Promoting greater visibility and application of research outputs through global networks of Open Access repositories

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The Current State of Open Access Repository Interoperability (2012)

Working Group 2: Repository Interoperability

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Contents

Acronyms and Abbreviations

API	Application Programming Interface
BOAI	Budapest Open Access Initiative
CERIF	Common European Research Information Format
COAR	Confederation of Open Access Repositories
COUNTER	Counting Online Usage of Networked Electronic Resources
CRIS	Current Research Information Systems
CRIS-OAR	Current Research Information Systems and Open Access Repositories
DAI	Digital Author Identifiers
DC	Dublin Core Metadata Standard
DOAJ	Directory of Open Access Journals
DOI	Digital Object Identifier
DRIVER	Digital Repository Infrastructure Vision for European Research
EC	European Commission
FP7	European Commission's Seventh Framework Programme (2007-2013)
HEI	Higher Education Institutions
IR	Institutional Repository
ISBN	International Standard Book Number
ISSN	International Standard Serial Number
KE	Knowledge Exchange
METS	Metadata Encoding and Transmission Standard
MODS	Metadata Object Description Schema
OA	Open Access
OAI-ORE	Open Archives Initiative – Object Reuse and Exchange
OAI-PMH	Open Archives Initiative – Protocol for Metadata Harvesting
OAR	Open Access Repositories
OAS	OA-Statistik
OER	Open Educational Resources
OpenAIRE	Open Access Infrastructure Research for Europe
OpenAIREplus	2nd Generation of Open Access Infrastructure for Research in Europe
OpenDOAR	Directory of Open Access Repositories
ORI	Organisation and Repository Identification
ORCID	Open Researcher & Contributor ID
NBN	National Bibliographic Number
NIH	National Institutes of Health, United States
PIRUS2	Publishers and Institutional Repository Usage Statistics 2
PLoS	Public Library of Science
PMC	PubMed Central
RDF	Resource Description Framework
RDM	Research Data Management
RIM	Research Information Management
RJ	Repository Junction
SEO	Search engine optimization
SURE	Statistics on the Usage of Repositories
SUSHI	NISO Standardized Usage Statistics Harvesting Initiative
SWORD	Simple Web-service Offering Repository Deposit
URL	Uniform Resource Locators
URN	Uniform Resource Names
XML	Extensible Markup Language

Executive Summary

In the past few years, Open Access repositories and their associated services have become an increasingly important component of the global e-Research infrastructure. The real value of repositories is their potential to be connected in order to develop a network of repositories which enables unified access to an open, aggregated mass of scholarship and related materials that machines and researchers can work with in new ways.

However, this potential to create a unified body of scholarly materials is entirely reliant on interoperability – specifically, that repositories follow consistent guidelines, protocols, and standards for interoperability which allow them to communicate with each other; connect with other systems; and transfer information, metadata, and digital objects between each other. The repository infrastructure is still relatively new, leading to an evolving interoperability landscape that at first sight may appear chaotic, confusing, and complex.

Section 1 of this report provides an overview of the current interoperability landscape and the services where progress has been made in recent years as a result of research and development efforts. Areas covered in this overview include:

- Metadata harvesting
- Usage statistics
- Cross system content transfer
- Creating unique identifiers for authors and repository content
- Increasing visibility of contents stored in repositories through Internet search engines
- Support services for repository networks
- Integrating repositories into research administration workflows
- Support for compound objects – digital objects that include multiple components or files

Additional areas that are currently under development and are briefly addressed include:

- Services to support linked data

Section 2 of this report provides further details on specific initiatives that are designed to support these services or address common challenges. Initiatives addressed include: AuthorClaim, CRIS-OAR, DataCite, DINI Certificate for Document and Publication Services, DOI, DRIVER, Handle System, KE Usage Statistics Guidelines, OAI-ORE, OAI-PMH, OA-Statistik, OA Repository Junction, OpenAIRE, ORCID, PersID, PIRUS, SURE, SWORD, and UK RepositoryNet+.

Since repository interoperability is paramount in order to achieve the goals of Open Access, it is a focal point for the Confederation of Open Access Repositories (COAR). This project is one of several tactics designed to promote the repository community's understanding of the interoperability landscape, share current best practices, and provide knowledge and information necessary to chart and implement institutional strategies for interoperability that profit from the services made available through interoperability initiatives.

This report is designed to be the first stage of a multi-phase process aiming to establish the COAR Roadmap for Interoperability. The second phase is planned to be completed with the release of a follow-up report: Future Directions for Interoperability. The follow-up report will address emerging issues and current research & development efforts.

Section 1: Introduction & Background Information

1.1: The Promise of Interoperability

In the past few years, Open Access repositories and their associated services have become an increasingly important component of the global e-Research infrastructure. The real value of repositories lies in their potential to become an interconnected repository network – a network that can provide unified access to an aggregated set of scholarly and related outputs that machines and researchers can work with in new ways.

However, this potential to create a unified body of scholarly materials is entirely reliant on interoperability. Interoperability is the ability of systems to communicate with each other and transfer information back and forth in a usable format. It allows us to exploit today's computational power so that we can aggregate repository content, data mine content from repositories, create new tools and services on top of repositories, and generate new knowledge from them.

Researchers need not know where a specific item was published or where an article is stored in order to find the appropriate information. Instead, users around the world rely on search engines to retrieve articles, and they are able to discover information they might have otherwise missed. Furthermore, by relying on search engines to provide a layer that knits together these disparate repositories, Open Access does not need to rely on a single repository to collect the world's research output. The decentralized infrastructure and the value-added services and tools built on top of repositories are all possible because of interoperability. The quality of these services depends on data provided by repositories and the standardization of such data.

Interoperability is the technical "glue" that makes it possible to virtually connect repositories to each other and to other systems and transfer information, metadata, and digital objects between each other. The repository infrastructure is still relatively new, leading to an evolving interoperability landscape that may at first glance look chaotic, confusing and complex.

Open Access itself is still a new concept: February 2012 marked the tenth anniversary of the Budapest Open Access Initiative (BOAI), the first public declaration outlining the vision for Open Access and its infrastructure through a combination of two methods:

1) "Gold" Open Access, where scholars publish in Open Access journals, i.e. peer-reviewed, scholarly journals that make articles freely available for access and re-use purposes
2) "Green" Open Access, where scholars publish in any peer-reviewed journal and subsequently deposit a copy of their scholarly materials into an Open Access repository that makes its contents freely available for access and re-use purposes

National governments and several major research funding bodies, including the European Commission and the National Institutes of Health (NIH) in the United States, have begun requiring research outputs resulting from their funding to be made publicly available through OA repositories. Argentina, Denmark, and Spain all have or are in the process of passing legislation requiring publicly-funded research to be made freely available through OA repositories. In addition to national and funding agency mandates for Open Access, several universities have passed institutional mandates requiring faculty to deposit copies of their research outputs into an institutional repository.

The result of all of these actions has been a steadily-rising body of research materials that are now free to access and free to use via OA repositories and journals. Gold Open Access now includes[1] nearly 8000 journals with over 848,000 articles. Likewise, Green Open Access includes over 2100 registered Open Access repositories.[2] This increase in freely-available knowledge and a growing number of containers storing information have led to a surge of developments in repository interoperability, all designed to tackle various issues stemming from this new, complex, and decentralized environment.

Examples of the types of challenges and questions raised in this new environment include:

- ***Access and usage***: how often are people downloading and viewing individual materials stored in repositories?
- ***Permissions and rights***: how can we tackle issues related to permissions and usage rights? Is it possible to have machine-readable codes indicating rights to manage embargo periods and release dates or to improve and limit search results?
- ***Multiple deposits for a single article:*** for articles that should be deposited in multiple repositories, is the one-input-many-outputs approach a feasible one, i.e. is it possible to deposit once and automate the process to send the contents over to multiple repositories?
- ***Author Identification***: how can we improve author identification so human readers and machines know which Jane Smith was the author of an article and what other articles/items she authored?
- ***Information exchange with other research information management systems***: how can we support repository integration with information systems that support research and scholarly communication, from journal publishing platforms to Current Research Information Systems (CRIS)?

Research & development efforts undertaken around the world have made it possible to answer some of these questions and have provided solutions to other common challenges. This report is intended to serve as a guide to outline the common services and challenges that interoperability initiatives[3]now address– and what to expect in forthcoming years. Our aim is to provide guidance for repositories with a wide range of infrastructures, resources, institutional support, scope and quantity of contents, technical support, and levels of maturity. All repositories, from the smallest institutional repository to large national or multi-national subject-based repositories, need to support interoperability in order for their repository contents to be part of the global aggregate of OA knowledge. We hope this report will help members of the repository community to make sense of the interoperability landscape and prepare for the future.

Interoperability-related initiatives are presented in two different ways in this report: by area (Section 1.2) and then in more detail, in an alphabetical directory (Section 2).

[1] Open Access journal statistics are from the Directory of Open Access Journals (DOAJ), accessed on 8 July 2012 from www.doaj.org.
[2] Open Access repository statistics are from the Directory of Open Access Repositories (OpenDOAR), accessed on 8 July 2012.
[3] By 'initiatives,' we are referring to the broad set of protocols, standards, guidelines, tools, and other resources or services that can be implemented within a repository system that support interoperability.

1.2: Current State of Repository Interoperability Initiatives

Areas and major issues addressed in current interoperability initiatives:

1) Metadata harvesting
2) Repository networks
3) Usage statistics
4) Cross-system transfer
5) Author identification
6) Persistent identifiers
7) Managing compound objects

A figure outlining these areas is included below as Figure 1.

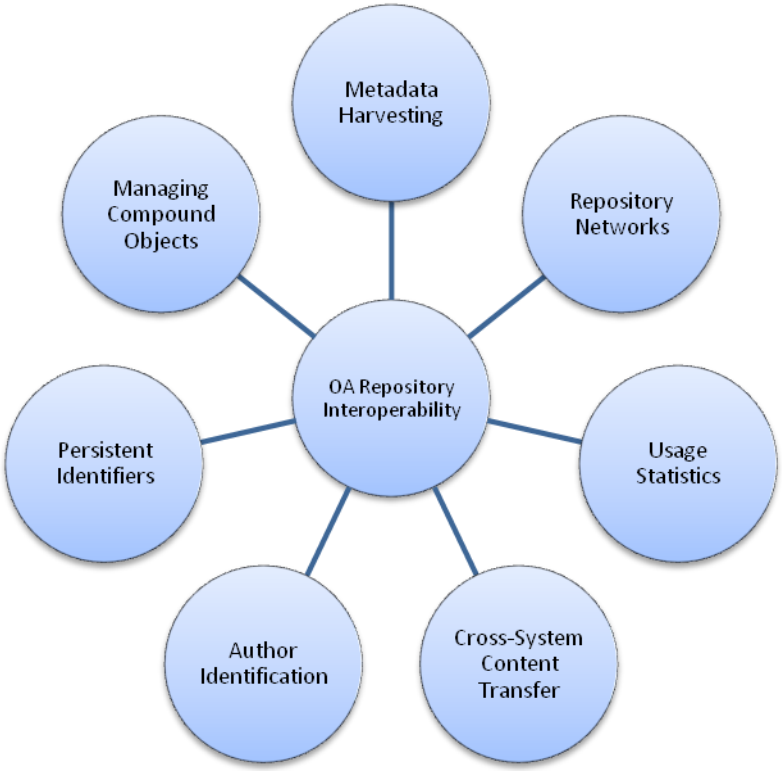

Figure 1: Areas of Interoperability-Related Services

Table 1 provides a list of interoperability-related areas and associated initiatives covered in this report.

Table 1: Areas of Interoperability-Related Initiatives

Areas	Associated Initiatives
Metadata Harvesting	OAI-PMH
Repository Networks	DRIVER OpenAIRE National repository networks UK RepositoryNet+
Usage Statistics	COUNTER KE Usage Statistics OA-Statistik PIRUS/IRUS-UK SURE
Cross-System Content Transfer	SWORD Open Access Repository Junction CRIS-OAR Metadata Interoperability
Author Identification	AuthorClaim ORCID
Persistent Identifiers	PersID DOI Handle System DataCite
Managing Compound Objects	OAI-ORE

The most well-established areas among these are ***metadata harvesting*** and ***developing national/regional networks of repositories***. Metadata harvesting for repositories has been under development since the late 1990s when a group developed the "Santa Fe Convention" to establish an interface for pre-print ("e-print") servers to expose their metadata in a way that would allow other repositories to identify and copy materials via the Protocol for Metadata Harvesting. The first version of ***OAI-PMH***, a more highly-developed version of the interface resulting from the Santa Fe Convention, was publicly released in 2001. With OAI-PMH, repositories describe their content through metadata standards such as Dublin Core (DC); metadata is then exposed in such a way that enables its harvesting by external, third-party systems. While OAI-PMH continues to be developed and maintained, the protocol has become the baseline for repository interoperability. All major repository software platforms nowadays feature a default OAI-PMH protocol, making it the easiest interoperability protocol to implement and is the starting point for repository interoperability.

A commonly-adopted strategy for ***building national and regional repository networks*** has been to use ***OAI-PMH*** to harvest metadata records from repositories within the network and present their contents through a single interface. OAI-PMH is the basis for this approach, with a minimal number of additional fields

layered on top of OAI-PMH. The European repository community has been a leader in this area. The ***DRIVER*** project from the 2000s was the first regional repository network developed in this manner. ***OpenAIRE***, a European repository network covering the European Union and beyond, is a next-generation project building on the success of DRIVER. The OpenAIRE repository network serves as a default infrastructure to host deposits of European Commission FP7-funded research outputs which are required to be made publicly-accessible via an OA repository.

Interoperable repository usage statistics is another major research area, since statistics can be used to help make the case for OA repositories and enable their benchmarking. Several initiatives have been or are being developed to deal with ***cross-repository usage statistics***: ***KE Usage Statistics Guidelines, OA-Statistik***, ***PIRUS/IRUS-UK***, and ***SURE*** initiatives all provide methods or mechanisms to collect cross-repository usage statistics.

In many cases, authors need to deposit their research outputs into multiple repositories – their institutional repository (IR), co-authors' IRs, subject-based repositories, and funder repositories such as PubMed Central (PMC). One of the main goals of the repository community is to make this multiple-deposit process as straightforward as possible for authors, leading to the development of tools to streamline the deposit process by ***transferring content from one system to another***. The ***SWORD*** protocol and the ***Open Access Repository Junction (OA-RJ)*** were both designed to support this ***cross-system content transfer***. SWORD allows authors to deposit their materials in multiple repositories; the OA-RJ Project aimed to support the deposit process for multi-authored, multi-institutional research articles – a common scenario for scholarly research. Another use of cross-system transfer is to move content between Current Research Information Systems (CRIS) and OA repositories via metadata exchange. This type of exchange is the focus of the ***CRIS-OAR Metadata Interoperability*** initiative. CRIS is a common approach to research administration in Europe.

As an ever-increasing number of authors start adding materials to the OA repository space, overlapping names is becoming a frequent issue. Projects dealing with unique author identification such as ***ORCID*** and ***AuthorClaim*** attempt to link individual authors to their publications. Through AuthorClaim, a scholar may "claim" his/her associated publications which can then be jointly displayed. ORCID, another author identification initiative, launched its author ID service in October 2012. ORCID plans include having author- and/or institutionally-maintained identification records for researchers and their research outputs.

Persistent identification for digital objects has always been a concern for the repository community. Web site addresses frequently change, making it difficult or impossible to create persistent links to records or find items years after they were created. ***The Digital Object Identifier (DOI)***, the ***Handle system,*** and ***PersID*** are all designed to set up persistent identifiers for any type of digital object. In addition to assigning persistent identifiers, ***PersID*** includes a framework for policies and technical infrastructure to implement persistent identifiers in a consistent way. ***DataCite*** is more precise in that it is specifically designed to assign persistent identifiers for datasets.

For ***compound digital objects***, the Object Reuse and Exchange (***OAI-ORE***) specification focuses on creating systemized ways to move bundles of objects from one system to another.

1.3: Emerging Areas

Supporting research data in repositories has been the focus of a tremendous amount of discussion and interest from the OA community in the past few years. Several initiatives are currently under development to support this broad area.

Two wide-scope projects related to repositories are currently running in Europe which will shortly become a source of new interoperability-related developments: the European OpenAIREplus and the UK RepositoryNet+ projects. The OpenAIREplus project is building on the OpenAIRE infrastructure to identify new areas for supporting OA repository operation. These include repository metadata enhancement to cover funder and project/grant information, repository usage statistics and research data management-related issues such as linking articles to associated datasets and vice-versa, analyzing copyright issues and sustainability models.

The JISC-funded UK RepositoryNet+ Project, also known as RepNet, is a current initiative being developed at EDINA for creating a socio-technical infrastructure supporting deposit, curation and exposure of Open Access research literature through OA repositories in the UK. RepNet aims to bring together all currently-running repository-related services in the UK in order to explore synergies among them and perform a gap analysis exercise. Sustainability of current repository services will be explored and new services arising from the gap analysis will be designed and deployed as part of RepNet.

Further development of the SWORD protocol through development of SWORDv2 includes additional support for dealing with dataset storage, curation, management, and interoperability issues. This new version of the SWORD protocol aims to enhance the previous one by specifically providing support to dataset transfer among repositories and/or other research data management (RDM) systems.

Besides these projects, the repository community as a whole keeps adjusting to the continuously evolving Open Access and related landscapes. Current research & development efforts are leading to the creation of new tools and services to support the areas described in Section 1.2, while at the same time additional areas such as Linked Data, the Semantic Web, and digital preservation should be closely watched in the coming months and years for new interoperability features arising from ongoing projects and initiatives within them.

Section 2: Current Repository Interoperability Initiatives

This section includes an overview of the key repository interoperability initiatives that are currently widely implemented. It is not intended to be an exhaustive directory of all interoperability initiatives, but rather it provides information about the major interoperability strategies that should be under consideration for implementation – now or as part of a strategic plan. No repository should implement all of these initiatives; some are specific to regions of the world, and many initiatives are designed to serve similar purposes. Each institution should select the initiatives that are most appropriate for its environment.

Table 2 includes a list of the initiatives included in this section in the order in which they are presented.

Table 2: Interoperability Initiatives

- AuthorClaim Registration Service
- CRIS-OAR
- DataCite
- DINI Certificate for Document and Publication Servers
- DOI
- DRIVER
- Handle System
- KE Usage Statistics Guidelines
- OAI-ORE
- OAI-PMH
- OA-Statistik
- OA Repository Junction
- OpenAIRE
- ORCID
- PersID
- PIRUS/IRUS-UK
- SURE
- SWORD
- UK RepositoryNet+

AuthorClaim Registration Service

About AuthorClaim

The AuthorClaim registration service aims to link scholars to the records of the works they have authored; information is recorded in a bibliographic database.

Applications of AuthorClaim

AuthorClaim builds a profile for registered scholars that shows all their identified works. Users of bibliographic databases that implement AuthorClaim records can link right to their profile pages or their homepages. Through AuthorClaim, it becomes possible to distinguish between the works written by people with similar names. For instance, if a scholar is recorded in a bibliography as "J. Smith", it becomes possible to see that she is "Jane Smith" rather than "James Smith."

Once such services are in place, authors can get regular statistics about downloads and citations of their works.

The collected data can be used to compute various rankings.

Getting Started

Scholars can register for AuthorClaim and create a profile in the system. The system asks for the workplace and performs a search for publications.

Examples of Implementations

http://authors.repec.org/
http://authorclaim.org
http://citec.repec.org/ (Citations in Economics): citation profile of authors registered in RePEc Author Service (RAS)

AuthorClaim
authorclaim.org

AuthorClaim

AuthorClaim aims to link scholars with records of the works they have produced.

Area: Author identification
Geographic Focus: Global

Current status: currently maintained; building-up phase

Sponsoring Organization: The development AuthorClaim was funded by an Open Society Institute grant to the ACIS project.

Other Projects in this Area:
- ORCID

Current Research Information Systems and Open Access Repositories (CRIS-OAR)

About this Initiative:

The CRIS-OAR project was designed to increase practical interoperability between Current Research Information Systems (CRIS) and Open Access Repositories (OARs). The focus of the project was on defining a metadata exchange format for publication information with an associated common vocabulary.

Applications of CRIS-OAR:

A growing number of organizations are using current research information systems in order to support research administration needs. In most cases, researchers interact with a CRIS early in the research cycle, and administrative information about research projects is captured at this point in time. In order to better support researchers and re-engineer isolated yet redundant processes, this Knowledge Exchange project aimed at using interoperability to facilitate metadata exchange between CRIS and OA repositories.

CRIS-OAR interoperability is rapidly becoming implemented as a default strategy for increasing effectiveness in repository population by automatically transferring metadata-only records from the CRIS to the OAR and asking authors to attach the appropriate full-text versions of the works to the records in the repository.

Additional Resources/Further Reading:

All documentation on this project can be found on the project wiki: http://bit.ly/cris-oar-wiki

CRIS-OAR

http://bit.ly/cris-oar

CRIS-OAR aims to increase the interoperability between CRIS and repositories through metadata exchange

Knowledge Exchange
CRIS-OAR interoperability project
publication metadata

Area: Cross-System Content Transfer
Geographic Focus: Europe

Current status: project has been completed

Sponsoring Organization: Knowledge Exchange

Other Projects in this Area:
- OA-RJ
- SWORD
- UK RepositoryNet+

DataCite

About this Initiative:
DataCite is an international organization founded in 2009 which promotes the use of Digital Object Identifiers (DOIs) for published datasets in order to establish easier access to research data, to increase acceptance of research data as legitimate contributions in the scholarly record, and to support data archiving to permit results to be verified and re-purposed for future study.

Applications of DataCite:
DataCite works with data centres around the world to assign persistent identifiers to datasets. Through this work, DataCite is developing an infrastructure that supports simple and effective methods for data citation, discovery, and access, as well as for linking datasets to other related research outputs such as research articles. Citable datasets become contributions to scholarly communication, paving the way for new metrics and publication models that recognise and reward data sharing.

Getting Started
Please contact DataCite via its homepage and you will be referred to your local DataCite Member. You may also directly contact the appropriate DataCite member, based on your location. Once you have established a relationship with the member organization, you will be provided access to the DataCite service for minting persistent identifiers (DOIs) and registering associated metadata.

Examples of Implementations

DataCite currently works with over 100 data centres around the world including:

- PANGAEA, Germany (German National Library of Science and Technology – TIB Hannover)
- DRYAD, USA (California Digital Library)
- Griffith University, Queensland, Australia (Australian National Data Service)
- Beijing Genomics Institute, China (British Library)

DataCite
www.datacite.org

DataCite Helping you to find, access, and reuse data

DataCite assigns persistent identifiers to published datasets.

Area: Persistent identifiers
Geographic Focus: Global

Current status: currently maintained

Sponsoring Organization: DataCite is a member-based international organization. Founding members include: the British Library; the Technical Information Center of Denmark; TU Delft Library; the National Research Council's Canada Institute for Scientific and Technical Information (NRC-CISTI); California Digital Library; Purdue University; and the German National Library of Science and Technology. Many other institutions are now members.

Other Projects in this Area:
- PersID
- Handle System

Additional Resources/Further Reading
- DataCite's metadata schema: http://schema.datacite.org
- DataCite's metadata search: http://search.datacite.org
- API documentation for the DOI registration infrastructure: https://mds.datacite.org/static/apidoc

DINI Certificate for Document and Publication Services

About this Initiative:
The German Initiative for Network Information (DINI) was established in 2000 to coordinate the development of modern information and communication technologies in the information infrastructures of higher education institutions and other research institutions in Germany. To keep track of new standards and technical trends and needs of the repository community, DINI maintains the DINI Certificate, issuing a new version every three years (2004, 2007 and 2010). The DINI Certificate has been translated into English, Spanish and French.

DINI Certificate for Document and Publication Services
www.dini.de/dini-zertifikat/english

This DINI Certificate describes technical, organizational, and legal aspects that should be considered when setting up and running a sustained document and publication service such as an OA repository.

Geographic Focus: Global

Current status: currently maintained

Applications of the DINI Certificate:
The certificate describes technical as well as organizational and legal aspects that should be considered when setting up and running a sustained Document and Publication Service like an Open Access repository. Concerning the interoperability of repositories, the DINI Certificate is a national standard that takes into account international initiatives such as OAI-PMH, Dublin Core and DRIVER. DINI Certification includes DRIVER compliance.

Getting Started
In order obtain the DINI Certificate, a repository must comply to its minimum requirements in all featured criteria. Once a repository fulfills these requirements, its repository manager should apply online for the DINI Certificate. This triggers a certification process in which two experts review the information provided by the repository manager and if needed contact him/her. The certification process can take up to three months. Once the DINI Certificate is awarded to a repository, the DINI seal may be displayed on its website to assure users of the trustworthiness and quality of the service.

Examples of Implementations

- EconStor is a subject based open access repository provided by the German National Library of Economics – Leibniz Information Centre for Economics. EconStor holds open access full-text works from the field of economics. http://www.econstor.eu
- pedocs is a subject-based Open Access repository that has been set up and is maintained by the German Institute for International Educational Research (DIPF). It collects electronic full-text works from the domains of educational research and educational science. http://www.pedocs.de
- edoc - Document and Publication Server of Humboldt-Universität Berlin, the institutional repository of the Humboldt-Universität zu Berlin, providing Open Access to full-text works published by affiliated researchers. http://edoc.hu-berlin.de/

Additional Resources/Further Reading

- DINI Certificate 2010 for Document and Publication Services http://nbn-resolving.de/urn:nbn:de:kobv:11-100182800
- Spanish, French, English, and German versions are available of the DINI Certificate.

Digital Repository Infrastructure Vision for European Research (DRIVER)

About this Initiative:

The EC-funded DRIVER project consisted of a multi-phase effort whose vision and primary objective was to create a cohesive, robust and flexible, pan-European infrastructure for digital repositories, offering sophisticated services and functionalities for researchers, administrators and the general public. Based on the establishment of a coordinated network of digital repositories containing textual research and other scholarly publications and on the development of an advanced-quality test-bed infrastructure, DRIVER enabled enhanced interoperability of data and service-providers while providing the required functionalities to end users.

One of the most important outputs of this initiative was the definition of the DRIVER Guidelines. The objective of these guidelines was to offer a best practice tool for the repository community through metadata and interoperability rules for exposing full-text Open Access materials stored in repositories as well as to streamline repository developments across Europe and worldwide. More specifically, the DRIVER Guidelines for Content Providers provide information and aim at:

- supporting repository managers to expose textual resources via OAI-PMH in an interoperable way
- providing orientation for managers of new repositories to define their local data-management policies
- directing managers of existing repositories to take steps towards improved services
- supporting developers of repository platforms to add supportive functionalities in future versions

DRIVER

http://www.driver-community.eu/

DRIVER was the first pan-European infrastructure for digital repositories.

Area: Repository Networks
Geographic Focus: Europe

Current status: maintained, core collection will soon be integrated into OpenAIRE

Sponsoring Organization: DRIVER consortium

Other Projects in this Area:
- OpenAIRE

Applications of DRIVER:

In the rapidly-evolving repository landscape, a unified approach on how to implement repositories is needed to ensure high-level interoperability and retrieval of content. DRIVER approached this challenge by harvesting and processing the aggregated data and by working with developers of leading repository software. The DRIVER aggregator and associated technologies allow *DRIVER Search* as well as third party search providers (e.g. national portals) to provide more sophisticated searching e.g. full text only records in an efficient and timely manner. This is made possible through the implementation of the DRIVER Guidelines by content providers which improve available metadata and through technologies and services developed by DRIVER and other third parties to simplify the use of this metadata by service providers, by end users and the repository community as a whole.

Getting Started

Although the DRIVER project finished in December 2009, much of its work is being carried on in some form. For now, the DRIVER Support Website is still being maintained. Some of the DRIVER work lines have been absorbed by the EC-funded OpenAIRE project. OpenAIRE will continue to support stakeholders in the growth and use of the European repository network, including project national support offices.

Implementing the Guidelines is straightforward and assistance is available from the DRIVER Guidelines Helpdesk. See also advice for Implementation of the DRIVER Guidelines.

DRIVER Tools like the DRIVER Repository Validation and Registration Service or DRIVER Search are available at the DRIVER Portal.

Examples of Implementations

Service Providers

The DRIVER Portal relies on DRIVER software D-NET v 1.0 that may be used to set up national portals. D-NET enables content harvest and aggregation from various sources and provides search, browsing and personalized services using customized user interfaces. An example of this application can be seen at the Belgium DRIVER portal. Other examples of national implementations are the Portuguese portal, RCAAP, and the Spanish publications portal, Recolecta. These two portals are different to previous example in that they do not use D-NET as a solution but implement the DRIVER guidelines in their own infrastructure, thus becoming fully DRIVER compliant.

Content providers

See the complete list of DRIVER-compliant repositories with examples worldwide.

Additional Resources/Further Reading

- The DRIVER Guidelines: http://www.driver-support.eu/documents/DRIVER_Guidelines_v2_Final_2008-11-13.pdf
- Publications from the first and second phases of DRIVER are available at: http://www.driver-support.eu/linkspubs/driverpubs.html
- A selection of presentations given by DRIVER partners at conferences and meetings are available at: http://www.driver-support.eu/linkspubs/driverslides.html
- A record of DRIVER II dissemination outputs are available at: http://www.driver-support.eu/linkspubs/driverdissem.html
- Further information, like reports, can be seen at the "Learn about DRIVER" website: http://www.driver-repository.eu/Downloads

Handle System

About this Initiative:

The Handle System provides efficient, extensible, and secure resolution services for unique and persistent identifiers of digital objects and is a component of CNRI's Digital Object Architecture.
Digital Object Architecture provides a means of managing digital information in a network environment. A digital object has a machine and platform independent structure that allows it to be identified, accessed and protected as appropriate. A digital object may incorporate not only informational elements, i.e., a digitized version of a paper, movie or sound recording, but also the unique identifier of the digital object and other metadata about the digital object. The metadata may include restrictions on access to digital objects, notices of ownership, and identifiers for licensing agreements, if appropriate.

The Handle System includes an open set of protocols, a namespace, and a reference implementation of the protocols. The protocols enable a distributed computer system to store identifiers, known as handles, of arbitrary resources and resolve those handles into the information necessary to locate, access, contact, authenticate, or otherwise make use of the resources. This information can be changed as needed to reflect the current state of the identified resource without changing its identifier, thus allowing the name of the item to persist over changes of location and other related status information.

The Handle System

handle.net

Handle System®

Handles are designed to provide unique and persistent identifiers of digital objects

Area: Persistent identification
Geographic Focus: Global

Current status: currently maintained

Sponsoring Organization: Corporation for National Research Initiatives (CNRI).

Other Projects in this Area:
- DataCite
- PersID

Applications of the Handle System:
Some examples of applications that use HDL®identifier and resolution services as infrastructure are rights management applications, digital object registries and repositories, and institutional data preservation and archiving.

Within the repository domain, handles allow item identification with a persistent URL, even if the URL of the repository itself changes. For end-users, handles are used to identify the digital version of a bibliographic reference.

Getting Started
The Handle System is not an end-user system, and it is not off-the-shelf software. It is an underlying infrastructure for identifying resources whose location information needs to be updated from time to time. In order to become a Handle user, the first step is to subscribe to the service provided by the CNRI, whose price is $50 for repository registration and $50 a year for system maintenance. (http://handle.net/service_agreement.html).

After registration, if the repository is not already running a Handle server, it should be installed by system administrators. After your system has a Handle server, create a configuration file (sitebndl.zip) that should be sent to the Handle service to properly configure your server with the central service that resolves the handle URL. After that, each new handle generated by your system should be resolved.

Examples of Implementations

- DSpace repositories implement the Handle Server by default - (http://www.dspace.org/)
- DOI System - http://www.doi.org/factsheets/DOIHandle.html
- CORDRA/ADL - Advanced Distributed Learning (ADL) Initiative
- More implementations: http://handle.net/apps.html

Additional Resources/Further Reading

- Registration on the Handle System: http://handle.net/service_agreement.html
- All the documentation: http://handle.net/documentation.html
- Support: http://handle.net/support.html

KE Usage Statistics Guidelines (KE-USG)

About this Initiative:
The Usage Statistics Guidelines are a result of a series of workshops on Usage Statistics organized by the Knowledge Exchange Initiative. These Guidelines enable comparability of Usage Statistics across systems when it comes to collecting and filtering usage data from repositories. Three national repository usage statistics initiatives -- OA Statistik (Germany), PIRUS2 (United Kingdom) and SURFsure (Netherlands) -- contributed to and agreed with this set of guidelines.

Applications of KE Usage Statistics Guidelines:
The guidelines describe a metadata format for usage data (OpenURL Context Objects) to be transferred from a repository to a central server using either OAI-PMH or SUSHI. By dividing the metadata format into core and extension sections, specificities of service providers can be incorporated. Rules are defined for usage data normalization regarding "double clicks" and robot filtering.

Getting Started
The KE Usage Statistics Guidelines target repositories and OA journal publishers, as well as service providers from usage initiatives. The guidelines define a framework on how usage data providers and service providers technically can interact with each other. Interested usage data providers should ask representatives from initiatives below.

Examples of Implementations

- SURFShare SURE - http://www.surf.nl/en/projecten/Pages/SURE.aspx
- OA-Statistics - http://www.dini.de/projekte/oa-statistik/
- PIRUS-II - http://www.cranfieldlibrary.cranfield.ac.uk/pirus2/tiki-index.php
- OpenAIRE - http://www.openaire.eu/en/support/guides/88-rep-man-toolkit-usage-stats

Additional Resources/Further Reading

- Usage statistics activities in KE: http://www.knowledge-exchange.info/Default.aspx?ID=365
- The guidelines: http://wiki.surf.nl/display/standards/KE+Usage+Statistics+Guidelines

KE Usage Statistics Guidelines

www.knowledge-exchange.info/Default.aspx?ID=395

http://wiki.surf.nl/display/standards/KE+Usage+Statistics+Guidelines

KE Usage Statistics Guidelines describe a metadata format for data usage to be transferred from a repository to a central server.

Area: Usage statistics
Geographic Focus: Global

Current status: currently maintained (formally accomplished)

Sponsoring Organization: Knowledge Exchange Partners (DEFF, DFG, JISC, SURF)

Other Projects in this Area:
- OA-Statistik
- PIRUS2
- SURE

Open Archives Initiative – Object Reuse and Exchange (OAI-ORE)

About this Initiative:
Open Archives Initiative - Object Reuse and Exchange (OAI-ORE) defines standards for the description and exchange of Web resource aggregations. These aggregations, sometimes called compound digital objects, may combine distributed resources with multiple media types including text, images, data, and video. OAI-ORE is based on the World Wide Web architecture and built upon the RDF model (which uses triples to describe items) using recent developments in the areas of Semantic Web, Linked Data and Cool URIs.

An OAI-ORE aggregation is a set of aggregated resources, all of which are represented by URIs, described by a Resource Map that has also a URI of its own. OAI-ORE Resource Maps can be represented by RDF/XML, Atom/XML or RDFa.

Applications of OAI-ORE:
The goal of OAI-ORE is to expose the rich content in Web resources aggregations to applications that support authoring, deposit, exchange, visualization, reuse, and preservation. The main motivation and field of application was scholarly and scientific resources (publications, data) used in research and scholarly communication, but the intent of OAI-ORE was to develop standards that generalize across all web-based information including the increasingly popular social networks of "web 2.0."

Getting Started
OAI-ORE is currently implemented in, and supported by, the major repository systems such as DSpace, ePrints and Fedora.

Examples of Implementations

- Enhanced Publications – An Enhanced Publication (EP) is a publication enriched with additional information and materials such as research data, models, algorithms, illustrative images, metadata sets or post-publication data such as comments or rankings. The concept was originally developed within the DRIVER project (http://www.driver-repository.eu/Enhanced-Publications.html), and was then tested and developed for SURF projects like Open Data and Publications (http://www.surf.nl/en/projecten/Pages/OpenDataandPublications.aspx)
- OREChem project using the OAI-ORE approach to explore how several chemistry groups can work together by linking their data. http://www.openarchives.org/oreChem/index.html

Additional Information/Further Reading:

- OAI-ORE User Guide – Primer. http://www.openarchives.org/ore/1.0/primer
- ORE Specifications and User Guides. http://www.openarchives.org/ore/1.0/toc

OAI-ORE

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

OAI-ORE defines the standards for the description and exchange of aggregations of compound objects.

Area: Managing compound objects
Geographic Focus: Global

Current status: currently maintained;

Current Version: Version 1.0 (2008) is currently in use.

Sponsoring Organization: Open Archive Initiative.

Other Projects in this Area:
- OAI-PMH
- SWORD

Open Archive Initiative – Protocol for Metadata Harvesting (OAI-PMH)

About this Initiative:
OAI-PMH makes it possible for metadata from items in repositories to be "harvested" or collected by external systems or repositories. When this occurs, metadata from multiple systems is aggregated together while the content itself remains at the host institution. OAI-PMH is used by both data and service providers. Data providers are repositories that allow their materials to be harvested using the OAI-PMH protocol, while service providers are systems that harvest materials via the OAI-PMH protocol.

OAI-PMH
www.openarchives.org/pmh

OAI-PMH facilitates metadata harvesting from compliant repositories

Area: Metadata harvesting
Geographic Focus: Global

Current status: currently maintained

Sponsoring Organization: Open Archive Initiative

Other Projects in This Area:
- OAI-ORE

Applications of OAI-PMH:
OAI-PMH serves a single purpose: to harvest metadata from a set of repositories at the same time. Once that metadata has been harvested, it is possible to create new platforms or services around the aggregated metadata.

OAI-PMH is the starting point for any interoperability work that involves harvesting metadata from multiple repositories.

Getting Started
OAI-PMH is the entry point for repository interoperability – it is a low-barrier interoperability protocol that most repository systems are designed to support with limited work by repository managers. Major repository systems such as DSpace, ePrints, Fedora, ContentDM, and Greenstone are all designed to support OAI-PMH.

Since OAI-PMH is designed to harvest metadata from repository records, it is necessary for compliant repositories to expose the Dublin Core metadata schema.

Examples of Implementations

- Connecting-Africa: a platform that uses OAI-PMH to harvest metadata records from repositories to provide a single interface for research about Africa. The platform currently includes resources from nearly 90 institutions; it is maintained by the African Studies Centre in Leiden, Netherlands. http://www.connecting-africa.net
- The Economists Online: provides access to bibliographic records for economics-related research and datasets produced at member institutions. Materials are harvested from their host institutions via OAI-PMH. The project was developed by the Network of European Economists Online (NEEO) and is now supported by Nereus. http://www.economistsonline.org/home
- Europeana: a collection of harvested metadata records for types of cultural heritage objects from various European institutions including museums, archives, universities, and other types of organizations. The focus is not just on scholarship, but also on other types of digital objects such as images and audio files. http://www.europeana.eu/portal/
- OAIster: a union catalog of harvested records covering a range of digital materials, including Open Access scholarship and other types of cultural heritage materials such as photographs and audio recordings. OAIster is currently supported by OCLC. http://oaister.worldcat.org/

- WorldCat: a union catalog of harvested metadata records from books, journals, and other types of resources such as Open Access Scholarship. http://www.worldcat.org

Additional Resources/Further Reading

- OAI for Beginners – the Open Archives Forum online tutorial: http://www.oaforum.org/tutorial/

Open Access Statistik (OA-Statistik)

About this Initiative:
The German project Open Access Statistics (OA-Statistik) aims to increase the acceptance of Open Access among authors and readers of scholarly publications by gathering internationally comparable usage statistics and by providing a lasting infrastructure for the collection and processing of usage data. Usage statistics reflect the level of interest in accessing the content of an individual article and thereby enable item-level, usage-based assessment. Moreover, recommendation services and relevance criteria can be developed on the basis of usage patterns.

In order to enable the comparison of usage statistics internationally, irrespective of the publication platform, the resource type, the country of origin, the language, and the thematic area, OA-Statistics and its national and international partners have agreed on uniform standards for the collection, exchange, and analysis of usage data.

Applications of OA-Statistik:
OA-Statistics has developed robust infrastructure components for the purpose of gathering and processing usage data and statistics from a wide variety of repositories.

The OA-Statistik infrastructure is based on OAS data providers that gather the usage data at the individual repositories, process them, and make them available via a standardized interface. From there the data is harvested by a central OAS service provider that calculates the statistics and makes them available in a standardized way to the repositories and to other value-added services.

Getting Started
Participating institutions need to install an OAS data provider. For more information you will find a specification of the data format and exchange on the OAS website. There are also software packages for several repository systems.

Examples of Implementations
Examples and all necessary information will be provided on the project's website.

OA-Statistik
www.dini.de/projekte/oa-statistik/english

Open-Access-Statistik

OA Statistik gathers internationally comparable usage statistics in order to increase the acceptance of OA among authors.

Area: Usage statistics
Geographic Focus: Germany, although it OAS can be applied anywhere in the world

Current status: currently maintained

Sponsoring Organization: DINI; Research Funder: German Research Foundation

Contact: oas@dini.de

Other Projects in this Area:
- KE Usage Statistics Guidelines
-PIRUS2
- SURE

Additional Resources/Further Reading
- The specification of the data format and exchange: http://www.dini.de/fileadmin/oa-statistik/projektergebnisse/Specification_V5.pdf
- Software Download: http://www.carpet-project.net/en/catalogue/detail-view/open-access-statistik-data-provider/
- Presentations: http://www.dini.de/projekte/oa-statistik/english/the-project-results/presentations/
- Publications: http://www.dini.de/projekte/oa-statistik/english/the-project-results/publications/

Open Access Repository Junction (OA-RJ)

About this Initiative:
The OA-RJ project was designed to deal with automatic deposit of multi-authored, multi-institutional research articles into multiple repositories, either institutional or otherwise (subject-based or funder repositories).

Applications of Repository Junction:
In many cases, a single article can have multiple destinations: an institutional repository for each author (when authors are affiliated with multiple universities), subject-based repositories, and funding agencies' repositories. If authors need to deposit the article in each repository, the workflow can be quite cumbersome and time consuming. The OA-RJ project aims to improve these processes.

The API developed for OA-RJ uses machine processing to refer and redirect users to the most appropriate repositories by determining depositors' institutional affiliation and associated repositories. An associated project, Organisation and Repository Identification (ORI), enables the matching of institutional affiliations to related institutional repositories therefore implementing a high-level interoperability-based workflow.

Getting Started
The Open Access Repository Junction API and instructions are available for download: http://oarepojunction.wordpress.com/junction/. Full details of the API are available here: http://oarepojunction.wordpress.com/junction-api/

Additional Resources/Further Reading

Information about the project can be found on the OA-RJ website: http://edina.ac.uk/projects/oa-rj/about.html and the OA-RJ project blog: http://edina.ac.uk/projects/oa-rj/links.html.

Additional information on the ORI feature is available at: http://edina.ac.uk/projects/ORI_summary.html.

Repository Junction
http://edina.ac.uk/projects/oa-rj/index.html

OA-RJ aims to simplify the deposit workflow for articles headed to multiple repositories

Area: Cross-System Content Transfer
Geographic Focus: Global

Current status: under development

Sponsoring Organization: EDINA with support from JISC

Other Projects in this Area:
- CRIS-OAR Interoperability
- SWORD
- UK RepositoryNet+

Open Access Infrastructure for Research in Europe (OpenAIRE)

About this Initiative:
The OpenAIRE Guidelines provide orientation for repository managers to define and implement their local data management policies in compliance with the Open Access demands of the European Commission. They comply with the technical requirements of the OpenAIRE infrastructure that were established to support and monitor the implementation of the FP7 OA pilot and ERC Guidelines for Open Access.

The OpenAIRE guidelines are supplementary to and built on top of the DRIVER Guidelines. For OpenAIRE compliance purposes, all the aspects of the DRIVER Guidelines are valid, with 4 exceptions only.

Applications of OpenAIRE Guidelines:
OpenAIRE provides an infrastructure for European research outputs. The guidelines are applied to OA repositories and journals. Through implementation of the guidelines, repositories and journals are facilitating compliance by authors who are required to deposit their publications in an OA repository in order to comply with the European Commission Open Access requirements.

It has been announced that a new version of the Guidelines (due in summer of 2012) will specify the requirements for compliance by aggregators (national portals, etc.)

Getting Started
Since the OpenAIRE Guidelines are built upon the DRIVER Guidelines, knowledge and application of the DRIVER Guidelines (especially on the use of OAI-DC) is required. Major repository platforms like DSpace and Eprints, as well as several national and local systems, and the Open Journal Systems, used by thousands of journals around the world, have plugins that make them OpenAIRE compliant.

Examples of Implementations

- Copernicus Publications – Publisher of Open Access journals. http://www.copernicus.org/
- E-Prints Complutense – Institutional Repository of Universidad Complutense (Madrid). http://eprints.ucm.es/
- KOPS - Institutional Repository of Universität Konstanz. http://kops.ub.uni-konstanz.de/
- ORBi – Open Repository and Bibliography, institutional repository of University of Liège. http://orbi.ulg.ac.be/

OpenAIRE
www.openaire.eu

OpenAIRE provides an infrastructure for European research outputs.

Area: Repository Networks
Geographic Focus: Europe

Current status: currently maintained

Sponsoring Organizations: European Commission, OpenAIRE Consortium

Other Projects in this Area:
- DRIVER
- UK RepositoryNet+

Additional Resources/Further Reading

- OpenAIRE Guide for Repository Managers: http://www.openaire.eu/en/support/guides/repository-managers
- OpenAIRE Guide for Journals: http://www.openaire.eu/en/support/guides/journals

Open Researcher & Contributor ID (ORCID)

About this Initiative: ORCID will create unique identifiers and records for scholars. ORCID records will be individually managed by scholars or collectively maintained by institutions for their researchers.

Applications of ORCID.

It is envisioned that ORCID records will be able to be used by:

- Individual researchers to update their records and maintain a current list of all of their publications
- Researchers to use an authenticated ORCID record into a manuscript or grant submission
- The repository community to ingest ORCID data into IRs
- Funding agencies to use unique author identifiers to facilitate the grant application process and to track the scholarly works resulting from their funding
- Publishers to use ORCID for author identification at manuscript submission time

Getting Started

The ORCID service was just launched in October 2012. After launch, individuals will be able to create a permanent ORCID record at: http://about.orcid.org/create_record

Examples of Implementations

ORCID identifiers will have the following structure:

http://orcid.org/0137-1963-7688-2319

ORCID
orcid.org

ORCID will create unique identifiers and author records for scholars that will be used to link scholars to their research outputs.

Area: Author identification
Geographic Focus: Global

Current status: active, launched in October of 2012

Sponsoring Organization: ORCID is an international not-for-profit membership organization for institutions.

Other Projects in this Area:
- AuthorClaim

Additional Resources/Further Reading

- ORCID blog – includes links to recent articles about ORCID http://about.orcid.org/

PersID

About this Initiative:.
The PersID initiative provides persistent identifiers using Uniform Resource Names (URN) and National Bibliography Numbers (NBN) along with an international infrastructure, framework, and knowledge base for applying these persistent identifiers.

Applications of PersID:.

Identifiers can be used to create persistent addresses for all types of web-based digital objects. The identifier system chosen for the PersID initiative is URN (rather than the Handle System or DOIs). The URN system is governed by the Internet Engineering Task Force (IETF), a public body and encompasses other bibliographic identification systems widely used by libraries – ISBN and ISSN.

Getting Started

Organizations wishing to become partners in the PersID initiative should contact info@persid.org.

Examples of Implementations

- The Data Archiving and Networked Services (DANS) online archiving system EASY uses URN:NBN for their persistent identifiers - https://easy.dans.knaw.nl/ui/home

Additional Resources/Further Reading

Documentation about the PersID project, including presentations and reports, is available from the project website: http://www.persid.org/documents.html.

PersID
www.persid.org

Area: Persistent identifiers
Geographic Focus: Global

Current status: active, currently in development

Sponsoring Organization: PersID partners: Data Archiving and Networked Services (DANS), Netherlands; Denmark's Electronic Research Library (DEFF); FondazioneRinascimentoDigitale (FDR), Italy; Knowledge Exchange; SURFfoundation, Netherlands; National Research Council (CNR), Italy; National Library, Sweden; National Library, Finland; Royal Library, Denmark; National Library, Germany

Other Projects in this Area:
- DataCite
- Handle System

Publishers and Institutional Repository Usage Statistics 2 (PIRUS2)

About this Initiative:.
PIRUS2 was designed to enable organizations – including publishers, repositories, and others – to generate and share authoritative usage statistics about individual items they host in repositories. It extends COUNTER usage standard granularity to cover repository content at the item level.

Applications of PIRUS:

PIRUS2 had the following objectives:

- To develop a suite of freely-available, open source programmes to support the generation of COUNTER-compliant usage data and statistics that can be extended to cover any and all individual items in repositories
- To define a core set of standard usage statistics that repositories should produce

According to JISC, the outcome of the project was to "demonstrate that it is technically feasible to create, record, and consolidate usage statistics for individual articles using data from repositories and publishers, despite the diversity of organizational and technical environments in which they operate."

Recommendations from PIRUS2 are being taken into consideration for future development of the COUNTER guidelines. PIRUS is currently being further developed within the UK RepositoryNet+ Project through the IRUS-UK extension to the institutional repository network in the UK. IRUS-UK, also being developed by Mimas, is a national aggregation service for usage collection.

Additional Resources/Further Reading:

- PIRUS2 Project Plans and Sample Reports: http://bit.ly/pirus2-dl
- Final Report for PIRUS2: http://www.projectcounter.org/News/Pirus2_oct2011.pdf
- IRUS-UK Project: http://www.irus.mimas.ac.uk/

PIRUS2

http://bit.ly/PIRUS2

The PIRUS project

The PIRUS2 Project

Area: Author identification
Geographic Focus: United Kingdom, although guidelines can be applied anywhere in the world

Current status: completed (2009-2011)
While PIRUS2 has been completed, recommendations from the report are under consideration for future updates of the COUNTER guidelines

Sponsoring Organization: JISC-funded project; Mimas (University of Manchester) had overall responsibility for the project

Other Projects in this Area:
- OA-Statistik
- SURE
- UK RepositoryNet+

Statistics on the Usage of Repositories (SURE)

About this Initiative:

In the SURE project (Statistics on the Usage of Repositories), an infrastructure has been deployed on a national scale for the accumulation and the exchange of usage data of Open Access publications from Dutch institutional repositories. A central component in this infrastructure is a database in which all the usage data from Dutch universities is recorded in a standardized way. The project technical specifications have also been aligned with those of similar projects in Germany and in the UK with the aid of the Knowledge Exchange organization.

In addition, a number of dashboards were developed on which the usage data can be visualised in a variety of ways by different stakeholders. On the NARCIS portal, the national gateway to scholarly information in the Netherlands, metrics can firstly be requested for individual publications. The dashboards provide information about the full number of downloads, the geographic distribution and the referrers used. By making use of Digital Author Identifiers (DAIs), metrics can be provided for individual authors and their publications. The dashboards have also been made available in the form of widgets, which can be embedded into local repositories, institutional and personal web pages. Even an API is available providing usage data based on persistent identifier queries or repository queries. Developers use the API to extract the data and combine it with other data to create their own applications and visualisations.
http://repositorymetrics.narcis.nl/

Applications of SURE:
Usage data is standardized on the basis of the OpenURL Context Objects schema. With the support of Knowledge Exchange, a collaborative initiative for leading national science organizations in Europe, the application of the OpenURL Context Objects standard has been aligned with those of similar projects and initiatives in Germany (OA Statistik), Belgium (NEEO) and the United Kingdom (PIRUS and COUNTER). The full application profile can be found on the following address:
http://wiki.surf.nl/display/standards/KE+Usage+Statistics+Guidelines

The software which was developed by the project has also been made available as open source:
http://code.google.com/p/surfshare-sure/downloads/list

SURE
http://wiki.surf.nl/display/statistics/Home

Statistics on the Usage of REpositories (SURE)

SURE provides guidelines for the creation and exchange of statistics about the usage of content in OA repositories.

Area: Usage statistics
Geographic Focus: Netherlands, although the guidelines can be applied anywhere in the world

Current status: currently maintained; building-up phase

Sponsoring Organization: The development of this project was funded by an Open Society Institute grant to the ACIS project.

Other Projects in this Area:
- KE Usage Statistics Guidelines
- OA-Statistik
- PIRUS2

Experiences so far have shown that usage-based metrics can offer a very effective instrument for the measurement of scientific impact and, subsequently, for the advocacy of Open Access repositories.

Additional Resources/Further Reading:

short history:
SURE1 (2009-2010): proof of concept, exchange of statistics &standardization (3 repositories)
http://www.surf.nl/en/projecten/Pages/SURE.aspx
SURE2 (2011): demo, dashboards, API, visualisations (11 repositories)
http://www.surf.nl/en/projecten/Pages/SURE2.aspx
SURE3 (2012): production environment, refactoring code, faster, increasing data quality (start-up phase)

Simple Web-Service Offering Repository Deposit (SWORD)

About this Initiative:
SWORD is a lightweight protocol that facilitates the deposit of resources from remote sources into repositories or similar systems. As a profile of the AtomPub standard, SWORD sits upon common web standards to provide a layer of interoperability between repositories for the ingest of content.

First developed in 2007, SWORD has evolved over several iterations. SWORD v1 was the original version and allowed SWORD clients to perform single deposits into repositories. SWORD v2 was later built upon this functionality to allow interaction with deposits. These interactions allow content to be updated, replaced, or deleted using the same protocol.

SWORD is agnostic about the resources it can deposit. The protocol can deal with metadata-only records and with metadata plus digital objects, files (large or small), file packages or complex objects. These are then ingested into the repository and processed in the regular way. SWORD has been implemented by default in recent versions of most open repository software systems, including DSpace, EPrints, Fedora, Invenio, Zentity, and Intralibrary.

Applications of SWORD:
SWORD can be used to facilitate a number of different use cases for content transfer into repositories. These include:

- Publisher to Repository
- Research Information System to Repository
- User's Desktop to Repository
- Repository to Repository
- Specialised Deposit User Interface to Repository
- Conference Submission System to Repository
- Laboratory equipment to Repository
- Repository Bulk Ingest
- Collaborative Authoring

(Source: 'SWORD: Facilitating Deposit Scenarios'. doi:10.1045/january2012-lewis)

SWORD
swordapp.org

SWORD provides a mechanism for authors to deposit a single article into multiple repositories.

Area: Cross-System Content Transfer
Geographic Focus: Global

Current status: currently maintained

Sponsoring Organization: JISC, UKOLN

Other Projects in this Area:
- OA-RJ
- UK RepositoryNet+

Typically SWORD deposits are made from a SWORD client to a SWORD server. SWORD clients range from right-click tools integrated into file explorers, through social deposit applications built in facebook integrated into institutional workflow tools, to laboratory equipment that automatically deposit data.

For further details see:
http://swordapp.org/sword-v1/sword-v1-implementations/
http://swordapp.org/sword-v2/sword-v2-implementations/

Getting Started

The first steps are:

1. Check if your systems have a SWORD client or server included and the protocol version (if not available, check this page to download a v1, http://swordapp.org/sword-v1/sword-v1-downloads/ or v2 client, http://swordapp.org/sword-v2/sword-v2-extensions/)

2. You will always need both a client (the application that sends the information) and a server (the application that receives / ingests the information). The exact specifications depend on the way in which you want to send the information.

3. Define what you want to transfer (metadata schema and files) and test the implementation.

Examples of Implementations

- Dspace / EPrints / Fedora
- arXiv 1.3-compliant endpoint: http://arxiv.org/help/submit_sword
- Biomedcentral's OpenRepository – implementing a SWORD interface
- Microsoft ZentityResearchOutputRepository platform supports SWORD deposit
- TARDIS, the Australian Repository for Diffraction Images is implementing a SWORD interface: http://tardis.edu.au/wiki/index.php/TARDIS2
- CUNY, The City University of New York Libraries are using SWORD for deposit into DSpace

Additional Resources/Further Reading

The Sword App Website: http://swordapp.org/
The Sword Course :http://swordapp.org/the-sword-course/ (with videos, presentations)

UK RepositoryNet+

About this Initiative:.
UK RepositoryNet+ (RepNet) is a socio-technical infrastructure supporting deposit, curation and exposure of Open Access research literature. The aim of the UK RepNet project is to increase the cost effectiveness of repositories of such literature. It will do this by offering a sustained and well-used suite of services that enable repositories to provide enhanced functionality to meet the needs perceived by different research-related stakeholders such as funders, higher education institutions, or repository managers among others.

Specifically, the RepNet project will:

- Scope and deliver repository and curation services via a production environment that offers economies of scale and scope
- Set up a production environment for repository shared services which works closely with the proposed innovation environment
- Provide market research/ intelligence, quality assurance, business case and sustainability planning to support the project.

Applications of UK RepositoryNet+:
At a time when various ways of providing extensive access to research outputs are being discussed, the RepNet project aims to bring Open Access and repositories back into the main focus. A set of repository-related services (such as *SHERPA RoMEO/JULIET*, *IRUS UK* or the *Repository Junction Broker*) will be brought together under RepNet coordination, in order to exploit synergies among them. Missing pieces of RIM infrastructure will be identified along a subsequent gap analysis to be performed following the JISC data-driven infrastructure approach, the result of which will be a set of new features and working procedures to be implemented in a harmonised way across the whole UK repository network.

RepNet comprehensive approach to research information management workflows features different existing repository services or tools (aka 'RepNet Components') in four main areas:

- **Deposit.** Includes setting up and launching OA-RJ/ORI as a tool for scholarly content notification and exchange among systems
- **Policies.** Brings together SHERPA RoMEO and JULIET services to explore their synergies and their integration into new repository services
- **Reporting.** Features IRUS-UK as a service for providing COUNTER-compliant repository usage at item level across the Uk repository network
- **Innovation.** A set of new repository services arising from a gap analysis jointly carried out with the JISC Innovation Zone from a data-driven infrastructure perspective are being identified and planned.

UK RepositoryNet+

http://www.repositorynet.ac.uk/

The RepNet project

UK RepositoryNet+

Area: Repository Networks
Geographic Focus: United Kingdom, although resulting services may be applied anywhere in the world

Current status: running (until Mar 2013)
Once the original project stage has been completed, RepNet is planned to evolve into a service for the UK repository network

Sponsoring Organization: EDINA (JISC-funded project)

Other Projects in This Area:
- DRIVER
- OA-RJ
- OpenAIRE
- PIRUS2
- SWORD

Additional Resources/Further Reading:

- UK RepositoryNet+ page at the JISC website: http://www.jisc.ac.uk/whatwedo/programmes/di_researchmanagement/repositories/ukrepositorynet.aspx
- Project Summary at RepNet blog: http://www.repositorynet.ac.uk/project-summary/
- OR2012 RepNet presentation: "The Development of a Socio-technical infrastructure to support Open Access Publishing though Institutional Repositories" , http://bit.ly/T3itHz

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About COAR

COAR, the Confederation of Open Access Repositories, is a young association of repository initiatives launched in October 2009, uniting over 80 members and partners from 24 countries from throughout Europe, Latin America, Asia, and North America. Its mission is to enhance greater visibility and application of research outputs through global networks of Open Access digital repositories. More information about COAR and its members is available on the COAR web site <http://www.coar-repositories.org>.

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