

# Machine Actionable Rights - Objects, Collections, Organisations

## M.A.R.-O.C.O.

This draft working paper<sup>1</sup> forms a part of ongoing work within the UK Data Service<sup>2</sup> and associated programmes<sup>3</sup> and projects<sup>4</sup> to address the activities and functions of FAIR-enabling trustworthy repositories and other data and metadata services. We are seeking to define how these activities and functions align with our catalogue of services, and how we develop information artefacts<sup>5</sup> to guide our processes and to provide transparent evidence for assessment, compliance and certification.

A key factor in supporting scalable, interoperable outcomes is the provision of key information in a machine actionable form, including rights management. Structured data models for rights management such as ODRL<sup>6</sup> define permissions, prohibitions and obligations (and their ensuing workflows) of parties (and collections of parties) in relation to assets (such as digital objects) and collections of assets.

This non-technical problem statement is intended to guide discussion on what existing standards can be adopted or adapted, and where new specifications need to be developed and agreed.

Candidates for improved specifications to support machine actionability include the different levels of care provided to digital objects in general and the handling of sensitive data in particular. The CoreTrustSeal<sup>7</sup> define a range of 'levels of care' for digital objects beyond simple retention, including defined deposit criteria, initial curation, and active long-term preservation.

The Five Safes Framework<sup>8</sup> addresses the handling of sensitive digital objects in the context of safe: data, outputs, projects, setting and people<sup>9</sup>. Data must be stored and worked on within a secure environment (setting) by suitably trained and qualified people for acceptable and approved purposes (projects). Results of analyses within those settings must be evaluated for potential risk of disclosure prior to release (outputs).

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<sup>1</sup> <https://doi.org/10.5281/zenodo.12761478>

<sup>2</sup> <https://ukdataservice.ac.uk/>

<sup>3</sup> <https://www.ukri.org/what-we-do/browse-our-areas-of-investment-and-support/future-data-services/>

<sup>4</sup> <https://fair-impact.eu/>

<sup>5</sup> metadata, policies, standard operating procedures etc.

<sup>6</sup> <https://www.w3.org/TR/odrl-model/>

<sup>7</sup> CoreTrustSeal Standards and Certification Board. (2024). Curation & Preservation Levels: CoreTrustSeal Position Paper. Zenodo. <https://doi.org/10.5281/zenodo.11476980>

<sup>8</sup> Desai, Tanvi; Ritchie, Felix; Welpton, Richard (2016). "Five Safes: designing data access for research" (PDF). *Bristol Business School Working Papers in Economics*:

<sup>9</sup> <https://ukdataservice.ac.uk/help/secure-lab/what-is-the-five-safes-framework/>

Trustworthy Repositories (TDR<sup>10</sup>) handling sensitive digital objects operate in a context influenced by the CoreTrustSeal repository requirements<sup>11</sup>, the 5 Safes and the need to enable the FAIR data Principles<sup>12</sup> of findability, accessibility, interoperability and reusability.

Parties and party collections (organisational entities):

- Contain human actors and/or machine agents
- Are associated with objects (assets/asset collections)
- Perform activities and functions
- Offer internal and external services

Organisations undertaking roles (acting as parties) may have responsibilities but not be legal entities. For example:

The UK Data Service is an organisation, an ESRC<sup>13</sup> investment project and a partnership (between the Universities of Essex, Manchester, Edinburgh, University College London and Jisc). The UK Data Archive is lead partner in the UKDS, a trustworthy repository, an organisation, and a department within the University of Essex. The University of Essex is the legal entity for depositor and end user contracts with the UKDS.

Different bodies and registries make different assumptions about organisations. The CoreTrustSeal<sup>14</sup> requires a clearly bounded organisation to define the scope of certification and asks for information about related third parties. RoR<sup>15</sup> identifiers are open to any organisation that self-identifies as research oriented. A Re3data repository must be run by a legal entity<sup>16</sup>. FAIR Sharing<sup>17</sup> databases are “knowledgebases and repositories of data and other digital assets”.

Definitions of repositories and trustworthy repositories<sup>18</sup> vary widely and may include technical service providers that only provide bit-level storage assurance, or organisations that do not provide the active long-term preservation required to be in scope for standards such as CoreTrustSeal, Nestor Seal<sup>19</sup> and ISO16636<sup>20</sup>.

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<sup>10</sup> Expressed, usually interchangeably, as Trustworthy Digital/Data Repository

<sup>11</sup> CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Requirements 2023-2025 (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051012>

<sup>12</sup> Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. The FAIR Guiding Principles for scientific data management and stewardship. Sci Data 3, 160018 (2016). <https://doi.org/10.1038/sdata.2016.18>

<sup>13</sup> <https://www.ukri.org/councils/esrc/>

<sup>14</sup> <https://www.coretrustseal.org/why-certification/frequently-asked-questions/>

<sup>15</sup> <https://ror.org/about/faqs/>

<sup>16</sup> <https://www.re3data.org/suggest>

<sup>17</sup> <https://fairsharing.org/search?fairsharingRegistry=Database>

<sup>18</sup> [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/aga\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/aga_en.pdf)

<sup>19</sup> [https://www.langzeitarchivierung.de/Webs/nestor/EN/Zertifizierung/nestor\\_Siegel/siegel.html](https://www.langzeitarchivierung.de/Webs/nestor/EN/Zertifizierung/nestor_Siegel/siegel.html)

<sup>20</sup> <https://public.ccsds.org/pubs/652x0m1.pdf>

Organisational information, including related artefacts (policies, standards etc), need to be shared with each of these assessment processes or registries on a case-by-case basis, and each requires the relevant metadata in different forms.

Without a clear specification of the digital object-related activities, functions and services undertaken there is limited value to self-labelling as research organisation, repository, TDR or database. The 'organisations' that act as 'parties' may be standalone, hosted by a wider body, or contain more granular sections, departments or branded entities. However, no generally applicable and scalable solution for rights management can depend on detailed hierarchical organograms for every organisation<sup>21</sup>.

The important characteristics for the use cases being examined here are: any *organisational entity* associated with one or more *collections of digital objects* - the degree and type of association can vary.

The Data Catalog Vocabulary (DCAT<sup>22</sup>) provides for catalogue *records* about catalogued *resources* (*datasets* and/or *services*). Its use of 'organization/person' is limited to specifying the creator and publisher of a resource. In an ideal scenario, it would be possible to record more detailed characteristics of an organisation and associated evidential artefacts (related controlled vocabularies, ontologies, policies and standards). Any organisation with one or more catalogues of digital objects might be assumed to function as a repository (holding a collection of digital objects<sup>23</sup>), and/or registry (holding a collection of metadata<sup>24</sup> referring to digital objects or other entities that exist elsewhere). Such organisational level metadata could then be inherited by a collections catalogue where appropriate.

Organisational characteristics, activities, functions and services influence the digital objects they hold or refer to. A repository organisation may offer a mixture of retention, initial curation and active preservation across its collection; the specific level of care in place can then be recorded at the level of individual objects. For example, a repository with a guaranteed 10-year retention period would record that information at organisation level, and associate this with relevant start/end dates at the object level.

For entities that self-describe as repositories, registries etc., applying a standard approach to organisation, collection and object level information would support further inheritance, links and extensions to address more complex challenges, including sensitive data management. Safe researcher accreditation information<sup>25</sup> could in future be asserted in association with an individual's ORCID<sup>26</sup> record and then validated by an accreditation organisation. Object level

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<sup>21</sup> This assertion is not intended to devalue their essential role in managing hierarchies of decisions and governance.

<sup>22</sup> <https://www.w3.org/TR/vocab-dcat-3/>

<sup>23</sup> Any useful definition of 'holding' depends on clarity about rights and responsibilities.

<sup>24</sup> While acknowledging the challenge of defining any clear separation between data and metadata

<sup>25</sup> <https://ukdataservice.ac.uk/help/secure-lab/training-requirements/>

<sup>26</sup> <https://orcid.org/>

information about sensitivity (of data and outputs) could be associated with relevant organisational information about the presence of secure research environments, statistical disclosure control (SDC) measures, or information security certification. From this basis, it would be possible to specify the remaining information necessary to describe safe projects and settings.

The ideal outcome would be transparency of levels of responsibility for digital objects and sufficient machine-actionable information to streamline and transform aspects of research data management, including secure data services.

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