Establishing Trust in Data Curation: OAIS and TRAC applied to a Data Staging Repository (DataStaR)

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Image courtesy of the Cornell Biological Field Station
What exactly is a data staging repository?
Where does it fit in the life cycle?
Where does it fit in the life cycle?
But DataStaR isn’t a preservation repository...

“...if repository developers and administrators are guided by a reference model, they are more likely to consider the right issues.”

Allinson 2006: OAIS as a Reference Model for Repositories: An Evaluation

“A repository is Trusted if it can demonstrate its capacity to fulfill its specified functions, and if and if those (...) functions satisfy (...) minimal criteria which all trusted repositories are assumed to require.”

DigitalPreservationEurope 2008: Repository Planning Checklist and Guidance
An OAIS view of DataStaR
An OAIS view of DataStaR

“pre”-SIP

DataStaR

create
metadata
publish

upload
data set
publish

Permanent Repository (domain, institutional)

disseminate

user

share

colleague
An OAIS view of DataStaR
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OAIS

IASSIST 2009
Look at other approaches to implementation

PLEDGE POLICY LIST
PLEDGE Project Report
Robert Wolfe, MIT Libraries

Introduction

The objective of this list is to identify and describe the policies that an institutional repository like DSpace would need to define and implement in order to satisfy the requirements of a set of best practices like NASA’s TRAC. The descriptions of each policy, specifically the requirements for satisfactory implementation are purposely abstract, so as to avoid prejudicing the list for or against any one particular institutional repository system.

The TRAC is organized as a checklist for certification or audit. Individual entries in the checklist represent necessary functions or conditions of a trusted digital repository. These functions and conditions are very specifically defined and do not predict the organization and operation of the repository. Often a single policy declaration is all that is necessary for a repository to accomplish several of the TRAC requirements, sometimes from several different sections of the TRAC.

Policy Examples

CU-0002 User Privacy (FR02, AR01)

Repository maintains an explicit definition of user rights to privacy and all allowable uses of end-user data, including usage data. Definitions will include specification of publicly available data and repository’s internal use of data. It will include schedules of data retention and procedures for responding to Homeland Security Agency (HSA) requests for usage data.

Actual DSpace@MIT Policy Example

Descriptive Statement

1. The MIT Libraries have a privacy policy at http://libraries.mit.edu/dspace/mit/build/policies/privacy.html
## TRAC Criteria and Checklist Worksheet 3.4


Revisions in the text have been made in accordance with DataStaR’s mission and implementation parameters.

This worksheet contains all TRAC criteria, annotated to reflect the mission and operations of DataStaR. As noted, some requirements are not relevant to DataStaR (N), and others will be addressed at a later point as part of mainstream repository development at Mann Library (M).

<table>
<thead>
<tr>
<th>SECTION</th>
<th>EVIDENCE (examples)</th>
<th>EVIDENCE (actual) and COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Organizational Infrastructure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1. Governance &amp; organizational viability</td>
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<tr>
<td>A1.1 Repository has a mission statement that reflects a commitment to the management of and access to digital information.</td>
<td>Mission statement for the repository and its organizational context.</td>
<td>DataStaR repository policies: <a href="https://confluence.comell.edu/x/fA41BQ">https://confluence.comell.edu/x/fA41BQ</a> (mission statement, org. context).</td>
</tr>
<tr>
<td>A1.2 Repository has an appropriate, formal succession plan in case the repository ceases to operate or the funding institution substantially changes its scope.</td>
<td>Succession plan: explicit and specific statement documenting the intent to ensure continuity of the repository, and the steps taken and to be taken to ensure continuity.</td>
<td>DataStaR repository policies: <a href="https://confluence.comell.edu/x/fA41BQ">https://confluence.comell.edu/x/fA41BQ</a> (org. commitment).</td>
</tr>
<tr>
<td>A2. Organizational structure &amp; staffing</td>
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</tr>
<tr>
<td>A2.1 Repository has identified and established the duties that it needs to perform and has appointed staff with adequate skills and experience to fulfill these duties.</td>
<td>A staffing plan: competency definitions; job description; development plans; plus evidence that the repository reviews and maintains these documents as requirements evolve.</td>
<td>M</td>
</tr>
</tbody>
</table>

Version 1.0
February 2007
What did DataStaR need...

Three things:

- Data depositor agreement
- Set of repository policies
- System documentation
Data deposit agreement

This document serves as evidence to meet (in part or entirely) the following TRAC requirements:

- A3.1, A3.3, A5.1, A5.2, A5.3

Specific statements that satisfy a TRAC requirement are noted within the document.

DataStar Data Deposit Agreement

DataStar's purpose is to support collaboration and data sharing among researchers during the research process, and to promote publishing or archiving data and high-quality metadata to discipline-specific data centers, and/or to Cornell's own digital repository (eCommons). DataStar fulfills its mission by managing content contributed by depositors as described in its repository policies and system documentation.

Your use of the DataStar system requires that you accept the terms of this data deposit agreement. This agreement grants permission for Cornell University Library (CUL), via the DataStar repository (DataStar) and other repositories or data centers (including CUL's institutional repository, eCommons), to archive and distribute data and metadata, as described in DataStar's repository policies and system documentation, and the terms you agree to below.

By using the DataStar system, you accept the terms of this agreement, and you (or your proxy, on your behalf) agree to the following:

1. You accept and abide by DataStar's repository policies, which describe the overall management and operation of the repository and related services.
2. You represent that in utilizing DataStar for the purposes of sharing your submission privately with selected colleagues, such sharing is not in violation of any applicable laws or policies, including those pertaining to the protection of private and confidential information. A5.4
3. You certify that in preparing this submission for public archiving and distribution, you have removed all information directly identifying the research subjects in these data, and you have used due diligence in preventing information in the collection from being used to disclose the identity of research subjects. A5.4
4. You agree to release and hold harmless Cornell University and CUL from any and all liability from claims arising out of any legal actions, including actions concerning identification of research subjects, breaches of confidentiality, or invasions of privacy by or on behalf of said subjects. A5.4
5. If the submission is your original work, and that you have the right to grant the rights contained in this license. You also represent that your submission does not, to the best of your knowledge, infringe upon anyone's copyright or any other applicable laws or licenses. A5.4
6. If the submission is not your original work, you represent that you have obtained the unrestricted permission of the owner to grant CUL the rights required by this license, and that the owner of the material is clearly identified and acknowledged within the text or content of the submission. A5.4
7. If the submission is based upon work that has been sponsored or supported by an agency or organization other than CUL, you represent that you have satisfied any right of review or other obligations required by such contract or agreement. A5.4
8. You grant CUL the non-exclusive right to distribute your data set(s) and metadata ("submission", hereafter), via DataStar, to authorized users selected by you. A3.3
9. You agree that CUL may make and keep multiple copies of your submission for purposes of security, back-up and preservation. A3.3
10. You represent that you have made a reasonable effort to ensure that data contained in your submission and distributed via DataStar are accurate.
Repository policies

This document serves as evidence to meet (in part or entirely) the following TRAC requirements:
- A3.1, A3.7, A5.1

DataStaR repository policies v1.0

DataStaR aims to be transparent and accountable in all of its operations. This is partially manifested by creating and maintaining the following publicly viewable documents and policies:

DataStaR repository policies:
- DataStaR mission statement
- Updates and amendments to these policies and related documents
- Overview for depositors
- DataStaR collection development policy
- Data and metadata management policy
- DataStaR and digital preservation
- Terms of use
- Feedback policy
- References

Additional documents:
- DataStaR data deposit agreement (separate document) A3.1, A3.3, A5.1, A5.2, A5.3, A5.4, B1.5, B1.6
- Preparing data for publication - guidelines (separate document)
- System documentation (separate document)

DataStaR mission statement

A1.1, A3.1

The purpose of DataStaR is to support collaboration and data sharing among researchers during the research process, and to promote publishing or archiving data and high-quality metadata to discipline-specific data centers, and/or to Cornell’s own digital repository, eCommons (http://ecommons.library.cornell.edu).

DataStaR accomplishes these goals by:
- Providing access-controlled file sharing to Cornell researchers and their collaborators;
- Developing and offering tools for creating metadata records in a variety of formats, and that allow researchers to reuse their personal information and information from previously created metadata records;
- Assisting researchers in identifying discipline-specific data centers for data publication, and in preparing data and metadata to the standards specified by those centers.
DataStar system documentation

Introduction

The purpose of DataStar is to support collaboration and data sharing and high-quality metadata to discipline-specific data centers. For further information on DataStar policies and operations, see the DataStar website.

Sections:
- Architecture - overview
- Ingest
- Access
- Metadata
- Publication
- Administrative and maintenance actions
- Backup
- Other functions
- Hardware inventory and history
- Software inventory and history
- Testing and further development
- Tabled items for future development

Related documents:
- Minimum metadata for DataStar
- System errors - documentation

Architecture - overview

The DataStar system consists of the following applications:
- Fedora - Open-source digital repository software
- vitrino - Ontology editor and semantic web application development tool
- CURIDP - Tool to integrate web applications with CoRD
- DataStar-specific code
  - Code to handle the file upload form.

Ingest

Ingest of Submission Information Package (SIP)

- Authentication: DataStar-35 Cornell users are authenticated via JUPLEXAuth. DataStar-33
- DataStar-15 Non-Cornell users are authenticated via the form-based login available at http://datastar.submission.cornell.edu. DataStar-33
- DataStar-73 File size of uploaded files is 1GB, with a total limit of 10GB per account. DataStar-33
- DataStar-40 The identity of the uploader of each file is stored as an object property in the DataStar metadata store. DataStar-33
- DataStar-41 File format verification: DataStar-21 PROOF is used for file format identification and validation. File format information is stored as object properties in the DataStar metadata store. DataStar-33
- DataStar-46 Checks are automatically performed when an object is uploaded to the Fedora repository (by which application?) DataStar-33
- DataStar-38 Checksums are stored in checksum properties in the DataStar metadata store, and as properties in the Fedora to facilitate runtime error checking of content in the repository. DataStar-33
- DataStar-42 A submitted digital object is considered "complete" and "correct" if the upload and verification processes proceed without errors. See also: System errors - documentation. DataStar-33
- DataStar-39 Successful deposits are documented with an automatically generated email receipt, including the checksum of the deposited file(s), to the depositor. See also: System errors - documentation. DataStar-33

Maintenance and construction of Archival Information Package (AIP)

- An AIP consists of the files uploaded by a user, and all related metadata - whether supplied by the user, the system, or DataStar staff. Uploaded files are managed by Fedora (see Fedora documentation for details). DataStar-39 Metadata is managed within the DataStar metadata store. Fedora content is linked to DataStar metadata via Fedora identifiers. See Minimum metadata for DataStar for description of the minimum required elements. DataStar-39
- DataStar-49 Minimum metadata for DataStar is required for the data set as a whole, and each file included in the data set, are complete. DataStar-47 If files fail to provide complete metadata, the upload fails and the user is notified (see System errors - documentation). DataStar-47
- Each AIP is assigned a URI within the DataStar system at the time it's created. DataStar-47 Our assumption is that data sets uploaded to DataStar have not been published elsewhere and do not have a prior unique identifier which must be retained. DataStar-48 Original file names are maintained within DataStar. DataStar-47
- DataStar-26 Files associated with an AIP may be updated by a user at any time. DataStar-50
- DataStar-39 In the case an older file is replaced with a newer one, only the newest is available to DataStar users. Older versions are available upon request to a DataStar administrator (accessible via the Fedora management interface). DataStar-50
- DataStar-50 Deletion of files: data owners may delete content (a single file or an entire AIP) at any time. DataStar-51 The immediate result of this action is to make the content inaccessible to anyone (including the owner), with the exception of system administrators, who will make it available upon request. Content will be retained and remain inaccessible for one year after which it will be deleted permanently. DataStar-53 Administrator
## System documentation

This document serves as evidence to meet (in part or entirely) the following TRAC requirements: #A37

### DataStaR system documentation

#### Introduction

The purpose of DataStaR is to support data and high-quality metadata to researchers. For further information on DataStaR...

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#### Sections:
- Architecture - overview
- Ingest
- Access
- Metadata
- Publication
- Administrative and maintenance
- Backup
- Other functions
- Hardware inventory and history
- Software inventory and history
- Testing and further development
- Tabled/ future development

#### Related documents:
- Minimum metadata for DataStaR
- System errors - documentation

#### Architecture - overview

The DataStaR system consists of:
- Fedora - Open-source digital repository
- FOSS - Ontology editor and semantic
- CUI
d - Tool to integrate
- DROID - File format identification
- DataStaR-specific code
- Code to handle the file upload

<table>
<thead>
<tr>
<th>T</th>
<th>Key</th>
<th>Summary</th>
<th>Components</th>
<th>Assignee</th>
<th>Reporter</th>
<th>Pr</th>
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**Note:** For further information on DataStaR and its requirements, please refer to the DataStaR staff's documentation. Uploaded files are stored as object properties in the repository (by which application?). DataStaR staff ensures routine error checking of the deposited file(s) to the repository (by which application?). DataStaR staff ensures ongoing maintenance of the deposited file(s) to the repository (by which application?).
## How did we do?

<table>
<thead>
<tr>
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<th>POLICIES</th>
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IASSIST 2009
How did we do?

Number and percentage of TRAC criteria addressed by (agreement, policies, system)

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<tr>
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<th>System doc/requirements</th>
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<tbody>
<tr>
<td>A (24 criteria)</td>
<td>6 (25%)</td>
<td>9 (38%)</td>
<td>3 (13%)</td>
</tr>
<tr>
<td>B (44 criteria)</td>
<td>4 (9%)</td>
<td>14 (32%)</td>
<td>30 (68%)</td>
</tr>
<tr>
<td>C (16 criteria)</td>
<td>0</td>
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• Section A criteria (organizational infrastructure) addressed mainly by policy
How did we do?

Number and percentage of TRAC criteria addressed by (agreement, policies, system)

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<td>0</td>
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</tr>
</tbody>
</table>

- Section A criteria (organizational infrastructure) addressed mainly by policy
- Section B and C criteria (digital object management and technologies, technical infrastructure and security addressed mainly (but not exclusively) by system
What didn’t we do?

<table>
<thead>
<tr>
<th>TRAC SECTION</th>
<th>Address at transition to production system</th>
<th>Not relevant to DataStaR</th>
</tr>
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<tr>
<td>A (24 criteria)</td>
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<td>1 (4%)</td>
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<td>B (44 criteria)</td>
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<td>8 (18%)</td>
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<tr>
<td>C (16 criteria)</td>
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</tr>
<tr>
<td>TOTAL (84 criteria)</td>
<td>21 (25%)</td>
<td>9 (11%)</td>
</tr>
</tbody>
</table>

We are making an effort to address 64% of the TRAC criteria, in the pilot phase.
Some observations

- Understanding/interpreting the criteria is a lot of work.
- The right tools might simplify policy development.
- The right software might simplify system specification.
- Compiling /presenting evidence: for auditors, or for users?
- Picking your partners...

\[\textit{TRAC has a lot to offer, even if long-term preservation isn’t your focus.}\]
Thank you.

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