



## **Implementation of the CoreTrustSeal**

The CoreTrustSeal board hereby confirms that the Trusted Digital repository Digital Repository of Ireland complies with the guidelines version 2017-2019 set by the CoreTrustSeal Board.

The afore-mentioned repository has therefore acquired the CoreTrustSeal of 2016 on April 10, 2018.

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

Yours sincerely,

The CoreTrustSeal Board

## Assessment Information

Guidelines Version: 2017-2019 | November 10, 2016  
Guidelines Information Booklet: [DSA-booklet\\_2017-2019.pdf](#)  
All Guidelines Documentation: [Documentation](#)

Repository: Digital Repository of Ireland  
Seal Acquiry Date: Apr. 10, 2018

For the latest version of the awarded DSA for this repository please visit our website: <http://assessment.coretrustseal.org/seals/>

Previously Acquired Seals: Seal date: June 30, 2015  
Guidelines version: 2014-2017 | July 19, 2013

This repository is owned by: **Digital Repository of Ireland**

Ireland

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W <http://www.dri.ie/>

# Assessment

## 0. Context

### Applicant Entry

*Self-assessment statement:*

(1) REPOSITORY TYPE

Domain or subject-based repository

- 

National repository system, including governmental

- 

The Digital Repository of Ireland is a national digital repository for Ireland's humanities, social sciences, and cultural heritage data.

(2) Brief Description of the Repository's Designated Community

DRI's designated community is composed of our members, whose collections DRI stewards, as well as end-users of DRI's open access data that span across research, education, and the general public. Membership is open to Research Performing Organisations, and institutions, organisations and digital archives who hold humanities and/or social sciences data. As of 2017 DRI has 22 members, which include universities, archives (including the National Archives of Ireland), the National Museum of Ireland, National Library of Ireland and other organisations holding digital humanities and/or social science data. Core academic institutions continue to manage the repository and implement its policies, guidelines and training. These are the Royal Irish Academy (RIA), Trinity College Dublin (TCD) and Maynooth University (MU). 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 the national broadcaster RTÉ.

End-users are academic researchers or educators and the general public. Members' collections are accessible to end users via the DRI web interface. The majority of the collections are available to the general public. A small selection of digital assets are restricted to research and teaching use only, but their metadata remains open via the web interface. The end users for restricted data are mostly academic researchers or educators, particularly those who use qualitative social scientific data.

### (3) Level of Curation Performed.

#### B. Basic curation – e.g., brief checking,

Our automated processes distribute responsibility, including data preparation and ingest, to depositing members]. This activity gives stakeholders high levels of autonomy and control over the ingest (or deposit) process. To maintain high standards of data deposit, membership is underpinned by a suite of legal agreements, as well as training and skill sharing within and among the community of DRI partners. DRI's automated processes reject deposits which are not associated with metadata prepared to one of DRI's internationally supported standards.

### (4) Outsource Partners

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

(5) As a national infrastructure for digital preservation and digital archiving in the social sciences and humanities, the DRI plays an important role in convening, educating, and building the data preservation community in Ireland. To do this well, DRI is actively involved in a number of global networks. For example, DRI is an official partner in the [Samvera](#) project - a community based, widely supported open-source repository solution, as well as an

implementer and contributor to the IIF community. DRI is also a partner in the Research Data Alliance Europe project, a member of the Digital Preservation Coalition, and a member of DataCite via the British Library.

## **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

## 1. Mission/Scope

*Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

## 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 part of DRI's business plan, which has been approved by DRI's funders – the Department of Education and Skills, via the funding mechanisms of the Higher Education Authority and the Irish Research Council – and by DRI's governance bodies - the Management team ('Core Implementation Team') and the founding Board.

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. (1)*

The DRI Vision Statement is as follows:

*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 digital repository (TDR), 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 .(1)*

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W [www.coretrustseal.org](http://www.coretrustseal.org)

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The DRI's mission statement is implemented by the provision of the DRI Repository, its governance frameworks and service level agreement with the Department of Education and Skills, policies and workflows developed by DRI, the partnerships with content owners, and an active and broad education and outreach programme. The DRI's comprehensive education and outreach program includes training courses, seminars, workshops, conferences and fact sheets, detailed metadata guidelines, user guides and other publications. A full list of publications can be found <https://repository.dri.ie/catalog/3b591898r>. A full list of events can be found at <http://www.dri.ie/events>.

(1) <http://www.dri.ie/about> Accessed 12th October 2017

**Supporting Documentation:**

[DRI Factsheet No. 4: Long-term Digital Preservation \(April 2014\): https://repository.dri.ie/catalog/rr17fc082](https://repository.dri.ie/catalog/rr17fc082)

[Digital Repository of Ireland. Digital Archiving in Ireland: National Survey of the Humanities and Social Sciences, Digital Repository of Ireland \[Distributor\], Digital Repository of Ireland \[Depositing Institution\], DOI: 10.7486/DRI.5m614676f: https://repository.dri.ie/catalog/5m614676f](https://repository.dri.ie/catalog/5m614676f)

[About DRI: http://www.dri.ie/about](http://www.dri.ie/about)

[Digital Repository of Ireland Publications: https://repository.dri.ie/catalog/3b591898r](https://repository.dri.ie/catalog/3b591898r)

[DRI Events: http://www.dri.ie/events](http://www.dri.ie/events)

All URL's visited on 24th of October 2017 unless marked otherwise.

## **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## 2. Licenses

### *Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

## Applicant Entry

### *Statement of Compliance:*

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

### *Self-assessment statement:*

The roles and responsibility of depositors and the Repository are clearly outlined in the Organisational Manager Agreement and in Deposit Terms & Conditions (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 Repository's responsibility to ensure these licenses are displayed within the system.

The DRI Breaches Procedure outlines the DRI response to instances of noncompliance with conditions of access and use. (this is not a public document and is available on request).

The repository uses End User Licenses governed by the laws and jurisdiction of the Republic of Ireland (see End User Licenses). Our Restricted Data policy outlines that we archive social scientific data pertaining to human subjects which may require both restricted access and anonymisation. Our End User licenses 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 informational website ([www.dri.ie](http://www.dri.ie)) is licensed under Creative Commons Attribution 4.0 International (CC BY 4.0), unless otherwise stated. Content on this informational site which is not covered by this licence is clearly marked with the appropriate licence or copyright statement.

The Digital Repository of Ireland also publishes content in the DRI repository which has been deposited by DRI members. In this case the DRI might not own or has not created, and cannot assign a licence to this content. 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 is clearly marked with the appropriate licence or copyright statement.

In order to deposit data within DRI, members must sign a legal agreement which confers upon them the responsibility to add copyright and license statements to the digital objects. The online data deposit infrastructure additionally prompts depositors to add copyright and a license statement at the point of ingest. Depositors may

choose from a drop-down menu of Creative Commons licences or where appropriate add their own license statement. Finally, on depositing collections, all depositors are required to agree to a Terms and Conditions statement which asserts that they have applied the correct copyright and license statements. The End Use Terms and Conditions mandate that users must agree to abide by the terms of this license. For more information see the Factsheet on Copyright, Licensing and Open Access.

Where there is a suspected licence breach we follow our Notice and Action Policy and associated Notice and Action Procedure.

### **Supporting Documentation**

[DRI Organisational Manager Agreement \(March 2018\): https://repository.dri.ie/catalog/zk527x75s](https://repository.dri.ie/catalog/zk527x75s)

[DRI Deposit Terms and Conditions \(Jan. 2018\): https://repository.dri.ie/catalog/1544r4085](https://repository.dri.ie/catalog/1544r4085)

[DRI Factsheet No. 2: Copyright, Licensing, and Open Access \(Feb 2014\): https://repository.dri.ie/catalog/rb699s72v](https://repository.dri.ie/catalog/rb699s72v)

[DRI Restricted Data Policy \(May 2015\): https://repository.dri.ie/catalog/sb39mq22h](https://repository.dri.ie/catalog/sb39mq22h)

[DRI End User Terms and Conditions \(March 2015\): https://repository.dri.ie/catalog/rr17fc189](https://repository.dri.ie/catalog/rr17fc189)

[DRI Notice and Action Policy \(Jan 2014\): https://repository.dri.ie/catalog/vh5499702](https://repository.dri.ie/catalog/vh5499702)

[DRI Position Statement on Open Access for Data \(2014\): https://repository.dri.ie/catalog/vx02dw063](https://repository.dri.ie/catalog/vx02dw063)

[National Principles for Open Access Policy Statement: https://repository.dri.ie/catalog/w376gn74s](https://repository.dri.ie/catalog/w376gn74s)

All URL's visited on 24th of October 2017 unless marked otherwise.

### **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

### 3. Continuity of access

*Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

#### Applicant Entry

*Statement of Compliance:*

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

*Self-assessment statement:*

DRI seeks to preserve digital objects and maintain their long-term usability in accordance with DRI's preservation strategy.

From 2017 DRI received its core funding from the Irish government. The Digital Repository of Ireland is named as a key national infrastructure in the Department of Business, Enterprise and Industry Innovation 2020 strategy on research and development. Through this recognition the Irish government has committed to long term funding of DRI.

DRI's core funding is augmented by the acquisition of leverage research project funding, as well as a revenue-generating membership scheme, launched in February 2018. This membership scheme focuses on increasing the volume of material deposited in the archive, but also the diversity of membership. This contributes to the overall sustainability of the repository by raising revenue which can be reinvested in the repository and, regular engagement with our members (eg. via the Biannual Member's Forum) will ensure we are meeting the long-term needs of the humanities and social sciences in Ireland.

With a view to the longer-term, DRI is collaborating directly with a number of large state institutions in Ireland to provide expertise, and potentially, preservation as a service to core bodies. This furthering of DRI's 'embeddedness' in the wider Irish data infrastructure complements DRI's long term sustainability, and by extension, the security of the data over the long term.

#### Relocation or transition of activity

The legal agreements signed by depositors grants to the repository the right to assign its benefits, rights and obligations to a third party in a situation where it is necessary. Should DRI funding cease, the repository partners would determine a final location for the repository and its deposited data, either at one of the partner's institutions, or at one of the many institutions that DRI partners with, such as the National Library or the National Archives (both legally mandated heritage institutions). The repository and national infrastructure that constitutes DRI is

maintained by three national partners with technical and domain expertise in digital archiving: the Royal Irish Academy, Trinity College Dublin and Maynooth. The repository's servers and digital expertise are located in Trinity College Dublin, and backup servers are located in Maynooth.

Should any depositor voice dissatisfaction with this plan, the DRI's partner institutions, in collaboration with owners/depositors, would provide download access to their data and its deletion from the DRI Repository thereafter. This is also outlined in the Organisational Manager Agreement, which must be signed before any data is deposited.

(1) <https://dbei.gov.ie/en/Publications/Publication-files/Innovation-2020.pdf> Accessed 12th October 2017

### **Supporting Documentation**

[DRI Factsheet No. 5: About DRI Membership: https://repository.dri.ie/catalog/rv04g792m](https://repository.dri.ie/catalog/rv04g792m)

[DRI Factsheet No. 4: Long-term Digital Preservation \(April 2014\): https://repository.dri.ie/catalog/rr17fc082](https://repository.dri.ie/catalog/rr17fc082)

[About DRI: http://www.dri.ie/about](http://www.dri.ie/about)

[DRI Management Board: http://www.dri.ie/dri-management-board](http://www.dri.ie/dri-management-board)

[DRI Membership Policy: https://repository.dri.ie/catalog/0574f668r](https://repository.dri.ie/catalog/0574f668r) accessed 27th March 2018

[DRI Organisational Manager Agreement \(March 2018\): https://repository.dri.ie/catalog/zk527x75s](https://repository.dri.ie/catalog/zk527x75s)

All URL's visited on 24th of October 2017 unless marked otherwise.

## **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

## 4. Confidentiality/Ethics

*Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

### Applicant Entry

*Statement of Compliance:*

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

*Self-assessment statement:*

The DRI policy manager is a trained social scientist with extensive expertise in best practice in archiving and managing social science data. Guidance on consents, confidentiality and anonymisation is provided where required by the policy manager and the DRI depositing organisation, the Irish Qualitative Data Archive (1).

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 the information is displayed with the digital objects (see How To DRI: Publishing your DRI Collection).

In addition to the digital objects, associated assets and contextual information may be deposited where applicable. Depositors are requested to submit 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 researchers to understand more fully the digital objects. Where the digital objects are generated in research conducted on people the depositor is asked to include details of the legal or ethical approval obtained. These contextual documents are publicly 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 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 Terms and Conditions.

Public access data/ unrestricted data:

This level of access 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 Terms & Conditions. 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:

Safeguarded data/ Standard access: Users are required to agree [via a tick box] with the standard End User Terms and Conditions. Registration is required in order to be able to view the data.

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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 Terms and Conditions. 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 (2)

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- 

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).

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The Repository application allows the depositor to set access restrictions on their data. Data can be available publicly, to logged-in users only, or restricted to named individuals (see the Restricted Data Policy). DRI also enables restriction of access to those with Edugate 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 (this technical metadata can be accessed only by the developer team). Users may request access to data via the web interface.

On accessing data with access restrictions a user is reminded not to share the data. End-users 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 when a user visits the Repository for the first time (stored in a cookie), and also on the DRI web page on the policy section of our publications page. Data is distributed via an ssl connection to ensure security while in transit to the user. Where there is a suspected breach we follow our Restricted Data policy and associated Breach procedure (this internal workflow is not available publicly). Our staff have expertise dealing data with disclosure risk.

(1) <https://www.maynoothuniversity.ie/igda> Accessed 15th October 2017

(2) Edugate is Ireland's federated higher education access service, which is partner of the wider eduGAIN. <https://www.heanet.ie/services/identity-access/edugate> Accessed 12th October 2017

### **Supporting Documentation**

[DRI Factsheet No. 5: About DRI Membership: https://repository.dri.ie/catalog/rv04g792m](https://repository.dri.ie/catalog/rv04g792m)

[DRI Restricted Data Policy \(May 2015\): https://repository.dri.ie/catalog/sb39mq22h](https://repository.dri.ie/catalog/sb39mq22h)

[DRI End User Terms and Conditions \(March 2015\): https://repository.dri.ie/catalog/rr17fc189](https://repository.dri.ie/catalog/rr17fc189)

[DRI Membership Policy \(August 2016\): https://repository.dri.ie/catalog/sj13pg90x](https://repository.dri.ie/catalog/sj13pg90x)

[DRI Organisational Manager Agreement \(March 2018\): https://repository.dri.ie/catalog/zk527x75s](https://repository.dri.ie/catalog/zk527x75s)

[DRI Deposit Terms and Conditions \(Jan. 2018\): https://repository.dri.ie/catalog/1544r4085](https://repository.dri.ie/catalog/1544r4085)

[How to DRI: Protect Your Data \(June 2015\): https://repository.dri.ie/catalog/t148tz10k](https://repository.dri.ie/catalog/t148tz10k)

[How To DRI: Publishing your DRI Collection: https://repository.dri.ie/catalog/t435vt94n](https://repository.dri.ie/catalog/t435vt94n)

[How to DRI: Contextual Information: https://repository.dri.ie/catalog/sn00qc64j](https://repository.dri.ie/catalog/sn00qc64j)

All URL's visited on 24th of October 2017 unless marked otherwise.

## **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

## 5. Organizational infrastructure

*Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

### Applicant Entry

*Statement of Compliance:*

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

*Self-assessment statement:*

DRI is made up of three long-established and respected partner institutions with expertise in key areas of archiving, repository infrastructure, and HSS domains: the Royal Irish Academy, Trinity College Dublin and Maynooth University. DRI staff are located across these three institutions with each institution and staff member providing unique experience and access to a wider group of experts who actively support work undertaken by DRI. The repository is hosted on servers in Trinity College Dublin with mirror servers in Maynooth University and supported by software developers in Trinity College Dublin. The Policy Manager is based in Maynooth University. The Director, Digital Archivist, Education and Outreach Manager and Programme Manager are based in the RIA, and are supported by additional, project-based staff recruited to expand DRI capacity while contributing to core work. Institutional IT departments provide access and support to email, networking and other IT support services for staff.

As discussed in more detail in Section 3, the DRI's core funding comes from Ireland's Department of Education and Skills, and over the longer term, is projected to cover 70% of core operational costs, with research project grants and Membership fees accounting for the remaining 30%. However, the core staff supported by the 70% direct state funding are sufficient to keep the repository running at a minimum standard, thereby ensuring continuity in the face of unexpected revenue shifts in the other income streams. DRI has a strong history of seeking and winning additional project funding, from research grants (eg H2020, national funding) and philanthropic sources. DRI's robust involvement in international networks creates ongoing possibilities for future funded partnerships.

The principal governance structure of the DRI is the Board. [The DRI Board](#) is comprised of members from across the Irish Archiving, Digital, Education and Cultural sectors who provide advice on the implementation of DRI's core activities and future endeavours. The principal management mechanism of the DRI is the Core Implementation Team (CIT). The CIT is responsible for the day-to-day operational management of the DRI in addition to overseeing requirements and developing the DRI strategy. The CIT is comprised of the DRI Director (Chair) and the DRI Principal Investigators with the DRI Programme Manager.

The Digital Repository of Ireland is a repository and research organisation with staff working in a wide range of domains, covering its governance, management, operational structure, implementation areas and taskforces. Staff members draw from a wide variety of backgrounds, including 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://dri.ie/dri-team>).

**CoreTrustSeal Board**

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In addition to this, experts from a wide range of institution and sectors provide input to DRI activities through DRI's Board, Core Implementation Team and individual task forces including Dublin City Public Libraries, Dublin Institute of Technology, the Irish Film Archive, the Irish Research Council, National Archives of Ireland, National Library of Ireland, National Museum of Ireland, National University of Ireland Galway and University College Cork.

DRI is a member of a number of organisations dedicated to digital archiving, digital preservation, cultural heritage preservation, open access, and data sharing. Membership of many of these groups, such as the Digital Preservation Coalition, provides DRI staff with priority access to training and briefing reports and events. DRI's core funding includes a small budget for travel which facilitates staff training, conferences attendance and travel for work. Staff are also provided with training by the institutions where they reside.

#### **Supporting Documentation:**

[DRI Management Board: http://www.dri.ie/dri-management-board](http://www.dri.ie/dri-management-board)

[DRI staff and expertise: http://dri.ie/dri-team](http://dri.ie/dri-team)

[Core Implementation Team \(CIT\): http://dri.ie/core-implementation-team](http://dri.ie/core-implementation-team)

[DRI Management Board Biographies: http://www.dri.ie/new-dri-board](http://www.dri.ie/new-dri-board)

[Royal Irish Academy: https://www.ria.ie/](https://www.ria.ie/)

[Trinity College Dublin: http://www.tcd.ie](http://www.tcd.ie)

[Maynooth University: https://www.maynoothuniversity.ie](https://www.maynoothuniversity.ie)

All URL's visited on 24th of October 2017 unless marked otherwise.

### **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

## 6. Expert guidance

*Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

### Applicant Entry

*Statement of Compliance:*

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

*Self-assessment statement:*

Unlike other organisations that seek to certify a repository that is part of their activity, DRI's core activity is operating a repository, hence its staff are experts in the various aspects of repository development, as detailed in the previous section. Beyond staff resources, the DRI has access to a wide variety of experts from a number of sources and perspectives:

Core Implementation Team (CIT) and Co-opted Advisors: CIT, DRI's management team, consists of senior experts from the various institutions that employ DRI staff, and these experts contribute formal feedback, via biweekly meetings and regular review processes, to staff. Any significant decisions or queries from day to day operations are put to CIT for discussion and approval.

In addition to CIT, DRI has formally co-opted expert advisors to advise in particular areas. For example, one of Ireland's leading experts on copyright law, Barrister-at-Law and Associate Professor of Law Eoin O'Dell (based at Trinity College Dublin), is DRI's legal advisor. Additional expertise is contributed via participation on DRI Taskforces, including the Metadata Taskforce, Business Models Taskforce, Business Records Taskforce, Trusted Digital Repository Taskforce and Workflow Taskforce, who have invited individuals from relevant member and partner institutions to advise on specific areas of expertise (see <http://dri.ie/about> for more information).

Additionally, DRI's Board includes stakeholders in digital preservation from across Higher Education, Cultural and Government sectors in Ireland, including the Directors of the National Archives and the National Library of Ireland.

The DRI also convenes an International Advisory Group when developing new policies and procedures. Members of this group are drawn from internationally recognised organisations with expertise that predates that of DRI, such as the UK Data Archive, the Digital Preservation Coalition, and the DANS in the Netherlands.

Beyond these organisational structures of expertise, DRI is actively involved in a number of organisations that build, share and disseminate best practices in digital archiving, digital preservation, data sharing and access.

At the national level, DRI has access to experts and early knowledge of relevant developments via membership in a number of fora and advisory committees. The Director is a member of the DARIAH Ireland Steering Group, the

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E [info@coretrustseal.org](mailto:info@coretrustseal.org)

National Open Research Forum, and the National Archives Advisory Council.

Internationally, DRI is involved in large networks of expertise and knowledge transfer. For example, DRI's Director is a member of the European Commission's FAIR data expert group, which provides access to a network of experts working in data management and preservation. DRI is a funded partner in the H2020 Research Data Alliance Europe project (RDA3) as well as a partner in the upcoming RDA 4 (start date March 2018). The RDA has over 3,000 members worldwide, who can be accessed via a number of expert working groups and biannual face to face plenary meetings. DRI staff are part of the following RDA Interest/Working Groups: Archives and Records Professionals for Research Data; Data Citation; Empirical Humanities Metadata; Ethics and Social Aspects of Data; Libraries for Research Data.

DRI also holds the Chair of the ALLEA E-Humanities Working Group, providing access to digital humanities experts across Europe as well as ALLEA's larger network of expertise, and DRI is actively involved in the activities of the Digital Preservation Coalition (DPC), including sitting on their Communications and Advocacy Committee. DRI staff organised the the Open Repositories conference in 2016, DPASSH in 2015 and 2017, and sat on the Programme Committee for PASIG 2017. Each of these committees and networks provide rich access to a variety of experts, above and beyond the formal networks of expertise maintained by DRI's management and governance structures.

On an ongoing basis, staff are active members of professional associations or discussion networks in a number of relevant areas, including: The Samvera Europe Steering Group, IASSIST, Archives and Records Association (Ireland), International Council on Archives, JISC Digital Preservation, Research Data Managers, UK Anonymisation Network, Fedora Commons network, Blacklight Development Community mailing list, and IIIF-Discuss, a discussion forum for the International Image Interoperability Framework (IIIF).

As much as DRI seeks external advice, it also widely solicits feedback from its designated communities. The original Stakeholder Advisory Group (1), created at the DRI project inception, has been developed into a biannual Members and Community Forum, and DRI events often solicit direct reviews. DRI staff interact directly with members around collection management, data preparation and ingest, and there is a mechanism to feed suggestions from these interactions through the Requirements Taskforce. New repository features are developed in tandem with a requirement gathering process and user acceptance testing (UAT). DRI additionally maintains an active and responsive Twitter account (@dri\_ireland), an inquiries email address ([dri@ria.ie](mailto:dri@ria.ie)), a mailing list and a blog which addresses issues of importance to SSH archiving (<http://www.dri.ie/blog>).

(1) In 2018 the Stakeholder Advisory Group will be replaced by a Members Forum.

### **Supporting Documentation:**

[DRI staff and expertise: http://dri.ie/dri-team](http://dri.ie/dri-team)



[Core Implementation Team \(CIT\): http://dri.ie/core-implementation-team](http://dri.ie/core-implementation-team)

[About DRI: http://www.dri.ie/about](http://www.dri.ie/about)

[International Advisory Group: http://www.dri.ie/international-advisory-group](http://www.dri.ie/international-advisory-group)

[Stakeholder Advisory Group: http://www.dri.ie/stakeholder-advisory-group](http://www.dri.ie/stakeholder-advisory-group)

All URLs visited on 24th of October 2017 unless marked otherwise.

**Mailing Lists:**

[digitalpreservation@jiscmail.co.uk](mailto:digitalpreservation@jiscmail.co.uk)

[humanist@lists.digitalhumanities.org](mailto:humanist@lists.digitalhumanities.org)

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[blacklight-development@googlegroups.com](mailto:blacklight-development@googlegroups.com)

## **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

## 7. Data integrity and authenticity

*Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

### Applicant Entry

*Statement of Compliance:*

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

*Self-assessment statement:*

On joining DRI each member signs the Organisational Managers Agreement (OMA). This legal agreement outlines that DRI undertakes to preserve the digital objects and maintain their long-term usability in accordance with DRI's preservation strategy. This document also outlines that the repository is not under any obligation to make available the digital objects in the same formats or resolutions as deposited.

DRI does, however, undertake to preserve the significant properties of deposited materials, and in practice, the repository will preserve the data exactly as it was ingested in so far as is possible. Even where format migration is required the original uploaded asset will be stored alongside the derived asset and its preservation metadata.

To ensure the integrity of the data, at the storage level, the Ceph (1) distributed storage system includes automatic data scrubbing functionality to check and fix bit-flip/decay errors.

Within the repository application 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 regularly by a process that opens the AIP and recalculates checksums. This is then compared against stored checksums. Any discrepancies are reported through a Nagios (2) 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 (3) format. Updated, or derived versions are saved alongside the previous versions and no files are deleted. Version metadata is captured whenever a change is made.

An audit trail is recorded of all changes to the digital objects, and both metadata and asset files are versioned.

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 Digital Object Identifier (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 'Persistent Identifiers and DOIs' Factsheet.

The Repository encapsulates ingested data as a digital object, which is a Fedora digital object along with the digital asset. 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 a combination of RDF and Dublin Core).

ActiveFedora also facilitates the specification of relationships between digital objects as Rails associations. These relationships are saved using the Resource Description Framework (RDF) specification in a special data-stream. 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. The DRI data model is described in the Building the Digital Repository of Ireland Infrastructure Chapter 6.

Our preservation policy is supplemented by regular training events and our membership meetings which highlight DRI's preservation practices.

(1) <http://ceph.com/>, accessed 20 Oct 2017

(2) <https://www.nagios.org/>, accessed 15 Sept 2017

(3) <http://journal.code4lib.org/articles/8482>, accessed 15 Sept 2017

(4) <http://fedorarepository.org/>, accessed 20 Oct 2017

## **Supporting Documentation**

[DRI Organisational Manager Agreement \(March 2018\): https://repository.dri.ie/catalog/zk527x75s](https://repository.dri.ie/catalog/zk527x75s)

[Digital Repository of Ireland. Building the Digital Repository of Ireland Infrastructure, Digital Repository of Ireland \[Distributor\], Digital Repository of Ireland \[Depositing Institution\], DOI: 10.7486/DRI.qr474f68n, https://repository.dri.ie/catalog/qr474f68n](https://repository.dri.ie/catalog/qr474f68n)

[DRI Factsheet No. 7: Persistent Identifiers and DOIs \(June 2015\): https://repository.dri.ie/catalog/s752kt28n](https://repository.dri.ie/catalog/s752kt28n)

[DRI Preservation Policy \(March 2018\): https://repository.dri.ie/catalog/zw13bm274](https://repository.dri.ie/catalog/zw13bm274) ,

accessed 26th March 2018

[All URL's visited on 24th of October 2017 unless marked otherwise.](#)

## **Reviewer Entry**

**CoreTrustSeal Board**

W [www.coretrustseal.org](http://www.coretrustseal.org)

E [info@coretrustseal.org](mailto:info@coretrustseal.org)

*Accept or send back to applicant for modification:*

Accept

*Comments:*

## 8. Appraisal

### *Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

## Applicant Entry

### *Statement of Compliance:*

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

### *Self-assessment statement:*

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

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 (see below), incoming files are scanned and validated for file type correctness using the File Information Tool Set (FITS) (1). 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 Building the Digital Repository of Ireland Infrastructure). 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.

The Repository encapsulates ingested data as a digital object, which is a Fedora (2) digital object along with the digital asset. 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.

ActiveFedora also facilitates the specification of relationships between digital objects as Rails associations. These relationships are saved using the Resource Description Framework (RDF) specification in a special data-stream. 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 Building the Digital Repository of Ireland Infrastructure, Chapter 6.

As discussed earlier, DRI supports and provides detailed guidelines for a variety of commonly adopted metadata standards (Simple and Qualified Dublin Core, MODS, MARC21 encoded as MARCXML, and EAD). 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 the metadata guidelines data producers make their collections more easily searchable in the Repository, and cross-searchable with other DRI collections.

DRI provides 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. Although DRI provides recommendations on formats for ingest it will ingest non-standard formats, in an effort to balance best practices with the realities of existing institutional data. DRI staff work closely with new Depositors to encourage the ingest of recommended formats, and will highlight poor format choices early in the Membership phase.

<http://projects.iq.harvard.edu/fits> , accessed 15th September 2017

1.

<http://fedorarepository.org/>, accessed 20 Oct 2017

2.

## **Supporting Documentation**

[Digital Repository of Ireland. Building the Digital Repository of Ireland Infrastructure, Digital Repository of Ireland \[Distributor\], Digital Repository of Ireland \[Depositing Institution\], DOI: 10.7486/DRI.qr474f68n, https://repository.dri.ie/catalog/qr474f68n](https://repository.dri.ie/catalog/qr474f68n)



[Digital Repository of Ireland. Digital Archiving in Ireland: National Survey of the Humanities and Social Sciences, Digital Repository of Ireland \[Distributor\], Digital Repository of Ireland \[Depositing Institution\], DOI: 10.7486/DRI.5m614676f: https://repository.dri.ie/catalog/5m614676f](https://repository.dri.ie/catalog/5m614676f)

[DRI Factsheet No. 3: File Formats \(June 2015\): https://repository.dri.ie/catalog/rj43ck402](https://repository.dri.ie/catalog/rj43ck402)

[DRI Collection Policy \(April 2015\): https://repository.dri.ie/catalog/s465jx541](https://repository.dri.ie/catalog/s465jx541)

[DRI Requirements: https://repository.dri.ie/catalog/wd37kb264](https://repository.dri.ie/catalog/wd37kb264)

[Metadata Guidelines: https://repository.dri.ie/catalog/r4958092r](https://repository.dri.ie/catalog/r4958092r)

[Guide to Metadata Quality Control: https://repository.dri.ie/catalog/sj13pg68d](https://repository.dri.ie/catalog/sj13pg68d)

[EAD, ISAD\(G\) and the Digital Repository of Ireland \(August 2016\): https://repository.dri.ie/catalog/rj43ck28s](https://repository.dri.ie/catalog/rj43ck28s)

[MODS and the Digital Repository of Ireland \(February 2016\): https://repository.dri.ie/catalog/rr17fb96g](https://repository.dri.ie/catalog/rr17fb96g)

[Dublin Core and the Digital Repository of Ireland: Version 2 \(December 2015\): https://repository.dri.ie/catalog/rx91h464n](https://repository.dri.ie/catalog/rx91h464n)

[Qualified Dublin Core and the Digital Repository of Ireland \(April 2015\): https://repository.dri.ie/catalog/sb39mq00g](https://repository.dri.ie/catalog/sb39mq00g)

[MARC21 encoded as MARCXML and the Digital Repository of Ireland, https://doi.org/10.7486/DRI.1831s091f](https://doi.org/10.7486/DRI.1831s091f)

[Project Hydra: http://www.dri.ie/dri-joins-hydra-project](http://www.dri.ie/dri-joins-hydra-project)

All URL's visited on 24th of October 2017 unless marked otherwise.

## **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

## 9. Documented storage procedures

*Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

### Applicant Entry

*Statement of Compliance:*

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

*Self-assessment statement:*

The Repository preservation workflow segregates archival assets from their access and discovery surrogates and applies different preservation levels to each. 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 replicated, ensuring that packages are always available and resistant to disk failures. Two of these hot storage clusters are separated geographically (to different cities).

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. Future plans will see that all storage media are 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

- 

The last known good copy is recovered from cold storage

- 

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

- 

Storage servers are hosted in locked racks in shared, modern, secure data centers that have controlled and monitored access with fire suppression and uninterrupted power supply. 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.

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**

[Digital Repository of Ireland. Building the Digital Repository of Ireland Infrastructure, Digital Repository of Ireland \[Distributor\], Digital Repository of Ireland \[Depositing Institution\], DOI: 10.7486/DRI.qr474f68n, https://repository.dri.ie/catalog/qr474f68n](https://repository.dri.ie/catalog/qr474f68n)

[DRI Preservation Policy \(March 2018\): https://repository.dri.ie/catalog/zw13bm274](https://repository.dri.ie/catalog/zw13bm274), accessed 26th March 2018

All URL's visited on 24th of October 2017 unless marked otherwise.

### **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

## 10. Preservation plan

### *Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

### **Applicant Entry**

#### *Statement of Compliance:*

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

#### *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 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 see 'Copyright, Licensing and Open Access Factsheet'). The roles and responsibility of Depositors and the Repository are clearly outlined in the Organisational Manager Agreement. This agreement also grants to the Repository the right to copy, transform and store the items as well as provide access to them. The Depositor retains ownership of the digital objects and DRI does not assume sole responsibility for access to and availability of any digital object. Depositors are allowed to make their own digital objects available in any means that they wish. Under our federated membership structure DRI members deposit their data and associated metadata (including rights statements) directly to the DRI infrastructure.

Both digital assets and their associated metadata are preserved within the repository. Other artefacts, such as web-renderable, or low-resolution surrogate versions of the assets, export versions of metadata, etc., are stored but not preserved as they can be regenerated by the system from the originals.

The repository software automatically performs many of the necessary steps to create and store the AIP from the SIP, allowing the SIP to be relatively simple and not require significant preparation by the data depositor. The repository performs file format identification, generates technical metadata and produces a report for the user, rejects malformed or invalid metadata entries and warns about duplicate records on ingest. All preservation actions taken by the repository software are recorded and form part of the Preservation Metadata.

To ensure continued access, DRI undertakes a yearly format watch process. The format watch process involves collaboration between the roles of Digital Archivist, Policy Manager and technical staff. The status of formats

contained within the repository is reviewed and a migration plan developed and implemented for any found to be at risk. This process involves first generating a report of all formats currently in the repository, and then investigating these formats on a case-by-case basis. A variety of resources are consulted to help with this undertaking, for example, PRONOM (1) the Library of Congress Digital Formats website (2) and the Digital Preservation Coalition Technology Watch Reports(3). Further detail on our format migration and emulation strategy is outlined in the Preservation Policy.

The preservation actions that the repository software carries out on ingested materials are explained in the DRI Preservation Policy and in the technical report Building the Digital Repository of Ireland Infrastructure.

DRI provides training, detailed guidelines, and user support to ensure that the digital objects are deposited in accordance to DRI's preservation policy (see DRI Guide to Deposit).

- (1) <http://apps.nationalarchives.gov.uk/pronom/Default.aspx>, accessed 22nd March 2018.
- (2) <http://www.digitalpreservation.gov/formats/intro/intro.shtml>, accessed 22nd March 2018.
- (3) <http://www.dpconline.org/advice/technology-watch-reports>, accessed 22nd March 2018.

## Supporting Documentation

[Digital Repository of Ireland. Building the Digital Repository of Ireland Infrastructure, Digital Repository of Ireland \[Distributor\], Digital Repository of Ireland \[Depositing Institution\], DOI: 10.7486/DRI.qr474f68n, https://repository.dri.ie/catalog/qr474f68n](https://repository.dri.ie/catalog/qr474f68n)

[DRI Membership Policy \(August 2016\): https://repository.dri.ie/catalog/sj13pg90x](https://repository.dri.ie/catalog/sj13pg90x)

[DRI Factsheet No. 4: Long-term Digital Preservation \(April 2014\): https://repository.dri.ie/catalog/rr17fc082](https://repository.dri.ie/catalog/rr17fc082)

[DRI Organisational Manager Agreement \(March 2018\): https://repository.dri.ie/catalog/zk527x75s](https://repository.dri.ie/catalog/zk527x75s)

[DRI Factsheet No. 2: Copyright, Licensing, and Open Access \(Feb 2014\):  
https://repository.dri.ie/catalog/rb699s72v](https://repository.dri.ie/catalog/rb699s72v)

[DRI Guide to Deposit: http://www.dri.ie/about/guide-to-deposit](http://www.dri.ie/about/guide-to-deposit)

[DRI Preservation Policy \(March 2018\): https://repository.dri.ie/catalog/zw13bm274](https://repository.dri.ie/catalog/zw13bm274), accessed 26th March 2018

All URL's visited on 24th of October 2017 unless marked otherwise.

## **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## 11. Data quality

### *Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

## Applicant Entry

### *Statement of Compliance:*

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

### *Self-assessment statement:*

The DRI staff and taskforce members include qualified archivists, librarians, social scientists, humanities 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://dri.ie/dri-team>).

Deposit of objects requires metadata in a recognised standard supported by DRI, with all mandatory fields, and institutional affiliation completed. DRI supports ingest using the most commonly used metadata standards in Ireland (see Requirement 8 for full list), and advises on preferred file formats for long term preservation.

Detailed 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. Guidelines are supported by regular training workshops.

It is recommended that depositors include citations to related works in the metadata for example by using the `isPartOf` term in Dublin Core. The same DC term can be used to link to related works held within the repository.

Data ingestion to the repository can happen in one of three different ways. First, 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.

Second, metadata in XML format can be ingested directly into the Repository using single ingest XML upload. Third, 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.

Most of our member institutions employ archivists or domain experts who ensure the quality of the data deposited within DRI. DRI additionally provides training and user guides on digitisation, collection management, file formats, metadata, contextual information and other data quality issues. We additionally facilitate learning through the regular showcasing of members collections at members forums and the provision of an online forum through which members can share their experiences and queries of data preparation and ingest. Overall, these processes and fora contribute to the deposit of quality data. The system performs checks on formats on ingest and alerts the depositor to any inconsistencies.

## **Supporting Documentation**

[DRI staff and expertise: http://dri.ie/dri-team](http://dri.ie/dri-team)

[International Advisory Group: http://www.dri.ie/international-advisory-group](http://www.dri.ie/international-advisory-group)

[Stakeholder Advisory Group: http://www.dri.ie/stakeholder-advisory-group](http://www.dri.ie/stakeholder-advisory-group)

[DRI Notice and Action Policy \(Jan 2014\): https://repository.dri.ie/catalog/vh5499702](https://repository.dri.ie/catalog/vh5499702)

[DRI Citation Policy \(April 2015\) https://repository.dri.ie/catalog/rx91h486p](https://repository.dri.ie/catalog/rx91h486p)

All URL's visited on 24th of October 2017 unless marked otherwise.

## **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

## 12. Workflows

### *Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

## Applicant Entry

### *Statement of Compliance:*

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

### *Self-assessment statement:*

The DRI 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. The DRI also publishes several fact sheets describing best practice, recommended formats, etc. These fact sheets are intended not only as a guide for DRI users to manage and assess their collections prior to ingestion into DRI, but we have been informed that they also serve as guides to best practice for organisations beyond our designated community.

The DRI provides online guides which outline fully all steps associated with depositing data within DRI (see DRI Guide to Deposit ). The Repository supports both synchronous and asynchronous (batch) data workflows for ingesting and processing data. These are documented in the Building the Digital Repository of Ireland Infrastructure (in particular Chapters 7 'Preservation', 8 'Metadata and Data Modelling' and 9 'User Interface Design' and the Cucumber Specifications).

The Repository holds a variety of objects from the social and cultural (social science and humanities) domains. 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 batch GUI is in development). Ingest of EAD is currently only possible from the command line due to the complexity of the records.

The metadata standard in which the descriptive metadata is encoded affects the workflow applied to ingested data. For example, while a form-based ingest creates a single object within the repository, an EAD ingest may include downloading of remote asset files and creation of multiple digital objects corresponding to the different EAD levels. All metadata ingested must be well-formed and must contain the mandatory DRI metadata fields or it will be rejected at this stage.

Once digital objects have been created, technical metadata about the asset is automatically extracted and saved as part of the object to enhance both access and preservation.

Although DRI provides recommendations on asset file formats for ingest, it will ingest non-standard formats. Depending on the file format various different surrogate access versions of the asset will be created, for example, web-renderable JPEG images for TIFF files, and webm and mp4 files for AVIs. In the case that an unsupported file format is ingested, no access surrogate will be created, but depending on the object permissions the asset file may still be provided for download.

Once ingested, metadata and data are archived in Fedora and an Archival Information Package (AIP) is created and stored on disk for long-term preservation (1). The AIP uses the Moab versioning format, and the initial version is created with a version of 1.

Additional administrative metadata will be added as the object and the collection in which it resides are reviewed and edited. Finally on publication a Digital Object Identifier (DOI) persistent identifier is minted and associated with the object.

Each time that an edit is made, a new version of the Moab AIP will be created and stored.

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. As with edits, any preservation actions which involve a change to the object (e.g. format migration) will cause a new version of the Moab AIP to be created. Preservation actions will also trigger the creation of preservation metadata which is stored in a combination of RDF, Dublin Core and PREMIS.

Several dissemination workflows are available within the repository. These depend on various factors such as the asset file format and the level of security associated with the objects.

The Restricted Data policy outlines the differing security levels attached to different types of data. While all our metadata is openly available, the depositor is able to set access restrictions as part of the ingest workflow (these levels are outlined in R4: Confidentiality/Ethics).

Supported asset file formats which have access surrogates automatically created on ingest can be configured to only allow download and viewing of this surrogate version. This may be desirable where the data owner only wishes to allow access to a lower resolution version of their asset, or where it is necessary to strip metadata embedded in the asset file before dissemination.

In the case where an asset file may have two versions with different security requirements, e.g. an original and redacted or anonymised version, then the original can be ingested as a 'preservation-only' asset, and it will never be disseminated via the repository.

Assets can be downloaded singly, or as part of an object archive which includes related object metadata, licence information and checksums to allow the verification of the asset files.

These workflows for ingest, preservation and dissemination are built into the repository codebase and reviewed regularly. DRI's Workflows Taskforce is responsible for defining the user interfaces and workflows necessary to interact with the system in order to ingest material into the Repository, or to access that material. monitoring and developing the technical processes of ingestion of material into the Repository. They review existing user and data workflows as well as to specify new workflows based on feature requests approved by the Requirements Task Force.

1. See <http://public.ccsds.org/publications/archive/650x0m2.pdf> page 36, accessed 15 September 2017

## **Supporting Documentation**

[Digital Repository of Ireland. Building the Digital Repository of Ireland Infrastructure, Digital Repository of Ireland \[Distributor\], Digital Repository of Ireland \[Depositing Institution\], DOI: 10.7486/DRI.qr474f68n, https://repository.dri.ie/catalog/qr474f68n](https://repository.dri.ie/catalog/qr474f68n)

[DRI Guide to Deposit: http://www.dri.ie/about/guide-to-deposit](http://www.dri.ie/about/guide-to-deposit)

[DRI Collection Policy \(April 2015\): https://repository.dri.ie/catalog/s465jx541](https://repository.dri.ie/catalog/s465jx541)

[DRI Restricted Data Policy \(May 2015\): https://repository.dri.ie/catalog/sb39mq22h](https://repository.dri.ie/catalog/sb39mq22h)

[DRI Policy Framework \(Feb. 2012\): https://repository.dri.ie/catalog/qz2167463](https://repository.dri.ie/catalog/qz2167463)

All URL's visited on 24th of October 2017 unless marked otherwise.

## **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

.

### 13. Data discovery and identification

*Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

#### Applicant Entry

*Statement of Compliance:*

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

*Self-assessment statement:*

DRI has an open access metadata policy, that is, metadata is publicly available. We would not seek to embargo or restrict access to metadata. DRI captures the metadata encoded in the following standards: Simple and Qualified Dublin Core, MODS, MARC21 encoded as MARCXML, and EAD.

Objects in the repository are indexed into Solr (1), a powerful open-source search engine tool (see Building the Digital Repository of Ireland 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 and different metadata standards 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 search box, 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.

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.

DRI uses Digital Object Identifier (DOI), 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), and a landing page for the object will remain accessible on the Repository.

DRI is listed in re3data.org, the Registry of Research Data Repositories (2)



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.

(1) <http://lucene.apache.org/solr/>, accessed 20 Oct 2017

(2) [Re3data.org: https://www.re3data.org/search?query=DIGITAL+REPOSITORY+OF+IRELAND](https://www.re3data.org/search?query=DIGITAL+REPOSITORY+OF+IRELAND)

### **Supporting Documentation**

[Digital Repository of Ireland. Building the Digital Repository of Ireland Infrastructure, Digital Repository of Ireland \[Distributor\], Digital Repository of Ireland \[Depositing Institution\], DOI: 10.7486/DRI.qr474f68n, https://repository.dri.ie/catalog/qr474f68n](#)

[DRI Citation Policy \(April 2015\) https://repository.dri.ie/catalog/rx91h486p](https://repository.dri.ie/catalog/rx91h486p)

[DRI Withdraw Data Policy \(April 2014\): https://repository.dri.ie/catalog/rb699s823](https://repository.dri.ie/catalog/rb699s823)

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### **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

**CoreTrustSeal Board**

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## 14. Data reuse

### *Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

## Applicant Entry

### *Statement of Compliance:*

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

### *Self-assessment statement:*

All digital objects must be deposited with associated metadata and where appropriate contextual information and associated documentation (see [How to DRI: Contextual Information](#)). DRI supports a number of descriptive metadata formats (see Requirement 8 for the full list). Guidelines to their use within DRI are provided.

The descriptive metadata also contains provenance information such as on the ownership of the digital objects and location of analogue originals, if they exist. Depositors are also asked to deposit contextual documents (see [How to DRI: Contextual Information](#)) that provide more detailed information about the origin and the creation of the digital objects. End users are required to include a citation to digital objects in any use. This citation is provided by DRI and includes the object's DOI.

Preservation metadata and object provenance is also captured and stored. Metadata output by the FITS tool is also captured and stored as technical metadata.

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.

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.

**Supporting Documentation:**

[Digital Repository of Ireland. Building the Digital Repository of Ireland Infrastructure, Digital Repository of Ireland \[Distributor\], Digital Repository of Ireland \[Depositing Institution\], DOI: 10.7486/DRI.qr474f68n, https://repository.dri.ie/catalog/qr474f68n](https://repository.dri.ie/catalog/qr474f68n)

[Digital Repository of Ireland. Digital Archiving in Ireland: National Survey of the Humanities and Social Sciences, Digital Repository of Ireland \[Distributor\], Digital Repository of Ireland \[Depositing Institution\], DOI: 10.7486/DRI.5m614676f: https://repository.dri.ie/catalog/5m614676f](https://repository.dri.ie/catalog/5m614676f)

[DRI Factsheet No. 3: File Formats \(June 2015\): https://repository.dri.ie/catalog/rj43ck402](https://repository.dri.ie/catalog/rj43ck402)

[DRI Factsheet No. 7: Persistent Identifiers and DOIs \(June 2015\): https://repository.dri.ie/catalog/s752kt28n](https://repository.dri.ie/catalog/s752kt28n)

[How to DRI: Contextual Information: https://repository.dri.ie/catalog/sn00qc64j](https://repository.dri.ie/catalog/sn00qc64j)

All URL's visited on 24th of October 2017 unless marked otherwise.

**Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

**CoreTrustSeal Board**

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## 15. Technical infrastructure

*Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

### Applicant Entry

*Statement of Compliance:*

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

*Self-assessment statement:*

The DRI technical infrastructure has been designed to be robust and reliable, and this includes the use of well-supported standards, operating systems, hardware and software components.

The DRI hardware is divided between two geographic locations, with production services at Trinity College Dublin (TCD) and test/training services at Maynooth University (MU). At the main TCD site, 10 Dell PowerEdge servers provide the compute resources (~540GB RAM, 152 CPU cores) for an OpenNebula private cloud on which the DRI production virtual servers are hosted. A further 10 servers comprise a Ceph storage cluster providing the underlying storage resources for all DRI services, with approximately 384TB of raw storage. Also at TCD is a tape storage machine, used for offline backup, which is located in a separate data centre to the other physical machines. At the MU site, 7 Dell PowerEdge servers are used for the OpenNebula cloud and Ceph storage cluster. As MU hosts test and training services it has fewer resources, with approximately 64TB of storage available to Ceph and 76GB of RAM with 60 CPU cores for OpenNebula. At both TCD and MU the DRI servers are located within data centers managed by the IT services of the university, providing stable power, cooling and networking infrastructure.

The DRI software stack is Open Source software published under the Apache License, Version 2.0 and the source code is publicly available on the GitHub code-sharing platform. The software also relies on several Open Source components such as Samvera, Fedora and Solr. DRI and its member organisations are active in the Open Source communities of these tools and technologies, and are members of the Samvera Consortium.

DRI uses Ansible, an Open Source automation platform as part of its software deployment system. Ansible allows the development and system administration team to programmatically describe each server within the DRI infrastructure so that any component can be recreated automatically to replace a failed machine or increase capacity. The Ansible scripts, many of which are available on GitHub, describe the entire architecture of the DRI. Software Updates are made in accordance with the DRI OS and Software Upgrade Policy.

The repository application and the development methodology is described in the report Building the Digital Repository of Ireland Infrastructure. The application is also well documented in the form of user guides as well as executable specifications written using the Cucumber framework and RSpec. These tools allow the development team to translate project requirements into acceptance tests which are run against the code each time a change is

made to ensure that all functionality works as expected. These automated tests are human-readable and are available in the same GitHub repository as the application code.

At an organisational level, the DRI structure 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 various OAIS functional components are represented in DRI by distinct functions, staff, working groups and task-forces or by software components.

Various other frameworks and standards also informed the development of the Repository application. For example the application uses well understood Model-View-Controller paradigm and the software development process relied heavily on an Agile methodology and elements of Behaviour-Driven Development (BDD) and Test-Driven Development (TDD). User interfaces were developed in line with W3C Web Content Accessibility Guidelines, while the API is based on the REST architecture.

The DRI Policy Framework, includes both the policy guidelines we adopt and the policy instruments we use to ensure robust policy development. Policies are reviewed on a four year cycle. 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.

Hardware replacement timelines are built into the Business plan and budget, and the DRI programme manager maintains an active list for feature planning for the infrastructure and a requirements gathering process centred on the Requirements Taskforce. DRI also runs a number of partnership leveraged projects targeting development of additional feature and collections. DRI's philosophy, which will be integrated into its 2018 strategic plan, is to focus on sustainability of infrastructure, software, and business decisions.

(1) Consultative Committee for Space Data Systems. (2012). Reference Model for an Open Archival Information System (OAIS). Washington, DC: CCSDS Secretariat. Accessed 15 September 2017

## **Supporting Documentation**

[Digital Repository of Ireland. Building the Digital Repository of Ireland Infrastructure, Digital Repository of Ireland \[Distributor\], Digital Repository of Ireland \[Depositing Institution\], DOI: 10.7486/DRI.qr474f68n, https://repository.dri.ie/catalog/qr474f68n](https://repository.dri.ie/catalog/qr474f68n)

[DRI Policy Framework \(Feb. 2012\): https://repository.dri.ie/catalog/qz2167463](https://repository.dri.ie/catalog/qz2167463)

[Open Source Apache Licence V2 http://www.apache.org/licenses/LICENSE-2.0](http://www.apache.org/licenses/LICENSE-2.0)

[DRI Samvera Repository Application on GitHub https://github.com/Digital-Repository-of-Ireland/dri-app](https://github.com/Digital-Repository-of-Ireland/dri-app)

[Samvera https://wiki.duraspace.org/display/samvera/Samvera](https://wiki.duraspace.org/display/samvera/Samvera)

[Fedora http://fedorarepository.org/](http://fedorarepository.org/)

[Solr http://lucene.apache.org/solr/](http://lucene.apache.org/solr/)

[W3C Web Content Accessibility Guidelines https://www.w3.org/TR/WCAG20/](https://www.w3.org/TR/WCAG20/)

[Ansible https://www.ansible.com/](https://www.ansible.com/)

[Ceph https://ceph.com/](https://ceph.com/)

[OpenNebula https://opennebula.org/](https://opennebula.org/)

**CoreTrustSeal Board**

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All URL's visited on 24th of October 2017 unless marked otherwise.

## **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

## 16. Security

### *Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

## Applicant Entry

### *Statement of Compliance:*

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

### *Self-assessment statement:*

The DRI Risk Assessment Report identifies risks to the organisation and the repository. This report is the output of periodic Risk Assessment Workshops where the risks are reviewed and impacts and likelihood determined.

Our Crisis and Disaster Management plan, disaster recovery procedures, IT security policy and procedures, and business continuity plans are all informed by this Risk Assessment Report.

Our Crisis Management strategy 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.

## **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*

## **17. Comments/feedback**

*Minimum Required Statement of Compliance:*

0. N/A: Not Applicable.

### **Applicant Entry**

*Statement of Compliance:*

0. N/A: Not Applicable.

*Self-assessment statement:*

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### **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*