

Metadata Semantic Enrichment

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Link to this document:

https://docs.google.com/document/d/1kthkOZ7C7SktPhpiKZRnmTkCaxnqaRtM_ytLAn2GvR8

Link to the enriched datasets, version 15 May 2020, with edm:Agent:

<https://drive.google.com/open?id=1IbNOAliDnGfSpcc7OXL1snBa2DMbYohD>

Link to the enriched datasets, version 15 May 2020, with edm:Places:

https://drive.google.com/open?id=1zcaTyKdZUYtjqMF_K35VC5C5deFZKBO

References:

Project grant agreement - Activity 2 - Metadata Enrichment

2.2 Automatic metadata enhancement

In this task GUF will develop a series of automatic and semi-automatic methods for enhancement of the structure, richness and multilingual capacity of metadata of Jewish cultural heritage materials. These methods will include, among others, semantic enrichment using open semantic resources, identified and surveyed in the task 2.1; extraction of named entities, such as people, geographical locations, historical periods and more.

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1. Introduction

1.1. Judaica Europeana project

Judaica Europeana 2.0 project aims to provide support to Jewish cultural heritage institutions to increase the amount of Jewish cultural heritage materials, digital content and metadata, accessible through Europeana, that is of high quality and available for re-use, and increase the awareness and usage of this content.

This project is a revival of the efforts to aggregate these materials from some 30 institutions in Europe, the US and Israel into Europeana. This aggregator is composed of several components (see Table 1). As it will be further explained in section 1.4, one of these components is enrichment of the data sources provided to the project., which will be the focus of this report.

1.2. Semantic enrichment

Semantic enrichment is the process of adding new information and relations at the semantic level to the data. It means entity resolution within and linking of metadata to improve resource access and to provide richer context to the user. The task of semantic enrichment consists of two steps; first, to identify entities which we would like to further enrich, unambiguously by means of stable URIs, and the second to find as much information (e.g., descriptions, links to related sources, etc.) as possible about the identified entity, usually by following links to other data sources. In brief semantic enrichment mainly aims to create links to controlled vocabularies representing contextual resources such as places and agents.

1.3. Semantic enrichment in Judaica Europeana project

As mentioned earlier semantic enrichment of the project datasets is one of the components of the aggregator. The aggregator will provide a mechanism for registering job triggers and the registered job will be triggered once dataset harvesting and conversion is completed. Record enrichment job will get a record as an input. The output of the job is an enriched record represented by a list of newly created objects (places, time spans, concepts etc.) along with relations to the heritage object represented by the

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record. The output objects will be inserted into the database via Data Storage API. Similarly, the dataset enrichment job will be able to retrieve the whole dataset from the database (via Data Storage API) and will invoke the dataset enrichment process. The resulting enrichment objects and relations will be inserted into the database via Data Storage API.

In the remaining of this report we will describe the datasets provided to this project. Next we will explain the semantic enrichment process, the sources which were used for enrichment of the datasets as well as the details of the implementations. At last we will present the enrichment results and some suggestions for the way forward.

Table 1. The components of the aggregator - The highlighted rows, Enrichment Workflow and Enrichment Scenarios are the focus of this report.

Name	Description
Data storage layer	The core data layer of the system, storing incoming partners' data and enriched data
Data storage API	External and internal APIs for using the data storage layer, allowing read/write access to all entities, batch access to datasets, and querying by pre-defined fields
Harvesters	A series of custom harvesters, fetching data from the partners' systems and storing it in the storage layer
Ingestion dashboard (incl analytics)	User dashboard for content partners to monitor their data on JHN
Enrichment workflow	Generic API-based mechanism implementing a placeholder (stub) for scenarios to enrich the harvested data with data from external semantic resources
Enrichment scenarios	Array of implementations to enrich specific metadata fields with information from external semantic resources
Europeana connector	Mapping of the data to and from Europeana's EDM format
Media storage	Online services for storing and managing media assets referenced by data
User portal	Portal displaying ingested data to online users

2. Datasets to be contextualized

2.1. Data partners

In this project the datasets are provided from 26 partners from 11 countries which mostly include museums, libraries, national archives, etc. The partners in total have provided 29 datasets which contain different types of content such as photos, books, priodica, sound recording and so on.

2.2. Description of datasets

The first step for semantic enrichment is to have a broad overview of the datasets and exactly know the content, the available attributes, records to be enriched and attributes which can be used to extract further context for the enrichment process and disambugation. Therefore, at the beginning of the project we used 10 of the available datasets as sample datasets to run descriptive analysis which will be explained in follow.

Table 2. Names and abbreviations of the sample datasets used for descriptive analysis

Name	Abbreviation
2048612_20170209_15009	221
Alliance Israélite Universelle	AIU
Akadem Europeana	AE
Archivio di Stato di Venezia	ASV
Hungarian Jewish Archive	HJA
Jewish Museum Lonon	JML
Jewish Museum Prague	JMP
Medem	Med
Musei Sefardi Toledo	MST
National Library Israel	NLI

These data sources were still on their original format as received from the providers. The enrichment process would be applied on the datasets when mapped into the EDM data model. Table 2 shows the dataset names which were used for this analysis along with their acronyms used in the rest of this text.

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We made several analyses on these datasets, to understand the structure and content of each of them. Table 3 illustrates all the attributes extracted from each dataset. As shown in the table, datasets have different attributes and therefore different information. In this table, 'X' means that the certain attribute exists in the mentioned datasets. For example, datasets 221, AE, MST, and NLI all have the attribute 'creator' while the attribute 'geoname' only exists in JMP dataset. At the same time, we should keep in mind that sometimes attributes with different names present the same information.

Each attribute can be useful for the enrichment process and therefore it is important to make sure that we don't lose any practical information and semantics during the mapping process.

Sometimes the content of attributes can be enriched directly. As in the following example;

```
<edm:ProvidedCHO rdf:about="#REB01: 000253485">
  <dc:contributor xml:lang="fre">Gayus, Eliya</dc:contributor>
```

The 'dc:contributor' attribute in the ProvidedCHO taken from one of the project datasets (AIUJE1_MARC21), can be enriched with further information about the stated person (Gayus, Eliya). The details of the enrichment process will be explained in the next sections. Some of the attributes might be used to extract further entities and information which can be used for enrichment of other entities. For example we can use the 'date' attribute, which represents the publication date for disambiguation when there are several options for a title or a contributor. In Table 3, the blue cells are the attributes which were identified as the ones which can be enriched and the green cells are the attributes which can be informative for the enrichment process, as explained earlier. This selection can be modified as required.

Our analysis also shows, the datasets have different formats and content types. For example, there is only one dataset originally available in EDM format which has Provided CHO objects and the content of some of them are for example text, such as books or newspaper articles, and some are images (such as photographs of art or historic photos).

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Table 3. Analysis of attributes in the sample datasets used for descriptive analysis . Blue cells, attributes identified as the ones which can be enriched. Green cells, attributes informative for the enrichment process. 'X' indicates attributes present in the corresponding dataset.

	221	AE	AIU	ASV	HJA	JML	JMP	Med	MST	NLI
Agent	X									
aggregatedCHO	X									
Aggregation	X									
alternative	X	X						X	X	
altLabel	X									
archdesc							X			
author							X			
begin	X									
biographicalInformation	X									
broader	X									
c01							X			
c02							X			
Concept	X									
contributor	X	X							X	X
controlaccess							X			
created		X	X	X	X	X				
creation							X			
creator	X	X	X		X	X			X	
dao							X			
dataProvider	X	X	X	X	X	X		X	X	X
date							X	X	X	X
dateOfBirth	X									
dateOfDeath	X									
description	X	X	X		X	X		X	X	
did							X			
dsc							X			
ead							X			
eadheader							X			
eadid							X			
end	X									
exportedRecords	X	X	X	X	X	X		X	X	X
extent	X	X			X	X			X	
filedesc							X			
format	X	X	X					X	X	

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geogname							X			
hasMet	X									
head							X			
identifier	X	X		X	X	X			X	X
isFormatOf									X	
isPartOf			X					X	X	
isReferencedBy									X	
isShownAt	X	X	X	X	X	X		X	X	
isShownBy				X	X	X		X	X	X
issued	X	X						X		
langmaterial							X			
language	1	X			X	X	X	X	X	X
language							X			
metadata	X	X	X	X	X	X		X	X	X
note	X									
object		X	X		X	X		X	X	X
p							X			
persname							X			
physdesc							X			
Place	X									
prefLabel	X									
profiledesc							X			
provenance			X							
ProvidedCHO	X									
provider	X	X	X	X	X	X		X	X	X
publicationstmt							X			
publisher	X	X						X	X	
RDF	X									
record	X	X	X	X	X	X		X	X	X
rights	X	X	X	X	X	X		X	X	X
scopecontent							X			
source	X			X	X	X			X	
spatial	X	X	X		X	X		X	X	X
subject	X	X	X	X	X	X	X	X	X	X
tableOfContents	X	X							X	
temporal									X	
TimeSpan	X									
title	X	X	X	X	X	X		X	X	X

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titleproper							X			
titlestmt							X			
type	X	X	X	X	X	X		X	X	X
unitdate							X			
unitid							X			
unittitle							X			
unstored					X					
WebResource	X									

3. Data sources used for contextualization

Based on the entities which have to be enriched, we need a variety of data sources for providing further information and linking. To this end, we have identified several data sources, including a variety of encyclopedias, book sections, as well as sub-graphs extracted from general-purpose knowledge bases, such as Integrated Authority File (GND) of the German National Library¹, which can be used for enrichment purposes.

3.1. Data sources

Reference works such as encyclopedias and glossaries function as guides to specific scholarly domains. Therefore encyclopedias with a focus on Jewish studies are one of the sources of information used for contextualization. There are also knowledge bases which contain a vast variety of information including facts related to Jewish culture such as DBpedia and GND. Therefore we also used these sources to extract a focused knowledge graph of concepts for the domain of Jewish studies. For more information on content extraction and data generation please see (Dadvar and Eckert 2018², Dadvar and Eckert 2019³).

In the next sections we present and explain recourse which have been used for semantic enrichment in this project.

¹ <http://www.dnb.de>

² M. Dadvar, K. Eckert, JudaicaLink; A Domain-Specific Knowledge Base for Jewish Studies, In the proceedings of the 17th Dutch-Belgian Information Retrieval Workshop (DIR2018), Leiden, 2018

³ M. Dadvar, K. Eckert, JudaicaLink: A Knowledge Base for Jewish Culture and History, Umanistica Digitale - ISSN:2532-8816 - n.4, 2019

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- **Das Jüdische Hamburg Das Jüdische Hamburg**

Das Jüdische Hamburg⁴ contains articles in German by notable scholars about persons, locations and events of the history of Jewish communities in Hamburg.

Das Jüdische Hamburg is a free online resource based on the book “Das Jüdische Hamburg - Ein historisches Nachschlagewerk”⁵. For these datasets we have implemented a Person recognition and have been able to identify 196 person descriptions among the articles. When available, the persons are described by occupation, date of birth and death as well as place of birth and death.

- **Encyclopedia of Russian Jewry**

Encyclopedia of Russian Jewry⁶ provides an Internet version of the Encyclopedia of Russian Jewry, which is published in Moscow since 1994, giving a comprehensive, objective picture of the life and activity of the Jews of Russia, the Soviet Union and the CIS.

The encyclopedia is structurally divided into three parts: 1. biographical information, 2. local history of the Jewish community in pre-revolutionary Russia, the Soviet Union and the CIS, and 3. thematic information on concepts related to Jewish civilization, the contribution of the Jews of Russia in various fields of activity, various Jewish social, scientific, cultural organizations, etc. The originally published volumes contain more than 10,000 biographies and more than 10,000 place names. The electronic version contains corrections and additions in the form of new articles.

- **YIVO Encyclopedia**

The YIVO Encyclopedia of Jews in Eastern Europe⁷, courtesy of the YIVO Institute of Jewish Research, NY. The only resource of its kind, this encyclopedia provides the most complete picture of the history and culture of Jews in Eastern Europe from the beginnings of their settlement in the region to the present.

- **The Library of Haskala**

⁴ <https://dasjuedischehamburg.de>

⁵ Wallstein, Göttingen, Das Jüdische Hamburg - Ein historisches Nachschlagewerk”, ISBN: 978-3-8353-0004-0, 2006

⁶ <http://www.ruje.ru>

⁷ <http://www.yivoencyclopedia.org>

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The Library of Haskala⁸ contains 525 books in German and Hebrew identified by leading scholars as Haskala literature. The database is hosted and run by the Judaica Division of the Frankfurt University Library. The author's information has been extracted and the created dataset is further enriched with the corresponding GND information of each author.

- **National Library of Israel**

This resource contains the authors extracted from the authority file of the National Library of Israel⁹. When available, extra information, such as the date of birth and death and list of publications of each author is also extracted.

- **Judaica collection of University Library of Frankfurt**

This resource contains authors extracted from the Judaica collections of the University Library of Frankfurt. We have used a collection of 330 Jewish newspapers and journals of the German speaking area of the years 1768–1938 and beyond. These periodicals represent the complete religious, political, social, literary and academic spectrum of the Jewish community and the "Science of Judaism", thus constituting a major source for the research on Judaism in the Modern Age. Moreover, this resource includes the Freimann collection which comprises the literature of Science of Judaism in European languages and is part of the historic Judaica collection. This is the most significant Judaica collection of the European continent before World War II. In 1932 a catalog of all titles was published, reprinted in 1968 as bibliography thus compiling the complete historic literature of Science of Judaism. When available, the authors have extra information from other resources such as the common authority file (Gemeinsame Normdatei, GND) of the German National Library.

- **Stolpersteine in Mainz**

The stumbling blocks are a project of the artist Gunter Demnig, which began in 1992. In May 2018, there were around 69,000 bricks in Germany and 23 other European countries. The stumbling blocks are the largest decentralized memorial in the world. In Mainz (including Mainz Kastel) since 2007, more than 200 stumbling blocks have been laid. This dataset is based on the Wikipedia page list of stumbling blocks in Mainz¹⁰ and contains the

⁸ <https://www.haskala-library.net>

⁹ <https://web.nli.org.il>

¹⁰ https://de.wikipedia.org/wiki/Liste_der_Stolpersteine_in_Mainz

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address of the Stolpersteins, the date of installation, the founder, comments and coordinates.

- **Eine Jüdische Familie aus Aschaffenburg**

The information regarding Hirsch family is gathered by Jüdische Leben in Unterfranken - Biographische Datenbank e.V. (Jewish Life in Lower Franconia - Biographical Database e.V.). The Association of Jewish Life in Lower Franconia¹¹ - Biographical Database e.V. systematically researches the city and monastery archives in Aschaffenburg for sources on Jewish history.

- **Biographisches Handbuch der Rabbiner**

The Biographisches Handbuch der Rabbiner is an online encyclopedia provided by the Salomon L. Steinheim Institute for German-Jewish history¹² at the University of Duisburg-Essen, edited by Michael Brocke and Julius Carlebach. The goal of this encyclopedia is to be a complete directory of all rabbis who lived and worked in or originated from German-speaking areas since the age of enlightenment. The encyclopedia consists of two parts: Part 1: Die Rabbiner der Emanzipationszeit in den deutschen, böhmischen und großpolnischen Ländern (1781 – 1871), edited by Carsten Wilke. Part 2: Die Rabbiner im Deutschen Reich (1871 – 1945), edited by Katrin Nele Jansen.

- **Geographical Coordinates**

This resource contains geo-coordinates of the cities and countries. All these coordinates as well as their GND identifiers are extracted from GND entries of the corresponding geographical locations when available.

- **Dataset on Jewish Education and Religion**

This resource contains authors from a bio-bibliographic database which lists publications on Jewish education and religion. This dataset is part of the DFG project; Innovation through Tradition? Jewish educational media as an access to the change of cultural orders during the 'saddle time'.

- **DBPedia**

¹¹ <http://www.historisches-unterfranken.uni-wuerzburg.de/juf/Datenbank>

¹² <http://www.steinheim-institut.de/wiki/index.php/Hauptseite>

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DBpedia is a large-scale source of structured and multilingual knowledge extracted from Wikipedia. This knowledge base contains over 400 million facts that describe 3.7 million things. We followed several approaches to extract relevant concepts from DBpedia. Our main focus was on identifying prominent Jewish persons from different fields of activities. For each person, the name in all available languages, as well as links to other data sources and any other available information are extracted. The DBpedia dataset contains currently 5,294 persons with 35 distinct occupations.

- **GND**

The Integrated Authority File (GND) of the German National Library is an authority file that contains identifiers to different concepts including to persons. This resource contains persons extracted from the GND, such as Rabbis who are related to Jewish culture and studies. When available these persons were linked to other resources. This dataset includes 4,029 persons and 303 occupations.

3.2. JudaicaLink

These sources reflect our work on JudaicaLink¹³, a new domain-specific knowledge base for Jewish culture, history and studies. The main application of JudaicaLink so far is to act as a central reference point for the contextualization of metadata. The resources mentioned in the previous sections are available as ready to use datasets on JudaicaLink, and depending on the original source, relevant information, such as birth/death date and location, occupation and identifiers are extracted from the sources, and structured as Linked Open Data¹⁴. Therefore, in this project we use JudaicaLink as the hub where all these resources are brought together and will be utilized for the data enrichment process.

¹³ <http://www.judaicalink.org>

¹⁴ <http://www.judaicalink.org/datasets>

4. Semantic enrichment implementation

4.1. Contextualized entities

In this project two types of entities were identified and further enriched using the contextualization resources:

- **Person:** for which properties such as '*dc:creator*' or '*dc:contributor*' which indicate the author or creator of the CHO were used.
- **Geographical places:** for which properties such as '*dcterms:spatial*' which indicate a country/city were used. This country/city could have been the place of birth/death or place of publication.

Once these properties were identified and enriched, two new EDM classes were created and added. The inclusion of these classes allows the exploitation of this rich data and allows data about the resources to be kept separate from the data about the object of the description.

- **edm:Agent** to refer to an agent comprising people, either individually or in groups, who have the potential to perform intentional actions for which they can be held responsible¹⁵.
- **edm:Place** to refer to a place as spatial locations identified by the provider and named according to some vocabulary or local convention¹⁶.

4.2. Matching rules

Within the semantic enrichment framework, the matching rules would be different depending on the entities to be enriched and the resources to be used for enrichment. The rules are applied to the selected properties of the objects. The matching would always start from the preferred label and to find a match in the resource. The names were case insensitive and preprocessed (for example removing any uninformative symbols or characters) to make sure the match is as accurate as possible. For the particular case of persons, the source fields are processed prior to matching to remove birth/death dates in

¹⁵ <https://docs.google.com/document/d/1JvirWMTpMIH7WnuieNqcT0zpJAXUPo6x4uMBj1pEx0Y/edit>

¹⁶ <https://docs.google.com/document/d/1JvirWMTpMIH7WnuieNqcT0zpJAXUPo6x4uMBj1pEx0Y/edit>

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parentheses. When the date of birth/death was available this information was added as new properties to that person. In the next step of matching, to deal with ambiguities, multi-match cases and having higher accuracy, we look into extra information available about the entities, for example, when available we would also match the dates of birth/death.

4.3. Implementation

For the semantic enrichment we have used python programming language and its required libraries. We have used NLP libraries for analysis and processing of the contents and texts of the attributes, web crawlers for extracting required information from online pages, as well as SPAQL for storing and querying datasets in Linked Open Data format.

In this project the two entities were enriched as follow:

1. **Persons;** for this purpose we first extracted the proper nouns of individual persons which were indicated through either or both '*dc:creator*' or '*dc:contributes*' attributes. The content of these attributes were first pre-processed to remove any uninformative character or symbol. Some of these attributes also contained the dates of birth and death which were also extracted for future matching. The enriched persons' names were saved as a new EDM class '*edm:Agent*' for which a unique URI was coined. There were few datasets such as 'jhm-documenten' where the content of the '*dc:creator*' or '*dc:contributes*' attributes were not names but a link to an existing *edm:Agent*. In these cases first the link was extracted and then directed to the Agent that it referred to. Then again any available information would be used to match against and further enrich that Agent.
2. **Geographical places:** for this purpose we first extracted the content of the '*dcterms:spatial*' attribute which contained countries or cities names. The content of these attributes were first pre-processed to remove any uninformative character or symbol. The enriched counties and cities were saved as a new EDM class '*edm:Place*' for which a unique URI was coined.

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The used vocabularies were first retrieved from the resources which were used for the enrichment and then converted into the corresponding contextualized property in EDM. we used Apache Jena Fuseki¹⁷ to store our resource datasets and for the matching and enrichment process through connecting to the triple store endpoint.

To fully understand the semantic enrichment process, it is important to also have a good understanding on how it is used in the aggregator which is the core infrastructure of the project. The aggregator provides a mechanism for registering job triggers and the registered job will be triggered once dataset harvesting and conversion is completed. Dataset enrichment job will retrieve the whole dataset from the database (via Data Storage API) as an input. The output of the job is an enriched dataset represented by a list of newly created objects (places, agents, etc.) along with relations to the heritage object represented by the record. The output will be inserted into the database via Data Storage API.

5. Results

In total there were 29 datasets provided by the project data partners. Out of which, 26 of them (~90%) were further enriched with a new `edm:Agent` class which represents `dc:creator` and `dc:contributor` attributes of the original dataset. The datasets which were not enriched, either didn't have the creator/contributor attributes, or it was a repeated organization name. Moreover, 15 of the datasets (~52%) were also enriched with a new class `edm:Place` which represents the `dcterms:spatial` attribute of the original datasets. Other datasets which were not enriched with this class, didn't have the spatial attribute. Table 4 shows the number of attributes in total and number of the enriched entities in each dataset.

The number of enriched entities depends on:

- the number of the attributes of each dataset, which is quite different,
- the language of the dataset; i.e. for datasets which are in English there are more resources available to find a match and enrich compared to other languages, and
- the content of the attributes; i.e. how well structured and harmonized the textual content of the attributes are.

¹⁷ <https://jena.apache.org/documentation/fuseki2>

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The enriched datasets, version 15 May 2020, with edm:Agent are accessible here:

<https://drive.google.com/open?id=1bNOAliDnGfSpcc7OXL1snBa2DMbYohD>

The enriched datasets, version 15 May 2020, with edm:Places are accessible here here:

https://drive.google.com/open?id=1zcaTyKdZUYtjgMF_-K35VC5C5deFZKBQ

Tabel 4. Number of enriched entities in datasets

Dataset	Enriched by Persons	Enriched by Geographical places	Number of the created edm:Agent	Number of the created edm:Place
AIUJE1_MARC21	Yes	Yes	679	255
AIUJE2_MARC21	Yes	Yes	71	57
MCYJE1_MARC21	Yes	Yes	624	9
MCYJE2_MARC21	Yes	Yes	23	4
JHI	Yes	No	111	NA
YIVO_JE	Yes	Yes	1364	289
LBI_art	Yes	Yes	247	51
LBI_books	Yes	Yes	858	174
LBI_periodicals	Yes	Yes	134	80
lbi_sound-recordings	Yes	Yes	81	9
LBI_ms	Yes	Yes	2787	592
LBI_photos	No	Yes	NA	148
AJHS_photographs	Yes	Yes	21	61
AJHS_text	Yes	Yes	74	45
BUL	No	No	NA	NA
CentralJudaicaDatabase	Yes	No	48	NA
GUF_freimann	Yes	No	320	NA
GUF_inchebr	Yes	No	3	NA
GUF_jd	Yes	No	1	NA
GUF_judaicaffm	Yes	No	26	NA
GUF_mshebr	Yes	No	9	NA
GUF_rothschild	No	No	NA	NA
GUF_cm	Yes	No	110	NA
NLI	Yes	No	2206	NA
jhm-documenten	Yes	No	3395	NA
jhm-foto	Yes	No	2140	NA
CCJM	Yes	Yes	2	102

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jhm-museum	Yes	No	1121	NA
JTSA	Yes	No	1096	NA

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Here is an example of an enriched *dc:creator* 'Adler, Hermann' and its corresponding created *edm:Agent*:

```
<https://data.jhn.ngo/persons/AIUJE1_MARC21/1155> a edm:Agent ;
    gnd:gndIdentifier "116008148" ;
    jl:birthLocation "Hannover" ;
    jl:deathLocation "London" ;
    rdaGr2:dateOfBirth "1839" ;
    rdaGr2:dateOfDeath "1911" ;
    edm:identifier "#REB01:000048421",
        "#REB01:000048728",
        "#REB01:000048762",
        "#REB01:000048768",
        "#REB01:000219499",
        "#REB01:000223129" ;
    owl:sameAs <http://d-nb.info/gnd/116008148>,
        <http://d-nb.info/gnd/116008148/about>,
        <http://data.judaicalink.org/data/bhr/Adler_Hermann>,
        <http://data.judaicalink.org/data/dbpedia/Hermann_Adler>,
        <http://data.judaicalink.org/data/gnd/116008148>,
        <http://dbpedia.org/resource/Hermann_Adler>,
        <http://de.dbpedia.org/resource/Hermann_Adler_(Oberrabbiner)>,
        <http://hub.culturegraph.org/entityfacts/116008148>,
        <http://id.loc.gov/authorities/n98091909>,
        <http://kalliope-verbund.info/gnd/116008148>,
        <http://rdf.freebase.com/ns/m.04_ktr>,
        <http://steinheim-institut.de:50580/cgi-bin/bhr?gnd=116008148>,
        <http://steinheim-institut.de:50580/cgi-bin/bhr?id=13>,
        <http://viaf.org/viaf/40119121>,
        <http://wikidata.dbpedia.org/resource/Q1610507>,
        <http://www.isni.org/0000000066767299>,
        <http://www.wikidata.org/entity/Q1610507>,
        <http://yago-knowledge.org/resource/Hermann_Adler>,
        <https://de.wikipedia.org/wiki/Hermann_Adler_%28Oberrabbiner%29>,
        <https://en.wikipedia.org/wiki/Hermann_Adler> ;
    skos:altLabel "Adler, Hermann",
        "Adler, Hermann, Dr.",
        "Hermann Adler",
        "Hermann Adler (Oberrabbiner)",
        "Naftali Zwi Hirsch A." ;
    skos:prefLabel "Adler, Hermann" .
```

Judaica Europeana 2.0 - Activity 2 - Task 2.2 - Metadata Semantic Enrichment

Here is an example of an enriched *dcterms:spatial* 'Egypte' and its corresponding created *edm:Place*.

```
<https://data.jhn.ngo/spatial/AIUJE1_MARC21/1093> a edm:Place ;
    edm:identifier "#REB01:000038396",
        "#REB01:000097854",
        "#REB01:000190859",
        "#REB01:000197624" ;
    owl:sameAs "http://d-nb.info/gnd/1030137-9",
        "http://d-nb.info/gnd/16296779-2",
        "http://sws.geonames.org/357994",
        "http://viaf.org/viaf/4146635346841981376" ;
    skos:altLabel "Arab Republic of Egypt",
        "Arabiese Republiek Egipte",
        "Arabische Republik Ägypten",
        "Chibet",
        "Dschemhūriyyat Miṣr al-ʿarabiyya",
        "Egapt",
        "Egitto",
        "Egiptomi Arab Köztársaság",
        "Egypt",
        "Egypte",
        "Ghibt",
        "Ghubt",
        "Gumhūriyyat Miṣr al-ʿArabiyyah",
        "Gumhūriyyat Miṣr al-ʿArabiya",
        "Jumhuriyyat Miṣr al-ʿArabiyyah",
        "Kingdom of Egypt",
        "Maṣr",
        "Miṣr",
        "Mısır",
        "Mısır Arap Cumhuriyeti",
        "Repubblica Araba d'Egitto",
        "Republic of Egypt",
        "Republica Arabe de Egipto",
        "República Árabe de Egipto",
        "République arabe d'Égypte",
        "République d'Egypte",
        "Ÿumhūriyyat Miṣr Al-ʿArabiyyah",
        "ad- Daula al-Miṣriya",
        "al- Mamlaka al-Miṣriya" ;
    skos:prefLabel "Egypte" .
```