

Recommendations for the representation of edm:Event in Europeana



[Campagna di Roma, Heinrich Kühn, Museum für Kunst und Gewerbe Hamburg](#)
[CC0](#)

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Contents

1. Introduction	2
2. Methodology	3
3. Relevance of edm:Event/why Events are interesting to Europeana	4
4. Event specification in EDM	5
a. Current specifications	5
b. Assessment of current edm:Event specification in EDM and recommendations	6
5. Completeness of Event data (or when to use the event-centric model)	8
6. Type of events	8
7. Events and TimeSpan	10
8. Events and Places	11
9. Events and Roles for Agents	11
10. Conclusion and recommendations for future work	13
References	14
Document history	15
Annex: Examples of metadata with events	16
1. Bildarchiv Foto Marburg	16
2. Research Center for Ethnomusicology (CREM- LESC, CNRS-Paris Nanterre University, France)	18
3. Erfgoedplus.be (Provincie Limburg, Belgium)	19
4. CARARE / 3D ICONS projects	22
5. Deutsche Digitale Bibliothek	25
6. Performings Arts	27
7. OpenUp!	28
8. MUSEU	29

1. Introduction

The need to support Events data in Europeana has been raised at many occasions. First Events have been thought of as part of the design of the Europeana Data Model (EDM). The EDM Primer¹ proposes a model for representing Events and the edm:Event class is defined as part of the EDM Definitions as follows:

An event is a change “of states in cultural, social or physical systems, regardless of scale, brought about by a series or group of coherent physical, cultural, technological or legal phenomena” (E5 Event in CIDOC CRM) or a “set of coherent phenomena or cultural manifestations bounded in time and space” (E4 Period in CIDOC CRM)

However it has not yet been implemented in Europeana for data aggregation. The question of Events implementation was raised again during an EDM workshop² which led to its inclusion in the topics discussed by the Europeana Data Quality Committee (DQC).

The DQC has worked on the development of recommendations on EDM elements in order to fulfill the usage scenarios as provided in the DQC’s “Discovery – User scenarios and their metadata requirements”³. Part of the discussion on the usage scenarios has been about the need for supporting Events data in EDM, which would both allow for browsing by Events as well as filtering results – e.g. after searching the collections for agents, dates, places – by the types of events associated.

This document reports on the gathering and analysis of existing events data in the Europeana Network. It provides a series of recommendations that aim at clarifying the requirements in terms of data modelling for supporting Events. It also makes an assessment of the current definition of the edm:Event class and its related properties. These recommendations will be communicated afterwards to those in charge of developing Europeana-related services, for them to make a decision on whether (and how) to include the exploitation of event data in appropriate implementation roadmaps.

2. Methodology

To be able to review the EDM model and identify key requirements for describing/modelling events, we asked participants to map their data to it using the current EDM specifications for events and to provide feedback on the model. We then collected the events data samples and the feedback (See section 3) and began with analysing them and formulating requirements.

¹ [EDM Documentation](#)

² [EDM turns five. so now what? - Workshop](#)

³ [Data Quality Committee - Discovery - User Scenarios](#)

The data samples we collected come from several domains:

- Photography collection from Bildarchiv Foto Marburg
- Archaeological objects from Carare
- Ethnographic collection from CNRS-CRM
- Performing Art collections from The Performings Arts project
- Museum collection from Erfgoedplus.be
- Cross domain collection from the German Digital Library
- Natural history collection from OpenUp
- Museum collection from Museu

All the data samples and related documentation can be **downloaded from the DQC page at <https://pro.europeana.eu/project/data-quality-committee#representing-events-in-edm>** and are also presented as Annexes to this document.

3. Relevance of edm:Event/why Events are interesting to Europeana

Implementing Events in EDM is relevant for Europeana as it allows capturing more detailed information about the creation, evolution and transition of cultural heritage objects over time. This is especially true when multiple events have been recorded in the history of an object that help to distinguish between different contexts. To illustrate, let's consider the example of the Rotunda (see Annex). The monument has a rich history of more than 15 centuries during which its function and shape changed. Built in the late 3rd or the early 4th century, it has first served as a Roman Mausoleum, then as a Christian church, eventually as a mosque and then again as a church. This information is currently recorded using a single EDM property (dc:description), which entails an extensive textual description. Although the text includes rich information, it is difficult to interpret by machines. Using the Event modeling will improve the representation of this information and will make it more discoverable, interoperable and reusable for researchers (see the Discovery – User scenarios).

The implementation of the edm:Event class will enable Europeana providers that hold Events data to provide more accurate and rich descriptions and to better contextualise their resources using EDM. Providers working with event-based models such as CIDOC-CRM⁴, LIDO⁵ or the new Linked Art Data Model⁶ (but not only) will be able to represent in EDM complex information that is currently lost because of the absence of the class in the current implementation.

Finally, supporting Events will improve the expressiveness and flexibility of EDM and will increase its re-use in the cultural heritage domain.

⁴ CIDOC-CRM <http://www.cidoc-crm.org/>

⁵ LIDO <http://www.lido-schema.org/schema/v1.0/lido-v1.0-schema-listing.html>

⁶ Linked Art Data Model <https://linked.art/model/>

4. Event specification in EDM

Current specifications

A first representation of Events has been proposed as part of the definition of the Europeana Data Model. This representation was never integrated to the EDM implementation (especially the EDM schema) currently used in Europeana services.

This proposal defines an `edm:Event` class with several elements to describe it.

edm:Event

Properties	Value type	Cardinality
<code>edm:happenedAt</code>	reference (to a Place)	min 0, max 1 ⁷
<code>edm:occurredAt</code>	reference (to a TimeSpan)	min 0, max unbounded
<code>owl:sameAs</code>	reference (to an Event)	min 0, max unbounded
<code>skos:prefLabel</code>	literal	min 0, max 1 per lang tag
<code>skos:altLabel</code> , <code>skos:hiddenLabel</code>	literal	min 0, max unbounded
<code>skos:note</code>	literal	min 0, max unbounded
<code>dc:identifier</code>	literal	min 0, max unbounded
<code>dcterms:hasPart</code>	reference to an Event that is part of the Event being described	min 0, max unbounded
<code>dcterms:isPartOf</code>	reference to an Event that the described Event is part of	min 0, max unbounded
<code>crm:P120_occurs_before</code> ⁸	reference (to an Event)	min 0, max unbounded
<code>edm:hasType</code>	literal or reference (to a Concept). It is strongly recommended to provide <code>edm:hasType</code> that indicates the nature of the event.	min 0, max unbounded
<code>edm:isRelatedTo</code>	reference	min 0, max unbounded

A series of properties are defined to link a resource (Provided Cultural Heritage Object (CHO), Agent, Place, Timespan) to an Event.

For relating an `edm:ProvidedCHO` with an `edm:Event`:

Properties	Value type	Cardinality
<code>dc:relation</code>	literal or reference	min 0, max unbounded
<code>dc:subject</code>	literal or reference	min 0, max unbounded

⁷ Note that there may be cases where an event can happen in more than 1 places (e.g. a virtual or other contemporary event that has happened in several places at the same time) so it is questionable if the cardinality of this property should be kept as such. For more information, please see the 'Events and Places' Section.

⁸ Note that this property is currently defined as `crm:P120F.occurs_before` in the EDM documentation, this will need to be amended.

edm:hasMet	reference	min 0, max unbounded
edm:wasPresentAt	reference	min 0, max unbounded

For relating an edm:Agent with an edm:Event:

Properties	Value type	Cardinality
edm:hasMet	reference	min 0, max unbounded
edm:wasPresentAt	reference	min 0, max unbounded

For relating an edm:Event with edm:Place and/or an edm:TimeSpan, the properties of edm:Event can be used (at the moment relations between a place or time span and an event are only represented by a link **from** the event **to** the place or time span):

Assessment of current edm:Event specification in EDM and recommendations

In the current EDM Event specification several properties that can be used for relating an Event to the Provided CHO and other classes have already been defined. However, mapping exercises with the data collected from various partners (see section 2) show that there are inconsistencies in the directionality of these properties which hinders the linking of the resources and expressing the relationship between them. In particular, properties for relating an Event with a Timespan or Place are defined only for the Event class, but not for the Timespan or the Place class. Also, properties for relating an Event with an Agent have been defined only for the Agent class, but not for the Event class. The figure below shows the gaps in the direction of links.

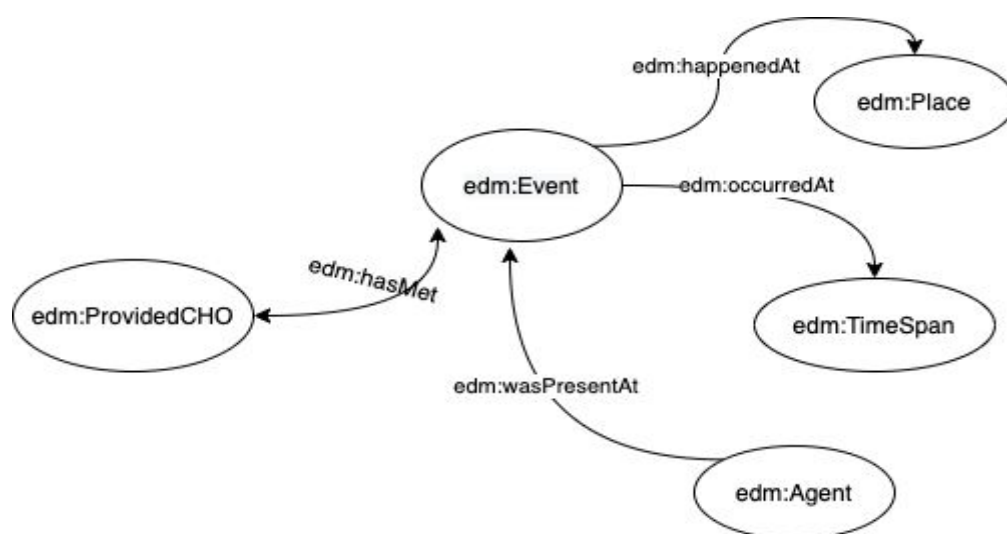


Fig.1 Inconsistencies in the description of links

It is thus questionable whether the current directionality of properties relating edm:Event with edm:Agent, edm:TimeSpan, and edm:Place should be kept. In order to have a homogeneous framework it would be recommended to explicitly add the *edm:hasMet*

property to the model. In accordance with its definition in the EDM Definition Document, (section 3.2.12 Has Met⁹), edm:hasMet is a general property that can be used for relating an edm:Event with other resources too:

Property	Value Type	Domain	Range	Cardinality
edm:hasMet	reference to an Agent that the Event 'has met'	edm:Event	edm:Agent (but see note below)	min 0, max unbounded
edm:hasMet	reference to an Event that happened in this Place	edm:Place	edm:Event	min 0, max unbounded
edm:hasMet	reference to an Event that occurred at this time(span)	edm:Timespan	edm:Event	min 0, max unbounded
edm:hasMet	reference to the ProvidedCHO that the Event 'has met'	edm:Event	edm:Provided CHO	min 0, max unbounded

In addition, it may be considered to add the following properties as well:

Property	Value Type	Domain	Range	Cardinality
edm:isTimeSpanOf ¹⁰	literal or reference to the Timespan of an Event (backwards property for edm:occurredAt)	edm:Time Span	edm:Event	min 0, max 1
edm:witnessed ¹¹	Reference to a Place where the Event took place (backwards property for edm:happenedAt)	edm:Place	edm:Event	min 0, max unbounded?
edm:occurredInThe PresenceOf ¹²	reference to an Agent or another resource that was present in the event (backwards property for edm:wasPresentAt)	edm:Event	edm:Agent, edm:InformationResource, edm:PhysicalThing	min 0, max unbounded

⁹ [EDM Definition](#), p.26

¹⁰ Equivalent properties in CIDOC-CRM are *P4.has time-span* and *P4i is time-span of*

¹¹ Equivalent properties in CIDOC-CRM are *P7 took place at* and *P7i witnessed*

¹² Equivalent property in CIDOC CRM are *P12.occurred_in_the_presence_of* and *P12i.was_presentAt*

5. Completeness of Event data (or when to use the event-centric model)

Representing Events in EDM requires the creation of fully fledged resources that relate Events with Places, TimeSpans and Agents. Events bundle temporal and spatial information together with the agents involved - *what* happened, *when* did it happen, *where* did it happen and *who* was involved.

In the data samples collected by DQC, the granularity of event descriptions varies. There are several examples that include rich descriptions of Events, reusing the full list of properties from the current EDM specification. But in other cases, the event descriptions are limited to only the type of the event; no other event information could be extracted.

Deciding on the appropriateness of using the Event model can be done by considering the balance between the information that needs to be conveyed and the effort that is required to create the data structured according to this model (Dijkshoorn 2019). Cultural heritage institutions whose source data is, for instance, LIDO - also an event-based data model - hold already this type of data and they could easily convert it to another event-based model. However, this doesn't mean that non-event-based models cannot include rich descriptions of event information that could be better represented using the event-centric approach. In this case though, modelling the data might require more effort and resources.

To have meaningful representations of events that will support the basic requirements of the corresponding user scenario ('browse by Events'), we recommend to define *edm:hasType* as mandatory property for the Event class and then add either a relation to a Timespan, Place or Agent.

Recommendations:

- Define *edm:hasType* as mandatory property for the *edm:Event* class.
- Define as mandatory one of the following properties:
edm:occuredAt/edm:isTimeSpanOf or *edm:happenedAt/edm:witnessed* or
edm:occurredInThePresenceOf/edm:wasPresentAt or *edm:hasMet*

6. Type of events

The data samples that were contributed by providers include events that are associated with the cultural heritage object's life cycle/history (e.g. production events, modifications, restorations etc.) and not historical events in the broad sense (e.g. battles, wars, coronations etc). Note that the latter might (in any case) be better represented as Concepts or TimeSpans rather than Events.

Event Types that are present in the data samples

Contributor	ProvidedCHO	Event Type
Bildarchiv Foto Marburg	Museum/Goethehaus	Use Production Modification Destruction
	Palace garden	Production Part addition Modification
German Digital Library	Poster	Design Manufacturing/printing Publication
	Drinking glass	Design Manufacturing
	Photograph	Manufacturing
CNRS-CRM	Sound recordings	Production Exhibition
CARARE	Fieldwork reports	Survey Excavation
	3D digital objects	3D capture/digitisation 3D processing Reconstruction Animation
ECLAP (Performing Arts project)	Play	Creation Dramatic Production
	Photograph	Dramatic Production
Erfgoedplus	Painting	Creation Restoration Exhibition
OpenUp!	Natural history object (eg. Preserved Specimen, Fossil Specimen, Living Specimen, Material Sample, Human Observation, Machine Observation...) - all types of digital objects (image, video, sound, text, 3D)	Gathering/finding Identification
MUSEU	Photograph	Production

		Commissioning
	Painting	Production

To distinguish among different types of events, the use of values/URIs from a controlled vocabulary is recommended. Below, we list several options of vocabularies that could be used:

- [Getty Art & Architecture Thesaurus - Events \(hierarchy\)](#)
- [Event type LIDO terminology](#)¹³
- Events in the GND ontology
- [FISH Event Types Thesaurus](#) published by Historic England and developed by the FISH consortium

[This document](#) tries to capture the most commonly used vocabularies for indicating the type of an event and it is based on the types of events that were present on the data samples. It was produced when analysing the data and might be a useful list for data providers who do not already use an event type vocabulary. Note that the list of terms in the document is not intended to be complete.

Recommendations:

- To distinguish between different types of events, we recommend the use of values/URIs from a controlled vocabulary (e.g Getty AAT)
- (for future work) Assess the feasibility and impact of creating a reference listing of event types as skos:Concept, which will be used in the Europeana Entity Collection and other relevant places.

7. Events and TimeSpan

Based on the current EDM specification, for expressing the date of an Event the property *edm:occurredAt* can be used with a reference to an instance of the TimeSpan class. At the same time, EDM offers already some specialisations of *dc:date* for representing the dates of different events in the history of an object: *dcterms:created* for Creation/Production of an object, and *dcterms:issued* for a Publication event. These properties can be seen as shortcuts of a Creation/Production or Publication event, which links the object and a time-span in the object's history together. They are extensively used in EDM data, and a recommendation is needed on when to use these properties in comparison with a fully developed 'event path' e.g. in some cases additional information for the Creation/Production or Publication event might be available from the source data, in others not.

Another issue that was identified is that the property *edm:occurredAt* supports only a reference to a Timespan. Not having the option to use literals (plain text) when no such URIs are available (See the OpenUp examples in Annex), could force data providers to create

¹³ Note that there might be some inconsistencies with English translations.

'fake' Timespan resources that would be rather meaningless and not dereferenceable by Europeana. A solution that was proposed is to broaden the range of the property *edm:occurredAt* to 'literal or reference' so it wouldn't be necessary to deal with blank nodes.

Finally, it is recommended to add to the model *edm:isTimespanOf* as a backwards property for *edm:occurredAt* as well as a property with domain Timespan and range Event to allow relating a Timespan with an Event (e.g. *edm:hasMet*)

Recommendations:

- Add *edm:isTimespanOf* as a backwards property for *edm:occurredAt*.
- Explicitly define *edm:hasMet* with domain Timespan and range Event to allow relating a Timespan with an Event.
- (for future work) Formulate a recommendation for providers on when to use the more generic EDM specialisations for expressing the date of an Event and not the Event model and its related properties.
- (for future work) Investigate what would be the impact of broadening the allowed value type of the property *edm:occurredAt* to 'literal or reference'.

8. Events and Places

Using the current EDM Event specification, one can associate events with places via the property *edm:happenedAt*, which supports a reference. This can be restrictive when the place where the event occurred is not having geospatial coordinates (e.g. uninhabited, mythological or virtual places). An example of such a case comes from the Natural History domain where the coordinates of the described places are often not available (see Annex).

Recommendations:

- (for future work) Investigate what would be the impact of broadening the allowed value type of the property *edm:happenedAt* to 'literal or reference'.

9. Events and Roles for Agents

An Event often involves the participation of various agents in a variety of roles. The current EDM specification allows capturing the participation of an agent to an event using the properties *edm:hasMet* and *edm:wasPresentAt*. But it does not allow specifying what kind of role the agent played in this particular event. Although EDM offers already some specialisations of the *dc:contributor* property for representing the role of an Agent: *dc:creator* and *dc:publisher*, it does not allow specifying more roles.

A variety of different agent roles¹⁴ are present in the data samples and in many cases events have more than one participating agent. For example, the Production event of a theatre performance involves several agents in different roles like the director of the play, the actors, the set designer etc.

To represent agent roles in EDM, we have been discussing the following ways:

- Create a new role property that will be attached to the edm:Agent class
 - To investigate this option we looked at CIDOC's property `P14.1.in_the_role_of` which describes the role of a specific agent in a specific event. However, since it is defined as a property of another property, namely `P14.carried_out_by`, modelling this in EDM can be challenging. Although RDF (the model on which EDM relies) offers a built-in vocabulary for providing additional information to properties (the reification vocabulary¹⁵), care is needed when using it.
- Define a set of sub-properties of the property `edm:wasPresentAt` to be attached to the Event class (see Performing Arts modelling attempt¹⁶). For example, sub-properties could be: `edm:publisher`, `edm:designer`, `edm:architect`, `edm:photographer` etc. (see the DM2E Model¹⁷). The problem obviously with this approach is that we would need to create as many properties as the number of potential roles.
- Use the already existing property of the Agent class, `rdaGr2:professionOrOccupation` with references to a controlled vocabulary¹⁸.

At the moment, there is no ideal solution for representing Agent roles in EDM. More work will be needed in order to conclude what the best solution would be. This work shall be aligned with other semantic-web based models, such as Linked Art, which do not yet offer a unified solution for representing roles, either¹⁹.

Recommendations:

- (for future work) Investigate further what would be the ideal solution to represent Agent roles in EDM.

¹⁴ Creators, publishers, photographers, designers, production artists, actors, architects, surveyors, archaeologists, architectural historians, building surveyors, photogrammetrists, fieldworkers, etc.

¹⁵ [RDF Reification](#) - W3C

¹⁶ Modeling work on performing art is also going to happen in a recently launched W3C group, [Performing Arts Information Representation Community Group](#).

¹⁷ [DM2E project](#)

¹⁸ [This document](#) was created to serve as a source for creating professions/roles that could be added to the Europeana Entity Collection and enrich the entities. It is based on the LC relator codes and Wikidata starting from the entities that are present in the Entity Collection.

¹⁹ At the time of writing, the Linked Art model treats some roles (e.g., "painter") via the involvement of agents in production activities that use a specific technique (i.e., "painting") but this cannot be applied to all the roles that can be present in CH metadata (e.g., "illustrator").

10. Conclusion and recommendations for future work

We have identified various requirements for implementing Events in EDM. These requirements are based on the analysis of data samples collected from various institutions. When requirements couldn't be addressed by the current EDM specification, extensions of EDM were proposed based on other models (e.g. CIDOC-CRM):

1. **Relevance of edm:Event:** data providers are encouraged to use the EDM Event specification to describe events related to a Provided CHO's history...
2. **Completeness of events data:** to have meaningful representations of events that will support the basic requirements of the user scenario ('browse by Events'), we recommend to define *edm:hasType* as mandatory property for the Event class and then add either a relation to a Timespan, Place or Agent.
3. **Type of events:** to distinguish among different types of events, the use of values/URIs from a controlled vocabulary is recommended.
4. **Events and Timespan:** we recommend to i) add *edm:isTimespanOf* as a backwards property for *edm:occurredAt* and ii) explicitly define *edm:hasMet* with domain Timespan and range Event to allow relating a Timespan with an Event.
5. **Events and Places:** we formulated a recommendation for future work (see below).
6. **Events and roles for Agents:** we did not have time to work further on identifying an ideal solution for representing Agent roles in EDM.

It would be good to emphasize that we did not have the time and resources to address all the requirements that have been raised so far. Therefore, we provide a number of recommendations for future work:

- Investigate further what is the ideal solution to represent agent roles in EDM.
- Assess the impact of extending the core EDM Event model to allow capturing the following information:
 - the digital files that were produced during the event
 - the organisation responsible for the event
 - the event method (equivalent property in LIDO is *lido:EventMethod*)
 - techniques and materials used during the event (equivalent property in LIDO is *lido:EventMaterialsTech*)
 - (bibliographic) references
- Discuss with the DQC if we want to broaden the allowed value type of some properties (e.g. *edm:occurredAt*, *edm:happened*) to accommodate literals when references are not available.
- Assess the feasibility and impact of creating a reference listing of event types as *skos:Concept*, which will be used in the Europeana Entity Collection and other relevant places.
- Discuss further if and what recommendations are needed on when to use the EDM Event profile and its related properties in comparison with the more generic properties that EDM offers for expressing the data and the place of an event related to the Provided CHO's history.

- Investigate the compatibility of EDM with the Linked Art Data Model (e.g. wrt types of events and list of properties to relate events to other classes).
- Check in with the Collections Design team how event related information can be displayed on Europeana Collections. The display chosen by the German Digital Library can be an inspiration for this.

References

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Document history

Version	Status	Authors	Contributors	Dates	Changes
0.1	ToC, Chapters 1-3, Annex	Regine Stein, Valentine Charles	Antoine Isaac, Aude Julien Da Cruz Lima, Cosmina Berta, Jef Malliet, Julia Beck, Kate Fernie, Marko Knepper and the DQC members	2017	First ToC, Chapters 1, 2 and 4, first Annex
0.2	First draft of the report sent for review	Eleftheria Tsoupra, Regine Stein	Cosmina Berta, Kate Fernie, Valentine Charles, Antoine Isaac and the DQC members	2020	Chapters 3, 5-11 (including 2 new chapters), update of chapter 4, update of Annex
0.3	Second draft of the report	Eleftheria Tsoupra	Regine Stein, Kate Fernie, Gerda Koch, Marco Scarbaci and the DQC members	2020	Addition of data samples provided by MUSEU, OpenUp! and CARARE. Update of 'Recommendations for future work'
1.0	Final Review	Eleftheria Tsoupra	DQC members	2021	Editorial work on Annex

Annex: Examples of metadata with events

All the data samples can be **downloaded from the DQC page at**

<https://pro.europeana.eu/project/data-quality-committee#representing-events-in-edm>

1. Bildarchiv Foto Marburg

Example 1: Goethehaus (museum, formerly the house of Goethe's family)

Object type: museum

- Event type: *production*
 - ◆ Agent: Johann Friedrich von Uffenbach
 - ◆ TimeSpan: after 1719
- Event type: *use*
 - ◆ Agent: Johann Wolfgang von Goethe
 - ◆ Agent: Katharina Elisabeth Goethe
 - ◆ TimeSpan: 1730-1795
 - ◆ Agent: Johann Caspar Goethe
 - ◆ TimeSpan: 1730-1795
- Event type: *modification*
 - ◆ TimeSpan: 1755/1756
 - ◆ TimeSpan: 1946/1951
- Event type: *destruction*
 - ◆ TimeSpan: 1944



Source data: Example 'Marburg_Goethehaus_Events_LIDO.xml'

Publication of example:

- [Bildindex](#)
- [DDB](#)

EDM mapping of events data:

- [DDB-EDM](#)
- Examples 'Marburg_Goethehaus_Events_EDM.xml', 'Museu_Goethehaus_Events_EDM.xml' and 'Marburg_Goethehaus_RDFgraph.png'

Discussion of example:

As a starting point, instead of unrelated information like:

```
<http://id.fotomarburg.de/thing/obj20225099> a edm:ProvidedCHO ;
  dc:contributor "Goethe, Catharina Elisabeth"@de ;
  dc:contributor <http://d-nb.info/gnd/118540238> , <http://d-nb.info/gnd/118695940> ;
  dc:date "1755/1756" , "1946/1951" , "1944" .
```


with in particular three dates that are not at all understandable - what happened at those dates - one will get grouped information that relates agents and dates together with the type of event .

See presentation of that kind of information in DDB:

Event:	Herstellung
(who):	👤 Uffenbach, Johann Friedrich Armand von (Entwerfer)
(when):	nach 1719
Event:	Gebrauch
(who):	👤 Goethe, Johann Wolfgang von
Event:	Gebrauch
(who):	Goethe, Catharina Elisabeth 👤 Goethe, Johann Caspar
Event:	Bearbeitung
(when):	1755/1756
Event:	Zerstörung
(when):	1944
Event:	Bearbeitung
(when):	1946/1951

Example 2: Schlosspark Nymphenburg

Object type: palace garden

→ Event type: *production*

- ◆ Agent: Agostino Barelli (Architect)
- ◆ Agent: Marx Schinnagl (Architect)
- ◆ TimeSpan: from 1664

→ Event type: *part addition*

- ◆ Agent: Charles Cabornet (Landscape Architect)
- ◆ Agent: Dominique Girard (Landscape Architect)
- ◆ Date: 1702

→ Event type: *modification*

- ◆ Agent: Friedrich Ludwig von Sckell (Landscape Architect)
- ◆ TimeSpan: 1799-1823



Source data: Example 'Marburg_Nymphenburg_Events_LIDO.xml'

Publication of example:

- [Bildindex](#)
- [DDB](#)

EDM mapping of events data:

- [DDB mapping](#)
- Examples 'Marburg_Nymphenburg_Events_EDM.xml' and 'Museu_Nymphenburg_Events_EDM.xml'

Discussion of example:

Instead of something like

```
<http://id.fotomarmburg.de/thing/obj20144943> a edm:ProvidedCHO ;
    dc:contributor <http://vocab.getty.edu/ulan/500010993-agent> ,
<http://vocab.getty.edu/ulan/500025075-agent> , <http://vocab.getty.edu/ulan/500080956-agent> ,
<http://vocab.getty.edu/ulan/500019068-agent> ;
    dc:date "1702" , "1799/1823" , "1715" .
```

one will get grouped information that relates agents and dates together with the type of event.

See presentation of that kind of information in DDB:

Event:	Herstellung
(who):	Barelli, Agostino (Architekt) Schinnagl, Marx (Bauleiter)
(when):	ab 1664
Event:	Erweiterung
(who):	Carbonet, Charles (Gartenarchitekt)
(when):	ab 1702
Event:	Erweiterung
(who):	Girard, Dominique (Gartenarchitekt) ▲ Effner, Joseph (Architekt)
(when):	ab 1715
Event:	Bearbeitung
(who):	▲ Sckell, Friedrich Ludwig von (Gartenarchitekt)
(when):	1799-1823

Roles in Event as displayed here would still be missing in Europeana's current EDM. DDB can display them because they store separate elements for indexing and display.

2. Research Center for Ethnomusicology (CREM- LESC, CNRS-Paris Nanterre University, France)

CREM manages audio archives in the field of ethnomusicology and anthropology, mainly unpublished records made by researchers during fieldwork missions or scientific events around the world since 1900 to nowadays. CREM is part of the Europeana Sounds project (as CNRS-CREM data provider).

Example 1: Ethnographic fieldwork mission (CREM example based on Ogooué-Congo Mission, 1946)

Publication of example:

- [Corpus in CREM](#)
- [Collection in CREM](#)
- [Europeana](#)

EDM mapping of events data: 'CREM-Examples.xlsx' (sheet CREM1)

Discussion of example:

Data requirements especially include:

- Type of event : scientific event (this is an itinerant event with several dates and locations).
- Roles of agents related to the event.
- Multiple locations and dates for an event during a period of time (e.g., itinerant event), with sequence of locations by dates.
- Specific relation with CHO resources produced during the event: should we use edm:wasProducedAt or a refinement?

Example 2: Exhibition (periodical) CREM data example based on Universal Exhibition in Paris 1900

Object type: Sound recordings from the Universal Exhibition in Paris 1900

- **Event type:** *production*
- **Event Name:** Universal Exhibition Paris 1900



Publication of example:

- [Corpus in CREM](#)
- [Collection in CREM](#)
- [Europeana](#)

EDM mapping of events data: 'CREM-Examples.xlsx' (sheet CREM2)

Discussion of example:

This is a case where the event is used as a key motivation for collecting a set of objects together. Even if it could be represented as a Collection in EDM, there would still be value in linking that collection to a representation of the event - and use the event as a 'hub' to contextualize and access the various objects related to it.

3. Erfgoedplus.be (Provincie Limburg, Belgium)

Three sample records from the collection Het Stadsmus, Hasselt.

The 'spil' data format was developed as a uniform exchange format for all our aggregated collections. It is based on Spectrum²⁰. The real source data in this case come from an Adlib Museum database. The data are exported in XML (standard Adlib function) and converted to 'spil' XML (XSLT conversion). From spil format we then derive an RDF rendering for publication in Erfgoedplus.be and edm for Europeana.

²⁰ [Spectrum - Collections Trust](#)

The samples are descriptions of paintings, but could be made for any kind of object in our aggregator. The selection has no specific reason other than that these happened to be readily accessible records at the beginning of a file, with a representative choice of events that we could easily produce.

The events represented are creation, restoration and exhibition events.

Source data: Example 'Erfgoedplus_Stadmus_Events_SPIL.xml'

EDM mapping of events data: Example 'Erfgoedplus_Stadmus_Events_EDM.xml'

Example 1

Object type: painting

- **Event type:** *creation*
 - ◆ **Agent:** Anten, Djef
 - ◆ **Timespan:** 1851-1913
- **Event type:** *exhibition*
 - ◆ **Agent:** Dienst Cultuur, Stad Genk
 - ◆ **Place:** C-mine Cultuurcentrum
 - ◆ **Timespan:** 2010-09-28 to 2010-12-05
- **Event type:** *exhibition*
 - ◆ ...



Publication of example:

- [Erfgoedplus](#)
- [Europeana](#)

Example 2

Object type: painting

- **Event type:** *creation*
 - ◆ **Agent:** Anten, Djef
 - ◆ **Timespan:** 1851-1913
- **Event type:** *restoration*
 - ◆ **Agent:** De Maeyer, Lies
 - ◆ **Place:** ?
 - ◆ **Timespan:** 2005



Publication of example:

- [Erfgoedplus](#)
- [Europeana](#)

Example 3

Object type: painting

- Event type: *creation*
 - ◆ Agent: Anten, Djef
 - ◆ Timespan: 1909
- Event type: *exhibition*
 - ◆ Agent: Het Stadsmus
 - ◆ Place: Het Stadsmus
 - ◆ Timespan: 2004-03-27 to 2004-05-02
- Event type: *exhibition*
 - ◆ ...



Publication of example:

- [Erfgoedplus](#)

Discussion of examples:

- There are links in dc:type to object types in the Getty AAT, these resources are not explicitly added in the EDM.
- We have our own lists of agents and places (by lack of external lists which cover all our needs). These are included under each edm:ProvidedCHO. We add agents and places to our lists according to what we get from the source data.
- We do not have a list of events to be used e.g. as subjects, though that is on our wishlist (but it is too big an effort to start ourselves). Resource descriptions of exhibitions are therefore duplicated in the edm for each CHO that was in the exhibition (with different URIs).
- We found the reference to edm:Timespan (in edm:occuredAt) a bit of an overkill. We would prefer to use a shortcut here in the ontology by adding edm:begin and edm:end directly as properties of edm:Event.
- Roles in events would be nice to have. edm:wasPresentAt is not very eloquent, and often we have a more precise indication in our source data.
- In the third example, there is an exhibition event which was organized in the museum at a time when the museum still had a different name. It is still the same institution and location today, but the current prefLabel does not match the name in the object and event descriptions (both names are included in the corresponding record in our reference list, as prefLabel and altLabel). The solution adopted in the EDM sample below, providing a URI resource reference and a literal in the same element, is technically not correct, but it points to a potential requirement, which we may want to render in EDM or not.

```
<edm:Event rdf:about="#71022A51.priref.889_exh1">
  ...
  <edm:happenedAt
    rdf:resource="http://www.pcce.be/egb/place#crab.snid.114717.Stadsmus">St
    edelijk Museum Stellingwerff-Waerdenhof</edm:happenedAt>
  ...
</edm:Event>
<edm:Place rdf:about="http://www.pcce.be/egb/place#crab.snid.114717.Stadsmus">
  <skos:prefLabel>Het Stadsmus</skos:prefLabel>
```

</edm:Place>

4. CARARE / 3D ICONS projects

The CARARE metadata schema includes an information class to allow for recording information about both historical events which took place at the heritage assets (such as building, alterations, demolition, battles, etc) and archaeological events (such as excavations, surveys, etc). The activities class was extended for the 3D-ICONS project to allow for recording of a more detailed description of the rationale for an activity in line with the London Charter²¹ recommendations for 3D projects.

Example 1: three records provided by partners in either CARARE or 3D-ICONS based on the CARARE metadata schema

Source data: Example 'CARARE_Event_Example_Records.docx'

The three records in the "source data" Google document have been found on the MORE repository²² and on 3D-ICONS²³. The event theme within these records are not available in Europeana, as the EDM event class has not been implemented yet, the data is held back on MORE. Data has also been held by data providers.

The following table pencils some correspondences between elements of the CARARE schema that are relevant to events and EDM properties currently available.

CARARE Properties	EDM Properties
<car:recordInformation> <car:id>	
<car:name>	skos:note
<car:description>	skos:note
<car:hasGeneralPurpose>	
<car:eventType>	edm:hasType
<car:actors> <car:id> <car:name> <car:actorType> <car:roles> <car:vitalDates>	edm:hasMet
<car:temporal> <car:timespan> <car:periodName> ...	edm:occurredAt

²¹ [The London Charter](#)

²² [MORE](#)

²³ [3D Digitisation of Icons of European Architectural and Archaeological Heritage](#)

<car:spatial> <car:locationSet> <car:namedLocation> <car:address> <car:geometry>	edm:happenedAt
<car:consistsOf> <car:hadSpecificPurpose> <car:startDate> <car:endDate> <car:methods> <car:techniques> <car:materials> <car:equipment>	
<car:assessments>	
<car:hasPart>	dcterms:hasPart
<car:isPartOf>	dcterms:isPartOf
<car:hasCreated> ²⁴	
<dc:relation>	dc:relation

Discussion of examples:

The examples provided vary considerably in the amount of detail included. Examples of uses of event data in archaeology/architecture heritage include:

- monitoring visits to protected monuments/buildings (to record the current condition)
- archaeological fieldwork
- conservation work (on archaeological monuments/objects/buildings) - methods and techniques used, type of restoration, repair, reconstruction
- visualisation and modelling - creating 3D representations of an archaeological monument/building at a moment in time based on academic interpretation of the available evidence + survey data of the surviving portions of the structure.
- digitisation - techniques, methods, reasons.

The current modelling of events in EDM doesn't allow:

- the type of event to be distinguished from its purpose. For example, the type of event could be 3D-digitisation but according to the purpose (conservation, gaming, education, general) the outcomes of the scan can be very different (more or less detail, more or less realistic) which in turn means that the outcome is suitable for different uses.
- for a relation to the web resource (created by the event). With 3D content it is important to know the provenance of the model (the methods and techniques used and the purpose of the capture), which is recorded in the Event. A provided CHO may have many web resources.

²⁴ The relation to a digital resource (created by the event)

Example 2: Rotunda

Object type: historic building

- **Event type:** *Production* (Mausoleum)
 - ◆ **Place:** Thessaloniki
 - ◆ **Timespan:** between 298/299 and 311
 - ◆ **Agent:** Roman emperor Galerius (founder)
- **Event Type:** *Transformation* (Christian church)
 - ◆ **Timespan:** between the late 4th and 6th century AD
 - ◆ **Agent:** Emperor Theodosius I (founder)
- **Event type:** *Transformation* (Muslim mosque)
 - ◆ **Timespan:** 1590-1
 - ◆ **Agent:** Ottoman Sinan Paşa, Hortacı Süleyman Efendi (founders)
- **Event type:** *Part addition* (minaret)
 - ◆ **Timespan:** 1590-1
- **Event type:** *Transformation* (Christian Church)
 - ◆ **Timespan:** 1912-1914
 - ◆ **Agent:** Greek Orthodox officials (founders)
- **Event type:** *Transformation* (Macedonian Museum)
 - ◆ **Date:** 1917
- **Event type:** *Destruction*
 - ◆ **Date:** 1978
- **Event type:** *Restoration*



Publication of example:

- [3D-Icons](#)
- [Europeana](#)

EDM mapping of events data: Example 'CARARE_Rotunda_Events_EDM.xml'

Discussion of example:

The example shows how multiple events can be used to record changes over time. In this case, the event centric approach is used to capture how a historical building (the Rotunda) evolved over fifteen centuries. The challenges encountered when modeling these events regard:

- *Mapping unstructured events data to another schema.* It is worth mentioning that the events data in this example is not captured in the source data in a structured way, but rather, it is provided as free text description which makes modelling efforts very time consuming and challenging.
- *Finding an appropriate event type vocabulary to describe the changes in the structure and the use of the historical building among the existing vocabularies.* The LIDO vocabulary for event types - which was used for this example - is mostly focused on events in relation with museum objects, so we think that it isn't yet comprehensive enough for our purposes, namely to describe how a historical building has changed over time. The term 'transformation' was chosen as the closest

match for capturing the changes in the use of the Rotunda, however related changes to the structure, decoration or internal layout of the building could not be described. The events hierarchy of Getty AAT, on the other hand, does include references to some of the events that could be used for this example, however these are represented as ‘processes’²⁵. Thus, we would need to investigate further how this could be used in relation with the events model. We also recommend, as future work, to assess the feasibility and impact of developing an event type vocabulary that would be used by Europeana’s data providers.

- *Capturing the result of the transformation event* (transformation of the Rotunda from mausoleum into Christian church, then into mosque and into Christian church again). A property is missing to describe the result of each transformation. CIDOC-CRM defines the property *P123 resultedIn*²⁶ to capture the object that is the result of a transformation event, however no equivalent property exists in EDM. As a consequence, the property *skos:note* was chosen to capture this information, but this property can only weakly describe the result of a transformation.
- *Capturing the roles of the people that were present in the event*. This is not possible using the current edm:Event specification as there is no property in EDM to accommodate this information.
- *Creating meaningful timespans when the exact timing of the event is unknown*.

5. Deutsche Digitale Bibliothek

Example 1

Object type: poster

- Event type: *design*
 - ◆ Agent: Felician von Myrbach-Rheinfeld
 - ◆ Place: Austria
 - ◆ Date: 1915
- Event type: *manufacturing/printing*
 - ◆ Agent: Martin Bäcker GmbH
 - ◆ Place: Dresden
 - ◆ Date: 1915
- Event type: *publication*
 - ◆ Agent: E. Pierson's Verlag
 - ◆ Place: Vienna
 - ◆ Date: 1915



Publication of example:

- [DDB](#)

²⁵ [Processes and Techniques Hierarchy - Getty AAT](#)

²⁶ [CIDOC CRM - p123-resulted-in](#)

- [Europeana](#)

EDM Mapping of events data: Example '*DDB_Plakat_Events_EDM.xml*'

Example 2

Object type: Shellac Record

→ **Event type:** *Production*

- ◆ **Agent:** Deutsche Grammophon (Producer)
Gramophone Concert Record (Label)
Čajkovskij, Pëtr Il'ič (Composer)
Dargomyžskij, Aleksandr S. (Composer)
Michajlova, Maria A. (Interpret; Soprano)
- ◆ **Place:** Berlin
- ◆ **Date:** around 1920



Publication of example:

- [DDB](#)

EDM Mapping of events data: Example '*DDB_Tschaikowsky_Events-EDM.xml*'

Example 3

Object type: Photography

→ **Event type:** *Production*

- ◆ **Agent:** Puyo, Emile Joachim Constant (Photographer)
- ◆ **Date:** before 1902

→ **Event type:** *Publication*

- ◆ **Agent:** Wilhelm Knapp (Editor)
- ◆ **Place:** Halle/Saale
- ◆ **Date:** 1902

→ **Event type:** *Execution of design*

- ◆ **Agent:** Meisenbach, Riffarth & Co (Printing House/Printer)
- ◆ **Place:** Berlin
- ◆ **Date:** 1902



Publication of example:

- [DDB](#)
- [Europeana](#)

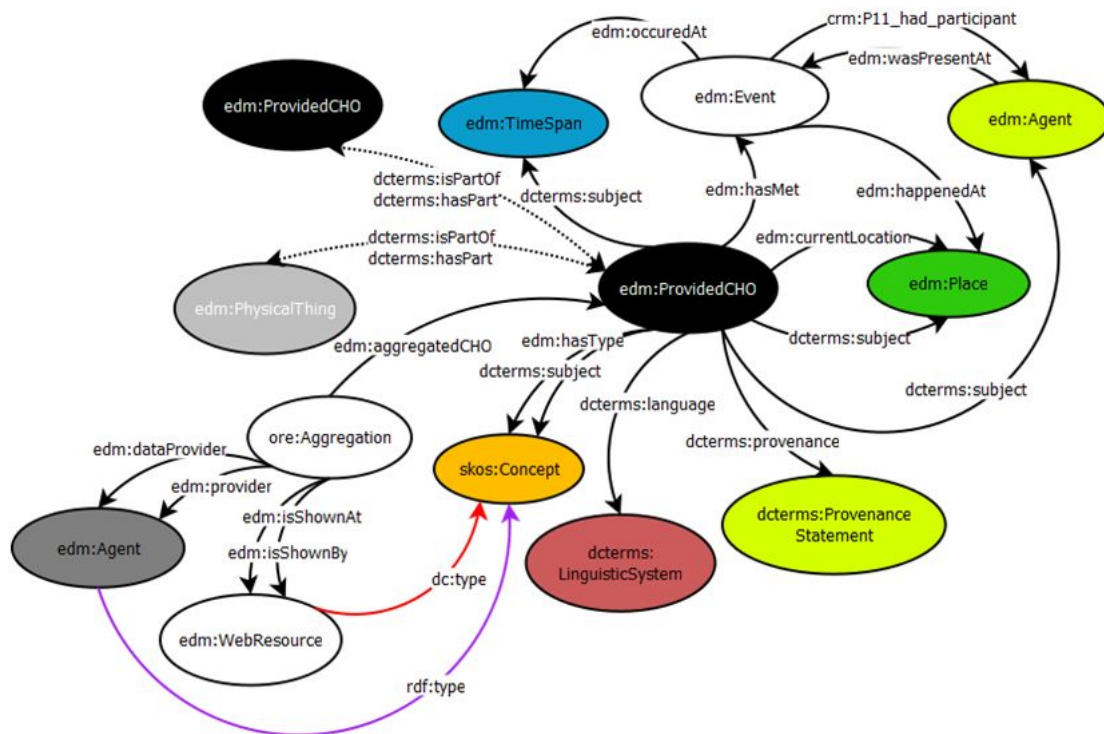
EDM Mapping of events data: Example '*DDB_Jungfrau_Events_EDM.xml*'

Discussion of examples:

The examples presented describe the events that an object experienced over time. There are three events described in the first example, straight forward: when and where the object

was designed and by whom, when and where the object was manufactured, and that again for the publication and by whom. In the second example, only one event was modelled, and the challenge was capturing the roles of the multiple agents involved in the event. A workaround was used and the role is shown in brackets next to the agent's name.

The Event Representation in DDB EDM:



6. Performings Arts

The project aggregates metadata from the performing arts domain describing performance-related objects from libraries, archives and museums in Germany, Austria and Switzerland. 13 examples have been provided that are rich in information about people, places and events.

One issue encountered by the project has been the mixing of information related to a particular performance with information about related cultural objects such as a photograph or a play.

In addition, difficulties were encountered while trying to capture the contribution of a specific Person to the performance Event using the current EDM specifications. Although it is possible to indicate that a person was present at the event, it is not possible to express what kind of contribution a person made to a performance like the role of the director of the play, the choreographer, or the set designer.

See also the '*PerformingArts_Event_Examples.docx*'.

7. OpenUp!

The biodiversity metadata standards ABCD(EFG) and DarwinCore primarily carry metadata elements related to the following **EVENT TYPES** in the lifetime of a natural history object:

- **GATHERING**: the information on who (agent) found/gathered the object at a certain point of time (usually accompanied by a place information where the object was gathered)
- **IDENTIFICATION**: the information on when (point of time/year) the object was scientifically **identified** (eg. taxonomy) and by whom (agent).

Example 1: Herbarium Specimen

Publication of example:

- [Kew Gardens](#)
- [Europeana](#)

Discussion of example:

- The Gathering of the Herbarium Specimen should be connected to the place information (literals and references).
- The various identification events should be connected to various different persons (literals and references) that identified the specimen at different points of time.

Currently we include the event related information in brackets in EDM.

Example 2: Living Specimen

Publication of example:

- [Museum für Naturkunde Berlin](#)
- [Europeana](#)

Discussion of example:

The metadata shows the event type Gathering at a certain time (exact to the minute) and place, done by a person collecting the material (collector) (but as literals!)

Example 3: Fossil Specimen

Source data:

```
<dwc:Occurrence rdf:about="http://coldb.mnhn.fr/catalognumber/mnhn/f/j05826">
  <dwc:institutionCode>MNHN</dwc:institutionCode>
  .....
  <dwc:country>France</dwc:country>
  <dwc:locality>Saucats</dwc:locality>
  <dwc:identifiedBy>Cossmann & Peyrot</dwc:identifiedBy>
  <dwc:dateIdentified>1919</dwc:dateIdentified>
```

```
<dwc:scientificName>Solarium (Pseudotorinia) angustifloratum COSSMANN &
PEYROT, 1919</dwc:scientificName>
</dwc:Occurrence>
```

Publication of example:

- [Europeana](#)

Discussion of example:

The metadata shows the event type Identification at a certain year and done by two persons, and the event type Gathering at a certain place (the Geoname link is generated by OpenUp!, but person names are literals).

See also the '*OpenUp!_Examples of events in the recording of natural history data.docx*'.

Example 4: Herbarium Specimen

Source data:

```
<dwc:Occurrence rdf:about="L.1927390">
  <dwc:catalogNumber>L.1927390</dwc:catalogNumber>
  ....
  <dwc:locality>Found in rain forest and along the edges of the scrub to 200 feet alt.
  Collected Oriomo Riv. Papua.</dwc:locality>
  ...
  <dwc:recordedBy>Jackson MFC</dwc:recordedBy>
  <dwc:scientificName>Acacia aulacocarpa A.Cunn. ex Benth.</dwc:scientificName>
  ....
  <dwc:stateProvince>New Guinea</dwc:stateProvince>
```

Publication of example:

- [Europeana](#)

Discussion of example:

The finding place is an unnamed (uninhabited) area (near a river). In this example no exact coordinates of the finding place are given, only the name of the country which is used to enrich the item with the geonames URI `<edm:hasMet rdf:resource="https://sws.geonames.org/2088628/" />` (currently not visible in the Europeana Collections Portal).

8. MUSEU

Example 1

Sample record from the AlliiertenMuseum, Berlin.

Object type: Photography

- **Event type:** *Production*
 - ◆ **Date:** 1986
 - ◆ **Place:** Parks Range



→ **Event type:** *Commissioning*

◆ **Agent:** U.S. Army Berlin Brigade Visual Information Activity (contributor)

Source data: Example '*Museu_Alliertenmuseum_Events_LIDO.xml*'

Publication of example:

- [Alliertenmuseum](#)
- [Europeana](#)

EDM mapping of events data: Example '*Museu_Alliertenmuseum_Events_EDM.xml*'

Discussion of example:

The source data in LIDO provides date and place information where the photography was taken, including georeferences for the place, and information about the agent who commissioned the photograph. When mapped to the current EDM implementation, name and georeferences of the place information can be transferred, resulting in an instance of the EDM contextual class edm:Place. However, in this mapping, one loses the specific information on how the place information (given in dcterms:spatial) and the agent information (given in dc:contributor) are bundled together. Using the contextual class edm:Event will in contrast allow for keeping this valuable information for the user.

The example also shows the shortcomings of:

- Missing a property relating an event as domain with an agent as range.
- Requiring a reference and not allowing for a literal as range for edm:occurredAt.

Example 2

Sample record from Bildarchiv Foto Marburg.

Object type: Painting

→ **Event type:** *Production*

◆ **Agent:** Achenbach, Andreas

◆ **Date:** 1875

◆ **Material** (dc:format): oil paint (paint); canvas (textile material)

Source data: Example '*Museu_FotoMarburg_Events_LIDO.xml*'

Publication of example:

- [Europeana](#)
- [Bildindex](#)

EDM mapping of events data: Example '*Museu_FotoMarburg_Events_EDM.xml*'

Discussion of example:

The LIDO source data provides agent and date information for the production event as well as information about the materials used for the production. When mapped to EDM, the

materials information can only be mapped to the ProvidedCHO and not to the production event, so the relationship is lost. If e.g. information about further materials used for the restoration were provided, the grouping of this information would be lost.