, pending), receipt confirmation and digital object identifier
- **Explain**: service offered by a repository, allowing remote users (machines or people) to inspect the repository for policy and/or other data
  - data in:
    - introspection request (“explain”)
  - data out:
    - introspection response (“repository policy info”)

Draft XML serialisations

Deposit API explain serialisation

This page is part of Deposit API.

```
<response>
  ...
  <explain>
    <responseCode/>
    <responseMessage/>
    <!-- If response code is success: - -->
    <repository>
      <globals>
        <repositoryId>[CDATA]</repositoryId>
        <!-- Description -->
        <policies/>
      </global>
      <!-- Same schema as //explain/repository/collections/collection -->
      <defaultCollection>
      </defaultCollection>

      <!-- For depth >0 requests -->
      <collections>
        <collection>
          <id>[CDATA]</id>
          <description>[CDATA]</description>
          <displayURL>[URL]</display>
          <acceptedFormats>
            <!-- Contains uri & description -->
            *<format/>
          </acceptedFormats>
          <defaultFormat>[As per format above]</defaultFormat>
```

http://www.ukoln.ac.uk/repositories/digirep

Deposit service specification

- To recap, following the scope defined earlier
- the repository developers came up two services: deposit and explain
- and a draft XML serialisation for each
- the service will work by the client issuing XML commands over HTTP to the repository Deposit service
- the service responds with formatted XML messages
- other approaches may also be considered, e.g. SOAP
- a layered approach was taken, with the specification of two levels of compliance.
  - Level 0 compliance requires a set of mandatory elements
  - Level 1 offers a set of additional optional elements that may or may not be used

Some issues

- Boundaries between deposit and ingest
  - what has already happened at point of deposit? regarding metadata and identifiers
  - how far does the deposit service need to validate what is being deposited
  - and can it reject deposit requests?
- Data integrity
  - is there requirement to get back (export) exact object that was deposited?
- Multiple data types, metadata formats and content packages
  - how far should the deposit service check its ability to accept what is being deposited?
  - Can look up of policy rules be done as a request to service registry?
  - how far is look up of policy rules automated?
- Authorisation and authentication
  - how will the deposit service check the authority of the person/machine doing the ‘putting’
  - how will it interface with auth services?

Next steps

Finish it and test it!

- At the moment, the deposit web service is still embryonic
- To take it forward, a funding proposal has been submitted
- to finalise the original deposit API work
- test it against different repository software
    - Eprints
    - DSpace
    - Fedora
    - Intrallect intraLibrary
- build a client implementation
- iteratively revise and re-test
- disseminate and embed into the repositories community

Final thoughts …

- This work is aligned with the vision of the JISC-DEST **E-Framework** and the soa approach in general
- also with the **JISC Information Environment** commitment to interoperability and the use of web services to facilitate interaction between Repositories and other services
- and with the objectives of the Object Re-use and Exchange Initiative and the definition of a ‘put’ interface

Thank you …