Post-workshop report

Guidelines on transparent exposure of repository information: informing decisions of trustworthiness

Workshop at the 18th International Digital Curation Conference

19 February 2024

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Terminology

Terminology/Acronym	Description
DCAT	Data Catalog Vocabulary
DQV	Data Quality Vocabulary
DRAWG	Data Repositories Attributes Working Group. A working group from the Research Data Alliance (RDA).
FAIR	Findable, Accessible, Interoperable, Reusable
IDCC	International Digital Curation Conference
PID	Persistent IDentifier
RDA	Research Data Alliance
TDR	Trustworthy Digital Repository

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Executive Summary

This report presents the experiences and results of the workshop 'Guidelines on transparent exposure of repository information: informing decisions of trustworthiness', held at the International Digital Curation Conference 2024 (IDCC24). The aim of the workshop was to introduce a targeted audience to the FAIR-IMPACT guidelines and plans for a prototype, and to gather specific and feedback on how to improve the guidelines to the realistic experience of the community. The workshop was structured to first allow participants to be introduced to the relevant information and background of the work, followed by hands-on work to consider their own organisations. Participants shared enthusiastic responses to the work, as well as critical and valuable feedback, specifically on how the communication about the work can be improved to be more inclusive and impactful. Most participants had not considered the way their organisation exposes information before, but quickly caught onto some of the added value of improving the transparency of this for themselves and their user community. Participants also identified interesting scenarios in which the applicability of the guidelines and proposed prototype are not immediately clear, which propose excellent use cases to investigate further in the future, to evaluate the flexibility of the work. The report also presents the next steps planned in FAIR-IMPACT for the development of this line of work.

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Background of the workshop

The FAIR-IMPACT project supports the implementation of FAIR-enabling practices, tools, and services. To this end, guidelines and a prototype[1] are being developed to improve the transparency of, and trust in, the services offered by Trustworthy Digital Repositories (TDRs) and other (meta)data service providers. These guidelines help to expose relevant information and accompanying evidence in a uniform and transparent way, to facilitate discovery, communication, and interoperability. This will occur at the organisational level as well at the digital object level. Since the first set of guidelines were published in October 2023[2], the focus has been on outreach and feedback collection to increasingly fit the needs and unlock the potential of the community in the next iterations of the work.

One of these outreach activities was the workshop titled 'Guidelines on transparent exposure of repository information: informing decisions of trustworthiness', held at the International Digital Curation Conference 2024 (IDCC24). The aim of the workshop was to introduce a targeted audience to our guidelines and plans for the prototype, and to gather specific and critical feedback on how to improve the guidelines to the realistic experience of the community. The IDCC24, under the main theme "trust through transparency", was the ideal gathering place for data practitioners from areas such as infrastructure, research, and funding bodies who deal with depositing, searching, and reusing data. They are the community who needs and utilises TDRs in their daily work and can therefore offer valuable feedback to the guidelines as well as consider the application of them to their own service or organisation. Participants were asked to consider their current position and drivers for change, while simultaneously providing meaningful input that will allow us to develop the guidelines and prototype further into something that will best fit the needs and desires of relevant stakeholders. The workshop attracted a total of eighteen participants.

Structure of the workshop

The workshop was structured to first allow participants to be introduced to the relevant information and background of the work, followed by hands-on work to consider their own organisations. The workshop materials have been made publicly available on Zenodo[3].

[1] Milestone report coming soon at: https://doi.org/10.5281/zenodo.10847707
[2] Verburg, M., Ulrich, R., L'Hours, H., Huber, R., Priddy, M., Davidson, J., Gonzalez-Beltran, A., Meijas, G., & Neidiger, C. (2023). M5.2 - Guidelines for repositories and registries on exposing repository trustworthiness status and FAIR data assessments outcomes (1.0). Zenodo. https://doi.org/10.5281/zenodo.10058634
[3] Verburg, M., Priddy, M., Ulrich, R., Huber, R., L'Hours, H., Neidiger, C., & Dillo, I. (2024). Guidelines on transparent exposure of repository information: Informing decisions of trustworthiness. 18th International Digital Curation Conference (IDCC24), Edinburgh, Schotland. Zenodo. https://doi.org/10.5281/zenodo.10794116

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Information shared in presentations

To introduce the workshop participants to the project background, the rationale and current iteration of the guidelines, the planned prototype, and examples of exposing both FAIR assessment and other information related to trustworthiness, a number of presentations were given by relevant experts from the task. To start things off, a general introduction to FAIR-IMPACT was given about how the project is structured, who is involved, what the objectives are, and the current status.

Motivating the need for metrics and guidelines, it was laid out how the current research data environment is populated with digital objects, each with a range of characteristics, including those that imply FAIRness and trustworthiness. Complex collaborative coordination is required by all (human) actors and (machine) agents involved (including repositories) to carry out the activities and functions required throughout the object lifecycle. The ability to cooperate, interoperate, and deliver services to researchers depends on mutual trust between service providers, digital object creators, depositors, users, and funders etc. As information varies in terms of level of detail, contexts, and time, it should be linked across different services and data providers to foster discovery and aggregation by registries, assessment tools etc. to provide additional value and insights to users.

The planned development of the prototype was also detailed. Its purpose is to transform the concepts into a tangible representation that allows to validate and understand limits and feasibility. Its goal is to collect feedback and ideas for added values from stakeholders and to revise and improve the initial concept . The envisioned demonstrator will start with the embedded organisations in FAIR-IMPACT, but its scope is planned to be expanded later on. Some initial envisioned work on exposing repository characteristics, PIDs, and FAIR assessments was presented to show how such implementations through the prototype could work in practice.

A range of interested parties, including researchers and repositories, can undertake FAIR assessment of digital objects. However, a clear understanding of the results of an assessment and its implications depends on an understanding of the methodology of the evaluation process. This is particularly important when assessment metrics are selected or adapted for a disciplinary context. The guidelines therefore include the exposure of assessment characteristics, such as the FAIR assessment authority, the tool, its creators, and the evidence they hold. Participants provided some interesting questions related to this work and the interpretability of FAIR assessment results. The aim of the prototype will be to improve the machine-actionability and comparability of different assessment results, through the exposure using DCAT and DQV.

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The concept of 'trust' was presented as the confidence and belief in the reliability or truth of something. This is offered, accepted, sought, and earned between parties. When someone chooses to trust, we may turn out to be right or wrong, depending on the resulting outcomes and experiences. In contrast to trust, 'trustworthiness' is about demonstrating that practices meet a set of standard requirements through an assessment process based on evidence. Through this rationale, transparency is a dependency for trust. Whilst certification for research data repositories exists (e.g., CoreTrustSeal), not all digital object services have such an external authority assessing and validating the service provided. Therefore, this model will also support the transparent disclosure of self-declared assertions about relevant activities and functions. This structured information expression supports harvesting and validation by third parties, which reduces administrative overhead, improves interoperability, and benefits the wider scope of research.

Practical examples of how to expose information that demonstrates aspects of trustworthiness were shared, drawing specifically from the Data Repository Attributes that have recently been defined and published by the RDA Data Repository Attributes Working Group (DRAWG)[4]. Taking the perspective of the CoreTrustSeal, it was presented what information should be declared in relation to these attributes. This focus on content shows how one validation authority can set standards for *what* should be exposed, whereas the focus of the work in general is on *how* information could be exposed. This practical example shows how the future prototype can be embraced and used as a form of communication and exposure of predefined standards.

Interactive exercise

After considering the different presentations and the information presented within them, with room for questions and discussion in between, participants were then asked to work on the worksheet that was created for the workshop (see Appendix A). Drawing again from the DRAWG list of attributes, a subselection was made for participants to consider: *Research area*, *Metadata*, *Terms of Deposit*, *Persistent Identifiers*, and *Preservation*.

For each attribute, a list of questions was offered up to the participants, to guide them in considering different elements of exposing this information. Participants were asked to search for the information related to each attribute, and consider different qualities and characteristics of the information. Emphasis was placed on considering the added value of exposing such information, taking the perspective of different stakeholders that could engage with the information if provided transparently.

[4] Witt, M., Cannon, M., Lister, A., Segundo, W., Shearer, K., Yamaji, K., & Research Data Alliance Data Repository Attributes Working Group. (2024). RDA Common Descriptive Attributes of Research Data Repositories (Version 1.0). Research Data Alliance. https://doi.org/10.15497/RDA00103

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Participants that did not represent one specific repository (e.g. representatives of registries, other initiatives, or repositories in creation) were asked to consider a (random) other repository instead. This proved to be more of a challenge for the participants, but did also clearly show the effects of insufficient exposure of information on other stakeholders.

The consolidated results from the workshop and the interactive exercise are presented in the next section of the report.

Consolidations from the workshop

This section of the report presents the consolidations from the workshop, based on the filled in exercise sheets and notes captured during discussions throughout the workshop.

Participants indicated often that they had not considered their organisation and the information they expose in the way they had done during the workshop. Although this was new to most participants, many expressed their interest and enthusiasm about the topic throughout the workshop. They also posed interesting questions and points for discussion during the initial presentations and the interactive exercise. After processing a significant amount of new information about the topic and developments so far, many participants expressed their interest in and support for the work and its further development. This is also reflected in the number of participants that chose to be included as contributors to this report, providing their input and review.

Our focus for this workshop was on considering the added values of exposing certain information in a transparent way, which coincidentally seemed to be the aspects that were most clear to participants throughout. What is interesting to observe is that most repositories focus solely on the added value in relation to their end users, but do not often seem to consider additional use cases in which other stakeholders are involved (e.g., registries, portals, reusers, third-party organisations). What is also observed is that many participants assume that the process of validation proposed in our work is already being executed by certain organisations (fitting the ‘validation authorities’ definition in our work, e.g. CoreTrustSeal and DataCite), while this is not currently the case yet. What this does indicate is that this way of working seems natural and logical, but it also means it is not transparent how such processes currently work.

With regards to the more technical aspects, such as the machine-friendliness of the exposure of information, a lot of participants were unsure about such qualities and how to assess them. Assessing such qualities about information does require specific expertise about machine-readability and machine-actionability, but is something that is currently mostly only assumed or guessed at. There was a desire for standards and examples for participants to consider and evaluate regarding such technical aspects, which we hope to provide to some extent through the prototype presentation later on in the project. Overall, the exercises indicated that quite a lot of information currently is not machine-friendly.

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At the end of the workshop, participants were asked to share their general feedback on the work and the workshop itself. The purpose of the work was clear to most of the participants, though the work covers so many different topics and strands of work that it also raises many new questions about defining terms, considering different perspectives, and assessing interactions between stakeholders. Some feedback was also given regarding the use of jargon and terminology that is not unambiguous to interpret. This was also observed in the results of the interactive exercise, where some participants felt they did not have the adequate expertise to engage in the work. Since it is very important in our work that it is beneficial to the full scientific landscape and all its stakeholders, it is thus important that we put in more effort to ensure the work is in the first place understandable to a wide audience. With this first targeted outreach effort in the form of this workshop, we were made aware of some of the assumptions we make and blind spots we have, which helps us to improve the description of our work to be more inclusive and accessible. Aside from improving explanations, we should also focus on clarifying the different roles and perspectives we see with regards to the exposure of repository information, so different people can identify themselves better in the landscape.

When asked whether they think their organisation would be willing to engage in this work in the future, participants highlighted that there is an important distinction to make between willingness and capability. Many participants assumed their organisation would be willing to work on improved exposure of information to some extent, but would need very clear cut instructions on the implementation of this to balance out the required efforts against the expected outcomes and added values. In this phase of the considerations, it is difficult to assess what kinds of expertise and capabilities would be needed to make changes with regards to exposing information, so that organisations can better assess whether they already have these capabilities available to them or whether there is an additional barrier there. Participants did recognise that once the landscape moves to a more machine-actionable focused environment, this would also reduce a lot of human effort that is currently required in the manual curation of information and the exposure of it, especially when this information is exposed in multiple places.

However, is it possible to make changes already based on the considerations covered in the workshop: CLOCKSS[5] included a new section in their website footer related to Governance to better expose information about legislations and depositor agreements as a direct result of the workshop (see Appendix B).

At the final opportunity for additional comments, some participants offered up interesting situations that could be considered further in their application to this work, as they are less common or more specific. For example, dynamic data, big data, and organisations different to repositories, may require some more specific considerations to see if they can align with the current form of the guidelines. Such considerations will require more time, and thus suit other forms of outreach activities better (see section on next steps).

[5] https://clockss.org/

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Next steps

As described in this report and the description of the workshop, the goal of this workshop was to be bidirectionally useful: for the participants to learn about the work and consider their organisation, and for us to receive valuable feedback on the work to use in further developments. The information collected during this workshop and presented in this report is directly inputted into the upcoming Milestone report from FAIR-IMPACT *'M5.5 - Initial repository registry support for discovery of repositories, policies, and interfaces'*, which will be delivered end of March 2024[6].

FAIR-IMPACT has also planned additional outreach activities with the same goals, to reach a broader audience and receive input on the work to facilitate further finetuning. The second open call for financial support[7] includes a support offer for *'Recommendations for trustworthy and FAIR-enabling data repositories'*, which is set up as an extended version of the IDCC24 workshop. Participants will work for a longer period of time and receive financial support to input this time and effort into evaluating the guidelines and assessing how their organisation exposes information transparently. The input from the IDCC24 workshop allows us to update the exercise and approach to be more effective for both sides, resulting in a more extensive targeted activity related to this work. The aim for this support action is to gather a wide variety of stakeholders in the field to consider this work, so that we can investigate whether certain 'edge cases' are also captured in the work as it is now, or whether we need to increase the flexibility of the guidelines and model. We will also continue to look for dissemination and outreach opportunities at events such as Open Repositories and the International Conference on Digital Preservation (iPres).

[6] Milestone report coming soon at: https://doi.org/10.5281/zenodo.10847707
[7] https://fair-impact.eu/2nd-open-call-route-2-support

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Appendix A. Interactive Exercise worksheet

Guidelines on transparent exposure of repository information: informing decisions of trustworthiness

Worksheet for the interactive exercise

Workshop at the 18th International Digital Curation Conference
19 February 2024

Name	
Organisation	
Role / Area(s) of expertise at organisation	
☐	I consent to being included in the workshop report, to be published on Zenodo, as a named contributor
ORCID	
Contact information	

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Exposing information about your organisation

Attribute	Research Area
Description	The subject classification of datasets in a repository.
Information:	*What is the information that you found that expresses this attribute? E.g. 'Biomedical Science; Geochemistry; Demographics; Humanities'. Is a standard controlled vocabulary used to define the assertion, e.g. European Research Council (ERC), Library of Congress Subject Headings (LCSH), UNESCO International Standard Classification Of Education (ISCED-F 2013)*
Location:	*What is the location where you found the information? Was it on the organisational or object level? E.g., repository description page, object landing page. If the information is exposed in multiple different locations, is the information consistent across locations?*
Human-friendly?	*Is this information accessible to humans? Why (not)? What assertion type(s) is/are used?*
	☐ Free-text assertion ☐ Controlled assertion (i.e. using ontologies or controlled vocabularies) ☐ Identification (i.e. using PIDs to reference the information) ☐ Evidence artefacts (i.e. using links to resources containing the information) ☐ Other: …
Machine-friendly?	*Is a machine able to find the information? Why (not)? What standard is used? e.g. European Research Council (ERC), Library of Congress Subject Headings (LCSH), UNESCO International Standard Classification Of Education (ISCED-F 2013)*

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Validation:	*How could this information be validated? Describe the relevant validation action(s). Who could carry them out?*
	☐ Acceptance without validation ☐ Direct machine-actionable validation ☐ Machine-actionable validation through a third-party ☐ Validation through human action ☐ Validation through a mixture of human and machine action
Added value:	*What would be the added value of improving the exposure of this information for your organisation? How important is it for your organisation to have this information exposed in a way that is transparently accessible by both humans and machines? Why? Is the information that is exposed the relevant information? If not, how could this be improved?*
Future improvement?	*How willing and able are you / is your organisation to improve the exposure of this information? Why?*
Wider examples	*What use cases and applications relevant to other stakeholders could you think of that are not necessarily important to your organisation?*

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Additional notes	*Any additional thoughts or notes about the attribute/process*

Attribute	**Metadata**
Description	Format/s of the metadata that describes datasets in a repository.
Information:	*What is the information that you found that expresses this attribute? E.g. Dublin Core, NetCDF, DDI*
Location:	*What is the location where you found the information? Was it on the organisational or object level? E.g., repository description page, object landing page. If the information is exposed in multiple different locations, is the information consistent across locations?*
Human-friendly?	*Is this information accessible to humans? Why (not)? What assertion type(s) is/are used?*
	☐ Free-text assertion ☐ Controlled assertion (i.e. using ontologies or controlled vocabularies) ☐ Identification (i.e. using PIDs to reference the information) ☐ Evidence artefacts (i.e. using links to resources containing the information) ☐ Other: …

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Machine-friendly?	*Is a machine able to find the information? Why (not)? What standard is used?*
Validation:	*How could this information be validated? Describe the relevant validation action(s). Who could carry them out?*
	☐ Acceptance without validation ☐ Direct machine-actionable validation ☐ Machine-actionable validation through a third-party ☐ Validation through human action ☐ Validation through a mixture of human and machine action
Added value:	*What would be the added value of improving the exposure of this information for your organisation? How important is it for your organisation to have this information exposed in a way that is transparently accessible by both humans and machines? Why? Is the information that is exposed the relevant information? If not, how could this be improved?*
Future improvement?	*How willing and able are you / is your organisation to improve the exposure of this information? Why?*
Wider examples	*What use cases and applications relevant to other stakeholders could you think of that are not necessarily important to your organisation?*

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Additional notes	*Any additional thoughts or notes about the attribute/process*

Attribute	**Terms of Deposit**
Description	Policies that explain what datasets the repository will accept for deposit, from whom, and under what conditions, including costs.
Information:	*What is the information that you found that expresses this attribute? E.g. content in 'TermsofDeposit.pdf'*
Location:	*What is the location where you found the information? Was it on the organisational or object level? E.g., repository description page, object landing page. If the information is exposed in multiple different locations, is the information consistent across locations?*
Human-friendly?	*Is this information accessible to humans? Why (not)? What assertion type(s) is/are used?*

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	☐ Free-text assertion ☐ Controlled assertion (i.e. using ontologies or controlled vocabularies) ☐ Identification (i.e. using PIDs to reference the information) ☐ Evidence artefacts (i.e. using links to resources containing the information) ☐ Other: …
Machine-friendly?	*Is a machine able to find the information? Why (not)? What standard is used?*
Validation:	*How could this information be validated? Describe the relevant validation action(s). Who could carry them out?*
	☐ Acceptance without validation ☐ Direct machine-actionable validation ☐ Machine-actionable validation through a third-party ☐ Validation through human action ☐ Validation through a mixture of human and machine action
Added value:	*What would be the added value of improving the exposure of this information for your organisation? How important is it for your organisation to have this information exposed in a way that is transparently accessible by both humans and machines? Why? Is the information that is exposed the relevant information? If not, how could this be improved?*

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Future improvement?	*How willing and able are you / is your organisation to improve the exposure of this information? Why?*
Wider examples	*What use cases and applications relevant to other stakeholders could you think of that are not necessarily important to your organisation?*
Additional notes	*Any additional thoughts or notes about the attribute/process*

Attribute	**Persistent Identifiers**
Description	The repository provides or utilises persistent identifiers.
Information:	*What is the information that you found that expresses this attribute? E.g. DOI, ORCID, RRID, CSTR*
Location:	*What is the location where you found the information? Was it on the organisational or object level? E.g., repository description page, object landing page. If the information is exposed in multiple different locations, is the information consistent across locations?*

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Human-friendly?	*Is this information accessible to humans? Why (not)? What assertion type(s) is/are used?*
	☐ Free-text assertion ☐ Controlled assertion (i.e. using ontologies or controlled vocabularies) ☐ Identification (i.e. using PIDs to reference the information) ☐ Evidence artefacts (i.e. using links to resources containing the information) ☐ Other: …
Machine-friendly?	*Is a machine able to find the information? Why (not)? What standard is used?*
Validation:	*How could this information be validated? Describe the relevant validation action(s). Who could carry them out?*
	☐ Acceptance without validation ☐ Direct machine-actionable validation ☐ Machine-actionable validation through a third-party ☐ Validation through human action ☐ Validation through a mixture of human and machine action
Added value:	*What would be the added value of improving the exposure of this information for your organisation? How important is it for your organisation to have this information exposed in a way that is transparently accessible by both humans and machines? Why? Is*

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	the information that is exposed the relevant information? If not, how could this be improved?
Future improvement?	*How willing and able are you / is your organisation to improve the exposure of this information? Why?*
Wider examples	*What use cases and applications relevant to other stakeholders could you think of that are not necessarily important to your organisation?*
Additional notes	*Any additional thoughts or notes about the attribute/process*

Attribute	**Preservation**
Description	Policies that explain the repository's commitment and processes that ensure the long-term preservation, fitness, and availability of datasets.
Information:	*What is the information that you found that expresses this attribute? What information about the organisation preserves digital objects exists and/or is made available outside the organisation eg. through a preservation policy or plan document or web*

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	page?
Location:	*What is the location where you found the information? Was it on the organisational or object level? E.g., dedicated preservation plan webpage or pdf file on the website. If the information is exposed in multiple different locations, is the information consistent across locations?*
Human-friendly?	*Is this information accessible to humans? Why (not)? What assertion type(s) is/are used?*
	☐ Free-text assertion ☐ Controlled assertion (i.e. using ontologies or controlled vocabularies) ☐ Identification (i.e. using PIDs to reference the information) ☐ Evidence artefacts (i.e. using links to resources containing the information) ☐ Other: …
Machine-friendly?	*Is a machine able to find the information? Why (not)? What standard is used?*
Validation:	*How could this information be validated? Describe the relevant validation action(s). Who could carry them out?*

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	☐ Acceptance without validation ☐ Direct machine-actionable validation ☐ Machine-actionable validation through a third-party ☐ Validation through human action ☐ Validation through a mixture of human and machine action
Added value:	*What would be the added value of improving the exposure of this information for your organisation? How important is it for your organisation to have this information exposed in a way that is transparently accessible by both humans and machines? Why? Is the information that is exposed the relevant information? If not, how could this be improved?*
Future improvement?	*How willing and able are you / is your organisation to improve the exposure of this information? Why?*
Wider examples	*What use cases and applications relevant to other stakeholders could you think of that are not necessarily important to your organisation?*
Additional notes	*Any additional thoughts or notes about the attribute/process*

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General feedback and opinion of the work

In your own words, what is the purpose of the work discussed today? Is it clear to you what is intended?
Do you have any questions, feedback, or suggestions that we weren't able to discuss today?
Are there any benefits to you or your organisation to expose information more transparently? Describe specific situations in which this would improve the current status or provide a solution for an open issue.
Would your organisation be willing and/or able to implement the guidelines as discussed today? Why (not)?
Room for further comments:

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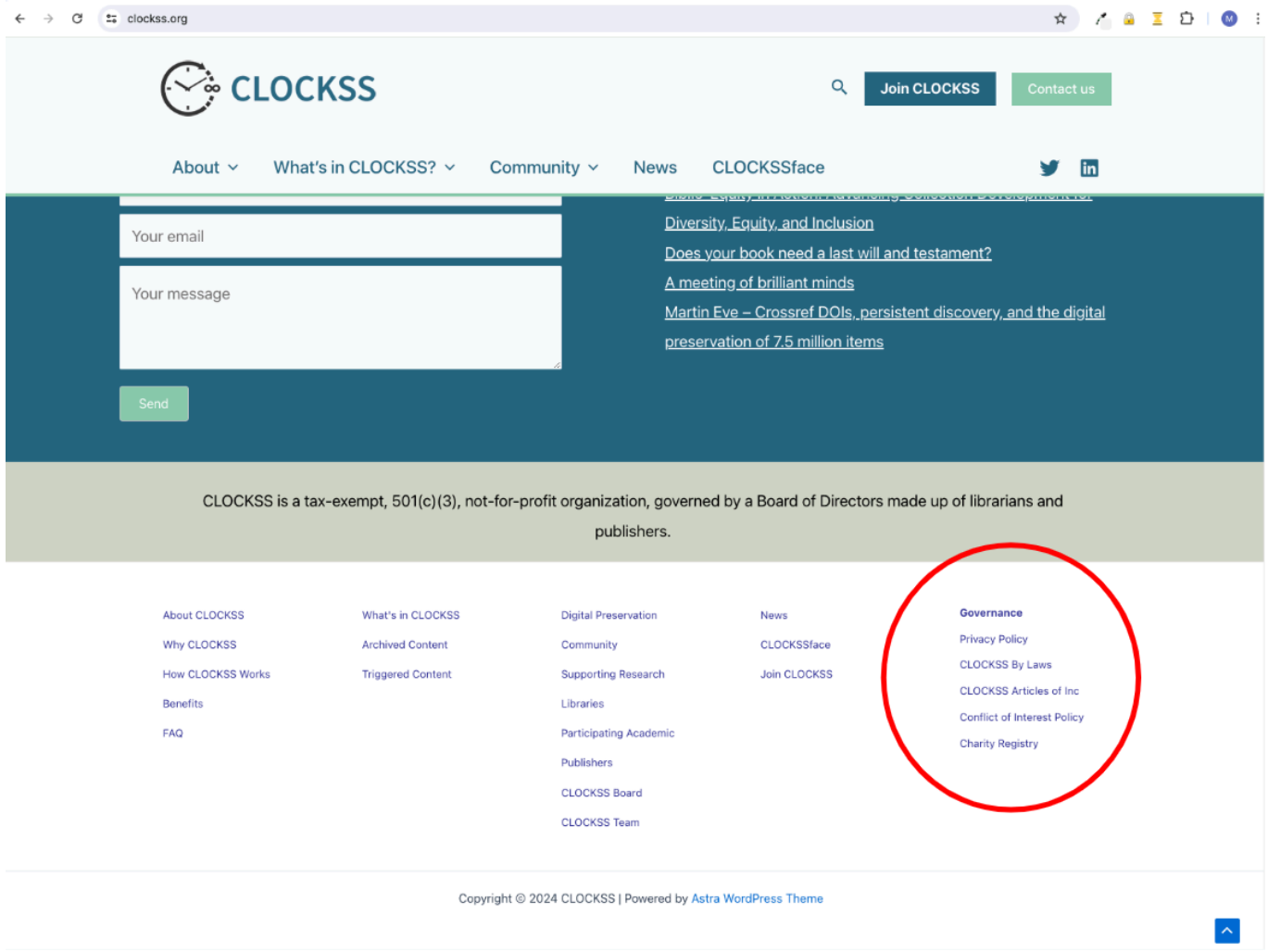
Appendix B. CLOCKSS improved information exposure



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