



Definition of the
CIDOC
object-oriented
Conceptual Reference Model

Produced by the ICOM/CIDOC
Documentation Standards Group,
continued by the
CIDOC CRM Special Interest Group

Version 3.4

Draft November 2002

Editors: Nick Crofts, Martin Doerr, Tony Gill, Stephen Stead, Matthew Stiff.

Copyright © 2002 ICOM/CIDOC CRM Special Interest Group

Preface to version 3.3.2	i
Amendments of version 3.3	i
Amendments to version 3.3.1	iii
Amendments of version 3.3.2	iv
Amendments of version 3.4	viii
Introduction	xii
Intended Scope	xii
Applied Form	xii
Terminology	xiii
Cardinality Constraints	xiv
Naming Rules	xiv
Modelling principles	xiv
Minimality	xiv
Shortcuts	xv
Disjointness	xv
About Types	xv
Completeness	xvi
Extensions	xvi
Examples	xvii
The Entity and Property List	xviii
Index of the entities of the CIDOC CRM presented as a monohierarchy :	xx
Index of the properties of the CIDOC CRM presented as a monohierarchy:	xxii

Definition of the CIDOC object-oriented Conceptual Reference Model

Editors:	Martin Doerr, ICS-FORTH, Heraklion-Crete, Greece	Nick Crofts City of Geneva, Geneva, Switzerland	Tony Gill RLG, Mountain View, CA, USA	Stephen Stead, Paveprime Ltd, London UK	Matthew Stiff English Heritage Swindon, UK
----------	---	--	--	--	---

Creation Date : 11-07-1998

Last Modified : 15-11-2002

Preface to version 3.4

The present version of the CIDOC CRM incorporates a series of amendments to version 3.2.1, submitted to ISO and accepted as Committee Draft ISO/CD 21127. These amendments were the result of a systematic exploration of the requirements for the intended scope of the CIDOC CRM as decided in summer 2001. This includes in particular documentation in Natural History, archaeology and the ability to communicate with traditional and Digital Libraries. These amendments have been developed and approved by the CIDOC CRM Special Interest Group, ISO/TC46/SC4/WG9 in a series of meetings together with various invited experts in the period from July 2001 to October 2002.

With this version, the cycle of amendments to extend the functionality of the CIDOC CRM ends. The development team felt that the task to cover the intended scope as outlined in July 2001 and the general functionality required by members of the team up to now has been successfully fulfilled. Further amendments should only concern editorial changes to improve the clarity of the text. Therefore, the modelling constructs of the CIDOC CRM are expected to undergo no changes from this version until the final International Standard.

With version 3.3.2, we have changed the format of the Definition of the CIDOC CRM. We present:

1. A general introduction to the model (as before)
2. The hierarchy of entities as an indented list (as before)
3. The hierarchy of properties as an indented list
4. The definition of each entity
5. The definition of each property.

We took out all cross-reference information, i.e. inherited properties, direct and inherited inverse references of properties at the range entity, as well as the indices to properties, alphabetically, by range and by domain. So this document remains the pure definition, whereas the full cross-referenced text will appear as an additional hypertext document, which will be semi-automatically generated. The reason for this change are: (1) the size of the cross-referenced document exceeds what one would normally print in one document. (2) the cross-referencing does not contribute to the definition. (3) Translators of the document are forced to manually trace the consistency of the cross-referencing, a nearly impossible task. The cross-referenced document is of course the only one, that allows for fully understanding the model by reading and for using it in conceptual modelling.

We further removed the references to the metamodel under which the CIDOC CRM was initially developed. Even though the use of this metamodel has contributed a lot to the rigidity of developing the CIDOC CRM, it seems to be of minor importance for the use of the Model itself. Moreover it needs reworking, and metamodeling is still not a standard procedure in conceptual modelling. Therefore the development team decided not to make it a part of the standard to become.

We present in the following the amendment history from version 3.2.1 on. This, together with the meeting minutes and the “issues list” on the CIDOC CRM home page, allows for tracing the correctness of this document with respect to the decisions of the development team.

Amendments of version 3.3

In the Second Joint Meeting of ISO/TC46/SC4/WG9 and CIDOC CRM SIG the following has been decided: 3, new entities and 14 new properties have been declared, domain of 3 properties and range of 2 properties was changed and 1 property renamed

1) New Entities and their properties

- E78 Collection is curated by (curates): Actor
- E79 Part Addition added to (was augmented by): Physical Man-Made Stuff
- E79 Part Addition added (was added by): Physical Stuff
- E80 Part Removal removed from (was diminished by): Physical Man-Made Stuff
- E80 Part Removal removed (was removed by): Physical Stuff

2) New properties

- E2 Temporal Entity. removed (was removed by): Temporal Entity
- E2 Temporal Entity. equal in time: Temporal Entity
- E2 Temporal Entity. finishes (finished-by): Temporal Entity
- E2 Temporal Entity. starts (started-by): Temporal Entity
- E2 Temporal Entity. during (includes): Temporal Entity
- E2 Temporal Entity. overlaps in time (overlapped-by in time): Temporal Entity
- E2 Temporal Entity. meets in time (met-by in time): Temporal Entity
- E2 Temporal Entity. before (after): Temporal Entity
- E53 Place overlaps. with: E53 Place
- E53 Place borders. with: E53 Place

3) The Property:

- E19 Physical Object. has former or current location (is former or current location of): Place
has been redirected to:
- E18 Physical Stuff. has former or current location (is former or current location of): Place

4) The Property:

- E19 Physical Object. has current permanent location (is current permanent location of): Place
has been redirected to:
- E18 Physical Stuff. has current permanent location (is current permanent location of): Place

5) The Property:

- E19 Physical Object. has current location (currently holds): Place
has been redirected to:
- E18 Physical Stuff. has current location (currently holds): Place

6) The Property:

- E7 Activity. was motivation for (motivated): Conceptual Object
has been redirected to:
- E7 Activity. was motivation for (motivated): Man-Made Stuff

7) The Property:

- E7 Activity. motivated the creation of (was created for): Conceptual Object
has been redirected and changed to:
- E7 Activity. motivated the creation of (was created because of): Man-Made Stuff

8) The property “P33 used specific technique” was declared as subproperty of “P15 took into account”

9) The property “P111 added to” was declared as subproperty of “P31 has modified”

10) The property “P113 removed from” was declared as subproperty of “P31 has modified”

11) Scope note for Actors Hierarchy, Actor and Title have been revised.

12) Scope notes for properties have been added.

Amendments to version 3.3.1

In the 3rd joined meeting of the CIDOC Special Interest Group and ISO/TC46//SC4/WG9 the following have been decided: 1 new entity and 5 new properties have been declared, domain of 4 properties was changed and 1 property renamed, 1 entity has been deleted, 7 entities was renamed.

1) New Entity and its properties

E81 Transformation resulted in (was result on): Persistent Item

E81 Transformation transformed (was transformed by): Persistent Item

2) New properties

E7 Activity. used general object (was used for): Type

E11 Modification Event. employed (was employed by): Material

E55 Type. has broader term (has narrower term): Type

3) The Property:

E19 Physical Object. has former or current keeper (is former or current keeper of): Actor
has been redirected to:

E18 Physical Stuff. has former or current keeper (is former or current keeper of): Actor

4) The Property:

E19 Physical Object. has keeper (is current keeper of): Actor

has been redirected to:

E18 Physical Stuff. has keeper (is current keeper of): Actor

5) The Property:

E19 Physical Object. has former or current owner (is former or current owner of): Actor
has been redirected to:

E18 Physical Stuff. has former or current owner (is former or current owner of): Actor

6) The Property:

E19 Physical Object. has owner (is current owner of): Actor

has been redirected to:

E18 Physical Stuff. has owner (is current owner of): Actor

7) The Property:

E7 Activity. used object (was used for): Physical Object

has been renamed to:

E7 Activity. used specific object (was used for): Physical Object

8) The entity

E76 Gender and the property P61 has gender
have been deleted

9) 7 entities has been renamed:

E8 Acquisition

E8 Acquisition Event

E11 Modification

E11 Modification Event

E12 Production

E12 Production Event

E16 Measurement

E16 Measurement Event

E65 Conceptual Creation

E65 Creation Event

E66 Formation

E66 Formation Event

E77 Existence

E77 Persistent Item

Amendments of version 3.3.2

In the 3th joined meeting of the CIDOC Special Interest Group and ISO/TC46//SC4/WG9 the following have been decided: 2 new entities and 12 new properties have been declared, 1 entity has been renamed, domain of 4 properties was changed, range of 8 properties was changed, 6 properties renamed, 7 properties has been deleted.

1) New Entities:

E82 Actor Appellation.
It was declared as subclass of E41 Appellation

E83 Type Creation.
It was declared as subclass of E65 Creation Event

2) New properties:

E23 Information Carrier. P128 is carried of (is materialized by): E73 Information Object

E73 Information Object. P129 is about (is subject of): E1 CRM Entity
It was declared as subproperty of
E28 Conceptual Object. P67 refers to (is referred to by): E1 CRM Entity

E70 Stuff. P130 shows features of (features are also found on): E70 Stuff
(kind of similarity: Type)
It was declared as superproperty of
E33 Linguistic Object. P73 has translation (is translation of): E33 Linguistic Object

E4 Period. P132 overlaps with: E4 Period

E4 Period. P133 is separated from: E4 Period

E7 Activity. P134 continued (was continued by): E7 Activity
It was declared as subproperty of
E7 Activity. P15 (was influenced by (influenced): E7 Activity

E83 Type Creation. P135 created type (was created by): E55 Type.
It was declared as subproperty of
E65 Creation Event. P94 has created (was created by): E28 Conceptual Object

E83 Type Creation. P136 was based on (supported type creation): E1 CRM Entity
(in the taxonomic role: E55 Type)
It was declared as subproperty of
E7 Activity. P15 was influenced by (influenced): E1 CRM Entity.

E55 Type. P137 is exemplified by (exemplifies): E1 CRM Entity
(in the taxonomic role: E55 Type)

E36 Visual Item. P138 visualizes (has visualization): E1 CRM Entity,
It was declared as subproperty of
E28 Conceptual Object. P67 refer to (is referred to by): E1 CRM Entity

E41 Appellation. P139 also represented by: E41 Appellation

3) The entity E23 Iconographic Object has been renamed to E23 Information Carrier

4) The domain of the following properties was changed:

The property:

E18 Physical Stuff. P43 has dimension (is dimension of): E54 Dimension
has been redirected to:
E70 Stuff. P43 has dimension (is dimension of): E54 Dimension.

The property:

E28 Conceptual Object. P67 refers to (is referred to by): E1 CRM Entity
has been redirected to:

E73 Information Object. P67 refers to (is referred to by): E1 CRM Entity

The property:

E18 Physical Stuff. P54 has current permanent location (is current permanent location of): E53 Place
has been redirected to:

E19 Physical Object. P54 has current permanent location (is current permanent location of): E53 Place

The property:

E18 Physical Stuff. P55 has current location (currently holds): E53 Place
has been redirected to:

E19 Physical Object. P55 has current location (currently holds): E53 Place

5) The ranges of the following properties were changed:

The property:

E16 Measurement Event. P39 measured (was measured by): E18 Physical Stuff
has been redirected to:

E16 Measurement Event. P39 measured (was measured by): E70 Stuff

The property:

E7 Activity. P16 used specific object (was used for): E19 Physical Object
has been redirected to:

E7 Activity. P16 used specific object (was used for): E70 Stuff

The property:

E8 Acquisition Event. P24 transferred title of (changed ownership by): E19 Physical Object
has been redirected to:

E8 Acquisition Event. P24 transferred title of (changed ownership by): E18 Physical Stuff

The property:

E5 Event. P12 occurred in the presence of (was present at): E70 Stuff
has been redirected to:

E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item

The property:

E7 Activity. P16 used specific object (was used for): E19 Physical Object
has been redirected to:

E7 Activity. P16 used specific object (was used for): E70 Stuff

7) The property:

E7 Activity. P15 took into account (was taken into account by): E77 Persistent Item
has been renamed and redirected to:

E7 Activity. P15 was influenced by (influenced): E1 CRM Entity

8) The property:

E7 Activity. P17 was motivation for (motivated): E71 Man-Made Stuff
has been renamed and redirected to:

E7 Activity. P17 was motivated by (motivated): E1 CRM Entity

9) The property:

E24 Physical Man-Made Stuff. P62 depicts object (is depicted by): E18 Physical Stuff
has been renamed and redirected to:

E24 Physical Man-Made Stuff. P62 depicts (is depicted by): E1 CRM Entity

10) The property:

E74 Group. P107 had member (was member of): E39 Actor

has been renamed to :
E74 Group. P107 has current or former member (is current or former member of): E39 Actor

- 11) The property:
E52 Time-Span. P81 at least covering: E61 Time Primitive
has been renamed to :
E52 Time-Span. P81 ongoing throughout: E61 Time Primitive
- 12) The property:
E52 Time-Span. P82 at most within: E61 Time Primitive
has been renamed to :
E52 Time-Span. P82 at some time within: E61 Time Primitive
- 13) The following properties was deleted:
E3 Condition State. P6 falls within (contains): E3 Condition State
E7 Activity. P18 motivated the creation of (was created because of): E71 Man-Made Stuff
E21 Person. P60 is member of: E40 Legal Body
E24 Physical Man-Made Stuff. P63 depicts event (is depicted by):E5 Event
E24 Physical Man-Made Stuff. P64 depicts concept (is depicted by):E55 Type
E28 Conceptual Object. P66 refer to concept (is referred to by): E55 Type
E52 Time-Span. P85 consists of (forms part of): E52 Time-Span
- 14) The property:
E5 Event. P11 had participants (participated in): E39 Actor
has been renamed to :
E5 Event. P11 had participant (participated in): E39 Actor
- 15) The property:
E7 Activity. P21 had as general purpose (was purpose of): E55 Type
has been renamed to :
E7 Activity. P21 had general purpose (was purpose of): E55 Type
- 16) The property:
E9 Move. P26 moved to (occupied): E53 Place
has been renamed to :
E9 Move. P26 moved to (was destination of): E53 Place
- 17) The property:
E9 Move. P27 moved from (vacated): E53 Place
has been renamed to :
E9 Move. P26 moved from (was origin of): E53 Place
- 18) The property:
E15 Identifier Assignment. P37 assigns (is assigned by): E42 Object identifier
has been renamed to :
E15 Identifier Assignment. P37 assigned (was assigned by): E42 Object identifier
- 19) The property:
E15 Identifier Assignment. P38 deassigns (is deassigned by): E42 Object identifier
has been renamed to :
E15 Identifier Assignment. P38 deassigned (was deassigned by): E42 Object identifier
- 20) The property:
E19 Physical Object. P48 preferred identifier is (is preferred identifier of): E42 Object identifier
has been renamed to :
E19 Physical Object. P48 has preferred identifier (is preferred identifier of): E42 Object identifier
- 21) The property:
E32 Authority Document. P71 contains (is part of): E55 Type
has been renamed to :

E32 Authority Document. P71 lists (is listed in): E55 Type

- 21) The property:
E39 Actor. P76 has contact points (provides access to): E51 Contact Point
has been renamed to :
E39 Actor. P76 has contact point (provides access to): E51 Contact Point
- 22) The property:
E52 Time-Span. P83 had at least duration: E54 Dimension
has been renamed to :
E52 Time-Span. P83 had at least duration (was minimum duration of): E54 Dimension
- 23) The property:
E52 Time-Span. P84 had at most duration: E54 Dimension
has been renamed to :
E52 Time-Span. P84 had at most duration (was maximum duration of): E54 Dimension
- 24) The property:
E54 Dimension. P90 value: E60 Number
has been renamed to :
E54 Dimension. P90 has value: E60 Number
- 25) The property:
P15 was influenced by (influenced)
was declared as superproperty of
P16 used specific object (was used for)
P17 was motivated by (motivated)
P19 was intended use of (was made for)
P20 had specific purpose (was purpose of)
P134 continued (was continued by)
- 26) The property:
P11 had participant (participated in)
was declared as subproperty of
P12 occurred in the presence of (was present at)
- 27) The entity
E72 Legal Object was declared as subclass of E70 Stuff
- 28) The entity
E55 Type was declared as subclass of E28 Conceptual Object
- 29) All uses of the word “link” as synonym for “property” have been replaced by the term “property”

The following changes for internal consistency have been proposed, but they have not been decided in the Copenhagen meeting. They are incorporated in this document, in expectation of a positive decision:

- 1) The property:
E40 Legal Body. consists of (belongs to): E40 Legal Body
was deleted (new issue 104).
- 2) The property
P105.2 has note: E62 String
was deleted (new issue 106).
- 3) The property:
P33 used specific technique
was declared as subproperty of
P12 occurred in the presence of (was present at)

- 4) New property
E39 Actor. P131 is identified by (identifies): E82 Actor Appellation.
It was declared as subproperty of
E1 CRM Entity. P1 is identified by (identifies): E41 Appellation

Amendments of version 3.4

In the 5th joined meeting of the CIDOC Special Interest Group and ISO/TC46//SC4/WG9 the following have been decided: 3 entities were deleted and 1 new entity was declared, 24 properties has been renamed, domain of 1 property was changed, and range of 1 property was changed.

- 1) The entity:
E23 Information Carrier
was deleted.
- 2) New entity
E84 Information Carrier
was declared.
- 3) The property
E8 Acquisition Event. P22 transferred title to (acquired title to): E39 Actor
has been renamed to :
E8 Acquisition Event. P22 transferred title to (acquired title through): E39 Actor
- 4) The property
E10 Transfer of Custody. P28 custody surrendered by (surrendered custody): E39 Actor
has been renamed to :
E10 Transfer of Custody. P28 custody surrendered by (surrendered custody through): E39 Actor
- 5) The property
E10 Transfer of Custody. P29 custody received by (received custody): E39 Actor
has been renamed to :
E10 Transfer of Custody. P29 custody received by (received custody through): E39 Actor
- 6) The property
E10 Transfer of Custody. P30 transferred custody of (custody changed by): E19 Physical Object
has been redirected and renamed to :
E10 Transfer of Custody. P30 transferred custody of (custody transferred through): E18 Physical Stuff
- 7) The property
E16 Measurement Event. P40 observed dimension (was observed): E54 Dimension
has been renamed to :
E16 Measurement Event. P40 observed dimension (was observed in): E54 Dimension
- 8) The property
E19 Physical Object. P58 has section definition (defines section): E46 Section Definition
has been redirected to:
E18 Physical Stuff. P58 has section definition (defines section): E46 Section Definition
- 9) The property
E52 Time-Span. P79 begins at qualify: E62 String
has been renamed to :
E52 Time-Span. P79 beginning is qualified by: E62 String
- 10) The property
E52 Time-Span. P80 ends at qualify: E62 String
has been renamed to :
E52 Time-Span. P80 end is qualified by: E62 String

- 11) The property
E54 Dimension. P91 unit: E58 Measurement Unit
has been renamed to :
E54 Dimension. P91 has unit (is unit of): E58 Measurement Unit
- 12) The property
E78 Collection. P109 is curated by (curates): E39 Actor
has been renamed to :
E78 Collection. P109 has current or former curator (is current or former curator of): E39 Actor
- 13) The property
E79 Part Addition. P110 added to (was augmented by): E24 Physical Man-Made Stuff
has been renamed to :
E79 Part Addition. P110 augmented (was augmented by): E24 Physical Man-Made Stuff
- 14) The property
E79 Part Removal. P112 removed from (was diminished by): E24 Physical Man-Made Stuff
has been renamed to :
E79 Part Removal. P112 diminished (was diminished by): E24 Physical Man-Made Stuff
- 15) The property
E2 Temporal Entity. P114 equal in time: E2 Temporal Entity
has been renamed to :
E2 Temporal Entity. P114 is equal in time to: E2 Temporal Entity
- 16) The property
E2 Temporal Entity. P115 finishes (finished-by): E2 Temporal Entity
has been renamed to :
E2 Temporal Entity. P115 finishes (is finished by): E2 Temporal Entity
- 17) The property
E2 Temporal Entity. P116 starts (started-by): E2 Temporal Entity
has been renamed to :
E2 Temporal Entity. P116 starts (is started by): E2 Temporal Entity
- 18) The property
E2 Temporal Entity. P117 during (includes): E2 Temporal Entity
has been renamed to :
E2 Temporal Entity. P117 occurs during (includes): E2 Temporal Entity
- 19) The property
E2 Temporal Entity. P118 overlaps in time (overlapped-by in time): E2 Temporal Entity
has been renamed to :
E2 Temporal Entity. P118 overlaps in time with (is overlapped in time by): E2 Temporal Entity
- 20) The property
E2 Temporal Entity. P119 meets in time (met-by in time): E2 Temporal Entity
has been renamed to :
E2 Temporal Entity. P119 meets in time with (is met in time by): E2 Temporal Entity
- 21) The property
E2 Temporal Entity. P120 before (after): E2 Temporal Entity
has been renamed to :
E2 Temporal Entity. P120 occurs before (occurs after): E2 Temporal Entity
- 22) The property
E81 Transformation. P123 resulted in (was resulted on): E77 Persistent Item
has been renamed to :
E81 Transformation. P123 resulted in (resulted from): E77 Persistent Item

- 23) The property
 E7 Activity. P125 used general object (was used for): E55 Type
 has been renamed to :
 E7 Activity. P125 used object of type (was type of object used in): E55 Type
- 24) The property
 E11 Modification Event. P126 employed (was employed by): E57 Material
 has been renamed to :
 E11 Modification Event. P126 employed (was employed in): E57 Material
- 25) The property
 E23 Information Carrier. P128 is carried of (is materialized by): E73 Information Object
 has been redirected and renamed to :
 E24 Physical Man-Made stuff. P128 carries (is carried by): E73 Information Object
- 26) The property
 E36 Visual Item. P138 visualizes (has visualization): E1 CRM Entity
 has been renamed to :
 E36 Visual Item. P138 represents (has representation): E1 CRM Entity
- 27) The property
 E41 Appellation. P139 also represented: E41 Appellation
 has been renamed to :
 E41 Appellation. P139 has alternative form: E41 Appellation
- 28) The property
 P3 has note
 has been declared as superproperty of
 P79 beginning is qualified by
 P80 end is qualified by
- 29) The property
 P11 had participant (participated in)
 was declared as superproperty of
 P14 carried out by (performed)
 P96 by mother (gave birth)
 P99 dissolved (was dissolvedby)
- 30) The property
 P12 occured in the presence of (was present at)
 was declared as superproperty of
 P11 had participant (participated in)
 P16 used specific object (was used for)
 P25 moved (moved by)
 P31 has modified (was modified by)
 P33 used specific technique (was used by)
 P92 brought into existence (was brought into existence by)
 P93 took out of existence (was taken out of existence by)
- 31) The property:
 P15 was influenced by (influenced)
 was declared as superproperty of
 P16 used specific object (was used for)
 P17 was motivated by (motivated)
 P33 used specific technique (was used by)
 P134 continued (was continued by)
 P136 was based on (supported type creation)
- 32) The property:
 E40 Legal Body. consists of (belongs to): E40 Legal Body

was deleted

33) The property
P105.2 has note: E62 String
was deleted

34) New property
E39 Actor. P131 is identified by (identifies): E82 Actor Appellation.
It was declared as subproperty of
E1 CRM Entity. P1 is identified by (identifies): E41 Appellation

Introduction

This document is a formal definition of the **oo CIDOC Conceptual Reference Model** (referred to in the following as the “CRM”). It is the result of work done by the CIDOC Documentation Standards Group, from 1994-2000, and the CIDOC CRM Special Interest Group from 2000-2002, as the result of an initiative to define the underlying semantics of database schemata and document structures needed in museum documentation for the support of good practice in conceptual modelling, data transformation, data exchange, information integration and mediation of heterogeneous sources.

Intended Scope

The intended scope should be understood as the domain that the CRM would ideally aim to cover, given sufficient time and resources, and is expressed as a definition of principles. The practical scope is, necessarily, a subset of the intended scope. The intended scope is difficult to define with the same degree of precision as the practical scope since it depends on concepts such as "cultural heritage" which are themselves complex and difficult to define. The objectives provided by the intended scope are important, however, since they allow appropriate sources to be selected for inclusion in the practical scope. The practical scope is expressed in terms of the reference documents and sources that have been used in its elaboration. The CRM covers the same domain as these reference sources ([x]...[y]). This means, that data encoded following one of those sources can be transformed or integrated into a CRM compatible form without loss of meaning, as long as the meaning remains within the intended scope of the CIDOC CRM.

The intended scope of the CRM may be defined as all information required for the scientific documentation of cultural heritage collections, with a view to enabling wide area information exchange and integration of heterogeneous sources. This definition requires some explanation:

- The term scientific documentation is intended to convey the requirement that the depth and quality of descriptive information which can be handled by the CRM should be sufficient for serious academic research into a given field and not merely that required for casual browsing. This does not mean that information intended for presentation to members of the general public is excluded, but rather that the CRM is intended to provide the level of detail and precision expected and required by museum professionals and researchers in the field.
- The term cultural heritage collections is intended to cover all types of material collected and displayed by museums and related institutions, as defined by ICOM [1]. This includes collections, sites and monuments relating to natural history, ethnography, archaeology, historic monuments, as well as collections of fine and applied arts. The exchange of relevant information with libraries and archives, and the harmonisation of the CRM with their models, fall within the CRM's intended scope.
- The documentation of collections is intended to encompass the detailed description both of individual items within collections as well as groups of items and collections as a whole. The scope of the CRM is the curated knowledge of museums. Information required solely for the administration and management of cultural heritage institutions, such as information relating to personnel, accounting, and visitor statistics, falls outside the intended scope.
- The CRM is specifically intended to cover contextual information: the historical, geographical and theoretical background in which individual items are placed and which gives them much of their significance and value.
- The goal of enabling information exchange and integration between heterogeneous sources determines the constructs and level of detail of the CRM. It also determines its perspective, which is necessarily supra-institutional and abstracted from any specific local context.
- The CRM aims to leverage contemporary technology while enabling communication with legacy systems.

Applied Form

The CRM is a domain ontology in the sense used in computer science[1]. As such, the model is designed to be explanatory and extensible rather than prescriptive and restrictive. Currently, no specific formalism for semantic models has been widely accepted as standard, nevertheless the semantic deviations between the various available

models are minimal. Consequently, the model has been formulated as an object-oriented semantic model[], which can easily be converted into other object-oriented models. It is our intention that this presentation format should be both natural and expressive for domain experts, and easily be converted to other machine readable formats such as RDF and XML. The definition itself, as presented here, is not enough to fully comprehend the model and its application. The use of rich specialization hierarchies causes a complex set of inherited properties and cross-references. So this relatively compact definition of about 220 elements corresponds to several thousand properties of the declared classes. A full set of direct and inherited declaration can automatically be generated from this definition, and be made available as a separate document.

Terminology

From the various terminologies in use for object-oriented models, we have selected the following for ease of understanding by non-computer experts. They are motivated by the terminology of RDF (Resource Description Framework), a recommendation of W3C. We use a slightly more constraint semantic model than RDF, a subset of TELOS [], which is compatible with many formalisms and can be implemented on a large variety of tools. We use:

- “**class**” for a concept that may be called “class”, “individual class”, “entity” or “node”, in contrast to properties. It denotes a category of items the definition of whose does not depend on the existence of other categories, such as “physical object”, in contrast to “carried out”, which requires persons and activities to make sense. A class plays a role similar to a grammatical noun. A class is characterized by an *intention*, which is conveyed by a scope note.
- “**scope note**” is not a definition in absolute terms but a text making clear to the user the relation of the class to known concepts of the domain. A class is associated in real life with a set of instances, the *extension*. This set is open and unknown – we do not know all instances of a concept in the current world or the past, nor can we foresee the future. *No* concept in the CRM is defined by its extension (such as enumeration sets), however references of good examples are used to clarify the intention.
- “**property**” for a concept that may be called “attribute”, “reference”, “link”, “role” or “property”. A property denotes a category of items the definition of whose does depend on the existence of two other items, such as “carried out”, which requires some persons and an action to make sense, in contrast to “physical object”, which is defined on its own. It plays a role similar to a verb, which stands between a grammatical subject and an object. In the manner of semantic networks, we do not distinguish between internal attributes and references. Rather, every value associated with an instance of a class is regarded as a reference to that value, which in turn is instance of another class. The property is characterized by an *intention*, which is conveyed by a scope note. It is also associated with an *extension*. For instance, “my role in the writing of this document” is regarded an instance of “carried out”. Properties may themselves have properties, which point to other entities. In the CRM this is used for dynamically specializing properties, such as in the case of multiple potential kinds of roles.
- “**domain**” for the class a property is defined for – like a grammatical subject. It is the most specialized class meaningful to the expert that comprises all potential uses of the property. We allow only *one* domain per property. Note, that it may always contain instances for which the property is not applicable.
- “**range**” for the class a property refers – like a grammatical object. It is the most specialized class meaningful to the expert that comprises all potential values of the property. We allow only *one* range per property. Note, that it may always contain instances for which the property is not applicable. Note that the difference between range and domain is not substantial but conventional. We always give in parenthesis the name the property has if domain and range are interchanged, frequently simply the passive voice. Hence which one is domain and which one range depends only on the name of the property, such as “carried out” versus “was carried out by”.
- “**Superclass-Subclass**” for “IsA” relations, which may be called “superclass – subclass”, “parent class - derived class”, “generalization - specialization”, “genus-species”, “subsumes – is subsumed by”. An IsA relation between classes, such “a birth IsA event”, denotes that the subclass has *all* properties of its superclasses (*strict inheritance*), and some more of its own, and that the superclass comprises all instances of all subclasses and some *more* of its own. As domain and range are interchangeable, inheritance holds for both. An instance of a subclass of a domain of a property can use this property, and any property instance can refer to an instance of a subclass of the range of this property. A class may have *more* than one immediate superclass (*multiple*

inheritance). The “IsA” relation holds also for properties. E.g. “carried out” is a subproperty of “participated”. If a property A is subclass of a property B, we require that domain of A is subclass of domain of B, and range of A is subclass of range of B.

Cardinality Constraints

We use **Cardinality constraints** of properties (e.g. one-to-many). They are *not* implementation recommendations. They *only* serve semantic clarification. As the model is designed to compile *alternative* opinions, and *incomplete* information, all properties should be implemented as multi-valued and optional, if not more complex relationships to information sources are used. Possible values are:

- “**1:many**”:
an individual domain instance can have zero or more such properties, but one of the values cannot be referred to by more than one (“fan-out”). E.g. one Formation Event may form many Groups, but one Group is formed by only one Formation Event (P95).
- “**many:1**”:
an individual domain instance can have zero or one such properties, but one of the values can be referred to by more than one (“fan-in”). E.g. one Birth can be only by one mother, but a mother may have had many births (P96).
- “**many:many**”:
unconstrained.

Naming Rules

We have applied the following naming rules:

- Classes are named using initial capitals, preceded by “E” (like “entity”), and an identification number.
- Classes are named using noun phrases (nominal groups).
- Properties are named using lower case letters and are labelled in both directions. They are preceded by “P” (like “property”), and an identification number.
- The direction of properties, and hence their names, are in accordance with the following priority list:
 - Events
 - Objects
 - Actors
 - Other
- property names are to be read from left to right for the domain – range direction, and, in brackets, from right to left, for the range – domain direction. Implementers can choose the appropriate name according to the orientation of their property of field attachment.
- Properties are named using verbal phrases. Properties with the character of states are named in present tense, such as “has type”, whereas properties related to events are named in past tense, such as “carried out”.

Modelling principles

The purpose of the CRM is not to analyse the philosophical substance of the concepts it defines, nor to provide a formal account of if an item is instance of one of its classes. Rather, it is to provide a core language that allows for integrating the semantics of heterogeneous data structures, or to develop data structures. The expert must be able to comprehend the meaning of a CRM concept, and decide, which of his data structure elements or intended meaning in a planned system are compatible with a CRM concept. We try to restrict the CRM to minimal notions that can safely be standardized.

Minimality

As a model for information integration, the CRM tries to be *monotonic* under increase of knowledge in an “*Open World*”: No construct should become invalid, if knowledge increases. The CRM does not provide any constraints to “improve” the quality of data produced by scholars and scientists, nor to enforce a certain “truth” for data about the past, such as requiring people to have one father only.

Consequently, there are no properties in the CRM that help justifying classification by one of its classes, such as “human DNA” may justify being a “person”. No definition of a CRM class is based on the existence of an

instance of some CRM property. For instance, even an “information carrier” may not carry information, such as an empty diskette.

CRM concepts are “*primitive*”; they cannot be logically derived from other CRM classes and properties. Siblings of CRM classes and properties under the same superclass are *non-exclusive* per default. E.g., an object may be a “biological object” and “man-made”. We do *not* declare *complements*, such as “former owner”, once we have declared a “current owner”.

Shortcuts

Some properties are declared as “**shortcuts**” of a path, that connects the same domain and range as the respective property, but leading through multiple properties and classes (normally one intermediate class). The declaration denotes, that all instances of this path can be seen as instances of the “shortcut” property. The opposite is normally not true: It may not be possible to infer the path from the existence of an instance of the shortcut property. In some cases, it may be possible to infer a path with a hypothetical intermediate node which is uniquely defined by a property, domain and range instance.

Disjointness

Disjoint sets are sets that share no instance. We call two concepts A and B “**disjoint**”, if their extensions should not share instances in any possible world. We have carefully studied, which concepts may be disjoint. The possible combinations of CRM concepts are many, the decision often not possible, and the practical use of such statement is questionable, when the fact is obvious to any expert. There are however two non-obvious cases, that are fundamental to the comprehension of the CRM:

- E2 Temporal Entity is disjoint from E77 Persistent Item. Instances of E2 are also called “**perdurants**”, and instances of E77 “**endurants**” []. Even though “persistent items” have a limited existence in time, we regard them as fundamentally different, because they preserve their identity between events, such as in the phrase “it is still there”. This position fits to the distinctions made in real data structures.
- E18 Physical Stuff is disjoint from E28 Conceptual Object. The distinction is between material and immaterial items, the latter being exclusively man-made. They differ in the way they are produced – incorporating material or not; in the way they participate in events – in one at a time, or in many at a time via multiple physical carriers; in the way they perish – by destruction, or by loss of the last carrier or forgetting.

About Types

Virtually any cultural data record begins with an object identifier and the “type” of the described item. Often such a field is analysed into “Classification”, “Category”, “Object Name”, “Role” etc. These terms all refer to classes or categories of items on different levels of specialization and in different contexts. I.e., they declare the respective item to be an instance of this class. In the CRM we found, that we do not create any ambiguity, if we describe them all by one term: E55 Type. So, actually, E55 Type is a class of classes, a metaclass.

On the other side, creating a record in a table “Object” for instance, also declares the item to be instance of a class “Object”. The practical difference is, that the declared type has no implications on the data structure used, whereas the creation of a record has. The CRM describes data structure semantics. Therefore we follow this practice in the CRM, declaring only classes as CRM concepts, which have a declared relationship (property) to another CRM class, except if the class is needed to group or link other CRM classes (such as E13 Attribute Assignment or E21 Person). Consequently we endow all CRM classes with the property “P2 has type”, that allows for refining the classification of any item to any level of detail. This is the link of the CRM to **terminological systems**, frequently provided in the form of **thesauri** or ontologies as well. Those are *not* the target of the CRM.

In an isolated Relational database, the table is always the most general class that is assigned to an item. The declared types form an IsA (subclass) hierarchy below the table level. So there is no conflict between the types and the table. In object-oriented systems like the CRM, the classes (corresponding to tables) form an IsA hierarchy themselves. Therefore any *type hierarchy* used for *CRM compatible* data must be an *extension* of the IsA hierarchy of CRM classes. This applies equally to types of properties.

E55 Type is also a range of many properties, such as “P125 used general object”. These properties, except for “P2 has type”, declare a kind of general knowledge about an object, quite frequent in cultural data, such as “this object was produced by a mold”, meaning that there has been an instance of “mold” that was actually used. This information allows to connect the object to all those that are of type (“P2 has type”) “mold”. This consistent treatment of general (metaclass) knowledge gives the CRM a particular power, one of the keys to integrate cultural knowledge. However, in order not to overload this standard with a complex theory, we do not express formally a constraint like: “the range of P125 is restricted to types of E70 Stuff”, even though it is understood that each CRM class corresponds to a respective subclass of E55 Type.

Finally, types play an extraordinary role in the history of the human mind. They are intellectual products, objects of our discourse, and their history and justification by physical evidence is a target of documentation, particularly in archaeology and Natural History. Therefore the CRM regards them as “conceptual objects”, parallel to their structural role. The CRM elegantly integrates both aspects in a way adequate to cultural data and Natural History documentation.

Completeness

Of necessity, some concepts are less thoroughly elaborated than others: “E39 Actor” and “E30 Right”, for example. This is a natural consequence of focussing on specific functionality in an intrinsically unlimited field. These ‘underdeveloped’ concepts can be considered as hook-in points for extensions compatible with the model. However, even without these extensions, the CRM is nevertheless ‘complete’ in that, through the use of free text fields (“has note”), it allows information to be captured that is not modelled explicitly. Indeed, some information has deliberately *not* been developed into formal properties. This approach is preferable when detailed, targeted queries are not expected: a good text description, a drawing or diagram provides often a better source of information than formally encoded knowledge. In general, only those concepts on which formal querying is required need to be made explicit - rather than all the information which needs to be stored and retrieved.

Extensions

The CRM has been designed to be extensible, giving credit to the fact, that the intended scope of the CIDOC CRM is not finite. This makes only sense in conjunction with a notion of **compatibility**, such that data described by an extension of the CRM can still be regarded as valid instances of the CRM. In practical terms this means that queries the CRM concepts allow to answer on a set of CRM instance data, can also be answered on the extension data (**query enclosure**, []). Note, that we talk about semantics, not about formalisms. For instance a query “list all events” is only correctly answered, if it returns everything that the CRM experts regard as an event, not only what an extension may have put under “event”.

A sufficient condition for compatibility of an extension is, that CRM classes subsume all classes of the extension, and all properties of the extension are either subsumed by CRM properties, or are part of a path, for which a CRM property is a shortcut. Obviously, such a condition can only intellectually be answered. The user has the last word, who is (or not) satisfied with the answer.

Examples

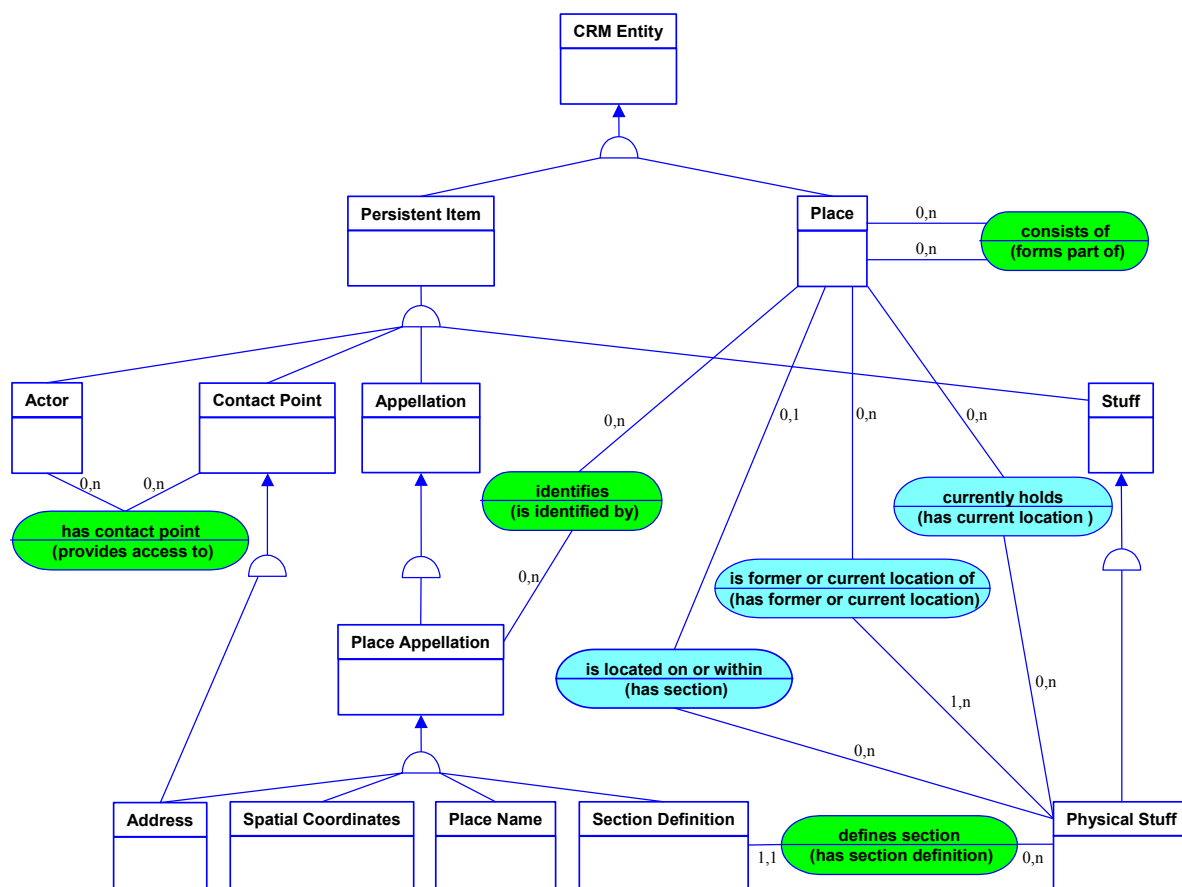


fig. 1 reasoning about spatial information

The diagram above shows a partial view of the CRM representing spatial information. Five of the main hierarchy branches are included in this view: Actor, Contact Point, Appellation, Place, and Physical Stuff. The relationships between these main classes and their subclasses are shown as branching lines. Properties between classes are shown as green ovals. A ‘shortcut’ property is included in this view: *has section (is located on or within)* between Place and Physical Object is a shortcut of the path through Section Definition. In some cases the order of priority for property names has been modified in order to facilitate reading the model from left to right. As can be seen, a Place *is identified by* a Place Appellation, which may be an Address, Spatial Coordinates, a Place Name, or a Section Definition such as ‘basement’, ‘prow’, or ‘lower left-hand corner’. A Place may *consist of or form part of* another place, thereby allowing a hierarchy of physical ‘containers’ to be constructed. An Address can be considered both as a Place Appellation – a way of referring to a place – and as a Contact Point for an Actor. An Actor may have any number of Contact Points. Physical Stuff is found on locations as a consequence of being created there or being moved there. Therefore the properties *is former or current location of* and *currently holds* are regarded shortcut of the paths through the respective events. *Currently holds* is a subproperty of *is former or current location of*. The latter is a container for location information without any knowledge about time of validity and related events.

An interesting aspect of the model is the *defines section (has section definition)* property between Section Definition and Physical Stuff, (and the corresponding shortcut from Place to Physical Object). This effectively means that a section of a Physical Object is the reference for a Place. We may know, for example that Nelson died on a particular spot on the Victory, without being able to locate the exact position of the vessel in geospatial terms. Similarly, a signature or inscription can be located ‘on the lower right hand corner of’ a painting, regardless of where the painting is hanging.

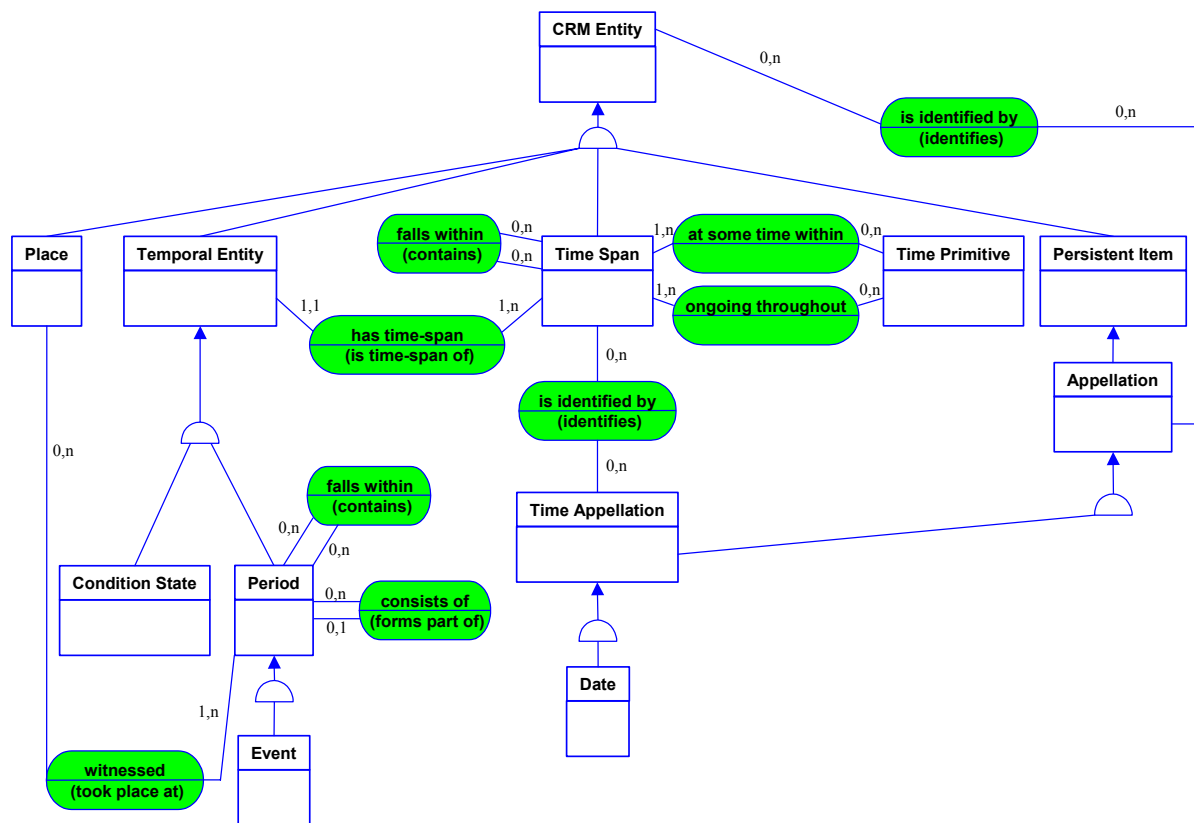


fig. 2 reasoning about temporal information

This second example shows how the model handles temporal information. Four of the main hierarchy branches are included in this view: Temporal Entity, Time-Span, Appellation and Place. The Temporal Entity class serves to group together all classes which have a temporal component, such as historical Periods, Events and Condition States. Typically, Periods and Events are identified by a name or Period Appellation. A Time-Span is simply a temporal interval that does not make any reference to cultural or geographical contexts, unlike Periods, which *take place at* a particular Place. Time-Spans are sometimes named, generally by reference to Dates. Time Appellations differ from Period Appellations in that one refers to a Period within a geo-cultural context while the other is purely temporal - a distinction which is often hard to recognise in natural language. Time-Span has the reflexive property *falls within*, a pure incidental inclusion and Period has also the reflexive property *consists of* that allows part-whole hierarchies to be constructed. The distinction between the two types of property is that in first case the relationship is merely contingent whereas in the second the whole is thought to be *composed of* or defined by its parts. An example might be a period of national celebration, which could be said to be composed of the individual phases, whereas the construction of a building might simply fall within the period of a particular government. Time-Spans can be approximated by outer bounds (indeterminacy interval) by the property *at some time within* and by inner bounds via *ongoing throughout*, where Time Primitive refers to an interval of dates that is better provided as basic type (Primitive Value) by a database system to support the suitable query operations.

The Entity and Property List

The following is the list of all entities and properties contained in the **model**. It consists of an index of entities and an index of properties, followed by the complete list of entity declarations and the complete list of property declarations. The list is ordered by the unique identifiers, which have been assigned in historical order from version 2 on.

The entity index has the following format:

- Unique identifier consisting of the letter “E” for “entity” and a number
- a series “-“ (minus) symbols indicating the depth in the IsA hierarchy.
- The English name of the entity itself.
- The index is ordered by hierarchic level, in a “depth first” manner, from the smaller to the larger

subhierarchies, and alphabetically between equal siblings.

- Entities that reappear at another position in the hierarchy due to multiple inheritance are marked using italics

The property index has the following format:

- Unique identifier consisting of the letter “P” for “property” and a number
- a series “-“ (minus) symbols indicating the depth in the IsA hierarchy.
- The English name of the property itself, followed by its name in parenthesis for reading it in inverse direction.
- The “domain” entity in which it is declared
- The “range” entity where it points to.
- The index is ordered by hierarchic level, in a “depth first” manner, from the smaller to the larger subhierarchies, and by property number between equal siblings.
- Properties that reappear at another position in the hierarchy due to multiple inheritance are marked using italics

Entity declarations use the following format:

- Entity names (terms) are presented as headings in bold face, preceded by the unique identifier.
- The line “Subclass of:” declares the superclass of the entity, from which it inherits properties.
- The line “Superclass of:” is a cross-reference to the following subclasses of this entity.
- The line “Scope note” contains the textual definition of the concept the entity represents.
- The title “Properties” announces the list of properties.
- Each property is represented by its unique identifier, its forward and backward name, and the entity it links to, separated by colon.
- Inherited properties are not represented.
- **Properties of properties** are given in an indented position in parenthesis under the respective property.

Property declarations use the following format:

- Property names are presented as headings in bold face, preceded by the unique identifier.
- The line “Domain:” declares the entity, for which this property is defined.
- The line “Range:” declares the entity, to which this property points, or which provides the values for this property.
- The line “Superclass of:” is a cross-reference to the following subclasses of this entity.
- The line “Cardinality:” declares the possible number of occurrences for an individual entity. Possible values are: 1:many, many:many, many:1.
- The line “Scope note” contains the textual definition of the concept the entity represents.
- The title “Properties” announces the list of properties of properties.
- Each property of a property is represented by a unique identifier relative to the property for which it is defined, its forward and backward name, and the entity it links to, separated by colon.
- Inherited properties are not represented.

Index of the entities of the CIDOC CRM presented as a monohierarchy :

E1	CRM Entity
E2	- Temporal Entity
E3	- - Condition State
E4	- - Period
E5	- - - Event
E7	- - - - Activity
E8	- - - - - Acquisition Event
E9	- - - - - Move
E10	- - - - - Transfer of Custody
E11	- - - - - Modification Event
E12	- - - - - - Production Event
E79	- - - - - - Part Addition
E80	- - - - - - Part Removal
E13	- - - - - Attribute Assignment
E14	- - - - - - Condition Assessment
E15	- - - - - - Identifier Assignment
E16	- - - - - - Measurement Event
E17	- - - - - - Type Assignment
E65	- - - - - Creation Event
E83	- - - - - - Type Creation
E66	- - - - - Formation Event
E63	- - - - - Beginning of Existence
E67	- - - - - - Birth
E81	- - - - - - Transformation
<i>E12</i>	- - - - - - <i>Production Event</i>
<i>E65</i>	- - - - - - <i>Creation Event</i>
<i>E83</i>	- - - - - - - <i>Type Creation</i>
<i>E66</i>	- - - - - - <i>Formation Event</i>
E64	- - - - - End of Existence
E6	- - - - - - Destruction
E68	- - - - - - Dissolution
E69	- - - - - - Death
<i>E81</i>	- - - - - - <i>Transformation</i>
E77	- Persistent Item
E70	- - Stuff
E72	- - - Legal Object
E18	- - - - Physical Stuff
E19	- - - - - Physical Object
E20	- - - - - - Biological Object
E21	- - - - - - - Person
E22	- - - - - - - Man-Made Object
E84	- - - - - - - Information Carrier
E24	- - - - - - Physical Man-Made Stuff
<i>E22</i>	- - - - - - - <i>Man-Made Object</i>
<i>E84</i>	- - - - - - - - <i>Information Carrier</i>
E25	- - - - - - - Man-Made Feature
E78	- - - - - - - Collection
E26	- - - - - - - Physical Feature
E27	- - - - - - - Site
<i>E25</i>	- - - - - - - <i>Man-Made Feature</i>
E73	- - - - - Information Object
E29	- - - - - - Design or Procedure
E31	- - - - - - Document
E32	- - - - - - - Authority Document
E33	- - - - - - - Linguistic Object

E34 - - - - - Inscription
 E35 - - - - - Title
 E36 - - - - - Visual Item
 E37 - - - - - Mark
 E34 - - - - - *Inscription*
 E38 - - - - - Image
 E71 - - - Man-Made Stuff
 E24 - - - - *Physical Man-Made Stuff*
 E22 - - - - *Man-Made Object*
 E84 - - - - - *Information Carrier*
 E25 - - - - - *Man-Made Feature*
 E78 - - - - - *Collection*
 E28 - - - - - Conceptual Object
 E73 - - - - - *Information Object*
 E29 - - - - - *Design or Procedure*
 E31 - - - - - *Document*
 E32 - - - - - *Authority Document*
 E33 - - - - - *Linguistic Object*
 E34 - - - - - *Inscription*
 E35 - - - - - *Title*
 E36 - - - - - *Visual Item*
 E37 - - - - - *Mark*
 E34 - - - - - *Inscription*
 E38 - - - - - *Image*
 E30 - - - - - Right
 E55 - - - - - Type
 E56 - - - - - Language
 E57 - - - - - Material
 E58 - - - - - Measurement Unit
 E39 - - Actor
 E74 - - - Group
 E40 - - - Legal Body
 E21 - - - *Person*
 E41 - - Appellation
 E42 - - - Object Identifier
 E44 - - - Place Appellation
 E45 - - - Address
 E46 - - - Section Definition
 E47 - - - Spatial Coordinates
 E48 - - - Place Name
 E49 - - - Time Appellation
 E50 - - - Date
 E75 - - - Conceptual Object Appellation
 E35 - - - *Title*
 E82 - - - Actor Appellation
 E51 - - Contact Point
 E45 - - - *Address*
 E52 - Time-Span
 E53 - Place
 E54 - Dimension
 E59 Primitive Value
 E60 - Number
 E61 - Time Primitive
 E62 - String

Index of the properties of the CIDOC CRM presented as a monohierarchy:

Property id	Property Name	Entity – Domain	Entity - Range
P1	is identified by (identifies)	E1 CRM Entity	E41 Appellation
P47	- is identified by (identifies)	E19 Physical Object	E42 Object Identifier
P48	- - has preferred identifier (is preferred identifier of)	E19 Physical Object	E42 Object Identifier
P78	- is identified by (identifies)	E52 Time-Span	E49 Time Appellation
P87	- is identified by (identifies)	E53 Place	E44 Place Appellation
P102	- has title (is title of)	E71 Man-Made Stuff	E35 Title
P131	- is identified by (identifies)	E39 Actor	E82 Actor Appellation
P2	has type (is type of)	E1 CRM Entity	E55 Type
P3	has note	E1 CRM Entity	E62 String
P79	- beginning is qualified by	E52 Time-Span	E62 String
P80	- end is qualified by	E52 Time-Span	E62 String
P4	has time-span (is time-span of)	E2 Temporal Entity	E52 Time-Span
P5	consists of (forms part of)	E3 Condition State	E3 Condition State
P7	took place at (witnessed)	E4 Period	E53 Place
P26	- moved to (was destination of)	E9 Move	E53 Place
P27	- moved from (was origin of)	E9 Move	E53 Place
P8	took place on or within (witnessed)	E4 Period	E19 Physical Object
P9	consists of (forms part of)	E4 Period	E4 Period
P10	falls within (contains)	E4 Period	E4 Period
P12	occurred in the presence of (was present at)	E5 Event	E77 Persistent Item
P11	- had participant (participated in)	E5 Event	E39 Actor
P14	- - carried out by (performed)	E7 Activity	E39 Actor
P22	- - - transferred title to (acquired title through)	E8 Acquisition Event	E39 Actor
P23	- - - transferred title from (surrendered title of)	E8 Acquisition Event	E39 Actor
P28	- - - custody surrendered by (surrendered custody through)	E10 Transfer of Custody	E39 Actor
P29	- - - custody received by (received custody through)	E10 Transfer of Custody	E39 Actor
P96	- - by mother (gave birth)	E67 Birth	E21 Person
P99	- - dissolved (was dissolved by)	E68 Dissolution	E74 Group
P16	- used specific object (was used for)	E7 Activity	E70 Stuff
P25	- moved (moved by)	E9 Move	E19 Physical Object
P31	- has modified (was modified by)	E11 Modification Event	E24 Physical Man-Made Stuff
P108	- - has produced (was produced by)	E12 Production Event	E24 Physical Man-Made Stuff
P110	- - augmented (was augmented by)	E79 Part Addition	E24 Physical Man-Made Stuff
P112	- - diminished (was diminished by)	E80 Part Removal	E24 Physical Man-Made Stuff
P33	- used specific technique (was used by)	E11 Modification Event	E29 Design or Procedure
P92	- brought into existence (was brought into existence by)	E63 Beginning of Existence	E77 Persistent Item
P94	- - has created (was created by)	E65 Creation Event	E28 Conceptual Object
P135	- - - created type (was created by)	E83 Type Creation	E55 Type
P95	- - has formed (was formed by)	E66 Formation Event	E74 Group
P98	- - brought into life (was born)	E67 Birth	E21 Person
P108	- - <i>has produced (was produced by)</i>	<i>E12 Production Event</i>	<i>E24 Physical Man-Made Stuff</i>
P123	- - resulted in (resulted from)	E81 Transformation	E77 Persistent Item
P93	- took out of existence (was taken out of existence by)	E64 End of Existence	E77 Persistent Item
P13	- - destroyed (was destroyed by)	E6 Destruction	E19 Physical Object
P99	- - <i>dissolved (was dissolved by)</i>	<i>E68 Dissolution</i>	<i>E74 Group</i>
P100	- - was death of (died in)	E69 Death	E21 Person
P124	- - transformed (was transformed by)	E81 Transformation	E77 Persistent Item
P15	was influenced by (influenced)	E7 Activity	E1 CRM Entity
P16	- used specific object (was used for)	E7 Activity	E70 Stuff
P17	- was motivated by (motivated)	E7 Activity	E1 CRM Entity
P33	- used specific technique (was used by)	E11 Modification Event	E29 Design or Procedure
P134	- continued (was continued by)	E7 Activity	E7 Activity
P136	- was based on (supported type creation)	E83 Type Creation	E1 CRM Entity
P19	was intended use of (was made for)	E7 Activity	E71 Man-Made Stuff
P20	had specific purpose (was purpose of)	E7 Activity	E7 Activity
P21	had general purpose (was purpose of)	E7 Activity	E55 Type
P24	transferred title of (changed ownership by)	E8 Acquisition Event	E18 Physical Stuff
P30	transferred custody of (custody transferred through)	E10 Transfer of Custody	E18 Physical Stuff
P32	used general technique (was technique of)	E11 Modification Event	E55 Type
P34	concerned (was assessed by)	E14 Condition Assessment	E18 Physical Stuff
P35	has identified (identified by)	E14 Condition Assessment	E3 Condition State
P36	registered (was registered by)	E15 Identifier Assignment	E19 Physical Object
P37	assigned (was assigned by)	E15 Identifier Assignment	E42 Object Identifier
P38	deassigned (was deassigned by)	E15 Identifier Assignment	E42 Object Identifier
P39	measured (was measured by)	E16 Measurement Event	E70 Stuff
P40	observed dimension (was observed in)	E16 Measurement Event	E54 Dimension
P41	classified (was classified by)	E17 Type Assignment	E1 CRM Entity
P42	assigned (was assigned by)	E17 Type Assignment	E55 Type
P43	has dimension (is dimension of)	E70 Stuff	E54 Dimension
P44	has condition (condition of)	E18 Physical Stuff	E3 Condition State
P45	consists of (is incorporated in)	E18 Physical Stuff	E57 Material

Property id	Property Name	Entity – Domain	Entity - Range
P46	is composed of (forms part of)	E18 Physical Stuff	E18 Physical Stuff
P49	has former or current keeper (is former or current keeper of)	E18 Physical Stuff	E39 Actor
P50	- has current keeper (is current keeper of)	E18 Physical Stuff	E39 Actor
P51	has former or current owner (is former or current owner of)	E18 Physical Stuff	E39 Actor
P52	- has current owner (is current owner of)	E18 Physical Stuff	E39 Actor
P53	has former or current location (is former or current location of)	E18 Physical Stuff	E53 Place
P55	- has current location (currently holds)	E19 Physical Object	E53 Place
P54	has current permanent location (is current permanent location of)	E19 Physical Object	E53 Place
P56	bears feature (is found on)	E19 Physical Object	E26 Physical Feature
P57	has number of parts	E19 Physical Object	E60 Number
P58	has section definition (defines section)	E18 Physical Stuff	E46 Section Definition
P59	has section (is located on or within)	E18 Physical Stuff	E53 Place
P62	depicts (is depicted by)	E24 Physical Man-Made Stuff	E1 CRM Entity
P67	refers to (is referred to by)	E73 Information Object	E1 CRM Entity
P70	- documents (is documented in)	E31 Document	E1 CRM Entity
P71	- lists (is listed in)	E32 Authority Document	E55 Type
P129	- is about (is subject of)	E73 Information Object	E1 CRM Entity
P138	- represents (has representation)	E36 Visual Item	E1 CRM Entity
P68	usually employs (is usually employed by)	E29 Design or Procedure	E57 Material
P69	is associated with	E29 Design or Procedure	E29 Design or Procedure
P72	has language (is language of)	E33 Linguistic Object	E56 Language
P74	has current or former residence (is current or former residence of)	E39 Actor	E53 Place
P75	possesses (is possessed by)	E39 Actor	E30 Right
P76	has contact point (provides access to)	E39 Actor	E51 Contact Point
P81	ongoing throughout	E52 Time-Span	E61 Time Primitive
P82	at some time within	E52 Time-Span	E61 Time Primitive
P83	had at least duration (was minimum duration of)	E52 Time-Span	E54 Dimension
P84	had at most duration (was maximum duration of)	E52 Time-Span	E54 Dimension
P86	falls within (contains)	E52 Time-Span	E52 Time-Span
P88	consists of (forms part of)	E53 Place	E53 Place
P89	falls within (contains)	E53 Place	E53 Place
P90	has value	E54 Dimension	E60 Number
P91	has unit (is unit of)	E54 Dimension	E58 Measurement Unit
P97	from father (was father for)	E67 Birth	E21 Person
P101	had as general use (was use of)	E70 Stuff	E55 Type
P103	was intended for (was intention of)	E71 Man-Made Stuff	E55 Type
P104	is subject to (applies to)	E72 Legal Object	E30 Right
P105	right held by (has right on)	E72 Legal Object	E39 Actor
P106	is composed of (forms part of)	E73 Information Object	E73 Information Object
P107	has current or former member (is current or former member of)	E74 Group	E39 Actor
P109	has current or former curator ((is current or former curator of)	E78 Collection	E39 Actor
P111	added (was added by)	E79 Part Addition	E18 Physical Stuff
P113	removed (was removed by)	E80 Part Removal	E18 Physical Stuff
P114	is equal in time to	E2 Temporal Entity	E2 Temporal Entity
P115	finishes (is finished by)	E2 Temporal Entity	E2 Temporal Entity
P116	starts (is started by)	E2 Temporal Entity	E2 Temporal Entity
P117	occurs during (includes)	E2 Temporal Entity	E2 Temporal Entity
P118	overlaps in time with (is overlapped in time by)	E2 Temporal Entity	E2 Temporal Entity
P119	meets in time with (is met in time by)	E2 Temporal Entity	E2 Temporal Entity
P120	occurs before (occurs after)	E2 Temporal Entity	E2 Temporal Entity
P121	overlaps with	E53 Place	E53 Place
P122	borders with	E53 Place	E53 Place
P125	used object of type (was type of object used in)	E7 Activity	E55 Type
P126	employed (was employed in)	E11 Modification Event	E57 Material
P127	has broader term (has narrower term)	E55 Type	E55 Type
P128	carries (is carried by)	E24 Physical Man-Made Stuff	E73 Information Object
P65	- shows visual item (is shown by)	E24 Physical Man-Made Stuff	E36 Visual Item
P130	shows features of (features are also found on)	E70 Stuff	E70 Stuff
P73	- has translation (is translation of)	E33 Linguistic Object	E33 Linguistic Object
P132	overlaps with	E4 Period	E4 Period
P133	is separated from	E4 Period	E4 Period
P137	is exemplified by (exemplifies)	E55 Type	E1 CRM Entity
P139	has alternative form	E41 Appellation	E41 Appellation

The Entity List:

E1 CRM Entity

Superclass of: E2 Temporal Entity
E52 Time-Span
E53 Place
E54 Dimension
E77 Persistent Item

Scope note: This is the abstract concept of the entities of our universe of discourse. It carries the rule that all entities can be classified by a type, which further refines the specific subclass an instance belongs to, and a free text field for anything we want to express and that is not captured by formal properties.

Properties:

P1 is identified by (identifies): E41 Appellation

P2 has type (is type of): E55 Type

P3 has note: E62 String

(P3.1 has type: E55 Type)

E2 Temporal Entity

Subclass of: E1 CRM Entity
Superclass of: E3 Condition State
E4 Period

Scope note: This is an abstract entity and has no examples. It groups together things such as events, states and other phenomena, which are limited in time. It is specialized into Period, which holds on some geographic area, and Condition State, which holds for, on, or over a certain object.

Properties:

P4 has time-span (is time-span of): E52 Time-Span

P114 is equal in time to: E2 Temporal Entity

P115 finishes (is finished by): E2 Temporal Entity

P116 starts (is started by): E2 Temporal Entity

P117 occurs during (includes): E2 Temporal Entity

P118 overlaps in time with (is overlapped in time by): E2 Temporal Entity

P119 meets in time with (is met in time by): E2 Temporal Entity

P120 occurs before (occurs after): E2 Temporal Entity

E3 Condition State

Subclass of: E2 Temporal Entity

Scope note: The state of an object characterized by a certain condition and a time-span, e.g. "In ruins from 1695 until 1952", where the qualifier "in ruins" is represented as the condition state type.

Properties:

P5 consists of (forms part of): E3 Condition State

E4 Period

Subclass of: E2 Temporal Entity
Superclass of: E5 Event

Scope note: A period is characterized by a coherent set of phenomena and or manifestations (explicitly intended or not), which are assumed to have taken place over a certain space and time.
Examples: Glacial period, bronze period, Ming Dynasty, Impressionism, Neolithic Period, Mc Carthy Era, The Sixties, Niniveh, 'Sturm und Drang'.
There are different opinions as to whether a 'style' is defined by physical features or by the historical context.

Properties:

P7 took place at (witnessed): E53 Place
P8 took place on or within (witnessed): E19 Physical Object
P9 consists of (forms part of): E4 Period
P10 falls within (contains): E4 Period
P132 overlaps with: E4 Period
P133 is separated from: E4 Period

E5 Event

Subclass of: E4 Period
Superclass of: E7 Activity
E63 Beginning of Existence
E64 End of Existence

Scope note: A change of state in cultural, social, physical systems, regardless of scale, brought about by a series or group of coherent physical, cultural, technological or legal phenomena.
Examples: World War II, Battle of Stalingrad, Earthquake in Lisbon, birth of Cleopatra, my birthday celebration 28-6-1995, the Yal ta Conference, "a tile fell from my roof", the CIDOC Conference 2005.
The distinction between an event and a period is partly a question of scale. Viewed at a broad scale, an event is an 'instantaneous' change of state. At a fine scale, the event can be analysed into its component phenomena within a space and time frame, i.e., a period. The reverse is not necessarily the case, not all periods give rise to a noteworthy change of state.

Properties:

P11 had participant (participated in): E39 Actor
P12 occurred in the presence of (was present at): E77 Persistent Item

E6 Destruction

Subclass of: E64 End of Existence

Scope note: An event, which causes one or more objects to lose their identity as the current subjects of documentation. Some destruction are intentional, others are independent of human activity. The decision as to the point at which an object is destroyed rather than modified may be arbitrary in some cases. The same event may, in some cases, be documented both as a destruction of one or more objects and as the creation of others using parts or material from the original, or, alternatively, as a modification. In the former case, the object record would close, in the latter, it would continue.
For living beings, death is usually more clearly defined.

Examples: The Lisbon Earthquake, the destruction of Nineveh, “I broke a champagne glass yesterday”, the shooting of the last wolf in Germany in 1729.

Properties:

P13 destroyed (was destroyed by): E19 Physical Object

E7 Activity

Subclass of: E5 Event
Superclass of: E8 Acquisition Event
E9 Move
E10 Transfer of Custody
E11 Modification Event
E13 Attribute Assignment
E65 Creation Event
E66 Formation Event

Scope note: An action or a series of actions, carried out by actors (people, groups or organisations) which follow a certain explicit or implicit intention and result as a collective effect in some change of state in the cultural, social, physical systems we are interested in. This notion includes both complex and long lasting actions such as the building of a settlement, or a war, as well as simple, short-lived actions such as the opening of a door. It does not include the notion of activity in the sense of professions and other non-targeted notions. These are seen rather as belonging to a part in the hierarchy above Event.

Properties:

P14 carried out by (performed): E39 Actor
(P14.1 in the role of: E55 Type)
P15 was influenced by (influenced): E1 CRM Entity
P16 used specific object (was used for): E70 Stuff
(P16.1 mode of use: E55 Type)
P17 was motivated by (motivated): E1 CRM Entity
P19 was intended use of (was made for): E71 Man-Made Stuff
(P19.1 mode of use: E55 Type)
P20 had specific purpose (was purpose of): E7 Activity
P21 had general purpose (was purpose of): E55 Type
P125 used object of type (was type of object used in): E55 Type
P134 continued (was continued by): E7 Activity

E8 Acquisition Event

Subclass of: E7 Activity

Scope note: This entity describes the transfer of the legal ownership from one legal person to another. Either one of the actors may be omitted, unknown or not existing. The entity describes the beginning, the end or the transfer of an ownership, acquisition from unknown source or loss of title, depending on the circumstances. It takes a neutral position with respect to the actors involved. The museum notion of "accession" seems to differ between institutions. We preferred therefore to model the notions of legal ownership and physical custody instead, which are well defined in international business. Institutions can choose to model their specific notions as combinations of these.
Annexation, donation, purchase, field collection - where legal title is appropriated by the collector, are types of acquisition. Examples: a fish collected in international waters, a painting bequeathed to a museum.

An E8 Acquisition Event implies establishment and/or loss of ownership rights on the implied physical objects or features. E8 does not, however, imply changes of rights in general.

Properties:

P22 transferred title to (acquired title through): E39 Actor

P23 transferred title from (surrendered title of): E39 Actor

P24 transferred title of (changed ownership by): E18 Physical Stuff

E9 Move

Subclass of: E7 Activity

Scope note: This entity captures the change of physical location of a museum object for exhibitions, conservation, reorganization, loans, study etc.
e.g. Taking objects from storage and putting them on display is a type of move.

Properties:

P25 moved (moved by): E19 Physical Object

P26 moved to (was destination of): E53 Place

P27 moved from (was origin of): E53 Place

E10 Transfer of Custody

Subclass of: E7 Activity

Scope note: This entity describes the transfer of physical custody from one legal person to another. Either one of the actors may be omitted, unknown or not existing. The entity may describe the beginning, the end or the transfer of custody, field collection or declared loss of an object, depending on the circumstances. It takes a neutral position with respect to the actors involved. The distinction between legal and physical custody can be modelled as types. Some events can simultaneously be considered as acquisition, transfer of custody and move. For example, purchase of a Polynesian feather hat at a market. In other cases, separate events are involved, e.g. purchase by telephone of an object on auction, physical transportation, and reception by the new owner.

Properties:

P28 custody surrendered by (surrendered custody through): E39 Actor

P29 custody received by (received custody through): E39 Actor

P30 transferred custody of (custody transferred through): E18 Physical Stuff

E11 Modification Event

Subclass of: E7 Activity

Superclass of: E12 Production Event
E79 Part Addition
E80 Part Removal

Scope note: This entity comprises all activities that alter or change physical man-made objects. Examples of modification events include the creation of an item from raw materials, the restoration or conservation of an object, or the re-use of an ancient object in the creation of a new object. This entity can be collective; the printing of a thousand books, for example, would normally be considered a single event.

Since the distinction between modification and creation is not always clear, modification is regarded as the more generally applicable concept. This implies that some items may be consumed or destroyed in a modification event, and that others may be created as a result of it. Typically, objects routinely involved in the modification event, such as tools or materials, are modelled as attributes of the Design or Procedure for efficient data representation. However, unusual and remarkable items or materials used for a specific instance of a modification event should be associated with the modification event.

Properties:

P31 has modified (was modified by): E24 Physical Man-Made Stuff

P32 used general technique (was technique of): E55 Type

P33 used specific technique (was used by): E29 Design or Procedure

P126 employed (was employed in): E57 Material

E12 Production Event

Subclass of: E11 Modification Event
E63 Beginning of Existence

Scope note: This entity specializes the notion of modification into production, i.e. activities which are designed to and succeed in creating one or a series of new items, new in the sense that there is no obvious similarity to the consumed items and material. Examples: painting a watercolour, printing an etching, producing a series of household forks, the recasting of the mermaid in Copenhagen.

Properties:

P108 has produced (was produced by): E24 Physical Man-Made Stuff

E13 Attribute Assignment

Subclass of: E7 Activity
Superclass of: E14 Condition Assessment
E15 Identifier Assignment
E16 Measurement Event
E17 Type Assignment

Scope note: This entity comprises the actions of making assertions about properties of an object. It serves the documentation of how the respective assessment came about, and whose opinion it was. All the attributes or properties assigned in such an action can also be seen as directly attached to the respective object, possibly as a collection of contradictory values. All cases of properties directly linking objects to values, which are in this model, also referred to indirectly through an action, are characterized as "short cuts" of this action. This redundant modeling of two alternative views is preferred because many implementations may have good reasons to model either the action or the short cut, and the relation between both alternatives can be captured by simple rules.
In addition, the entity describes the actions of people making propositions and statements during certain museum procedures, e.g. the person and date when a condition statement was made, an identifier was assigned, the museum object was measured, etc. Which kinds of such assignments and statements need to be documented explicitly in schema structures rather than free text, depends on a museum's practice. In the latter case shortcuts may be used which refer directly to the museum object.

E14 Condition Assessment

Subclass of: E13 Attribute Assignment

Scope note: This entity describes the action of assessing the condition of preservation of an object over a particular period, either by inspection, measurement or historical studies.

Properties:

P34 concerned (was assessed by): E18 Physical Stuff

P35 has identified (identified by): E3 Condition State

E15 Identifier Assignment

Subclass of: E13 Attribute Assignment

Scope note: This entity describes the action of assigning an identifier, such as a museum number, to an object. The interest in this action arises when objects are exchanged, and multiple identifiers are used, or the identification system of an organization is changed. In order to cover these cases, it is important to document by whom, when and for what purpose an identifier is assigned to a museum object.

Properties:

P36 registered (was registered by): E19 Physical Object

P37 assigned (was assigned by): E42 Object Identifier

P38 deassigned (was deassigned by): E42 Object Identifier

E16 Measurement Event

Subclass of: E13 Attribute Assignment

Scope note: This entity describes actions of measuring physical properties by counting or use of some tool, whether by simple yardstick or complex radiation detection device. The interest is in the method and care applied, in order to decide afterwards on the reliability of the result. For properties, which may change value over time, such as length, due to shrinkage, the date is of direct relevance as well. Details of methods and devices are best handled as free text, whereas basic methods such as "C14" should be encoded in the type field.

Properties:

P39 measured (was measured by): E70 Stuff

P40 observed dimension (was observed in): E54 Dimension

E17 Type Assignment

Subclass of: E13 Attribute Assignment

Scope note: This entity describes the act of classifying another entity, for example an object, a specimen, an action or a concept. The value of classification depends critically on the identity of the classifier and the date that the classification was assigned. This entity also comprises the process of "determination," i.e. the systematic and molecular identification of a specimen in biology.

Example: "first classification of object GE34604 as Lament Cloth, October 2.

Properties:

P41 classified (was classified by): E1 CRM Entity

P42 assigned (was assigned by): E55 Type

E18 Physical Stuff

Subclass of: E72 Legal Object

Superclass of: E19 Physical Object

E24 Physical Man-Made Stuff

E26 Physical Feature

Scope Note: Physical stuff is an abstract notion that groups all physical objects, man-made and natural, as well as physical features of objects, such as holes. We use the term 'feature' to refer to anything of a material nature, such as scratches, holes, rivers, and stains, which it would be strange to refer to as 'objects'.

Properties:

P44 has condition (condition of): E3 Condition State

P45 consists of (is incorporated in): E57 Material

P46 is composed of (forms part of): E18 Physical Stuff

P49 has former or current keeper (is former or current keeper of): E39 Actor

P50 has current keeper (is current keeper of): E39 Actor

P51 has former or current owner (is former or current owner of): E39 Actor

P52 has current owner (is current owner of): E39 Actor

P53 has former or current location (is former or current location of): E53 Place

P58 has section definition (defines section): E46 Section Definition

P59 has section (is located on or within): E53 Place

E19 Physical Object

Subclass of: E18 Physical Stuff

Superclass of: E20 Biological Object

E22 Man-Made Object

Scope note: A discrete, real item of material nature, which constitutes a unit for documentation. The decision as to what constitutes a complete item, rather than parts or components, may be purely administrative.

Examples: John Smith, Aphrodite of Milos, the Palace of Knossos, the Cullinan diamond, Apollo 13 at the time of launch.

Properties:

P47 is identified by (identifies): E42 Object Identifier

P48 has preferred identifier (is preferred identifier of): E42 Object Identifier

P54 has current permanent location (is current permanent location of): E53 Place

P55 has current location (currently holds): E53 Place

P56 bears feature (is found on): E26 Physical Feature

P57 has number of parts: E60 Number

E20 Biological Object

Subclass of: E19 Physical Object

Superclass of: E21 Person

Scope note: An individual, real item of material nature, which lives, has lived, or is a natural product of living organisms. Artificial objects, which incorporate biological elements, such as Victorian butterfly frames, can be classified as both natural and man-made objects.
Examples: Me, Tut-Ankh-Amun, Boukephalas.

E21 Person

Subclass of: E20 Biological Object
E39 Actor

Scope note: A real person, who lives or is assumed to have lived.
Examples: John Smith, Tut-Ankh-Amun.
Legendary figures, such as Ulysses and King Arthur, who may have existed, fall into this class if the documentation refers to them as historical figures. In cases where doubt exists as to whether several persons are in fact identical, multiple instances can be created and linked to indicate their relationship.

E22 Man-Made Object

Subclass of: E19 Physical Object
E24 Physical Man-Made Stuff
Superclass of: E84 Information Carrier

Scope note: A discrete real item of material nature, which is an artifact of technological actions.
Example: My car, chassis no. AMT-9566-XXX9384,
The Portland Vase,
The Colloseum, The Parthenon.

E24 Physical Man-Made Stuff

Subclass of: E18 Physical Stuff
E71 Man-Made Stuff
Superclass of: E22 Man-Made Object
E25 Man-Made Feature
E78 Collection

Scope Note: E71 Man-Made Stuff is a general class that groups man-made objects and features. The distinction between 'objects' and 'features' is useful since it avoids referring to things like holes and texture as objects. Features and objects share many common characteristics however, hence the need for a general class of man-made things.

Properties:

P62 depicts (is depicted by): E1 CRM Entity
(P62.1 mode of depiction: E55 Type)
P65 shows visual item (is shown by): E36 Visual Item
P128 carries (is carried by): E73 Information Object

E25 Man-Made Feature

Subclass of: E24 Physical Man-Made Stuff
E26 Physical Feature

Scope Note: Man-Made Features are those physical features which result from human intervention. Cf. E26 Physical Feature.

E26 Physical Feature

Subclass of: E18 Physical Stuff
Superclass of: E25 Man-Made Feature,
E27 Site

Scope Note: Features are logically or physically attached in an integral way to a particular physical object, and they share many of the attributes of physical objects. They have a non-zero one-, two- or three-dimensional geometric extent, but there are no natural borders that separate them completely in an objective way from the carrier object. E.g. a door hole is a feature, but the door, being attached by hinges, is not. They can be features in a narrower sense, like scratches, holes, reliefs, surface colours, reflection zones in an opal crystal, a density change in a piece of wood. In the wider sense, they are portions of particular objects with partially imaginary borders, like the core of earth, a real estate on the surface of earth, a landscape, the head of a contiguous marble statue. They can be measured and dated, and we can sometimes say who was responsible for them. They cannot be separated from the carrier object, but a smaller segment of the carrier object may be identified (or sometimes removed) carrying the complete feature. Cf. Man-made features for the results of human intervention
This definition implies the so-called "fiat objects" [B.Smith & A.Varzi], i.e. artificially defined objects, except for aggregates or collections of objects. Physical Objects, in contrast, imply the so-called "bona fide objects", i.e. naturally defined objects, but also aggregates and collections of those.
Examples: The temple in Abu Simbel before its removal, my nose, Albrecht Durer's signature on his painting of Charles the Great, the destroyed part of the nose of the Great Sphinx in Gizeh.

E27 Site

Subclass of: E26 Physical Feature

Scope Note: A site is a recognisable place that can be represented by an Iconographic object, such as a photograph, painting or map. A site is composed of relatively immobile material items and features in a particular configuration at a particular location.

E28 Conceptual Object

Subclass of: E71 Man-Made Stuff
Superclass of: E30 Right
E55 Type
E73 Information Object

Scope note: This entity is the attempt to group the non-material products of our minds, and specifically to allow for reasoning about their identity, circumstances of creation and historical implications. Characteristically, these things are created, invented or thought, and somehow documented or communicated between persons. Conceptual objects need not have a particular carrier, but may be found on several different carriers, such as paper, electronic signals, marks, audio media, paintings, photos, human memory, etc. They cannot be destroyed as long as they exist on at least one carrier or in memory. Examples include texts, maps, photos, music, sounds, fairy tales, signs, patterns, symbols, plans, rights, and rules. A greater distinction could be made between products having a clear identity, such as a specific text, or photographs, and the ideas and concepts shared and traded by groups of people.

E29 Design or Procedure

Subclass of: E73 Information Object

Scope note: An established plan for execution of a series or group of technological actions, which result in a physical change of state in certain pieces of material and/or any physical object.

Examples: All elements of the AAT "processes and techniques" facets., a plan for a building, conservation procedures, complex editing techniques, flint napping, etc..

Properties:

P68 usually employs (is usually employed by): E57 Material

P69 is associated with: E29 Design or Procedure

E30 Right

Subclass of: E28 Conceptual Object

Scope Note: The Right class is used in the sense of legal privileges to use material and immaterial things and their derivatives. For example, the right of property, reproduction rights, etc.

Example: Copyright of ICOM in the "Definition of the CIDOC Conceptual Reference Model" Version 2.1.

E31 Document

Subclass of: E73 Information Object

Superclass of: E32 Authority Document

Scope note: This entity comprises items, which make propositions about reality, whether intentionally or by chance. The means may be text, graphics, images, sound, video. Examples: Books on history, maps, photos.

Databases are regarded as a special case of E31 Document.

Properties:

P70 documents (is documented in): E1 CRM Entity

E32 Authority Document

Subclass of: E31 Document

Scope note: This entity describes encyclopedia, thesauri, authority lists: all documents which define terminology or conceptual systems for consistent use.

e.g. Webster's, Getty Art and Architecture Thesaurus, MDA Archaeological Objects Thesaurus, This Document, etc.

Properties:

P71 lists (is listed in): E55 Type

E33 Linguistic Object

Subclass of: E73 Information Object
Superclass of: E34 Inscription
E35 Title

Scope note: The Linguistic Object class comprises identifiable expressions in natural languages(s). Linguistic Objects can be expressed in many ways: For example, as written text, recorded speech or sign language. However, the CRM treats Linguistic Objects as distinct from the medium or method by which they are expressed. Note that expressions in formal languages, such as computer code or mathematical formulae, are not treated as Linguistic Objects by the CRM; these should be modeled as instances of E73 Information Object.
Examples: the text of the Ellesmere Chaucer manuscript; the lyrics of the song "Blue Suede Shoes"; the text of the Jabberwocky by Lewis Carroll; the text of "Doktoro Jekyll kaj Sinjoro Hyde" (an Esperanto translation of Dr Jekyll and Mr Hyde).

Properties:

P72 has language (is language of): E56 Language
P73 has translation (is translation of): E33 Linguistic Object

E34 Inscription

Subclass of: E33 Linguistic Object
E37 Mark

Scope note: This entity comprises texts attached to a physical object. The attributes of the entity could be extended to include alphabet used, rather than documenting these features in the note. NB The entity does *not* describe idiosyncratic characteristics of individual physical embodiments of an inscription but the underlying prototype, e.g. Dürer's signature.

E35 Title

Subclass of: E33 Linguistic Object
E41 Appellation

Scope note: The name of a work, such as a textual work, artwork or piece of music.
Examples: The Merchant of Venice, Gioconda, La Joconde, Mona Lisa, Lucy in the Sky with Diamonds.
Titles are proper nouns, and should not be confused with generic object names (such as chair, painting, book), which are common nouns and are modelled in the CRM as instances of E55 Type.

E36 Visual Item

Subclass of: E73 Information Object
Superclass of: E37 Mark
E38 Image

Scope Note: Visual Items refers to the intellectual or conceptual aspect of recognizable marks and images. When we identify a trade mark, say the ICOM logo, we are generally prepared to say that the same logo is used on any number of publications. The size, orientation and colour may change, but something uniquely identifiable remains. The same can be said of images, which are reproduced many times. What these examples highlight is that visual items are independent of

their physical support. The visual items class provides a means of identifying and linking together objects, which carry the same visual symbols, marks, images or whatever.

Properties:

P138 represents (has representation): E1 CRM Entity
(P138.1 mode of representation: E55 Type)

E37 Mark

Subclass of: E36 Visual Item
Superclass of: E34 Inscription

Scope note:
Symbols, signs, signatures or short texts applied to physical objects by arbitrary techniques in order to indicate the creator, owner, dedications, purpose, etc.
Examples: Minoan double axe mark, ©, ☺, STOP! .
This entity specifically does not include marks such as scratches, which have no semantic significance. These can be documented as physical features.

E38 Image

Subclass of: E36 Visual Item

Scope note:
This entity refers to distributions of form and colour which may be found on surfaces such as photos, paintings, prints and sculptures etc. or directly on electronic media. The degree to which variations in the distribution of form and colour are tolerated depends on a given purpose.
The 'depiction' properties between objects and depicted subjects may be regarded as short cuts of an intermediate image node capturing the optical features of the depiction. Cf E25
Examples: The front side of all 20 Frs notes.

E39 Actor

Subclass of: E77 Persistent Item
Superclass of: E21 Person
E74 Group

Scope note:
Actors are people, either individually or in groups that have the potential to perform intentional actions for which they can be held responsible. Examples include the ISO Central Committee, the Benaki Museum, the Fauvists, and Pablo Picasso. The CRM does not attempt to model the inadvertent acts of actors.
Individual people should be documented as instances of E21 Person, whereas groups should be documented as instances of either E74 Group or its subclass E40 Legal Body.

Properties:

P74 has current or former residence (is current or former residence of): E53 Place
P75 possesses (is possessed by): E30 Right
P76 has contact point (provides access to): E51 Contact Point
P131 is identified by (identifies): E82 Actor Appellation

E40 Legal Body

Subclass of: E74 Group

Scope Note: A legal body is any institution or group of people which can act collectively as an agent i.e. it can perform actions, own property, create or destroy and be held responsible for its actions. The term 'personne morale' is often used in French. Examples: MDA (Europe) Ltd., GreenPeace.

E41 Appellation

Subclass of: E77 Persistent Item
Superclass of: E35 Title
E42 Object Identifier
E44 Place Appellation
E49 Time Appellation
E75 Conceptual Object Appellation
E82 Actor Appellation

Scope note: This entity comprises all names in the proper sense. Codes or words, meaningless or meaningful, in the script of some group or encoding of an electronic system, used solely to identify a specific instance of some category within a certain context. These words do not identify the object by their meaning but by convention, tradition or agreement. In contrast to other entities an instance of Appellation is not an identifier for a real world entity different in nature from it, but it is the appellation itself. E.g. an Appellation "Martin" does not refer to any Martin, but is nothing else than the name "Martin" itself. Therefore there is no property pointing to any value of it. Appellation should not be confused with the practice of naming a thing by some group over a certain period.

Properties:

P139 has alternative form: E41 Appellation

E42 Object Identifier

Subclass of: E41 Appellation

Scope note: Unique codes assigned to objects in order to identify them uniquely within the context of one or more organizations. Typically alphanumeric sequences. Examples: MM.GE.195, 13.45.1976, etc.

E44 Place Appellation

Subclass of: E41 Appellation
Superclass of: E45 Address
E46 Section Definition
E47 Spatial Coordinates
E48 Place Name

Scope Note: A place appellation is any sort of identifier used to refer to a place. Place appellations may vary over time, and the same appellation may be used to refer to several places, either because of cultural shifts, or because things move around. These unstable aspects of place appellations are dealt with in the more general Appellation class. Place appellations can be extremely

varied in form, postal addresses and spatial coordinates and parts of buildings can all be considered as place appellations.

Examples: Vienna, Wien, Aquae Sulis Minerva, Bath, Cambridge, “The Other Place”. “The City”.

E45 Address

Subclass of: E48 Place Appellation
E51 Contact Point

Scope Note: An address is generally a postal address used for mailing. An address can be considered both as the name of a place and as a contact point for an actor. This dual aspect is reflected in the multiple inheritance.

Example: 1-29-3 Otsuka, Bunkyo-ku,
Tokyo, 121, Japan.

E46 Section Definition

Subclass of: E44 Place Appellation

Scope Note: Section definition groups together names used to refer to parts of objects. The 'prow' of a boat, the 'frame' of the picture, the 'basement' of the building are all section definitions. The entity highlights the fact that parts of objects can be treated as locations. (cf. E53 Place) In answer to the question 'where is the signature?' one might reply 'on the lower left corner'.

Example: The entrance lobby to MDA House, Matthew's bedroom, the poop deck of H.M.S. Victory, the Venus de Milo's left buttock, “left inner side of the box”.

E47 Spatial Coordinates

Subclass of: E44 Place Appellation

Scope Note: Coordinates are a specific form of place appellation, that is, a means of referring to a particular place. (cf E53 place) Coordinates are not restricted to longitude, latitude and altitude. Any regular system of reference that maps onto a physical object can be considered as coordinates.

Examples: 6°5'29"N 45°12'13"W,
Black queen's bishop 4.

E48 Place Name

Subclass of: E44 Place Appellation

Scope Note: A place name is a particular and common form of place appellation. 'Greece', 'Athens', 'Geneva', are all place names. Place names may shift their meaning over time. Cf E44 Place appellation.

E49 Time Appellation

Subclass of: E41 Appellation
Superclass of E50 Date

Scope Note: Time appellation groups all forms of names or codes, such as historical periods, and dates, which are used to refer to specific time frames. Time appellations may vary in their degree of precision, and they may be relative to other time frames, 'prehistoric' for example. These aspects of time appellations are dealt with in the more general 'appellations' class. In contrast to cultural periods, proper names are seldom given to particular Time-spans, hence it was decided to exclude a specific entity 'Time-spans name'. Time-spans are often referred to in association with cultural periods, and events e.g. 'the duration of Ming Dynasty'. Cf. E52 Time-span.
Examples: Meiji, 1st half of the XX century, Quaternary, 1215 Hegira. Last century.

E50 Date

Subclass of: E49 Time Appellation

Scope Note: Dates are a specific form of time appellation. Dates may vary in their degree of precision. E.g. 1900, 4-4-1959, 19640604.

E51 Contact Point

(new)

Subclass of: E77 Persistent Item

Superclass of: E45 Address

Scope Note: This entity comprises identifiers used to communicate with Actors.
Examples: E-mail addresses, telephone numbers, post office boxes, Fax numbers, etc. NB postal addresses can be considered both as place appellations and Contact Points.

E52 Time-Span

(former E36)

Subclass of: E1 CRM Entity

Scope note: A determination of a range of dates or duration without any further connotations, to be used to set limits to the temporal extent of periods, events and any other phenomena valid for a certain time. A time appellation is a verbal form which refers to a time-span. The time-span itself is a temporal extent in the sense of Galilean physics. Different time-appellations may express the same time-span. The Time-Span represents the real extent of the entity it refers to, which is always fuzzy to a certain degree and only known in approximation. Respective properties of Properties of time-span allow the expression of approximations of a time-span according to our knowledge.
Examples: from 12-17-1993 to 12-8-1996, 14h30 – 16h22 4th July 1945, 9.30 am 1.1.1999 to 2.00 pm 1.1.1999, Duration of the Ming Dynasty.

Properties:

P78 is identified by (identifies): E49 Time Appellation

P79 beginning is qualified by: E62 String

P80 end is qualified by: E62 String

P81 ongoing throughout: E61 Time Primitive

P82 at some time within: E61 Time Primitive

P83 had at least duration (was minimum duration of): E545 Dimension

P84 had at most duration (was maximum duration of): E54 Dimension

P86 falls within (contains): E52 Time-Span

E53 Place

Subclass of: E1 CRM Entity

Scope note: This entity describes extents in space, in particular on the surface of the earth, in the pure sense of physics: independent from temporal phenomena and matter. Places are usually determined by reference to the position of “immobile” objects such as buildings, cities, mountains, and rivers. On a large time-scale however, these things are either not persistent or may actually move, with respect to each other. This motivates the search for a global or absolute system of reference.

However, relative references are more relevant in the context of cultural documentation and records of relative places tend to be more precise. In particular, we are often interested in position in relation to large objects, such as ships, which move. Any object can serve as a reference for place determination; therefore the model foresees the notion of a "section" of a physical object as a place determination of equal validity.

Matching between multiple reference systems is in principle possible for a given moment in time, but depends on the precision and completeness of the information available. However, the resolution of places to “absolute” coordinates is not, in general, necessary in cultural documentation systems, and absolute referencing may be dependent on the present state of global knowledge.

Example: the place at which Nelson died is known with reference to a large mobile object – H.M.S Victory. A resolution of this place in terms of absolute coordinates requires knowledge about the position of the vessel and the precise time of his death, either of which may be revised. Hence, documenting only an absolute reference effectively removes the possibility of recalculating. It is more relevant to preserve the *reasoning* behind an assumption than the result.

Hence a *place* can be determined by combining, one or more times, a frame of reference and a location with respect to this frame. These combinations are modelled by E44 Place Appellation. (Instance of place are themselves nameless.)

Example: The place referred to by the “Fish collected at three miles north of the confluence of the Arve and the Rhone, or N W. (GPS)”, Here -> <-

Properties:

P87 is identified by (identifies): E44 Place Appellation

P88 consists of (forms part of): E53 Place

P89 falls within (contains): E53 Place

P121 overlaps with: E53 Place

P122 borders with: E53 Place

E54 Dimension

Subclass of: E1 CRM Entity

Scope note: This entity is an abstract class for properties that are measured by some calibrated means and result in numerical values.

Examples: currency: £26.00, length: 4 cm, diameter 26 mm, weight 150 lbs, density: 0.85 gm/cc, luminescence: 56 ISO lumens, tin content: 0.46 %, taille au garot: 5 hands, C14 date: 2460 years, etc.

Properties:

P90 has value: E60 Number

P91 has unit (is unit of): E58 Measurement Unit

E55 Type

Subclass of: E28 Conceptual Object
Superclass of: E56 Language
E57 Material
E58 Measurement Unit

Scope note: This entity captures the names of all entities in the model and any refinements of these entities which do not require further analysis of their formal properties, but which represent typological distinctions important to a given user group. The semantic interpretation of these subtypes is based on the agreement of specific groups. Instances of the Type entity have to be formally organized in thesauri, with scope notes, illustrations, etc. to clarify their meaning. In general, it is expected that different domains and cultural groups develop different thesauri in parallel. Consistent reasoning on the expansion of sub terms used in a thesaurus is possible insofar as it conforms to both the entities and the hierarchies of this Model.
Examples: Weight, length, depth are types of measurement. Portrait, sketch, animation could be types of depiction. Oral, written could be types of language. Excellent, good, poor could be types of condition state.

Properties:

P127 has broader term (has narrower term): E55 Type

P137 is exemplified by (exemplifies): E55 Type

P137.1 in the taxonomic role: E55 Type

E56 Language

Subclass of: E55 Type

Scope note: This entity comprises the names identifying natural languages. Internationally used codes are recommended (ISO...). This type does not correspond to another explicit entity in the Model.
Example: ISO language codes.

E57 Material

Subclass of: E55 Type

Scope note: This entity comprises the names used to identify materials. Internationally used codes and terminology are recommended. This type does not correspond to any other explicit entity in the Model, because materials do not have well-defined instances, especially after they are used. Discrete pieces of raw-materials kept in museums, such as bricks, sheets of fabric, pieces of metal, should be modelled separately just as other objects. Discrete used or processed pieces, such as the stones from Nefer Titi's temple, should be modelled as parts.

E58 Measurement Unit

Subclass of: E55 Type

Scope Note: This entity provides the authority list for all types of measurement units: feet, inches, centimeters, litres, lumens, etc.

E59 Primitive Value

Scope Note: This entity is a container for primitive values used as documentation elements, which are not further analysed. As such they are not considered as elements within our universe of discourse. No specific implementation recommendations are made.

E60 Number

Subclass of: E59 Primitive Value

Scope Note: This entity comprises any encoding of computable (algebraic) values like integers, reals, complex numbers, vectors, tensors etc., including intervals of those values to express limited precision. They are fundamentally distinct from identifiers in continua, like dates and spatial coordinates, even though their encoding may be similar. Whereas numbers can be combined with numbers to yield numbers in algebraic operations, identifiers in continua are combined with numbers expressing distances to yield identifiers. Instances of entity Number are the encoding itself, in contrast to the real world quantity measured by them. So one real world quantity can be measured by different numbers, based on the system of units and the procedure. E.g. 100 Greek Drachmas are equal to 340.447 Euro. Examples: 5, 3+2i, 1.5e-04, (0.5, - 0.7,88).

E61 Time Primitive

Subclass of: E59 Primitive Value

Scope Note: This entity is a primitive value that should implement appropriate validation and interval logic for date ranges and precision relevant to cultural documentation. It is not further analysed in this model.

E62 String

Subclass of: E59 Primitive Value

Scope Note: This entity is a primitive value to be used for any kind of documentation, which lacks formal structure, defined within the model e.g. free text, bitmaps, vector graphics, etc.

E63 Beginning of Existence

Subclass of: E5 Event

Superclass of: E12 Production Event

E65 Creation Event

E66 Formation Event

E67 Birth

E81 Transformation

Scope note: Entity for temporal reasoning about things beginning to exist –
Intellectual products, physical items, groups of people, living beings –
A hook for termini postquem and antequem. It may turn out useful to define more specializations of this entity for Natural History.

Properties:

P92 brought into existence (was brought into existence by): E77 Persistent Item

E64 End of Existence

Subclass of: E5 Event
Superclass of: E6 Destruction
E68 Dissolution
E69 Death
E81 Transformation

Scope note: Entity for temporal reasoning about things stopping to exist –
Physical items, groups of people, living beings –
A hook for termini postquem and antequem.

Properties:

P93 took out of existence (was taken out of existence by): E77 Persistent Item

E65 Creation Event

Subclass of: E7 Activity
E63 Beginning of Existence
Superclass of: E83 Type Creation

Scope note: The creation of an immaterial product – Text, music, image, movie, Law etc.

Properties:

P94 has created (was created by): E28 Conceptual Object

E66 Formation Event

Subclass of: E7 Activity
E63 Beginning of Existence

Scope note: The formation or foundation of a formal or informal group of people.

Properties:

P95 has formed (was formed by): E74 Group

E67 Birth

Subclass of: E63 Beginning of Existence

Scope note: The birth of a human being.

Properties:

P96 by mother (gave birth): E21 Person
P97 from father (was father for): E21 Person
P98 brought into life (was born): E21 Person

E68 Dissolution

Subclass of: E64 End of Existence

Scope note: The formal or informal end of a group of people. If it was a deliberate act, the instance should also be instantiated as an activity.

Properties:

P99 dissolved (was dissolved by): E74 Group

E69 Death

Subclass of: E63 End of Existence

Scope note: The death of a human being. If the person was killed, the instance should also be instantiated as an activity

Properties:

P100 was death of (died in): E21 Person

E70 Stuff

Subclass of: E77 Persistent Item

Superclass of: E71 Man-Made Stuff
E72 Legal Object

Scope note: An identifiable, discrete, persistent item which constitutes a unit for documentation, be it an intellectual product or a physical thing. Such items are characterized by a relative stability, i.e. either a solid physical form, an electronic encoding, a reproducible pattern, a logical concept or structure. It introduces the concept of **being used**.
Excluded are liquids flowing, gases moving around etc. A packaged liquid however fits this entity.

Properties

P43 has dimension (is dimension of): E54 Dimension

P101 had as general use (was use of): E55 Type

P130 shows features of (features are also found on): E70 Stuff
(P130.1 kind of similarity: E55 Type)

E71 Man-Made Stuff

Subclass of: E70 Stuff

Superclass of: E24 Physical Man-Made Stuff
E28 Conceptual Object

Scope note: An identifiable, discrete, persistent item deliberately produced, invented or created by humans which constitutes a unit for documentation, be an intellectual product, idea or a physical thing.

Properties

P102 has title (is title of): E35 Title
(P102.1 has type : E55 Type)

P103 was intended for (was intention of): E55 Type

E72 Legal Object

Subclass of: E70 Stuff
Superclass of: E18 Physical Stuff
E73 Information Object

Scope note: The Legal Object class comprises of those material or immaterial items to which rights, such as the right of ownership or use, can be applied. This is true for all material stuff. In the case of conceptual objects, however, the identity of the conceptual object or the method of its use may be too ambiguous to reliably establish rights, as in the case of taxa and inspirations. Ownership of corporations is currently regarded as out of scope of the CRM.
Example: The Cullinan diamond, "Definition of the CIDOC Conceptual Reference Model", version 2.1..

Properties:

P104 is subject to (applies to): E30 Right
P105 right held by (has right on): E39 Actor
(P105.1 has type: E55 Type)

E73 Information Object

Subclass of: E28 Conceptual Object
E72 Legal Object
Superclass of: E29 Design or Procedure
E31 Document
E33 Linguistic Object
E36 Visual Item

Scope note: An identifiable immaterial item, such as a poem, joke, data set, image, text, multimedia object, procedural prescription, computer program code, algorithm or mathematical formula, that constitutes a unit for documentation and has an objectively recognizable structure. An information object does not depend on its physical carrier, which can include human memory, and can exist on one or more carriers simultaneously.
Information objects of a linguistic nature should be declared as instances of the E33 Linguistic Object subclass. Information objects of a documentary nature should be declared as instances of the E31 Document subclass. Conceptual items such as types and classes are not information objects, nor are ideas without a reproducible expression.
Examples: Image BM000038850.JPG from the Clayton Herbarium in London, E. A. Poe's "The Raven", the movie "The Seven Samurai" by Akira Kurosawa, the Maxwell Equations.

Properties:

P67 refers to (is referred to by): E1 CRM Entity
(P67.1 has type: E55 Type)
P106 is composed of (forms part of): E73 Information Object
P129 is about (is subject of): E1 CRM Entity

E74 Group

Subclass of: E39 Actor
Superclass of: E40 Legal Body

Scope note: A group is any gathering of people that acts collectively or in a similar way due to any kind

of social bounds or contact. Nationality can be handled as membership in a group of appropriate type. Note the distinction between citizenship and ethnic group and other subtleties not easily expressible by nationality adjectives.

Examples: A group of people painting together at some happening, A tribe of indigenous people, an artist workshop, a *museum*, “Those at the Bastille”, a nation, *a government*, *a company*.

Properties:

P107 has current or former member (is current or former member of): E39 Actor

E75 Conceptual Object Appellation

Subclass of: E41 Appellation

Scope note: Specific Identifiers of an intellectual product or standardised pattern.
Examples: ISBN 3-7913-1418-1, ISO2788-1986 (E).

E77 Persistent Item

Subclass of: E1 CRM Entity

Superclass of: E39 Actor
E41 Appellation
E51 Contact Point
E70 Stuff

Scope note: E77 Persistent Item encompasses (and thereby isolates) entities which share two attributes: having the potential to exist over a period of time, and having persistent identity during this period of existence. These attributes are intended to apply to both concrete objects, whether animate or inanimate and to ideas or concepts. Hypothetical or imaginary objects fall within this category insofar as they can be considered as conceptual objects i.e. E77 Persistent Item is not intended to be restricted to physical existence.

The conditions under which an object can be deemed to maintain its identity are often difficult to establish - the decision depends largely on the judgement of the observer. Most people would agree, for example, that a building ceases to exist if it is dismantled and the materials reused in a different configuration. Human beings, on the other hand, in common with many other organisms, go through radical and profound changes during their life-span, affecting both material composition and form, yet preserve their identity. But also material objects in daily use also undergo material changes due to maintenance etc. without changing identity. Identity in these cases would seem to depend more on continuity rather than the presence of any particular physical state or component.

The main classes of objects which fall outside the scope E77 Persistent Item are temporal objects such as periods, events and acts, and descriptive properties, (such as materials) which function as adjectives and adverbs. The former may have persistent identity but are excluded primarily to avoid the possibility of a meaningless regression of beginning and ending periods of periods, the later because they have no real identity, or, to be more precise, their identity is of no interest in the present context.

E78 Collection

Subclass of: E24 Physical Man-Made Stuff

Scope note: This entity describes an aggregate of items, which is maintained by an Actor following a plan of cultural relevance over time. Things may be added or taken out of a collection in pursuit of

this plan. A collection is designed for a certain public, and the conservation of the collected items is normally catered for. Collective objects in the general sense, like a tomb full of gifts, a folder with stamps, a set of chessmen fall naturally under Physical Object and not under Collection. They form wholes in the sense that they share a common lifecycle, either because they physically stick together, like the folder or the tomb, or because they are kept together for their functionality, like the chessmen.

Examples for Collection are: The John Clayton Herbarium.

Properties:

P109 has current or former curator (is current or former curator of): E39 Actor

E79 Part Addition

Subclass of: E11 Modification Event

Scope note: This Entity describes the activities by which a unit of Physical Man-Made Stuff is increased by part. This can be either an accessory or a component, which is more or less permanently attached to or integrated into a Physical Object. It can be an element, which is added to an aggregate of items, like a collection of stamps or a heap of sherds. It can be an immobile object, which is added to a special collection of immobile objects curated by some organisation, e.g. caves with prehistoric findings. The objects added form afterwards part of a whole clearly identifiable by independent criteria which justify a common lifecycle of all parts of that whole - be it because they are kept together for a certain function, like a set of chessman, be it because they stick physically together like a car, or be it because they are treated, conserved and restaurated together like a collection of caves. The object subject to the addition is Man-Made, at least due to the very activity of adding. This Entity is the basis for reasoning on the continuity of history of objects, which are integrated or removed without affecting their internal identity over time, like valuable antique items or bones of saints being repeatedly integrated into precious jewelry or containers, but also museum objects being transferred from collection to collection.

Properties:

P110 augmented (was augmented by): E24 Physical Man-Made Stuff

P111 added (was added by): E18 Physical Stuff

E80 Part Removal

Subclass of: E11 Modification Event

Scope note: This Entity describes the activities by which a unit of Physical Stuff is decreased by a part, which may in the sequence be documented with an individual identity or has been documented individually already before. This can be either an accessory or a component, which is more or less permanently detached or removed from a Physical Object. It can be an element, which is taken from an aggregate of items, like a collection of stamps or a heap of sherds. It can be an immobile object, which is taken out of special collection of immobile objects curated by some organisation, e.g. caves with prehistoric findings. This Entity is the basis for reasoning on the continuity of history of objects, which are integrated or removed without affecting their internal identity over time, like valuable antique items or bones of saints being repeatedly integrated into precious jewelry or containers, but also museum objects being transferred from collection to collection. In case of cutting or breaking out pieces, which had no recognizable identity before the removal, the latter should be regarded as a combination of Part Removal and production. Cases of complete decomposition of a whole into pieces, such that the whole ceases to exist under the aspect it had been documented, should be modelled as transformation, i.e. a simultaneous destruction and production. Similarly, a dissolution of a collection is a

simultaneous part removal and destruction. It does not imply loss of an identifiable part. This should be documented by the Destruction of the respective item.

Properties:

P112 diminished (was diminished by): E24 Physical Man-Made Stuff

P113 removed (was removed by): E18 Physical Stuff

E81 Transformation

Subclass of: E63 Beginning of Existence
E64 End of Existence

Scope note:

Properties:

P123 resulted in (resulted from): E77 Persistent Item

P124 transformed (was transformed by): E77 Persistent Item

E82 Actor Appellation

Subclass of: E41 Appellation

Scope note: An actor appellation is any sort of name, number, code or symbol used to identify an Actor. An Actor will typically have more than one Appellation, and Appellations in turn may have alternative representations.

The distinction between corporate and personal names, which is particularly important in library applications, should be made by explicitly linking the Actor Appellation to an instance of either Person or Group/Legal Body. If this is not possible, the distinction can be made through the use of the P2 *has type* mechanism.

Examples; “Johnny”, “John Doe”, “Doe”, “J.X.D.”, “the U.S. Social Security Number 246-14-2304”, “The Artist Formerly Known as Prince”, “The Master of the Flemish Madonna”, “Raphael’s Workshop”, “the Brontë Sisters”, “ICOM”, “International Council of Museums”.

E83 Type Creation

Subclass of: E65 Creation Event

Scope note:

Properties:

P135 created type (was created by): E55 Type

P136 was based on (supported type creation): E1 CRM Entity
(P136.1 in the taxonomic role: E55 Type)

E84 Information Carrier

Subclass of: E22 Man-Made Object

Scope note: This class comprises all instances of man-made objects that are explicitly designed to act as persistent physical carriers for instances of E73 Information Objects. This allows a relationship to be asserted between a physical object and its immaterial information contents.

The Property List:

P1 is identified by (identifies)

Domain: E1 CRM Entity
Range: E41 Appellation
Superproperty of: E19 Physical Object. P47 is identified by (identifies): E42 Object Identifier
E52 Time-Span. P78 is identified by (identifies): E49 Time Appellation
E53 Place. P87 is identified by (identifies): E44 Place Appellation
E71 Man-Made Stuff. P102 has title (is title of): E35 Title
E39 Actor. P131 is identified by (identifies): E82 Actor Appellation
Quantification: many to many (0,n:0,n)

Scope note: This property describes the naming or identification of any real world item by a name or any other identifier.
This property is intended for identifiers in general use, which form part of the world the model intends to describe, and not merely for internal database identifiers which are specific to a technical system, unless these latter also have a more general use outside the technical context. This property includes in particular identification by mathematical expressions such as coordinate systems used for the identification of places. The property does not reveal anything about when, where and by whom this identifier was used. A more detailed representation can be made using the fully developed (i.e. indirect) path through *E15 Identifier Assignment*.

Examples: The capital of Italy (E53) *is identified by* Rome (E48)
Or
Text 25014–32 (E33) *is identified by* “The Decline and Fall of the Roman Empire” (E35)

P2 has type (is type of)

Domain: E1 CRM Entity
Range: E55 Type
Quantification: many to many (0,n:0,n)

Scope note: This property allows sub typing of CRM entities - a form of specialisation – through the use of a terminological hierarchy, or thesaurus.
The CRM is intended to focus on the high-level entities and relationships needed to describe data structures. Consequently, it does not specialise entities any further than is required for this immediate purpose. However, entities in the isA hierarchy of the CRM may be specialised into any number of sub entities, which can be defined in the type hierarchy (E55). E51 Contact Point, for example, may be specialised into “e-mail address”, “telephone number”, “post office box”, “URL” etc. none of which figures explicitly in the CRM hierarchy. Sub typing obviously requires consistency between the meaning of the terms assigned and the more general intent of the CRM entity in question.

Examples: www.cidoc.icom.org (E51) *has type* URL (E55)

P3 has note

Domain: E1 CRM Entity
Range: E62 String
Superproperty of: E52 Time-Span. P79 beginning is qualified by: E62 String
E52 Time-Span. P80 end is qualified by: E62 String
Quantification: one to many (0,n:0,1)

Scope note: The “has note” property is a container for all informal descriptions about an object that cannot be expressed in terms of CRM constructs.
In particular it captures the characterisation of the item itself, its internal structures, appearance etc.
Like property P2, “has type”, this property is a consequence of the restricted focus of the CRM.

The aim is not to capture, in a structured form, *everything* that can be said about an item; indeed, the CRM formalism is not regarded as sufficient to express everything that can be said. Good practice requires use of *distinct* note fields for different aspects of a characterisation. The P2 “has type” property of “has note” allows differentiation of specific notes, e.g. “construction”, “decoration” etc.

An item may have many notes, but a note is attached to a specific item.

Examples: Coffee mug – OXCMS:1983.1.1 (E19) *has note* chipped at edge of handle (E62) *has type* Condition (E55)

Properties: P3.1 has type: E55 Type

P4 has time-span (is time-span of)

Domain: E2 Temporal Entity

Range: E52 Time-Span

Quantification: many to one, necessary, dependent (1,1:1,n)

Scope note: This property describes the temporal confinement of an instance of a E2 Temporal Entity. The related time-span is understood as the real time-span during which the phenomena were active, which make up the temporal entity instance. It does not convey any other meaning than a positioning on the “time-line” of chronology. The time-span in turn is approximated by a set of dates (E61 Time Primitive). A temporal entity can have in reality only one time-span, but there may exist alternative opinions about it, which we would express by assigning multiple time-spans. Related temporal entities may share a time-span. Time-spans may have completely unknown dates but other descriptions by which we can infer knowledge.

Examples: The Yalta Conference (E7) *has time-span* Yalta Conference time-span (E52), *ongoing throughout* 11 February 1945 (E61)

P5 consists of (forms part of)

Domain: E3 Condition State

Range: E3 Condition State

Quantification: one to many (0,n:0,1)

Scope note: This property describes the decomposition of a condition state into discrete, subsidiary states. It is assumed that the sub-states into which the condition state is analysed form a logical whole - although the entire story may not be completely known – and that the sub-states are in fact *constitutive* of the general condition state. For example, a general condition state of “in ruins” may be decomposed into the individual stages of decay

Examples: Ruination of the Tower of Babylon (E3) *consists of* wind-erosion phase (E3)

P7 took place at (witnessed)

Domain: E4 Period

Range: E53 Place

Superproperty of: E9 Move. P26 moved to (was destination of): E53 Place

E9 Move. P27 moved from (was origin of): E53 Place

Quantification: many to many, necessary (1,n:0,n)

Scope note: This property describes the spatial location of an instance of a period. The related place should be seen as an approximation of the geographical area within which the phenomena that characterise the period in question occurred. “Took place at” does not convey any meaning other than spatial positioning (generally on the surface of the earth). For example, the period “Révolution française” can be said to have taken place in “France”, the “Victorian” period, may be said to have taken place in Britain and its colonies, as well as other parts of Europe and north America. A period can take place at multiple locations.

Examples: The period “Révolution française” (E4) *took place at* France (E53)

P8 took place on or within (witnessed)

Domain: E4 Period
Range: E19 Physical Object
Quantification: many to many (0,n:0,n)

Scope note: This property describes the location of a period with respect to a physical object. P8 is a short-cut of a path defining a place with respect to the geometry of an object. cf. *E46 Section Definition*. This property is in effect a special case of P7 “took place at”. It describes a period that can be located with respect to the space defined by a physical object such as a ship or a building. The precise geographical location of the object during the period in question may be unknown or unimportant. For example, the French and German armistice of 22 June 1940 was signed in the same railway carriage as the armistice of 11 November 1918.

Examples: The coronation of Queen Elizabeth II (E7) *took place on or within* Westminster Abbey (E19)

P9 consists of (forms part of)

Domain: E4 Period
Range: E4 Period
Quantification: one to many, (0,n:0,1)

Scope note: This property describes the decomposition of a period into discrete, subsidiary periods. The sub-periods into which the period is decomposed form a logical whole - although the entire picture may not be completely known - and the sub-periods are *constitutive* of the general period.

Examples: Cretan Bronze Age (E4) *consists of* Middle Minoan (E4)

P10 falls within (contains)

Domain: E4 Period
Range: E4 Period
Quantification: many to many (0,n:0,n)

Scope note: This property describes a period, which falls within the place and time-span of another. The difference with P9 “consists of” is subtle. Unlike P9, P10 does not imply any logical connection between the two periods and it may refer to a period of a completely different type.

Examples: The Great Plague (E4) *falls within* The Gothic period (E4)

P11 had participant (participated in)

Domain: E5 Event
Range: E39 Actor
Subproperty of: E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
Superproperty of: E7 Activity. P14 carried out by (performed): E39 Actor
E67 Birth. P96 by mother (gave birth): E21 Person
E68 Dissolution. P99 dissolved (was dissolved by): E74 Group
Quantification: many to many (0,n:0,n)

Scope note: This property describes the active or passive participation of actors in an event. It connects the life-line of the related actor with the place and date of the event. The property implies that the actor was *involved in* the event but does not imply any causal relationship. The subject of a portrait can be said to have participated in the creation of the portrait.

Examples: Napoleon (E21) *participated in* The Battle of Waterloo (E7)

Or
Maria (E21) *participated in* Photographing of Maria (E7)

P12 occurred in the presence of (was present at)

Domain: E5 Event
Range: E77 Persistent Item
Superproperty of: E5 Event. P11 had participant (participated in): E39 Actor
E7 Activity. P16 used specific object (was used for): E70 Stuff
E9 Move. P25 moved (moved by): E19 Physical Object
E11 Modification Event. P31 has modified (was modified by): E24 Physical Man-Made Stuff
E11 Modification Event. P33 used specific technique (was used by): E29 Design or Procedure
E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77
Persistent Item
E64 End of Existence. P93 took out of existence (was taken out of existence by): E77
Persistent Item
Quantification: many to many (0,n:0,n)
Scope note: This property describes the active or passive presence of a persistent item in an event without implying any specific role.
It connects the history of a thing with the place and date of an event. For example, an object may be the desk, now in a museum on which a treaty was signed. The presence of an immaterial thing implies the presence of at least one of its carriers.
Examples: Deckchair 42 (E19) *was present at* The sinking of the Titanic (E5)

P13 destroyed (was destroyed by)

Domain: E6 Destruction
Range: E19 Physical Object
Subproperty of: E64 End of Existence. P93 took out of existence (was taken out of existence by): E77
Persistent Item
Quantification: one to many, necessary (1,n:0,1)
Scope note: This property allows specific objects that have been destroyed to be related to a destruction event.
Destruction implies the end of an object's life as a subject of cultural documentation – the physical matter of which the object was composed may in fact continue to exist. A destruction event may be contiguous with a creation event that brings into existence a derived object composed partly of matter from the destroyed object.
Examples: The Tay Bridge Disaster (E6) *destroyed* The Tay Bridge (E22)

P14 carried out by (performed)

Domain: E7 Activity
Range: E39 Actor
Subproperty of: E5 Event. P11 had participant (participated in): E39 Actor
Superproperty of: E8 Acquisition Event. P22 transferred title to (acquired title through): E39 Actor
E8 Acquisition Event. P23 transferred title from (surrendered title of): E39 Actor
E10 Transfer of Custody. P28 custody surrendered by (surrendered custody through): E39
Actor
E10 Transfer of Custody. P29 custody received by (received custody through): E39 Actor
Quantification: many to many, necessary (1,n:0,n)
Scope note: This property describes the active participation of an actor in an activity.
It implies causal or legal responsibility. The “in the role of” property of the property allows the nature of an actor's participation to be specified.
Examples: The painting of the Sistine Chapel (E7) *was carried out by* Michaelangelo Buonaroti (E21) *in the role of* master craftsman (E55)

Properties: P14.1 in the role of: E55 Type

P15 was influenced by (influenced)

Domain: E7 Activity
Range: E1 CRM Entity
Superproperty of: E7 Activity. P16 used specific object (was used for): E70 Stuff
E7 Activity. P17 was motivated by (motivated): E1 CRM Entity
E11 Modification Event. P33 used specific technique (was used by): E29 Design or Procedure
E7 Activity. P134 continued (was continued by): E7 Activity
E83 Type Creation. P136 was based on (supported type creation): E1 CRM Entity
Quantification: many to many (0,n:0,n)
Scope note: This is a high level property, which captures the relationship between an activity and anything that may have had some bearing upon it.
The property has more specific sub properties.
Examples: The designing of the Sydney Harbour Bridge (E7) *was influenced by* the Tyne bridge (E22)

P16 used specific object (was used for)

Domain: E7 Activity
Range: E19 Physical Object
Subproperty of: E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
E7 Activity. P15 was influenced by (influenced): E1 CRM Entity
Quantification: many to many (0,n:0,n)
Scope note: This property describes the use of material or immaterial things in a way essential to the performance or the outcome of an activity.
This property typically applies to tools, instruments, moulds, raw materials and items embedded in a product. It implies that the presence of the object in question was a necessary condition for the action. For example, the activity of writing this text required the use of a computer. An immaterial thing can be used if at least one of its carriers is present. For example, the software tools on a computer.
Examples: The writing of this scope note (E7) *used* Nicholas Crofts' computer (E22) *mode of use* Typing Tool; Storage Medium (E55)

Properties: P16.1 mode of use: E55 Type

P17 was motivated by (motivated)

Domain: E7 Activity
Range: E1 CRM Entity
Subproperty of: E7 Activity. P15 was influenced by (influenced): E1 CRM Entity
Quantification: many to many (0,n:0,n)
Scope note: This property describes an item or items that are regarded as a *reason* for carrying out the activity.
For example, the discovery of a large hoard of treasure may call for a celebration, an order from head quarters can start a military manoeuvre.
Examples: The resignation of the chief executive (E7) *was motivated by* the collapse of SwissAir (E68).
The coronation of Elizabeth II (E7) *was motivated by* the death of George VI (E69)

P19 was intended use of (was made for):

Domain: E7 Activity
Range: E71 Man-Made Stuff
Quantification: many to many (0,n:0,n)

Scope note: This property relates an activity with objects created specifically for *use* in the activity. This is distinct from the intended use of an item in some general type of activity such as the book of common prayer which was intended for use in Church of England services (see P101 *had as general use*).

Examples: Lady Diana Spencer's wedding dress (E71) *was made for* Wedding of Prince Charles and Lady Diana Spencer (E7) *mode of use* To Be Worn (E55)

Properties: P19.1 mode of use: E55 Type

P20 had specific purpose (was purpose of)

Domain: E7 Activity
Range: E7 Activity
Quantification: many to many (0,n:0,n)

Scope note: This property describes the relationship between an activity and an activity that it is intended as a preparation for.

This may involve activities in preparation for other activities, or orders and other organisational activities which lead to some other specific activity.

P20 does not imply that an activity succeeded in achieving its aims. For example, dubious accounting practices may be carried out with the specific purpose of enhancing share values and enabling a take-over bid. The specific purpose remains the same even if the strategy fails and the company goes bankrupt instead.

Examples: Van Eyck's pigment grinding (E7) *had specific purpose* the painting of the Ghent alter piece (E12).

P21 had general purpose (was purpose of)

Domain: E7 Activity
Range: E55 Type
Quantification: many to many (0,n:0,n)

Scope note: This property describes an intentional relationship between an activity and some general goal or purpose.

This may involve activities intended as preparation for some class of activity. For example, a musician practices an instrument in order to develop his or her musical ability, Van Eyck ground pigments and prepared oil paints in order to paint oil paintings. I travel to Oxford in order to work more effectively face-to-face rather than by email and telephone. P21 differs from P20 in that no specific activity is implied as the purpose. E7 does not imply that an activity succeeds in achieving its general aims.

Examples: Van Eyck's pigment grinding (E7) *had general purpose* painting (E55)

P22 transferred title to (acquired title through)

Domain: E8 Acquisition Event
Range: E39 Actor
Subproperty of: E7 Activity. P14 carried out by (performed): E39 Actor
Quantification: many to many (0,n:0,n)

Scope note: This property identifies the actor that acquire the legal ownership of an object as a result of an acquisition event.

The property will typically describe an actor purchasing or otherwise acquiring an object from

another actor. However, title may also be acquired, without any corresponding loss of title by another actor, through legal fieldwork such as hunting, shooting or fishing.

In reality the title is either transferred to or from someone, or both.

Examples: Acquisition of the Amoudrouz collection by the Geneva Ethnography Museum (E8)
transferred title to Geneva Ethnography Museum (E74)

P23 transferred title from (surrendered title of)

Domain: E8 Acquisition Event
Range: E39 Actor
Subproperty of: E7 Activity. P14 carried out by (performed): E39 Actor
Quantification: many to many (0,n:0,n)

Scope note: This property identifies the actors who relinquish legal ownership as the result of an acquisition event.

The property will typically be used to describe a person donating or selling an object to a museum.

In reality title is either transferred to or from someone, or both.

Examples: Acquisition of the Amoudrouz collection by the Geneva Ethnography Museum (E8)
transferred title from Heirs of Amoudrouz (E74)

P24 transferred title of (changed ownership by)

Domain: E8 Acquisition Event
Range: E18 Physical Stuff
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the physical object(s) involved in an acquisition. In reality, an acquisition must refer to at least one transferred item.

Examples: Acquisition of the Amoudrouz collection by the Geneva Ethnography Museum (E8)
transferred title of Amoudrouz Collection (E78)

P25 moved (moved by)

Domain: E9 Move
Range: E19 Physical Object
Subproperty of: E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the physical object that is moved during a move event.

The property implies the object's passive participation. For example, Monet's painting "Impression sunrise" was moved for the first Impressionist exhibition in 1870.

In reality, a move must concern at least one object

Examples: "Impression sunrise" (E22) *moved by* preparations for the First Impressionist Exhibition (E9)

P26 moved to (was destination of)

Domain: E9 Move
Range: E53 Place
Subproperty of: E4 Period. P7 took place at (witnessed): E53 Place
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the destination of a move.

A move will be linked to a destination, such as the move of an artefact from storage to display. A move may be linked to many terminal places. In this case the move describes a distribution of a set of objects. The area of the move includes the origin, route and destination.

Examples: The movement of the Tutenkhamun Exhibition (E9) *moved to* The British Museum (E53)

P27 moved from (was origin of)

Domain: E9 Move
Range: E53 Place
Subproperty of: E4 Period. P7 took place at (witnessed): E53 Place
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the starting place of a move.
A move will be linked to an origin, such as the move of an artefact from storage to display. A move may be linked to many origins. In this case the move describes the picking up of a set of objects. The area of the move includes the origin, route and destination.

Examples: The movement of the Tutenkhamun Exhibition (E9) *moved from* The Cairo Museum (E53)

P28 custody surrendered by (surrendered custody through)

Domain: E10 Transfer of Custody
Range: E39 Actor
Subproperty of: E7 Activity. P14 carried out by (performed): E39 Actor
Quantification: many to many (0,n:0,n)

Scope note: This property identifies the actors who surrender custody of an instance of physical stuff in a transfer of custody activity.

The property will typically describe an actor surrendering custody of an object when it is handed over to someone else's care. On occasion, physical custody may be surrendered involuntarily – through accident, loss or theft.

In reality, custody is either transferred to someone or from someone, or both.

Examples: The Secure Deliveries Inc. crew (E40) *surrendered custody through* The delivery of the paintings by Secure Deliveries Inc. to the National Gallery (E10).

P29 custody received by (received custody through)

Domain: E10 Transfer of Custody
Range: E39 Actor
Subproperty of: E7 Activity. P14 carried out by (performed): E39 Actor
Quantification: many to many (0,n:0,n)

Scope note: This property identifies the actors who receive custody of an instance of physical stuff in a transfer of custody activity.

The property will typically describe actors receiving custody of an object when it is handed over from another actor's care. On occasion, physical custody may be received involuntarily or illegally – through accident, unsolicited donation, or theft.

In reality, custody is either transferred to someone or from someone, or both.

Examples: Representatives of The National Gallery (E40) *received custody through*. The delivery of the paintings by Secure Deliveries Inc. to the National Gallery (E10)

P30 transferred custody of (custody transferred through)

Domain: E10 Transfer of Custody
Range: E19 Physical Object
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies an item or items of physical stuff concerned in a transfer of custody activity.

The property will typically describe the object that is handed over by an actor to another actor's custody. On occasion, physical custody may be transferred involuntarily or illegally – through

Examples: accident, unsolicited donation, or theft.
The delivery of the paintings by Secure Deliveries Inc. to the National Gallery (E10)
transferred custody of paintings from The Iveagh Bequest (E19).

P31 has modified (was modified by)

Domain: E11 Modification Event
Range: E24 Physical Man-Made Stuff
Subproperty of: E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
Superproperty of: E12 Production Event. P108 has produced (was produced by): E24 Physical Man-Made Stuff
E79 Part Addition. P110 augmented (was augmented by): E24 Physical Man-Made Stuff
E80 Part Removal. P112 diminished (was diminished by): E24 Physical Man-Made Stuff
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the physical man-made stuff modified in a modification event.
If a modification is applied to a non-man-made object, it is regarded as a man-made object from that time onwards.

Examples: Rebuilding of the Reichstag (E11) *has modified* the Reichstag in Berlin (E24).

P32 used general technique (was technique of)

Domain: E11 Modification Event
Range: E55 Type
Quantification: many to many (0,n:0,n)

Scope note: This property identifies the technique that was employed in an act of modification.
These techniques should be drawn from an external type hierarchy of consistent terminology of general techniques such as embroidery, oil-painting, etc. Specific techniques may be further described as instances of E29 Design or Procedure.

Examples: Ornamentation of silver cup 113 (E11) *used general technique* gold-plating (E55) (Design or Procedure Type)

P33 used specific technique (was used by)

Domain: E11 Modification Event
Range: E29 Design or Procedure
Subproperty of: E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
E7 Activity. P15 was influenced by (influenced): E1 CRM Entity
Quantification: many to many (0,n:0,n)

Scope note: This property identifies a specific design or procedure used in a modification event.
Modification may be carried out in order to ensure the preservation of an object and not just as part of the creative process.
The property differs from P32 in that the design or procedure referred to is specific and *documented* rather than simply being a term in the type hierarchy. Typical examples would include intervention plans for conservation.

Examples: Ornamentation of silver cup 232 (E11) *used specific technique* 'Instructions for golden chase work by A N Other' (E29)
Rebuilding of Reichstag (E11) *used specific technique* Architectural plans by Foster and Partners (E29)

P34 concerned (was assessed by)

Domain: E14 Conditional Assessment
Range: E18 Physical Stuff
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the Physical Stuff that was assessed during a Condition Assessment activity.
Conditions may be assessed either by direct observation or using recorded evidence. In the latter case the Physical Stuff does need to be present or extant.

Examples: 1997 condition assessment of the silver collection (E14) *concerned* silver cup 232 (E22)

P35 has identified (identified by)

Domain: E14 Conditional Assessment
Range: E3 Condition State
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the Condition State that was observed in a Condition Assessment activity.

Examples: 1997 condition assessment of silver cup 232 (E14) *has identified* oxidation traces were present in 1997 (E3) *has type* oxidation traces (E55)

P36 registered (was registered by)

Domain: E15 Identifier Assignment
Range: E19 Physical Object
Quantification: many to one, necessary (1,1:0,n)

Scope note: This property indicates the physical object to which an identifier is assigned.
P47 *is identified by* - a property of a Physical Object - is a short cut of the fully developed path from E19 through P36, E15, P37 to E42 *Object identifier*

Examples: 01 June 1997 Identifier Assignment of the silver cup donated by Martin Doerr (E15) *registered* silver cup 232 (E19)

P37 assigned (was assigned by)

Domain: E15 Identifier Assignment
Range: E42 Object Identifier
Quantification: many to many (0,n:0,n)

Scope note: This property records the identifier that was assigned to an object in an Identifier Assignment activity.
P47 *is identified by* - a property of a Physical Object - is a short cut of the fully developed path from E19 Physical Object through P36, E15, P37 to E42 *Object identifier*.
The same identifier may be assigned on more than one occasion.
An Object Identifier might be created prior to an assignment.

Examples: 01 June 1997 Identifier Assignment of the silver cup donated by Martin Doerr (E15) *assigned* 232 (E42)

P38 deassigned (was deassigned by)

Domain: E15 Identifier Assignment
Range: E42 Object Identifier
Quantification: many to many (0,n:0,n)

Scope note: This property records the identifier that was deassigned from an object.
Deassignment of an identifier may be necessary when an object is taken out of an inventory, a new numbering system is introduced or objects are merged or split up.
The same identifier may be deassigned on more than one occasion.

Examples: 31 July 2001 Identifier Assignment of the silver cup OXCMS:2001.1.32 (E15) *deassigned* 232 (E42)

P39 measured (was measured by):

Domain: E16 Measurement Event
Range: E70 Stuff
Quantification: many to one, necessary (1,1:0,n)

Scope note: This property records the Stuff that was the subject of an act of Measurement. Stuff may be measured more than once. Both material and immaterial Stuff may be measured: for example the number of words in a text.

Examples: 31 August 1997 measurement of height of silver cup 232 (E16) *measured* silver cup 232 (E22)

P40 observed dimension (was observed in)

Domain: E16 Measurement Event
Range: E54 Dimension
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property records the dimension that was observed in a Measurement activity. Dimension can be any quantifiable aspect of Stuff. Weight, image colour depth and monetary value are dimensions in this sense. One Measurement activity may determine more than one Dimension of one object. Dimensions may be determined either by direct observation or using recorded evidence. In the latter case the Physical Stuff does need to be present or extant. Even though knowledge of the value of a dimension requires measurement, the dimension may be an object of discourse prior to, or even without any measurement being made.

Examples: 31 August 1997 measurement of height of silver cup 232 (E16) *observed dimension* silver cup 232 height (E54) *P91 unit* mm (E58), *P90 has value* 224 (E60)

P41 classified (was classified by)

Domain: E17 Type Assignment
Range: E1 CRM Entity
Quantification: many to one, necessary (1,1:0,n)

Scope note: This property records the item to which a type was assigned in a Type Assignment activity. Any instance of a CRM entity may be assigned a type through type assignment. Type assignment events allow a more detailed path from E1 through P41, E17, P42 to E55 for assigning types to objects compared to the shortcut offered by P2 *has type*.

Examples: 31 August 1997 classification of silver cup 232 (E17) *classified* silver cup 232 (E22)

P42 assigned (was assigned by)

Domain: E17 Type Assignment
Range: E55 Type
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property records the type that was assigned to an entity by a Type Assignment activity. Type assignment events allow a more detailed path from E1 through P41, E17, P42 to E55 for assigning types to objects compared to the shortcut offered by P2 *has type*. For example, a fragment of an antique vessel could be assigned the type “attic red figured belly handled amphora” by expert A. The same fragment could be assigned the type “shoulder handled amphora” by expert B.

A Type may be intellectually constructed independent from assigning an instance of it.
Examples: 31 August 1997 classification of silver cup 232 (E17) *assigned* goblet (E55).

P43 has dimension (is dimension of)

Domain: E70 Stuff
 Range: E54 Dimension
 Quantification: one to many, dependent (0,n:1.1)

Scope note: This property records a Dimension of some Stuff.
 It is a shortcut of the more fully developed path from E70 through P39,E16 *measurement* P40 to E54. It offers no information about how and when a dimension was established, nor by whom.
 An instance of Dimension is specific to an instance of Stuff.

Examples: silver cup 232 (E22) *has dimension* height of silver cup 232 (E54) *P91 unit* mm (E58), *P90 has value* 224 (E60)

P44 has condition (condition of)

Domain: E18 Physical Stuff
 Range: E3 Condition State
 Quantification: one to many, dependent (0,n:1,1)

Scope note: This property records a Condition State for some Physical Stuff.
 It is a shortcut of the more fully developed path from E18 through P34,E14 *condition assessment* P35 to E3. It offers no information about how and when the Condition State was established, nor by whom.
 An instance of Condition State is specific to an instance of Physical Stuff.

Examples: Silver cup 232 (E22) *has condition* oxidation traces were present in 1997 (E3) *has type* oxidation traces (E55)

P45 consists of (is incorporated in)

Domain: E18 Physical Stuff
 Range: E57 Material
 Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the materials of which an instance of Physical Stuff is composed. All physical things consist of physical materials. P45 allows the different materials to be recorded. “Consists of” refers here to observed material as opposed to the consumed raw material.
 A Material (E57), such as a theoretical alloy, may not have any physical instances.

Examples: silver cup 232 (E22) *consists of* silver (E57)

P46 is composed of (forms part of)

Domain: E18 Physical Stuff
 Range: E18 Physical Stuff
 Quantification: many to many (0,n:0,n)

Scope note: This property allows instances of Physical Stuff to be analysed into component elements. Component elements, since they are themselves instances of Physical Stuff, may be further analysed into sub-components, thereby creating a hierarchy of part decomposition.
 An instance of Physical Stuff may be shared between multiple wholes, for example two buildings may share a common wall.
 This property is intended to describe specific components that are *individually documented*, rather than general aspects. Overall descriptions of the structure of an instance of Physical Stuff are captured by the *has note* property.
 The materials of which an item of physical stuff is composed should be documented using P45 *consists of*.

Examples: The Royal carriage (E22) *forms part of* the Royal train (E22).
 The “Hog’s Back” (E24) *forms part of* the “Fosseway” (E24).

P47 is identified by (identifies)

Domain: E19 Physical Object
Range: E42 Object Identifier
Subproperty of: E1 CRM Entity. P1 is identified by (identifies): E41 Appellation
Superproperty of: E19 Physical Object. P48 has preferred identifier (is preferred identifier of): E42 Object Identifier
Quantification: many to many (0,n:0,n)

Scope note: This property records the Object Identifier used for a particular instance of Physical Object. It is intended primarily for museum identification numbers, such as object numbers, inventory numbers, registration numbers or accession* numbers.
* (Note that the identification of the acquisition event is sometimes mistaken for the identification of the acquired objects themselves).
P47 is a sub-property of P1 *identifies*. The range of P47 is restricted to E42 Object Identifier. The property is a shortcut that associates an object identifier directly with an object. It says nothing about when and where an object identifier was assigned, nor by whom.
A more detailed representation can be made using the fully developed (i.e. indirect) path from E19 Physical Object through P36, E15 Identifier Assignment, P37 to E42 Object Identifier.

Examples: The silver cup donated by Martin Doerr (E22) *is identified by* object number OXCMS:2001.1.32 (E42)

P48 has preferred identifier (is preferred identifier of)

Domain: E19 Physical Object
Range: E42 Object Identifier
Subproperty of: E19 Physical Object. P47 is identified by (identifies): E42 Object Identifier
Quantification: many to one (0,1:0,n)

Scope note: This property records the preferred Object Identifier that was used to identify the Physical Object at the time this property was instantiated.
More than one preferred identifier may have been assigned to an object during its history. Use of this property requires an external mechanism for assigning temporal validity to the respective CRM instance.
P48, like P47 is a shortcut for the path from E19 Physical Object through P36, E15 Identifier Assignment, P37 to E42 Object Identifier.

Examples: The pair of Lederhosen donated by Dr Martin Doerr (E22) *has preferred identifier* OXCMS:2001.1.32 (E42)

P49 has former or current keeper (is former or current keeper of)

Domain: E18 Physical Stuff
Range: E39 Actor
Superproperty of: E18 Physical Stuff. P50 has current keeper (is current keeper of): E39 Actor
Quantification: many to many (0,n:0,n)

Scope note: This property identifies the actors who have or have had custody of an instance of physical stuff at some time.
The distinction with P50 is that P49 leaves open the question as to whether the specified keepers are *current*.
P49 is a shortcut for the more detailed path from E18 Physical Stuff through P30, E10 Transfer of Custody, P28 or P29 to E39 Actor.

Examples: Paintings from The Iveagh Bequest (E18) *has former or current keeper* Secure Deliveries Inc. (E40)

P50 has current keeper (is current keeper of)

Domain: E18 Physical Stuff
Range: E39 Actor
Subproperty of: E18 Physical Stuff. P49 has former or current keeper (is former or current keeper of): E39 Actor
Quantification: many to many (0,n:0,n)
Scope note: This property identifies the actors who had custody of an instance of physical stuff at the time this property was instantiated.
P50 is a shortcut for the more detailed path from E18 Physical Stuff through P30, E10 Transfer of Custody, P29 to E39 Actor.
Examples: Paintings from The Iveagh Bequest (E18) *has current keeper* The National Gallery (E40)

P51 has former or current owner (is former or current owner of)

Domain: E18 Physical Stuff
Range: E39 Actor
Superproperty of: E18 Physical Stuff. P52 has current owner (is current owner of): E39 Actor
Quantification: many to many (0,n:0,n)
Scope note: This property identifies the actor that is or has been the legal owner (i.e. title holder) of an instance of Physical Stuff at some time.
The distinction with P52 is that P51 does not indicate whether the specified owners are *current*.
P51 is a shortcut for the more detailed path from E18 Physical Stuff through P24, E8 Acquisition, P23 or P22 to E39 Actor.
Examples: Paintings from the Iveagh Bequest (E18) *has former or current owner* Lord Iveagh (E21)

P52 has current owner (is current owner of)

Domain: E18 Physical Stuff
Range: E39 Actor
Subproperty of: E18 Physical Stuff. P51 has former or current owner (is former or current keeper of): E39 Actor
Quantification: many to many (0,n:0,n)
Scope note: This property identifies the person, group or organisation that was the owner of an instance of Physical Stuff at the time this property was instantiated.
P52 is a shortcut for the more detailed path from E18 Physical Stuff through P24, E8 Acquisition, P22 to E39 Actor, if and only if this Acquisition event is the most recent.
Examples: Paintings from the Iveagh Bequest (E18) *has current owner* «English Heritage» (E40)

P53 has former or current location (is former or current location of)

Domain: E18 Physical Stuff
Range: E53 Place
Superproperty of: E19 Physical Object. P55 has current location (currently holds): E53 Place
Quantification: many to many, necessary (1,n:0,n)
Scope note: This property allows an instance of Place to be associated as the former or current location of an instance of Physical Stuff.
In the case of Physical Objects, the property does not allow any indication of the time-span during which the Physical Object was located at this Place, nor if this is the current location.
In the case of immobile objects, the Place would normally correspond to the place of creation.
P53 is a shortcut. A more detailed representation can make use of the fully developed (i.e. indirect) path from E19 Physical Object through P25, E9 Move, P26 or P27 to E53 Place.
Examples: Silver cup 232 (E22) *has former or current location* Display Case 4, Room 23, Museum of Oxford (E53)

P54 has current permanent location (is current permanent location of)

Domain: E19 Physical Object
Range: E53 Place
Quantification: many to one (0,1:0,n)

Scope note: This property records the foreseen permanent location of an instance of Physical Object at the time this property was instantiated.
P54 is similar to *P55 has current location*. However, it indicates the Place currently reserved for an object, such as the permanent storage location or a permanent exhibit location. The object may be temporarily removed from the permanent location, for example when used in temporary exhibitions or loaned to another institution. The object may never actually be located at its permanent location.

Examples: Silver cup 232 (E22) *has current permanent location* Shelf 3.1, Store 2, Museum of Oxford (E53)

P55 has current location (currently holds)

Domain: E19 Physical Object
Range: E53 Place
Subproperty of: E18 Physical Stuff. P53 has former or current location (is former or current location of): E53 Place
Quantification: many to one (0,1:0,n)

Scope note: This property records the location of a Physical Object at the time the property was instantiated.
This property is a specialisation of *P53 has former or current location*. It indicates that the Place associated with the Physical Object is the *current* location of the object. The property does not allow any indication of how long the Object has been at the current location.
P55 is a shortcut. A more detailed representation can make use of the fully developed (i.e. indirect) path from E19 Physical Object through P25, E9 Move P26 to E53 Place if and only if this Move is the most recent.

Examples: Silver cup 232 (E22) *has current location* Display cabinet 23, Room 4, British Museum (E53)

P56 bears feature (is found on):

Domain: E19 Physical Object
Range: E26 Physical Feature
Quantification: one to many, dependent (0,n:1,1)

Scope note: This property describes a Physical Feature found on a Physical Object. It does not specify the location of the feature on the object.
P56 is a shortcut. A more detailed representation can make use of the fully developed (i.e. indirect) path from E19 Physical Object through P59, E53 Place, P53 to E26 Physical Feature.
A physical feature can only exist on one object.. One object may bear more than one physical feature. A Site should be considered as a Physical Feature on the surface of the Earth.

Examples: Silver cup 232 (E22) *bears feature* 32 mm scratch on silver cup 232 (E26)

P57 has number of parts

Domain: E19 Physical Object
Range: E60 Number
Quantification: many to one (0,1:0,n)

Scope note: This property documents the Number of parts of which an instance of Physical Object is composed.
This may be used as a method of checking inventory counts with regard to aggregate or

collective objects.

What constitutes a part or component depends on the context and requirements of the documentation. Normally, the parts documented in this way would not be considered as worthy of individual attention.

For a more complete description, objects may be decomposed into their components and constituents using *P46 is composed of* and *P45 consists of*. This allows each element to be described individually.

Examples: Chess set 233 (E22) *has number of parts* 33 (E60)

P58 has section definition (defines section)

Domain: E18 Physical Stuff
Range: E46 Section Definition
Quantification: one to many, dependent, (0,n:1,1)

Scope note: This property links an area (section) named by a Section Definition to the instance of Physical Stuff upon which it is found.

The CRM handles sections as locations (instances of E53 Place) within or on Physical Stuff that are identified by Section Definitions. Sections need not be discrete and separable components or parts of an object.

This is part of a more developed path from E18 through P58, E46, P87 that allows a more precise definition of a location found on an object than the shortcut P59.

A particular instance of a Section Definition only applies to one instance of Physical Stuff.

Examples: HMS Victory (E22) *has section definition* poop deck of HMS Victory (E46)

P59 has section (is located on or within)

Domain: E18 Physical Stuff
Range: E53 Place
Quantification: one to many (0,n:0,1)

Scope note: This property links an area to the instance of Physical Stuff upon which it is found.

It is typically used when a named Section Definition is not appropriate.

Physical Stuff may be subdivided into arbitrary regions.

P59 is a shortcut. If the Place is identified by a Section Definition, a more detailed representation can make use of the fully developed (i.e. indirect) path from E18 Physical Stuff through P58, E46 Section Definition, P87 to E53 Place.

A Place can only be located on or within one Physical Object.

Examples: HMS Victory (E22) *has section* HMS Victory section B347.6 (E53)

P62 depicts (is depicted by)

Domain: E24 Physical Man-Made Stuff
Range: E1 CRM Entity
Quantification: many to many (0,n:0,n)

Scope note: This property identifies something that is depicted by an instance of Physical Man-Made Stuff. This property is a shortcut of the more fully developed path from E24 through P65, E36 Visual Item, P138 to E1.

P62.1 mode of depiction allows the nature of the depiction to be refined.

Examples: "Impression Sunrise" by Monet (E23) *depicts* sun rising over Le Havre (E5) *mode of depiction* Impressionistic (E55)

A 20 pence coin (E24) *depicts* Queen Elizabeth II (E21) *mode of depiction* Profile (E55)

Properties: P62.1 mode of depiction: E55 Type

P65 shows visual item (is shown by)

Domain: E24 Physical Man-Made Stuff
Range: E36 Visual Item
Subproperty of: E24 Physical Man-Made Stuff. carries (is carried by): E73 Information Object
Quantification: many to many (0,n:0,n)

Scope note: This property documents a Visual Item shown by an instance of Physical Man-Made Stuff. This property is similar to *P62 depicts* in that it associates an item of Physical Man-Made Stuff with a visual representation. However, *P65 shows visual item* differs from the *P62 depicts* property in that it makes no claims about what the Visual Item is deemed to *represent*. E36 Visual Item identifies a recognisable image or visual symbol, regardless of what this image may or may not represent.
For example, all recent British coins bear a portrait of Queen Elizabeth II, a fact that is correctly documented using *P62 depicts*. Different portraits have been used at different periods, however. *P65 shows visual item* can be used to refer to a *particular* portrait. *P65 shows visual item* may also be used for visual items such as signs, marks and symbols, for example the 'Maltese Cross' or the 'copyright symbol' that have no particular representational content.
This property is part of the fully developed path from E24 Physical Man-Made Stuff through P65, E36, P138 to E1 which is shortcut by P62.

Examples: "Impression Sunrise" by Monet (E23) *shows visual item* Impression_Sunrise.jpg (E39)

P67 refers to (is referred to by)

Domain: E73 Information Object
Range: E1 CRM Entity
Superproperty of: E31 Document. P70 documents (is documented in): E1 CRM Entity
E32 Authority Document. P71 lists (is listed in): E55 Type
E73 Information Object. P129 is about (is subject of): E1 CRM Entity
E36 Visual Item. P138 represents (has representation): E1 CRM Entity
Quantification: many to many (0,n:0,n)

Scope note: An Information Object may refer to any other CRM Entity.
This property documents that an Information Object makes a statement about an instance of a CRM Entity.
P67 has the P67.1 *has type* link to an instance of E55 Type. This is intended to allow a more detailed description of the type of reference.
This differs from P129, which describes the primary subject or subjects of the Information Object.

Examples: The eBay auction listing for 4 July 2002 (E73) *refers to* silver cup 232 (E22) *has type* auction listing (E55)

Properties: P67.1 has type: E55 Type

P68 usually employs (is usually employed by):

Domain: E29 Design or Procedure
Range: E57 Material
Quantification: many to many (0,n:0,n)

Scope note: This property describes a Material usually employed in a Design or Procedure. Designs and procedures commonly employ particular materials. The fabrication of adobe bricks, for example, requires straw, clay and water. This property enables this to be documented.
This property is not intended for the documentation of materials that were required on a *particular* occasion when a design or procedure was executed.

Examples: Procedure for soda glass manufacture (E29) *usually employs* soda (E57)

P69 is associated with

Domain: E29 Design or Procedure
Range: E29 Design or Procedure
Quantification: many to many (0,n:0,n)

Scope note: This symmetric property describes the association of Designs or Procedures with other Designs or Procedures.
Any instance of E29 Design or Procedure may be associated with other designs or procedures.
The nature of the association may be whole-part, sequence, prerequisite etc.
The property is assumed to be entirely reciprocal.

Examples: Procedure for glass blowing (E29) *is associated with* procedure for glass heating (E29)

P70 documents (is documented in)

Domain: E31 Document
Range: E1 CRM Entity
Subproperty of: E73 Information Object. P67 refers to (is referred to by): E1 CRM Entity
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property describes the CRM Entities documented by instances of Documents.
Documents may describe any conceivable entity, hence the link to the highest-level entity in the CRM hierarchy.
This property is intended for cases where a reference is regarded as being of a documentary character, in the scholarly or scientific sense.

Examples: The British Museum catalogue (E31) *documents* the British Museum's Collection (E78)

P71 lists (is listed in)

Domain: E32 Authority Document
Range: E55 Type
Subproperty of: E73 Information Object. P67 refers to (is referred to by): E1 CRM Entity
Quantification: many to many (0,n:0,n)

Scope note: This property documents a source Authority Document for an instance of a Type.
Examples: The Art & Architecture Thesaurus (E32) *lists* alcazars (E55)

P72 has language (is language of)

Domain: E33 Linguistic Object
Range: E56 Language
Quantification: many to many, necessary (0,n:0,n)

Scope note: This property describes the Language of a Linguistic Object.
Linguistic objects are composed in one or more human languages. This property allows these languages to be documented.

Examples: The American Declaration of Independence (E33) *has language* 18th Century English (E56)

P73 has translation (is translation of)

Domain: E33 Linguistic Object
Range: E33 Linguistic Object
Subproperty of: E70 Stuff. P130 shows features of (features are also found on): E70 Stuff
Quantification: one to many (0,n:0,1)

Scope note: This property describes the source and target Linguistic Objects involved in a translation.
When a Linguistic Object is translated into a new language it becomes a new Linguistic

Object, despite being conceptually similar to the source object.
Examples: “Les Baigneurs” (E33) *has translation* “The Bathers” (E33)

P74 has current or former residence (is current or former residence of)

Domain: E39 Actor
Range: E53 Place
Quantification: many to many (0,n:0,n)

Scope note: This property describes the current or former Place of residence of an Actor.
The residence may be either the place where the Actor resides, or a legally registered address of any kind.

Examples: Queen Elizabeth II (E39) *has current or former residence* Buckingham Palace (E53)

P75 possesses (is possessed by)

Domain: E39 Actor
Range: E30 Right
Quantification: many to many (0,n:0,n)

Scope note: This property identifies former or current Rights held by an Actor.

Examples: Michael Jackson (E21) *possesses* Intellectual property rights on the Beatles’ back catalogue (E30)

P76 has contact point (provides access to)

Domain: E39 Actor
Range: E51 Contact Point
Quantification: many to many (0,n:0,n)

Scope note: This property identifies a Contact Point of any type that provides access to an Actor by any communication method, such as e-mail or fax.

Examples: RLG (E40) *has contact point* bl.ric@rlg.org (E51)

P78 is identified by (identifies)

Domain: E52 Time-Span
Range: E49 Time Appellation
Subproperty of: E1 CRM Entity. P1 is identified by (identifies): E41 Appellation
Quantification: many to many (0,n:0,n)

Scope note: This property identifies a Time-Span using a Time Appellation.

Examples: The time span 1926 to 1988 (E52) *is identified by* Showa (Japanese time appellation) (E49)

P79 beginning is qualified by

Domain: E52 Time-Span
Range: E62 String
Subproperty of: E1 CRM Entity. P3 has note: E62 String
Quantification: many to one (0,1:0,n)

Scope note: This property qualifies the beginning of a Time-Span in some way.
The nature of the qualification may be certainty, precision, source etc.

Examples: The time-span of the Holocene (E52) *beginning is qualified by* approximately (E62)

P80 end is qualified by

Domain: E52 Time-Span
Range: E62 String
Subproperty of: E1 CRM Entity. P3 has note: E62 String
Quantification: many to one (0,1:0,n)

Scope note: This property qualifies the end of a Time-Span in some way.
The nature of the qualification may be certainty, precision, source etc.
Examples: The time-span of the Holocene (E52) *end is qualified by* approximately (E62)

P81 ongoing throughout

Domain: E52 Time-Span
Range: E61 Time Primitive
Quantification: many to one, necessary (1,1:0,n)

Scope note: This property describes the minimum period of time covered by a Time-Span. Since Time-spans may not have precisely known temporal extents, the CRM supports statements about the minimum and maximum temporal extents of Time-spans. This property allows a Time-span's minimum temporal extent (i.e. its inner boundary) to be assigned a Time Primitive value. Time Primitives are treated by the CRM as application or system specific date intervals, and are not further analysed.
Examples: The time-span of the development of the CIDOC CRM (E52) *ongoing throughout* 1996-2002 (E61)

P82 at some time within

Domain: E52 Time-Span
Range: E61 Time Primitive
Quantification: many to one, necessary (1,1:0,n)

Scope note: This property describes the maximum period of time within which a Time-Span falls. Since Time-spans may not have precisely known temporal extents, the CRM supports statements about the minimum and maximum temporal extents of Time-spans. This property allows a Time-span's maximum temporal extent (i.e. its outer boundary) to be assigned a Time Primitive value. Time Primitives are treated by the CRM as application or system specific date intervals, and are not further analysed.
Examples: The time-span of the development of the CIDOC CRM (E52) *at some time within* 1992-infinity (E61)

P83 had at least duration (was minimum duration of)

Domain: E52 Time-Span
Range: E54 Dimension
Quantification: one to one (1,1:1,1)

Scope note: This property describes the minimum length of time covered by a Time-Span. It allows a Time-span to be associated with a Dimension representing its minimum duration (i.e. its inner boundary) independent from the actual beginning and end.
Examples: The time span of the Battle of Issos 333 B.C.E. (E52) *had at least duration* Battle of Issos minimum duration (E54) *P91 unit* day (E58) *P90 has value* 1 (E60)

P84 had at most duration (was maximum duration of)

Domain: E52 Time-Span
Range: E54 Dimension

Quantification: one to one (1,1:1,1)

Scope note: This property describes the maximum length of time covered by a Time-Span. It allows a Time-span to be associated with a Dimension representing its maximum duration (i.e. its outer boundary) independent from the actual beginning and end.

Examples: The time span of the Battle of Issos 333 B.C.E. (E52) *had at most duration* Battle of Issos maximum duration (E54) *P91 unit* day (E58) *P90 has value* 2 (E60)

P86 falls within (contains)

Domain: E52 Time-Span
Range: E52 Time-Span
Quantification: many to many (0,n:0,n)

Scope note: This property describes the inclusion relationship between two instances of Time-Span. This property supports the notion that a Time-Span's temporal extent falls within the temporal extent of another Time-Span. It addresses temporal containment only, and no contextual link between the two instances of Time-Span is implied.

Examples: The time-span of the Apollo 11 moon mission (E52) *falls within* the time-span of the reign of Queen Elizabeth II (E52)

P87 is identified by (identifies)

Domain: E53 Place
Range: E44 Place Appellation
Subproperty of: E1 CRM Entity. P1 is identified by (identifies): E41 Appellation
Quantification: many to many (0,n:0,n)

Scope note: This property identifies a Place using a Place Appellation. Examples of Place Appellations used to identify Places include place names, addresses, spatial co-ordinates etc.

Examples: The location of the Duke of Wellington's House (E53) *is identified by* No 1 London (E45)

P88 consists of (forms part of)

Domain: E53 Place
Range: E53 Place
Quantification: many to many (0,n:0,n)

Scope note: This property identifies a Place that forms part of another Place. It supports the notion that a Place can be subdivided into one or more constituent parts. It implies both spatial and contextual containment relationships between the two Places.

Examples: The area covered by the London Borough of Islington in 1976 (E53) *forms part of* the area covered by Greater London in 1976 (E53)

P89 falls within (contains)

Domain: E53 Place
Range: E53 Place
Quantification: many to many (0,n:0,n)

Scope note: This property identifies Places that fall within the area covered by another Place. It addresses spatial containment only, and no 'whole-part' relationship between the two places is implied.

Examples: The area covered by the World Heritage Site of Stonehenge (E53) *falls within* the area of Salisbury Plain (E53)

P90 has value

Domain: E54 Dimension
Range: E60 Number
Quantification: many to one, necessary (1,1:0,n)

Scope note: This property allows a Dimension to be approximated by a Number primitive.

Examples: Height of silver cup 232 (E54) *has value* 226 (E60)

P91 has unit (is unit of)

Domain: E54 Dimension
Range: E58 Measurement Unit
Quantification: many to one, necessary (1,1:0,n)

Scope note: This property shows the type of unit a dimension was expressed in.

Examples: Height of silver cup 232 (E54) *has unit* mm (E58)

P92 brought into existence (was brought into existence by)

Domain: E63 Beginning of Existence
Range: E77 Persistent Item
Subproperty of: E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
Superproperty of: E65 Creation Event. P94 has created (was created by): E28 Conceptual Object
E66 Formation Event. P95 has formed (was formed by): E74 Group
E67 Birth. P98 brought into life (was born): E21 Person
E12 Production Event. P108 has produced (was produced by): E24 Physical Man-Made Stuff
E81 Transformation. P123 resulted in (resulted from): E77 Persistent Item

Quantification: one to many, necessary, dependent (1,n:1,1)

Scope note: This property allows a Beginning of Existence event to be linked to the Persistent Item brought into existence by it.

It allows a “start” to be attached to any Persistent Item being documented i.e. Stuff (E70), Legal Object (E72), Actor (E39), Appellation (E41), Contact Point (E51) and Type (E55).

Examples: The birth of Mozart (E67) *brought into existence* Mozart (E21)

P93 took out of existence (was taken out of existence by)

Domain: E64 End of Existence
Range: E77 Persistent Item
Subproperty of: E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
Superproperty of: E6 Destruction. P13 destroyed (was destroyed by): E19 Physical Object
E68 Dissolution. P99 dissolved (was dissolved by): E74 Group
E69 Death. P100 was death of (died in): E21 Person
E81 Transformation. P123 transformed (was transformed by): E77 Persistent Item

Quantification: one to many, necessary (1,n:0,1)

Scope note: This property allows an End of Existence event to be linked to the Persistent Item taken out of existence by it.

In the case of immaterial things, the End of Existence is considered to take place with the destruction of the last physical carrier.

This allows an “end” to be attached to any Persistent Item being documented i.e. Stuff (E70), Legal Object (E72), Actor (E39), Appellation (E41), Contact Point (E51) and Type (E55). For many Persistent Items we know the maximum life-span and can infer, that they must have ended to exist. We assume in that case an End of Existence, which may be as unnoticeable as forgetting the secret knowledge by the last representative of some indigenous nation.

Examples: The death of Mozart (E69) *took out of existence* Mozart (E21)

P94 has created (was created by)

Domain: E65 Creation Event
Range: E28 Conceptual Object
Subproperty of: E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item
Superproperty of: E83 Type Creation. P135 created type (was created by): E55 Type
Quantification: one to many, necessary, dependent (1,n:1,1)

Scope note: This property allows a conceptual Creation Event to be linked to the Conceptual Object created by it.

It represents the act of conceiving the intellectual content of the Conceptual Object. It does not represent the act of creating the first physical carrier of the Conceptual Object. As an example, this is the composition of a poem, not its commitment to paper.

Examples: The composition of “The Four Friends” by A. A. Milne (E65) *has created* “The Four Friends” by A. A. Milne (E28)

P95 has formed (was formed by)

Domain: E66 Formation Event
Range: E74 Group
Subproperty of: E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item
Quantification: one to many, necessary, dependent (1,n:1,1)

Scope note: This property links the founding or Formation of a Group with the Group itself.

Examples: The formation of the CIDOC CRM SIG at the August 2000 CIDOC Board meeting (E66) *has formed* the CIDOC CRM Special Interest Group (E74)

P96 by mother (gave birth)

Domain: E67 Birth
Range: E21 Person
Subproperty of: E5 Event. P11 had participant (participated in): E39 Actor
Quantification: many to one, necessary (1,1:0,1)

Scope note: This property links a Birth (E67) event (E5) to a Person (E21) as a participant in the role of mother.

Note that fathers are not necessarily participants in the birth (see *from father (was father for)* (P97)). The person being born is linked to the Birth with the property *brought into life (was born)* (P98).

This is not intended for use with general natural history material, only people. There is no explicit method for modelling conception and gestation except by using extensions. This is a sub-property of *had participant (participated in)* (P11).

Examples: The birth of Queen Elizabeth II (E67) *by mother* Queen Mother (E21)

P97 from father (was father for)

Domain: E67 Birth
Range: E21 Person
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property links a Birth (E67) event (E67) to a Person (E21) in the role of father.

Note that fathers are not seen as necessary participants in the birth, whereas mothers are (see *by mother (gave birth)* (P96)). The person being born is linked to the birth with the property *brought into life (was born)* (P98).

This is not intended for use with general natural history material, only people. There is no

explicit method for modelling conception and gestation except by using extensions.
A Birth event is normally (but not always) associated with one father.

Examples: King George VI (E21) *was father for* the birth of Queen Elizabeth II (E67)

P98 brought into life (was born)

Domain: E67 Birth
Range: E21 Person
Subproperty of: E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item
Quantification: one to many, dependent (0,n:1,1)

Scope note: This property links a Birth event to a Person in the role of offspring.
Twins, triplets etc. are *brought into life* by the same Birth event.
This is not intended for use with general Natural History material, only people. There is no explicit method for modelling conception and gestation except by using extensions.

Examples: The Birth of Queen Elizabeth II (E67) *brought into life* Queen Elizabeth II (E21)

P99 dissolved (was dissolved by)

Domain: E68 Dissolution
Range: E74 Group
Subproperty of: E5 Event. P11 had participant (participated in): E39 Actor
E64 End of Existence. P93 took out of existence (was taken out of existence by): E77 Persistent Item
Quantification: one to many, necessary (1,n:0,n)

Scope note: This property links the disbanding or dissolution of a Group to the Group itself.
Examples: The end of The Hole in the Wall Gang (E68) *dissolved* The Hole in the Wall Gang (E74)

P100 was death of (died in)

Domain: E69 Death
Range: E21 Person
Subproperty of: E64 End of Existence. P93 took out of existence (was taken out of existence by): E77 Persistent Item
Quantification: one to many, necessary (1,n:0,n)

Scope note: This property links a Death event to the Person that died.
A Death event may involve multiple people, for example in the case of a battle or disaster.
This is not intended for use with general Natural History material, only people.

Examples: Mozart's death (E69) *was death of* Mozart (E21)

P101 had as general use (was use of)

Domain: E70 Stuff
Range: E55 Type
Quantification: many to many (0,n:0,n)

Scope note: This property links an instance of Stuff to a Type of usage.
It allows the generic link between things, both physical and immaterial, to methods and techniques of use. Thus it can be asserted that a baseball bat had a general use for sport and a specific use for threatening people during the Great Train Robbery.

Examples: Tony Gill's Ford Mustang (E22) *had as general use* transportation (E55)

P102 has title (is title of)

Domain: E71 Man-Made Stuff
Range: E35 Title
Subproperty of: E1 CRM Entity. P1 is identified by (identifies): E41 Appellation
Quantification: many to many (0,n:0,n)

Scope note: This property describes the Title applied to an instance of Man-Made Stuff. The Type of Title is assigned in a sub property.
The *has type* property of the *has title* property enables the relationship between the Title and the stuff to be further clarified, for example, if the title was a given title, a supplied title etc. It allows any man-made material or immaterial thing to be given a Title. It is possible to imagine a title being created without a specific object in mind.

Examples: The first book of the Old Testament (E33) *has title* "Genesis" (E35)
has type translated (E55)

Properties: P102.1 has type: E55 Type

P103 was intended for (was intention of)

Domain: E71 Man-Made Stuff
Range: E55 Type
Quantification: many to many (0,n:0,n)

Scope note: This property links an instance of Man-Made Stuff to a Type of usage.
It creates a property between specific man-made things, both physical and immaterial, to types of intended methods and techniques of use.

Note: A link between specific man-made things and a *specific* use activity should be expressed using P19 *was intended use of*.

Examples: This plate (E22) *was intended for* being destroyed at a wedding reception (E55)

P104 is subject to (applies to)

Domain: E72 Legal Object
Range: E30 Right
Quantification: many to many (0,n:0,n)

Scope note: This property links a particular legal object to the rights to which it is subject.
The Right is held by an Actor as described by P75 *possesses*.

Examples: Beatles back catalogue (E72) *is subject to* reproduction right on Beatles back catalogue (E30)

P105 right held by (has right on)

Domain: E72 Legal Object
Range: E39 Actor
Quantification: many to many (0,n:0,n)

Scope note: This property identifies the Actor who holds rights to a Legal Object.
P105 is a shortcut of the fully developed path from E72 through P104, E30 Right, P75 to E39.
The *has type* property of the *right held by* property enables the relationship between the Legal Object and the Actor to be further clarified.

Examples: Beatles back catalogue (E73) *right held by* Michael Jackson (E21)

Properties: P105.1 has type: Type

P106 is composed of (forms part of)

Domain: E73 Information Object
Range: E73 Information Object

Quantification: many to many (0,n:0,n)

Scope note: This property links an Information Object to another Information Object in a part/whole relationship.
It allows for the decomposition of an Information Object into component parts, and hence the creation of a nested hierarchy of Information Objects

Examples: “The love song of J. Alfred Prufrock” (E33) *forms part of* The Works of T.S. Eliot. (E33)

P107 has current or former member (is current or former member of)

Domain: E74 Group
Range: E39 Actor
Quantification: many to many (0,n:0,n)

Scope note: This property relates an Actor to the Group of which he or she is a member.
Groups, Legal Bodies and Persons may all be members of groups. A Group necessarily consists of more than one Person.

Examples: Moholy Nagy (E21) *is current or former member of* Bauhaus (E74)
National Museum of Science and Industry (E40) *has current or former member* The National Railway Museum (E40)

P108 has produced (was produced by)

Domain: E12 Production Event
Range: E24 Physical Man-Made Stuff
Subproperty of: E11 Modification Event. P31 has modified (was modified by): E24 Physical Man-Made Stuff
E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item
Quantification: one to many, necessary, dependent (1,n:1,1)

Scope note: This property identifies the Physical Man-Made Stuff that came into existence as a result of a Production event.
The identity of an instance of Physical Man-Made Stuff is not defined by its matter, but by its existence as a subject of documentation.
A Production event can result in the creation of multiple instances of Physical Man-Made Stuff.

Examples: The building of Rome (E12) *produced* the Coliseum (E22)

P109 has current or former curator (is current or former curator of)

Domain: E78 Collection
Range: E39 Actor
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the Actor or Actors who assume or have assumed overall curatorial responsibility for a Collection.
This property is effectively a short-cut. It does not allow a history of curation to be recorded.
This would require use of an Event assigning responsibility for a collection to a curator.

Examples: The Robert Opie Collection (E78) *has current or former curator* Robert Opie (E39)

P110 augmented (was augmented by)

Domain: E79 Part Addition
Range: E24 Physical Man-Made Stuff
Subproperty of: E11 Modification Event. P31 has modified (was modified by): E24 Physical Man-Made Stuff
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the Physical Man-Made Stuff that is added to (augmented) in a Part Addition.
Although a Part Addition event normally concerns only one item of Physical Man-Made Stuff, it is possible to imagine circumstances under which more than one item might be added to (augmented). For example, the artist Jackson Pollock trailing paint onto multiple canvasses.

Examples: The final nail-insertion Event (E79) *augmented* Coffin of George VI (E24)

P111 added (was added by)

Domain: E79 Part Addition
Range: E18 Physical Stuff
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the Physical Stuff that is added during a Part Addition activity

Examples: The insertion of the final nail (E79) *added* the last nail in George VI's coffin (E18)

P112 diminished (was diminished by)

Domain: E80 Part Removal
Range: E24 Physical Man-Made Stuff
Subproperty of: E11 Modification Event. P31 has modified (was modified by): E24 Physical Man-Made Stuff
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the Physical Man-Made Stuff that was diminished by Part Removal.
Although a Part removal activity normally concerns only one item of Physical Man-Made Stuff, it is possible to imagine circumstances under which more than one item might be diminished by a single Part Removal activity.

Examples: The coffin of Tut Ankh Amun (E22) *was diminished by* The opening of the coffin of Tut Ankh Amun (E80)

P113 removed (was removed by)

Domain: E80 Part Removal
Range: E18 Physical Stuff
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the Physical Stuff that is removed during a Part Removal activity.

Examples: The opening of the coffin of Tut Ankh Amun (E80) *removed* The mummy of Tut Ankh Amun (E20,E22)

P114 is equal in time to

Domain: E2 Temporal Entity
Range: E2 Temporal Entity
Quantification: many to many (0,n:0,n)

Scope note: This symmetric property allows Temporal Entities with the same time-span to be equated.
This is only necessary if the time span is unknown (otherwise the equivalence can be calculated).
This property is the same as the "equal" relationship of Allen's temporal logic.

Examples: The destruction of the Villa Justinian Tempus (E6) *is equal in time to* the death of Maximus Venderus (E69)

P115 finishes (is finished by)

Domain: E2 Temporal Entity
Range: E2 Temporal Entity

Quantification: many to many (0,n:0,n)

Scope note: This property allows the ending point for a temporal entity to be situated by reference to the ending point of another temporal entity of longer duration.
This is only necessary if the time span is unknown (otherwise the relationship can be calculated).

Examples: This property is the same as the "finishes / finished-by" relationships of Allen's temporal logic.
Late Bronze Age (E4) *finishes* Bronze Age (E4)

P116 starts (is started by)

Domain: E2 Temporal Entity
Range: E2 Temporal Entity
Quantification: many to many (0,n:0,n)

Scope note: This property allows the starting point for a temporal entity to be situated by reference to the starting point of another temporal entity of longer duration.
This is only necessary if the time span is unknown (otherwise the relationship can be calculated).

Examples: This property is the same as the "starts / started-by" relationships of Allen's temporal logic.
Early Bronze Age (E4) *starts* Bronze Age (E4)

P117 occurs during (includes)

Domain: E2 Temporal Entity
Range: E2 Temporal Entity
Quantification: many to many (0,n:0,n)

Scope note: This property allows the entire time-span of a temporal entity to be situated within the time-span of another temporal entity that starts before and ends after the included temporal entity.
This is only necessary if the time span is unknown (otherwise the relationship can be calculated).

Examples: This property is the same as the "during / includes" relationships of Allen's temporal logic.
Middle Saxon period (E4) *occurs during* Saxon period (E4)

P118 overlaps in time with (is overlapped in time by)

Domain: E2 Temporal Entity
Range: E2 Temporal Entity
Quantification: many to many (0,n:0,n)

Scope note: This property identifies an overlap between the time-spans of two temporal entities. It implies a temporal order between the two entities: if A overlaps in time B, then A must start before B, and B must end after A.
This property is only necessary if the relevant time spans are unknown (otherwise the relationship can be calculated).

Examples: This property is the same as the "overlaps / overlapped-by" relationships of Allen's temporal logic.
The Iron Age (E52) *overlaps in time with* the Roman period (E52)

P119 meets in time with (is met in time by)

Domain: E2 Temporal Entity
Range: E2 Temporal Entity
Quantification: many to many (0,n:0,n)

Scope note: This property indicates that one temporal entity immediately follows another. It implies a

particular order between the two entities: if A meets in time with B, then A must precede B. This property is only necessary if the relevant time spans are unknown (otherwise the relationship can be calculated).

Examples: This property is the same as the "meets / met-by " relationships of Allen's temporal logic. Early Saxon Period (E52) *meets in time with* Middle Saxon Period (E52)

P120 occurs before (occurs after)

Domain: E2 Temporal Entity
Range: E2 Temporal Entity
Quantification: many to many (0,n:0,n)

Scope note: This property identifies the relative chronological sequence of two temporal entities. It implies that a temporal gap exists between the end of A and the start of B. This property is only necessary if the relevant time spans are unknown (otherwise the relationship can be calculated).

Examples: This property is the same as the "before / after " relationships of Allen's temporal logic. Early Bronze age (E52) *occurs before* Late Bronze age (E52).

P121 overlaps with

Domain: E53 Place
Range: E53 Place
Quantification: many to many (0,n:0,n)

Scope note: This symmetric property allows places with overlapping geometric extents to be associated with each other. It does not specify anything about the shared area. This property is purely spatial, in contrast to Allen operators which are purely temporal.

Examples: The territory of the United States (E53) *overlaps with* the Arctic (E53)

P122 borders with

Domain: E53 Place
Range: E53 Place
Quantification: many to many (0,n:0,n)

Scope note: This symmetric property allows places which share common borders to be related as such. This property is purely spatial, in contrast to Allen operators which are purely temporal.

Examples: Scotland (E53) *borders with* England (E53)

P123 resulted in (resulted from)

Domain: E81 Transformation
Range: E77 Persistent Item
Subproperty of: E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item
Quantification: many to many, necessary (1,n:0,n)

Scope note: This property identifies the persistent item or items that are the result of a transformation event. New items replace the transformed item or items, which cease to exist as units of documentation. The physical continuity between the old and the new is expressed by the link to the common transformation event.

Examples: The transformation of the Venetian Loggia in Heraklion into a city hall (E81) *resulted in* the City Hall of Heraklion (E22).
The death and mummification of Tut Ankh Amun (E81) *resulted in* the Mummy of Tut Ankh Amun (E22 and E20)

P124 transformed (was transformed by)

Domain: E81 Transformation
Range: E77 Persistent Item
Subproperty of: E64 End of Existence. P93 took out of existence (was taken out of existence by): E77 Persistent Item
Quantification: one to many, necessary (1,n:0,1)

Scope note: This property identifies the persistent item or items that cease to exist due to a transformation event. It is replaced by the result of the transformation, which becomes a new unit of documentation. The continuity between both items, the new and the old, is expressed by the link to the common transformation.

Examples: The transformation of the Venetian Loggia in Heraklion into a city hall (E81) *transformed* the Venetian Loggia in Heraklion (E22).
The death and mummification of Tut Ankh Amun (E81) *transformed* the ruling Pharaoh Tut Ankh Amun (E21).

P125 used object of type (was type of object used in)

Domain: E7 Activity
Range: E55 Type
Quantification: many to many (0,n:0,n)

Scope note: This property defines the kind of objects used in an activity, when the specific instance is either unknown or not of interest, such as use of "a hammer".

Examples: At the battle of Agincourt (E7), the English archers *used object of type* long bow (E55)

P126 employed (was employed in)

Domain: E11 Modification Event
Range: E57 Material
Quantification: many to many (0,n:0,n)

Scope note: This property identifies Material employed in a Modification Event.
The material used during the Modification Event does not necessarily become incorporated into the Physical Man-Made Stuff that forms the subject of the Modification Event.

Examples: The repairing of the Queen Mary (E11) *employed* Steel (E57)
Distilled water (E57) *was employed in* the restoration of the Sistine Chapel (E11)

P127 has broader term (has narrower term)

Domain: E55 Type
Range: E55 Type
Quantification: many to many (0,n:0,n)

Scope note: This property identifies a supertype to which a type is related.
It allows types to be organised into hierarchies.
This is the sense of "broader term generic (BTG)" as defined in ISO 2788

Examples: Dime (E55) *has broader term* coin (E55)

P128 carries (is carried by)

Domain: E24 Physical Man-Made Stuff
Range: E73 Information Object
Quantification: many to many (0,n:0,n)

Scope note: This property identifies an Information Object carried by an instance of Physical man-made

stuff. In general this would be an Information Carrier (E23).

P65 is a specialisation of P128 which should be used for carrying visual items (E36).

Examples: Matthew's paperback copy of Reach for the Sky (E23) carries the text of Reach for the Sky (E73)

P129 is about (is subject of)

Domain: E73 Information Object
Range: E1 CRM Entity
Subproperty: E28 Conceptual Object. P67 refers to (is referred to by): E1 CRM Entity
Quantification: many to many (0,n:0,n)

Scope note: This property identifies a CRM Entity that is the subject of an Information Object, in the sense of "aboutness" used in library science.
This differs from P67, which refers to a CRM Entity, in that it describes the primary subject or subjects of the Information Object.

Examples: Reach for the Sky (E73) *is about* Douglas Bader (E39)

P130 shows features of (features are also found on)

Domain: E70 Stuff
Range: E70 Stuff
Superproperty: E33 Linguistic Object. P73 has translation (is translation of): E33 Linguistic Object
Quantification: many to many (0,n:0,n)

Scope note: This property generalises the notions of "copy of" and "similar to" into a dynamic, asymmetric relationship, where the domain expresses the derivative, if such a direction can be established. Otherwise, the relationship is symmetric.
It is a short-cut of P15 was influenced by in a creation or production, if such a reason for the similarity can be verified. Moreover it expresses similarity in cases that can be stated between two objects only, without historical knowledge about its reasons.

Examples: The Parthenon Frieze on the Acropolis in Athens (E22) *shows features of* the Original Parthenon Frieze in the British museum (E22). *Kind of similarity:* Copy (E55)

Properties: P130.1 kind of similarity: E55 Type

P131 is identified by (identifies)

Domain: E39 Actor
Range: E82 Actor Appellation
Subproperty: E1 CRM Entity. P1 is identified by (identifies): E41 Appellation
Quantification: many to many (0,n:0,n)

Scope note: This property identifies a name used specifically to identify an Actor.
This property is a specialisation of P1 is identified by.

Examples: Tyler Withersopp IV (E39) *is identified by* US social security number 619-17-4204 (E82)

P132 overlaps with

Domain: E4 Period
Range: E4 Period
Quantification: many to many (0,n:0,n)

Scope note: This symmetric property allows periods that overlap both temporally and spatially to be related, i.e. they share some spatio-temporal extent.
This property does not imply any ordering or sequence between the two periods, either spatial or temporal.

Examples: The “Urnfield” period (E4) *overlaps with* the “Hallstatt” period (E4)

P133 is separated from

Domain: E4 Period
Range: E4 Period
Quantification: many to many (0,n:0,n)

Scope note: This symmetric property allows periods that do not overlap both temporally and spatially, to be related i.e. they do not share any spatio-temporal extent.
This property does not imply any ordering or sequence between the two periods either spatial or temporal.

Examples: The “Hallstatt” period (E4) *is separated from* the “La Tène” era (E4)

P134 continued (was continued by)

Domain: E7 Activity
Range: E7 Activity
Subproperty: E7 Activity. P15 was influenced by (influenced): E1 CRM Entity
Quantification: many to many (0,n:0,n)

Scope note: This property allows two activities to be related where the domain is considered as an intentional continuation of the range.
Used multiple times, this allows a chain of related activities to be created which follow each other in sequence.

Examples: The construction of the Kölner Dom (Cologne Cathedral) (E7), abandoned in the 15th century, *was continued by* construction in the 19th century adapting the initial plans so as to preserve the intended appearance (E7).

P135 created type (was created by)

Domain: E83 Type Creation
Range: E55 Type
Subproperty: E65 Creation Event. P94 has created (was created by): E28 Conceptual Object
Quantification: one to many, necessary (1,n:0,1)

Scope note: This property identifies the Type (E55) which is created in a Type Creation (E83) activity.

Examples: Classification by Lineas (E83) *created type* “*Lineus bilineatus*” (E55)

P136 was based on (supported type creation)

Domain: E83 Type Creation
Range: E1 CRM Entity
Subproperty: E7 Activity. P15 was influenced by (influenced): E1 CRM Entity
Quantification: many to many (0,n:0,n)

Scope note: This property identifies one or more items that were used as evidence to declare a new type. The examination of these items is often the only objective way to understand the precise characteristics of a new type. Such items should be deposited in a museum or similar institution for that reason.
The taxonomic role renders the specific relationship of each item to the type, such as "holotype" or "original element".

Examples: The taxon creation of "Serratula glauca" in 1753 (E83) *was based on* Object BM000576251 of the Clayton Herbarium (E20) *in the taxonomic role* original element (E55)

Properties: P136.1 in the taxonomic role: E55 Type

P137 is exemplified by (exemplifies)

Domain: E55 Type
Range: E1 CRM Entity
Quantification: many to many (0,n:0,n)

Scope note: This property allows an item to be declared as an example of a type or taxon. The taxonomic role renders the specific relationship of this example to the type, such as "prototypical", "archetypical" "lectotype", etc. The taxonomic role "lectotype" is not associated with the Type Creation itself, but selected in a later phase.

Examples: *Spigelia marilandica*' (E55) is exemplified by Object BM000098044 of the Clayton Herbarium (E20) in the taxonomic role lectotype

Properties: P137.1 in the taxonomic role: E55 Type

P138 represents (has representation)

Domain: E36 Visual Item
Range: E1 CRM Entity
Subproperty: E28 Conceptual Object. P67 refers to (is referred to by): E1 CRM Entity
Quantification: many to many (0,n:0,n)

Scope note: This property establishes the relationship between a visual item and the entity that it visually represents. Any entity may be represented visually. This property is part of the fully developed path from E24 Physical Man-Made Stuff through P65, E36, P138 to E1 which is shortcut by P62. P138.1 mode of representation allows the nature of the representation to be refined.

Examples: The design on the reverse of a Swiss coin (E36) represents Helvetia (E28) mode of representation Profile (E55)

Properties: P138.1 mode of representation: E55 Type

P139 has alternative form

Domain: E41 Appellation
Range: E41 Appellation
Quantification: many to many (0,n:0,n)

Scope note: This property establishes a relationship of synonymy between two appellations. The synonymy applies to *all* cases of use of an instance of appellation. Multiple names assigned to an object which are not always synonymous should be instantiated as repeated values of the "is identified by" property. This property is symmetric but *not* transitive.

Examples: "Museum Documentation Association" (E41) has alternative form "mda" (E41). "Martin Doerr" (E41) has alternative form "Martin Dörr" (E41)