TECHNICAL SPECIFICATION

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DM2E Model V 1.2 Specification

Revision: Version 1.2

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Revision History

Revision	Date	Author	Organisation	Description
Version 0.1	22.10.12	Julia Iwanowa Evelyn Dröge Steffen Hennicke	UBER	First EDM+ v0.1
Version 0.2	04.12.12	Evelyn Dröge	UBER	Added additional provider requirements from the Vienna workshops and feedback from Antoine Isaac.
Version 0.3	26.02.13	Kai Eckert	UMA	Overview section, explanation of the overall architecture of the model, connection of ORE and VoID.
Version 1.0	15.04.13	Julia Iwanowa Evelyn Dröge Steffen Hennicke Kai Eckert	UBER UMA	Consolidation of the first operational version v1.0 Replaced `dm2e: <http://onto.dm2e.eu/schemas/dm2e/0.3/>` with `dm2e: <http://onto.dm2e.eu/schemas/dm2e/>`
Version 1.1	11.03.14	Evelyn Dröge Julia Iwanowa	UBER	Consolidation of Version 1.1
Version 1.2 RC 1	01.04.14 - 02.06.14	Evelyn Dröge Julia Iwanowa Konstantin Baierer	UBER EL	- Corrected ore:Aggregation example (KB) - Added “Allowed characters” paragraph (KB) - Added section “Technical details” (ED) - Highlighted property and class candidates in orange that were not used so far and could be removed from the model (ED) - Update of the Document description (ED) Checked model and adapted according to with newest mapping guidelines (v2.1): (ED) - extended dm2e:scopeNote for edm:hasView - changed dm2e:scopeNote for dc:creator - added dc:creator for edm:WebResource - removed edm:isDerivativeOf from edm:WebResource - removed edm:wasPresentAt from edm:WebResource - marked rdaGr2:otherDesignationAssociatedWithThePerson and rdaGr2:otherDesignationAssociatedWithTheCorporateBody as not being part of EDM - Removed skos:hiddenLabel from

				edm:Place
Version 1.2 RC 2	03.06.14 - 10.11.14	Evelyn Dröge Julia Iwanowa Konstantin Baierer	UBER EL	- Corrected CIDOC-CRM Namespace (KBA) - Changed superproperty of dm2e:copyist - Added section “Model evaluation” (ED) - Added class dm2e:Fragment (MD, DG) - Added letter properties (domain edm:ProvidedCHO): dm2e:sentOn, dm2e:receivedOn, dm2e:sentFrom, dm2e:receivedIn (CM, DG) - Extended scopeNote of dcterms:spatial - Added bf:Cartography and bf:NotatedMusic as subclasses of edm:PhysicalThing (DG) - Changed superclass of bibo:Book, bibo:Issue, bibo:Journal, bibo:Letter and dm2e:Manuscript from dm2e:Document to edm:PhysicalThing
Version 1.2	15. - 20.01.15	Evelyn Dröge Julia Iwanowa	UBER	Final revision

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List of Abbreviations

CHO	Cultural Heritage Object
DM2E	Digitised Manuscripts to Europeana
DM2E v1.0	First operational version of the DM2E model
EAJC	European Association for Jewish Culture
EL	Ex Libris
EDM	Europeana Data Model
GLAM	Galleries, Libraries, Archives and Museums
SBB	Staatsbibliothek zu Berlin *(Berlin State Library)*
UBER	Humboldt-Universität zu Berlin *(Humboldt University Berlin)*
UBFFM	Universitätsbibliothek Frankfurt am Main *(University Library Johann Christian Senckenberg)*
UIB	Universitetet i Bergen *(University of Bergen)*
UMA	Universität Mannheim *(University of Mannheim)*

Please note that some translations of institution names are unofficial and do only serve a better understanding of the corresponding abbreviation.

1 Document Description

The following specification document describes the final release candidate (rc3) of the DM2E model v1.2. It is the current specialisation of the *Europeana Data Model* (EDM) made by the *Digitised Manuscripts to Europeana* project (DM2E)[1].

Section 2 of the document describes the overall architecture of the model. The DM2E model makes use of *Named Graphs* (Carroll et al., 2005). OAI-ORE[2] as basis of EDM is preserved but proxies are removed. For provenance tracking, the relation of published documents and underlying datasets is made explicit by using the VoID vocabulary[3] instead.

Some technical details and important modelling decisions are explained in Section 3. That includes recommendations about using of dc, dcterms, language tags and allowed characters for URIs.

The last part of the document (Section 4) is the core of the specification which includes descriptions of elements in the DM2E model. Tables with properties were created for all important classes in the DM2E model. Sections 4.1 to 4.3 include element descriptions of the outer part of the model like datasets which are not part of the individual mapping process of a data provider but added automatically during the data ingestion. Sections 4.4 to 4.18 deal with classes and properties that are used in the provider's mappings to describe Cultural Heritage Objects with the core classes *ore:Aggregation*, *edm:ProvidedCHO* and *edm:WebResource* and the contextual classes like *edm:Agent*.

[1] DM2E project website: http://dm2e.eu/ [20.01.2015].
[2] OAI-ORE: http://www.openarchives.org/ore/ [20.01.2015].
[3] Vocabulary of Interlinked Datasets (VoID): http://vocab.deri.ie/void [20.01.2015].

2 Overview

The DM2E model is a specialisation of the *Europeana Data Model* (EDM)[4] for the domain of manuscripts[5]. The EDM has been developed within the Europeana v1.0 project as an RDF-based data model for describing rich metadata records for Europeana, the European digital library[6]. It can handle huge metadata record collections represented by heterogeneous metadata standards that have to be accessible via the same platform. The EDM covers *Cultural Heritage Objects* (CHOs) that are collected and delivered to Europeana by diverse cultural heritage institutions. The model very generic to cover Europes rich and diverse CHOs but it can be specialised for domain-specific descriptions like it is the case in DM2E. The DM2E model has been developed regarding the requirements of the projects' data providers. These requirements have been collected and analysed during the whole project period (2012-2015).

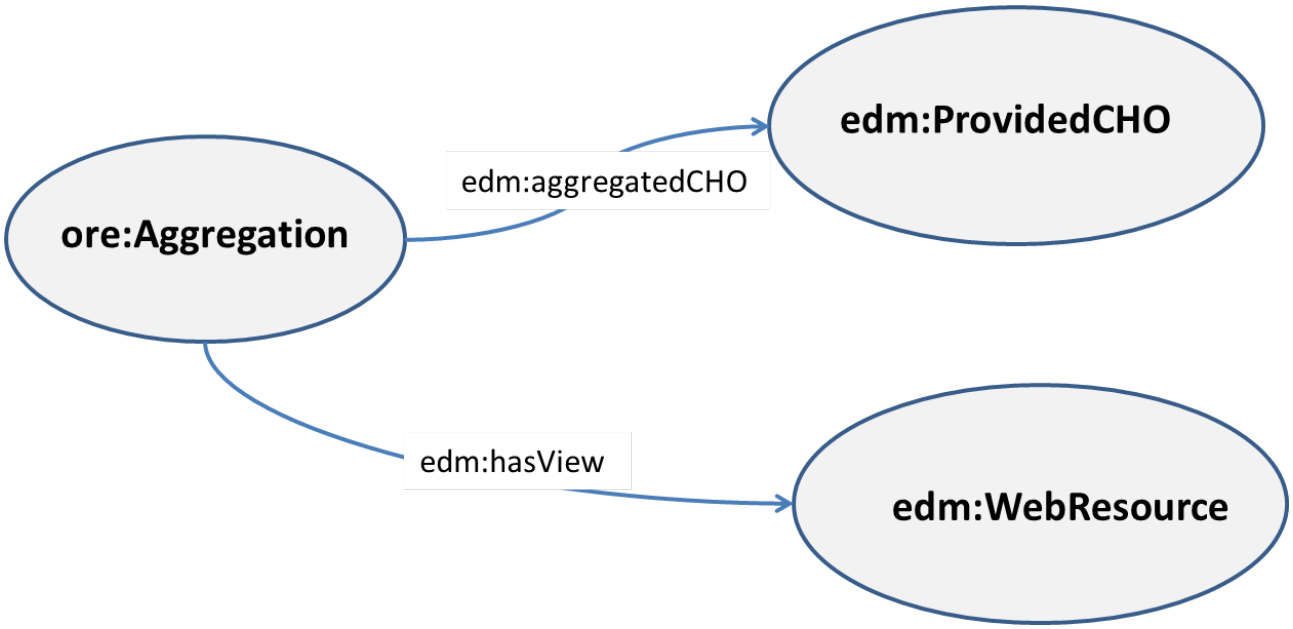

Figure 1: EDM (and DM2E) core classes.

Linked Data is the paradigm that drives the whole DM2E infrastructure. The DM2E model reflects this by explicitly defining classes for datasets and published data resources. This way, the meta-level of resource descriptions becomes a first-class member of the data model and can be used for annotations and provenance tracking.

The DM2E model as an EDM specialisation is an application profile of the EDM[7]. Properties and classes in the DM2E model are usually added as subproperties or subclasses to existing EDM elements; exceptions are properties that are for example used to properly represent hierarchical objects in DM2E search interfaces. The DM2E model is not the only EDM application profiles. Other specialisations, like EDM refinements of Europeana

[4] EDM documentation: http://pro.europeana.eu/edm-documentation [20.01.2015].
[5] Our definition of manuscript is very broad and includes not only handwritten manuscripts but all kind of text documents. Thus, the model also includes classes for physical objects like journals and even letters.
[6] Europeana website: http://www.europeana.eu/ [20.01.2015].
[7] Efforts towards a definition for RDF Application Profiles are undertaken by the Dublin Core RDF Application Profiles Task Group in which the DM2E model plays a major role: http://wiki.dublincore.org/index.php/RDF_Application_Profiles/ [20.01.2015].

Libraries[8] and EDM extensions of Europeana Creative[9] are described in Charles & Olensky, 2014.

Handling resource descriptions from different providers is a key issue for cultural heritage or memory institutions like *galleries, libraries, archives and museums* (GLAM). Descriptions need an own identity, for instance to provide provenance information. The EDM uses OAI-ORE as underlying framework to address this issue, i.e., proxy resources are created for each provided Cultural Heritage Object (*edm:ProvidedCHO*) and descriptive statements are assigned to these proxy resources. Aggregations (*ore:Aggregation*) are used to link the proxies to the provided CHOs and as subject of additional statements, like license information. Web resources, which should ideally include a digitisation of the CHO, are also linked to the aggregation (see Figure 1).

For Linked Data, different mechanisms, principles and best-practices exist to provide information about descriptions (Eckert, 2012). The DM2E model uses the EDM as basis, but aims for a better integration with common Linked Data principles. DM2E translates the Linked Data principles to well-defined concepts that can be used for data modelling.

The DM2E model follows two motivations:

1. A statement within DM2E is identified consistently, i.e., it is possible to make statements about statements that have been delivered on the Web. Additionally, the said statement can be identified in other Web documents that are representations of the same data, i.e., contain the identical statement, but it is not confused with the same (but not identical) statement found in a different context.
2. In metadata practice, we often have meta-information that does not refer to a single statement and cannot be easily mapped to a strict set of RDF statements, as contained in a *Named Graph* (Carroll et al., 2005). They can be put as "statements about a description". In EDM, such a description is captured by using *ore:Aggregation*, an abstract concept. In RDF, the description of a resource is not abstract; it is a graph of RDF statements about the resource. We want to meet the requirements of the metadata practitioners without violating the Linked Data and RDF principles. At the same time, we want to be as close to these principles as possible, without missing a requirement that exists in particular in DM2E.

In DM2E, descriptions of resources can be found on three different levels:

1. **Cultural Heritage Objects:** The actual objects that are described primarily by data providers.
2. **Aggregations:** An abstract resource representing a single resource description by one provider.
3. **Datasets/Data Resources:** The representation of RDF graphs that are created from the input data delivered by the data providers. A data resource is an RDF graph that is provided on the Web. Typically, it represents a subgraph of a dataset.

Each level is a meta-level of the former level. CHOs are the real world objects, aggregations represent the metadata of CHOs from the providers' perspective, the datasets and data resources represent actual RDF representations from DM2E's perspective. CHOs and Aggregations are taken from EDM and partly specialised (see Section 4). The datasets are described using the VoID vocabulary, the data resources are used to connect VoID and OAI-ORE, based on Linked Data principles.

8 Europeana libraries website: http://www.europeana-libraries.eu/web/ [20.01.2015].
9 Europeana creative website: http://www.europeanacreative.eu/ [20.01.2015].

2.1 Datasets

Datasets are identified by an URI and belong to the class *void:DataSet*. A *void:Dataset* is a set of RDF triples that are created from the data of a single data provider. The content of a dataset in DM2E is stable. Typically, a dataset is created from the transformation of one or more files of the data provider. A new transformation of the same files results in a new dataset. When dereferenced, a description of the dataset is provided, including provenance information and links to different versions.

2.2 Data Resources

Data resources belong to the class *dm2e:DataResource* and contain an RDF graph in an arbitrary serialisation. When dereferenced, the RDF data is directly delivered. The URI **must not** be changed. A *dm2e:DataResource* is a subclass of *foaf:Document* and is linked to a dataset by *void:inDataset*. A special data resource is the *ore:ResourceMap* that provides a description of an *ore:Aggregation* according to the OAI-ORE data model. A *ore:ResourceMap* is linked to an aggregation by *ore:describes*.

The classes *void:Dataset* and *dm2e:DataResource* are automatically generated by the DM2E ingestion platform. Thus, they do not have to be considered during the mappings of the delivered metadata records. The intermediate version of the ingestion platform is finished and currently tested.

2.3 Data Consumption and Provenance

Any DM2E data that is accessible on the Web is provided as a *dm2e:DataResource* that is associated with a *void:DataSet*. Provenance is tracked on dataset level. Therefore, a client that consumes DM2E data **must** ensure that the connection of RDF statements to datasets remains intact. A simple implementation will store the statements in a Named Graph using the dataset URI and discard the information of the URI where the data was actually fetched from. This is especially important for the annotation of RDF statements. They are always identified via the URIs of the subject, the predicate, the object and the dataset. This way, it is ensured that annotations on different data resources can be combined.

2.4 Further Reading

This document describes the DM2E model in great detail. However, not all surrounding aspects can be covered in the data model specification. For further reading, please refer to the following documents:

- DM2E model overview including the underlying modelling approach: Dröge, Iwanowa & Hennicke (2014): http://ozk.unizd.hr/proceedings/index.php/lida/article/view/117.
- DM2E model evaluation: Baierer, Dröge et al. (2014): http://dcevents.dublincore.org/IntConf/dc-2014/paper/view/265/223.
- DM2E mapping recommendations: Goldfarb & Ritze (2014): http://wiki.dm2e.eu/File: Dm2e_mapping_recommendations.pdf.
- EDM Documentation: http://pro.europeana.eu/edm-documentation.

3 Technical Details

The use of (external) namespaces as well as special requirements and characteristics regarding reused Dublin Core vocabularies, language tags and allowed characters in URIs were stated for the use of the DM2E model.

3.1 Namespaces

The DM2E ontology schema namespace, which is used for referencing classes and properties, has the following format:

```
http://onto.dm2e.eu/schemas/dm2e/
```

The namespace for the individuals described by the ontology (i.e., its actual content) is:

```
http://data.dm2e.eu/data/
```

External vocabularies are directly reused in the DM2E model. That means that they are integrated into the model via subproperty or subclass relations, e.g.:

```
dm2e:composer rdfs:subPropertyOf dc:creator
```

```
dm2e:Cover rdfs:subClassOf edm:PhysicalThing
```

3.2 Use of Dublin Core Namespaces

The use of properties from the *dc*[10] or the *dcterms*[11] namespaces within the DM2E Model is based on the recommendations provided by Europeana and defined in the Europeana Data Model (Definition of the Europeana Data Model v5.2.4, 2013:38). If there are two possible *dc* or *dcterms* properties that can be used, always take the one which is defined in the *dc* namespace. In all other cases the *dcterms* property should be taken into account.

3.3 Definition and Use of Language Tags

In v1.1 of the DM2E model, the recommendation how to use language tags was changed to the language representation standards RFC 3066[12] and RFC 5646[13]. The standards

[10] Definition of the Dublin Core Element Set: http://dublincore.org/documents/dces/ [20.01.2015].
[11] Definition of the DCMI Metadata Terms: http://dublincore.org/documents/dcmi-terms/ [20.01.2015].
[12] Tags for the Identification of Languages (RFC 3066): http://www.rfc-editor.org/rfc/rfc3066.txt [20.01.2015].
[13] Tags for Identifying Languages (RFC 5646): http://www.rfc-editor.org/rfc/rfc5646.txt [20.01.2015].

strongly suggest using an ISO-639-1 two-character language code and otherwise, if no two-character code exists, switch to an ISO-639-2 three-character language code[14]. Furthermore, language tags should be used whenever language information is available, but they are no longer mandatory to avoid an overflow of undetermined language tags. For more information see the excerpt from http://tools.ietf.org/html/bcp47. A list of two- and three-character language codes for the representation of names of languages is published by the Library of Congress[15] and can be found at http://www.loc.gov/standards/iso639-2/php/code_list.php.

3.4 Allowed Characters in URIs

The use of RFC 3986 compliant URIs[16] is obligatory and verified at validation time. In summary, a character in the path part of an URI must adhere to these conditions:

No special treatment is necessary if it is an

- ASCII letter (ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz)
- A number (0123456789)
- dash (-)
- underscore (_)
- dot (.)
- tilde (~)
- colon (:)

If it is anything other than the aforementioned it should be converted to Form-C UTF-8 and percent-encoded.

As an additional restriction, the following percent encoded characters for those URIs within our namespace (i.e. those starting with `http://data.dm2e.eu/data/`) are blacklisted:

- %0A / %0D / %09 (newline, carriage return, tab: this is most likely a mapping bug)
- %2F (slash: while technically allowed, percent-encoded slashes lead to problems when transcoding URI)
- %3C / %3E (opening/closing bracket: this might lead to trouble when transcoding using XML tools)

[14] "When a language has both an ISO 639-1 2-character code and an ISO 639-2 3-character code, you MUST use the tag derived from the ISO 639-1 2-character code. When a language has no ISO 639-1 2-character code, and the ISO 639-2/T (Terminology) code and the ISO 639-2/B (Bibliographic) code differ, you MUST use the Terminology code. NOTE: At present, all languages for which there is a difference have 2-character codes, and the displeasure of developers about the existence of 2 code sets has been adequately communicated to ISO. So this situation will hopefully not arise."

[15] Library of Congress: http://www.loc.gov/ [20.01.2015].

[16] Uniform Resource Identifier (URI): Generic Syntax (RDF 3986): http://www.rfc-editor.org/rfc/rfc3986.txt [20.01.2015].

4 Definitions of Classes and Properties

The following section provides detailed information on classes and properties that are reused or created by DM2E. Tables with properties were created for all important classes in the DM2E model.

The tables have the following columns: “Property” or “Class”, “Range”, “Subproperty of” or “Subclass of”, “DM2E Scope note”, “Original scope note” and “Constraints”. The column “Range” is only used when properties are described and indicates which ranges can be used for it. If more than one range is shown, the range on top is the recommended one. If the range is a class which is a superclass of more specific subclasses, the subclasses can be used as well. Please do always use the most specific class for your mappings.

Properties in red have been created by DM2E (indicated by the namespace prefix “dm2e”) whereas properties in blue are taken from an existing ontology. Properties and classes that are not in a special colour are part of the EDM but can have a special DM2E description which may differ from the original one. In order to provide a better readability and clarity, the turtle syntax[17] was used for all included examples. The mapping examples are based on the TEI file *Ms-114_OA.xml*[18] from the Wittgenstein Archive of the University of Bergen which was extended by some additionally invented properties in order to provide rich mapping examples.

The column “DM2E Scope Note” holds a description for the use of the property or class in the context of DM2E. The annotation property in the RDF representation of the model which points to the exact description is *dm2e:scopeNote*. The column “Original Scope Note” holds the original definitions and scope notes of properties reused from existing ontologies. These descriptions support the explanations in the “DM2E Scope Note” column. For EDM properties, the definitions have been derived from the Definition of the Europeana Data Model, Version 5.2.4 (2013).

4.1 void:Dataset

A *void:Dataset* represents a stable version of an RDF graph that contains descriptions of *ore:Aggregations* and *edm:providedCHO*s of one data provider. A dataset is typically not directly accessed. If dereferenced, a 303 redirect to an RDF description of the dataset is performed (NOT to the content of the dataset).

[17] For detailed information, please visit the Turtle W3C recommendation document: http://www.w3.org/TR/turtle/ [20.01.2015].
[18] TEI-XML file provided by the Wittgenstein Archive of the University of Bergen: http://wab.uib.no/cost-a32_xml/Ms-114_OA.xml [20.01.2015].

Namespace
```
void:       <http://rdfs.org/ns/void#> .
```

4.2 dm2e:DataResource

Subclass of: *foaf:Document*[19]

A data resource is a non-abstract information resource that provides RDF data. Therefore, it is a specialisation of *foaf:Document*. In DM2E, every *dm2e:DataResource* is connected to a *void:Dataset* by means of *void:inDataset*.

Namespaces
```
void:       <http://rdfs.org/ns/void#> .
dm2e:       <http://onto.dm2e.eu/schemas/dm2e/> .
```

Property	Range	DM2E Scope Note	Original Scope Note	Constraints
void:inDataset	void:Dataset	The dataset that contains the RDF statements provided via this data resource.	*"in dataset* – Points to the *void:Dataset* that a document is a part of."	**mandatory** **not** repeatable

Table 1: dm2e:DataResource.

4.3 ore:ResourceMap

Subclass of: *dm2e:DataResource*

An *ore:ResourceMap*[20] is a special *dm2e:DataResource* that contains statements about a single *ore:Aggregation* and the aggregated resources (which are of the class *edm:WebResource* or *edm:ProvidedCHO*).

[19] Definition of the FOAF vocabulary: http://xmlns.com/foaf/spec/ [20.01.2015].
[20] Definition of the OAI-ORE vocabulary: http://www.openarchives.org/ore/1.0/vocabulary.html [20.01.2015].

Namespaces
```
ore:        <http://www.openarchives.org/ore/terms/> .
```

Property	Range	Subproperty of	DM2E Scope Note	Original Scope Note	Constraints
ore:describes	ore:Aggregation	-	-	Definition: “This relationship asserts that the subject (a Resource Map) describes the object (an Aggregation).”	**mandatory** **not** repeatable

Table 2: ore:ResourceMap.

4.4 ore:Aggregation

Subclass of: *dcmitype:Collection*

The class *ore:Aggregation* aggregates Web resources (*edm:WebResource*) as well as CHOs (*edm:ProvidedCHO*). Additionally, it can provide information about the data provider, metadata rights etc. As *ore:Aggregation* is an abstract resource, there will be a 303 redirect to an *ore:ResourceMap* that contains the RDF description of the aggregation and the CHO. The definition of *ore:Aggregation* within the EDM specification (Version 5.2.4) includes the following description: “A set of related resources (Aggregated Resources), grouped together such that the set can be treated as a single resource. This is the entity described within the ORE interoperability framework by a Resource Map.” and “This class plays a central role in EDM, as it serves to group together all important elements of cultural heritage objects contributed by the content providers. Aggregations are used in Europeana to represent the complex constructs that are provided by contributors. An aggregation is associated to the object that it is about, by the property *edm:aggregatedCHO*” (Definition of the Europeana Data Model 2013:7-8).

Namespaces
```
edm:        <http://www.europeana.eu/schemas/edm/> .
dc:         <http://purl.org/dc/elements/1.1/> .
dcterms:    <http://purl.org/dc/terms/> .
pundit:     <http://purl.org/pundit/ont/ao#> .
ore:        <http://www.openarchives.org/ore/terms/> .
dm2edata:   <http://data.dm2e.eu/data/> .
```

Property	Range	Subproperty of	DM2E Scope Note	Original Scope Note	Constraints
edm: aggregatedCHO	edm:ProvidedCHO	ore:aggregates	The property *edm:aggregatedCHO* connects the *ore:Aggregation* with exactly one *edm:ProvidedCHO.* The property expresses what the Aggregation is about.	Definition: "This property associates an ORE aggregation with the cultural heritage object(s) (CHO for short) it is about." Comment: "This property indicates the CHO(s) an aggregation is about. It supports several operations regarding the discovery and management of CHOs."	**mandatory** **not** repeatable
edm:provider	foaf:Organization	edm:hasMet	The property *edm:provider* holds the name or identifier of the organisation (*foaf:Organization*, see below) that provided the data, i.e. the aggregation, to Europeana. Note that this organisation does not necessarily own the original or digitised object. Typically, *edm:provider* is an aggregator. The owner of the metadata record is recorded in *edm:dataProvider*. The values in *edm:provider* and *edm:dataProvider* can be the same. In the context of DM2E the value for *edm:provider* is always `dm2edata:agent/dm2e/DM2E`.	Definition: "The name or identifier of the organisation who delivers data directly to an aggregation service (e.g. Europeana)." Comment: "Together with *edm:dataProvider* this property allows the names of organisations at different points in a data supply chain to be differentiated and recorded for search and display purposes. In the Europeana context this will be the name of the organisation that sends the data to Europeana, and this is not necessarily the institution that holds or owns the original or digitised object. Where data is being supplied by an aggregator or project *edm:provider* is the name of aggregator or project. The name of the content holder can be recorded in *edm:dataProvider*. If the content holder supplies data directly to Europeana then the	**mandatory** **not** repeatable

				name should also appear in this Property. Although the range of this property is given as *edm:Agent*, organization names should be provided as an ordinary text string until a Europeana authority file for organisations has been established. At that point providers will be able to send an identifier from the file instead of a text string. The name should be in the original language(s)."	
edm:dataProvider	foaf:Organization	dcterms: provenance	The property *edm:dataProvider* holds the name or identifier of the organisation (*foaf:Organization*, see below) that provided and owns the source metadata record for this aggregation. Note that this organisation does not necessarily own the physical object which is described in the metadata record.	Definition: "The name or identifier of the organisation who contributes data indirectly to an aggregation service (e.g. Europeana)." Comment: "Together with *edm:provider* this property allows the names of organisations at different points in a data supply chain to be differentiated and recorded for search and display purposes. In the Europeana context this will be the name of the organisation that sends the data to Europeana, and this is not necessarily the institution that holds or owns the original or digitised object. Where data is being supplied by an aggregator or project *edm:provider* is the name of aggregator or project. The name of the content holder can be recorded in *edm:dataProvider*. If the content holder supplies data	**mandatory** **not** repeatable

				directly to Europeana then the name should also appear in this Property. Although the range of this property is given as *edm:Agent*, organization names should be provided as an ordinary text string until a Europeana authority file for organisations has been established. At that point providers will be able to send an identifier from the file instead of a text string. The name should be in the original language(s)."	
dcterms: rightsHolder	edm:Agent	dcterms: provenance	The property *dcterms:rightsHolder* holds the name or identifier of the agent (a person or organisation) who owns or manages the rights of the physical object (the CHO) which is described in the source metadata record.	Definition: "A person or organization owning or managing rights over the resource."	optional repeatable
edm:rights	edm:WebResource	dc:rights	The property *edm:rights* holds copyright information pertaining to all digital objects (*edm:WebResource*) given by *edm:hasView* or one of its subproperties. If a digital object (*edm:WebResource*) holds an additional copyright information given by *dc:rights* then this more specific copyright information has priority. Otherwise the value given in *edm:rights* at the Aggregation is the default value for digital object attached to this Aggregation. The four main types of rights statements in Europeana are:	Definition: "Information about usage and access rights of the digital objects indicated in *isShownBy* and *isShownAt*." Comment: "To support discovery by associated rights and access permissions this property will hold the URI of a rights statement. In the context of Europeana the value must come from the set defined at http://pro.europeana.eu/available-rights-statements. The URIs consist of a code indicating the legal status of an object (e.g. "publicdomain") attached to the	**mandatory not** repeatable

			Public Domain Mark, CCO 1.0, Rights Reserved Statements and Unknown. The list of the all available licensing rights supported by Europeana can be found here: http://pro.europeana.eu/available-rights-statements.	domain name where that status is defined (e.g. creativecommons.org or europeana.eu). For users of Europeana.eu this information on rights may apply to several digital objects, e.g. the preview specified in *edm:object* and the small previews (thumbnails)on the portal."	
edm:hasView	edm:WebResource	ore:aggregates	The property *edm:hasView* holds the URL of an *edm:WebResource* which shows, depicts or otherwise contains any kind of view of the *edm:ProvidedCHO*. The property should not be used twice for the same or similar view of an object.	Definition: "This property relates a ORE aggregation about a CHO with a web resource providing a view of that CHO. Examples of view are: a thumbnail, a textual abstract and a table of contents. The ORE aggregation may be a Europeana aggregation, in which case the view is an object owned by Europeana (i.e., an instance of *edm:EuropeanaObject*) or an aggregation contributed by a content provider. In order to capture both these cases, the domain of *edm:hasView* is *ore:Aggregation* and its range is *edm:WebResource*." Comment: "This property enables associating an aggregation about a CHO with the possibly many and heterogeneous views of that CHO. This is required since Europeana may collect several such views in order to support browsing of its resources. In addition, it allows the integration of all properties used in content providers' descriptions that	optional repeatable

				capture the notion of view in the sense outlined above. To this end, any such properties should be declared to be a (direct or indirect) subproperty of *edm:hasView*."	
edm:isShownBy	edm:WebResource	edm:hasView	The property *edm:isShownBy* holds the URL of an *edm:WebResource* which leads to a "plain" image with any kind of view of the *edm:ProvidedCHO*. "Plain" image means that the image must be without any information context, for example, the URL points to a plain JPG-image. The image should not be embedded in a viewer. Either *edm:isShownBy* or *edm:isShownAt* must be provided.	Definition: "An unambiguous URL reference to the digital object on the provider's web site in the best available resolution/quality. See also *edm:isShownAt*." Comment: "This property will contain a URL that will be active in the Europeana interface. It will lead users to the digital object on the provider's website where they can view or play it. The digital object needs to be directly accessible by the URL and reasonably independent at that location. If the URL includes short copyright information or minimal navigation tools it can be entered in *edm:isShownBy*."	**mandatory** (either *edm:isShownBy* or *edm: isShownAt*) **not** repeatable
edm:isShownAt	edm:WebResource	edm:hasView	The property *edm:isShownAt* holds the URL of an *edm:WebResource* which leads to a view of the digital object on the provider's website in its full information context (e.g. in a viewer application). Either *edm:isShownBy* or *edm:isShownAt* must be provided.	Definition: "An unambiguous URL reference to the digital object on the provider's website in its full information context. See also *edm:isShownBy*." Comment: "This property will contain a URL that will be active in the Europeana interface. It will lead users to the digital object displayed on the provider's web site in its full information context.	**mandatory** (either *edm:isShownBy* or *edm: isShownAt*) **not** repeatable

				Use *edm:isShownAt* if you display the digital object with extra information (such as header, banner etc). Also use it for digital objects embedded in HTML pages (even where the page is extremely simple)."	
edm:object	edm:WebResource	edm:hasView	The property *edm:object* holds the URL of an *edm:WebResource* which leads to a thumbnail representing the digital object or, if there is no such thumbnail, the URL of the digital object in the best resolution available on the website of the data provider from which a thumbnail could be generated. This will often be the same URL as given in *edm:isShownBy*. If you provide an edm:object it is mandatory to add one of the following MIME types with dc:format to the *edm:WebResource*: • image/png • image/jpeg • image/gif • image/tiff • application/pdf	Definition: "The URL of a suitable source image in the best resolution available on the web site of the data provider from which small images could be generated for use in a portal. This will often be the same URL as given in *edm:isShownBy*." Comment: "The specifications for suitable source images and details of their use and processing in Europeana can be found in the Europeana Portal Image Policy. Please consult that document before entering a URL in this metadata element. Note that there is no requirement to provide an image in any other format than those readily available on the providers' website. A default icon corresponding to the Europeana type of object will be displayed if no other can be created."	not mandatory but **strongly recommended** **not** repeatable
dm2e:hasAnnotatableVersionAt	edm:WebResource	edm:hasView	The property *dm2e:hasAnnotatableVersionAt* holds an URL which leads to an HTML representation or to an image of the content, i.e. of the	-	not mandatory but **strongly recommended** repeatable

			CHO aggregated by the current Aggregation. The URL of the HTML content or image file must be stable. The type of the WebResource must be further specified as • text/html-named-content • text/plain • text/html • image/gif • image/jpeg • image/png		
dm2e:displayLevel	xsd:boolean "true" or "false"	-	The property with the value "true" should be added to the Level-CHO that should be displayed via the search engine. To all other Part-CHO the value is "false".	-	**mandatory** **not** repeatable
dcterms:created	edm:TimeSpan xsd:dateTime rdf:Literal	dc:date	cf. original scope note	Definition: "Date of creation of the resource."	optional repeatable
dcterms:modified	edm:TimeSpan xsd:dateTime rdf:Literal	dc:date	The property *dcterms:modified* holds the modification date and time of the aggregation, i.e. the original source metadata record.	Definition: "Date on which the resource was changed."	optional repeatable
dc:creator	edm:Agent	edm:hasMet	The property *dcterms:creator* holds the name or identifier of the agent (a person or organisation) who created the resource, e.g. the original metadata record or CHO (possibly its author).	Definition: "An entity primarily responsible for making the resource." Comment: "Examples of a Creator include a person, an organization, or a service."	optional repeatable
dc:contributor	edm:Agent	edm:hasMet	The property *dc:contributor* holds the name or identifier of the agent	Definition: "An entity responsible for making contributions to the	optional repeatable

			(a person or organisation) who contributed to the creation of the aggregation, i.e. the original source metadata record.	resource." Comment: "Examples of a Contributor include a person, an organization, or a service. Typically, the name of a Contributor should be used to indicate the entity."	

Table 3: ore:Aggregation.

URI Scheme

All *ore:Aggregation* entities are identified by an URI with the following scheme:

`http://data.dm2e.eu/data/aggregation/[provider]/[dataset]/[identifier]`

ore:Aggregation example

```
dm2edata:aggregation/uib/wittgenstein/Ms-114
          a ore:Aggregation ;
          edm:aggregatedCHO dm2edata:item/uib/wittgenstein/Ms-114 ;
          edm:dataProvider
                 dm2edata:agent/uib/wittgenstein/Wittgenstein_Archives_at_the_University_of_Bergen_(WAB)_Ms-
               114 ;
          edm:provider dm2edata:agent/dm2e/DM2E ;
          edm:rights <http://creativecommons.org/publicdomain/mark/1.0/> ;
          edm:isShownAt <http://www.wittgensteinsource.org/texts/BTEn/Ms-114> ;
          edm:hasView <http://www.wittgensteinsource.org/texts/BTEn/Ms-114_d> ;
          edm:object <http://www.wittgensteinsource.org/uploads/flexip_scraps/Facsimile-331.jpg> ;
          dm2e:displayLevel "false"^^xsd:boolean ;
          dcterms:created "2002-10-10T00:00:00"^^xsd:dateTime ;
          dcterms:modified "2002-10-10T00:00:00"^^xsd:dateTime ;
          dm2e:hasAnnotatableVersionAt <http://www.wittgensteinsourcevps.org/Ms-114,iv%5B1%5D_n.html> ;
          dc:creator <http://data.dm2e.eu/data/agent/uib/wittgenstein/Alois_Pichler> ;
          dc:contributor <http://data.dm2e.eu/data/agent/uib/wittgenstein/Vemund_Olstad> .
```

```
dm2edata:item/uib/wittgenstein/Ms-114
     a edm:ProvidedCHO ;
     dc:type dm2e:Manuscript .

dm2edata:agent/uib/wittgenstein/Wittgenstein_Archives_at_the_University_of_Bergen_(WAB)
     a dm2e:Archive ;
     skos:prefLabel “Wittgenstein Archives at the University of Bergen (WAB)” .

dm2edata:agent/uib/wittgenstein/Alois_Pichler
     a foaf:Person ;
     skos:prefLabel “Alois Pichler” .

dm2edata:agent/dm2e/DM2E
     a foaf:Organization ;
     skos:prefLabel “DM2E” .
```

4.5 edm:ProvidedCHO

Subclass of: *rdfs:Resource*[21]

The EDM Definitions 5.2.4 describes *edm:ProvidedCHO* as follows: “This class comprises the Cultural Heritage objects that Europeana collects descriptions about.” (Definition of the Europeana Data Model, 2013:13).

Namespaces

```
edm:        <http://www.europeana.eu/schemas/edm/> .
dc:         <http://purl.org/dc/elements/1.1/> .
dcterms:    <http://purl.org/dc/terms/> .
bibo:       <http://purl.org/ontology/bibo/> .
pro:        <http://purl.org/spar/pro/> .
dm2e:       <http://onto.dm2e.eu/schemas/dm2e/> .
dm2edata:   <http://data.dm2e.eu/data/> .
```

[21] Definition of the RDF Schema: http://www.w3.org/TR/rdf-schema/ [20.01.2015].

Property	Range	Subproperty of	DM2E Scope Note	Original Scope Note	Constraint
edm:type	rdf:Literal	dc:type	The Europeana material type of the resource. Must be one of the following Europeana types (in upper case): TEXT, VIDEO, SOUND, IMAGE, 3D.	Definition: "The Europeana material type of the resource." Comment: "To support discovery based on the broad type of an object this property will hold a term from a controlled vocabulary. As well as recording the original type values in *dc:type*, providers are asked to map from the local type terminology to controlled vocabulary terms used in Europeana. Associated with the 3D value in this property, "3D-PDF" should be used as the value in *dc:format* if appropriate."	**mandatory** **not** repeatable
dc:type	edm:PhysicalThing skos:Concept	edm:hasType	The property *dc:type* provides a specific type that applies to the CHO. By type, we mean either a physical form (e.g. book) or logical form (e.g. paragraph) as they are specified as subclasses of *edm:PhysicalThing* and *skos:Concept* respectively. At least one *dc:type* must be provided.	Definition: "The nature or genre of the resource." Comment: "Recommended best practice is to use a controlled vocabulary such as the DCMI Type Vocabulary [DCMITYPE]. To describe the file format, physical medium, or dimensions of the resource, use the Format element."	**mandatory** repeatable
dc:title	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	The property *dc:title* gives the main title of the CHO. It is mandatory to provide either a *dc:title* or a *dc:description* for the CHO.	Definition: "A name given to the resource." Comment: "The title of the CHO. Either *dc:title* or *dc:description* must be provided. Exact translations of the title can be	**mandatory** (either *dc:title* or *dc:description*) repeatable

				provided using appropriate xml language attributes"	
dm2e:subtitle	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	dc:title	Any form of a subtitle.	-	optional repeatable
dcterms:alternative	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	dc:title	An alternative name for the resource. Should not be used for subtitles in DM2E. Can be used if title and subtitle are in one field.	Definition: "An alternative name for the resource." Comment: "The distinction between titles and alternative titles is application-specific."	optional repeatable
dm2e:incipit	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	dc:description	Opening words of a manuscript.	-	optional repeatable
dm2e:explicit	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	dc:description	Final words of a manuscript.	-	optional repeatable
dc:description	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	cf. original scope note	Definition: "An account of the resource." Comment: "Description may include but is not limited to: an abstract, a table of contents, a graphical representation, or a free-text account of the resource."	**mandatory** (either *dc:title* or *dc: description*) repeatable

dcterms: provenance	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	Is used for mixed provenance data that cannot be mapped to *dm2e:modeOfAcquisition*.	Definition: “A statement of changes in ownership and custody of the CHO since its creation. Significant for authenticity, integrity and interpretation.” Comment: “The statement may include a description of any changes successive custodians made to the resource.”	optional repeatable
dm2e:modeOf Acquisition	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	dcterms:provenance	The property *dm2e:modeOf Acquisition* holds metadata about the acquisition of the CHO (analogue to MAB field 664ba1).		optional repeatable
dcterms:medium	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	dc:format	cf. original scope note	Definition: “The material or physical carrier of the CHO.” Comment: “This is the medium of the original analog or born digital object.”	optional repeatable
dc:language	rdf:Literal	edm:hasType	The property *dc:language* holds the most prominent language of the CHO. If an *edm:type* property with the value “TEXT” has been given, it is mandatory to provide at least one language of the CHO. If several languages are present in the CHO then repeat *dc:language* for each language. Following the RFC 3306 and 5646 recommendations, the ISO 639-1 two-character code should be used for this property. When a	Definition: “A language of the resource.” Comment: “Recommended best practice is to use a controlled vocabulary such as RFC 4646.”	**mandatory** (for CHOs of *edm:type* “TEXT“) repeatable

			language has no two-character code, and there are two different ISO 639-2 three-character codes, the ISO 639-2/T (Terminology) code should be added.		
dcterms:issued	edm:TimeSpan xsd:dateTime rdf:Literal	dc:date	Date of publication (of the described CHO, usually the original one).	Definition: “Date of formal issuance (e.g., publication) of the resource.”	optional repeatable
dcterms:created	edm:TimeSpan xsd:dateTime rdf:Literal	dc:date	cf. original scope note	Definition: “Date of creation of the resource.”	optional repeatable
dcterms:spatial	edm:Place	dc:coverage	This property can be used for not further specified places. If the place of publication, printing writing, sending or receiving should be indicated, use *dm2e:publishedAt*, *dme2e:printedAt*, *dm2e:writtenAt, dm2e:sentFrom* or *dm2e:receivedOn* instead. This property should be used for unspecified or not exactly defined spatial characteristics of the CHO itself.	Definition: “Spatial characteristics of the resource.”	optional repeatable
dcterms:temporal	edm:TimeSpan xsd:dateTime rdf:Literal	dc:coverage	Temporal characteristics of the CHO. This property should be used for unspecified or not exactly defined temporal characteristics of the CHO itself.	Definition: “Temporal characteristics of the resource.”	optional repeatable
dm2e:sentOn	edm:TimeSpan xsd:dateTime rdf:Literal	dc:date	The date on which a letter was sent.	-	optional repeatable

dm2e:receivedOn	edm:TimeSpan xsd:dateTime rdf:Literal	dc:date	The date on which a letter was received.		optional repeatable
dm2e:publishedAt	edm:Place edm:WebResource	dc:coverage	The place of a physical publication or the *edm:WebResource* of a Web publication.	-	optional repeatable
dm2e:printedAt	edm:Place	dcterms:spatial	Indicates the place where the CHO was printed.	-	optional repeatable
dm2e:writtenAt	edm:Place	dcterms:spatial	Indicates the place where the CHO was written.	-	optional repeatable
dm2e:sentFrom	edm:Place	dcterms:spatial	The place from which a letter was sent.		optional repeatable
dm2e:receivedIn	edm:Place	dcterms:spatial	The place in which a letter was received.		optional repeatable
dc:identifier	rdf:Literal	-	Identifier of the resource.	Definition: “An identifier of the original CHO.” Comment: “Recommended best practice is to identify the resource by means of a string conforming to a formal identification system.”	optional repeatable
bibo:isbn	rdf:Literal	dc:identifier	The ISBN number for the CHO of type book.	-	optional **not** repeatable
bibo:issn	rdf:Literal	dc:identifier	The ISSN number for the CHO of type journal.	-	optional **not** repeatable

dm2e:callNumber	rdf:Literal	dc:identifier	The call number for some archival item.	-	optional **not** repeatable
edm: currentLocation	edm:Place	dcterms:spatial Equivalent to: geo:location[22], P55_has_current_location (CIDOC CRM[23]).	Current geographic location of the physical CHO.	Definition: "The geographic location whose boundaries presently include the CHO. If the name of a repository, building, site, or other entity is used then it should include an indication of its geographic location." Comment: "Current locations are used for the contextualization of resources and for answering "where" queries."	optional **not** repeatable
dm2e: holdingInstitution	foaf:Organization	edm:hasMet	The institution holding the physical CHO, e.g. a specific library.	-	optional **not** repeatable
dm2e: shelfmarkLocation	rdf:Literal	dc:description	Shelfmark location from the CHO.	-	optional **not** repeatable
dc:rights	edm:WebResource	-	URL of a resource describing licensing rights of the CHO.	Definition: "Information about rights held in and over the resource." Comment: "Typically, rights information includes a statement about various property rights associated with the resource, including intellectual property rights."	optional repeatable

[22] Definition of the GEO vocabulary: http://www.w3.org/2003/01/geo/wgs84_pos# [20.01.2015].
[23] Definition of the CIDOC CRM vocabulary: http://www.cidoc-crm.org/rdfs/cidoc_crm_v5.1-draft-2013May.rdfs [20.01.2015].

dcterms: rightsHolder	edm:Agent	edm:hasMet	The person or institution that holds the copyright.	Definition: “A person or organization owning or managing rights over the resource.”	optional repeatable
dc:subject	skos:Concept edm:Agent edm:Place edm:TimeSpan	edm:isRelatedTo	Subject of the CHO. Can be taken from another vocabulary. May also relate to a person, concept, place or timespan that is the subject of a CHO. The mapped metadata describes content-based information.	Definition: “The topic of the resource.” Comment: “Typically, the subject will be represented using keywords, key phrases, or classification codes. Recommended best practice is to use a controlled vocabulary.”	not mandatory but **strongly recommended** repeatable
dm2e:genre	skos:Concept	dc:type	Genre of the CHO, in German “Formschlagworte”. Examples: schoolbook, letter collection.		optional repeatable
dcterms:extent	rdf:Literal	dc:format	cf. original scope note	Definition: “The size or duration of the resource.”	optional repeatable
bibo:numPages	xsd:unsignedInt *(recommended, otherwise:)* rdf:Literal	dcterms:extent	cf. original scope note	Definition: “The number of pages contained in a document.”	optional **not** repeatable
bibo:pages	rdf:Literal	dc:description	cf. original scope note	Definition: “A string of non-contiguous page spans that locate a Document within a Collection. Example: 23-25, 34, 54-56. […]”	optional **not** repeatable
bibo:number	xsd:unsignedInt *(recommended, otherwise:)* rdf:Literal	dc:description	The property *bibo:number* is used to store the page number of each CHO from type *dm2e:Page.*	Definition: “A generic item or document number. Not to be confused with issue number.”	optional **not** repeatable
bibo:numVolumes	xsd:unsignedInt *(recommended,*	dcterms:extent	cf. original scope note	Definition: “The number of volumes contained in a collection	optional **not** repeatable

	otherwise:) rdf:Literal			of documents (usually a series, periodical, etc.).”	
bibo:volume	xsd:unsignedInt *(recommended, otherwise:)* rdf:Literal	dc:identifier	cf. original scope note	Definition: “A volume number.”	optional **not** repeatable
dcterms: tableOfContents	rdf:Literal	dc:description	Any kind of table of contents for the CHO.	Definition: “A list of sub-units of the CHO.”	optional repeatable
dc:format	rdf:Literal	edm:hasType	cf. original scope note	Definition: “The file format, physical medium, or dimensions of the resource.” Comment: “Examples of dimensions include size and duration. Recommended best practice is to use a controlled vocabulary such as the list of Internet Media Types [MIME].”	optional repeatable
edm:isDerivativeOf	edm:ProvidedCHO	edm:isSimilarTo	Original version (in case of CHOs) or a related resource (in case of WebResources) from which this object has been derived in whole or in part.	Definition: “This property captures a narrower notion of derivation than *edm:isSimilarTo*, in the sense that it relates a resource to another one, obtained by reworking, reducing, expanding, parts or the whole contents of the former, and possibly adding some minor parts. Versions have an even narrower meaning, in that it requires common identity between the related resources. Translations, summaries, abstractions etc. do not qualify as versions, but do qualify as derivatives.”	optional repeatable

				Comment: “This property enables associating resources that are one the derivation of the other. […] It also supports browsing of resources by derivation. Finally, it allows the integration of all properties used in content providers’ descriptions that capture the notion of derivation in the sense outlined above, such as those capturing versioning, translations and abstractions. […]”	
dcterms: isVersionOf	edm:ProvidedCHO	edm:isDerivativeOf	cf. original scope note	Definition: “A related resource of which the described resource is a version, edition, or adaptation.” Comment: “Changes in version imply substantive changes in content rather than differences in format.”	optional repeatable
dcterms: hasVersion	edm:ProvidedCHO	-	cf. original scope note	Definition: “A related resource that is a version, edition, or adaptation of the described resource.”	optional repeatable
dcterms:hasPart	edm:ProvidedCHO	dc:relation	*dcterms:hasPart* can be used to indicate that a resource is part of the current resource. It can only be used for the same type of objects, e.g. *edm:ProvidedCHO dcterms:hasPart edm:ProvidedCHO*.	“This term is intended to be used with non-literal values as defined in the DCMI Abstract Model[24]. As of December 2007, the DCMI Usage Board is seeking a way to express this intention with a formal range declaration.”	optional repeatable
dcterms:isPartOf	edm:ProvidedCHO	dc:relation	*dcterms:isPartOf* can be used to indicate that a resource is part of	“This term is intended to be used with non-literal values as defined	optional repeatable

[24] DCMI Abstract Model: http://dublincore.org/documents/abstract-model/ [20.01.2015].

			the current resource. It can only be used for the same type of objects, e.g. *edm:ProvidedCHO dcterms:isPartOf edm:ProvidedCHO*.	in the DCMI Abstract Model. […]"	
dm2e: levelOfHierarchy	xsd:int	-	The Top-Level-CHO (e.g., a book) must contain the number "1" as value of the *dm2e:levelOfHierarchy* property. All bottom hierarchy levels must be mark by incremental adding +1. For example, a Second-Level-CHO (e.g., a chapter) has the value "2" and so on.	-	optional **not** repeatable
edm: isNextInSequence	edm:ProvidedCHO	dc:relation	*edm:isNextInSequence* relates two resource (in the case of CHOs, reosurces on the same level; see *dm2e:levelOfHierarchy*) in a ordered sequence. The two resources have the same rdf:type and, if provided, the same dc:type. For example, if a CHO *ex:manuscriptX* of *rdf:type dm2e:Manuscript* consists of two CHOs *ex:chapter1* and *ex:chapter2* of *rdf:type fabio:Chapter*, then the relation between them should be described by the following triple: *ex:chapter2 edm:isNextInSequence ex:chapter1*.	Definition: "*edm:isNextInSequence* relates two resources S and R that are ordered parts of the same resource A, and such that S comes immediately after R in the order created by their being parts of A." Comment: "*isNextInSequence* supports browsing through the parts of resources, by establishing the correct order. It also supports proper displaying of the information, when order matters, such as in hierarchically structured objects."	optional repeatable
dcterms:references	edm:ProvidedCHO	dc:relation	Another CHO referenced in the content of this CHO.	Definition: "A related resource that is referenced, cited, or otherwise	optional repeatable

				pointed to by the described resource."	
dm2e:watermark	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	dc:description	Contains a description of a watermark which the CHO carries.	-	optional **not** repeatable
dm2e:illustration	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	dc:description	Generic description of illustrations in the CHO.	-	optional repeatable
dm2e:support	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	dc:description	Description of the type of material of the physical CHO.		optional repeatable
dm2e:cover	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	dc:description	Description of the cover of the CHO, e.g. the cover's type of material.		optional repeatable
edm:isRelatedTo	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	Any other related resource. This is the most general data property (range Literal) in the model and should only be used if none of the more specialised properties can be used.	Definition: "*edm:isRelatedTo* is the most general contextual property in EDM. Contextual properties have typically to do either with the things that have happened to or together with the object under consideration, or what the object refers to by its shape, form or features in a figural or encoded form. For sake of simplicity, we include in the contextual	optional repeatable

				relationships also the scholarly classification, which may have either to do with the role and cultural connections of the object in the past, or its kind of structure, substance or contents as it can be verified at present."	
edm:hasMet	edm:Agent edm:Place edm:Timespan skos:Concept	dc:relation	Unites all object properties. This is the most general object property (range *edm:Agen*t, *edm:Place*, *edm:Timespan* and *skos:Concept*) in the model. If used in a contextual class (e.g., *edm:Agent*), it should only be used with a resource of the same *rdf:type*.	Definition: "The identifier of an agent, a place, a time period or any other identifiable entity that the CHO may have "met" in its life." Comment: "*edm:hasMe*t allows for querying historical relationships without specifying simultaneous correlations to other things, such as the specific constellations of people and things at a particular event. It allows for "who, when, where, what" queries, without specifying if the "who" matches the "when", such as a (fictitious) object made by Praxiteles and found in 1865. In addition, it supports the integration of all properties used within the descriptions contributed by content providers to Europeana that capture the notion of meeting in the sense outlined above, such as *dc:creator*, *dc:publisher*, *dc:contributor*, *dc:date*. To this end, any such properties should be declared to be a (direct or indirect) subproperty of *edm:hasMet*."	optional repeatable

owl:sameAs	rdf:Resource	-	Two instances that refer to the same thing can be interlinked via the *owl:sameAs* property.	*Definition*: "The built-in OWL property *owl:sameAs* links an individual to an individual. Such an *owl:sameAs* statement indicates that two URI references actually refer to the same thing: the individuals have the same "identity"."	optional repeatable
dm2e: pageDimension	rdf:Literal	dcterms:extent	Page size. Please do also note the unit that was used.	-	optional repeatable
dm2e:writtenArea Dimension	rdf:Literal	dcterms:extent	Size of writing or the part of the page where something is actually written. Please do also note the unit that was used.	-	optional repeatable
dm2e:refersTo	foaf:Person edm:ProvidedCHO	dcterms:references	A person or CHO that is explicitly or implicitly referred to in the (textual) CHO.	-	optional repeatable
dc:creator	edm:Agent	edm:hasMet	The property *dcterms:creator* holds the name or identifier of the agent (a person or organisation) who created the resource, e.g. the original metadata record or CHO (possibly its author).	Definition: "An entity primarily responsible for making the resource." Comment: "Examples of a Creator include a person, an organization, or a service."	optional repeatable
dc:publisher	edm:Agent	edm:hasMet	Publisher of the CHO. Can be a person or an institution.	Definition: "An entity responsible for making the resource available." Comment: "Examples of a Publisher include a person, an organization, or a service. Typically, the name of a Publisher should be used to indicate the entity."	optional repeatable

dm2e:artist	foaf:Person	dc:creator	An artist that has created (e.g. painted) the CHO.	-	optional repeatable
pro:author	foaf:Person	dc:creator	The author of the CHO.	Definition: “The role a person has of authorship of some material (for example a document).”	optional repeatable
dm2e:composer	foaf:Person	dc:creator	The person that has composed a CHO (e.g. a letter). Can be the same as the person who wrote the letter, but can also be a different person, e.g. someone who dictated but not wrote the letter.	-	optional repeatable
dc:contributor	foaf:Person	edm:hasMet	A person that is responsible for making contributions to the resource.	Definition: “An entity responsible for making contributions to the resource.” Comment: “Examples of a Contributor include a person, an organization, or a service. […]”	optional repeatable
dm2e:copyist	foaf:Person	dc:contributor	A person that has copied a CHO.	-	optional repeatable
bibo:editor	foaf:Person	edm:hasMet	cf. original scope note	Definition: “A person having managerial and sometimes policy-making responsibility for the editorial part of a publishing firm or of a newspaper, magazine, or other publication.”	optional repeatable
dm2e:honoree	foaf:Person	edm:hasMet	An honoured person for whom the CHO is published or created.	-	optional repeatable
pro:illustrator	edm:Agent	dc:creator	An agent that has made the illustrations of a CHO.	Definition: “The role of an agent that illustrates a document.”	optional repeatable

dm2e:mentioned	edm:Agent	edm:hasMet	A person or institution that is explicitly mentioned in the (textual) CHO.	-	optional repeatable
dm2e:portrayed	foaf:Person	dm2e:mentioned	A person that is portrayed in the (textual or painted) CHO by its creator.	-	optional repeatable
dm2e:owner	edm:Agent	edm:hasMet	Indicates the ownership of a CHO.	-	optional repeatable
dm2e: previousOwner	edm:Agent	edm:hasMet	A person or an institution that has owned the CHO before.	-	optional repeatable
dm2e:painter	foaf:Person	dc:contributor	A painter. In the manuscript context especially used in works of the 16th and 17th century (rare books).	-	optional repeatable
pro:printer	edm:Agent	edm:hasMet	A person or institution who printed the CHO. In the manuscript context especially used in works of the 16th and 17th century (rare books).	Definition: “The role of an agent involved in printing documents, either a company providing printing services or an individual engaged in the process of printing documents.”	optional repeatable
dm2e:principal	edm:Agent	edm:hasMet	A person or an institution that gave the order to create the CHO.	-	optional repeatable
bibo:recipient	edm:Agent	edm:hasMet	cf. original scope note	Definition: “An agent that receives a communication document.”	optional repeatable
dm2e:sponsor	edm:Agent	edm:hasMet	A person or an institution who sponsored (parts of the) CHOs creation.	-	optional repeatable
pro:translator	edm:Agent	dc:contributor	A person or institution that	Definition: “The role of an agent	optional

			translated the CHO.	that translates a document into another language.”	repeatable
dm2e:writer	foaf:Person	dc:creator	A person who has written a CHO, e.g. a letter.	-	optional repeatable

Table 4: edm:ProvidedCHO.

URI Scheme

All *edm:ProvidedCHO* entities are identified by an URI with the following scheme:

```
http://data.dm2e.eu/data/item/[provider]/[dataset]/[identifier]
```

edm:ProvidedCHO example

```
dm2edata:item/uib/wittgenstein/Ms-114
      a edm:ProvidedCHO ;
      dc:type dm2e:Manuscript ;
      edm:type “TEXT” ;
      dc:title “Philosophische Grammatik”@de ;
      dcterms:alternative
            “Wittgenstein Nachlass MS 114: Ms-114.xml - A machine-readable transcription” ;
      dm2e:subtitle “Philosophische Grammatik”@de ;
      dc:description
            “Volume Ms-114, X., Philosophische Grammatik (1932 and 1933): This manuscript consists of two
            distinct texts. The first part is not paginated by Wittgenstein. The second, paginated 1-228 is
            continued in the first part of Ms-115 and is partially revised in Ms-140. Page 21r includes a
            section containing 3 typescript remarks pasted-in. -- The manuscript is written in ink with
            typescript paste-ins in a hardback notebook containing 146 leaves with text on both sides of 203 x
            330 mm inside a binding measuring 217 x 335 mm that shows some sign of repair to the binding. The
            language of the manuscript is German. The original is in the Wren Library, Trinity College
            Cambridge.”@en ;
      dc:language “en” ;
      dcterms:issued “2002-10-10T01:01:01”^^xsd:dateTime ;
      dc:identifier “Ms-114” ;
```

```
        bibo:isbn “978-3-86680-192-9” ;
        dc:rights <http://creativecommons.org/licenses/by-nc/3.0/> ;
        dc:creator dm2edata:agent/uib/authority_gnd/118634313 ;
        dc:subject dm2edata:concept/uib/wittgenstein/philosophy_of_language .

dm2edata:agent/uib/authority_gnd/118634313
     a foaf:Person ;
     skos:prefLabel “Ludwig Wittgenstein” ;
     owl:sameAs <http://d-nb.info/gnd/118634313> .

dm2edata:concept/uib/wittgenstein/philosophy_of_language
     a skos:Concept ;
     skos:prefLabel “Philosophy of Language”@en ;
     skos:inScheme <http://philpapers.org/> .
```

4.6 edm:WebResource

Subclass of: *edm:InformationResource*

According to the EDM Definitions 5.2.4, *edm:WebResource*s are “Information Resources that have at least one Web Representation and at least a URI.” (Definition of the Europeana Data Model, 2013:14).

The resource, which resembles any kind of view of the described CHO, is an instance of the class *edm:WebResource*. There must be at least one *edm:WebResource* for each CHO.

Namespaces

```
edm:       <http://www.europeana.eu/schemas/edm/> .
dc:        <http://purl.org/dc/elements/1.1/> .
dcterms:   <http://purl.org/dc/terms/> .
dm2edata:  <http://data.dm2e.eu/data/> .
```

Property	Range	Subproperty of	DM2E Scope Note	Original Scope Note	Constraint
dc:creator	edm:Agent	edm:hasMet	The property *dcterms:creator* holds the name or identifier of the agent (a person or organisation) who created the resource, e.g. the original metadata record or CHO (possibly its author).	Comment: "For the creator of the WebResource. If possible supply the identifier of the creator from an authority source. Repeat for multiple creators."	optional repeatable
dc: description	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)		cf. original scope note	Definition: "An account of the resource." Comment: "Description may include but is not limited to: an abstract, a table of contents, a graphical representation, or a free-text account of the resource."	optional repeatable
dc:format	rdf:Literal	edm:hasType	Format of the Web resource, e.g. PDF, HTML or JPG. If **annotatable content** is described, please use one of the following specifications: "text/html-named-content" for HTML content as specified by Pundit, "text/plain" for plain text content, "text/html" for websites with text and images, or "image/gif", "image/jpeg" resp. "image/png" for image files. If **edm:object** is described, please use one these MIME types: "image/png", " image/jpeg", "image/gif", "image/tiff" for image files or "application/pdf" for pdf. See the technical specification "DM2E Annotatable Content" or the "Recommendations for the RDF representation of DM2E	Definition: "The file format, physical medium, or dimensions of the resource." Comment: "Examples of dimensions include size and duration. Recommended best practice is to use a controlled vocabulary such as the list of Internet Media Types [MIME]."	**mandatory** (for the annotatable resources, otherwise:) optional repeatable

			metadata"[25] for further information.		
dc:rights	edm:Agent rdf:Literal	-	Holds the name or identifier of the agent (a person or organisation) who owns or manages the rights of the digital representation of the CHO.	Definition: "Use for the name of the rights holder of this digital representation if possible or for more general rights information. […]" Comment: "This is a free text property and should be used for information about intellectual property rights or access arrangements that is additional to the controlled value provided in *edm:rights*.[…]"	optional repeatable
dcterms:created	edm:TimeSpan xsd:dateTime rdf:Literal	dc:date	cf. original scope note	Definition: "Date of creation of the resource."	optional repeatable
edm:rights	edm:WebResource	dc:rights	The property *edm:rights* holds copyright information pertaining to all digital objects (*edm:WebResource*) given by *edm:hasView* or one of its subproperties. If a digital object (*edm:WebResource*) holds an additional copyright information given by *dc:rights* then this more specific copyright information has priority. Otherwise the value given in *edm:rights* at the Aggregation is the default value for digital object attached to this Aggregation. The four main types of rights	Definition: "Information about usage and access rights of the digital objects indicated in *isShownBy* and *isShownAt*." Comment: "The value in this element is a URL constructed according to the specifications in the "Specifications of the controlled values for *edm:rights*". The URLs are constructed by adding a code indicating the copyright status of an object to the domain name where that status is defined. The domain will be either	not mandatory but **strongly recommended** **not** repeatable

[25] Recommendations for the RDF representation of DM2E metadata: http://wiki.dm2e.eu/File:Dm2e_mapping_recommendations.pdf [20.01.2015].

			statements in Europeana are: Public Domain Mark, CCO 1.0, Rights Reserved Statements and Unknown. The list of the all available licensing rights supported by Europeana can be found here: http://pro.europeana.eu/available-rights-statements.	the europeana.eu domain or the creativecommons.org domain. For users of Europeana.eu this copyright information also applies to the preview specified in *edm:object*. In order to allow organisations to manage the provision of this element, *edm:rights* has an obligation level of "recommended" in this version of EDM. It will be changed to "Mandatory" in a later version."	
dcterms:hasPart	edm:WebResource	dc:relation	*dcterms:hasPart* can be used to indicate that a resource is part of the current resource. It can only be used for the same type of objects, e.g. *edm:WebResource dcterms: hasPart edm:WebResource*.	"This term is intended to be used with non-literal values as defined in the DCMI Abstract Model. As of December 2007, the DCMI Usage Board is seeking a way to express this intention with a formal range declaration."	optional repeatable
dcterms:isPartOf	edm:WebResource	dc:relation	*dcterms:isPartOf* can be used to indicate that a resource is part of the current resource. It can only be used for the same type of objects, e.g. *edm:WebResource dcterms: isPartOf edm:WebResource*.	"This term is intended to be used with non-literal values as defined in the DCMI Abstract Model. As of December 2007, the DCMI Usage Board is seeking a way to express this intention with a formal range declaration."	optional repeatable
edm: isNextInSequence	edm:WebResource	dc:relation	*edm:isNextInSequence* relates two resource (in the case of CHOs, reosurces on the same level; see *dm2e:levelOfHierarchy*) in a ordered sequence. The two resources have the same rdf:type and, if provided, the same dc:type. For example, if a CHO *ex:manuscriptX* of *rdf:type*	Definition: "*edm:isNextInSequence* relates two resources S and R that are ordered parts of the same resource A, and such that S comes immediately after R in the order created by their being parts of A." Comment: "*isNextInSequence* supports browsing through the	optional repeatable

			dm2e:Manuscript consists of two CHOs *ex:chapter1* and *ex:chapter2* of *rdf:type fabio:Chapter*, then the relation between them should be described by the following triple: *ex:chapter2 edm:isNextInSequence ex:chapter1*.	parts of resources, by establishing the correct order. It also supports proper displaying of the information, when order matters, such as in hierarchically structured objects."	

Table 5: edm:WebResource.

edm:WebResource example

```
<http://www.wittgensteinsource.org/Ms-114_f>
    a edm:WebResource ;
    dc:description "Facsimile view"@en ;
    dc:format "text/html" ;
    edm:rights <http://creativecommons.org/publicdomain/zero/1.0/> .
```

4.7 Subclasses of edm:PhysicalThing

Namespaces

```
edm:       <http://www.europeana.eu/schemas/edm/> .
bibo:      <http://purl.org/ontology/bibo/> .
bf:        <http://bibframe.org/vocab/> .
fabio:     <http://purl.org/spar/fabio/> .
dm2e:      <http://onto.dm2e.eu/schemas/dm2e/> .
dm2edata:  <http://data.dm2e.eu/data/> .
```

Class	Subclass of	DM2E Scope Note	Original Scope Note
bibo:Book	edm:PhysicalThing	cf. original scope note	Definition: “A written or printed work of fiction or nonfiction, usually on sheets of paper fastened or bound together within covers.”
bf:Cartography	edm:PhysicalThing	Cartography includes e.g. maps. The MARC field that can be mapped to *bf:Cartography* is Cartographic Material.	Definition: “Resource that show spatial information, including maps, atlases, globes,digital maps, and other cartographic items.”
fabio:Cover	edm:PhysicalThing	ProvidedCHO of type cover. Can be part of another CHO, e.g. a book.	Definition: “A protective covering used to bind together the pages of a document or the first, informative, page of a digital document.”
dm2e:Document	edm:PhysicalThing	ProvidedCHO of type document. Unlike *foaf:Document*, *dm2e:Document* refers to a physical document.	-
dm2e:File	edm:PhysicalThing	Archival item.	-
dm2e:Fragment	edm:PhysicalThing	A physical fragment of a document, e.g. a collection of pages of a manuscript.	-
bibo:Issue	edm:PhysicalThing	An issue of a journal.	“Something that is printed or published and distributed, esp. a given number of a periodical.”
bibo:Journal	edm:PhysicalThing	cf. original scope note	Definition: “A periodical of scholarly journal Articles.”
bibo:Letter	edm:PhysicalThing	cf. original scope note	Definition: “A written or printed communication addressed to a person or organization and usually transmitted by mail.”
dm2e:Manuscript	edm:PhysicalThing	ProvidedCHO of type manuscript, e.g. Wittgensteins brown book. Not equivalent to *bibo:Manuscript*.	-

bf:NotatedMusic	edm:PhysicalThing	Notated music of musical notations in physical form.	Definition: “Graphic, non-realized representations of musical works intended to be perceived visually.”
dm2e:Poster	edm:PhysicalThing	ProvidedCHO of type poster. Basically any piece of printed paper (often on a large sheet) that can be attached to a wall. *dm2e:Poster* does also include, but is not restricted to, conference posters.	-

Table 6: edm:PhysicalThing subclasses.

4.8 edm:Agent

Subclass of: *edm:NonInformationResource*
Equivalent class: *E39_Actor* (CIDOC CRM)

“This class comprises people, either individually or in groups, who have the potential to perform intentional actions for which they can be held responsible.” (Definition of the Europeana Data Model, 2013:9).

Namespaces

```
edm:        <http://www.europeana.eu/schemas/edm/> .
skos:       <http://www.w3.org/2004/02/skos/core#> .
dc:         <http://purl.org/dc/elements/1.1/> .
dm2edata:   <http://data.dm2e.eu/data/> .
```

Property	Range	Subproperty of	DM2E Scope Note	Original Scope Note	Constraint
skos:prefLabel	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	The preferred name of the resource, preferably in a normalised form. Only one preferred label per language tag is allowed!	Definition: “The preferred lexical label for a resource, in a given language.”	**mandatory** **not** repeatable (max 1 per language tag)

skos:altLabel	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	An alternative name, e.g. a former name or the name in another form.	Definition: “An alternative lexical label for a resource.” Example: “Acronyms, abbreviations, spelling variants, and irregular plural/singular forms may be included among the alternative labels for a concept. Misspelled terms are normally included as hidden labels (see *skos:hiddenLabel*).”	optional repeatable
skos:note	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	Information related to the resource that cannot be modelled with other properties of the class.	Definition: “This property may be used directly, or as a super-property for more specific note types.”	optional repeatable
edm:hasMet	edm:Agent	dc:relation	Unites all object properties. This is the most general object property (range *edm:Agen*t, *edm:Place*, *edm:Timespan* and *skos:Concept*) in the model. If used in a contextual class (e.g., *edm:Agent*), it should only be used with a resource of the same *rdf:type*.	Definition: “*edm:hasMet* relates a resource with the objects or phenomena that have happened to or have happened together with the resource under consideration. We can abstractly think of history and the present as a series of “meetings” between people and other things in space-time. Therefore we name this relationship as the things the object “has met” in the course of its existence. These meetings are events in the proper sense, in which other people and things participate in any role.” Comment: “*edm:hasMet* allows for querying historical relationships without specifying simultaneous	optional repeatable

				correlations to other things, such as the specific constellations of people and things at a particular event. It allows for “who, when, where, what” queries, without specifying if the “who” matches the “when”, such as a (fictitious) object made by Praxiteles and found in 1865. In addition, it supports the integration of all properties used within the descriptions contributed by content providers to Europeana that capture the notion of meeting in the sense outlined above, such as *dc:creator*, *dc:publisher*, *dc:contributor*, *dc:date*. To this end, any such properties should be declared to be a (direct or indirect) subproperty of *edm:hasMet*.”	
edm:isRelatedTo	rdf:Literal	-	Any other related resource.	Definition: “*edm:isRelatedTo* is the most general contextual property in EDM. Contextual properties have typically to do either with the things that have happened to or together with the object under consideration, or what the object refers to by its shape, form or features in a figural or encoded form. For sake of simplicity, we include in the contextual relationships also the scholarly classification, which may have either to do with the role and cultural connections of the object in the past, or its kind of structure, substance or contents as it can be	optional repeatable

				verified at present." Comment: "Querying *edm:isRelatedTo* corresponds to a typical retrieval by keyword, as supported by web search engines; but it also allows more, as the objects of *edm:isRelatedTo* statements can be fully-fledged resource such as concepts, documents etc."	
dc:date	edm:TimeSpan	edm:hasMet	A significant date associated with this resource.	Definition: "A point or period of time associated with an event in the lifecycle of the resource." Comment: "Date may be used to express temporal information at any level of granularity. Recommended best practice is to use an encoding scheme, such as the W3CDTF profile of ISO 8601."	optional repeatable
dc:identifier	rdf:Literal	-	Identifier of the resource.	Definition: "An unambiguous reference to the resource within a given context." Comment: "Recommended best practice is to identify the resource by means of a string conforming to a formal identification system."	optional repeatable
bibo:suffixName	rdf:Literal	skos:note	Persons names or notations about organisations including counting, for example Johannes Paul, I.	Definition: "The suffix of the name."	optional repeatable
owl:sameAs	rdf:Resource		Two instances that refer to the same thing can be interlinked via	*Definition*: "The built-in OWL property *owl:sameAs* links an	optional

			the *owl:sameAs* property.	individual to an individual. Such an *owl:sameAs* statement indicates that two URI references actually refer to the same thing: the individuals have the same "identity"."	

Table 7: edm:Agent.

DM2E has created a lot of properties in *edm:ProvidedCHO* with the range *edm:Agent*, partly as subproperties of *dc:creator*. See the *edm:ProvidedCHO* specification for details.

URI Scheme

All *edm:Agent* entities created by DM2E are identified by an URI with the following scheme:

```
http://data.dm2e.eu/data/agent/[provider]/{[dataset]}/[identifier]
```

The identifier in the curly brackets is optional.

edm:Agent example

```
dm2edata:agent/uib/wittgenstein/12536
    a vivo:University ;
    skos:prefLabel “University of Bergen”@en ;
    skos:altLabel “Universitetet i Bergen”@no ;
    edm:begin “1946-01-01T01:01:01”^^xsd:dateTime .
```

4.9 Subclasses of edm:Agent

Subclasses of *edm:Agent* in the DM2E model.

Namespaces

```
edm:        <http://www.europeana.eu/schemas/edm/> .
foaf:       <http://xmlns.com/foaf/0.1/> .
dm2edata:   <http://data.dm2e.eu/data/> .
```

Class	Subclass of	DM2E Scope Note	Original Scope Note
foaf:Person	edm:Agent	cf. original scope note	"The Person class represents people. Something is a Person if it is a person. We don't nitpic about whether they're alive, dead, real, or imaginary. The Person class is a subclass of the Agent class, since all people are considered 'agents' in FOAF."
foaf:Organization	edm:Agent	cf. original scope note	"The Organization class represents a kind of Agent corresponding to social institutions such as companies, societies etc."

Table 8: edm:Agent subclasses.

4.10 foaf:Person

Subclass of: *foaf:Agent*
edm:Agent

"The Person class represents people. Something is a Person if it is a person. We don't nitpic about whether they're alive, dead, real, or imaginary. The Person class is a subclass of the Agent class, since all people are considered 'agents' in FOAF." (FOAF Vocabulary Specification 0.98).

Namespaces

```
foaf:       <http://xmlns.com/foaf/0.1/> .
rdaGr2:     <http://RDVocab.info/ElementsGr2/> .
dm2e:       <http://onto.dm2e.eu/schemas/dm2e/> .
dm2edata:   <http://data.dm2e.eu/data/> .
```

Additional properties of *foaf:Person* to those that are inherited by *edm:Agent*:

Property	Range	Subproperty of	DM2E Scope Note	Original Scope Note	Constraint
rdaGr2:gender	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	The gender of the person.	Definition: "The gender with which a person identifies."	optional **not** repeatable
rdaGr2: professionOrOccupation	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	The profession or occupation in which the person works or has worked.	Definition: "A profession or occupation in which a person works or has worked."	optional repeatable
rdaGr2: biographicalInformation	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	Information related to the biography of the agent.	Definition: "Information pertaining to the life or history of a person."	optional repeatable
rdaGr2:dateOfBirth	edm:TimeSpan xsd:dateTime rdf:Literal	-	The date the person was born.	Definition: "The year a person was born. Date of birth may also include the month and day of the person's birth."	optional **not** repeatable
rdaGr2: dateOfDeath	edm:TimeSpan xsd:dateTime rdf:Literal	-	The date the person died.	Definition: "The year a person died. Date of death may also include the month and day of the person's death."	optional **not** repeatable
rdaGr2:otherDesignationAssociatedWithThePerson	rdf:Literal	-	Additional names.	Definition: "A term other than a title that is associated with a person's name."	optional **not** repeatable

Table 9: foaf:Person.

4.11 foaf:Organization

Subclass of: *foaf:Agent*
edm:Agent

"The Organization class represents a kind of Agent corresponding to social institutions such as companies, societies etc." (FOAF Vocabulary Specification 0.98).

Namespaces

```
rdaGr2:     <http://RDVocab.info/ElementsGr2/> .
foaf:       <http://xmlns.com/foaf/0.1/> .
dm2edata:   <http://data.dm2e.eu/data/> .
```

Additional properties of *foaf:Organization* to those that are inherited by *edm:Agent*:

Property	Range	Subproperty of	DM2E Scope Note	Original Scope Note	Constraint
rdaGr2: dateOf Establishment	edm:TimeSpan xsd:dateTime rdf:Literal	dc:date	The date the institution was established.	Definition: "The date on which a corporate body was established or founded."	optional **not** repeatable
rdaGr2: dateOfTermination	edm:TimeSpan xsd:dateTime rdf:Literal	dc:date	The date the institution was terminated.	Definition: "The date on which a corporate body was terminated or dissolved."	optional **not** repeatable
rdaGr2:other Designation AssociatedWithThe CorporateBody	rdf:Literal	-	Additional names.	Definition: "A term other than a title that is associated with a person's name."	optional **not** repeatable

Table 10: foaf:Organization.

4.12 Subclasses of edm:NonInformationResource

edm:NonInformationResource subclasses in the DM2E model.

Namespaces

```
edm:        <http://www.europeana.eu/schemas/edm/> .
skos:       <http://www.w3.org/2004/02/skos/core#> .
dm2e:       <http://onto.dm2e.eu/schemas/dm2e/> .
dm2edata:   <http://data.dm2e.eu/data/> .
foaf:       <http://xmlns.com/foaf/0.1/> .
```

Class	Subclass of	DM2E Scope Note	Original Scope Note
edm:Agent	edm: NonInformationResource Equivalent to: E39_Actor (CIDOC CRM).	cf. original scope note	Definition: "This class comprises people, either individually or in groups, who have the potential to perform intentional actions for which they can be held responsible."
foaf:Image	foaf:Document edm: NonInformationResource	cf. original scope note	Definition: "The class Image is a subclass of Document corresponding to those documents which are images. Digital images (such as JPEG, PNG, GIF bitmaps, SVG diagrams etc.) are examples of Image."
dm2e:Photo	foaf:Image	ProvidedCHO of type photo.	-
edm:PhysicalThing	edm: NonInformationResource Equivalent to: E18_Physical_Thing (CIDOC CRM).	cf. original scope note	Definition: "A persistent physical item such as a painting, a building, a book or a stone. Persons are not items. This class represents cultural heritage objects known to Europeana to be physical things (such as Mona Lisa) as well as all physical things Europeana refers to in the descriptions of cultural heritage objects (such as the Rosetta Stone)."
edm:Place	edm: NonInformationResource Equivalent to: Place (FRBR, ABC	cf. original scope note	Definition: "An "extent in space, in particular on the surface of the earth, in the pure sense of physics: independent from temporal phenomena and matter" (CIDOC CRM)."

	Harmony), dol:space-region (DOLCE[26]), E53_Place(CIDOC CRM).		Comment: "Places are identified by the content provider and named according to some vocabulary or local convention, and possibly normalized by Europeana at enrichment or at ingestion time. This class is the range of property *edm:happenedAt*."
edm:TimeSpan	edm: NonInformationResource Equivalent to: Time (ABC Harmony, E52 Time-Span (CIDOC CRM), dol:time-interval.	cf. original scope note	Definition: "The class of "abstract temporal extents, in the sense of Galilean physics, having a beginning, an end and a duration" (CIDOC CRM)." Comment: "This class is the range of *edm:occurredAt*. Time spans are identified by the content provider or by Europeana at enrichment time." Europeana Note: "Time spans are identified by the content provider or by Europeana at enrichment time."
dm2e:Collection	edm: NonInformationResource	The collection of CHOs as provided by a data provider.	-
skos:Concept	edm: NonInformationResource	cf. original scope note	Definition: "A SKOS concept can be viewed as an idea or notion; a unit of thought. However, what constitutes a unit of thought is subjective, and this definition is meant to be suggestive, rather than restrictive. The notion of a SKOS concept is used to refer to specific ideas or meanings established within a knowledge organization system and describe their conceptual structure."

Table 11: edm:NonInformationResource subclasses.

[26] The DOLCE-Lite ontology: http://www.loa.istc.cnr.it/ontologies/DOLCE-Lite.owl [20.01.2015].

4.13 skos:Concept

Subclass of: *edm:NonInformationResource*

"A unit of thought or meaning that comes from an organised knowledge base (such as subject terms from a thesaurus or controlled vocabulary) where URIs or local identifiers have been created to represent each concept. In the cultural heritage world there are many such controlled vocabularies such as the Library of Congress Subject Headings[27] and the AAT[28]." (Europeana Data Model Mapping Guidelines, 2013:28).

In DM2E, subclasses of *skos:Concept* (e.g. *fabio:Article*) are used to indicate the type of a CHO.

Namespaces

```
skos:      <http://www.w3.org/2004/02/skos/core#> .
dm2edata:  <http://data.dm2e.eu/data/> .
```

Property	Range	Subproperty of	DM2E Scope Note	Original Scope Note	Constraint
skos:prefLabel	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	The preferred name of the resource, preferably in a normalised form. Only one preferred label per language tag is allowed!	Definition: "The preferred lexical label for a resource, in a given language."	**mandatory not** repeatable (max 1 per language tag)
skos:altLabel	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	An alternative name, e.g. a former name or the name in another form.	Definition: "An alternative lexical label for a resource." Example: "Acronyms, abbreviations, spelling variants, and irregular plural/singular forms may be included among the alternative labels for a concept.	optional repeatable

[27] The Library of Congress Subject Headings (LCSH): http://id.loc.gov/authorities/subjects.html [20.01.2015].
[28] Art & Architecture Thesaurus® Online (AAT): http://www.getty.edu/research/tools/vocabularies/aat/index.html [20.01.2015].

				Misspelled terms are normally included as hidden labels (see *skos:hiddenLabel*)."	
skos:notation	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	If available: A notation of the concept.	Definition: "A notation, also known as classification code, is a string of characters such as "T58.5" or "303.4833" used to uniquely identify a concept within the scope of a given concept scheme." Scope Note: "By convention, *skos:notation* is used with a typed literal in the object position of the triple."	optional repeatable
skos:broader	rdf:Literal	-	URI of the broader concept.	Definition: "Relates a concept to a concept that is more general in meaning." Scope Note: "By convention, *skos:broader* is only used to assert an immediate (i.e. direct) hierarchical link between two conceptual resources."	optional repeatable
skos:narrower	rdf:Literal	-	URI of the narrower concept.	Definition: "Relates a concept to a concept that is more specific in meaning." Scope Note: "By convention, *skos:broader* is only used to assert an immediate (i.e. direct) hierarchical link between two conceptual resources."	optional repeatable
skos:inScheme	URI-Resource	-	The URI of a concept scheme.	Definition: "Relates a resource (for example a concept) to a concept	optional repeatable

				scheme in which it is included." Scope Note: "A concept may be a member of more than one concept scheme."	
owl:sameAs	rdf:Resource	-	Two instances that refer to the same thing can be interlinked via the *owl:sameAs* property.	*Definition*: "The built-in OWL property *owl:sameAs* links an individual to an individual. Such an *owl:sameAs* statement indicates that two URI references actually refer to the same thing: the individuals have the same "identity"."	optional
dc:creator	edm:Agent	edm:hasMet	The property *dc:creator* holds the name or identifier of the agent (a person or organisation) who created the concept. This property can e.g. be used for referenced objects which are not modelled as *edm:ProvidedCHO*s.	Definition: "An entity primarily responsible for making the resource." Comment: "Examples of a Creator include a person, an organization, or a service."	optional repeatable

Table 12: skos:Concept.

URI Scheme

All *skos:Concept* entities created by DM2E are identified by an URI with the following scheme:

```
http://data.dm2e.eu/data/concept/[provider]/{[dataset]}/[identifier]
```

The identifier in the curly brackets is optional.

skos:Concept example

```
dm2edata:concept/uib/wittgenstein/philosophy_of_language
    a skos:Concept ;
    skos:prefLabel "Philosophy of Language"@en ;
    skos:inScheme <http://philpapers.org/> .
```

4.14 Subclasses of skos:Concept

skos:Concept subclasses in the DM2E model. They are used to indicate the type of a non-physical CHO.

Namespaces

```
bibo:      <http://purl.org/ontology/bibo/> .
fabio:     <http://purl.org/spar/fabio/> .
skos:      <http://www.w3.org/2004/02/skos/core#> .
dm2e:      <http://onto.dm2e.eu/schemas/dm2e/> .
dm2edata:  <http://data.dm2e.eu/data/> .
```

Class	Subclass of	DM2E Scope Note	Original Scope Note
dm2e:Work	skos:Concept	A non-physical piece of work of an agent, e.g. the theoretical concept of a manuscript.	-
fabio:Article	skos:Concept	cf. original scope note	Definition: "The realization of a piece of writing on a particular topic."
fabio:Chapter	skos:Concept	cf. original scope note	Definition: "A defined document section, forming part of or intended for inclusion within a larger document, usually with its own title or chapter number. Different chapters within a document such as a book or a report may each be independently authored, or may all be authored by a single individual or group of authors."

dm2e:Page	edm:PhysicalThing	One side of a sheet of paper. Can be part of another CHO, e.g. *dm2e:Manuscript*.	-
dm2e:Paragraph	skos:Concept	Concept of type paragraph. Can be part of another (textual) CHO, e.g. *dm2e:Manuscript*.	-
bibo:Series	skos:Concept	A collection of documents, based on some shared aspects, like a topic or provenance etc.	Definition: "A loose, thematic, collection of Documents, often Books."

Table 13: skos:Concept subclasses.

4.15 edm:Place

Subclass of: *edm:NonInformationResource*
Equivalent classes: *Place* (FRBR[29]), *dol:space-region*, *E53_Place* (CIDOC CRM)

"An 'extent in space, in particular on the surface of the earth, in the pure sense of physics: independent from temporal phenomena and matter' (CIDOC CRM)" (Definition of the Europeana Data Model, 2013:13).

Namespaces

```
edm:        <http://www.europeana.eu/schemas/edm/> .
wgs84_pos:  <http://www.w3.org/2003/01/geo/wgs84_pos#> .
skos:       <http://www.w3.org/2004/02/skos/core#> .
dcterms:    <http://purl.org/dc/terms/> .
dm2edata:   <http://data.dm2e.eu/data/> .
```

Property	Range	Subproperty of	DM2E Scope Note	Original Scope Note	Constraint
wgs84_pos:lat	rdf:Literal	-	The latitude of a place (decimal degree).	Definition: "The WGS84 latitude of a SpatialThing (decimal degrees)."	optional **not** repeatable
wgs84_pos:long	rdf:Literal	-	The longitude of a place (decimal	Definition: "The WGS84 longitude	optional

[29] Definition of the FRBR vocabulary: http://purl.org/vocab/frbr/core# [20.01.2015].

			degree).	of a SpatialThing (decimal degrees)."	**not** repeatable
wgs84_pos:alt	rdf:Literal	-	The altitude of a place (decimal metres above the reference).	Definition: "The WGS84 altitude of a SpatialThing (decimal meters above the local reference ellipsoid)."	optional **not** repeatable
skos:prefLabel	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	The preferred name of the resource, preferably in a normalised form. Only one preferred label per language tag is allowed!	Definition: "The preferred lexical label for a resource, in a given language."	**mandatory** **not** repeatable (max 1 per language tag)
skos:altLabel	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	An alternative name, e.g. a former name or the name in another form.	Definition: "An alternative lexical label for a resource." Example: "Acronyms, abbreviations, spelling variants, and irregular plural/singular forms may be included among the alternative labels for a concept. Misspelled terms are normally included as hidden labels (see *skos:hiddenLabel*)."	optional repeatable
skos:note	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	Information related to the resource that cannot be modelled with other properties of the class.	Definition: "A general note, for any purpose." Scope Note: "This property may be used directly, or as a super-property for more specific note types."	optional repeatable
dcterms:hasPart	edm:Place	dc:relation	*dcterms:hasPart* can be used to indicate that a resource is part of the current resource. It can only be used for the same type of	"This term is intended to be used with non-literal values as defined in the DCMI Abstract Model. As of December 2007, the DCMI Usage	optional repeatable

			objects, e.g. *edm:Place dcterms: hasPart edm:Place*.	Board is seeking a way to express this intention with a formal range declaration."	
dcterms:isPartOf	edm:Place	dc:relation	*dcterms:isPartOf* can be used to indicate that a resource is part of the current resource. It can only be used for the same type of objects, e.g. *edm:Place dcterms: isPartOf edm:Place*.	"This term is intended to be used with non-literal values as defined in the DCMI Abstract Model. As of December 2007, the DCMI Usage Board is seeking a way to express this intention with a formal range declaration."	optional repeatable
owl:sameAs	rdf:Resource		Two instances that refer to the same thing can be interlinked via the *owl:sameAs* property.	*Definition*: "The built-in OWL property *owl:sameAs* links an individual to an individual. Such an *owl:sameAs* statement indicates that two URI references actually refer to the same thing: the individuals have the same "identity"."	optional

Table 14: edm:Place.

URI Scheme

All *edm:Place* entities created by DM2E are identified by an URL with the following scheme:

```
http://data.dm2e.eu/data/place/[provider]/{[dataset]}/[identifier]
```

The identifier in the curly brackets is optional.

4.16 edm:TimeSpan

Subclass of: *edm:NonInformationResource*
Equivalent classes: *Time* (ABC Harmony), *E52_Time-Span* (CIDOC CRM), *dol:time-interval*

"The class of 'abstract temporal extents, in the sense of Galilean physics, having a beginning, an end and a duration' (CIDOC CRM)" (Definition of the Europeana Data Model, 2013:14).

Namespaces

```
edm:        <http://www.europeana.eu/schemas/edm/> .
skos:       <http://www.w3.org/2004/02/skos/core#> .
dcterms:    <http://purl.org/dc/terms/> .
dm2edata:   <http://data.dm2e.eu/data/> .
crm:        <http://www.cidoc-crm.org/rdfs/cidoc-crm#> .
```

Property	Range	Subproperty of	DM2E Scope Note	Original Scope Note	Constraint
skos:prefLabel	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	The preferred name of the resource, preferably in a normalised form. Only one preferred label per language tag is allowed!	Definition: "The preferred lexical label for a resource, in a given language."	**mandatory not** repeatable (max 1 per language tag)
skos:altLabel	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	An alternative name, e.g. a former name or the name in another form.	Definition: "An alternative lexical label for a resource." Example: "Acronyms, abbreviations, spelling variants, and irregular plural/singular forms may be included among the alternative labels for a concept. Misspelled terms are normally included as hidden labels (see *skos:hiddenLabel*)."	optional repeatable
skos:note	rdf:Literal with optional language tag (RFC 3066 compliant, see section 3.3)	-	Information related to the resource that cannot be modelled with other properties of the class.	Definition: "A general note, for any purpose." Scope Note: "This property may be used directly, or as a super-property for more specific note	optional repeatable

				types.”	
dcterms:hasPart	edm:TimeSpan	dc:relation	*dcterms:hasPart* can be used to indicate that a resource is part of the current resource. It can only be used for the same type of objects, e.g. *edm:TimeSpan dcterms:hasPart edm: TimeSpan*.	“This term is intended to be used with non-literal values as defined in the DCMI Abstract Model. As of December 2007, the DCMI Usage Board is seeking a way to express this intention with a formal range declaration.”	optional repeatable
dcterms:isPartOf	edm:TimeSpan	dc:relation	*dcterms:isPartOf* can be used to indicate that a resource is part of the current resource. It can only be used for the same type of objects, e.g. *edm: TimeSpan dcterms:isPartOf edm: TimeSpan*.	“This term is intended to be used with non-literal values as defined in the DCMI Abstract Model. As of December 2007, the DCMI Usage Board is seeking a way to express this intention with a formal range declaration.”	optional repeatable
edm:begin	xsd:dateTime rdf:Literal	edm:isRelatedTo	The beginning of a timespan.	Definition: “This property denotes the start date of a period of time.”	optional **not** repeatable
edm:end	xsd:dateTime rdf:Literal	edm:isRelatedTo	The end of a timespan.	Definition: “This property denotes the end date of a period of time.”	optional **not** repeatable
crm:P79F. beginning_is _qualified_by	rdf:Literal		This property is used to indicate the certainty of a timespan, in this case its beginning. Use “uncertainty_data” or “uncertainty_granularity” to indicate the type of uncertainty. More information can be found in the “Recommendations for the RDF representation of DM2E metadata”.	Definition: “Qualifying information about the start of the timespan – such as degree of certainty, precision, source etc.”	optional repeatable
crm:P80F. end_is_qualified_ by	rdf:Literal		This property is used to indicate the certainty of a timespan, in this case its end. Use	Definition: “Qualifying information about the end of the timespan – such as degree of certainty,	optional repeatable

			“uncertainty_data” or “uncertainty_granularity” to indicate the type of uncertainty. More information can be found in the “Recommendations for the RDF representation of DM2E metadata”.	precision, source etc.”	

Table 15: edm:TimeSpan.

URI Scheme

All *edm:TimeSpan* entities created by DM2E are identified by an URI with the following scheme:

```
http://data.dm2e.eu/data/timespan/[provider]/{[dataset]}/[identifier]
```

The identifier in the curly brackets is optional.

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