{{count:figures;legend=Mdorim mindmap}}

# Summary

In this article, we present the Data Model for the Organization and Representation of Museological Information (MDORIM) of Elucidário.art, an app under development that aims to be a tool for the management and dissemination of museum collections. MDORIM uses Linked-art for information representation and the Standard Procedures for Collections Recording Used in Museums (SPECTRUM) version 5.1. The life cycle of a museum object can describe its trajectory from before its acquisition to leaving the collection, including stages of conservation, restoration, exhibition, research, loans, among others. SPECTRUM is a standard that describes 21 procedures for managing museum collections, nine of which are mandatory for a museum to be accredited by the Collections Trust, a British organization that defines museum management standards. SPECTRUM is also recommended by ICOM and used by museums around the world, including in Brazil. Linked-Art is a data model for applications based on CIDOC-CRM. Focused on data representation for art museums, Linked-Art was created by an international CIDOC working group and representatives from museum institutions. MDORIM establishes a bridge between Linked-Art and SPECTRUM, allowing documentation management to be interoperable using common standards among museums. To achieve this, we will analyze the documentation of SPECTRUM and Linked-Art to create a mapping between the two. MDORIM also introduces information classes for auditing and control, such as editing history and permission levels by user type.

# Introduction

Hello everyone, first of all, I would like to apologize to my colleagues from Latin America because I don’t fell confident with my “Portunhol”, so I will present in English.

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Second, this research is very different from the others that presented here in this session, because we had some issues with the organization, and I was prompted to present my research in this session. But I hope you enjoy it.

My name is Henrique Godinho, and I work as the communication coordinator at The Ema Klabin House Museum in São Paulo, a collector’s museum with over 1700 (seventeen hundred) items in its museum collection, spanning 35 centuries of art history. I am also a professional master’s student in Information Management, specializing in the Organization, Mediation, and Circulation of Information within the Graduate Program in Information Science at the School of Communications and Arts at the University of São Paulo.

I am here to present a bit of my research in the master’s program, which involves the development of a WordPress plugin as a Collection Management System: The Elucidário.art plugin.

![](data:image/png;base64;base64,)

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As a fundamental part in the development of a plugin like this, we need to define the data model for the operations of reading, writing, editing, and removal of the data at the system. For this purpose, we have developed the Data Model for Organization and Representation of Museum Information (Mdorim), which uses Linked Art as the primary model for the entities described by the system, and introduces some new entities and interfaces for a more comprehensive interaction in a Collection Management System.

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The model extends the user creation system of WordPress and introduces four new user roles: Curatorship (curator), Museology (museologist), Assistance (assistant), and Research (researcher), where each of these roles comes with a set of permissions and access restrictions to the system’s metadata. We also have system options, such as the ability to import and export data, general settings, and integrations, used to store configuration data, such as an API key for a cloud storage that holds digital objects like records in images, videos, and other types of media. We have also the edit History entity, responsible for intercepting any action of a user in the system and recording the change. The Procedure Entity is responsible for describing the Spectrum Procedures within the System and the Mapping entity that describes how can we represent other data models using Linked Art.

All of these elements were developed in JSON-Schema and MySQL schemas that describe the database tables. In this discussion, due to time constraints, I would like to focus only on the model, especially on the intersections between Linked Art and Spectrum, and not on the MySQL schemas.

# Intersections between Linked Art and Spectrum

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But why did we choose these two standards in Mdorim?

Linked Art was chosen because it is a standard for describing cultural heritage focused on interoperability and can be used by 90% of organizations in 90% of cases. Spectrum was chosen due to the procedures used to represent the workflows of the Elucidario.art.

**Quadro 1: Comparison between Spectrum (2022) and Linked Art (2021).**

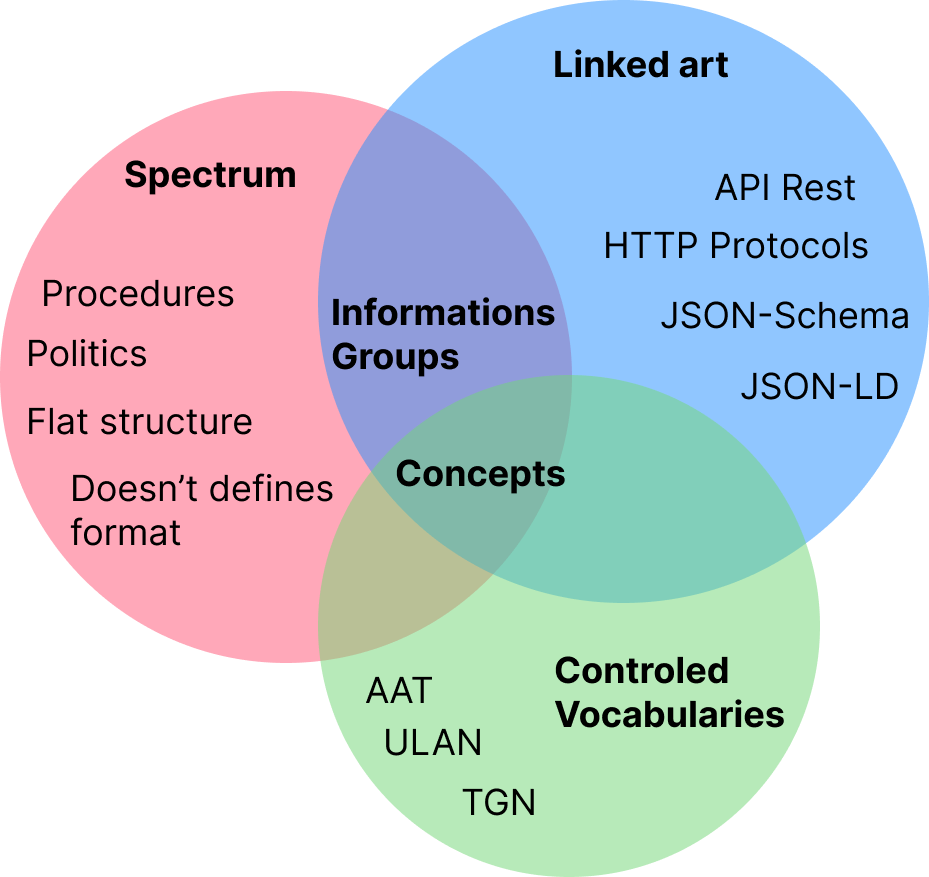
| Comparison points | Spectrum | Linked art |
| --- | --- | --- |
| Description | Procedures and units of information for the management of museum collections | Data model for applications to represent information cultural heritage with a focus on interoperability between systems |
| Origin | United Kingdom | Multi-institutional |
| Version | 5.1 | 0.8.0 |
| Maintainers | Collections Trust | Linked Art Working Group - CIDOC-ICOM |
| Main users | All Collections Trust accredited museums in the UK | Getty, MoMA, Rijksmuseum |
| Main users in Brazil | Pinacoteca de São Paulo, Museu do Café, Museu da Imigração | not found |
| Format | Not defined, “flat” structure. Presents specialized metadata for each type of information described, can be defined in files or tables | JSON-LD. It presents more generic and comprehensive metadata, but allows more precise contextualization with the use of controlled vocabularies |
| Dimensão | Spectrum defines 21 procedures for museum management and 546 metadata for representing objects and related entities, which are divided into three groups: object information, procedural information and record management information | Linked Art presents 11 main entities for representing cultural heritage information and 27 additional classes. The model also presents 91 different metadata that are used to describe classes and entities |

**Source**: Developed by the author.

In this table, we can see a brief comparison between the two models.

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**Figure 1** - Intersections between Spectrum and Linked Art.



intersections

**Source:** Developed by the authors.

The above image demonstrates the importance of using controlled vocabularies to provide more context for metadata in Linked Art.

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For example, the *identified\_by* property in Linked Art is the standard way to identify any class defined by the model, such as *Object*, *Concept*, *DigitalObject*, *Event*, and others. It accepts an array of objects that can be either *Identifiers* or *Names* that have the *classified\_as* property - an array of *Concept* objects representing the concepts identified by the content of the property:

**Table 2**: Identification of an object, demonstrates the *identified\_by* property with an array of *Identifier* and *Name* objects and their *classified\_as* properties.

{  
 "identified\_by": [  
 {  
 "type": "Identifier",  
 "\_label": "Accession Number",  
 "classified\_as": [  
 {  
 "id": "http://vocab.getty.edu/aat/300404621",  
 "\_label": "Accession Number"  
 }  
 ],  
 "content": "M-0821"  
 },  
 {  
 "type": "Name",  
 "\_label": "Title",  
 "classified\_as": [  
 {  
 "id": "http://vocab.getty.edu/aat/300404621",  
 "\_label": "Title"  
 }  
 ],  
 "content": "Rio de Janeiro",  
 "language": {  
 "type": "Language",  
 "\_label": "Português brasileiro"  
 }  
 }  
 ]  
}

**Source:** Developed by the authors. Based on Linked Art, it describes Tarsila do Amaral’s work “Rio de Janeiro” from the Ema Klabin Collection.

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On the other hand, Spectrum defines specialized fields for the type of identification we are performing (Collections Trust, 2017):

**Figura 1: Representation of the identification of the painting Rio de Janeiro by Tarsila do Amaral using Spectrum**

| Metadado | Valor |
| --- | --- |
| *Object Name* | Rio de Janeiro |
| *Object Number* | M-0821 |
| *Title* | Rio de Janeiro |
| *Title language* | Português-brasileiro |

**Source**: Developed by the author.

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In this way, Mdorim haves the Mapping and PropMap entities responsible for recording and storing the mapping between the two models:

**Quadro 2: Mapping Entity.**

| Name | Type | Required | Description |
| --- | --- | --- | --- |
| mapping\_id | int | yes | Mapping ID. |
| title | string | yes | Mapping title |
| description | string | - | Mapping description |
| author | int | yes | Mapping author ID |
| standard | string | yes | Mapped standard name |
| standard\_uri | string | yes | Mapped standard URI |
| version | string | yes | Mapping version |
| created | datetime | yes | Creation date |
| modified | datetime | yes | Update date |
| mapping | PropMap[] | yes | Mapped properties |

**Fonte**: Created by the author.

So here we have the Mapping entity, responsible for describe the mapping between two models,

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**Quadro 3: PropMap Entity.**

| Name | Type | Required | Description |
| --- | --- | --- | --- |
| map\_id | int | yes | Mapped property ID |
| description | string | - | Mapped property description |
| prop\_name | string | yes | Target property name |
| entity\_type | string | yes | Target property type |
| external\_prop\_name | string | yes | Origin property name |
| external\_prop\_uri | string | - | Origin property URI |
| external\_prop\_type | string | yes | Origin property type |
| map\_value | any | yes | Mapped property value |
| editable | boolean | - | Indicates if the mapped property is editable |
| status | string | yes | Mapped property status (active, inactive) |

**Source**: Developed by the author.

And the PropMap entity, responsible for describe the mapping between two properties of the models.

With these two entities, we allow the user to perform as many mappings as necessary to represent their collection, including mapping between others models.

The map\_value property stores a pre-populated Linked Art object, leaving the responsibility for the user to complete the missing information, like content in an Identifier object.

These entities are also used by the system to define which fields will be used for data import and export.

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To represent the Spectrum procedures, we created a new entity called Procedure, responsible for storing information about each performed procedure:

**Quadro 4: Procedure Entity.**

| Name | Type | Required | Description |
| --- | --- | --- | --- |
| id | int | yes | Procedure ID |
| type | string | yes | Procedure Type (one of the 21 Spectrum procedures) |
| description | string | - | Procedure description |
| author | int | yes | Procedure author ID |
| created | datetime | yes | Creation date |
| modified | datetime | yes | Update date |
| status | string | yes | Procedure status, which may be draft, pending, done or scheduled |
| related\_entities | array | - | Related entities |
| schedule | object | - | Schedule object that defines the procedure execution schedule |
| data | JSON | yes | Procedure data |
| history | History | yes | History |

**Source**: Developed by the author.

With this entity, we allow the recording of information about each procedure, creation and update dates, the responsible user, status, procedure type - which can be any of the 21 procedures defined in Spectrum, and other information, such as entities related to the procedure, like Object for example. Schedule is another object that defines a procedure schedule, which can be set to repeat daily, weekly, monthly (or another time interval), or even only at a specific moment. In data, we record the Spectrum Procedure Information Group in JSON format.

# Conclusions

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In conclusion, Mdorim is a data model designed for use in the Elucidário.art plugin, currently in development and scheduled for release by the end of this year. The model was created to be flexible and allow for the representation and description of Art Collections belonging to Museums. It was developed based on two standards: Linked Art and Spectrum. Linked Art was chosen as a standard for describing cultural heritage and is responsible for describing the main entities within Mdorim. Spectrum was selected for its procedures used to represent the workflows of Elucidário.art.

Thank you!

<https://elucidario.art> instagram: elucidario.art

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