Tutorial 1
OAI and OAI-PMH for absolute beginners
a non-technical introduction

Monica Duke
UKOLN, University of Bath, United Kingdom
M.Duke@ukoln.ac.uk

Philip Hunter
UKOLN, University of Bath, United Kingdom
P.J.Hunter@ukoln.ac.uk
Overview of the morning

- Overview and Introductions
- Part I
  - History and overview
- Short break (10.30 am)
- Quiz
- Part II
  - Main Ideas of the OAI-PMH
- Part III
  - Implementation issues
Acknowledgements

- These slides have a long history!
- Many of them have been kindly donated by (taken from!)
  Herbert Van de Sompel
  Carl Lagoze
  Michael Nelson
  Simeon Warner
  Andy Powell
  Pete Cliff
  Uwe Muller
  (and others probably!)
Tutorial 1
OAI and OAI-PMH for absolute beginners
An introduction to the Open Archives Initiative and the Protocol for Metadata Harvesting
Part I: History and basic concepts
The Open Archives Approach

- Facilitates access to heterogenous web-accessible material
- A low-barrier interoperability solution
- Based on repositories supporting metadata sharing
  - Publishing
  - Archiving
- Arose out of the e-print community
- 2 main features
  - Open Archives Initiative
  - OAI Protocol for Metadata Harvesting (OAI-PMH)
The Open Archives Initiative

- **Mission**
  
  "The Open Archives Initiative develops and promotes interoperability standards that aim to facilitate the efficient dissemination of content."

- **Executive for management, Steering and Technical Committees**

- **Funding**
  
  Digital Library Federation (DLF)
  National Science Foundation (NSF)
  Coalition for Networked Information (CNI)

- **Participation of a world-wide community, especially Europe and North America**
OAI-PMH

- A mechanism for harvesting
- Data providers make metadata available for harvesting
- Service Providers harvest metadata
- Metadata can be centrally collected or “aggregated”
- That’s all it is: a way to bring metadata together in one place!
Open Archives Forum Tutorial

- Task List Page
- Task 1 Seven key definitions
- Local Link
  file:///D:/Moni/OAFTutorial/page1.htm#section3
- Web link
  http://www.oaforum.org/tutorial/english/page1.htm#section3
A History Lesson - Roots of OAI

- Early activity: scholarly research (eprints archive)
  - XXX (arXiv) – high energy physics
  - CogPrints - psychology
  - NCSTRL – computer science technical reports
  - RePEc - economics
- Web interfaces for people
  - No machine interfaces
- Different interfaces for different archives
- End Users forced to learn diverse interfaces
- Little or no autonomous metadata sharing
“...the joint impact of these and future initiatives can be substantially higher when interoperability between them [e-print archives] can be established...”

[Ginsparg, Luce, Van de Sompel, UPS Call, July 1999]
The Problems

Two problems:

- End users were/are faced with multiple search interfaces making resource discovery harder.

- No machine based way of sharing the metadata
Cross Search?

- US Digital Library Experience suggests cross searching doesn’t scale - N > 100 = bad!
- Collection description - knowing which target to use
- Query language and search attribute variation
- Rank merging problem
- Different size and type of target can skew results
- Performance - limited to slowest target
- Difficult to build a browse interface

SOLUTION: get all the metadata records in one place
Harvest?

- Harvest records out of archives into one place
- Universal Preprint Service Prototype

So:

- $N = 1$ most of the time…
- One query language, set of search attributes and ranking algorithm
- An awareness of the data makes browse structures easier to build
- UPS was quickly changed to OAI - the Open Archives Initiative
Data and Service Providers

- **Data Provider**
  Creators and keepers of the metadata and repositories of resources
  Handle deposit and publishing

- **Service Provider**
  Harvesters of metadata for the purpose of providing a service such as a search interface, peer-review system, etc.

- One ‘service’ can play both roles
To facilitate metadata harvesting there needs to be agreement on:

- Transport protocol - HTTP or FTP or …
- Metadata format - Dublin Core or MARC or …
- Metadata Quality Assurance - mandatory element set, naming and subject conventions, etc.
- Intellectual Property and Usage Rights - who can do what with what?

Agreement led to (fanfare): the Santa Fe Convention
The Santa Fe Convention

- First incarnation of the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH)

- Drew upon:
  - The UPS Prototype
  - RePEc/SODA - the Service/Data provider model
  - the Dienst Protocol
  - Work of the Santa Fe group

- To “optimise the discovery of e-prints”
The OAI-PMH 1.0

- Introduced Dublin Core element set
- Drew upon:
  - Santa Fe Convention
  - Digital Library Federation meetings
  - Work at Cornell
  - Feedback from alpha-testers
- A new focus to facilitate the discovery of “document-like objects”
The OAI-PMH 1.0 - Summary

- Low barrier interoperability specification
- Based around metadata harvesting model
- Focus on “document-like objects”
- HTTP based
- GET / POST requests
- XML responses
- Uses unqualified Dublin Core
- Not a search protocol!
- Experimental
The OAI-PMH 1.1

- A revision of the 1.0 specification taking account of changes to the emerging XML Schema specification
The OAI-PMH 2.0

- Major revision - not compatible with 1.x
- Drew upon:
  - OAI-PMH 1.x
  - Feedback from OAI Implementers List
  - OAI tech deliberation
  - Feedback from alpha-testers

- “the recurrent exchange of metadata about resources between systems”
The OAI-PMH 2.0 - Summary

- Still a low barrier interoperability specification
- Based around metadata harvesting model
- Metadata about resources
- HTTP based
- GET / POST requests
- XML responses
- Uses unqualified Dublin Core
- Not a search protocol!
- Stable - OAI has committed to making subsequent revisions of the protocol backwards compatible
open archives forum

nature experimental
verbs Dienst
requests HTTP GET/POST
responses XML
transport HTTP
metadata OAMS
about eprints
model metadata harvesting

Santa Fe convention

OAI-PMH v.1.0/1.1

metadata
harvesting

unqualified
Dublin Core
document
like objects
resources

OAI-PMH v.2.0

metadata
harvesting

unqualified
Dublin Core

CERN Workshop on Innovations in Scholarly Communications (OAI3) 12th-14th February 2004
Multiple data and service p’s

Data providers

Service providers

Harvesting based on OAI-PMH
Can be mixed with x-searching

Data providers

Service providers

Harvesting based on OAI-PMH

Searching based on Z39.50 or SRW
The Benefits of OAI-PMH

- Simple
- Web (and so firewall) friendly
- Access-control, compression, error codes, etc. based on HTTP
- Many toolkits - can hide the protocol from developers
- Multiple SPs can harvest from multiple DPs ensuring a wider spread of metadata
- A base layer to build other services on
- Complements search protocols like Z39.50
Summary So Far

- Early movers developing separately
- Need for interoperability
- Santa Fe Meeting led to OAI
- OAI promotes interoperability via:
  - OAI-PMH
    - Low cost
    - Harvest model
    - Data Providers / Service Providers
    - Simple, easy and built on existing technology
    - An open standard
Open Archives Forum Tutorial

- Task Page
- Task 2 Sources of further information
- Local link
  file:///D:/Moni/OAFTutorial/page2.htm#section9
- Web link
  http://www.oaforum.org/tutorial/english/page2.htm#section9
Tutorial 1
OAI and OAI-PMH for absolute beginners
An introduction to the Open Archives Initiative and the Protocol for Metadata Harvesting
Part II: Main Ideas of OAI-PMH
Open Archives Forum Tutorial

- Task Page
- Task 3 Quiz
- Local link
- Web link

http://www.oaforum.org/tutorial/english/page1.htm#section5
The Open Archives Initiative (OAI)

- **Main ideas**
  - world-wide consolidation of scholarly archives
  - free access on the archives (at least: metadata)
  - consistent interfaces for archives and service provider
  - low barrier protocol / effortless implementation
  - based on existing standards (e.g. HTTP, XML, DC)

- **Basic functioning of protocol**
OAI: General Assumptions

- two groups of ‘participants’
- **Data Providers** (Open Archives, Repositories)
  - free access of metadata
  - not necessarily: free access to full texts / resources
  - easy to implement, low barriers
- **Service Providers**
  - use OAI interfaces of the **Data Providers**
  - harvest and store metadata (no live requests!)
  - may select certain subsets from **Data Providers**
    - (set hierarchy, date stamp)
  - may enrich metadata
  - offer (value-added) service on the basis of the metadata
OAI-PMH: Structure Model

Requests:
- Identify
- ListMetadataformats
- ListSets
- ListIdentifiers
- ListRecords
- GetRecord

Responses:
- General information
- Metadata formats
- Set structure
- Record identifier
- Metadata

Repositories:
- e-prints
- Images
- OPAC
- Museum
- Archive
OAI-PMH: Protocol Overview

- protocol based on HTTP
- request arguments as GET or POST parameters
- six request types
- e.g. http://archive.org?
  verb=ListRecords&from=2002-11-01
- responses are encoded in XML syntax
- supports any metadata format (at least: Dublin Core)
- logical set hierarchy (definition: data providers)
- date stamps (last change of metadata set)
- error messages
- flow control
Protocol Details: Definitions

Harvester
- client application issuing OAI-PMH requests

Repository
- network accessible server, able to process OAI-PMH requests correctly

Resource
- object the metadata is “about”, nature of resources is not defined in the OAI-PMH

Item
- component of a repository from which metadata about a resource can be disseminated
- has an unique identifier

Record
- metadata in a specific metadata format

Identifier
- unique key for an item in a repository

Set
- optional construct for grouping items in a repository
Protocol Details: Definitions (2)

item = identifier

all available metadata about David

records

Dublin Core metadata

MARC metadata

SPECTRUM metadata

resource

item
Protocol Details: Records

- metadata of a resource in a specific format
- three parts
  1. header (mandatory)
     - identifier (1)
     - datestamp (1)
  2. metadata (mandatory)
     - XML encoded metadata with root tag, namespace
     - repositories must support Dublin Core
     - May support other formats
  3. about (optional)
     - rights statements
     - provenance statements
Protocol Details: Metadata Schema

- OAI-PMH supports dissemination of multiple metadata formats from a repository
- Properties of metadata formats
  - id string to specify the format (metadataPrefix)
  - metadata schema URL (XML schema to test validity)
  - XML namespace URI (global identifier for metadata format)
- Repositories must be able to disseminate unqualified Dublin Core
- Arbitrary metadata formats can be defined and transported via the OAI-PMH
- Returned metadata must comply with XML namespace specification
Protocol Details: Metadata Schema (2)

- minimum standard: unqualified Dublin Core
  - [http://dublincore.org/](http://dublincore.org/)
  - Dublin Core Metadata Element Set contains 15 elements
  - elements are optional
  - elements may be repeated

The Dublin Core Metadata Element Set:

<table>
<thead>
<tr>
<th>Title</th>
<th>Contributor</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creator</td>
<td>Date</td>
<td>Language</td>
</tr>
<tr>
<td>Subject</td>
<td>Type</td>
<td>Relation</td>
</tr>
<tr>
<td>Description</td>
<td>Format</td>
<td>Coverage</td>
</tr>
<tr>
<td>Publisher</td>
<td>Identifier</td>
<td>Rights</td>
</tr>
</tbody>
</table>
Request Types

- six different request types
  1. Identify
  2. ListMetadataFormats
  3. ListSets
  4. ListIdentifiers
  5. ListRecords
  6. GetRecord
- harvester has not to use all types
- repository must implement all types
- required and optional arguments
- depend on request types
Example: http://edoc.hu-berlin.de/OAI-2.0?
verb=ListIdentifiers&from=2002-01-06&until=2002-01-08&
metadataPrefix=oai_dc&set=doctypes:dissertations

<?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>2002-10-22T17:49:49+01:00</responseDate>
  <request verb="ListIdentifiers" from="2002-01-03" until="2002-01-08" metadataPrefix="oai_dc"
              set="doctypes:dissertations">http://edoc.hu-berlin.de/OAI-2.0</request>
  <ListIdentifiers>
    <header>
      <identifier>oai:HUBerlin.de:3000819</identifier>
      <datestamp>2002-01-08</datestamp>
      <setSpec>doctypes</setSpec>
      <setSpec>doctypes:dissertations</setSpec>
      <setSpec>dnb</setSpec>
      <setSpec>dnb:dnb33</setSpec>
    </header>
    <header>
      <identifier>oai:HUBerlin.de:3000831</identifier>
      <datestamp>2002-01-07</datestamp>
      <setSpec>doctypes</setSpec>
      <setSpec>doctypes:dissertations</setSpec>
      <setSpec>dnb</setSpec>
      <setSpec>dnb:dnb27</setSpec>
    </header>
  </ListIdentifiers>
</OAI-PMH>
Protocol Details: Sets

- Logical partitioning of repositories
- Optional – archives do not have to define sets
- No recommendations
- Also support selective harvesting
- Useful sets are defined by the community where they are used:
  - publication types (thesis, article, …)
  - document types (text, audio, image, …)
  - content sets, according to DNB (medicine, biology, …)
Protocol Details: Datestamps

- date of last modification of a metadata set
- mandatory characteristic of every item
- enables selective harvesting
Protocol Details: Flow control

Example

Service Provider

“want to have all your new records”

“have 267, but give you only 100”
100 records + resumptionToken “anyID1”

“want more of this”
archive.org/oai?verb=ListRecords&resumptionToken=anyID1

“have 267, give you another 100”
100 records + resumptionToken “anyID2”

“want more of this”
archive.org/oai?verb=ListRecords&resumptionToken=anyID2

“have 267, give you my last 67”
67 records + resumptionToken “”

Data Provider

Repository

Harvester
Task 4
Using Repository Explorer

- http://oai.dlib.vt.edu/cgi-bin/Explorer/oai2.0/testoai

Tasks
- Scroll down the alphabetical list to find the arXiv repository
- Click on the Identify link in the Verbs box
- Click on the list Metadata Formats link
- Copy oai_dc into the MetadataPrefix box in the parameters section
- Click on ListRecords
- Copy the identifier from the header section of the first result, scroll to the bottom of the page and paste the identifier into the identifier box of the parameters section
- Select raw XML in the display section and click GetRecord in the verbs section
Tutorial
OAI and OAI-PMH for Beginners
An introduction to the Open Archives Initiative and the Protocol for Metadata Harvesting

Part III: Implementation Issues
Agenda

1. Data Provider or Service Provider
2. Metadata Records
3. Tools and services
4. Examples
General: First Questions

Data Provider
Which data do I want to deliver?
Which service providers do I want to provide with data?

Service Provider
Which Service do I want to provide?
From which data providers do I get the metadata?
In which way the metadata have to be processed?

Data Provider & Service Provider
Which aspects do we have to agree upon?
General: Metadata Formats / Sets

- required: unqualified Dublin Core
- special subjects / communities: other metadata specifications may be required
  - describe resources in a specialised way
  - definition of an XML schema (publicly available for validation)
- define set hierarchy
  - sensible partitioning for selective harvesting
  - agreement between data providers and between data and service providers
General: Organisational Structure

- aggregated data providers
  - if harvested by a service provider, “sub data providers” should not be harvested by the same SP (duplication ...)

- subject gateways
  - selective harvesting if corresponding sets have been defined and implemented
Data Provider: Prerequisites

- metadata on resources ("items")
  - should be stored in (SQL) database
  - possible in case of need: file system ...
  - unique identifier for each item
- web server, accessible via the internet
  - e.g. apache, IIS
- programming interface / API
  - e.g. Perl, PHP, Java-Servlet
  - web server extension
  - access to database (or filesystem)
  - not needed: session management
Data Provider: Prerequisites (2)

- archive identifier / base URL
- unique identifier for items
- metadata format (at least: unqualified Dublin Core)
- datestamps for metadata (created / last modified)
- logical set hierarchy (may have)
  - agreement within (subject) communities
- flow control / implementation of resumption token
  (optional, ‘larger’ archives should have that)
Service Provider: Prerequisites

- internet connected server
- database system (relational or XML)
- programming environment
  - can issue HTTP requests to web servers
  - can issue database requests
  - XML parser
Agenda

1. Data Provider or Service Provider
2. Metadata Records
3. Tools and services
4. Examples
OAI-PMH uses XML Schemas
Schemas described what is allowed in an XML document
Schemas have a ‘name’ (namespace)
Schemas have a physical location (commonly on the web)
Example

http://www.openarchives.org/OAI/2.0/oai_dc/
http://www.openarchives.org/OAI/2.0/oai_dc.xsd
Any XML with an XML Schema = OK for OAI!
OAI-PMH mandates ‘oai_dc’ schema
OAI-PMH documentation includes schema for
  - RFC1807 metadata
  - MARC21 metadata (Library of Congress)
  - oai_marc metadata
Example: http://edoc.hu-berlin.de/OAI-2.0?
verb=GetRecord&identifier=oai:HUBerlin:3000819&
metadataPrefix=oai_dc

<?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>2002-11-27T14:57:01+01:00</responseDate>
  <request verb="GetRecord" metadataPrefix="oai_dc"
  <GetRecord>
    <record>
      <header>
        <identifier>oai:HUBerlin.de:3000819</identifier>
        […]
      </header>
      <metadata>
        <oai_dc:dc xmlns:oai_dc="http://www.openarchives.org/OAI/2.0/oai_dc/"
                   xmlns:dc="http://purl.org/dc/elements/1.1/"
                   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                   xsi:schemaLocation="http://www.openarchives.org/OAI/2.0/oai_dc/
                                        http://www.openarchives.org/OAI/2.0/oai_dc.xsd">
          <dc:title>Einfluß genetischer Variationen im Tumor Nekrose […]</dc:title>
          <dc:creator>Schüttlöffel, Antje</dc:creator>
          […]
        </oai_dc:dc>
      </metadata>
    </record>
  </GetRecord>
</OAI-PMH>
Mandatory ‘Lowest Common Denominator’
Simple unqualified DC schema
A Container schema is also required
OAI specific

Locations:
Container schema hosted @ OAI Web site
Imports a generic DCMES schema
DCMES schema @ DCMI Web site
Other metadata formats

- oai_dc is a simple format providing baseline interoperability

- It may not be suitable:
  Not enough (or the required) elements!
  Not very precise - it is an “unqualified” MES
  (not covered in this talk... Sorry!)
  Not the metadata format you need ie. not:
  IMS/IEEE LOM - eLearning metadata
  ODRL - Open Digital Rights Language
oai_dc... is not the MES I’m looking for

- Implement a different format eg. IMS/IEEE LOM
- Already agreed names, XML schema and namespaces
- Easier than creating your own schema
- Create test records and validate
- Modify repository (source code and/or configuration files) to support new format e.g. listMetadataRecords response
- Test and validate new repository output
Extending a format

- Decide a name and some namespaces
- Develop XML schema for the container and the new elements
- Create test records and validate
- Modify repository (source code and/or configuration files) to support new format
- Test and validate new repository output
Summary

- OAI-PMH allows for any MES so long as...
- ...it is encoded in XML with an XML Schema
- All repositories *must* support oai_dc for...
- ...minimum level of interoperability
- If oai_dc is not enough - extend it!
- If oai_dc is not ‘the one’ - use something else as well!
1. Data Provider or Service Provider
2. Metadata Records
3. Tools and services
4. Examples
Choosing tools

- Choice depends on:
  - Technical skills available
  - Type of repository or service

- Evaluations and comparisons
  - Guide to institutional repository Software
    http://www.soros.org/openaccess/software/
  - DAEDALUS: Initial experiences with EPrints and DSpace at the University of Glasgow
    http://www.ariadne.ac.uk/issue37/nixon/ (Ariadne)
  - DSpace vs. ETD-db: Choosing software to manage electronic theses and dissertations
    http://www.ariadne.ac.uk/issue38/jones/
Available Tools

- Large choice see list at [http://www.openarchives.org/tools/](http://www.openarchives.org/tools/)
- Most are open source
- Available for a variety of platforms
- Difference in emphasis
  - Metadata formats supported
  - Configurability
  - Use out of the box or programming library
Tool Examples

- Dspace
  http://www.dspace.org/
- CERN
  http://cdsware.cern.ch/
- Eprints.org
  http://software.eprints.org/
- ARC
  http://sourceforge.net/projects/oaiarc/
- Net::OAI::Harvester
  http://search.cpan.org/~esummers/OAI-Harvester-0.94/lib/Net/OAI/Harvester.pm
- Develop your own (if none of these meet your requirements)
How to advertise your service and find data providers

- Repository Explorer
  http://oai.dlib.vt.edu/cgi-bin/Explorer/oai2.0/testoai
- OAISTER
  http://www.oaister.org/o/oaister/
- Southampton
  http://archives.eprints.org/eprints.php
Agenda

1. Data Provider or Service Provider
2. Metadata Records
3. Tools and services
4. Examples
About

Portfolio & Duke was developed from a requirement of the Deans' Office to improve its ability to accurately assess the progression of intellectual growth at the University. One particular mode of assessment is the objective comparison of documents written by individual students over time as a part of the regular curriculum.

The Deans' Office was interested in an easy-to-use, web-based interface which would allow undergraduates to upload writing samples to a centralized, secure repository which would be accessible to the office's assessment experts. In addition to this office assessment space, they were interested in providing an unofficial personal space that undergraduates might use to publish information of their own choosing, such as Web pages of their own design, resumes and/or curricula vitae to facilitate educational and/or career aspirations, or image files to be shared with family and friends.

It was decided that programmers from Arts & Sciences Computing, specifically [URL], would work with representatives of OIT and the Deans' Office to come up with a viable solution that would meet the requirements.

The programmers found an open-source solution. [URL] is a newly developed (available Nov 2002) digital repository created to capture, distribute and preserve the intellectual output of MIT. As a joint project of MIT Libraries and the Hewlett-Packard Company, it provides stable long-term storage needed to house the digital products of MIT faculty and researchers.

The system was molded into the Portfolio & Duke system that you are using today. It was beta tested by student, faculty, and staff in the summer of 2003 and is slated to be broadly used in the fall of 2003.
The LACITO Archive

http://lacito.vjf.cnrs.fr/archivage/index.html
The LACITO Archive

An archive of natural speech in “rare” languages

Gives access to original recordings, with transcriptions and translations
ArtWorld

http://artworld.uea.ac.uk/

- A group of museums, art galleries and academic departments.
- Provides digital images and associated resources for the enhancement of learning and teaching in world art studies.
- Facilitates access for students and teachers to primary visual resource materials that are normally relatively inaccessible or widely scattered.
Summary

- during today’s tutorial we hope that you have
  - gained an overview of the history behind the OAI-PMH and an overview of its key features
  - acquired an understanding of how the protocol works
  - learned something about some of the main implementation issues
  - gained familiarity with the OAForum tutorial and learned where to look for more information
  - become comfortable with the terminology used
  - started thinking about how you will be using OAI in your institution
Questions

- now…
- feel free to tell us what you didn’t understand
- and ask general questions

**Monica Duke**
UKOLN, University of Bath, United Kingdom
M.Duke@ukoln.ac.uk

**Philip Hunter**
UKOLN, University of Bath, United Kingdom
P.J.Hunter@ukoln.ac.uk
Resources

- Open Archives Initiative (OAI official Web site)  

- Open Archives Forum (OA-Forum Web site)  

- OAI-PMH protocol specification  
  [http://www.openarchives.org/OAI/openarchivesprotocol.html](http://www.openarchives.org/OAI/openarchivesprotocol.html)

- Implementation guidelines:  
  [http://www.openarchives.org/OAI/2.0/guidelines.htm](http://www.openarchives.org/OAI/2.0/guidelines.htm)

- OAI general mailing list  

- OA-Forum expert reports and reviews of organisational and technical issues  
Resources

- Repository explorer
  http://oai.dlib.vt.edu/cgi-bin/Explorer/oai2.0/testoai
- Tools
  http://www.openarchives.org/tools/
- Implementers mailing list
  http://www.openarchives.org/mailman/listinfo/OAI-implementers/
- Dublin Core
  http://dublincore.org/
- The Eprints User's Handbook
  http://software.eprints.org/handbook
Eprint Archives

- ArXiv
  http://arXiv.org/
- RePec
  http://www.repec.org/
- Cogprints
  http://cogprints.ecs.soton.ac.uk/
- NCSTRL:
  http://www.ncstrl.org
Examples of Service Providers

- Citation Indexing
  http://icite.sissa.it
- Printing on Demand Service
  http://www.proprint-service.de
- Value added Search Engine
  http://www.myoai.com
- DINI
  http://edoc.hu-berlin.de/oaisearch/
- Physnet
  http://physnet.uni-oldenburg.de/oai/query.php
- ARC
  http://arc.cs.odu.edu/
Task Page

Task 1 Seven Key Definitions
http://www.oaforum.org/tutorial/english/page1.htm#section3

Task 2 Sources of Further Information
http://www.oaforum.org/tutorial/english/page2.htm#section9

Task 3 Quiz
http://www.oaforum.org/tutorial/english/page1.htm#section5

Task 4 Using Repository Explorer
http://oai.dlib.vt.edu/cgi-bin/Explorer/oai2.0/testoai

Task 5 Exploring some service interfaces: choose from
https://portfolio.oit.duke.edu/index.jsp
https://ir.uoregon.edu:8443/dspace/index.jsp
http://artworld.uea.ac.uk/

Or any of the service providers or archives listed under Resources