



Implementation of the Data Seal of Approval

The Data Seal of Approval board hereby confirms that the Trusted Digital repository Digital Repository of Ireland complies with the guidelines version 2014-2017 set by the Data Seal of Approval Board.

The afore-mentioned repository has therefore acquired the Data Seal of Approval of 2013 on June 30, 2015.

The Trusted Digital repository is allowed to place an image of the Data Seal of Approval logo corresponding to the guidelines version date on their website. This image must link to this file which is hosted on the Data Seal of Approval website.

Yours sincerely,

The Data Seal of Approval Board

Assessment Information

Guidelines Version:	2014-2017 July 19, 2013
Guidelines Information Booklet:	DSA-booklet_2014-2017.pdf
All Guidelines Documentation:	Documentation
Repository:	Digital Repository of Ireland
Seal Acquiry Date:	Jun. 30, 2015
For the latest version of the awarded DSA for this repository please visit our website:	http://assessment.datasealofapproval.org/seals/
Previously Acquired Seals:	None
This repository is owned by:	Digital Repository of Ireland
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	T +353 1 609 0674
	E dri@ria.ie
	W http://www.dri.ie/

Assessment

0. Repository Context

Applicant Entry

Self-assessment statement:

[The Digital Repository of Ireland](#)

The **Digital Repository of Ireland** is a national trusted digital repository for Ireland's social and cultural data. The repository links together and preserves both historical and contemporary data held by Irish institutions, providing a central internet access point and interactive multimedia tools. As a national e-infrastructure for the future of education and research in the humanities and social sciences, DRI is available for use by the public, students and scholars.

The Digital Repository of Ireland is built by a research consortium of six academic partners working together to deliver the repository, policies, guidelines and training. These research consortium partners are: [Royal Irish Academy](#) (RIA, lead institute), [Maynooth University](#) (MU), [Trinity College Dublin](#)(TCD), [Dublin Institute of Technology](#) (DIT), [National University of Ireland, Galway](#) (NUIG), and [National College of Art and Design](#) (NCAD). DRI is also supported by a network of academic, cultural, social, and industry partners, including the National Library of Ireland (NLI), the National Archives of Ireland (NAI) and RTÉ. Originally awarded €5.2M from the Higher Education Authority PRTL Cycle 5 for the period of 2011-2015, DRI has also received awards from Enterprise Ireland, Science Foundation Ireland, The European Commission's Seventh Framework Programme (FP7) and the Ireland Funds, and Horizon 2020, the EU Framework Programme for Research and Innovation.

We at the Digital Repository of Ireland believe our national mandate is best achieved through partnership, so continue to build relationships and collaborations with national and international centres of excellence in digital preservation, and with the owners and custodians of cultural and social content.

Mission

The Digital Repository of Ireland is a trusted national infrastructure for the preservation, curation and dissemination of Ireland's humanities, social sciences, and cultural heritage data.

Data Seal of Approval Board

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Vision

The Digital Repository of Ireland is a national service for the long-term digital preservation of Ireland's humanities, social science, and cultural heritage resources.

-

DRI is a trusted service, providing online access to a wealth of digital resources across multiple domains for students, scholars and the public.

-

DRI actively engages in the development of policy, and is an internationally recognised leader in digital archiving and repository infrastructure.

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Outsourcing

The DRI uses the [DataCite](#) service to both mint and store the DOIs (Digital Object Identifiers) for ingested digital objects.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

This is a good statement setting the context for the repository.

1. The data producer deposits the data in a data repository with sufficient information for others to assess the quality of the data, and compliance with disciplinary and ethical norms.

Minimum Required Statement of Compliance:

3. In progress: We are in the implementation phase.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

The depositing organisation is assessed before becoming a member and signs legal documentation asserting that a full and correct package will be deposited (see Membership Policy and legal agreements below). The depositing organisation and other affiliated organisations are captured on ingest and displayed with the digital objects (see How To: Publishing your DRI Collection below).

Valid metadata with all mandatory fields filled, together with institutional affiliation are required on deposit. DRI supports ingest using the most commonly used metadata standards in Ireland; Simple and Qualified Dublin Core, EAD, MODS and MARC21 encoded as MARCXML. Guidelines are provided for each of the supported standards to help the depositor prepare their data for ingest into the Repository. These guidelines outline mandatory and recommended fields, as well as giving advice on relevant content standards and controlled vocabularies. Information on the data producer is captured in the descriptive metadata.

Additionally associated assets and a contextual information may be deposited where applicable. Depositors are requested to submit a contextual information according to the rules and ethics of the individual disciplines. These additional documents provide information on the data creation process and additional information on the digital objects which allows future researcher to understand more fully the digital objects. Where the digital objects are generated in research conducted on people the depositor is asked to include legal or ethical approval obtained. These contextual documents are publically available. The [How to DRI: Contextual Information](#) guide outlines the types of documentation which would be useful for the depositor to include with their contextual information documents along with information on how to deposit them within the system.

DRI automatically generates citations for the collections it holds. The fields used to generate these citations are drawn from the descriptive and technical metadata attached to the object and are based on international best practice. These are outlined in the Citation Policy.

Supporting Documentation

[DRI Citation Policy](#) (April 2015)

[How to DRI: Contextual Information](#) (June 2015)

[How to DRI: Publishing Your DRI Collection](#) (June 2015)

DRI Factsheet No. 5: [About DRI Membership](#) (Jan 2015)

[DRI Membership Policy](#) (Nov. 2014)

[DRI Organisational Manager Agreement](#) (June 2015)

[How to DRI: Understanding Administrative Roles](#) (June 2015)

[DRI Deposit Terms and Conditions](#) (Feb. 2015)

[Qualified Dublin Core and the Digital Repository of Ireland](#)

[Dublin Core and the Digital Repository of Ireland](#)

[Metadata Quality Control](#)

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Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

2. The data producer provides the data in formats recommended by the data repository.

Minimum Required Statement of Compliance:

3. In progress: We are in the implementation phase.

Applicant Entry

Statement of Compliance:

3. In progress: We are in the implementation phase.

Self-assessment statement:

DRI provide a guide to recommended and preferred formats. This is published as a Format Fact Sheet and is regularly reviewed and updated. The Repository also provides a report on the characterisation that was performed on ingested asset files which informs the user of any issues with the file format.

Uploaded preservation-quality assets undergo a rigorous set of checks before they are permanently stored in the Repository. As set out by the project requirements, incoming files are scanned and validated for file type correctness using the File Information Tool Set (FITS) [<http://projects.iq.harvard.edu/fits>]. These tests deliver error messages to the user who is attempting the upload if the ingest fails. They also generate a report with the file type and other essential properties of the file. If all tests are passed, the assets are preserved in DRI's internal storage system (see section 6.2.2 of the Report on the DRI Infrastructure: Building a National Trusted Digital Repository for further information on asset handling). Technical information on file formats is captured on ingest and displayed in a report available to the depositor.

The depositor is also asked to include information about the digitising processes, including technology and software use in the Contextual Guide attached to their collection.

Supporting Documentation

[DRI Factsheet No. 3: File Formats Version 2](#) (June 2015)

[Report on the DRI Infrastructure: Building a National Trusted Digital Repository](#)

[DRI Factsheet No. 6: Producing High-Quality Images for Digital Preservation](#) (June 2015)

[How to DRI: Contextual Information](#) (June 2015)

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

3. The data producer provides the data together with the metadata requested by the data repository.

Minimum Required Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

DRI captures the metadata encoded in the following standards: Simple and Qualified Dublin Core, MODS, MARC21 encoded as MARCXML and EAD. Data ingestion to the repository can happen in one of three different ways. Firstly, the Repository includes a web-based user interface for single object ingest. This user interface provides blank fields to allow cataloguers to create metadata for a single digital object and ingestion of associated digital assets. The metadata records are stored as XML and can be exported by the cataloguer as an XML file if desired. The single ingest web form supports Simple and Qualified Dublin Core.

Secondly, metadata in XML format can be ingested directly into the Repository using single ingest XML upload. Thirdly, bulk ingest of metadata records in XML format can also be ingested via the DRI client tool. This is a command-line application providing access via an API to the DRI Repository. All supported standards may be ingested via XML ingest. The appropriate namespace and schema information must be included in the header of the XML record.

The DRI provides a range of user guides which outline how to prepare metadata for ingest into DRI, for example a guide to [Metadata Quality Control](#). These are supported by regular training workshops. DRI also produces a guidelines document for each supported metadata format detailing mandatory and recommended fields.

Data must be provided for mandatory elements to enable metadata to be ingested by the Repository; metadata will be automatically rejected by the system if mandatory elements are not included. Recommended elements do not have to be included, but DRI strongly advises that they are completed if possible in order to facilitate searching. All submitted elements, whether mandatory, recommended or optional, are stored and available in the Repository. By following these guidelines data producers make their collections more easily searchable in the Repository, and cross-searchable with other DRI collections.

Supporting Documentation

[How to DRI: Command Line Tool \(June 2015\)](#)

[Qualified Dublin Core and the Digital Repository of Ireland](#)

[Dublin Core and the Digital Repository of Ireland](#)

[Metadata Quality Control](#)

Guidelines on the use of EAD, MODS, and MARC are due to be published by December 2015.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

4. The data repository has an explicit mission in the area of digital archiving and promulgates it.

Minimum Required Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

The DRI mission statement is issued under the authority of the funding agency [Higher Education Authority](#) and the DRI governance bodies. The DRI mission statement is as follows:

The Digital Repository of Ireland is a trusted national infrastructure for the preservation, curation and dissemination of Ireland's humanities, social sciences, and cultural heritage data.

Vision

- The Digital Repository of Ireland is a national service for the long-term digital preservation of Ireland's humanities, social science, and cultural heritage resources.
- DRI is a trusted service, providing online access to a wealth of digital resources across multiple domains for students, scholars and the public.
- DRI actively engages in the development of policy, and is an internationally recognised leader in digital archiving and repository infrastructure.

The DRI's mission statement is implemented by the provision of the DRI Repository, and associated services, legal frameworks, policies and workflows developed by DRI, the partnerships with content owners, and an active and broad education and outreach programme. A plan will be put in place with our partner institutions to hold data should the DRI cease to operate. The DRI has a comprehensive education and outreach program which includes

training courses, seminars, workshops, conferences and fact sheets, user guides and other publications. A full list of publications can be found at <http://www.dri.ie/publications>. A full list of events can be found at <http://www.dri.ie/events>.

Supporting Documentation

[DRI Factsheet No. 4: Long-term Digital Preservation](#)

[Digital Archiving in Ireland: National Survey of the Humanities and Social Sciences DRI Series no. 1](#) (Oct. 2012)

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

5. The data repository uses due diligence to ensure compliance with legal regulations and contracts including, when applicable, regulations governing the protection of human subjects.

Minimum Required Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

DRI is an unincorporated association of six partners. These research consortium partners are: [Royal Irish Academy](#) (RIA, lead institute), [Maynooth University](#) (MU), [Trinity College Dublin](#)(TCD), [Dublin Institute of Technology](#) (DIT), [National University of Ireland, Galway](#) (NUIG), and [National College of Art and Design](#) (NCAD).

DRI is also supported by a network of academic, cultural, social, and industry partners, including the National Library of Ireland (NLI), the National Archives of Ireland (NAI) and RTÉ. Originally awarded €5.2M from the Higher Education Authority PRTL Cycle 5 for the period of 2011-2015, DRI has also received awards from Enterprise Ireland, Science Foundation Ireland, The European Commission's Seventh Framework Programme (FP7) and the Ireland Funds, and Horizon 2020, the EU Framework Programme for Research and Innovation.

The Digital Repository of Ireland believe our national mandate is best achieved through partnership, so continue to build relationships and collaborations with national and international centres of excellence in digital preservation, and with the owners and custodians of cultural and social content.

The DRI membership structure, deposit and end use processes are all underpinned by a suite of legal agreements (see DRI Factsheet No. 5: [About DRI Membership](#) and Member Policy). Standard contracts have been developed which mandate compliance on behalf of our members with Irish and International law (see legal agreements below). These are supplemented by appropriate fact sheets and guides (for example on copyright).

All data within the repository is stored on a secure storage cluster which is behind a firewall and only accessible to a user authenticated with an ssh key pair.

All metadata is publicly accessible and licenced under CC BY.

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DRI supports a range of access controls to data. These are outlined below. All users are required to agree [via a tick box] with the standard end user agreement.

Public access data/ unrestricted data:

Applies to all metadata in the Repository (and can also apply to objects and collections). Users are required to agree [via a tick box] with the standard end user agreement. Registration is not required. Unregistered users are able to view the metadata and public access/unrestricted assets.

Restricted data:

In order to safeguard certain kinds of data, especially those generated through research carried out with human subjects, DRI will allow for the imposition of two different types of data restriction. We will follow these definitions.

Safeguarded data/ Standard access:

Users are required to agree [via a tick box] with the standard end user agreement. Registration is required in order to be able to view the data.

Safeguarded Data/ Special Conditions:

Some data collections are subject to additional conditions of access. Users are required to agree [via a tick box] with the standard end user agreement. Registration is required in order to be able to view the data. Users will have to meet further special conditions. These special conditions include one or more of

An embargo: data only available after a time period

-

The user has registered with an edugate account

-

The user completes a Special Condition Data Access form

-

Additional special conditions: the user must be manually approved by the depositor who will ensure that the user meets the additional special conditions (See Restricted Data Policy).

-

The Repository application allows a data owner to set access restrictions on their data. Data can be available publicly, to logged-in users, or restricted to named individuals (see the Restricted Data Policy). We will additionally support the restriction of access to those with Edugate (1) usernames and passwords. These access restrictions are implemented via a custom user and groups code library developed by DRI which stores the permissions as technical metadata alongside each object or collection. Users may request access to data via the

web interface. On accessing data with access restrictions a user will be reminded not to share the data.

End-users will additionally only obtain access on acceptance of End User Terms and Conditions which places legal restrictions and responsibilities on data use. End User Terms and Conditions are displayed on access to the digital objects and also on the DRI web page as part of the DRI life cycle. Data is distributed via an ssl connection to ensure security while in transit to the user.

Our Breaches Procedure outlines the DRI response to instances where the conditions are not met (this is not a public document and is available on request).

(1) The [Edugate Federation](#) is comprised of public and private Irish Higher Education Institutions and Research Organisations that have agreed upon a standard procedure for exchanging information about users and resources to enable access and use of those resources and services.

Supporting Documentation

[DRI Factsheet No. 2: Copyright, Licensing, and Open Access](#) (Feb 2014)

[How to DRI: Protect Your Data](#) (June 2015)

[DRI Factsheet No. 5: About DRI Membership](#)

[DRI Membership Policy](#) (Nov.2014)

[DRI Organisational Manager Agreement](#) (June 2015)

[How to DRI: Understanding Administrative Roles](#) (June 2015)

[DRI Deposit Terms and Conditions](#) (Feb. 2015)

[DRI End User Terms and Conditions](#) (March 2015)

[DRI Restricted Data Policy](#) (May 2015)

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

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6. The data repository applies documented processes and procedures for managing data storage.

Minimum Required Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Applicant Entry

Statement of Compliance:

3. In progress: We are in the implementation phase.

Self-assessment statement:

The Digital Repository of Ireland is committed to the long-term preservation of deposited assets. Trusted preservation is at the core of DRI's mandate and has informed the project's requirements from the beginning. The repository's commitment to digital preservation best practices is informed by ISO16363 and the Data Seal of Approval (DSA), and supported by extensive international research into the practices of exemplary existing national repositories.

The Repository preservation workflow segregates archival assets from their access and discovery surrogates. At ingest, the asset is packaged with its metadata and manifests. Packages are stored on separate logical groupings of storage media (hot storage clusters) that are fault tolerant, self-healing and geo-replicated, ensuring that packages are always available and resistant to disk failures. Two of these hot storage clusters are separated geographically and synced continuously by rsync.

A backup and tape management strategy is in place and describes how often and when backups occur and how tapes are to be handled. Backup is managed by Bareos open source technology. Backups are taken from hot storage regularly and stored to cold storage at another location, first to disk then to tape. Tapes are then stored in a fireproof, secure safe. All storage media will be encrypted, rotated and tested for defects.

An integrity process continuously tests archive packages in all locations, re-calculating the checksums of all assets, and comparing them to the stored manifest. Should a discrepancy be found, an alert is generated and data recovery procedures are undertaken.

These data recovery provisions are:

The system administrator receives alerts and determines the nature and extent of the incident

-

Depending on the scale of the incident a team is assembled

-

The affected data owners are alerted

-

A last good copy is recovered from cold storage

-

This is recovered as a new version alongside the damaged/missing data

-

Our disaster recovery and risk assessment processes are informed by DRAMBORA. Drambora is an audit tool that allows us to identify and assess the risks, manage them to mitigate the likelihood of their occurrence and establish effective contingencies to alleviate the effects of the risks that cannot be avoided.

Storage servers are hosted in locked racks in shared modern secure data centers that have controlled and monitored access with fire repression and uninterrupted power supply. Hot and cold data disks/tapes are encrypted and traffic between servers is encrypted. Backup tapes are archived in a secure safe. Storage servers are firewalled and all traffic from the internet is through load balancers. Access to the operating systems is by ssh key only that is centrally managed. Servers are scanned for rootkits.

Hard drives are monitored for SMART defects. Tapes are monitored for defects by the physical tape machine and also by Bareos tape backup software. Any defects in either hard drives or tapes are alerted through our Nagios alert/monitoring system.

Chapter 5 of the Report on the DRI Infrastructure: Building a National Trusted Digital Repository discusses the storage solutions and storage architecture employed by DRI.

Supporting Documentation

[Report on the DRI Infrastructure: Building a National Trusted Digital Repository](#)

DRI is in the process of finalising our Preservation Policy. Version 1 was submitted to external review and we are currently incorporating suggestions from this review process.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

7. The data repository has a plan for long-term preservation of its digital assets.

Minimum Required Statement of Compliance:

3. In progress: We are in the implementation phase.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

DRI follows best practice with regard to file format obsolescence. The technical team monitors file format trends and identifies assets that may be at risk. Asset files will be migrated where appropriate. Migrated files will undergo the same file identification and characterisation process applied to uploaded files, and a report will be made available to show the essential properties of the new file so that differences between the versions can be identified and corrected where appropriate. Furthermore, the original version of the file will always be preserved alongside any migrated versions. We provide recommendations on file formats and these are updated on a regular basis (see DRI Factsheet No. 3: [File Formats](#)).

The DRI creates and stores surrogate versions of ingested assets which are web-renderable and potentially compressed for optimal display; these are the versions that are delivered to the data consumer. The list of generated surrogate files will evolve over time as technology changes and new surrogates will be created. This will ensure that a usable version of the file will be available.

All digital objects must be deposited with associated metadata, and where appropriate contextual information. DRI supports QDC, SDC, MODS, MARC21 encoded as MARCXML and EAD descriptive metadata formats. Guidelines to their use within DRI are provided. Preservation metadata and object provenance is also captured and stored as PREMIS metadata. Metadata output by the FITS tool is also captured and stored as technical metadata.

For further information please see the Infrastructure Report, in particular Chapters 5 'Storage', 6 'Metadata and Data Modelling' and 7 'User Interface Design' and the Cucumber Specifications.

Supporting Documentation

[DRI Factsheet No. 3: File Formats Version 2](#) (June 2015)

[Qualified Dublin Core and the Digital Repository of Ireland](#)

[Dublin Core and the Digital Repository of Ireland](#)

[Metadata Quality Control](#)

[Report on the DRI Infrastructure: Building a National Trusted Digital Repository](#)

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

8. Archiving takes place according to explicit work flows across the data life cycle.

Minimum Required Statement of Compliance:

3. In progress: We are in the implementation phase.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

The DRI provides online guides and an FAQ which outline fully all steps associated with depositing data within DRI (see DRI lifecycle). The Repository supports both synchronous and asynchronous (batch) data workflows for ingesting and processing data. These are documented in the Report on the DRI Infrastructure: Building a National Trusted Digital Repository (See the Report on the DRI Infrastructure, in particular Chapters 7 'Preservation', 8 'Metadata and Data Modelling' and 9 'User Interface Design' and the Cucumber Specifications).

Once ingested, metadata and data are archived in Fedora and an Archival Information Package (AIP) (See <http://public.ccsds.org/publications/archive/650x0m2.pdf> page 36, last accessed 17 June 2015) is created and stored on disk for long-term preservation. Over time as data formats evolve, it may be necessary to take preservation actions on these files in order to ensure continued access. The DRI maintains a technology watch to identify at-risk data formats and has a process for mitigating these risks. In addition DRI has a policy framework which mandates regular policy review, including policy on data formats.

The DRI staff includes qualified archivists, librarians, social scientists, humanities scholars, Irish language scholars, legal advisors, project management professionals, education and outreach specialists, software engineers, system administrators and information and data management professionals (for more information see <http://www.dri.ie/dri-team>).

Although DRI provides recommendations on formats for ingest it will ingest non-standard formats. The Repository holds objects generated by Humanities and Social Science (HSS) scholars. Different metadata standards are appropriate to different types of data within these domains. The workflows for ingest of the different standards vary. A web-ingest form is provided for Simple and Qualified Dublin Core. Web upload of individual XML files is possible for Simple and Qualified Dublin Core, MODS and MARC21 encoded as MARCXML, while ingest for all standards is available via a command line tool. A tool has been developed to facilitate this. Ingest of EAD is currently only possible from the command line due to the complexity of the records.

The Collection Policy provides an overview of the types of data, digital assets and collections which DRI aims to preserve, and should inform potential depositors on whether they may hold appropriate content for ingestion.

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The roles and responsibility of depositors and the Repository are clearly outlined in the Organisational Manager agreement.

Supporting Documentation

[DRI Lifecycle](#)

[DRI FAQ](#)

[Report on the DRI Infrastructure: Building a National Trusted Digital Repository](#)

[How to DRI: Command Line Tool](#) (June 2015)

[DRI Collection Policy](#) (April 2015)

[DRI Organisational Manager Agreement](#) (June 2015)

[DRI Policy Framework](#) (Feb. 2012)

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

9. The data repository assumes responsibility from the data producers for access and availability of the digital objects.

Minimum Required Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Applicant Entry

Statement of Compliance:

3. In progress: We are in the implementation phase.

Self-assessment statement:

The roles and responsibility of depositors and the Repository are clearly outlined in the Organisational Manager and in Data Deposit agreements (see below). Within our federated membership structure these agreements assert that it is the Depositor's responsibility to apply the appropriate licenses to the data and the Repositories responsibility to ensure they are displayed with the system.

The DRI Breaches Procedure outlines the DRI response to instances where the conditions are not met (this is not a public document and is available on request).

Our Crisis Management strategy (currently in development) adopts the following principles

Prevention: prevent disasters where possible

-

Preparation: prepare for the most likely disaster scenarios

-

Quick Response: when disaster does strike

-

Effective Recovery: recover effectively and maintain access.

-

The Repository infrastructure is built to handle failure. All major components are duplicated or clustered such that a server or node can be lost without affecting service. Storage is particularly highly-available: one node or several individual hard drives can be lost before service is affected.

Additionally all hardware is monitored such that failing devices are identified before they become critical (for example failing hard drives or nodes). The DRI infrastructure mitigates against peaks in demand by having spare compute resources. Should demand rise temporarily, this spare capacity can be added to the application. Future separation of the ingest and access repositories will allow better allocation of resources and continuity of access during resource intensive ingests. It will also be possible to put the repository into "read only" mode, stopping ingestion, to allow the access repository to remain online

The Repository has identified the key threats as: hardware failure, site failure, web based attacks (denial of service DOS etc).

The ability to respond quickly to threats demands a robust and accurate monitoring system. Checks are in place for the threats outlined above such that in the event of one of these events, a member of DRI staff is alerted. The staff member then assess the nature of the incident and if necessary, assembles a crises management team.

Recovering effectively demands spare resources and the ability to rapidly deploy new services. All nodes and services can be redeployed quickly using our Ansible configuration management system. Backups of all critical data including databases are kept and can be recovered back in place. During any downtime, a second site is available that we can failover to. This second site will have a full repository stack installed, should our main site go down, we can switch over and maintain access.

Supporting Documentation

[DRI Organisational Manager Agreement](#) (June 2015)

[How to DRI: Understanding Administrative Roles](#) (June 2015)

[DRI Deposit Terms and Conditions](#) (Feb. 2015)

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Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

10. The data repository enables the users to discover and use the data and refer to them in a persistent way.

Minimum Required Statement of Compliance:

3. In progress: We are in the implementation phase.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

Data is deposited in formats used by the designated community (a requirements gathering process identified what these were, see Digital Archiving in Ireland: National Survey of the Humanities and Social Sciences). The acceptable and preferable formats are outlined in the File Format fact sheet.

Digital Object Identifier (DOI) is a well known, widely used persistent identifier system. It is currently in use at digital repositories including the UK Data Archive, the British, German and Dutch National Libraries and the Open University. DOIs are minted for objects in the repository allowing a persistent identifier and URI for long-term access to each object. The minting of a DOI requires 5 metadata fields (mapping to Dublin core) for each digital object. This metadata is searchable on the Datacite website and is submitted under a Creative Commons CC0 license. If an object in DRI is subsequently deleted or closed, the metadata will remain on DataCite (our Withdraw Data Policy outlines how we respond to requests for data removal).

DRI has an open access metadata policy, that is, metadata is publicly available. We would not seek to embargo or restrict access to metadata.

Objects in the repository are indexed into Solr, a powerful open-source search engine tool (see Report on the DRI Infrastructure, Sections 6.3 and 7.2) to provide search functionality. Search can be performed across collections allowing related objects from a range of different organisations to be returned or can be restricted to a particular collection in order to drill-down into a dataset. Searching with wildcards is supported, along with suggested terms ("Did you mean?"). Searching can be performed via a searchbox, as well as refinement of the search results via faceted search. A map search function is also provided allowing coordinate-based searching. Hierarchical browsing of collections is also supported. Logged in users have the ability to view a search history and to save and re-run their searches as well as bookmarking particular objects or collections.

Deep searching is possible for certain formats and permission levels (open text based documents) See the Report on the DRI Infrastructure Section 8.2.2 Digital Assets Management for more information.

The Repository acts as a data provider. We support harvesting from DRI, collections will be exposed via OAI-PMH for third parties to harvest and re-use the data.

Supporting Documentation

[Digital Archiving in Ireland: National Survey of the Humanities and Social Sciences DRI Series no. 1](#) (Oct. 2012)

[DRI Factsheet No. 3: File Formats Version 2](#) (June 2015)

[DRI Withdraw Data Policy](#) (April 2014)

[Report on the DRI Infrastructure: Building a National Trusted Digital Repository](#)

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

11. The data repository ensures the integrity of the digital objects and the metadata.

Minimum Required Statement of Compliance:

3. In progress: We are in the implementation phase.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

MD5 checksums are calculated at ingest and stored alongside the asset in the Archival Information Package (AIP) and also stored in a central database.

The integrity of the asset and metadata is checked continuously by a process that opens the AIP and recalculates checksums. This is then compared against stored checksums. Any discrepancies are reported through a Nagios (1) monitoring system and data recovery procedures are followed. The results of these tests are available to the user through object audit reports.

Versioning is handled at the application layer within the AIP according to the MOAB format (2). Different versions are saved alongside previous versions. No files are deleted. Version metadata is captured.

(1) <https://www.nagios.org/>, accessed 17 June 2015.

(2) <http://journal.code4lib.org/articles/8482> for more information, accessed 17 June 2015.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

12. The data repository ensures the authenticity of the digital objects and the metadata.

Minimum Required Statement of Compliance:

3. In progress: We are in the implementation phase.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

The Repository encapsulates ingested data as a digital object, which is a Fedora digital object along with the digital asset modelled as a Ruby class. The data model incorporates a set of Fedora data-streams so as to handle the different types of metadata required by the system. Examples of metadata types include descriptive metadata, technical metadata, and DRI administrative metadata, which incorporates preservation metadata (stored as PREMIS xml).

ActiveFedora also facilitates the specification of relationships between digital objects as Rails associations (Project Hydra, 2012). These relationships are saved using the Resource Description Framework (RDF) specification in a special data-stream, RELS-EXT. This allows for easier access and management of the relationships between stored digital objects, as well as exposing this relational information to third party applications. Descriptive metadata, technical metadata and one or more asset files. The DRI data model is described in the DRI Infrastructure Report Chapter 6.

The descriptive metadata also contains provenance information such as on the ownership of the digital objects and location of an analogue originals if they exist. Depositors are also asked to deposit a contextual documents (see [How to DRI: Contextual Information](#)) which provides more detailed information about the origin and the creation of the digital objects.

An audit trail is recorded within Fedora of all changes to the digital objects, and both metadata and asset files are versioned. This information is also stored explicitly within a PREMIS datastream in Fedora and within the AIP which uses the Bagit format.

If a new version of an asset file is ingested the old version continues to be stored and preserved. While older versions are no longer available to end-users they can always be retrieved by the data owner in case of error.

Updating of objects can occur freely before the object is published as part of the ingest and review workflow. Once reviewed and published a DOI is minted and certain elements of the metadata and asset file are no longer permitted to change without minting a new DOI. Published data can be edited, but the workflow involves creation of a new DOI and what is essentially considered as a new digital object. This is described in the DOI Factsheet.

Supporting Documentation

[DRI Factsheet No. 7: Persistent Identifiers and DOIs](#) (June 2015)

[How to DRI: Contextual Information](#) (June 2015)

[Report on the DRI Infrastructure: Building a National Trusted Digital Repository](#)

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

13. The technical infrastructure explicitly supports the tasks and functions described in internationally accepted archival standards like OAIS.

Minimum Required Statement of Compliance:

3. In progress: We are in the implementation phase.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

DRI is organised into multiple Strands and Work Packages to deliver the functions of a TDR (see <http://www.dri.ie/about>). This arrangement is heavily influenced by the Reference Model for an Open Archival Information System (OAIS) (1). This reference model establishes a common framework of terms and concepts which constitute a digital repository and lays out the functional components and responsibilities of such a repository at an organisational level.

The DRI Policy Framework, includes both the policy guidelines we adopt and the policy instruments we use to ensure robust policy development. DRI adopts the Data Seal of Approval as our policy guideline. In framing policy, we also consult the ISO 16363 guidelines for additional guidance. The policy development process is logged in an internal Policy Tracking System.

The DRI programme manager maintains an active list for feature planning for the infrastructure. DRI also runs a number of partnership leveraged [projects](#) targeting development of additional feature and collections.

(1) Consultative Committee for Space Data Systems. (2012). [Reference Model for an Open Archival Information System \(OAIS\)](#). Washington, DC: CCSDS Secretariat

Supporting Documentation

[DRI Policy Framework](#) (Feb. 2012) _

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

14. The data consumer complies with access regulations set by the data repository.

Minimum Required Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

The repository uses End User Terms and Conditions governed by the laws and jurisdiction of the courts of the Republic of Ireland. Our Restricted Data Policy outlines that we archive social scientific data or data pertaining to human subjects which may require both restricted access and anonymisation. Our End User Terms and Conditions therefore also contain clauses which pertain to restricted-use (confidential) data.

The Digital Repository of Ireland supports the principles of Open Access, and in recognition of this, content published on the Digital Repository of Ireland's project website (www.dri.ie) is licensed under [Creative Commons Attribution 4.0 International \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/). Content published on the Digital Repository of Ireland's project website (www.dri.ie) is licensed under a [Creative Commons Attribution 4.0 International \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/) licence unless otherwise stated. Content on the website which is not covered by this licence is clearly marked with the appropriate licence or copyright statement.

The Digital Repository of Ireland has applied a CC-BY licence to most content on the project website. However, the site also publishes content which it does not own or has not created, and cannot assign a licence to.

This content may include photographs, scanned archival documents, videos and publications. In cases where the DRI does not have permission to assign a licence to content, this content will be clearly marked with the appropriate licence or copyright statement. All objects must be deposited with an associated licence, the End Use Terms and Conditions mandate that users must agree to abide by the terms of this licence. For more information see the Factsheet on Copyright, Licensing and Open Access.

Where there is a suspected breach we follow our Notice And Action policy and associated Notice and Action procedure (this internal workflow is not available publically).

Supporting Documentation

[DRI End User Terms and Conditions](#) (March 2015)

[DRI Restricted Data Policy](#) (May 2015)

[DRI Position Statement on Open Access for Data](#)

[National Principles for Open Access Policy Statement](#)

[DRI Factsheet No. 2: Copyright, Licensing, and Open Access](#) (Feb 2014)

[DRI Notice and Action Policy](#) (Jan. 2014)

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

15. The data consumer conforms to and agrees with any codes of conduct that are generally accepted in the relevant sector for the exchange and proper use of knowledge and information.

Minimum Required Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

DRI's ethical statement on digital objects pertaining to research on persons or people is outlined in the DRI Restricted Data Policy.

In order to obtain access to objects, including restricted use objects, users must first agree with End Use Terms and Conditions, which mandates agreement both with the license applied to the object and protection of the identity of research subjects. These End User Terms and Conditions are governed by the laws and jurisdiction of the courts of the Republic of Ireland

Our Restricted Data Policy and our Breaches procedure (an internal document) details our response to breaches of the legal commitments to protect human subjects and/or to disclosure threats to restricted data.

Supporting Documentation

[DRI Restricted Data Policy](#) (May 2015)

[DRI End User Terms and Conditions](#) (March 2015)

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

16. The data consumer respects the applicable licences of the data repository regarding the use of the data.

Minimum Required Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Applicant Entry

Statement of Compliance:

4. Implemented: This guideline has been fully implemented for the needs of our repository.

Self-assessment statement:

The Organisational Manager Agreements mandates the application of correct rights statements, and where applicable, licensing statements, to the digital objects in the repository. In this agreement, DRI agrees to display the rights statements applied to digital object by the depositor.

In the case of orphan works the depositor must ensure that a diligent search is carried out in good faith in respect of each work, must prepare a record of each diligent search in respect of an orphan work, and provide this record to the Repository and must ensure that, in the case of an orphan Work, its status as an orphan Work is noted in the metadata associated with the Work.

In order to obtain access to objects users must first agree with End Use Terms and Conditions, which states that the end user must will abide by the appropriate copyright and licence statements applied to digital object and metadata. These are governed by the laws and jurisdiction of the courts of the Republic of Ireland

Our Notice and Action Policy and associated procedure (an internal document) details our response to breaches of the licenses applied to the objects.

Supporting Documentation

[DRI Organisational Manager Agreement](#) (June 2015)

[End User Terms and Conditions](#) (Feb. 2015)

[DRI Notice and Action Policy](#) (Jan. 2014)

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments: