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Extended Abstracts

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Turning Machine-Actionable DMPs Into FAIR Digital Objects

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Abstract. This paper discusses possible changes to the machine-actionable Data Management Plans specification and ecosystem of services to enable compatibility with the FDO architecture, as defined by the DONA foundation.

Keywords: maDMPs, RDA, maDMP Store, Machine-Actionable, RDM, RDA

1. Introduction

Data Management Plans (DMPs) in most settings describe how research data is handled in funded research projects. They include information on datasets produced, metadata used, storage locations, and licensing, ethical and legal aspects [1]. Depending on the project stage, they describe planned actions or already completed actions, e.g., datasets will be deposited into a specific repository. Research Data Alliance (RDA) published a recommendation on machine-actionable DMPs (maDMPs) [2], which provides a common way to express information from traditional DMPs in a structured form that can be easily consumed by Research Data Management (RDM) services. The goal is to maximize the reuse of the information and automate many typical RDM tasks [3].

As of today, DMP tools follow the RDA recommendation to import or export maDMPs [4]. However, the full potential of making DMP machine-actionable remains untapped because they are not yet truly living documents updated fully or partially by different stakeholders involved in the research data lifecycle. Turning maDMPs into FAIR Digital Objects (FDOs) and connecting them tighter with other FDOs is one of the possible next steps to achieve this.

In this paper, we discuss possible changes to the maDMP specification and the evolution of DMP tools to enable compatibility with the FDO architecture, as defined by the DONA foundation[1]. By presenting the results of our conceptual work, we want to seek feedback from the community that would help prioritize and scope the next developments. We also, hope to identify synergies with other components of the FDO ecosystem, e.g., Type Registries, FDO Repositories, etc. To streamline the discussion on the possibility of turning maDMPs into FDOs, we focused on two main paths of evolution needed, presented in consecutive sections.

[1] https://www.dona.net/digitalobjectarchitecture

2. maDMP specification evolution

Figure 1 presents two possible directions of maDMP specification evolution. The notion of a dataset lies at the heart of the maDMP recommendation [5]. The new revision of maDMPs can use FDOs instead, and instead of modeling information, such as the license of the dataset, it can simply point to the FDO. An appropriate operation offered by the FDO or the metadata associated with it would always provide the most up-to-date information instead. In this setting, the role of the maDMP is reduced to the glue between projects, people, and FDOs, likely adding some human-readable narrative on top that is still relevant for us – humans. The tradeoff of what information needs to be kept in the maDMP and which can be removed depends on what information can be taken for granted from the FDO ecosystem.

The maDMP can also be an FDO itself. This includes a definition of a dedicated type and a set of operations on this type. The operations should include typical read-and-write operations to support the current use cases, e.g., to read out information on the associated project, location of data, access restrictions, etc. However, making maDMPs FDOs creates new opportunities to provide operations that are more advanced. For example, the health check of the DMP could be computed using indicators of its FAIRness or also the FAIRness of the FDOs that the DMP is composed of. This could help in implementing novel approaches to maDMP assessment [6].

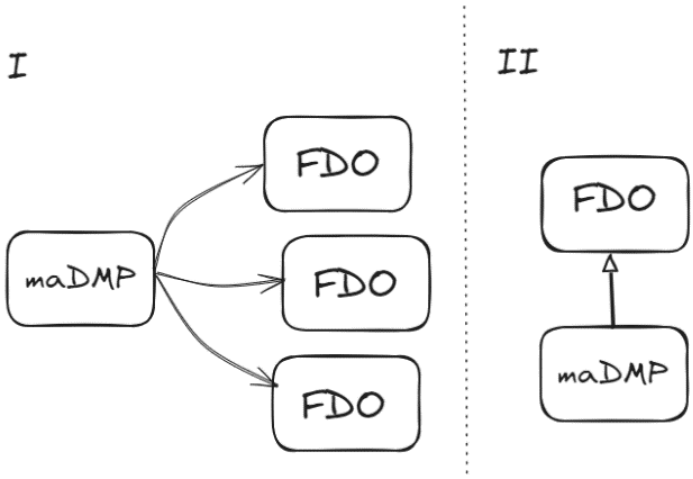

Figure 1. *Two possible types of relations between maDMPs and FDOs. The left one shows that maDMP can point to multiple FDOs. The right one shows that maDMP can be an FDO itself.*

3. maDMP ecosystem evolution

Figure 2 presents the conceptual architecture and highlights the challenges that we need to tackle in order to turn maDMPs into FDOs. Traditional DMP tools need to evolve into *maDMP stores*. The maDMP stores have the role of repository systems and registry systems as defined in the DO architecture. Each of the maDMPs must have its own identifier and is kept within the maDMP store. Clients communicate with maDMP stores using the DOIP protocol. Depending on the role, i.e., researcher working on the project, funder checking the state of the DMP, data repository reporting publication of a dataset, clients get different permissions on maDMPs that are digital objects. MaDMPs use identifiers to point to other Digital Objects, e.g., research data used and produced. To implement the vision from Figure 2, we need to define own type for maDMPs and

define a basic set of metadata and operations assigned to it. Extend existing DMP tools, such as DAMAP[2], with the support of DOIP protocol.

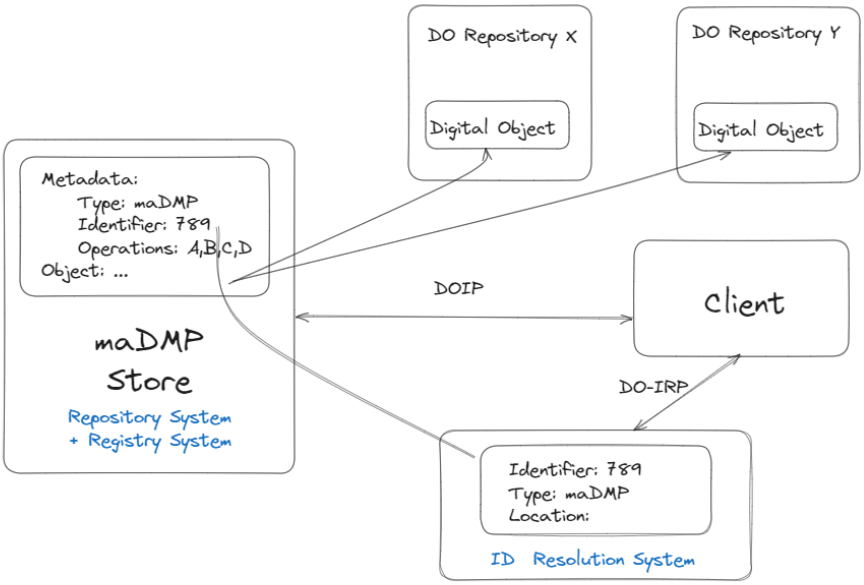

Figure 2. *Interaction between the Client and the maDMP store using the DOIP.*

Data availability statement

There is no data associated with this paper.

Underlying and related material

There is no additional material provided with this paper.

Author contributions

Tomasz Miksa is the only author of the paper.

Competing interests

The authors declare that they have no competing interests.

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[2] https://damap.org

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