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Authors (in alphabetical order):

Benda Odo   AIT Forschungsgesellschaft mbH

Höller Astrid   AIT Forschungsgesellschaft mbH

Koch Gerda   AIT Forschungsgesellschaft mbH

Koch Walter   AIT Forschungsgesellschaft mbH

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Version 0.2		O. Benda, A. Höller, W. Koch, G. Koch	AIT	Including comments
Version 1.0	2014-01-28	G. Koch	AIT	Finalisation of Version 1
Version 1.1	2014-01-29	Coordination Team (P.Böttinger, A. Michel)	BGBM	Minor Editing

Statement of Originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Distribution

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TMG	29.1.2014	1.0	YES
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1 DESCRIPTION OF WORK

This document describes the data field mapping of the ABCD(EFG) [1] data standard used by the natural heritage domain, to the Europeana data standards ESE (Europeana Semantic Elements) and EDM (Europeana Data Model) [2].

The data mappings are the baseline for the transformation processes in the OpenUp! Pentaho Data Transformation tool, marked in the figure below. The field to field mapping parameters are captured in a stylesheet that is used during transformation.
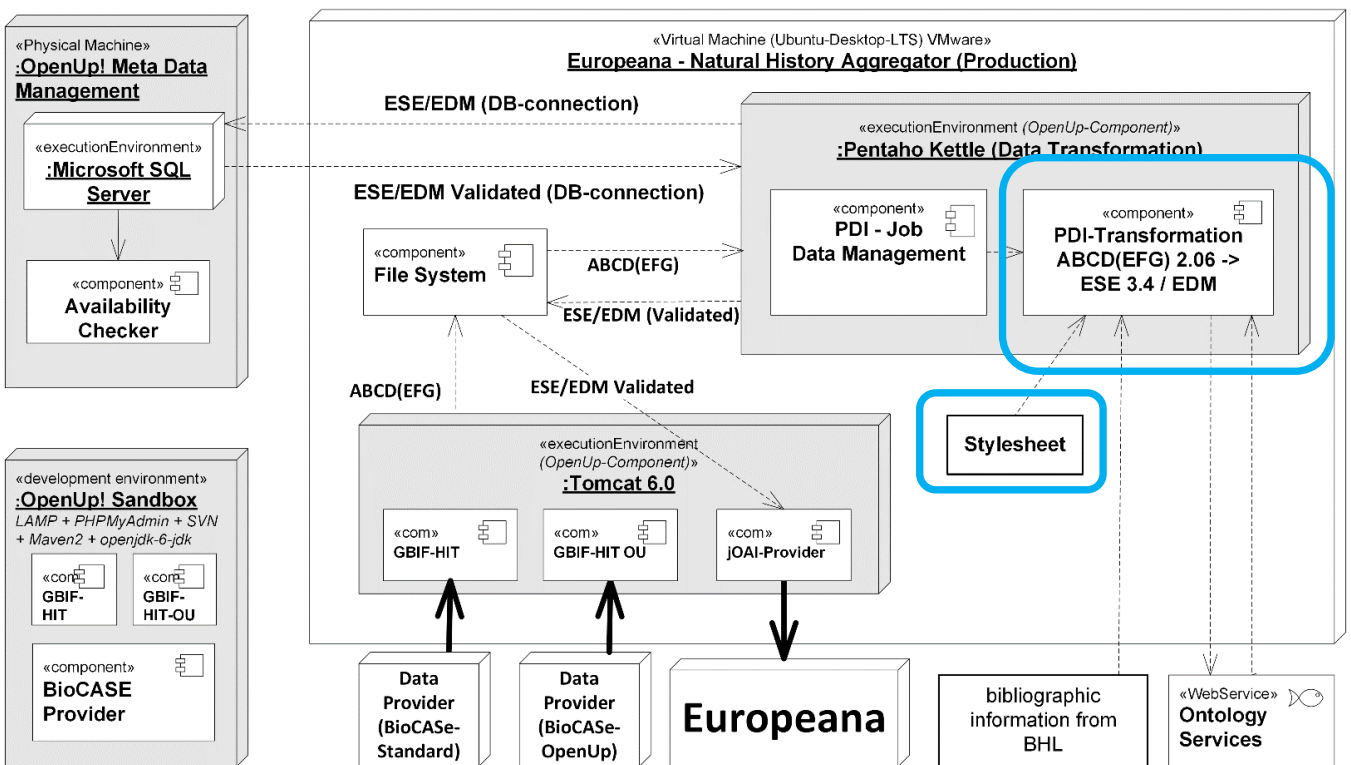

Figure 1 Ingesting records into Europeana (technical components)

The Transformation does not only process the field to field mapping of the two standards but involves mappings of data values via ontology services, like *scientific names* to common names vocabularies and bibliographic information, or geo *coordinates* to geonames enrichment services. These services further enrich the metadata. These enrichment processes implemented in OpenUp! are described in detail in Deliverable 25 "Domain specific vocabularies for EUROPEANA final".

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[1] *ABCD - Access to Biological Collection Data*. http://wiki.tdwg.org/ABCD 28 Jan. 2014.

[2] *Europeana Technical Requirements*. http://pro.europeana.eu/web/guest/technical-requirements 28 Jan. 2014.

2   Introduction to the OpenUp! data mappings

All metadata provided by OpenUp! partners has to be exposed in the ABCD(EFG) metadata format in the BioCASe[3] providers. The native databases of the content providers are therefore mapped to the ABCD2.06 standard.[4] The BioCASe providers do not only serve as data providers for Europeana but are used as well by other data portals in the natural heritage domain (eg. the GBIF portal[5]). By chosing a common provider platform positive synergy effects were created and the future sustainability of the data repositories is supported.

2.1   Two mapping formats, two target formats

The first mappings of ABCD metadata to the Europeana Semantic Elements were established in spring 2011. The consortium had decided to use two mappings in order to forward data to Europeana: First, an "unrestricted" mapping of ABCD data using as many ABCD data fields as possible and useful for the mapping to ESE. Secondly, a "restricted" mapping format providing only a minimum of ABCD data fields necessary to create a valid ESE data mapping.

This need for implementing two different data crosswalks resulted from the fact that Europeana office introduced the Data Exchange Agreement (short: DEA[6]) during the first project year, requring from all content providers to expose their metadata in www.europeana.eu under the Public Domain license (CC0).

But different to other metadata the zoological and botanical data of the OpenUp! content providers is essentially research data and therefore several copyright restrictions apply also to the metadata. Hence, the project decided to let the content providers choose between two metadata mapping formats taking into account the copyright of the researchers and the research institutes.

To date nine OpenUp! content partners (38 data sources) are using the restricted format while the other eleven partners (121 data sources) are using the unrestricted data mapping.

In a first mapping workshop in June 2011 in Berlin the initial mapping of the ABCD2.06 metadata to the Europeana metadata standard (ESE v3.4 – Europeana Semantic Elements) was developed. This mapping built the basis for the transformation process of the data and was being subsequently refined during project lifetime.

In January 2012 version 1 of the metadata mapping was used for the first ingestion of OpenUp! data to the Europeana portal. The mapping further evolved during project lifetime and the final version was established in October 2013.

In December 2012 the first version of the ABCD(EFG) to EDM mapping was established. A separate OAI provider that exposes the OpenUp! data in EDM format was then set up in spring 2013. First EDM data ingest tests of Europeana were carried out in autumn 2013 and since December 2013 OpenUp! is delivering its data in EDM format to Europeana.

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[3] *BioCASe Provider Software*. http://www.biocase.org/products/provider_software/ 28 Jan. 2014.

[4] *ABCD - Access to Biological Collection Data*. http://wiki.tdwg.org/ABCD 28 Jan. 2014.

[5] http://en.wikipedia.org/wiki/GBIF 28 Jan. 2014.

[6] http://pro.europeana.eu/web/guest/licensing 28 Jan. 2014.

2.2   Using the mappings in the transformation process

The ABCD metadata is harvested with the GBIF HIT Harvesting and Indexing Toolkit[7] from the OpenUp! BioCASe providers. The mappings are the baseline for the Pentaho transformation process that follows after the harvest was performed.

The Data Transformation tool transforms the metadata into the Europeana metadata format. The data is then archived and links are being checked with the Availability Checker. Finally the transformed data is exposed at the OpenUp! OAI-PMH Service platform from where Europeana harvests and ingests it into the Europeana portal www.europeana.eu.

Europeana collects the data usually in a bi-monthly schedule. The data is published at www.europeana.at at the beginning of the month that follows the harvest. This means that the data harvested mid of November is published in the Europeana portal at the beginning of December etc.

OpenUp! is serving currently 160 data sources and it is necessary to start early in order to have all data ready for the Europeana harvest. Therefore the process of collecting the native data from the OpenUp! BioCASe provider starts in the middle (in exceptional cases at the end) of the previous month. In our example this means that the harvesting of data from the OpenUp! BioCASe providers takes place from middle to end of October.
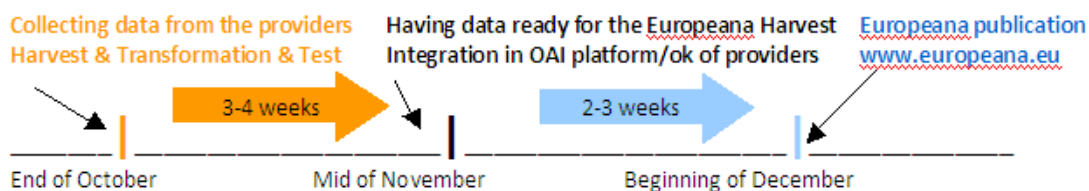
The ingest of OpenUp! data to the Europeana portal is supported by the Natural History Aggregator. The aggregator consists of four main components: the GBIF HIT Harvester, the Data Transformation tool, the Availability Checker and the OAI-PMH Service platform (see Figure 1).

2.3   Short introduction to the transformation technology

OpenUp! is a best practice project therefore it was decided to use the state-of-the art open source Pentaho Data Integration system[8] to support the data transformation process. Pentaho is an open source business intelligence (BI)[9] solution that features a core data integration engine based on ETL[10]. Extract, transform and load (ETL) is a standard process for integrating distributed data sets into a common target database.

The OpenUp! common database can be accessed via the OAI-PMH Service platform where it is finally checked whether the transformed data complies with the current Europeana ESE/EDM standards. Hence, the platform displays both: the result of the ESE/EDM transformation (data in ESE/EDM format) and the view on the original ABCD2.06 Unit metadata (*see figure 2 and 3*).

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[7] *GBIF Harvesting and Indexing Toolkit*. http://www.gbif.org/informatics/standards-and-tools/integrating-data/harvesting-and-indexing-toolkit/ 28 Jan. 2014.

[8] *Pentaho*. http://www.pentaho.com/ 28 Jan. 2014.

[9] *Business intelligence*. http://en.wikipedia.org/wiki/Business_intelligence 28 Jan. 2014.

[10] *Extract, transform, load*. http://en.wikipedia.org/wiki/Extract,_transform,_load 28 Jan. 2014.
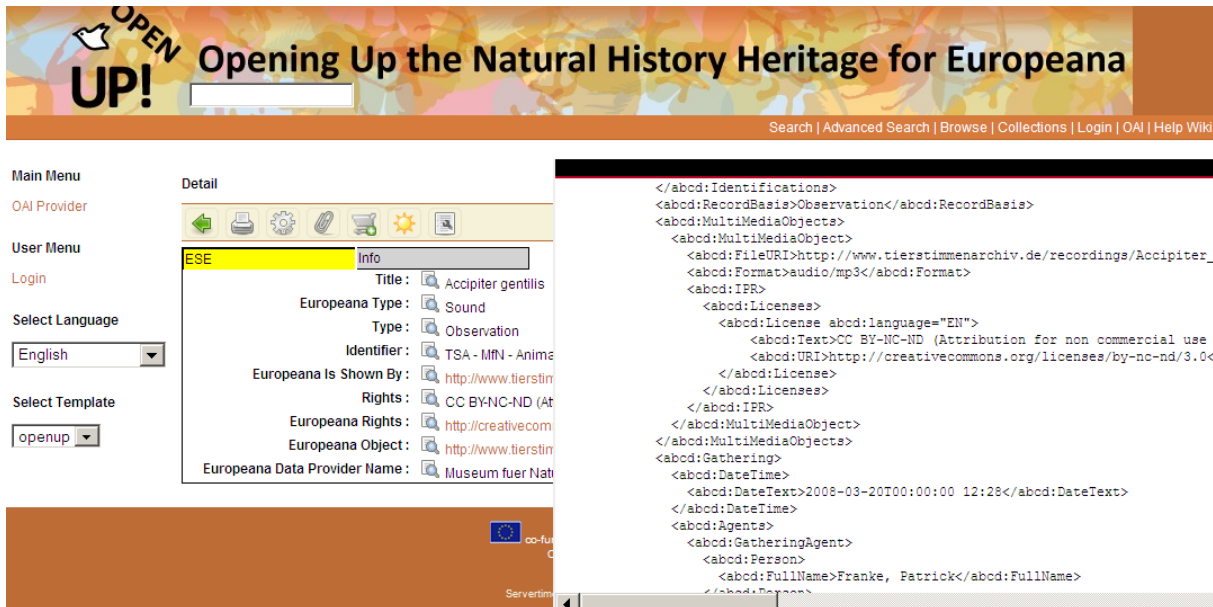
Figure 2 ESE Data check with the OpenUp! OAI-PMH platform
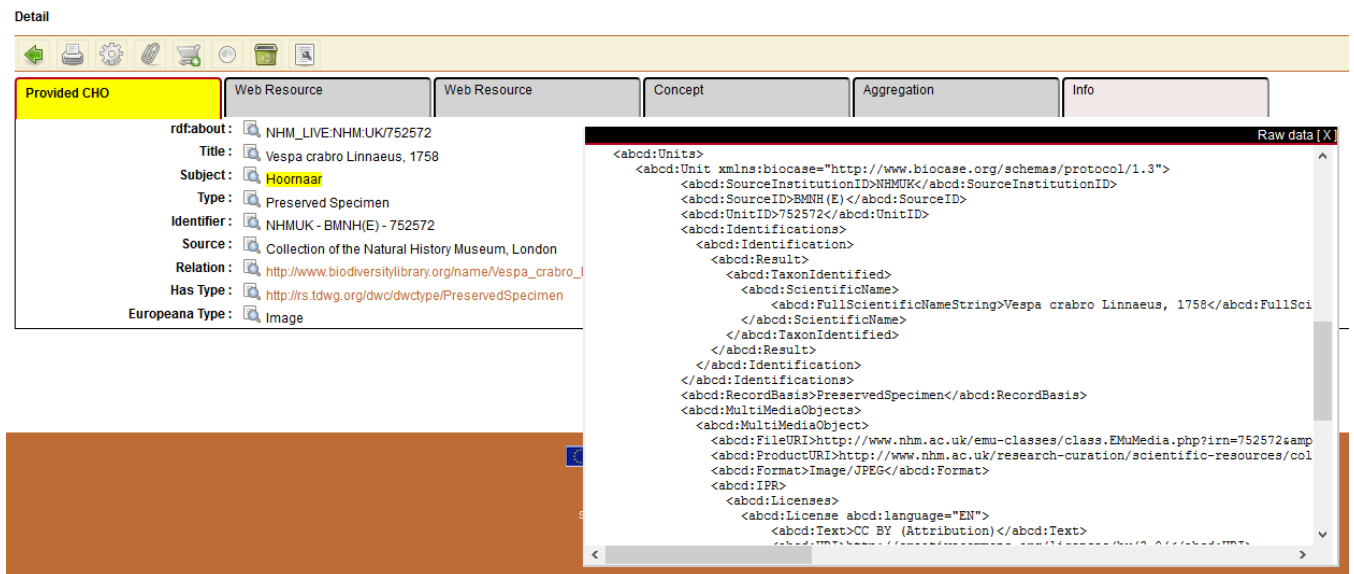
Figure 3 EDM Data check with the OpenUp! OAI-PMH platform

The content providers receive feedback and a short overview on the data check. When Openup! was still delivering in ESE format the providers had the possibility to preview their data in the ESE Europeana look-an-feel environment of the content checker tool (*see figure 4*). The blue arrows in the figure point to the browser windows that open up when the users click on the thumbnail (direct link to digital object) or on the "*View item at …*" link (the link to digital object at the institution's website).
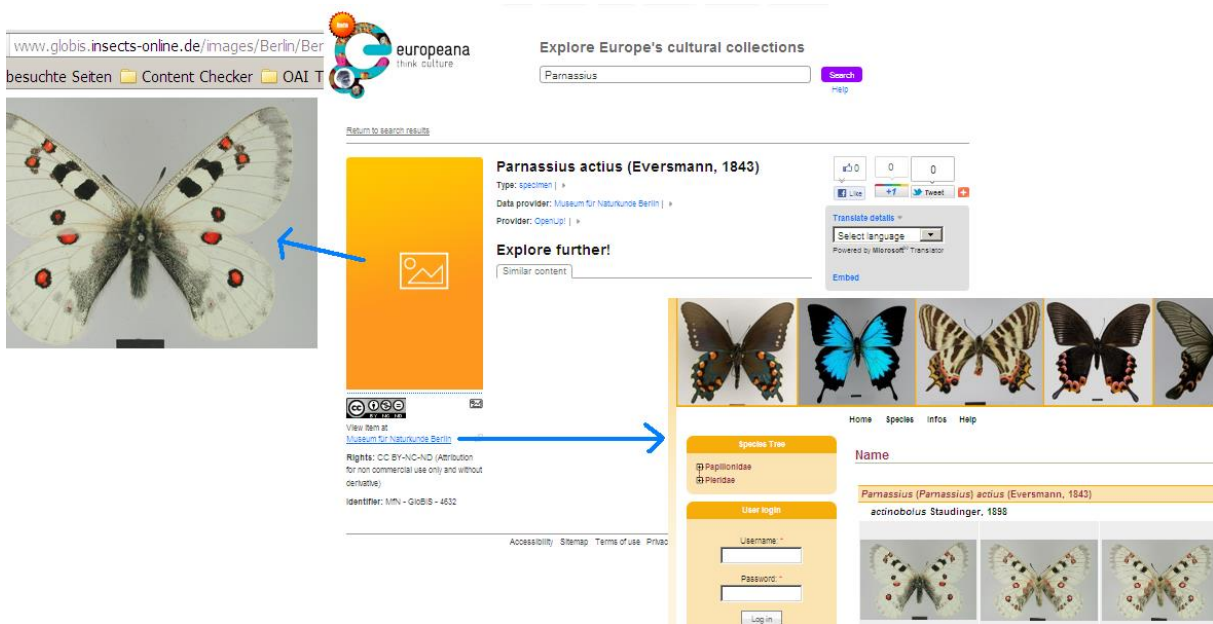
Figure 4 Former Data display with the Europeana Content Checker Tool

But when Europeana relaunched the official portal with a new design in April 2013 the data display within the Europeana portal changed and no new preview tool was made available.

In the new Europeana portal design the thumbnail does not link anymore to the image URL at the providers' servers. Now a lightbox opens that shows the picture/s and some related information. In future this lightbox shall display the data fields that are connected to the "Web Resource" information of the EDM record.
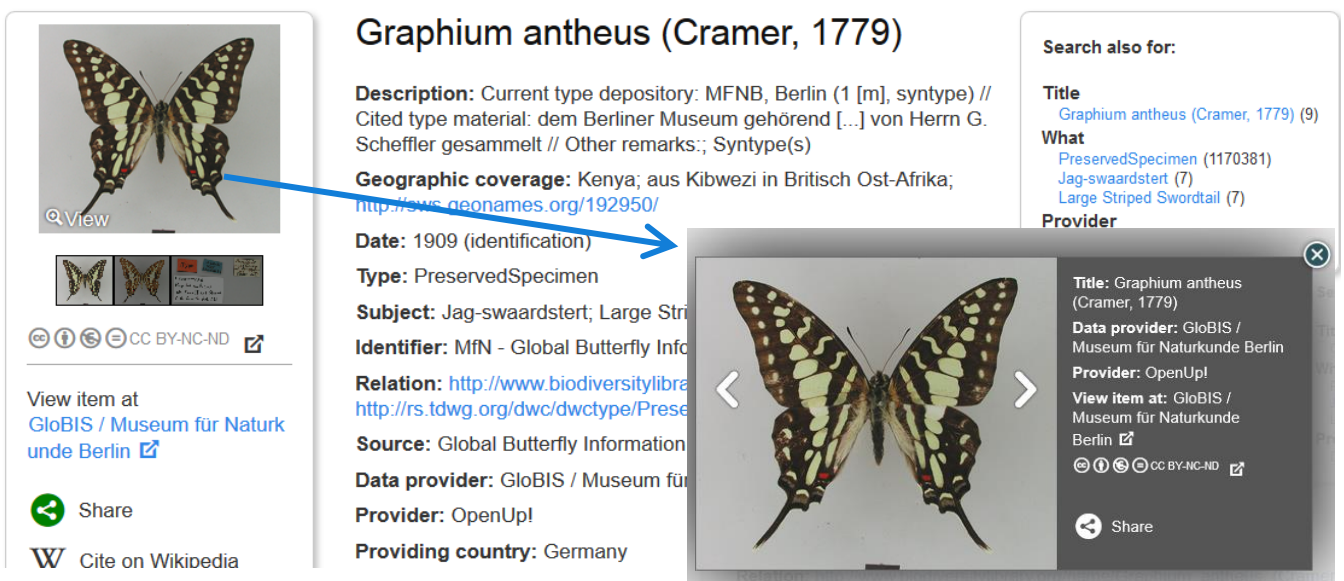
Figure 5 New image display in the Europeana portal

2.4 OpenUp! Metadata

Metadata is the descriptive information about a dataset, an object (digital or real) or any other information resource (eg. website). Part of the work in work package 3 of OpenUp! was dedicated to metadata modelling. The following paragraphs name some metadata standards that we had to bear in mind when ingesting OpenUp! data to the European digital library, Europeana.

2.4.1 ABCD

"*ABCD - Access to Biological Collections Data - Schema is a common data specification for biological collection units, including living and preserved specimens, along with field observations that did not produce voucher specimens. It is intended to support the exchange and integration of detailed primary collection and observation data. […] Development of the ABCD content definition started after the 2000 meeting of the Taxonomic Databases Working Group (TDWG) in Frankfurt/Main, where the decision was made to specify both a protocol and a data structure to enable interoperability of the numerous heterogeneous biological collection databases then available.*"[11]

The current version of the ABCD standard is version 2.06 (July 2006). This common metadata standard builds the baseline for the transformation process of OpenUp! metadata to the Europeana standards.

2.4.2 ESE

ESE (Europeana Semantic Elements)[12] was the initial metadata standard of the Europeana, www.europeana.eu, portal launched in late 2008.

The ESE standard is based on a subset of Dublin Core standard[13] metadata fields and is enhanced with several "Europeana data fields". The Europeana data fields have been added in order to allow a common display of the various data in the Europeana portal and to enable certain portal browsing features (eg. Browse by Copyright, Browse by Provider, etc.). The current version of the ESE standard is version 3.4.1 (updated April 2013). Data can still be delivered to Europeana in ESE format.

2.4.3 EDM

The Europeana Data Model (short: EDM)[14] is a more comprehensive metadata model than ESE and is now the preferred data standard for data provision to Europeana. EDM documentation was first published in 2010. One benefit of the data presentation via EDM is the display of linked data in a wide semantic context. EDM also supports the presentation of the original data of each domain without reducing it to a minimal common denominator (like ESE is doing). "*EDM is not built on any particular community standard but rather adopts an open, cross-domain Semantic Web-based framework that can accommodate particular community standards such as LIDO, EAD or METS.*"(EDM Primer) The current version of EDM is version 5.2.4 (July 2013).

In April 2013 Europeana started to integrate EDM features in the Europeana web portal (eg. multiple images per record). OpenUp! has established first mappings of their data to EDM in 2012 and published the results in the

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[11] *An Introduction to the ABCD Schema v2.0.* http://wiki.tdwg.org/twiki/bin/view/ABCD/AbcdIntroduction 28 Jan. 2014.

[12] *Europeana Technical Requirements.* http://group.europeana.eu/web/guest/technical-requirements/ 28 Jan. 2014.

[13] *Dublin Core Metadata Initiative.* http://dublincore.org/ 28 Jan. 2014.

[14] *Europeana Documents.* http://group.europeana.eu/web/europeana-project/technicaldocuments/ 28 Jan. 2014.

component C3.2.1 in August 2012. First test records were sent to Europeana in winter 2012. In spring 2013 a new OpenUp! OAI-PMH repository that exposes the OpenUp! data in EDM style was established. First data ingest tests with Europeana were performed in autumn 2013 and since December 2013 OpenUp! is delivering its data in EDM format to Europeana.

The following chapters depict the final versions of the mappings of OpenUp! data to ESE and EDM format.

2.4.4 Introduction to OpenUp! Metadata crosswalks to Europeana

The mapping from one data schema to another can be depicted in a metadata crosswalk. A first data crosswalk from ABCD to ESE was established right at the beginning of the project, spring 2011. This crosswalk was further updated and enhanced during project lifetime (eg. when providers started to contribute data in ABCD(EFG) format (mineralogy data) or when Europeana introduced new versions of the ESE and EDM schemas).

One of the biggest challenges for crosswalks is that no two metadata schemes are 100% equivalent. One scheme may have a field that does not exist in another scheme, or it may have a field that is split into two different fields in another scheme. Because of that, data may be lost when mapping from a complex scheme to a simpler one. This is also the case in the ABCD(EFG) to ESE mapping. Not all ABCD(EFG) fields could have been mapped to the ESE Schema, and in some cases it was necessary to append or prepend additional information in order to make the data "understandable" for users of the Europeana portal. The ABCD(EFG) standard is especially tailored for the natural heritage domain and even the current (and not yet complete) implementation of EDM did allow for a 100% equivalent mapping. Fe. The ESE/EDM standard just knows the field dc:contributor without any qualification what kind of role the contributor in the process had. Therefore during OpenUp! to ESE/EDM transformation this role information (identifier or collector) had to be added to the value of the metadata field mapped to dc:contributor. On the other hand the EDM Standard needed a unique identifier field for each record that is forwarded to Europeana. This unique identifier, which is not yet available throughout all OpenUp! data was created by combining three identifier fields that are mandatory wihtin the ABCD(EFG) standard: The SourceInstitution ID, the Institution ID, and the Source ID.

The schema crosswalks are tables that show equivalent elements (or "fields") in the ABCD(EFG) schema and the Europeana standards. All crosswalks include partial lists of the elements for each standard, focusing on the areas of overlap. These crosswalks are also accessible via the OpenUp! web site (OpenUp! to ESE/EDM documentation http://open-up.eu/node/1238). The online version of the crosswalks allows the users to click on the name of the standard at the top of the column in order to get to the full list of elements and the descriptions of these elements

This crosswalk depicts the unrestricted mapping of the ABCD(EFG) v2.06 to the Europeana ESE v3.4.1 data fields. The final mapping version was issued October 3rd 2013.

The column **Obligation** shows whether the field is mandatory for Europeana (ESE). In some cases Europeana requires one of two possible fields (eg. either dc:title or dc:description).

The column **Transformation Comment** displays important comments for the automatic data transformation, it was kept here for further information purposes**.**

3   OpenUp! ABCD(EFG) to Europeana ESE crosswalk (unrestricted)

ABCD 2.06 -->>	ESE	Obligation		TRANSFORMATION Comment
/DataSets/DataSet/Units/Unit/Identifications/Identification/Result/TaxonIdentified/ScientificName/FullScientificNameString	dc:title	Mandatory to provide one of these two (dc:title or dc:description)	**1**	This field is **MANDATORY** for the HIT **HARVESTER!** take the value with: PreferredFlag
/DataSets/DataSet/Units/Unit/SpecimenUnit/NomenclaturalTypeDesignations/NomenclaturalTypeDesignation/TypifiedName/FullScientificNameString	dc:title			Append: (Typus) repeatable
/DataSets/DataSet/Units/Unit/Identifications/Identification/Result/Extension/MineralRockIdentified/InformalNameString	dc:title			Field only used in the **HIT version of the Mineralogy datasets**
/DataSets/DataSet/Units/Unit/Identifications/Identification/Result/Extension/MineralRockIdentified/ClassifiedName/FullScientificNameString	dc:title			Field only used in the **HIT version of the Mineralogy datasets** **This field is MANDATORY for the HIT HARVESTER!**
/DataSets/DataSet/Units/Unit/Identifications/Identification/Result/Extension/MineralRockIdentified/NameAddendum	dc:title		**1E**	(only together with FullScientifcNameString or VarietalNameString)

3 OpenUp! ABCD(EFG) to Europeana ESE crosswalk (unrestricted)

ABCD 2.06 -->>	ESE	Obligation		TRANSFORMATION Comment
/DataSets/DataSet/Units/Unit/Identifications/Identification/Result/Extension/MineralRockIdentified/VarietalNameString	dc:title	Optional	2	
/DataSets/DataSet/Units/Unit/KindOfUnit	dc:description			
/DataSets/DataSet/Units/Unit/SpecimenUnit/Preparations/Preparation/PreparationType	dc:description			
/DataSets/DataSet/Units/Unit/SpecimenUnit/Marks/Mark/MarkText	dc:description			
/DataSets/DataSet/Units/Unit/Gathering/Notes	dc:description			
/DataSets/DataSet/Units/Unit/Sex	dc:description			Append: (sex)
/DataSets/DataSet/Units/Unit/Age	dc:description			
/DataSets/DataSet/Units/Unit/Notes	dc:description			
/DataSets/DataSet/Units/Unit/SpecimenUnit/NomenclaturalTypeDesignations/NomenclaturalTypeDesignation/TypeStatus	dc:description			
/DataSets/DataSet/Units/Unit/UnitExtension/PalaeontologicalUnit/PartOfOrganism	dc:description		2E	
/DataSets/DataSet/Units/Unit/UnitExtension/PalaeontologicalUnit/PreservationMode/PreservationModeText	dc:description			
/DataSets/DataSet/Units/Unit/UnitExtension/EarthScienceSpecimen/UnitWeight	dc:description			Append (Unit Weight)
/DataSets/DataSet/Units/Unit/UnitExtension/MineralogicalUnit/CrystalForm/Pseudomorph	dc:description			Append (Pseudomorph)
/DataSets/DataSet/Units/Unit/UnitExtension/MineralogicalUnit/CrystalForm/Twinning	dc:description			Append (Twinning)
/DataSets/DataSet/Units/Unit/RecordBasis	dc:type	Mandatory to provide one of these two (dc:type or dcterms:spatial)	3	(EXAMPLES: PreservedSpecimen, LivingSpecimen, FossileSpecimen, OtherSpecimen, HumanObservation, MachineObservation, DrawingOrPhotograph, MultimediaObject)
/DataSets/DataSet/Units/Unit/Gathering/Altitude/MeasurementOrFactAtomised/LowerValue	dcterms:spatial		4	prepend: Altitude:
/DataSets/DataSet/Units/Unit/Gathering/Altitude/MeasurementOrFactAtomised/LowerValue/accuracy	dcterms:spatial			
/DataSets/DataSet/Units/Unit/Gathering/Altitude/MeasurementOrFactAtomised/UnitOfMeasurement	dcterms:spatial			default m (meter) if no value here
/DataSets/DataSet/Units/Unit/Gathering/Altitude/MeasurementOrFactAtomised/UpperValue	dcterms:spatial			

3   OpenUp! ABCD(EFG) to Europeana ESE crosswalk (unrestricted)

ABCD 2.06 -->>	ESE	Obligation		TRANSFORMATION Comment
/DataSets/DataSet/Units/Unit/Gathering/Altitude/MeasurementOrFactAtomised/UpperValue/accuracy	dcterms:spatial			
/DataSets/DataSet/Units/Unit/Gathering/AreaDetail	dcterms:spatial			
/DataSets/DataSet/Units/Unit/Gathering/Aspect/Ordination	dcterms:spatial			
/DataSets/DataSet/Units/Unit/Gathering/Aspect/Text	dcterms:spatial			prepend: Aspect:
/DataSets/DataSet/Units/Unit/Gathering/Biotope/Name	dcterms:spatial			
/DataSets/DataSet/Units/Unit/Gathering/Biotope/Text	dcterms:spatial			prepend:Biotope:
/DataSets/DataSet/Units/Unit/Gathering/Country/Name	dcterms:spatial			
/DataSets/DataSet/Units/Unit/Gathering/Depth/MeasurementOrFactAtomised/LowerValue	dcterms:spatial			prepend: Depth:
/DataSets/DataSet/Units/Unit/Gathering/Depth/MeasurementOrFactAtomised/UnitOfMeasurement	dcterms:spatial			default m (meter) if no value here
/DataSets/DataSet/Units/Unit/Gathering/Height/MeasurementOrFactAtomised/LowerValue	dcterms:spatial			prepend: Height:
/DataSets/DataSet/Units/Unit/Gathering/Height/MeasurementOrFactAtomised/UnitOfMeasurement	dcterms:spatial			default m (meter) - if not used
/DataSets/DataSet/Units/Unit/Gathering/Height/MeasurementOrFactAtomised/UpperValue	dcterms:spatial			
/DataSets/DataSet/Units/Unit/Gathering/LocalityText	dcterms:spatial			
/DataSets/DataSet/Units/Unit/Gathering/NamedAreas/NamedArea/AreaClass	dcterms:spatial			qualifies Area (put it in brackets after the Area Name)
/DataSets/DataSet/Units/Unit/Gathering/NamedAreas/NamedArea/AreaName	dcterms:spatial			
/DataSets/DataSet/Units/Unit/Gathering/NearNamedPlaces/NamedPlaceRelation/NearNamedPlace	dcterms:spatial			
/DataSets/DataSet/Units/Unit/Gathering/SiteCoordinateSets/SiteCoordinates/CoordinateMethod	dcterms:spatial			
/DataSets/DataSet/Units/Unit/Gathering/SiteCoordinateSets/SiteCoordinates/CoordinatesLatLong/CoordinateErrorDistanceInMeters	dcterms:spatial			put it after longitude
/DataSets/DataSet/Units/Unit/Gathering/SiteCoordinateSets/SiteCoordinates/CoordinatesLatLong/SpatialDatum	dcterms:spatial			put it in brackets after the longitude
/DataSets/DataSet/Units/Unit/Gathering/Stratigraphy/BiostratigraphicTerms/BiostratigraphicTerm/Term	dcterms:spatial			prepend:Stratigraphy:

3 OpenUp! ABCD(EFG) to Europeana ESE crosswalk (unrestricted)

ABCD 2.06 -->>	ESE	Obligation		TRANSFORMATION Comment
/DataSets/DataSet/Units/Unit/Gathering/Stratigraphy/ChronostratigraphicTerms/ChronostratigraphicTerm/Term	dcterms:spatial			prepend:Stratigraphy:
/DataSets/DataSet/Units/Unit/Gathering/Stratigraphy/LithostratigraphicTerms/LithostratigraphicTerm/Term	dcterms:spatial			prepend:Stratigraphy:
/DataSets/DataSet/Metadata/Owners/Owner/Organisation/Name/Representation/Text	europeana:dataProvider	Mandatory	5	if no unit owner is given
/DataSets/DataSet/Units/Unit/Owner/Organisation/Name/Representation/Text	europeana:dataProvider			this is the preferred ABCD field for dataprovider if not used than take the value from /DataSets/DataSet/Metadata/Owners/Owner/Organisation/Name/Representation/Text
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/ProductURI	europeana:isShownAt	mandatory to provide either europeana:isShownBy or europeana:isShownAt	6	mandatory to provide either ProductURI or FileURI - in any case the Format information for the digital object has to be provided even if there is only a ProductURI in your ABCD data (see below)!!
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/FileURI	europeana:isShownBy		7	The file to be displayed should be one of the following formats: jpeg, mp3, mp4, txt, pdf, wmv, flv
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Licenses/License/URI	europeana:rights	Mandatory	8	License.URI [Priority: 1.MultimediaObject.IPRStatements, 2. Unit.IPRStatements and 3. Dataset.Metadata.IPRStatements)
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/Format	europeana:type	Mandatory	9	for correct object type mapping in ESE the Format field has to be filled in! (you may use one of these values: image, video, audio, text or another standard mimetype) NB: *Europeana, at the time of the creation of this mapping, does need a qualification of any object as:* ***image, video, audio, text,3D***

3 OpenUp! ABCD(EFG) to Europeana ESE crosswalk (unrestricted)

ABCD 2.06 -->>	ESE	Obligation		TRANSFORMATION Comment
/DataSets/DataSet/Units/Unit/SourceInstitutionID	dc:identifier	Mandatory	**10**	all three together: unique identifier
/DataSets/DataSet/Units/Unit/SourceID	dc:identifier			all three together: unique identifier
/DataSets/DataSet/Units/Unit/UnitID	dc:identifier			all three together: unique identifier
/DataSets/DataSet/Units/Unit/Gathering/Agents/GatheringAgent/AgentText	dc:contributor	Optional	**11**	
/DataSets/DataSet/Units/Unit/Identifications/Identification/Identifiers/IdentifiersText	dc:contributor (role: identifier)			preferred flag
/DataSets/DataSet/Units/Unit/Gathering/Agents/GatheringAgent/Person/FullName	dc:contributor (role:collector)			Append: (/DataSets/DataSet/Units/Unit/CollectorsFieldNumber), (/DataSets/DataSet/Units/Unit/Gathering/Code)
/DataSets/DataSet/Units/Unit/Gathering/Agents/GatheringAgentsText	dc:contributor (role:collector)			attribute: primary etc. most important
/DataSets/DataSet/Units/Unit/Identifications/Identification/Identifiers/Identifier/PersonName/FullName	dc:contributor (role:identifier)			only for identifiaction with preferred flag after (role:identifier) put: (/DataSets/DataSet/Units/Unit/Identifications/Identification/Date/ISODateTimeBegin(if not available put: (/DataSets/DataSet/Units/Unit/Identifications/Identification/Date/DateText)
/DataSets/DataSet/Units/Unit/CollectorsFieldNumber	dc:contributor			Append after: dc:contributor field number(collector)
/DataSets/DataSet/Units/Unit/Identifications/Identification/Date/ISODateTimeBegin	dc:contributor			dc:contributor (role:identifier)
/DataSets/DataSet/Units/Unit/Gathering/Code	dc:contributor			dc:contributor field number(collector)
/DataSets/DataSet/Units/Unit/Gathering/DateTime/DateText	dc:date	Optional	**12**	Append: (Gathering)
/DataSets/DataSet/Units/Unit/Identifications/Identification/Date/DateText				Append: (Identification)
/DataSets/DataSet/DatasetGUID	dc:identifier		**13**	

3 OpenUp! ABCD(EFG) to Europeana ESE crosswalk (unrestricted)

ABCD 2.06 -->>	ESE	Obligation		TRANSFORMATION Comment
/DataSets/DataSet/Units/Unit/UnitGUID	dc:identifier			
				For ALL IPR information: Concatenate Statement.Text + Statement.Details **NO USE OF**: Dataset.Metadata.IPRStatements (because of Europeana DEA)
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/IPRDeclarations/IPRDeclaration/Text	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/IPRDeclarations/IPRDeclaration/Details	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/IPRDeclarations/IPRDeclaration/URI	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Copyrights/Copyright/Text	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Copyrights/Copyright/Details	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Copyrights/Copyright/URI	dc:rights	14		
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Licenses/License/Text	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Licenses/License/Details	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/TermsOfUseStatements/TermsOfUse/Text	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/TermsOfUseStatements/TermsOfUse/Details	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/TermsOfUseStatements/TermsOfUse/URI	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Disclaimers/Disclaimer/Text	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Disclaimers/Disclaimer/Details	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Disclaimers/Disclaimer/URI	dc:rights			

3 OpenUp! ABCD(EFG) to Europeana ESE crosswalk (unrestricted)

ABCD 2.06 -->>	ESE	Obligation		TRANSFORMATION Comment
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Acknowledgements/Acknowledgement/Text	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Acknowledgements/Acknowledgement/Details	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Acknowledgements/Acknowledgement/URI	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Citations/Citation/Text	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Citations/Citation/Details	dc:rights			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Citations/Citation/URI	dc:rights			
/DataSets/DataSet/Metadata/Description/Representation/Title	dc:source	Optional	**15**	
/DataSets/DataSet/Units/Unit/SpecimenUnit/History/PreviousUnitsText	dcterms:provenance	Optional	**16**	
	europeana:object	Optional	**17**	used for thumbnail creation re-use of image link in: /DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/FileURI
/DataSets/DataSet/Units/Unit/UnitExtension/EarthScienceSpecimen/UnitStratigraphicDetermination/ChronostratigraphicAttributions/ChronostratigraphicAttribution/ChronoStratigraphicDivision	dcterms:temporal	Optional	**18E**	put: Name (Division)
/DataSets/DataSet/Units/Unit/UnitExtension/EarthScienceSpecimen/UnitStratigraphicDetermination/ChronostratigraphicAttributions/ChronostratigraphicAttribution/ChronostratigraphicName	dcterms:temporal			put: Name (Division)
/DataSets/DataSet/Units/Unit/UnitExtension/UnitHostRock/HostRockStratigraphy/ChronostratigraphicAttributions/ChronostratigraphicAttribution/ChronoStratigraphicDivision	dcterms:temporal			put: Name (Division)
/DataSets/DataSet/Units/Unit/UnitExtension/UnitHostRock/HostRockStratigraphy/ChronostratigraphicAttributions/ChronostratigraphicAttribution/ChronostratigraphicName	dcterms:temporal			put: Name (Division)
/DataSets/DataSet/Units/Unit/UnitExtension/AllocthonousMaterial/OriginalStratigraphy/StratigraphicAttributions/ChronostratigraphicAttributions/ChronostratigraphicAttribution/ChronoStratigraphicDivision	dcterms:temporal			put: Name (Division)

3 OpenUp! ABCD(EFG) to Europeana ESE crosswalk (unrestricted)

ABCD 2.06 -->>	ESE	Obligation		TRANSFORMATION Comment
/DataSets/DataSet/Units/Unit/UnitExtension/AllocthonousMaterial/OriginalStratigraphy/StratigraphicAttributions/ChronostratigraphicAttributions/ChronostratigraphicAttribution/ChronostratigraphicName	dcterms:temporal			put: Name (Division)
/DataSets/DataSet/Units/Unit/UnitReferences/UnitReference/TitleCitation	dcterms:isReferencedBy	Optional	19	Concatenate TitleCitation + Citation Detail + URI
/DataSets/DataSet/Units/Unit/UnitReferences/UnitReference/URI	dcterms:isReferencedBy			Concatenate TitleCitation + Citation Detail + URI
/DataSets/DataSet/Units/Unit/UnitReferences/UnitReference/CitationDetail	dcterms:isReferencedBy			Concatenate TitleCitation + Citation Detail + URI
/DataSets/DataSet/Units/Unit/UnitExtension/EarthScienceSpecimen/UnitStratigraphicDetermination/LithostratigraphicAttributions/LithostratigraphicAttribution/Formation	dcterms:medium	Optional	20E	
/DataSets/DataSet/Units/Unit/UnitExtension/EarthScienceSpecimen/UnitStratigraphicDetermination/LithostratigraphicAttributions/LithostratigraphicAttribution/Member	dcterms:medium			
/DataSets/DataSet/Units/Unit/UnitExtension/UnitHostRock/HostRockStratigraphy/LithostratigraphicAttributions/LithostratigraphicAttribution/Formation	dcterms:medium			
/DataSets/DataSet/Units/Unit/UnitExtension/UnitHostRock/HostRockStratigraphy/LithostratigraphicAttributions/LithostratigraphicAttribution/Member	dcterms:medium			
/DataSets/DataSet/Units/Unit/UnitExtension/AllocthonousMaterial/OriginalStratigraphy/StratigraphicAttributions/LithostratigraphicAttributions/LithostratigraphicAttribution/Formation	dcterms:medium			
/DataSets/DataSet/Units/Unit/UnitExtension/AllocthonousMaterial/OriginalStratigraphy/StratigraphicAttributions/LithostratigraphicAttributions/LithostratigraphicAttribution/Member	dcterms:medium			

Table 1 OpenUp! ABCD(EFG) to Europeana ESE crosswalk (unrestricted)

This crosswalk depicts the **restricted** mapping of the ABCD(EFG) v2.06 to the Europeana ESE v3.4.0 data fields. The final mapping version was issued May 13th 2013.

The column **Obligation** shows whether the field is mandatory for Europeana (ESE). In some cases Europeana requires one of two possible fields (eg. either dc:title or dc:description).

The column **Transformation Comment** displays important comments for the automatic data transformation, it was kept here for further information purposes.

4   OpenUp! ABCD(EFG) to Europeana ESE crosswalk (restricted)

ABCD 2.06 -->>	ESE	Obligation		TRANSFORMATION Comment	
/DataSets/DataSet/Units/Unit/Identifications/Identification/Result/TaxonIdentified/ScientificName/FullScientificNameString	dc:title	Mandatory	1	This field is **MANDATORY** for the HIT **HARVESTER!** take the value with: PreferredFlag	*organism name*
/DataSets/DataSet/Units/Unit/SpecimenUnit/NomenclaturalTypeDesignations/NomenclaturalTypeDesignation/TypifiedName/FullScientificNameString	dc:title			Append: (Typus) repeatable	*organism name*
/DataSets/DataSet/Units/Unit/Identifications/Identification/Result/Extension/MineralRockIdentified/InformalNameString	dc:title			Field only used in the **HIT version of the Mineralogy datasets**	*mineral rock informal name*
/DataSets/DataSet/Units/Unit/Identifications/Identification/Result/Extension/MineralRockIdentified/ClassifiedName/FullScientificNameString	dc:title			Field only used in the **HIT version of the Mineralogy datasets** **This field is MANDATORY for the HIT HARVESTER!**	*mineral rock classified name*
/DataSets/DataSet/Units/Unit/RecordBasis	dc:type	Mandatory	3	(PreservedSpecimen, LivingSpecimen, FossileSpecimen, OtherSpecimen, HumanObservation, MachineObservation, DrawingOrPhotograph, MultimediaObject)	*kind of object*
/DataSets/DataSet/Metadata/Owners/Owner/Organisation/Name/Representation/Text	europeana:dataProvider	Mandatory	5	if no unit owner is given	*institutional metadata*

4 OpenUp! ABCD(EFG) to Europeana ESE crosswalk (restricted)

ABCD 2.06 -->>	ESE	Obligation		TRANSFORMATION Comment	
/DataSets/DataSet/Units/Unit/Owner/Organisation/Name/Representation/Text	europeana:dataProvider			this is the preferred ABCD field for dataprovider if not used than take the value from /DataSets/DataSet/Metadata/Owners/Owner/Organisation/Name/Representation/Text	*institutional metadata*
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/ProductURI	europeana:isShownAt	mandatory to provide either europeana:isShownBy or europeana:isShownAt	6	mandatory to provide either ProductURI or FileURI - in any case the Format information for the digital object has to be provided even if there is only a ProductURI in your ABCD data (see below)!!	*URL that links to the multimedia content*
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/FileURI	europeana:isShownBy		7	The file to be displayed should be one of the following formats: jpeg, mp3, mp4, txt, pdf, wmv, flv	*URL that links to the multimedia content*
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Licenses/License/URI	europeana:rights	Mandatory	8	License.URI [Priority: 1.MultimediaObject.IPRStatements, 2. Unit.IPRStatements and 3. Dataset.Metadata.IPRStatements)	*IPR statements regarding the linked object*
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/Format	europeana:type	Mandatory	9	for correct object type mapping in ESE the Format field has to be filled in! (you may use one of these values: image, video, audio, text or another standard mimetype) NB: *Europeana, at the time of the creation ofthis mapping, does need a qualification of any object as:* **image, video, audio, text, 3D**	*Type of the multimedia object*
/DataSets/DataSet/Units/Unit/SourceInstitutionID	dc:identifier	Mandatory	10	all three together: unique identifier	*institutional metadata*
/DataSets/DataSet/Units/Unit/SourceID	dc:identifier			all three together: unique identifier	*institutional metadata*
/DataSets/DataSet/Units/Unit/UnitID	dc:identifier			all three together: unique identifier	*institutional metadata*
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/IPRDeclarations/IPRDeclaration/Text	dc:rights	Optional	14		*IPR statements regarding the linked object*

4   OpenUp! ABCD(EFG) to Europeana ESE crosswalk (restricted)

ABCD 2.06 -->>	ESE	Obligation	TRANSFORMATION Comment
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/IPRDeclarations/IPRDeclaration/Details			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/IPRDeclarations/IPRDeclaration/URI			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Copyrights/Copyright/Text			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Copyrights/Copyright/Details			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Copyrights/Copyright/URI			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Licenses/License/Text			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Licenses/License/Details			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/TermsOfUseStatements/TermsOfUse/Text			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/TermsOfUseStatements/TermsOfUse/Details			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/TermsOfUseStatements/TermsOfUse/URI			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Disclaimers/Disclaimer/Text			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Disclaimers/Disclaimer/Details			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Disclaimers/Disclaimer/URI			
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Acknowledgements/Acknowledgement/Text			

4 OpenUp! ABCD(EFG) to Europeana ESE crosswalk (restricted)

ABCD 2.06 -->>	ESE	Obligation		TRANSFORMATION Comment	
/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Acknowledgements/Acknowledgement/Details /DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Acknowledgements/Acknowledgement/URI /DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Citations/Citation/Text /DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Citations/Citation/Details /DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/IPR/Citations/Citation/URI					
/DataSets/DataSet/Metadata/Description/Representation/Title	dc:source	Optional	15		*institutional metadata*

Table 2 OpenUp! ABCD(EFG) to Europeana ESE crosswalk (restricted)

5   INTRODUCTION TO THE EDM MODEL AND CLASSES

The Europeana Data Model (short: EDM) [15] is a comprehensive metadata model that is now the favoured data standard for metadata integration into the Europeana portal (http://www.europeana.eu).

The model introduces own elements and re-uses elements from various names spaces. Among those count:

- The Resource Description Framework (RDF) and the RDF Schema (RDFS) namespaces (http://www.w3.org/TR/rdf-concepts/)
- The OAI Object Reuse and Exchange (ORE) namespace (http://www.openarchives.org/ore)
- The Simple Knowledge Organization System (SKOS) namespace (http://www.w3.org/TR/skos-reference/)
- The Dublin Core namespaces for elements (http://purl.org/dc/elements/1.1/, abbreviated as DC), terms (http://purl.org/dc/terms/, abbreviated as DCTERMS) and types (http://purl.org/dc/dcmitype/, abbreviated as DCMITYPE)

The EDM is a theoretical data model that allows data to be presented in different ways according to the practices of the various domains who contribute data to Europeana. A process has been undertaken to translate the model from a specification into a practical implementation. This has necessitated a selection process. Initially the essential classes that could realistically be taken forward to a first implementation were selected. Following this, the properties from EDM that could apply to each of those classes were identified. The final stage was to select a sub-set of those properties that would be incorporated in the initial XML schema.[16]
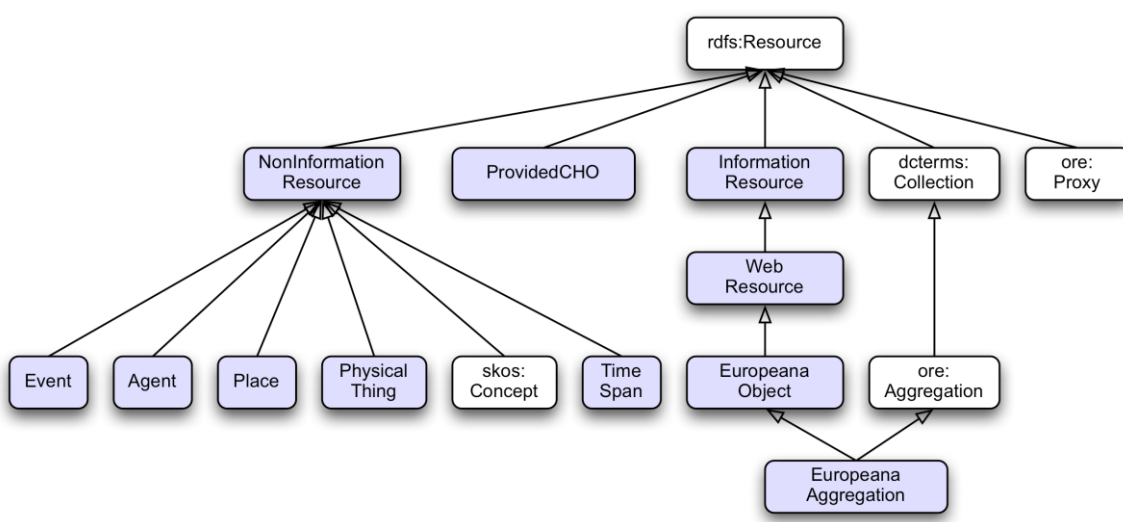

Figure 6 The EDM Class hierarchy[17]

Figure 2: The classes introduced by EDM are shown in light blue rectangles. The classes in the white rectangles are re-used from other schemas; the schema is indicated before the colon.

EDM data integration is being realized step by step in the Europeana portal[18]. For the initial implementations a set of seven classes has been selected:

Core classes:

• the provided cultural heritage object (edm:ProvidedCHO)

• the web resource that is the digital representation (edm:WebResource)

• the aggregation that groups the classes together (ore:Aggregation).

Contextual classes:

• who (edm:Agent)

• where (edm:Place)

• when (edm:TimeSpan)

• what (skos:Concept)

The contextual classes support the modelling of semantic enrichment and allow to present information that is distinct from the actually provided cultural heritage object and give additional details on eg. the collector of data, or the place of gathering etc. The inclusion of this additional data is realized via a "proxy" mechanism in Europeana in order to support this function without distorting the original data received from the providers.

Usually the values of the properties of these classes are taken from controlled vocabularies and thesauri in form of identifiers that link to further information to the vocabulary term (eg. the longitude/latitude of the place of finding, the birth date of the collector etc.) The enrichment processes in OpenUp! therefore fulfil the tasks to provide the values of the properties of the EDM contextual classes edm:Place and skos:Concept.
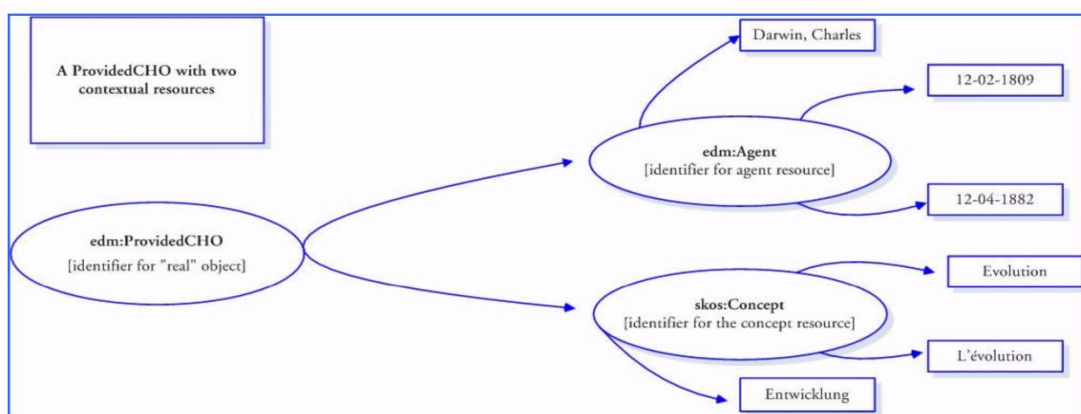

Figure 7 Two contextual classes[19]

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18   Europeana portal. http://www.europeana.eu 28 Jan. 2014.

19   Europeana Data Model Mapping Guidelines. http://pro.europeana.eu/web/guest/edm-documentation 28 Jan. 2014.

6   OpenUp! ABCD(EFG) to Europeana EDM crosswalk

All data provided for an OpenUp! Europeana harvest is first transformed from the native databases into the ABCD(EFG) standard and provided via the BioCASe[20] provider software. Out of the BioCASe providers the ABCD(EFG) data is harvested with the GBIF HIT-Tool. Afterwards the data has to be transformed into Europeana valid metadata. For the first OpenUp! ingestions of data to Europeana the transformation was based on the Europeana Semantic Elements[21]. This baseline transformation was then further developed and allows now also the transformation of ABCD(EFG) data into EDM data. This chapter depicts the mapping of the ABCDv2.06 standard[22] and the ABCD extension EFG[23] to the core classes of the Europeana Data Model. The focus of the mapping in this document is on the assortment of additional ABCD fields relevant for the Europeana Data Model and qualified fields for vocabulary enrichment processes. The EDM mapping recognizes the same restrictions as the ESE mapping if the partner has opted for a restricted mapping.

6.1   edm:ProvidedCHO

Definition: "The ProvidedCHO is the cultural heritage object which has given rise to and is the subject of the package of data that has been submitted to Europeana. Its properties are those of the original cultural heritage object with a few Europeana-specific ones added. [*This means that they are the attributes of the original cultural heritage object (CHO) itself, not the digital representation of it*.] In the model it is the class of resource that is the object of the edm:aggregatedCHO statement. There is an exact match between ProvidedCHOs and the items that can appear from a search."[24]

In the OpenUp! and ABCD(EFG) context this means that each unit record with a unique identifier (Unit ID) within the data source constitutes one potential cultural heritage object (ProvidedCHO) for Europeana.

The following crosswalk depicts the mapping of the ABCD(EFG) v2.06 to the Provided Cultural Heritage Object class of The Europeana Data Model.

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[20]   *BioCASe Provider Software*. http://www.biocase.org/products/provider_software/ 28 Jan. 2014.

[21]   Europeana Semantic Elements (ESE) documentation http://pro.europeana.eu/web/guest/technical-requirements 28 Jan. 2014.

[22]   *ABCD - Access to Biological Collection Data*. http://wiki.tdwg.org/ABCD 28 Jan. 2014.

[23]   *ABCDEFG - Access to Biological Collection Databases Extended for Geosciences*. http://wiki.tdwg.org/twiki/bin/view/ABCD/ DesignAbcdExtensions 28 Jan. 2014.

[24]   Europeana Data Model Mapping Guidelines. http://pro.europeana.eu/web/guest/edm-documentation 28 Jan. 2014.

Provided CHO[25]

This mapping was issued October 9th 2012.

EDM				ABCD2.06	Enrichment
dc:contributor	For contributors to the CHO. If possible supply the identifier of the contributor from an authority source.	literal or reference	min 0, max unbounded	/DataSets/DataSet/Units/Unit/Gathering/Agents/GatheringAgent/Person/FullName	
				/DataSets/DataSet/Units/Unit/Gathering/Agents/GatheringAgentsText	
				/DataSets/DataSet/Units/Unit/Gathering/Agents/GatheringAgent/AgentText	
				/DataSets/DataSet/Units/Unit/Identifications/Identification/Identifiers/Identifier/PersonName/FullName	
				/DataSets/DataSet/Units/Unit/Identifications/Identification/Identifiers/IdentifiersText	
dc:date	Use for a significant date in the life of the CHO. Consider the sub-properties of dcterms:created or dcterms:issued.	literal or reference	min 0, max unbounded	same as standard ABCD-ESE mapping	
dc:description	A description of the CHO. Either dc:description or dc:title must be provided.	literal or reference	min 0, max unbounded	same as standard ABCD-ESE mapping	
dc:identifier	An identifier of the original CHO.	literal	min 0, max unbounded	same as standard ABCD-ESE mapping	
dc:relation	The name or identifier of a related resource, generally used for other related CHOs. Cf edm:isRelatedTo	literal or reference	min 0, max unbounded	/DataSets/DataSet/Units/Unit/Associations/UnitAssociation/AssociatedUnitID /DataSets/DataSet/Units/Unit/Associations/UnitAssociation/AssociatedUnitSourceInstitutionCode /DataSets/DataSet/Units/Unit/Associations/UnitAssociation/AssociatedUnitSourceName (together) Append: /DataSets/DataSet/Units/Unit/Associations/UnitAssociation/AssociationType /DataSets/DataSet/Units/Unit/Associations/UnitAssociation/Comment	

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[25] Properties marked in **bold** will be used for the first implementation of EDM. Properties with grey background will not be implemented.

Provided CHO[25]

This mapping was issued October 9th 2012.

EDM				ABCD2.06	Enrichment
				/DataSets/DataSet/Units/Unit/Assemblage/UnitAssemblage/AssemblageID /DataSets/DataSet/Units/Unit/Assemblage/UnitAssemblage/AssemblageNa me (together)	
dc:rights	Use to give the name of the rights holder of the CHO if possible or for more general rights information. Note the difference between this property and the use of the controlled edm:rights property which relates to the digital objects (see WebResource and Aggregation tables).	literal or reference	min 0, max unbounded	/DataSets/DataSet/**Units/Unit/IPRStatements/**IPRDeclarations/IPRDeclarat ion/Text	
				/DataSets/DataSet/Units/Unit/IPRStatements/IPRDeclarations/IPRDeclaratio n/Details	
				/DataSets/DataSet/Units/Unit/IPRStatements/IPRDeclarations/IPRDeclaratio n/URI	
				/DataSets/DataSet/Units/Unit/IPRStatements/Copyrights/Copyright/Text	
				/DataSets/DataSet/Units/Unit/IPRStatements/Copyrights/Copyright/Details	
				/DataSets/DataSet/Units/Unit/IPRStatements/Copyrights/Copyright/URI	
				/DataSets/DataSet/Units/Unit/IPRStatements/Licenses/License/Text	
				/DataSets/DataSet/Units/Unit/IPRStatements/Licenses/License/Details	
				/DataSets/DataSet/Units/Unit/IPRStatements/Licenses/License/URI	
				/DataSets/DataSet/Units/Unit/IPRStatements/TermsOfUseStatements/Term sOfUse/Text	
				/DataSets/DataSet/Units/Unit/IPRStatements/TermsOfUseStatements/Term sOfUse/Details	
				/DataSets/DataSet/Units/Unit/IPRStatements/TermsOfUseStatements/Term sOfUse/URI	

Provided CHO[25]

This mapping was issued October 9th 2012.

EDM				ABCD2.06	Enrichment
				/DataSets/DataSet/Units/Unit/IPRStatements/Disclaimers/Disclaimer/Text	
				/DataSets/DataSet/Units/Unit/IPRStatements/Disclaimers/Disclaimer/Details	
				/DataSets/DataSet/Units/Unit/IPRStatements/Disclaimers/Disclaimer/URI	
				/DataSets/DataSet/Units/Unit/IPRStatements/Acknowledgements/Acknowledgement/Text	
				/DataSets/DataSet/Units/Unit/IPRStatements/Acknowledgements/Acknowledgement/Details	
				/DataSets/DataSet/Units/Unit/IPRStatements/Acknowledgements/Acknowledgement/URI	
				/DataSets/DataSet/Units/Unit/IPRStatements/Citations/Citation/Text	
				/DataSets/DataSet/Units/Unit/IPRStatements/Citations/Citation/Details	
				/DataSets/DataSet/Units/Unit/IPRStatements/Citations/Citation/URI	
dc:source	The source of the original CHO. This property should no longer be used for the name of the content holder: for this, see edm:dataProvider in the ore:Aggregation table below.	literal or reference	min 0, max unbounded	same as standard ABCD-ESE mapping	
dc:subject	The subject of the CHO. One of dc:subject or dc:coverage or dc:type or dcterms:spatial must be provided	literal or reference	min 0, max unbounded	Integration of the common names	OpenUp! Common name services
dc:title	The title of the CHO. Either dc:title or dc:description must be provided.	literal	min 0, max unbounded	same as standard ABCD-ESE mapping	
dc:type	The nature or genre of the CHO. Ideally the term(s) will be taken from a controlled vocabulary. One of dc:type or dc:subject or dc:coverage or dcterms:spatial	literal or reference	min 0, max unbounded	same as standard ABCD-ESE mapping	

Provided CHO[25]

This mapping was issued October 9th 2012.

EDM				ABCD2.06	Enrichment
	must be provided				
dcterms:hasPart	A resource that is included either physically or logically in the CHO.	literal or reference	min 0, max unbounded	DataSets/DataSet/Units/Unit/Sequences/Sequence/SequencedPart	
dcterms:isReferencedBy	Another resource that references, cites or otherwise points to the CHO.	literal or reference	min 0, max unbounded	same as standard ABCD-ESE mapping	
dcterms:medium	The material or physical carrier of the CHO.	literal or reference	min 0, max unbounded	same as standard ABCD-ESE mapping	
dcterms:provenance	A statement of changes in ownership and custody of the CHO since its creation. Significant for authenticity, integrity and interpretation.	literal or reference	min 0, max unbounded	same as standard ABCD-ESE mapping	
				DataSets/DataSet/Units/Unit/SpecimenUnit/Acquisition/AcquiredFrom/Person/FullName	
				DataSets/DataSet/Units/Unit/SpecimenUnit/Acquisition/AcquiredFrom/Organisation/Name/Representation/Text	
dcterms:references	Other resources referenced, cited or otherwise pointed to by the CHO.	literal or reference	min 0, max unbounded	DataSets/DataSet/Units/Unit/Identifications/Identification/Identifiers/IdentificationSource/TitleCitation	
				DataSets/DataSet/Units/Unit/Identifications/Identification/Identifiers/IdentificationSource/CitationDetail	
				DataSets/DataSet/Units/Unit/Identifications/Identification/Identifiers/IdentificationSource/URI	
dcterms:spatial	Spatial characteristics of the CHO. i.e. what the CHO represents or depicts in terms of space (e.g. a location, co-ordinate or place).	literal or reference	min 0, max unbounded	same as standard ABCD-ESE mapping	

Provided CHO[25]

This mapping was issued October 9th 2012.

EDM				ABCD2.06	Enrichment
	Either dcterms:spatial or dc:type or dc:subject or dc:coverage must be provided				
				/DataSets/DataSet/Units/Unit/Gathering/SiteCoordinateSets/SiteCoordinates/CoordinatesLatLong/LatitudeDecimal	GeoNames Country Subdivision / reverse geocoding GeoNames Find nearby populated place / reverse geocoding
				/DataSets/DataSet/Units/Unit/Gathering/SiteCoordinateSets/SiteCoordinates/CoordinatesLatLong/LongitudeDecimal	GeoNames Country Subdivision / reverse geocoding GeoNames Find nearby populated place / reverse geocoding
dcterms:temporal	Temporal characteristics of the CHO. i.e. what the CHO is about or depicts in terms of time (e.g. a period, date or date range.)	literal or reference	min 0, max unbounded	same as standard ABCD-ESE mapping	
				DataSets/DataSet/Units/Unit/PalaeontologicalUnit/TimeRange	
edm:currentLocation	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.	reference	min 0, max 1	DataSets/DataSet/Units/Unit/Owner/URIs/URL	
edm:hasMet	The identifier of an agent, a place, a time period or any other identifiable entity that the CHO	reference	min 0, max unbounded		put in here the indentifiers of the various thesaurus

Provided CHO[25]

This mapping was issued October 9th 2012.

EDM				ABCD2.06	Enrichment
	may have "met" in its life.				terms connected to the CHO
edm:hasType	The identifier of a concept, or a word or phrase from a controlled vocabulary (thesaurus etc) giving the type of the CHO. E.g. Painting from the AAT thesaurus. This property can be seen as a super-property of e.g. dc:format or dc:type to support "What" questions.	reference or literal	min 0, max unbounded	/DataSets/DataSet/Units/Unit/RecordBasis	Darwin Core Type Vocabulary - identifier
edm:isRelatedTo	The identifier or name of a concept or other resource to which the described CHO is related. E.g. Moby Dick is related to XIX Century literature. Cf dc:relation.	reference or literal	min 0, max unbounded	/DataSets/DataSet/Units/Unit/Associations/UnitAssociation/AssociatedUnitID /DataSets/DataSet/Units/Unit/Associations/UnitAssociation/AssociatedUnitSourceInstitutionCode /DataSets/DataSet/Units/Unit/Associations/UnitAssociation/AssociatedUnitSourceName (together)	
				/DataSets/DataSet/Units/Unit/Assemblage/UnitAssemblage/AssemblageID /DataSets/DataSet/Units/Unit/Assemblage/UnitAssemblage/AssemblageName (together)	
edm:type	The provided object is one of the types accepted by Europeana and will govern which facet it appears under in the portal - TEXT, VIDEO, SOUND, IMAGE, 3D. (For 3D see also dc:format)	literal (TEXT-VIDEO-SOUND-IMAGE-3D)	min 1, max1	same as standard ABCD-ESE mapping	
edm:wasPresentAt	The identifier of an event at which the described object was present. E.g. the Stone of Scone was present at the coronation of King James I of England.	reference	min 0, max unbounded	DataSets/DataSet/Units/Unit/Gathering/Project/ProjectTitle	not implemented in Europeana

Provided CHO[25]

This mapping was issued October 9th 2012.

EDM				ABCD2.06	Enrichment
owl:sameAs	Use to point to your own (linked data) representation of the object, if you have already minted a URI identifier for it. It is also possible to provide URIs minted by third-parties for the object.	reference	min 0, max unbounded		
rdf:type	Use to indicate if this resource is of a given "real-world object" type - it could be edm:PhysicalThing or a more specific class.	reference	min 0, max unbounded		not implemented in Europeana

Table 3 edm:ProvidedCHO and ABCD(EFG)

6.2 edm:Aggregation

Definition: "These are the properties that can be used for the class of ore:Aggregation. This means that they are attributes that apply to the whole set of related resources about one particular provided cultural heritage object. For each ore:Aggregation a set of these properties should be provided."[26]

This crosswalk depicts the mapping of the ABCD(EFG) v2.06 to the Aggregation class of The Europeana Data Model.

Aggregation[27]

This mapping was issued July 7th 2012.

EDM				ABCD2.06
ore:aggregates	This property exists in principle only as it is stated through edm:aggregatedCHO and edm:hasView statements.	ref	min 0, max unbounded	
edm:aggregatedCHO	The identifier of the source object e.g. the Mona Lisa itself. This could be a full linked open data URI or an internal identifier.	ref	min 1, max 1	/DataSets/DataSet/Units/Unit/SourceInstitutionID /DataSets/DataSet/Units/Unit/SourceID /DataSets/DataSet/Units/Unit/UnitID (together)
edm:dataProvider	The name or identifier of the data provider of the object (i.e. the organisation providing data to an aggregator). Identifiers will not be available until Europeana has implemented its Organisation profile.	literal or ref	min 1, max 1	same as standard ABCD-ESE mapping
edm:hasView	The URL of a web resource which is a digital representation of the CHO. This may be the source object itself in the case of a born digital cultural heritage object. edm:hasView should only be used where there are several views of the CHO and one (or both) of the mandatory edm:isShownAt or edm:isShownBy properties have already been used. It is for cases where one CHO has several views of the same object. (e.g. a shoe and a detail of the label of the shoe)	ref	min 0, max unbounded	enter here the multiple "DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/FileURI" appearing after the first one (used for isShownBy) enter here the multiple "DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMediaObject/ProductURI" appearing after the first one (used for isShownAt)
edm:isShownBy	The URL of a web view of the object. Either edm:isShownAt or edm:isShownBy is mandatory. For the rights that will apply to previews please see edm:rights below.	ref	min 0, max 1	same as standard ABCD-ESE mapping
edm:isShownAt	The URL of a web view of the object in full information context. Either edm:isShownAt or edm:isShownBy is mandatory. For the rights that will apply to previews please see edm:rights	ref	min 0, max 1	same as standard ABCD-ESE mapping

---

[26]   Europeana Data Model Mapping Guidelines. http://pro.europeana.eu/web/guest/edm-documentation 28 Jan. 2014.

[27]   Properties marked in **bold** will be used for the first implementation of EDM. Properties with grey background will not be implemented.

Aggregation[27]

This mapping was issued July 7th 2012.

EDM				ABCD2.06
	below.			
edm:object	The URL of a representation of the CHO which will be used for generating previews for use in the Europeana portal. This may be the same URL as edm:isShownBy. See Europeana Portal Image Guidelines (http://pro.europeana.eu/technical-requirements) for information regarding the specifications of previews.	ref	min 0, max 1	same as standard ABCD-ESE mapping
edm:provider	The name or identifier of the provider of the object (i.e. the organisation providing data directly to Europeana). Identifiers will not be available until Europeana has implemented its Organisation profile.	literal or ref	min 1, max 1	same as standard ABCD-ESE mapping
edm:rights	This is a mandatory property and the value given here should be the rights statement that applies to the digital representation at the URL given in edm:object or edm:isShownAt/By. The value should be taken from one of those listed in the Europeana Rights Guidelines (http://pro.europeana.eu/technical-requirements) The rights statement given in this property will also apply to the previews used in the portal and will be the source of: * the entry in the Rights facet in the portal * the license badge that appears under the preview on the result page Where there are several web resources attached to one edm:ProvidedCHO the rights statement given here will be regarded as the "reference" value for all the web resources so a suitable value should be chosen if the rights statements vary between different resources. In future implementations it is hoped to handle rights statements for separate web resources associated with one CHO separately.	ref	min 1, max 1	same as standard ABCD-ESE mapping

Table 4 edm:Aggregation and ABCD(EFG)

6.3 edm:WebResource

Definition: "These are the properties that can be used for the class of edm:WebResource. This means that they are attributes of the digital representation of the provided cultural heritage object, not the cultural heritage object itself. There may be more than one edm:WebResource for each edm:ProvidedCHO and they will be associated via the ore:Aggregation using edm:isShownBy, edm:isShownAt, edm:hasView or edm:object. Each web resource provided should have its own set of properties."[28]

This crosswalk depicts the mapping of the ABCD(EFG) v2.06 to the Web Resource class of The Europeana Data Model.

Web Resource[29]

This mapping was issued October 5th 2012.

EDM				ABCD2.06
dc:description	Use for an account or description of this digital representation	literal or ref	min 0, max unbounded	DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/Context
				DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/Creator
				DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/Comment
				DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/CaptureEquipment
dc:format	Use for the format of this digital representation. (Use the value "3D- PDF" if appropriate to trigger portal icon display.)	literal or ref	min 0, max unbounded	DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/Format
				DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/ImageResolution
dc:rights	Use for the name of the rights holder of this digital representation if possible or for more general rights information. Note the difference between this property and the use of the mandatory, controlled edm:rights property below.	literal or ref	min 0, max unbounded	/DataSets/DataSet**/Units/Unit/MultiMediaObjects**/MultiMed iaObject/IPR/IPRDeclarations/IPRDeclaration/Text
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/IPRDeclarations/IPRDeclaration/Details
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/IPRDeclarations/IPRDeclaration/URI

---

[28]   Europeana Data Model Mapping Guidelines. http://pro.europeana.eu/web/guest/edm-documentation 28 Jan. 2014.

[29]   Properties marked in **bold** will be used for the first implementation of EDM. Properties with grey background will not be implemented.

Web Resource[29]

This mapping was issued October 5th 2012.

EDM				ABCD2.06
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Copyrights/Copyright/Text
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Copyrights/Copyright/Details
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Copyrights/Copyright/URI
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Licenses/License/Text
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Licenses/License/Details
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/TermsOfUseStatements/TermsOfUse/Text
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/TermsOfUseStatements/TermsOfUse/Details
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/TermsOfUseStatements/TermsOfUse/URI
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Disclaimers/Disclaimer/Text
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Disclaimers/Disclaimer/Details
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Disclaimers/Disclaimer/URI
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Acknowledgements/Acknowledgement/Text
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Acknowledgements/Acknowledgement/Details
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Acknowledgements/Acknowledgement/URI
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Citations/Citation/Text
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Citations/Citation/Details
				/DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/IPR/Citations/Citation/URI
dcterms:extent	The size or duration of the web resource.	literal or ref	min 0, max unbounded	DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/ImageSize
				DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/ImageSize/Width
				DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/ImageSize/Height
				DataSets/DataSet/Units/Unit/MultiMediaObjects/MultiMedia Object/FileSize

Table 5 edm:WebResource and ABCD(EFG)

7 Samples of OpenUp! data display in Europeana

7.1 The Mapping process (technical overview)

The Mapping Tool (Pentaho Kettle – Transformation) receives ABCD records and processes them:

- The data is mapped to EDM

- Enriched with the bibliographic information from BHL (relation)

- Enriched with the geonames information if coordinates available

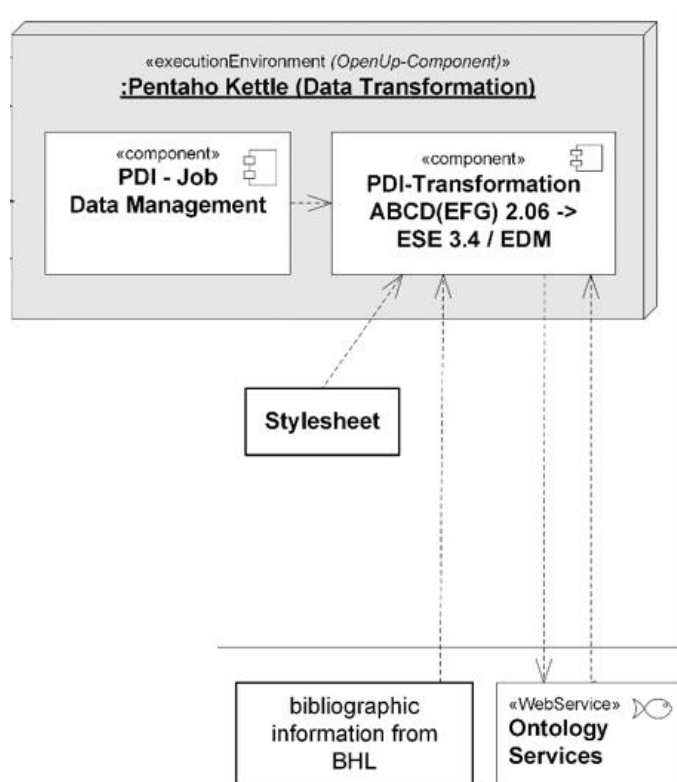- Enriched via OpenUp! Vocabulary webservices (common names)
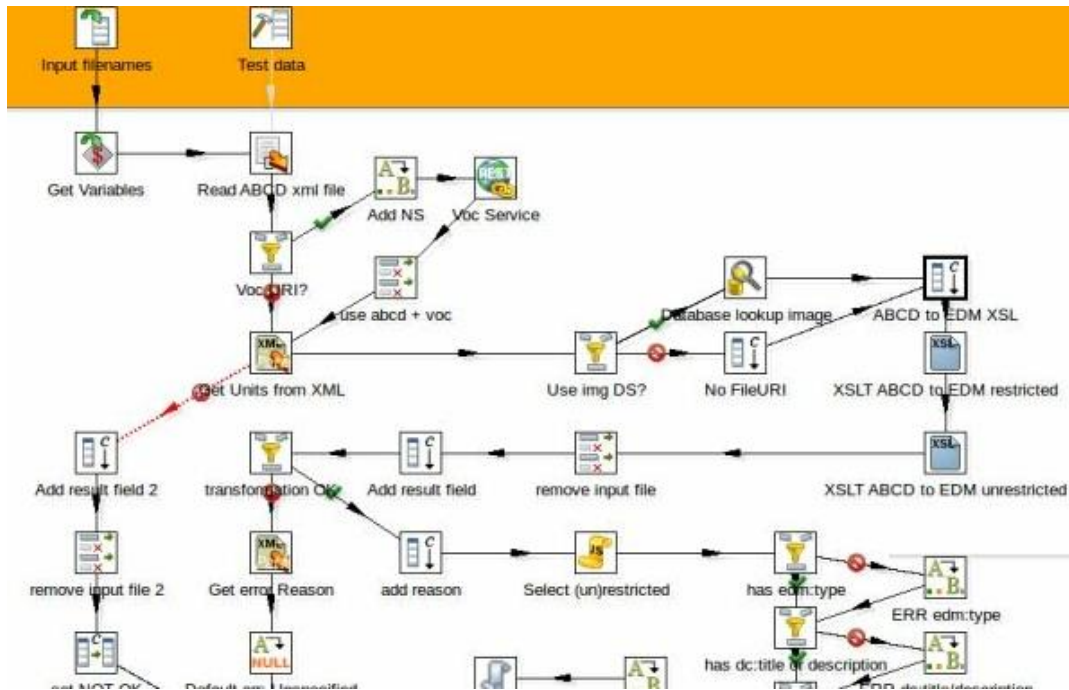

Figure 8 Data transformation components

Figure 9 Pentaho Kettle – Transformation (Excerpt)

Finally the EDM valid data is imported into the OAI PMH Provider[30] for Europeana

During the import the links contained in the data are checked.
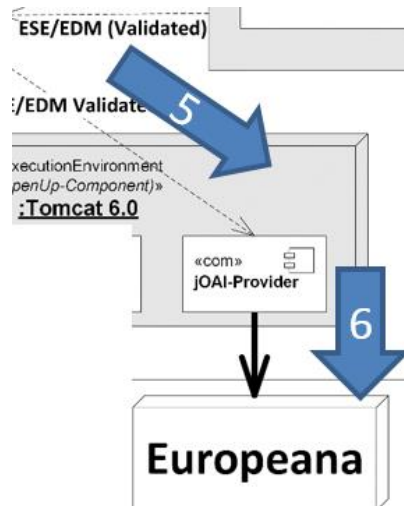
Figure 10 OAI Data provision to Europeana

[30] http://www.openarchives.org/pmh/ 28 Jan. 2014.

7.2 Sample XML Records

Section Provided CHO:

```xml
<rdf:RDF>
 <edm:ProvidedCHO rdf:about="GLOBIS:MFN:GERMANY/10325">
  <dc:identifier>MfN - Global Butterfly Information System (GloBIS) - 10325</dc:identifier>
  <dc:title>Papilio machaon Linnaeus, 1758</dc:title>
  <dc:description>Current type depository: MFNB, Berlin (1 [m], syntype) // Cited type material: // Other
  remarks:</dc:description>
  <dc:description>Syntype(s)</dc:description>
  <dc:date>1903 (identification)</dc:date>
  <dc:relation>http://www.biodiversitylibrary.org
/name/Papilio_machaon_Linnaeus%2C_1758</dc:relation>
  <dc:source>Global Butterfly Information System (GloBIS)</dc:source>
  <dc:subject>flutura bajrake</dc:subject>
  <dc:subject>Koninginnenpage</dc:subject>
  <dc:subject>makaonfjäril</dc:subject>
  <dc:subject>Svalehale</dc:subject>
  <dc:subject>svalestjert</dc:subject>
  <dc:subject>Swallowtail</dc:subject>
  <dc:subject>Махаон</dc:subject>
  <dc:subject>Artemisia Swallowtail</dc:subject>
  <dc:subject>Common Yellow Swallowtail</dc:subject>
  <dc:subject>Old World Swallowtail</dc:subject>
  <dc:subject>Ritariperhonen</dc:subject>
  <dc:subject>Le Grand Porte-queue</dc:subject>
  <dc:subject>Schwalbenschwanz</dc:subject>
  <dc:subject>Paz królowej</dc:subject>
  <dc:subject>Makaon</dc:subject>
  <dc:subject>Makaonfjäril</dc:subject>
  <dc:subject>Riddarfjäril</dc:subject>
  <dc:subject>ritariperhonen</dc:subject>
  <dc:subject>Koninginnepage</dc:subject>
  <dc:subject>fecskefarkú lepke</dc:subject>
  <dc:subject>Fecskefarkú pille</dc:subject>
  <dc:subject>http://openup.nhm-wien.ac.at/commonNames/references/scientificName
/1549</dc:subject>
  <dc:type>Preserved Specimen</dc:type>
  <dcterms:spatial>Japan</dcterms:spatial>
  <dcterms:temporal></dcterms:temporal>
  <edm:hasType rdf:resource="http://rs.tdwg.org/dwc/dwctype/PreservedSpecimen">
  </edm:hasType>
  <edm:type>IMAGE</edm:type>
 </edm:ProvidedCHO>
```
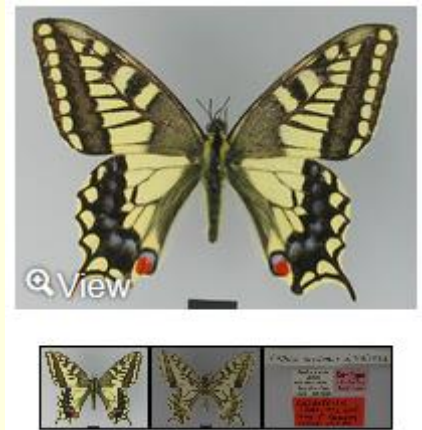
Web Page leading to the references of the vocabulary sources.

```
<rdf:RDF>
 <edm:ProvidedCHO rdf:about="ZOOLOGYNM:NM:CZECHREPUBLIC/Z53">
  <dc:identifier>Národní muzeum - NM - Z53</dc:identifier>
  <dc:title>Lepomis gibbosus (Linnaeus, 1758)</dc:title>
  <dc:contributor>Šanda, R.,Kohout, J.&Šedivá,A. (collector)</dc:contributor>
  <dc:date>2008-09-12 (gathering)</dc:date>
  <dc:relation>http://www.biodiversitylibrary.org/name/Lepomis_gibbosus_(Linnaeus%2C_1758)
  </dc:relation>
  <dc:source>Zoological collection of the National Museum</dc:source>
  <dc:subject>Zonnebaars</dc:subject>
  <dc:subject>Pumpkinseed sunfish</dc:subject>
  <dc:subject>http://openup.nhm-wien.ac.at/commonNames/references/scientificName
/134435</dc:subject>
  <dc:type>Preserved Specimen</dc:type>
  <dcterms:spatial>(43.7016666667,17.2641388889)</dcterms:spatial>
  <dcterms:spatial>Altitude: 866meters</dcterms:spatial>
  <dcterms:spatial>Bosnia and Herzegovina</dcterms:spatial>
  <dcterms:spatial>Bosnia and Herzegovina Duvanjsko polje, Tomislavgrad</dcterms:spatial>
  <dcterms:temporal></dcterms:temporal>
  <edm:hasMet rdf:resource="http://www.geonames.org
/maps/google_43.7016666667_17.2641388889.html"></edm:hasMet>
  <edm:hasType rdf:resource="http://rs.tdwg.org/dwc/dwctype
/PreservedSpecimen"></edm:hasType>
  <edm:type>IMAGE</edm:type>
 </edm:ProvidedCHO>
```

Geonames enrichment (coordinates)

Linking to the Darwin Core object type vocabulary

Section Web Resource:

Multiple digital objects linked to one record.


```xml
<edm:WebResource rdf:about="http://globis-images.insects-online.de/image
/Berlin/Berlin_14/orientalis_Neuburger_Papilio_machaon_MNHU_1A.jpg">
 <dc:description>upperside</dc:description>
 <dc:format>image/jpeg</dc:format>
 <dc:rights>CC-BY-SA (Attribution for share alike)</dc:rights>
 <edm:rights rdf:resource="http://creativecommons.org/licenses/by-sa/3.0/">
 </edm:rights>
</edm:WebResource>
<edm:WebResource rdf:about="http://globis-images.insects-online.de/image
/Berlin/Berlin_14/orientalis_Neuburger_Papilio_machaon_MNHU_1B.jpg">
 <dc:description>underside</dc:description>
 <dc:format>image/jpeg</dc:format>
 <dc:rights>CC-BY-SA (Attribution for share alike)</dc:rights>
 <edm:rights rdf:resource="http://creativecommons.org/licenses/by-sa/3.0/">
 </edm:rights>
</edm:WebResource>
<edm:WebResource rdf:about="http://globis-images.insects-online.de/images
/Berlin/Berlin_14/orientalis_Neuburger_Papilio_machaon_MNHU_1C.jpg">
 <dc:description>labels</dc:description>
 <dc:format>image/jpeg</dc:format>
 <dc:rights>CC-BY-SA (Attribution for share alike)</dc:rights>
 <edm:rights rdf:resource="http://creativecommons.org/licenses/by-sa/3.0/">
 </edm:rights>
</edm:WebResource>
<edm:WebResource rdf:about="http://www.globis.insects-online.de/?q=node
/3&s=10325">
 <dc:format>text/html</dc:format>
 <dc:rights>CC-BY-SA (Attribution for share alike)</dc:rights>
 <edm:rights rdf:resource="http://creativecommons.org/licenses/by-sa/3.0/">
 </edm:rights>
</edm:WebResource>
```

Link to Website of the provider.

Section Concept:

```xml
<skos:Concept rdf:about="http://openup.nhm-wien.ac.at/commonNames/9966">
  <skos:prefLabel>flutura bajrake</skos:prefLabel>
  <skos:note>common name</skos:note>
  <skos:note>Language: sq</skos:note>
  <skos:note>Reference(s): PESI (2014). Pan-European Species directories Infrastructure. Accessed through
  www.eu-nomen.eu/portal, at 2014-01-24</skos:note>
  <skos:editorialNote>http://openup.nhm-wien.ac.at/commonNames/references/scientificName
  /1549</skos:editorialNote>
</skos:Concept>
<skos:Concept rdf:about="http://openup.nhm-wien.ac.at/commonNames/9967">
  <skos:prefLabel>Koninginnenpage</skos:prefLabel>
  <skos:note>common name</skos:note>
  <skos:note>Language: nl</skos:note>
  <skos:note>Reference(s): PESI (2014). Pan-European Species directories Infrastructure. Accessed through
  www.eu-nomen.eu/portal, at 2014-01-24</skos:note>
  <skos:editorialNote>http://openup.nhm-wien.ac.at/commonNames/references/scientificName
  /1549</skos:editorialNote>
</skos:Concept>
<skos:Concept rdf:about="http://openup.nhm-wien.ac.at/commonNames/9968">
  <skos:prefLabel>makaonfjäril</skos:prefLabel>
  <skos:note>common name</skos:note>
  <skos:note>Language: sv</skos:note>
  <skos:note>Reference(s): PESI (2014). Pan-European Species directories Infrastructure. Accessed through
  www.eu-nomen.eu/portal, at 2014-01-24</skos:note>
  <skos:editorialNote>http://openup.nhm-wien.ac.at/commonNames/references/scientificName
  /1549</skos:editorialNote>
</skos:Concept>
<skos:Concept rdf:about="http://openup.nhm-wien.ac.at/commonNames/9969">
  <skos:prefLabel>Svalehale</skos:prefLabel>
  <skos:note>common name</skos:note>
  <skos:note>Language: da</skos:note>
  <skos:note>Reference(s): PESI (2014). Pan-European Species directories Infrastructure. Accessed through
  www.eu-nomen.eu/portal, at 2014-01-24</skos:note>
  <skos:editorialNote>http://openup.nhm-wien.ac.at/commonNames/references/scientificName
  /1549</skos:editorialNote>
</skos:Concept>
```

Metadata field used to carry the website with the vocabulary references. This field is mapped to dc:subject in the CHO. (This workaround is necessary as long as Europeana does not display the skos:note field in the portal.
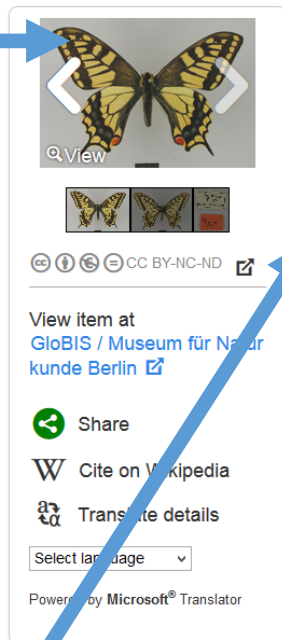
Section Aggregation:

```
<ore:Aggregation rdf:about="http://web-openup.nhm.ac.uk/oai-provider
/index.php?form=display&oaiid=GLOBIS:MFN:GERMANY
/MFNGLOBALBUTTERFLYINFORMATIONSYSTEMGLOBIS10325&db=0">
 <edm:aggregatedCHO rdf:resource="GLOBIS:MFN:GERMANY/10325">
 </edm:aggregatedCHO>
 <edm:dataProvider>Museum für Naturkunde Berlin, GloBIS</edm:dataProvider>
 <edm:hasView rdf:resource="http://globis-images.insects-online.de/images
 /Berlin/Berlin_14/orientalis_Neuburger_Papilio_machaon_MNHU_1B.jpg">
 </edm:hasView>
 <edm:hasView rdf:resource="http://globis-images.insects-online.de/images
 /Berlin/Berlin_14/orientalis_Neuburger_Papilio_machaon_MNHU_1C.jpg">
 </edm:hasView>
 <edm:isShownAt rdf:resource="http://www.globis.insects-online.de/?q=node
/3&s=10325"></edm:isShownAt>
 <edm:isShownBy rdf:resource="http://globis-images.insects-online.de/images
 /Berlin/Berlin_14/orientalis_Neuburger_Papilio_machaon_MNHU_1A.jpg">
 </edm:isShownBy>
 <edm:object rdf:resource="http://globis-images.insects-online.de/images/Berlin
 /Berlin_14/orientalis_Neuburger_Papilio_machaon_MNHU_1A.jpg"></edm:object>
 <edm:provider>OpenUp!</edm:provider>
 <edm:rights rdf:resource="http://creativecommons.org/licenses/by-sa/3.0/">
 </edm:rights>
 </ore:Aggregation>
</rdf:RDF>
```

7.3 Sample Records in the Europeana portal

Carousel of images. Within the carousel the information related to the **web resource** will be displayed (Still work in progress for Europeana)

This geonames info is added by Europeana.

Papilio machaon Linnaeus, 1758

Description: Current type depository: MFNB, Berlin (1 [m], syntype) // Cited type material: // Other remarks:; Syntype(s)

Geographic coverage: Japan;
http://sws.geonames.org/1861060/

Date: 1903 (identification)

Type: PreservedSpecimen

Subject: flutura bajrake; Koninginnenpage; makaonfjäril; Svalehale; svalestjert; Swallowtail; Махаон; Artemisia Swallowtail; Common Yellow Swallowtail; Old World Swallowtail; Ritariperhonen; Le Grand Porte-queue; Schwalbenschwanz; Paz królowej; Makaon; Makaonfjäril; Riddarfjäril; ritariperhonen; Koninginnepage; fecskefarkú lepke; Fecskefarkú pille

Identifier: MfN - Global Butterfly Information System (GloBIS) - 10325

Relation:

http://www.biodiversitylibrary.org/name/Papilio_machaon_Linnaeus%2C_1758;
http://rs.tdwg.org/dwc/dwctype/PreservedSpecimen

Source: Global Butterfly Information System (GloBIS)

Data provider: GloBIS / Museum für Naturkunde Berlin

Provider: OpenUp!

Providing country: Germany

Auto-generated tags ▾

What ▸

Where ▸

Search also for:

Title
Papilio machaon Linnaeus, 1758 (14)
What
PreservedSpecimen (1170381)
flutura bajrake (21)
Koninginnenpage (23)
makaonfjäril (21)
Svalehale (22)
svalestjert (21)
Swallowtail (56)
Махаон (21)
Artemisia Swallowtail (14)
Common Yellow Swallowtail (14)
Old World Swallowtail (14)
Ritariperhonen (21)
Le Grand Porte-queue (14)
Schwalbenschwanz (17)
Paz królowej (14)
Makaon (14)
Makaonfjäril (21)
Riddarfjäril (14)
ritariperhonen (21)
Koninginnepage (18)
fecskefarkú lepke (14)
Provider
OpenUp! (1520441)

Ranunculus trichophyllus Chaix

Description: Hydrobotanische Exkursion ins Wiener Becken unter der Leitung von Univ.Prof.Dr. Georg Janauer.

Contributor: Gilli,C. (collector); C. Gilli & G. Janauer (identifier)

Geographic coverage: (47.7208333327,16.0672222216) WGS84; Altitude: 373 m; [Bundesland]; Austria; Niederösterreich, Neunkirchen, Kehrbach (künstliches Gerinne).

Type: Preserved Specimen

Subject: Water buttercup

Identifier: WU - Herbarium WU - 267350

Relation:
http://www.biodiversitylibrary.org/name/Ranunculus_trichophyllus_Chaix; http://rs.tdwg.org/dwc/dwctype/PreservedSpecimen

Source: University of Vienna, Institute for Botany - Herbarium WU

Data provider: University of Vienna, Institute for Botany - Herbarium WU

Provider: OpenUp!

Providing country: Austria

Auto-generated tags ▾

What ▾
Concept Term: http://openup.nhm-wien.ac.at/commonNames/38222
Concept Label: [Water buttercup] (def)

Where ▾
Place Term: http://www.geonames.org/maps/google_47.7208333327_16.0672222216.html
Geo Space: 47.720833; 16.067223

Search also for:

Title
Ranunculus trichophyllus Chaix (52)
Who
Gilli,C. (collector) (1140)
C. Gilli & G. Janauer (identifier) (14)
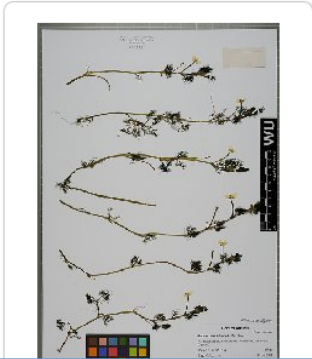**What**
Preserved Specimen (1170381)
Water buttercup (5)
Provider
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Ranunculus trichophyllus Chaix

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OpenUp! (1520441)

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 <skos:note>Geography: New Zealand</skos:note>
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What ▾
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Biodiversity Heritage Library

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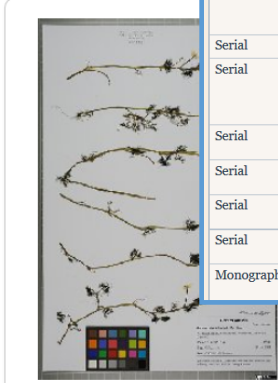Like   Tweet

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Serial	Actes de la Société linnéenne de Bordeaux.	Société Linnéenne de Bordeaux. Société Linnéenne de Bordeaux.	t.35 (1881)	1881	Page 237	
Serial	Annales de la Société des sciences naturell	Société des sciences naturelles de la Charer Académie de La Rochelle. Société des sciences naturelles de la Charer	no.31-32 (189	1894-18	Page 109	
Serial	Atti della Società italiana di scienze natura	Società italiana di scienze naturali.	v.13 (1870)	1870	Page 64	
Serial	Botanisches Zentralblatt;	Association internationale des botanistes. Botanischer Verein, Munich. Botaniska sällskapet, Stockholm. Deutsche Botanische Gesellschaft.	jahrg. 38. bd.	1880	Page 348	
Serial	Bulletin /	Smithsonian Institution. Smithsonian Institution.	no. 133 (1943)	1901	Page 444	
Serial	Bulletin de la Société botanique de France.	Centre national de la recherche Société botanique de France.				
Serial	The Canadian field-naturalist.	Ottawa Field-Naturalists' Club Ottawa Field-Naturalists' Club.				
Serial	The Canadian field-naturalist.	Ottawa Field-Naturalists' Club Ottawa Field-Naturalists' Club.				
Monograph/Item	The fur seals and fur-seal islands of the No	United States. Clark, George Archilbald,	v. 3	1898	Page 602	

lso for:

lus trichophyllus Chaix (48)

ollector) (1133)

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(1240571)

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Subject: Water buttercup

Identifier: WU - Herbarium WU - 267350

Relation: http://www.biodiversitylibrary.org/name/Ranunculus_trichophyllus_Chaix;
http://rs.tdwg.org/dwc/dwctype/PreservedSpecimen

Source: University of Vienna, Institute or Botany - Herbarium WU

Provider: OpenUp!

Providing country: Austria

Link to Darwin Core Vocabulary

Term Name: PreservedSpecimen

Identifier:	http://rs.tdwg.org/dwc/dwctype/PreservedSpecimen
Definition:	A resource describing a preserved specimen.
Comment:	For discussion see http://code.google.com/p/darwincore/wiki/DwCTypeVocabulary
Type of Term:	http://www.w3.org/2000/01/rdf-schema#Class
Member Of:	http://rs.tdwg.org/dwc/terms/DwCType
Version:	PreservedSpecimen-2011-10-16
Refines:	
Details:	PreservedSpecimen

8 LIST OF FIGURES

9 LIST OF TABLES

10 GLOSSARY

TERM	DESCRIPTION
EDM	Europeana Data Model[31]
ESE	The Europeana Semantic elements (ESE) is the metadata set used to describe cultural heritage objects in Europeana.[32]

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[31] http://pro.europeana.eu/edm-documentation 28 Jan. 2014.
[32] http://www.europeana.eu/schemas/ese/ 28 Jan. 2014.

TERM	DESCRIPTION
GBIF	The Global Biodiversity Information Facility (GBIF) is an international organisation that focuses on making scientific data on biodiversity available via the Internet using web services.[33]
GeoNames	GeoNames is a geographical database available and accessible through various Web services, under a Creative Commons attribution license.[34]
Ontology	In computer science and information science, an ontology formally represents knowledge as a set of concepts within a domain, and the relationships between pairs of concepts.[35]
PDI	Pentaho Data Integration[36]
Web service	A Web service is a method of communication between two electronic devices over the World Wide Web.[37]
XML	Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.[38]
XSL	In computing, the term Extensible Stylesheet Language (XSL) is used to refer to a family of languages used to transform and render XML documents.[39]

11 LIST OF REFERENCES

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[33] http://en.wikipedia.org/wiki/GBIF 28 Jan. 2014.

[34] http://en.wikipedia.org/wiki/GeoNames 28 Jan. 2014.

[35] http://en.wikipedia.org/wiki/Ontology_(information_science) 28 Jan. 2014.

[36] http://kettle.pentaho.com/ 28 Jan. 2014.

[37] http://en.wikipedia.org/wiki/Webservice 28 Jan. 2014.

[38] http://en.wikipedia.org/wiki/Xml 28 Jan. 2014.

[39] http://en.wikipedia.org/wiki/Xsl 28 Jan. 2014.