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| Definition of the **CIDOCConceptual Reference Model** |

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### E1 CRM Entity

Superclass of: [E2](#_E2_Temporal_Entity) Temporal Entity

[E52](#_E52_Time-Span) Time-Span

[E53](#_E53_Place) Place

[E54](#_E54_Dimension) Dimension

[E77](#_E77_Persistent_Item) Persistent Item

[E92](#_E92_Spacetime_Volume) Spacetime Volume

Scope note: This class comprises all things in the universe of discourse of the CIDOC Conceptual Reference Model.

It is an abstract concept providing for three general properties:

1. Identification by name or appellation, and in particular by a preferred identifier
2. Classification by type, allowing further refinement of the specific subclass an instance belongs to
3. Attachment of free text for the expression of anything not captured by formal properties

With the exception of E59 Primitive Value, all other classes within the CRM are directly or indirectly specialisations of E1 CRM Entity.

Examples:

* the earthquake in Lisbon 1755 (E5)
1. *Chester*, D. K., ‘The 1755 Lisbon earthquake’, *Progress in physical geography: an international review of geographical work in the natural and environmental sciences*, vol. 25, no. 3, 2001, pp. 363-384.

In First Order Logic:

 E1(x)

Properties:

[P1](#_P1_is_identified) is identified by (identifies): [E41](#_E41_Appellation) Appellation

[P2](#_P2_has_type) has type (is type of): [E55](#_E55_Type) Type

[P3](#_P3_has_note) has note: [E62](#_E62_String) String

 (P3.1 has type: [E55](#_E55_Type) Type)

[P48](#_P48_has_preferred) has preferred identifier (is preferred identifier of): [E42](#_E42_Object_Identifier) Identifier

[P137](#_P137_exemplifies_(_is exemplified b) exemplifies (is exemplified by): [E55](#_E55_Type) Type

 (P137.1 in the taxonomic role: [E55](#_E55_Type) Type)

### E2 Temporal Entity

Subclass of: [Ε1](#_E1_CRM_Entity) CRM Entity

Superclass of: [Ε3](#_E3_Condition_State) Condition State

 [E4](#_E4_Period) Period

Scope note: This class comprises all phenomena, such as the instances of E4 Periods, E5 Events and states, which happen over a limited extent in time. This extent in time must be contiguous, i.e., without gaps. In case the defining kinds of phenomena for an instance of E2 Temporal Entity cease to happen, and occur later again at another time, we regard that the former E2 Temporal Entity has ended and a new instance has come into existence. In more intuitive terms, the same event cannot happen twice.

 In some contexts, these are also called perdurants. This class is disjoint from E77 Persistent Item. This is an abstract class and has no direct instances. E2 Temporal Entity is specialized into E4 Period, which applies to a particular geographic area (defined with a greater or lesser degree of precision), and E3 Condition State, which applies to instances of E18 Physical Thing.

Examples:

* Bronze Age (E4)
1. Childe, G. V., The Bronze Age, New York, Biblo & Tannen, 1963.
* the earthquake in Lisbon 1755 (E5)
1. Chester, D. K., ‘The 1755 Lisbon earthquake’, *Progress in physical geography: an international review of geographical work in the natural and environmental sciences*, vol. 25, no. 3, 2001, pp. 363-384.
* the Peterhof Palace near Saint Petersburg being in ruins from 1944 – 1946 (E3)
1. Maddox, S., *Saving Stalin's Imperial City: Historic Preservation in Leningrad, 1930–1950,* Indiana University Press, 2015.

In First Order Logic:

 E2(x) ⊃ E1(x)

Properties:

[P4](#_P4_has_time-span_(is time-span of)) has time-span (is time-span of): [E52](#_E52_Time-Span) Time-Span

[P114](#_P114_is_equal_in time to) is equal in time to: [E2](#_E2_Temporal_Entity) Temporal Entity

[P115](#_P115_finishes_(is_finished by)) finishes (is finished by): [E2](#_E2_Temporal_Entity) Temporal Entity

[P116](#_P116_starts_(is_started by)) starts (is started by): [E2](#_E2_Temporal_Entity) Temporal Entity

[P117](#_P117_occurs_during_(includes)) occurs during (includes): [E2](#_E2_Temporal_Entity) Temporal Entity

[P118](#_P118_overlaps_in_time with (is over) overlaps in time with (is overlapped in time by): [E2](#_E2_Temporal_Entity) Temporal Entity

[P119](#_P119_meets_in_time with (is met in ) meets in time with (is met in time by): [E2](#_E2_Temporal_Entity) Temporal Entity

[P120](#_P120_occurs_before_(occurs after)) occurs before (occurs after): [E2](#_E2_Temporal_Entity) Temporal Entity

[P173](#_P173_starts_before) starts before the end of (ends after the start of): [E2](#_E2_Temporal_Entity) Temporal Entity

[P174](#_P174_starts_before) starts before (starts after the start of): [E2](#_E2_Temporal_Entity) Temporal Entity

[P175](#_P175_starts_within) starts within (includes the start of): [E2](#_E2_Temporal_Entity) Temporal Entity

[P176](#_P176__ends) ends before (starts after the end of): [E2](#_E2_Temporal_Entity) Temporal Entity

[P177](#_P177__) ends within (includes the end of): [E2](#_E2_Temporal_Entity) Temporal Entity

[P178](#_P178_ends_after) ends after or with (ends before or at the end of): [E2](#_E2_Temporal_Entity) Temporal Entity

### E3 Condition State

Subclass of: [E2](#_E2_Temporal_Entity) Temporal Entity

Scope note: This class comprises the states of objects characterised by a certain condition over a time-span.

An instance of this class describes the prevailing physical condition of any material object or feature during a specific E52 Time Span. In general, the time-span for which a certain condition can be asserted may be shorter than the real time-span, for which this condition held.

 The nature of that condition can be described using *P2 has type*. For example, the E3 Condition State “condition of the SS Great Britain between 22 September 1846 and 27 August 1847” can be characterized as E55 Type “wrecked”.

Examples:

* the "reconstructed" state of the “Amber Room” in Tsarskoje Selo from summer 2003 until now
1. Owen, J., *Forever Amber: The impact of the Amber Room on Russia's cultural stature then, now and in the future*, PhD Thesis, ProQuest Dissertations Publishing, 2009.
* the "ruined" state of Peterhof Palace near Saint Petersburg from 1944 to 1946
1. Maddox, S., *Saving Stalin's Imperial City: Historic Preservation in Leningrad, 1930–1950*, Indiana University Press, 2015.
* the state of my turkey in the oven at 14:30 on 25 December, 2002 (*P2* *has type: E55* *Type* “still not cooked”)
* the topography of the leaves of Sinai Printed Book 3234.2361 on the 10th of July 2007 (described as: of type "cockled")

In First Order Logic:

 E3(x) ⊃ E2(x)

Properties**:**

[P5](#_P5_consists_of) consists of (forms part of): [E3](#_E3_Condition_State) Condition State

### E4 Period

Subclass of: [E2](#_E2_Temporal_Entity) Temporal Entity

Subclass of [E92](#_E91_Co-Reference_Assignment) Spacetime volume

Superclass of: [E5](#_E5_Event) Event

Scope note: This class comprises sets of coherent phenomena or cultural manifestations occurring in time and space.

It is the social or physical coherence of these phenomena that identify an E4 Period and not the associated spatiotemporal extent. This extent is only the “ground” or space in an abstract physical sense that the actual process of growth, spread and retreat has covered. Consequently, different periods can overlap and coexist in time and space, such as when a nomadic culture exists in the same area and time as a sedentary culture. This also means that overlapping land use rights, common among first nations, amounts to overlapping periods.

Often, this class is used to describe prehistoric or historic periods such as the “Neolithic Period”, the “Ming Dynasty” or the “McCarthy Era”, but also geopolitical units and activities of settlements are regarded as special cases of E4 Period. However, there are no assumptions about the scale of the associated phenomena. In particular all events are seen as synthetic processes consisting of coherent phenomena. Therefore E4 Period is a superclass of E5 Event. For example, a modern clinical E67 Birth can be seen as both an atomic E5 Event and as an E4 Period that consists of multiple activities performed by multiple instances of E39 Actor.

As the actual extent of an E4 Period in spacetime we regard the trajectories of the participating physical things during their participation in an instance of E4 Period. This includes the open spaces via which these things have interacted and the spaces by which they had the potential to interact during that period or event in the way defined by the type of the respective period or event. Examples include the air in a meeting room transferring the voices of the participants. Since these phenomena are fuzzy, we assume the spatiotemporal extent to be contiguous, except for cases of phenomena spreading out over islands or other separated areas, including geopolitical units distributed over disconnected areas such as islands or colonies.

Whether the trajectories necessary for participants to travel between these areas are regarded as part of the spatiotemporal extent or not has to be decided in each case based on a concrete analysis, taking use of the sea for other purposes than travel, such as fishing, into consideration. One may also argue that the activities to govern disconnected areas imply travelling through spaces connecting them and that these areas hence are spatially connected in a way, but it appears counterintuitive to consider for instance travel routes in international waters as extensions of geopolitical units.

Consequently, an instance of E4 Period may occupy a number of disjoint spacetime volumes, however there must not be a discontinuity in the timespan covered by these spacetime volumes. This means that an instance of E4 Period must be contiguous in time. If it has ended in all areas, it has ended as a whole. However it may end in one area before another, such as in the Polynesian migration, and it continues as long as it is ongoing in at least one area.

We model E4 Period as a subclass of E2 Temporal Entity and of E92 Spacetime volume. The latter is intended as a phenomenal spacetime volume as defined in CRMgeo (Doerr and Hiebel 2013). By virtue of this multiple inheritance we can discuss the physical extent of an E4 Period without representing each instance of it together with an instance of its associated spacetime volume. This model combines two quite different kinds of substance: an instance of E4 Period is a phenomena while a spacetime volume is an aggregation of points in spacetime. However, the real spatiotemporal extent of an instance of E4 Period is regarded to be unique to it due to all its details and fuzziness; its identity and existence depends uniquely on the identity of the instance of E4 Period. Therefore this multiple inheritance is unambiguous and effective and furthermore corresponds to the intuitions of natural language.

There are two different conceptualisations of ‘artistic style’, defined either by physical features or by historical context. For example, “Impressionism” can be viewed as a period lasting from approximately 1870 to 1905 during which paintings with particular characteristics were produced by a group of artists that included (among others) Monet, Renoir, Pissarro, Sisley and Degas. Alternatively, it can be regarded as a style applicable to all paintings sharing the characteristics of the works produced by the Impressionist painters, regardless of historical context. The first interpretation is an instance of E4 Period, and the second defines morphological object types that fall under E55 Type.

Another specific case of an E4 Period is the set of activities and phenomena associated with a settlement, such as the populated period of Nineveh.

Examples:

* Jurassic
1. Hallam, A., *Jurassic environments*, Cambridge, Cambridge University Press, 1975.
* European Bronze Age
1. Harrison. R.J. *Symbols and warriors, images of the European Bronze Age,* Bristol, Western Academic & Specialist Press, c2004.
* Italian Renaissance
1. Macdonald, F., *The Italian renaissance*, London, Collins Educational, 1992.
* Thirty Years War
1. Lee, S.J., *The thirty years war*, London, Routledge, 1991.
* Sturm und Drang
1. Berkoff, S., *Sturm und Drang,* London,Bloomsbury, 2013.
* Cubism
1. Cox, N., *Cubism, London,* Phaidon, 2000.

In First Order Logic:

 E4(x) ⊃ E2(x)

E4(x) ⊃ E92(x)

Properties**:**

[P7](#_P7_took_place) took place at (witnessed): [E53](#_E53_Place) Place

[P8](#_P8_took_place) took place on or within (witnessed): [E18](#_E19_Physical_Object) Physical Thing

[P9](#_P9_consists_of_(forms part of)) consists of (forms part of): [E4](#_E4_Period) Period

### E5 Event

Subclass of: [E4](#_E4_Period) Period

Superclass of: [E7](#_E7_Activity) Activity

[E63](#_E63_Beginning_of_Existence) Beginning of Existence

[E64](#_E64_End_of_Existence) End of Existence

Scope note: This class comprises changes of states in cultural, social or physical systems, regardless of scale, brought about by a series or group of coherent physical, cultural, technological or legal phenomena. Such changes of state will affect instances of E77 Persistent Item or its subclasses.

The distinction between an E5 Event and an E4 Period is partly a question of the scale of observation. Viewed at a coarse level of detail, an E5 Event is an ‘instantaneous’ change of state. At a fine level, the E5 Event can be analysed into its component phenomena within a space and time frame, and as such can be seen as an E4 Period. The reverse is not necessarily the case: not all instances of E4 Period give rise to a noteworthy change of state.

Examples:

* the birth of Cleopatra (E67)
1. Pomeroy, S.B., *Women in Hellenistic Egypt, from Alexander to Cleopatra*, New York: Schocken Books, 1984.
* the destruction of Herculaneum by volcanic eruption in 79 AD (E6)
1. Camardo, D., ‘Herculaneum from the ad 79 eruption to the medieval period: analysis of the documentary, iconographic and archaeological sources, with new data on the beginning of exploration at the ancient town’,*Papers of the British School at Rome*, Oct 2013, Vol.81, pp.303-340.
* World War II (E7)
1. Barber, N,. *World War II*, London, Evans Brothers, 1994.
* the Battle of Stalingrad (E7)
1. *Hoyt*, E. P., *199 days: the battle of Stalingrad*, New York, Tor, 1993.
* the Yalta Conference (E7)
1. Harbutt, F., *Yalta 1945: Europe and America at the crossroads*, Cambridge, Cambridge University Press, 2010.
* my birthday celebration 28-6-1995 (E7)
* the falling of a tile from my roof last Sunday
* the CIDOC Conference 2003 (E7)

In First Order Logic:

 E5(x) ⊃ E4(x)

Properties:

[P11](#_P11_had_participant_(participated i) had participant (participated in): [E39](#_E39_Actor) Actor

[P12](#_P12_occurred_in_the presence of (wa) occurred in the presence of (was present at): [E77](#_E77_Persistent_Item) Persistent Item

### E6 Destruction

Subclass of: [E64](#_E64_End_of_Existence) End of Existence

Scope note: This class comprises events that destroy one or more instances of E18 Physical Thing such that they lose their identity as the subjects of documentation.

Some destruction events are intentional, while others are independent of human activity. Intentional destruction may be documented by classifying the event as both an E6 Destruction and E7 Activity.

The decision to document an object as destroyed, transformed or modified is context sensitive:

1. If the matter remaining from the destruction is not documented, the event is modelled solely as E6 Destruction.

2. An event should also be documented using E81 Transformation if it results in the destruction of one or more objects and the simultaneous production of others using parts or material from the original. In this case, the new items have separate identities. Matter is preserved, but identity is not.

3. When the initial identity of the changed instance of E18 Physical Thing is preserved, the event should be documented as E11 Modification.

Examples:

* the destruction of Herculaneum by volcanic eruption in 79 AD
1. Camardo, D., ‘Herculaneum from the ad 79 eruption to the medieval period, analysis of the documentary, iconographic and archaeological sources, with new data on the beginning of exploration at the ancient town’,*Papers of the British School at Rome*, vol.81, Oct 2013, pp.303-340
* the destruction of Nineveh (E6, E7)
1. George, A. R., ‘The final sack of Nineveh. The discovery, documentation, and destruction of King Sennacherib's throne room at Nineveh, Iraq’*, Journal of the Royal Asiatic Society*, vol.10, no.1, 2000, pp.84-85.
* the breaking of a champagne glass yesterday by my dog.

In First Order Logic:

 E6(x) ⊃ E64(x)

Properties:

[P13](#_P13_destroyed_(was) destroyed (was destroyed by): [E18](#_E18_Physical_Thing) Physical Thing

### E7 Activity

Subclass of: [E5](#_E5_Event) Event

Superclass of: [E8](#_E8_Acquisition) Acquisition

[E9](#_E9_Move) Move

[E10](#_E10_Transfer_of_Custody) Transfer of Custody

[E11](#_E11_Modification) Modification

[E13](#_E13_Attribute_Assignment) Attribute Assignment

[E65](#_E65_Creation) Creation

[E66](#_E66_Formation) Formation

[E85](#_E85_Joining) Joining

[E86](#_E86_Leaving) Leaving

[E87](#_E87___ Curation Activity) Curation Activity

Scope note: This class comprises actions intentionally carried out by instances of E39 Actor that result in changes of state in the cultural, social, or physical systems documented.

This notion includes complex, composite 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.

Examples:

* the Battle of Stalingrad
1. Hoyt, E. P., 199 days: the battle of Stalingrad, New York, Tor, 1993.
* the Yalta Conference
1. Harbutt, F., *Yalta 1945, Europe and America at the crossroads*, Cambridge, Cambridge University Press, 2010.
* my birthday celebration 28-6-1995
* the writing of “Faust” by Goethe (E65)
1. Williams, J., *G*[*oethe's Faust,*](http://ucl-primo.hosted.exlibrisgroup.com/primo_library/libweb/action/display.do?tabs=detailsTab&ct=display&fn=search&doc=UCL_LMS_DS000007478&indx=8&recIds=UCL_LMS_DS000007478&recIdxs=7&elementId=7&renderMode=poppedOut&displayMode=full&frbrVersion=&vl%282235576UI3%29=all_items&&dscnt=0&vl%281UIStartWith0%29=contains&vl%281UIStartWith2%29=contains&vid=UCL_VU1&mode=Advanced&vl%2850210315UI1%29=any&vl%28boolOperator1%29=AND&tab=local&vl%2818346185UI4%29=eng&vl%28drEndMonth5%29=00&vl%28freeText1%29=Goethe&vl%28drEndDay5%29=00&dstmp=1484044134932&vl%28drEndYear5%29=Year&vl%2850210435UI2%29=any&vl%2850210261UI0%29=any&frbg=&vl%28drStartMonth5%29=00&scp.scps=scope%3A%28UCL%29%2Cprimo_central_multiple_fe&tb=t&vl%281UIStartWith1%29=contains&srt=rank&vl%28boolOperator0%29=AND&Submit=Search&vl%28freeText2%29=&vl%28boolOperator2%29=AND&vl%28drStartYear5%29=Year&vl%28freeText0%29=Faust&dum=true&vl%28drStartDay5%29=00) London, Allen & Unwin,  1987,
* the formation of the Bauhaus 1919 (E66)
1. Droste, M., Gössel, P*., The Bauhaus 1919-1933, reform and avant-garde*, Köln, Taschen, 2006.
* calling the place identified by TGN ‘7017998’ ‘Quyunjig’ by the people of Iraq
* Kira Weber working in glass art from 1984 to 1993
* Kira Weber working in oil and pastel painting from 1993

In First Order Logic:

 E7(x) ⊃ E5(x)

Properties:

[P14](#_P14_carried_out_by (performed)) carried out by (performed): [E39](#_E39_Actor) Actor

(P14.1 in the role of: [E55](#_E55_Type) Type)

[P15](#_P15_was_influenced_by (influenced)) was influenced by (influenced): [E1](#_E1_CRM_Entity) CRM Entity

[P16](#_P16_used_specific_object (was used ) used specific object (was used for): [E70](#_E70_Thing) Thing

(P16.1 mode of use: [E55](#_E55_Type) Type)

[P17](#_P17_was_motivated_by (motivated)) was motivated by (motivated): [E1](#_E1_CRM_Entity) CRM Entity

[P19](#_P19_was_intended_use of (was made f) was intended use of (was made for): [E71](#_E71_Man-Made_Thing) Man-Made Thing

(P19.1 mode of use: [E55](#_E55_Type) Type)

[P20](#_P20_had_specific_purpose (was purpo) had specific purpose (was purpose of): [E5](#_E5_Event) Event

[P21](#_P21_had_general_purpose (was purpos) had general purpose (was purpose of): [E55](#_E55_Type) Type

[P32](#_P32_used_general_technique (was tec) used general technique (was technique of): [E55](#_E55_Type) Type

[P33](#_P33_used_specific_technique (was us) used specific technique (was used by): [E29](#_E29_Design_or_Procedure) Design or Procedure

[P125](#_P125_used_object_of type (was type ) used object of type (was type of object used in): [E55](#_E55_Type) Type

[P134](#_P134_continued_(was_continued by)) continued (was continued by): [E7](#_E7_Activity) Activity

### E8 Acquisition

Subclass of: [E7](#_E7_Activity) Activity

Scope note: This class comprises transfers of legal ownership from one or more instances of E39 Actor to one or more other instances of E39 Actor.

The class also applies to the establishment or loss of ownership of instances of E18 Physical Thing. It does not, however, imply changes of any other kinds of right. The recording of the donor and/or recipient is optional. It is possible that in an instance of E8 Acquisition there is either no donor or no recipient. Depending on the circumstances, it may describe:

1. the beginning of ownership
2. the end of ownership
3. the transfer of ownership
4. the acquisition from an unknown source
5. the loss of title due to destruction of the item

It may also describe events where a collector appropriates legal title, for example by annexation or field collection. The interpretation of the museum notion of "accession" differs between institutions. The CRM therefore models legal ownership (E8 Acquisition) and physical custody (E10 Transfer of Custody) separately. Institutions will then model their specific notions of accession and deaccession as combinations of these.

Examples

* + - the collection of a hammer-head shark of the genus *Sphyrna* (Carchariniformes) XXXtbc by John Steinbeck and Edward Ricketts at Puerto Escondido in the Gulf of Mexico on March 25th, 1940
1. Steinbeck, J. *The Log from the Sea of Cortez*, Penguin Classics*, 2000.*
	* + the acquisition of El Greco’s painting entitled ‘The Apostles Peter and Paul’ by the State Hermitage in Saint Petersburg
		+ the loss of my stuffed chaffinch *‘Fringilla coelebs* Linnaeus, 1758’ due to insect damage last year

In First Order Logic:

 E8(x) ⊃ E7(x)

Properties:

[P22](#_P22_transferred_title_to (acquired ) transferred title to (acquired title through): [E39](#_E39_Actor) Actor

[P23](#_P23_transferred_title_from (surrend) transferred title from (surrendered title through): [E39](#_E39_Actor) Actor

[P24](#_P24_transferred_title_of (changed o) transferred title of (changed ownership through): [E18](#_E18_Physical_Thing) Physical Thing

### E9 Move

Subclass of: [E7](#_E7_Activity) Activity

Scope note: This class comprises changes of the physical location of the instances of E19 Physical Object.

Note, that the class E9 Move inherits the property *P7 took place at (witnessed): E53 Place*. This property should be used to describe the trajectory or a larger area within which a move takes place, whereas the properties *P26 moved to (was destination of)*, *P27 moved from (was origin of)* describe the start and end points only. Moves may also be documented to consist of other moves (via *P9 consists of (forms part of)*), in order to describe intermediate stages on a trajectory. In that case, start and end points of the partial moves should match appropriately between each other and with the overall event.

Examples

* the relocation of London Bridge from the UK to the USA
1. Clarke, J., ‘London Town in the desert Famed bridge centrepiece of Brit-mania in Arizona lake Havasu City, Ariz.’, *Toronto Star*, 21 November 1992, p.G16
* the movement of the exhibition “Treasures of Tut-Ankh-Amun” 1976-1979
1. Treasures *of Tutankhamun*, exhibition catalogue, London, British Museum, 1972.

In First Order Logic:

 E9(x) ⊃ E7(x)

Properties:

[P25](#_P25_moved_(moved_by)) moved (moved by): [E19](#_E19_Physical_Object) Physical Object

[P26](#_P26_moved_to_(was destination of)) moved to (was destination of): [E53](#_E53_Place) Place

[P27](#_P27_moved_from_(was origin of)) moved from (was origin of): [E53](#_E53_Place) Place

### E10 Transfer of Custody

Subclass of: [E7](#_E7_Activity) Activity

Scope note: This class comprises transfers of physical custody of objects between instances of E39 Actor.

The recording of the donor and/or recipient is optional. It is possible that in an instance of E10 Transfer of Custody there is either no donor or no recipient. Depending on the circumstances it may describe:

1. the beginning of custody
2. the end of custody
3. the transfer of custody
4. the receipt of custody from an unknown source
5. the declared loss of an object

The distinction between the legal responsibility for custody and the actual physical possession of the object should be expressed using the property *P2 has type (is type of)*. A specific case of transfer of custody is theft. The sense of physical possession requires that the object of custody is in the hands of the keeper at least with a part representative for the whole. The way, in which a representative part is defined, should ensure that it is unambiguous who keeps a part and who the whole and should be consistent with the identity criteria of the kept instance of E18 Physical Thing. For instance, in the case of a set of cutlery we may require the majority of pieces having been in the hands of the actor regardless which individual pieces are kept over time.

The interpretation of the museum notion of "accession" differs between institutions. The CRM therefore models legal ownership and physical custody separately. Institutions will then model their specific notions of accession and deaccession as combinations of these.

Examples:

* the delivery of the paintings by Secure Deliveries Inc. to the National Gallery
	+ - the return of Picasso’s “Guernica” to Madrid’s Prado in 1981
1. Chipp, J., *Picasso's Guernica: history, transformations, meanings*, University of California Press, 1988.

In First Order Logic:

 E10(x) ⊃ E7(x)

Properties:

[P28](#_P28_custody_surrendered_by (surrend) custody surrendered by (surrendered custody through): [E39](#_E39_Actor) Actor

[P29](#_P29_custody_received_by (received c) custody received by (received custody through): [E39](#_E39_Actor) Actor

[P30](#_P30_transferred_custody_of (custody) transferred custody of (custody transferred through): [E18](#_E18_Physical_Thing) Physical Thing

### E11 Modification

Subclass of: [E7](#_E7_Activity) Activity

Superclass of: [E12](#_E12_Production) Production

 [E79](#_E79_Part_Addition) Part Addition

 [E80](#_E80_Part_Removal) Part Removal

Scope note: This class comprises all instances of E7 Activity that create, alter or change E24 Physical Man-Made Thing.

This class includes the production of an item from raw materials, and other so far undocumented objects, and the preventive treatment or restoration of an object for conservation.

Since the distinction between modification and production 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, and that others may be produced as a result of it. An event should also be documented using E81 Transformation if it results in the destruction of one or more objects and the simultaneous production of others using parts or material from the originals. In this case, the new items have separate identities.

If the instance of the E29 Design or Procedure utilized for the modification prescribes the use of specific materials, they should be documented using property *P68 foresees use of (use foreseen by):* E57 Material of E29 Design or Procedure, rather than via *P126 employed (was employed in*): E57 Material.

Examples:

* the construction of the SS Great Britain (E12)
1. Gregor, H., *The S.S. Great Britain*, London, Published for the S.S. Great Britain Project by Macmillan, 1971.
* the impregnation of the Vasa warship in Stockholm for preservation after 1956
1. Håfors, B., *Conservation of the wood of the Swedish warship Vasa of A.D. 1628, evaluation of polyethylene glycol conservation programmes*, Göteborg: Acta Universitatis Gothoburgensis, c2010.
	* + the transformation of the Enola Gay into a museum exhibit by the National Air and Space Museum in Washington DC between 1993 and 1995 (E12, E81)
2. Yakel, E., ‘Museums, Management, Media, and Memory, Lessons from the Enola Gay Exhibition’, *Libraries and Culture*,vvol.35, no2, 2000, pp.278
* the last renewal of the gold coating of the Toshogu shrine in Nikko, Japan
1. Cali, J., Dougil, J., *Shinto Shrines, A Guide to the Sacred Sites of Japan's Ancient Religion*, Honolulu: University of Hawaii Press, November 2012, pp.188.

In First Order Logic:

 E11(x) ⊃ E7(x)

Properties:

[P31](#_P31_has_modified_(was modified by)) has modified (was modified by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

[P126](#_P126_employed_(was_employed in)) employed (was employed in): [E57](#_E57_Material) Material

### E12 Production

Subclass of: [E11](#_E11_Modification) Modification

 [E63](#_E63_Beginning_of_Existence) Beginning of Existence

Scope note: This class comprises activities that are designed to, and succeed in, creating one or more new items.

It specializes the notion of modification into production. The decision as to whether or not an object is regarded as new is context sensitive. Normally, items are considered “new” if there is no obvious overall similarity between them and the consumed items and material used in their production. In other cases, an item is considered “new” because it becomes relevant to documentation by a modification. For example, the scribbling of a name on a potsherd may make it a voting token. The original potsherd may not be worth documenting, in contrast to the inscribed one.

This entity can be collective: the printing of a thousand books, for example, would normally be considered a single event.

An event should also be documented using E81 Transformation if it results in the destruction of one or more objects and the simultaneous production of others using parts or material from the originals. In this case, the new items have separate identities and matter is preserved, but identity is not.

Examples:

* the construction of the SS Great Britain
1. Gregor, H., The S.S. Great Britain, London, Published for the S.S. Great Britain Project by Macmillan, 1971.
* the first casting of the Little Mermaid from the harbour of Copenhagen
1. Dewey, D., ‘The Little Mermaid’, *Scandinavian* *Review*, vol.91, no1, 2003, pp.34.
	* + Rembrandt’s creating of the seventh state of his etching “Woman sitting half dressed beside a stove”, 1658, identified by Bartsch Number 197 (E12,E65,E81)
2. Hind, A., M., A Catalogue of Rembrandt's Etchings, chronologically arranged and completely illustrated, London, Methuen & Co., 1923.

In First Order Logic:

 E12(x) ⊃ E11(x)

 E12(x) ⊃ E63(x)

Properties:

[P108](#_P108_has_produced_(was produced by)) has produced (was produced by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

### E13 Attribute Assignment

Subclass of: [E7](#_E7_Activity) Activity

Superclass of: [E14](#_E14_Condition_Assessment) Condition Assessment

[E15](#_E15_Identifier_Assignment) Identifier Assignment

[E16](#_E16_Measurement) Measurement

[E17](#_E17_Type_Assignment) Type Assignment

Scope note: This class comprises the actions of making assertions about properties of an object or any relation between two items or concepts.

This class allows the documentation of how the respective assignment 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 item or concept, possibly as a collection of contradictory values. All cases of properties in this model that are also described indirectly through an action are characterised as "short cuts" of this action. This redundant modelling 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 particular, the class 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 structures of a schema rather than free text, depends on if this information should be accessible by structured queries.

Examples:

* the assessment of the current ownership of Martin Doerr’s silver cup in February 1997

In First Order Logic:

 E13(x) ⊃ E7(x)

Properties:

[P140](#_P140_assigned_attribute_to (was att) assigned attribute to (was attributed by): [E1](#_E1_CRM_Entity) CRM Entity

[P141](#_P141_assigned_(was_assigned by)) assigned (was assigned by): [E1](#_E1_CRM_Entity) CRM Entity

### E14 Condition Assessment

Subclass of: [E13](#_E13_Attribute_Assignment) Attribute Assignment

Scope note: This class describes the act of assessing the state of preservation of an object during a particular period.

The condition assessment may be carried out by inspection, measurement or through historical research. This class is used to document circumstances of the respective assessment that may be relevant to interpret its quality at a later stage, or to continue research on related documents.

Examples:

* last year’s inspection of humidity damage to the frescos in the St. George chapel in our village

In First Order Logic:

 E14(x) ⊃ E13(x)

Properties:

[P34](#_P34_concerned_(was) concerned (was assessed by): [E18](#_E18_Physical_Thing) Physical Thing

[P35](#_P35_has_identified_(was identified ) has identified (identified by): [E3](#_E3_Condition_State) Condition State

### E15 Identifier Assignment

Subclass of: [E13](#_E13_Attribute_Assignment) Attribute Assignment

Scope note: This class comprises activities that result in the allocation of an identifier to an instance of E1 CRM Entity. An E15 Identifier Assignment may include the creation of the identifier from multiple constituents, which themselves may be instances of E41 Appellation. The syntax and kinds of constituents to be used may be declared in a rule constituting an instance of E29 Design or Procedure.

Examples of such identifiers include Find Numbers, Inventory Numbers, uniform titles in the sense of librarianship and Digital Object Identifiers (DOI). Documenting the act of identifier assignment and deassignment is especially useful when objects change custody or the identification system of an organization is changed. In order to keep track of the identity of things in such cases, it is important to document by whom, when and for what purpose an identifier is assigned to an item.

The fact that an identifier is a preferred one for an organisation can be expressed by using the property *E1 CRM Entity. P48 has preferred identifier (is preferred identifier of): E42 Identifier*. It can better be expressed in a context independent form by assigning a suitable E55 Type, such as “preferred identifier assignment”, to the respective instance of E15 Identifier Assignment via the *P2 has type* property.

Examples:

* + - Replacement of the inventory number TA959a by GE34604 for a 17th century lament cloth at the Museum Benaki, Athens
		- Assigning the author-uniform title heading “Goethe, Johann Wolfgang von, 1749-1832. Faust. 1. Theil.” for a work (E28)
		- On June 1, 2001 assigning the personal name heading “Guillaume, de Machaut, ca. 1300-1377” (E42,E82) to Guillaume de Machaut (E21)

In First Order Logic:

 E15(x) ⊃ E13(x)

Properties:

[P37](#_P37_assigned_(was_assigned by)) assigned (was assigned by): [E42](#_E42_Object_Identifier) Identifier

[P38](#_P38_deassigned_(was_deassigned by)) deassigned (was deassigned by): [E42](#_E42_Object_Identifier) Identifier

[P142](#_P142_used_constituent_(was used in)) used constituent (was used in): [E90](#_E90_Symbolic_Object) Symbolic Object

### E16 Measurement

Subclass of: [E13](#_E13_Attribute_Assignment) Attribute Assignment

Scope note: This class comprises actions measuring physical properties and other values that can be determined by a systematic procedure.

Examples include measuring the monetary value of a collection of coins or the running time of a specific video cassette.

The E16 Measurement may use simple counting or tools, such as yardsticks or radiation detection devices. The interest is in the method and care applied, so that the reliability of the result may be judged at a later stage, or research continued on the associated documents. The date of the event is important for dimensions, which may change value over time, such as the length of an object subject to shrinkage. Details of methods and devices are best handled as free text, whereas basic techniques such as "carbon 14 dating" should be encoded using *P2 has type (is type of:) E55 Type*.

Examples:

* + - measurement of height of silver cup 232 on the 31st August 1997
		- the carbon 14 dating of the “Schoeninger Speer II” in 1996 [an about 400.000 years old Palaeolithic complete wooden spear found in Schoeningen, Niedersachsen, Germany in 1995]
1. Kouwenhoven, A., ‘World's Oldest Spears’, *Archaeology,* newsbriefs, *v*ol. 50, no3, 1997.

In First Order Logic:

 E16(x) ⊃ E13(x)

Properties:

[P39](#_P39_measured_(was_measured by):) measured (was measured by): [E1](#_E1_CRM_Entity) CRM Entity

[P40](#_P40_observed_dimension_(was observe) observed dimension (was observed in): [E54](#_E54_Dimension) Dimension

### E17 Type Assignment

Subclass of: [E13](#_E13_Attribute_Assignment) Attribute Assignment

Scope note: This class comprises the actions of classifying items of whatever kind. Such items include objects, specimens, people, actions and concepts.

This class allows for the documentation of the context of classification acts in cases where the value of the classification depends on the personal opinion of the classifier, and the date that the classification was made. This class also encompasses the notion of "determination," i.e. the systematic and molecular identification of a specimen in biology.

Examples:

* + - the first classification of object GE34604 as Lament Cloth, October 2nd
		- the determination of a cactus in Martin Doerr’s garden as ‘*Cereus hildmannianus* K.Schumann’, July 2003

In First Order Logic:

 E17(x) ⊃ E13(x)

Properties:

[P41](#_P41_classified_(was_classified by)) classified (was classified by): [E1](#_E1_CRM_Entity) CRM Entity

[P42](#_P42_assigned_(was_assigned by)) assigned (was assigned by): [E55](#_E55_Type) Type

### E18 Physical Thing

Subclass of: [E72](#_E72_Legal_Object) Legal Object

 [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

Superclass of: [E19](#_E19_Physical_Object) Physical Object

[E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

[E26](#_E26_Physical_Feature) Physical Feature

Scope Note: This class comprises all persistent physical items with a relatively stable form, man-made or natural.

Depending on the existence of natural boundaries of such things, the CRM distinguishes the instances of E19 Physical Object from instances of E26 Physical Feature, such as holes, rivers, pieces of land etc. Most instances of E19 Physical Object can be moved (if not too heavy), whereas features are integral to the surrounding matter.

An instance of E18 Physical Thing occupies not only a particular geometric space, but in the course of its existence it also forms a trajectory through spacetime, which occupies a real, that is phenomenal, volume in spacetime. We include in the occupied space the space filled by the matter of the physical thing and all its inner spaces, such as the interior of a box. Physical things consisting of aggregations of physically unconnected objects, such as a set of chessmen, occupy a number of individually contiguous spacetime volumes equal to the number of unconnected objects that constitute the set.

We model E18 Physical Thing to be a subclass of E72 Legal Object and of E92 Spacetime volume. The latter is intended as a phenomenal spacetime volume as defined in CRMgeo (Doerr and Hiebel 2013). By virtue of this multiple inheritance we can discuss the physical extent of an E18 Physical Thing without representing each instance of it together with an instance of its associated spacetime volume. This model combines two quite different kinds of substance: an instance of E18 Physical Thing is matter while a spacetime volume is an aggregation of points in spacetime. However, the real spatiotemporal extent of an instance of E18 Physical Thing is regarded to be unique to it, due to all its details and fuzziness; its identity and existence depends uniquely on the identity of the instance of E18 Physical Thing. Therefore this multiple inheritance is unambiguous and effective and furthermore corresponds to the intuitions of natural language.

The CIDOC CRM is generally not concerned with amounts of matter in fluid or gaseous states.

Examples:

* + - the Cullinan Diamond (E19)
1. Scarratt K., Shor R., ‘The Cullinan Diamond Centennial: A History and Gemological Analysis Of Cullinans I And II.’ *Gem and Gemology,* vol*.* 42, no. 2, 2006, pp.120-132.
	* + the cave “Ideon Andron” in Crete (E26)
2. Smith, W., *Dictionary of Greek and Roman biography and mythology*, London, Murray 1844-49
	* + the Mona Lisa (E22)
3. Mohen, J. P., *Mona Lisa: inside the painting*, New York, Abrams, 2006.

In First Order Logic:

 E18(x) ⊃ E72(x)

E18(x) ⊃ E92(x)

Properties:

[P44](#_P44_has_condition_(condition of)) has condition (is condition of): [E3](#_E3_Condition_State) Condition State

[P45](#_P45_consists_of_(is incorporated in) consists of (is incorporated in): [E57](#_E57_Material) Material

[P46](#_P46_is_composed_of (forms part of)) is composed of (forms part of): [E18](#_E18_Physical_Thing) Physical Thing

[P49](#_P49_has_former_or current keeper (i) has former or current keeper (is former or current keeper of): [E39](#_E39_Actor) Actor

[P50](#_P50_has_current_keeper (is current ) has current keeper (is current keeper of): [E39](#_E39_Actor) Actor

[P51](#_P51_has_former_or current owner (is) has former or current owner (is former or current owner of): [E39](#_E39_Actor) Actor

[P52](#_P52_has_current_owner (is current o) has current owner (is current owner of): [E39](#_E39_Actor) Actor

[P53](#_P53_has_former_or current location ) has former or current location (is former or current location of): [E53](#_E53_Place) Place

[P58](#_P58_has_section_definition (defines) has section definition (defines section): [E46](#_E46_Section_Definition) Section Definition

[P59](#_P59_has_section_(is located on or w) has section (is located on or within): [E53](#_E53_Place) Place

[P128](#_P128_carries_(is_carried by)) carries (is carried by): [E90](#_E90_Symbolic_Object) Symbolic Object

[P156](#_P156_occupies_(is) occupies (is occupied by): [E53](#_E53_Place) Place

### E19 Physical Object

Subclass of: [E18](#_E18_Physical_Thing) Physical Thing

Superclass of: [E20](#_E20_Biological_Object) Biological Object

[E22](#_E22_Man-Made_Object) Man-Made Object

Scope note: This class comprises items of a material nature that are units for documentation and have physical boundaries that separate them completely in an objective way from other objects.

The class also includes all aggregates of objects made for functional purposes of whatever kind, independent of physical coherence, such as a set of chessmen. Typically, instances of E19 Physical Object can be moved (if not too heavy).

In some contexts, such objects, except for aggregates, are also called “bona fide objects” (Smith & Varzi, 2000, pp.401-420), i.e. naturally defined objects.

The decision as to what is documented as a complete item, rather than by its parts or components, may be a purely administrative decision or may be a result of the order in which the item was acquired.

Examples:

* John Smith
* Aphrodite of Milos
1. Kousser, R., ‘Creating the Past: The Vénus de Milo and the Hellenistic Reception of Classical Greece’, *American Journal of Archaeology*, vol.109, no.2, 1 April 2005, pp.227-250.
* the Palace of Knossos
1. Evans, A., *The palace of Minos : a comparative account of the successive stages of the early Cretan civilization as illustrated by the discoveries at Knossos*, London, Macmillan,  1921-36
* the Cullinan Diamond
1. Scarratt K., Shor R., ‘The Cullinan Diamond Centennial: A History and Gemological Analysis Of Cullinans I And II.’ *Gem and Gemology, vol.* 42, no. 2, 2006, pp.120-132.
* Apollo 13 at the time of launch
1. Lovell, J., Kluger, J,. *Lost Moon: The Perilous Voyage of Apollo 13*, Boston, Houghton Mifflin Co., 1994.

In First Order Logic:

 E19(x) ⊃ E18(x)

Properties:

[P54](#_P54_has_current_permanent location ) has current permanent location (is current permanent location of): [E53](#_E53_Place) Place

[P55](#_P55_has_current_location (currently) has current location (currently holds): [E53](#_E53_Place) Place

[P56](#_P56_bears_feature_(is found on):) bears feature (is found on): [E26](#_E26_Physical_Feature) Physical Feature

[P57](#_P57_has_number_of parts) has number of parts: [E60](#_E60_Number) Number

### E20 Biological Object

Subclass of: [E19](#_E19_Physical_Object) Physical Object

Superclass of: [E21](#_E21_Person) Person

Scope note: This class comprises individual items of a material nature, which live, have lived or are natural products of or from living organisms.

Artificial objects that incorporate biological elements, such as Victorian butterfly frames, can be documented as both instances of E20 Biological Object and E22 Man-Made Object.

Examples:

* me
	+ - Tut-Ankh-Amun
1. Edwards, I. E. S., *Tutankhamun: his tomb and its treasures*, London, Gollancz, 1979
* Boukephalas [Horse of Alexander the Great]
1. Lamb, R., ‘Alexander The Great and Bucephalus’, *Horse & Rider*, vol.44, no.6, Jun 2005, p.19
* petrified dinosaur excrement PA1906-344

In First Order Logic:

 E20(x) ⊃ E19(x)

### E21 Person

Subclass of: [E20](#_E20_Biological_Object) Biological Object

[E39](#_E39_Actor) Actor

Scope note: This class comprises real persons who live or are assumed to have lived.

Legendary figures that may have existed, such as Ulysses and King Arthur, 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. The CRM does not propose a specific form to support reasoning about possible identity.

Examples:

* + - Tut-Ankh-Amun
1. Edwards, I. E. S., *Tutankhamun, his tomb and its treasures*, London, Gollancz, 1979
	* + Nelson Mandela
2. Brown, L., Lenny, H., *Nelson Mandela*, London, Dorling Kindersley, 2006.

In First Order Logic:

 E21(x) ⊃ E20(x)

 E21(x) ⊃ E39(x)

Properties:

[P152](#_P152_has_parent) has parent (is parent of): [E21](#_E21_Person) Person

### E22 Man-Made Object

Subclass of: [E19](#_E19_Physical_Object) Physical Object

 [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

Superclass of: [E84](#_E84_Information_Carrier) Information Carrier

Scope note: This class comprises physical objects purposely created by human activity.

No assumptions are made as to the extent of modification required to justify regarding an object as man-made. For example, an inscribed piece of rock or a preserved butterfly are both regarded as instances of E22 Man-Made Object.

Examples:

* Mallard (the World’s fastest steam engine)
1. Solomon, B., *Railway Masterpieces*, Newton Abbot, David & Charles, 2003.
* the Portland Vase
1. Walker, S., *The Portland vase*, London, British Museum, 2004.
* the Coliseum
1. Hopkins, K., Beard, M., *The Colosseum*, London, Profile, 2005.

In First Order Logic:

 E22(x) ⊃ E19(x)

 E22(x) ⊃ E24(x)

### E24 Physical Man-Made Thing

Subclass of: [E18](#_E18_Physical_Thing) Physical Thing

 [E71](#_E71_Man-Made_Thing) Man-Made Thing

Superclass of: [E22](#_E22_Man-Made_Object) Man-Made Object

[E25](#_E25_Man-Made_Feature) Man-Made Feature

[E78](#_E78_Collection) Collection

Scope Note: This class comprises all persistent physical items that are purposely created by human activity.

This class comprises man-made objects, such as a swords, and man-made features, such as rock art. No assumptions are made as to the extent of modification required to justify regarding an object as man-made. For example, a “cup and ring” carving on bedrock is regarded as instance of E24 Physical Man-Made Thing.

Examples:

* the Forth Railway Bridge (E22)
1. The Forth Railway Bridge centenary 1890-1990 ICE Proceedings, 1990, Vol.88(6), pp.1079-1107.
* the Channel Tunnel (E25)
1. Holliday, I., Marcou, G., and Vickerman, R. W., *The Channel Tunnel, public policy*, regional development, and European integration, London; New York, Belhaven Press, 1991.
* the Historical Collection of the Museum Benaki in Athens (E78)
1. Georgoula, E., (ed.), *Greek treasures from the Benaki Museum in Athens*, Sydney, Powerhous Pub. in association with Benaki Museum, 2005.

In First Order Logic:

 E24(x) ⊃ E18(x)

 E24(x) ⊃ E71(x)

Properties:

[P62](#_P62_depicts_(is_depicted by)) depicts (is depicted by): [E1](#_E1_CRM_Entity) CRM Entity

(P62.1 mode of depiction: [E55](#_E55_Type) Type)

[P65](#_P65_shows_visual_item (is shown by)) shows visual item (is shown by): [E36](#_E36_Visual_Item) Visual Item

### E25 Man-Made Feature

Subclass of: [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

[E26](#_E26_Physical_Feature) Physical Feature

Scope Note: This class comprises physical features that are purposely created by human activity, such as scratches, artificial caves, artificial water channels, etc.

No assumptions are made as to the extent of modification required to justify regarding a feature as man-made. For example, rock art or even “cup and ring” carvings on bedrock a regarded as types of E25 Man-Made Feature.

Examples:

* the Manchester Ship Canal
1. Farnie, D. A., *The Manchester Ship Canal and the rise of the Port of Manchester, 1894-1975*, Manchester, Manchester University Press 1980
* Michael Jackson’s nose following plastic surgery

In First Order Logic:

 E25(x) ⊃ E26(x)

 E25(x) ⊃ E24(x)

### E26 Physical Feature

Subclass of: [E18](#_E18_Physical_Thing) Physical Thing

Superclass of: [E25](#_E25_Man-Made_Feature) Man-Made Feature

[E27](#_E27_Site) Site

Scope Note: This class comprises identifiable features that are physically attached in an integral way to particular physical objects.

Instances of E26 Physical Feature share many of the attributes of instances of E19 Physical Object. They may have a one-, two- or three-dimensional geometric extent, but there are no natural borders that separate them completely in an objective way from the carrier objects. For example, a doorway is a feature but the door itself, being attached by hinges, is not.

Instances of E26 Physical Feature can be features in a narrower sense, such as scratches, holes, reliefs, surface colours, reflection zones in an opal crystal or a density change in a piece of wood. In the wider sense, they are portions of particular objects with partially imaginary borders, such as the core of the Earth, an area of property on the surface of the Earth, a landscape or the head of a contiguous marble statue. They can be measured and dated, and it is sometimes possible to state who or what is or was responsible for them. They cannot be separated from the carrier object, but a segment of the carrier object may be identified (or sometimes removed) carrying the complete feature.

This definition coincides with the definition of "fiat objects" (Smith & Varzi, 2000, pp.401-420), with the exception of aggregates of “bona fide objects”.

Examples:

* the temple in Abu Simbel before its removal, which was carved out of solid rock
1. Hawass, Z., *The mysteries of Abu Simbel, Ramesses II and the temples of the rising sun*, Cairo, American University in Cairo, c2000.
* Albrecht Duerer's signature on his painting of Charles the Great
1. Strauss, W. L. (ed), *The complete drawings of Albrecht Dürer*, New York, Abaris Books, 1974.
* the damage to the nose of the Great Sphinx in Giza
1. Temple, R., *The Sphinx mystery, the forgotten origins of the sanctuary of Anubis*, Rochester, Vt., Inner Traditions, c2009.
* Michael Jackson’s nose prior to plastic surgery

In First Order Logic:

 E26(x) ⊃ E18(x)

### E27 Site

Subclass of: [E26](#_E26_Physical_Feature) Physical Feature

Scope Note: This class comprises pieces of land or sea floor.

In contrast to the purely geometric notion of E53 Place, this class describes constellations of matter on the surface of the Earth or other celestial body, which can be represented by photographs, paintings and maps.

Instances of E27 Site are composed of relatively immobile material items and features in a particular configuration at a particular location.

Examples:

* the Amazon river basin
1. Hegen, E., *Highways into the Upper Amazon Basin. Pioneer lands in Southern Colombia, Ecuador and Northern Peru*, Gainesville, University of Florida Press, 1966.
* Knossos
1. Evans, A., *The palace of Minos, a comparative account of the successive stages of the early Cretan civilization as illustrated by the discoveries at Knossos*, London, Macmillan & Co., 1921-36.
* the Apollo 11 landing site
1. Siegler, M. A., Smrekar, S. E., ‘Lunar heat flow: Regional prospective of the Apollo landing sites’, *Journal of Geophysical Research: Planets*, vol. 119, no. 1, pp. 47, 2014.
* Heathrow Airport
1. Wicks, R., *Heathrow Airport operations manual: 1929 onwards, designing, building and operating the world's busiest international airport*, Sparkford, Yeovil, Somerset, Haynes Publishing, 2014.
* the submerged harbour of the Minoan settlement of Gournia, Crete
1. Watrous, V., *An Archaeological Survey of the Gournia Landscape, A Regional History of the Mirabello Bay, Crete, in Antiquity*, Philadelphia, Penn., INSTAP Academic Press, 2012.

In First Order Logic:

 E27(x)⊃ E26(x)

### E28 Conceptual Object

Subclass of: [E71](#_E71_Man-Made_Thing) Man-Made Thing

Superclass of: [E55](#_E55_Type) Type

[E89](#_E89_Propositional_Object) Propositional Object

[E90](#_E90_Symbolic_Object) Symbolic Object

Scope note: This class comprises non-material products of our minds and other human produced data that have become objects of a discourse about their identity, circumstances of creation or historical implication. The production of such information may have been supported by the use of technical devices such as cameras or computers.

Characteristically, instances of this class are created, invented or thought by someone, and then may be documented or communicated between persons. Instances of E28 Conceptual Object have the ability to exist on more than one particular carrier at the same time, such as paper, electronic signals, marks, audio media, paintings, photos, human memories, etc.

They cannot be destroyed. They exist as long as they can be found on at least one carrier or in at least one human memory. Their existence ends when the last carrier and the last memory are lost.

Examples:

* Beethoven’s “Ode an die Freude” (Ode to Joy) (E73)
1. Richard Kershaw, *Owed to joy: theme and 6 variations on Beethoven's Ode to joy, in the style of Bach, Mozart, Mendelssohn, Dvořák, Wagner and Scott Joplin: string orchestra*, Monmouth, Spartan Press, 1999.
* the definition of “ontology” in the Oxford English Dictionary
* the knowledge about the victory at Marathon carried by the famous runner
* ‘Maxwell equations’ [preferred subject access point from LCSH,

 http://lccn.loc.gov/sh85082387, as of 19 November 2012]

* ‘Equations, Maxwell’ [variant subject access point, from the same source]

In First Order Logic:

 E28(x) ⊃ E71(x)

Properties: [P149](#_P149_is_identified) is identified by (identifies): [E75](#_E75_Conceptual_Object_Appellation) Conceptual Object Appellation

### E29 Design or Procedure

Subclass of: [E73](#_E73_Information_Object) Information Object

Scope note: This class comprises documented plans for the execution of actions in order to achieve a result of a specific quality, form or contents. In particular it comprises plans for deliberate human activities that may result in the modification or production of instances of E24 Physical Thing.

Instances of E29 Design or Procedure can be structured in parts and sequences or depend on others. This is modelled using *P69* has association with (is associated with)..

Designs or procedures can be seen as one of the following:

1. A schema for the activities it describes
2. A schema of the products that result from their application.
3. An independent intellectual product that may have never been applied, such as Leonardo da Vinci’s famous plans for flying machines.

Because designs or procedures may never be applied or only partially executed, the CRM models a loose relationship between the plan and the respective product.

Examples:

* + - the ISO standardisation procedure
		- the musical notation for Beethoven’s “Ode to Joy”
		- the architectural drawings for the Kölner Dom in Cologne, Germany
		- The drawing on the folio 860 of the Codex Atlanticus from Leonardo da Vinci, 1486-1490, kept in the Biblioteca Ambrosiana in Milan

In First Order Logic:

 E29(x) ⊃ E73(x)

Properties:

[P68](#_P68_usually_employs_(is usually emp) foresees use of (use foreseen by): [E57](#_E57_Material) Material

[P69](#_P69_is_associated_with) has association with (is associated with): [E29](#_E29_Design_or_Procedure) Design or Procedure

 (P69.1 has type: [E55](#_E55_Type) Type)

### E30 Right

Subclass of: [E89](#_E89_Propositional_Object) Propositional Object

Scope Note: This class comprises legal privileges concerning material and immaterial things or their derivatives.

These include reproduction and property rights.

Examples:

* copyright held by ISO on ISO/CD 21127
* ownership of the “Mona Lisa” by the Louvre

In First Order Logic:

 E30(x) ⊃ E89(x)

### E31 Document

Subclass of: [E73](#_E73_Information_Object) Information Object

Superclass of: [E32](#_E32_Authority_Document) Authority Document

Scope note: This class comprises identifiable immaterial items that make propositions about reality.

These propositions may be expressed in text, graphics, images, audiograms, videograms or by other similar means. Documentation databases are regarded as a special case of E31 Document. This class should not be confused with the term “document” in Information Technology, which is compatible with E73 Information Object.

Examples:

* the Encyclopaedia Britannica (E32)
1. Kogan, H., *The great EB , the story of the Encyclopædia Britannica,* Chicago, University of Chicago Press; London, Cambridge University Press, 1958.
* The image content of the photo of the Allied Leaders at Yalta published by UPI, 1945 (E38)
* the Doomsday Book

In First Order Logic:

 E31(x) ⊃ E73(x)

Properties:

[P70](#_P70_documents_(is_documented in)) documents (is documented in): [E1](#_E1_CRM_Entity) CRM Entity

### E32 Authority Document

Subclass of: [E31](#_E1_CRM_Entity) Document

Scope note: This class comprises encyclopaedia, thesauri, authority lists and other documents that define terminology or conceptual systems for consistent use.

Examples:

* Webster's Dictionary
1. Herbert, C. M., *The story of Webster's third, Philip Gove's controversial dictionary and its critics,* Cambridge, Cambridge University Press, 1994.
* Getty Art and Architecture Thesaurus
1. *Art & architecture thesaurus*, New York , Oxford University Press, Published on behalf of the J. Paul Getty Trust, c1990.
* the CIDOC Conceptual Reference Model
1. Gergatsoulis, M. et al., ‘Mapping Cultural Metadata Schemas to CIDOC Conceptual Reference Model’, Springer; *Lecture Notes in Computers Science*, 2010, pp. 404-413.

In First Order Logic:

 E32(x) ⊃ E31(x)

Properties:

[P71](#_P71_lists_(is_listed in)) lists (is listed in): [E1](#_E1_CRM_Entity) CRM Entity

### E33 Linguistic Object

Subclass of: [E73](#_E73_Information_Object) Information Object

Superclass of: [E34](#_E34_Inscription) Inscription

[E35](#_E35_Title) Title

Scope note: This class comprises identifiable expressions in natural language or languages.

Instances of E33 Linguistic Object can be expressed in many ways: e.g. as written texts, recorded speech or sign language. However, the CRM treats instances of E33 Linguistic Object independently from the medium or method by which they are expressed. Expressions in formal languages, such as computer code or mathematical formulae, are not treated as instances of E33 Linguistic Object by the CRM. These should be modelled as instances of E73 Information Object.

The text of an instance of E33 Linguistic Object can be documented in a note by P3 has note: E62 String

Examples:

* the text of the Ellesmere Chaucer manuscript
1. Hilmo, M.A., *Medieval images, icons, and illustrated English literary texts, from the Ruthwell Cross to the Ellesmere Chauce*, Aldershot, Ashgate, 2004.
* the lyrics of the song "Blue Suede Shoes"
1. Cooper, B.L., ‘Blue Suede Shoes: A Rockabilly Session by Carl Perkins and friends’, *Popular music and society*. Vol. 31, no 3, 2008, pp. 398-399.
* the text of the Jabberwocky by Lewis Carroll
1. Carroll, L. *Jabberwocky and Other Poems*, London, Macmillan Children's Books, 1981.
* the text of "Doktoro Jekyll kaj Sinjoro Hyde" (an Esperanto translation of Dr Jekyll and Mr Hyde)
1. Stevenson, R.L., *Doktoro Jekyll kaj Sinjoro Hyde*, trans. Mann, W., Morrison, W., London, W.C. The British Esperado Association, 1909.

In First Order Logic:

 E33(x) ⊃ E73(x)

Properties:

[P72](#_P72_has_language_(is language of)) has language (is language of): [E56](#_E56_Language) Language

[P73](#_P73_has_translation_(is translation) has translation (is translation of): [E33](#_E33_Linguistic_Object) Linguistic Object

### E34 Inscription

Subclass of: [E33](#_E33_Linguistic_Object) Linguistic Object

[E37](#_E37_Mark) Mark

Scope note: This class comprises recognisable, short texts attached to instances of E24 Physical Man-Made Thing.

The transcription of the text can be documented in a note by *P3 has note: E62 String*. The alphabet used can be documented by *P2 has type: E55 Type*. This class does not intend to describe the idiosyncratic characteristics of an individual physical embodiment of an inscription, but the underlying prototype. The physical embodiment is modelled in the CRM as E24 Physical Man-Made Thing.

The relationship of a physical copy of a book to the text it contains is modelled using *E84 Information Carrier. P128 carries (is carried by): E33 Linguistic Object.*

Examples:

* “keep off the grass” on a sign stuck in the lawn of the quad of Balliol College
* The text published in Corpus Inscriptionum LatinarumV 895
* Kilroy was here

In First Order Logic:

 E34(x) ⊃ E33(x)

 E34(x) ⊃ E37(x)

### E35 Title

Subclass of: [E33](#_E33_Linguistic_Object) Linguistic Object

[E41](#_E41_Appellation) Appellation

Scope note: This class comprises the names assigned to works, such as texts, artworks or pieces of music.

Titles are proper noun phrases or verbal phrases, and should not be confused with generic object names such as “chair”, “painting” or “book” (the latter are common nouns that stand for instances of E55 Type). Titles may be assigned by the creator of the work itself, or by a social group.

This class also comprises the translations of titles that are used as surrogates for the original titles in different social contexts.

Examples:

* + - “The Merchant of Venice”
1. McCullough, C., *The merchant of Venice*, Basingstoke, Palgrave Macmillan, 2005.
	* + “Mona Lisa”
2. Mohen, J. P., *Mona Lisa: inside the painting*, New York, Abrams, 2006.
	* + “La Pie or The Magpie”
3. Bortolatto, L. R., *Tout l'oeuvre peint de Monet, 1870-1899*, Paris, 1981.
	* + “Lucy in the Sky with Diamonds”
4. Lennon, J., *Lucy in the sky with diamonds. Words and music by John Lennon and Paul McCartney*, London, Northern Songs, c1967.

In First Order Logic:

 E35(x) ⊃ E33(x)

 E35(x) ⊃ E41(x)

### E36 Visual Item

Subclass of: [E73](#_E73_Information_Object) Information Object

Superclass of: [E37](#_E37_Mark) Mark

[E38](#_E38_Image) Image

Scope Note: This class comprises the intellectual or conceptual aspects of recognisable marks and images.

This class does not intend to describe the idiosyncratic characteristics of an individual physical embodiment of a visual item, but the underlying prototype. For example, a mark such as the ICOM logo is generally considered to be the same logo when used on any number of publications. The size, orientation and colour may change, but the logo remains uniquely identifiable. The same is true of images that are reproduced many times. This means that visual items are independent of their physical support.

The class E36 Visual Item provides a means of identifying and linking together instances of E24 Physical Man-Made Thing that carry the same visual symbols, marks or images etc. The property *P62 depicts (is depicted by)* between E24 Physical Man-Made Thing and depicted subjects (E1 CRM Entity) can be regarded as a short-cut of the more fully developed path from E24 Physical Man-Made Thing through *P65 shows visual item (is shown by)*, E36 Visual Item, *P138 represents (has representation)* to E1CRM Entity, which in addition captures the optical features of the depiction.

Examples:

* the visual appearance of Monet’s “La Pie” (E38)
* the Coca-Cola logo (E34)
* the Chi-Rho (E37)
* the communist red star (E37)

In First Order Logic:

 E36(x) ⊃ E73(x)

Properties:

[P138](#_P138_represents_(has_representation) represents (has representation): [E1](#_E1_CRM_Entity) CRM Entity

(P138.1 mode of representation: [E55](#_E55_Type) Type)

### E37 Mark

Subclass of: [E36](#_E36_Visual_Item) Visual Item

Superclass of: [E34](#_E34_Inscription) Inscription

Scope note: This class comprises symbols, signs, signatures or short texts applied to instances of E24 Physical Man-Made Thing by arbitrary techniques in order to indicate the creator, owner, dedications, purpose, etc.

This class specifically excludes features that have no semantic significance, such as scratches or tool marks. These should be documented as instances of E25 Man-Made Feature.

Examples:

* Minoan double axe mark
1. Lowe Fri, M., *The Minoan double axe, an experimental study of production and use*, Oxford, Archaeopress, 2011.
* ©
* ☺

In First Order Logic:

 E37(x) ⊃ E36(x)

### E38 Image

Subclass of: [E36](#_E36_Visual_Item) Visual Item

Scope note: This class comprises distributions of form, tone and colour that may be found on surfaces such as photos, paintings, prints and sculptures or directly on electronic media.

The degree to which variations in the distribution of form and colour affect the identity of an instance of E38 Image depends on a given purpose. The original painting of the Mona Lisa in the Louvre may be said to bear the same instance of E38 Image as reproductions in the form of transparencies, postcards, posters or T-shirts, even though they may differ in size and carrier and may vary in tone and colour. The images in a “spot the difference” competition are not the same with respect to their context, however similar they may at first appear.

Examples:

* + - the front side of all 20 Swiss Frs notes
		- the image depicted on all reproductions of the Mona Lisa

In First Order Logic:

 E38(x) ⊃ E36(x)

### E39 Actor

Subclass of: [E77](#_E77_Persistent_Item) Persistent Item

Superclass of: [E21](#_E21_Person) Person

[E74](#_E74_Group) Group

Scope note: This class comprises people, either individually or in groups, who have the potential to perform intentional actions of kinds for which someone may be held responsible.

The CRM does not attempt to model the inadvertent actions of such 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.

Examples:

* London and Continental Railways (E40)
* the Governor of the Bank of England in 1975 (E21)
* Sir Ian McKellan (E21)
1. Gibson, J. L., Ian McKellen, London , Weidenfeld and Nicolson, 1990, c1986.

In First Order Logic:

 E39(x) ⊃ E77(x)

Properties:

[P74](#_P74_has_current_or former residence) has current or former residence (is current or former residence of): [E53](#_E53_Place) Place

[P75](#_P75_possesses_(is_possessed by)) possesses (is possessed by): [E30](#_E30_Right) Right

[P76](#_P76_has_contact_point (provides acc) has contact point (provides access to): [E51](#_E51_Contact_Point) Contact Point

[P131](#_P131_is_identified_by (identifies)) is identified by (identifies): [E82](#_E82_Actor_Appellation) Actor Appellation

### E40 Legal Body

Subcass of: [E74](#_E74_Group) Group

Scope Note: This class comprises institutions or groups of people that have obtained a legal recognition as a group and can act collectively as agents.

This means that they can perform actions, own property, create or destroy things and can be held collectively responsible for their actions like individual people. The term 'personne morale' is often used for this in French.

Examples

* Greenpeace
1. Kozak, M., *Greenpeace*, Oxford, Heinemann Library, 1998.
* Paveprime Ltd
* the National Museum of Denmark
1. Hagensen Boyer, M., *Japanese export lacquers from the seventeenth century in the National Museum of Denmark*, Copenhagen , National Museum, 1959.

In First Order Logic:

 E40(x) ⊃ E74(x)

### E41 Appellation

Subclass of: [E90](#_E90_Symbolic_Object) Symbolic Object

Superclass of: [E35](#_E35_Title) Title

[E42](#_E42_Object_Identifier) Identifier

[E44](#_E44_Place_Appellation) Place Appellation

[E49](#_E49_Time_Appellation) Time Appellation

[E51](#_E51_Contact_Point) Contact Point

[E75](#_E75_Conceptual_Object_Appellation) Conceptual Object Appellation

[E82](#_E82_Actor_Appellation) Actor Appellation

Scope note: This class comprises signs, either meaningful or not, or arrangements of signs following a specific syntax, that are used or can be used to refer to and identify a specific instance of some class or category within a certain context.

Instances of E41 Appellation do not identify things by their meaning, even if they happen to have one, but instead by convention, tradition, or agreement. Instances of E41 Appellation are cultural constructs; as such, they have a context, a history, and a use in time and space by some group of users. A given instance of E41 Appellation can have alternative forms, i.e., other instances of E41 Appellation that are always regarded as equivalent independent from the thing it denotes.

Specific subclasses of E41 Appellation should be used when instances of E41 Appellation of a characteristic form are used for particular objects. Instances of E49 Time Appellation, for example, which take the form of instances of E50 Date, can be easily recognised.

E41 Appellation should not be confused with the act of naming something. *Cf.* E15 Identifier Assignment

Examples:

* "Martin"
* "the Forth Bridge"
* "the Merchant of Venice" (E35)
1. McCullough, C., *The merchant of Venice*, Basingstoke, Palgrave Macmillan, 2005.
* "*Spigelia marilandica* (L.) L." [not the species, just the *name*]
1. Hershberger, A. J., Jenkins, T. M. and Robacker, C., ‘ Molecular Genetic Variability of Spigelia marilandica and S. gentianoides’, *Journal of the American society for horticultural science*, vol. 140, no 2, 2015, pp. 120-128.
* "*information* science" [not the science itself, but the name through which we refer to it in an English-speaking context]
* “安” [Chinese “an”, meaning “peace”]

In First Order Logic:

 E41(x) ⊃ E90(x)

Properties:

[P139](#_P139_has_alternative_form) has alternative form: [E41](#_E41_Appellation) Appellation

 (P139.1 has type: [E55](#_E55_Type) Type)

### E42 Identifier

Subclass of: [E41](#_E41_Appellation) Appellation

Scope note: This class comprises strings or codes assigned to instances of E1 CRM Entity in order to identify them uniquely and permanently within the context of one or more organisations. Such codes are often known as inventory numbers, registration codes, etc. and are typically composed of alphanumeric sequences. The class E42 Identifier is not normally used for machine-generated identifiers used for automated processing unless these are also used by human agents.

Examples:

* “MM.GE.195”
* “13.45.1976”
* “OXCMS: 1997.4.1”
* ISSN “0041-5278”
* ISRC “FIFIN8900116”
* Shelf mark “Res 8 P 10”
	+ - “Guillaume de Machaut (1300?-1377)” [a controlled personal name heading that follows the French rules]
1. Reaney, G., *Guillaume de Machaut,* London, Oxford University Press, 1974.

In First Order Logic:

 E42(x) ⊃ E41(x)

### E44 Place Appellation

Subclass of: [E41](#_E41_Appellation) Appellation

Superclass of [E45](#_E45_Address) Address

[E46](#_E46_Section_Definition) Section Definition

[E47](#_E47_Spatial_Coordinates) Spatial Coordinates

[E48](#_E48_Place_Name) Place Name

Scope Note: This class comprises any sort of identifier characteristically used to refer to an E53 Place.

Instances of E44 Place Appellation may vary in their degree of precision and their meaning may vary over time - the same instance of E44 Place Appellation may be used to refer to several places, either because of cultural shifts, or because objects used as reference points have moved around. Instances of E44 Place Appellation can be extremely varied in form: postal addresses, instances of E47 Spatial Coordinate, and parts of buildings can all be considered as instances of E44 Place Appellation.

Examples:

* “Vienna”
1. Tingay, P., *Vienna*, London, New Holland, 2008.
* “CH-1211, Genève”
* “Aquae Sulis Minerva”
* “Bath”
1. Braithwaite, A., *Bath from Roman time*, Cambridge, Dinosaur Publications for Bath City Council, 1977.
* “Cambridge”
1. Nelson, A. H., (ed.), *Cambridge*, University of Toronto Press, 1989.
* “the Other Place”
* “the City”

In First Order Logic:

 E44(x) ⊃ E41(x)

### E45 Address

Subclass of: [E44](#_E44_Place_Appellation) Place Appellation

 [E51](#_E51_Contact_Point) Contact Point

Scope Note: This class comprises identifiers expressed in coding systems for places, such as postal addresses used for mailing.

An E45 Address can be considered both as the name of an E53 Place and as an E51 Contact Point for an E39 Actor. This dual aspect is reflected in the multiple inheritance. However, some forms of mailing addresses, such as a postal box, are only instances of E51 Contact Point, since they do not identify any particular Place. These should not be documented as instances of E45 Address.

Examples:

* “1-29-3 Otsuka, Bunkyo-ku, Tokyo, 121, Japan”
* “Rue David Dufour 5, CH-1211, Genève”

In First Order Logic:

 E45(x) ⊃ E44(x)

 E45(x) ⊃ E51(x)

### E46 Section Definition

Subclass of: [E44](#_E44_Place_Appellation) Place Appellation

Scope Note: This class comprises areas of objects referred to in terms specific to the general geometry or structure of its kind.

The 'prow' of the boat, the 'frame' of the picture, the 'front' of the building are all instances of E46 Section Definition. The class highlights the fact that parts of objects can be treated as locations. This holds in particular for features without natural boundaries, such as the “head” of a marble statue made out of one block (cf. E53 Place). In answer to the question 'where is the signature?' one might reply 'on the lower left corner'. (Section Definition is closely related to the term “segment” in Gerstl, P.& Pribbenow, S, 1996 “ A conceptual theory of part – whole relations and its applications”, Data & Knowledge Engineering 20 305-322, North Holland- Elsevier ).

Examples:

* “the entrance lobby to the Ripley Center”
* “the poop deck of H.M.S Victory”
1. Gregor, H., *H.M.S. Victory*, Macmillan, 1973.
* “the Venus de Milo’s left buttock”
1. Musée du Louvre, département des antiquités grecques et romaines, *La Vénus de Milo et les Aphrodites du Louvre,* Réunion des musées nationaux, 1985.
* “left inner side of my box”

In First Order Logic:

 E46(x) ⊃ E44(x)

### E47 Spatial Coordinates

Subclass of: [E44](#_E44_Place_Appellation) Place Appellation

Scope Note: This class comprises the textual or numeric information required to locate specific instances of E53 Place within schemes of spatial identification.

Coordinates are a specific form of E44 Place Appellation, that is, a means of referring to a particular E53 Place. Coordinates are not restricted to longitude, latitude and altitude. Any regular system of reference that maps onto an E19 Physical Object can be used to generate coordinates.

Examples:

* “6°5’29”N 45°12’13”W”
* “Black queen’s bishop 4” [chess coordinate]

In First Order Logic:

 E47(x) ⊃ E44(x)

### E48 Place Name

Subclass of: [E44](#_E44_Place_Appellation) Place Appellation

Scope Note: This class comprises particular and common forms of E44 Place Appellation.

Place Names may change their application over time: the name of an E53 Place may change, and a name may be reused for a different E53 Place. Instances of E48 Place Name are typically subject to place name gazetteers.

Examples:

* “Greece”
1. Casson, S., Greece, London, Oxford University Press, 1942.
* “Athens”
1. Barber, R. L. N. *Athens*, London, A.& C.Black, 1999.
* “Geneva”
1. Walker, K., *Geneva*, Peterborough, Thomas Cook Publishing, c2007.
* “Lac Léman”
1. Smails, N. W., *Beautiful Lake Geneva, a collection of views of the many features, both natural and architectural, which lend attractiveness to this charming resort*, Washington, Library of Congress Photoduplication Service, 1975.

In First Order Logic:

 E48(x) ⊃ E44(x)

### E49 Time Appellation

Subclass of: [E41](#_E41_Appellation) Appellation

Superclass of [E50](#_E50_Date) Date

Scope Note: This class comprises all forms of names or codes, such as historical periods, and dates, which are characteristically used to refer to a specific E52 Time-Span.

The instances of E49 Time Appellation may vary in their degree of precision, and they may be relative to other time frames, “Before Christ” for example. Instances of E52 Time-Span are often defined by reference to a cultural period or an event e.g. ‘the duration of the Ming Dynasty’.

Examples:

* “Meiji” [Japanese term for a specific time-span]
* “1st half of the XX century”
1. Overy, R. J., *20th century,* London, Dorling Kindersley, 2012.
* “Quaternary”
* “1215 Hegira” [a date in the Islamic calendar]
* “Last century”

In First Order Logic:

 E49(x) ⊃ E41(x)

### E50 Date

Subclass of: [E49](#_E49_Time_Appellation) Time Appellation

Scope Note: This class comprises specific forms of E49 Time Appellation.

Dates may vary in their degree of precision.

Examples:

* “1900”
* “4-4-1959”
* “19-MAR-1922”
* “19640604”

In First Order Logic:

 E50(x) ⊃ E49(x)

### E51 Contact Point

Subcass of: [E41](#_E41_Appellation) Appellation

Superclass of: [E45](#_E45_Address) Address

Scope Note: This class comprises identifiers employed, or understood, by communication services to direct communications to an instance of E39 Actor. These include E-mail addresses, telephone numbers, post office boxes, Fax numbers, URLs etc. Most postal addresses can be considered both as instances of E44 Place Appellation and E51 Contact Point. In such cases the subclass E45 Address should be used.

 URLs are addresses used by machines to access another machine through an http request. Since the accessed machine acts on behalf of the E39 Actor providing the machine, URLs are considered as instances of E51 Contact Point to that E39 Actor.

Examples:

* “+41 22 418 5571”
* weasel@paveprime.com

In First Order Logic:

 E51(x) ⊃ E41(x)

### E52 Time-Span

Subclass of: [E1](#_E1_CRM_Entity) CRM Entity

Scope note: This class comprises abstract temporal extents, in the sense of Galilean physics, having a beginning, an end and a duration.

Time Span has no other semantic connotations. Time-Spans are used to define the temporal extent of instances of E4 Period, E5 Event and any other phenomena valid for a certain time. An E52 Time-Span may be identified by one or more instances of E49 Time Appellation.

Since our knowledge of history is imperfect, instances of E52 Time-Span can best be considered as approximations of the actual Time-Spans of temporal entities. The properties of E52 Time-Span are intended to allow these approximations to be expressed precisely. An extreme case of approximation, might, for example, define an E52 Time-Span having unknown beginning, end and duration. Used as a common E52 Time-Span for two events, it would nevertheless define them as being simultaneous, even if nothing else was known.

 Automatic processing and querying of instances of E52 Time-Span is facilitated if data can be parsed into an E61 Time Primitive.

Examples:

* 1961
* 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
1. *Chan*, H., *Ming Taizu (r. 1368-98) and the foundation of the Ming Dynasty in China*, Farnham, Ashgate Variorum, c2011.

In First Order Logic:

 E52(x) ⊃ E1(x)

Properties:

[P78](#_P78_is_identified_by (identifies)) is identified by (identifies): [E49](#_E49_Time_Appellation) Time Appellation

[P79](#_P79_beginning_is_qualified by) beginning is qualified by: [E62](#_E62_String) String

[P80](#_P80_end_is_qualified by) end is qualified by: [E62](#_E62_String) String

[P81](#_P81_ongoing_throughout) ongoing throughout: [E61](#_E61_Time_Primitive) Time Primitive

[P82](#_P82_at_some_time within) at some time within: [E61](#_E61_Time_Primitive) Time Primitive

[P83](#_P83_had_at_least duration (was mini) had at least duration (was minimum duration of): [E54](#_E54_Dimension) Dimension

[P84](#_P84_had_at_most duration (was maxim) had at most duration (was maximum duration of): [E54](#_E54_Dimension) Dimension

[P86](#_P86_falls_within_(contains)) falls within (contains): [E52](#_E52_Time-Span) Time-Span

### E53 Place

Subclass of: [E1](#_E1_CRM_Entity) CRM Entity

Scope note: This class comprises extents in space, in particular on the surface of the earth, in the pure sense of physics: independent from temporal phenomena and matter.

The instances of E53 Place are usually determined by reference to the position of “immobile” objects such as buildings, cities, mountains, rivers, or dedicated geodetic marks. A Place can be determined by combining a frame of reference and a location with respect to this frame. It may be identified by one or more instances of E44 Place Appellation.

 It is sometimes argued that instances of E53 Place are best identified by global coordinates or absolute reference systems. However, relative references are often more relevant in the context of cultural documentation and tend to be more precise. In particular, we are often interested in position in relation to large, mobile objects, such as ships. For 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 would require knowledge of the movements of the vessel and the precise time of death, either of which may be revised, and the result would lack historical and cultural relevance.

Any object can serve as a frame of reference for E53 Place determination. The model foresees the notion of a "section" of an E19 Physical Object as a valid E53 Place determination.

Examples:

* the extent of the UK in the year 2003
* the position of the hallmark on the inside of my wedding ring
* the place referred to in the phrase: “Fish collected at three miles north of the confluence of the Arve and the Rhone”
* here -> <-

In First Order Logic:

 E53(x) ⊃ E1(x)

Properties:

[P87](#_P87_is_identified_by (identifies)) is identified by (identifies): [E44](#_E44_Place_Appellation) Place Appellation

[P89](#_P89_falls_within_(contains)) falls within (contains): [E53](#_E53_Place) Place

[P121](#_P121_overlaps_with) overlaps with: [E53](#_E53_Place) Place

[P122](#_P122_borders_with) borders with: [E53](#_E53_Place) Place

[P157](#_P157(Px2)_is_at) is at rest relative to (provides reference space for): [E18](#_E18_Physical_Thing) Physical Thing

[P168](#_P168_place_is) place is defined by (defines place) : [E94](#_E94_Space_Primitive) Space Primitive

### E54 Dimension

Subclass of: [E1](#_E1_CRM_Entity) CRM Entity

Scope note: This class comprises quantifiable properties that can be measured by some calibrated means and can be approximated by values, i.e. points or regions in a mathematical or conceptual space, such as natural or real numbers, RGB values etc.

An instance of E54 Dimension represents the true quantity, independent from its numerical approximation, e.g. in inches or in cm. The properties of the class E54 Dimension allow for expressing the numerical approximation of the values of an instance of E54 Dimension. If the true values belong to a non-discrete space, such as spatial distances, it is recommended to record them as approximations by intervals or regions of indeterminacy enclosing the assumed true values. For instance, a length of 5 cm may be recorded as 4.5-5.5 cm, according to the precision of the respective observation. Note, that interoperability of values described in different units depends critically on the representation as value regions.

Numerical approximations in archaic instances of E58 Measurement Unit used in historical records should be preserved. Equivalents corresponding to current knowledge should be recorded as additional instances of E54 Dimension as appropriate.

Examples:

* currency: £26.00
* length: 3.9-4.1 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
* calibrated C14 date: 2460-2720 years, etc
	+ Christies’ hammer price for “Vase with Fifteen Sunflowers” (E97) has currency British Pounds (E98)

In First Order Logic:

 E54(x) ⊃ E1(x)

Properties:

[P90](#_P90_has_value) has value: [E60](#_E60_Number) Number

[P91](#_P91_has_unit_(is unit of)) has unit (is unit of): [E58](#_E58_Measurement_Unit) Measurement Unit

### E55 Type

Subclass of: [E28](#_E28_Conceptual_Object) Conceptual Object

Superclass of: [E56](#_E56_Language) Language

[E57](#_E57_Material) Material

[E58](#_E58_Measurement_Unit) Measurement Unit

Scope note: This class comprises concepts denoted by terms from thesauri and controlled vocabularies used to characterize and classify instances of CRM classes. Instances of E55 Type represent concepts in contrast to instances of E41 Appellation which are used to name instances of CRM classes.

E55 Type is the CRM’s interface to domain specific ontologies and thesauri. These can be represented in the CRM as subclasses of E55 Type, forming hierarchies of terms, i.e. instances of E55 Type linked via P127 has broader term (has narrower term). Such hierarchies may be extended with additional properties.

Examples:

* weight, length, depth [types of E54]
* portrait, sketch, animation [types of E38]
* French, English, German [E56]
* excellent, good, poor [types of E3]
* Ford Model T, chop stick [types of E22]
* cave, doline, scratch [types of E26]
* poem, short story [types of E33]
* wedding, earthquake, skirmish [types of E5]

In First Order Logic:

 E55(x) ⊃ E28(x)

Properties:

 [P127](#_P127_has_broader_term (has narrower) has broader term (has narrower term): [E55](#_E55_Type) Type

 [P150](#_P151_was_formed) defines typical parts of(define typical wholes for): [E55](#_E55_Type) Type

### E56 Language

Subclass of: [E55](#_E55_Type) Type

Scope note: This class is a specialization of E55 Type and comprises the natural languages in the sense of concepts.

This type is used categorically in the model without reference to instances of it, i.e. the Model does not foresee the description of instances of instances of E56 Language, e.g.: “instances of Mandarin Chinese”.

It is recommended that internationally or nationally agreed codes and terminology are used to denote instances of E56 Language, such as those defined in ISO 639:1988.

Examples:

* el [Greek]
1. *Palmer*, L., R., *The Greek language*, London, Faber, 1980.
* en [English]
1. *Wilson*, R. L., *English language*, London, Letts, 1983.
* eo [Esperanto]
1. *Nuessel*, F., *The Esperanto language*, New York, Legas, c2000.
* es [Spanish]
1. *Pineda*, I., *Spanish language 2*, London, University of London, 1993.
* fr [French]
1. *Rickard*, P., *A history of the French language*, London, Hutchinson, 1974.

In First Order Logic:

 E56(x) ⊃ E55(x)

### E57 Material

Subclass of: [E55](#_E55_Type) Type

Scope note: This class is a specialization of E55 Type and comprises the concepts of materials.

Instances of E57 Material may denote properties of matter before its use, during its use, and as incorporated in an object, such as ultramarine powder, tempera paste, reinforced concrete. Discrete pieces of raw-materials kept in museums, such as bricks, sheets of fabric, pieces of metal, should be modelled individually in the same way as other objects. Discrete used or processed pieces, such as the stones from Nefer Titi's temple, should be modelled as parts (cf. *P46 is composed of*).

This type is used categorically in the model without reference to instances of it, i.e. the Model does not foresee the description of instances of instances of E57 Material, e.g.: “instances of gold”.

It is recommended that internationally or nationally agreed codes and terminology are used.

Examples:

* Brick
1. *Gurcke*, K., *Bricks and brickmaking*, A handbook for historical archaeology, Moscow, Idaho, University of Idaho Press, c1987.
* Gold
1. *Watson*, M. J., *Cluster compounds of gold and the platinum metals*, University of Oxford Press, 1990.
* Aluminium
1. *Norman*, C. F. W., *Corrosion of aluminium*, University of Manchester Press, 1986.
* Polycarbonate
1. *Mhaske*, S.T., ‘Polycarbonate: Medical applications’, Chemical weekly, vol. 56, no.30, 2011, pp. 201-204.
* resin
1. *Barton*, S. J., *The study of an electrically insulating resin for humid environments*, Kingston University Press, 1992.

In First Order Logic:

 E57(x) ⊃ E55(x)

### E58 Measurement Unit

Subclass of: [E55](#_E55_Type) Type

Scope Note: This class is a specialization of E55 Type and comprises the types of measurement units: feet, inches, centimetres, litres, lumens, etc.

This type is used categorically in the model without reference to instances of it, i.e. the Model does not foresee the description of instances of instances of E58 Measurement Unit, e.g.: “instances of cm”.

Système International (SI) units or internationally recognized non-SI terms should be used whenever possible. (ISO 1000:1992). Archaic Measurement Units used in historical records should be preserved.

Examples:

* cm [centimetre]
* km [kilometre]
* m [meter]
* m/s [meters per second]
1. Hau, L. V., et al., ‘Light speed reduction to 17 metres per second In an ultrecold atomic gas’, *Nature*, no 6720, 1999, pp. 594-597
* A [Ampere]
* GRD [Greek Drachme]
1. Daniel, B. C., ‘A graceful return of the drachma’, *European economic review*, vol.71, 2014, pp. 228-243.
* °C [degrees centigrade]
1. Beckman, O., ‘Celsius, Linne and the Celsius Temperature Scale’, *Bulletin of the Scientific Instrument Society*, no. 56, 1998, pp. 17-23.

In First Order Logic:

 E58(x) ⊃ E55(x)

### E59 Primitive Value

Superclass of: [E60](#_E60_Number) Number

 [E61](#_E61_Time_Primitive) Time Primitive

 [E62](#_E62_String) String

Scope Note: This class comprises values of primitive data types of programming languages or database management systems and data types composed of such values used as documentation elements, as well as their mathematical abstractions.

They are not considered as elements of the universe of discourse this model aims at defining and analysing. Rather, they play the role of a symbolic interface between the scope of this model and the world of mathematical and computational manipulations and the symbolic objects they define and handle.

In particular they comprise lexical forms encoded as "strings" or series of characters and symbols based on encoding schemes (characterised by being a limited subset of the respective mathematical abstractions) such as UNICODE and values of datatypes that can be encoded in a lexical form, including quantitative specifications of time-spans and geometry. They have in common that instances of E59 Primitive Value define themselves by virtue of their encoded value, regardless the nature of their mathematical abstractions.

Therefore they must not be represented in an implementation by a universal identifier associated with a content model of different identity. In a concrete application, it is recommended that the primitive value system from a chosen implementation platform and/or data definition language be used to substitute for this class and its subclasses.

Examples:

* ABCDEFG (E62)
* 3.14 (E60)
* 0
* 1921-01-01 (E61)

In First Order Logic:

 E59(x)

### E60 Number

Subclass of: [E59](#_E59_Primitive_Value) Primitive Value

Scope Note: This class comprises any encoding of computable (algebraic) values such as integers, real numbers, complex numbers, vectors, tensors etc., including intervals of these values to express limited precision.

Numbers are fundamentally distinct from identifiers in continua, such as instances of E50 Date and E47 Spatial Coordinate, even though their encoding may be similar. Instances of E60 Number can be combined with each other in algebraic operations to yield other instances of E60 Number, e.g., 1+1=2. Identifiers in continua may be combined with numbers expressing distances to yield new identifiers, e.g., 1924-01-31 + 2 days = 1924-02-02. Cf. E54 Dimension

Examples:

* 5
* 3+2i
* 1.5e-04
* (0.5, - 0.7,88)

In First Order Logic:

 E60(x) ⊃ E59(x)

### E61 Time Primitive

Subclass of: [E59](#_E59_Primitive_Value) Primitive Value

Scope Note: This class comprises instances of E59 Primitive Value for time that should be implemented with appropriate validation, precision and interval logic to express date ranges relevant to cultural documentation.

E61 Time Primitive is not further elaborated upon within the model.

Examples:

* 1994 – 1997
* 13 May 1768
* 2000/01/01 00:00:59.7
* 85th century BC

In First Order Logic:

 E61(x) ⊃ E59(x)

### E62 String

Subclass of: [E59](#_E59_Primitive_Value) Primitive Value

Scope Note: This class comprises the instances of E59 Primitive Values used for documentation such as free text strings, bitmaps, vector graphics, etc.

E62 String is not further elaborated upon within the model

Examples:

* the Quick Brown Fox Jumps Over the Lazy Dog
* 6F 6E 54 79 70 31 0D 9E

In First Order Logic:

 E62(x) ⊃ E59(x)

### E63 Beginning of Existence

Subclass of: [E5](#_E5_Event) Event

Superclass of: [E12](#_E12_Production) Production

[E65](#_E65_Creation)Creation

 [E66](#_E66_Formation) Formation

 [E67](#_E67_Birth) Birth

 [E81](#_E81_Transformation) Transformation

Scope note: This class comprises events that bring into existence any E77 Persistent Item.

It may be used for temporal reasoning about things (intellectual products, physical items, groups of people, living beings) beginning to exist; it serves as a hook for determination of a terminus post quem and ante quem.

Examples:

* the birth of my child
* the birth of Snoopy, my dog
* the calving of the iceberg that sank the Titanic
* the construction of the Eiffel Tower
1. Tissandier, G., *The Eiffel Tower: a description of the monument*, London, Sampson Low, 1889.

In First Order Logic:

 E63(x) ⊃ E5(x)

Properties:

[P92](#_P92_brought_into_existence (was bro) brought into existence (was brought into existence by): [E77](#_E77_Persistent_Item) Persistent Item

### E64 End of Existence

Subclass of: [E5](#_E5_Event) Event

Superclass of: [E6](#_E6_Destruction) Destruction

 [E68](#_E68_Dissolution) Dissolution

 [E69](#_E69_Death) Death

 [E81](#_E81_Transformation) Transformation

Scope note: This class comprises events that end the existence of any E77 Persistent Item.

It may be used for temporal reasoning about things (physical items, groups of people, living beings) ceasing to exist; it serves as a hook for determination of a terminus postquem and antequem. In cases where substance from a Persistent Item continues to exist in a new form, the process would be documented by E81 Transformation.

Examples:

* the death of Snoopy, my dog
* the melting of the snowman
* the burning of the Temple of Artemis in Ephesos by Herostratos in 356BC
1. Trell, B., ‘The Temple of Artemis at Ephesos’, *New York, American Numismatic Society*, 1945.

In First Order Logic:

 E64(x) ⊃ E5(x)

Properties:

[P93](#_P93_took_out_of existence (was take) took out of existence (was taken out of existence by): [E77](#_E77_Persistent_Item) Persistent Item

### E65 Creation

Subclass of: [E7](#_E7_Activity) Activity

[E63](#_E63_Beginning_of_Existence) Beginning of Existence

Superclass of: [E83](#_E83_Type_Creation) Type Creation

Scope note: This class comprises events that result in the creation of conceptual items or immaterial products, such as legends, poems, texts, music, images, movies, laws, types etc.

Examples:

* the framing of the U.S. Constitution
1. Farrand, M., *The Framing of the Constitution of the United States*, Yale University Press, 1913.
* the drafting of U.N. resolution 1441
1. United Nations Security Council, *Resolution 1441*, 2002.

In First Order Logic:

 E65(x) ⊃ E7(x)

 E65(x) ⊃ E63(x)

Properties:

[P94](#_P94_has_created_(was created by)) has created (was created by): [E28](#_E28_Conceptual_Object) Conceptual Object

### E66 Formation

Subclass of: [E7](#_E7_Activity) Activity

[E63](#_E63_Beginning_of_Existence) Beginning of Existence

Scope note: This class comprises events that result in the formation of a formal or informal E74 Group of people, such as a club, society, association, corporation or nation.

E66 Formation does not include the arbitrary aggregation of people who do not act as a collective.

The formation of an instance of E74 Group does not require that the group is populated with members at the time of formation. In order to express the joining of members at the time of formation, the respective activity should be simultaneously an instance of both E66 Formation and E85 Joining.

Examples:

* the formation of the CIDOC CRM Special Interest Group
* the formation of the Soviet Union
1. Pipes, R., *The Formation of the Soviet Union: Communism and Nationalism 1917-1923*, Harvard University Press, 1964.
* the conspiring of the murderers of Caesar
1. Irwin, W. A., *The Julius Caesar Murder Case*, New York; London, D. Appleton-Century Co., 1935.

In First Order Logic:

 E66(x) ⊃ E7(x)

 E66(x) ⊃ E63(x)

Properties:

[P95](#_P95_has_formed_(was formed by)) has formed (was formed by): [E74](#_E74_Group) Group

[P151](#_P51_has_former) was formed from: [E74](#_E74_Group) Group

### E67 Birth

Subclass of: [E63](#_E63_Beginning_of) Beginning of Existence

Scope note: This class comprises the births of human beings. E67 Birth is a biological event focussing on the context of people coming into life. (E63 Beginning of Existence comprises the coming into life of any living beings).

Twins, triplets etc. are brought into life by the same E67 Birth event. The introduction of the E67 Birth event as a documentation element allows the description of a range of family relationships in a simple model. Suitable extensions may describe more details and the complexity of motherhood with the intervention of modern medicine. In this model, the biological father is not seen as a necessary participant in the E67 Birth event.

Examples:

* the birth of Alexander the Great
1. Stoneman, A., *Alexander the Great*, London, Routledge, 2004.

In First Order Logic:

 E67(x) ⊃ E63(x)

Properties:

[P96](#_P96_by_mother_(gave birth)) by mother (gave birth): [E21](#_E21_Person) Person

[P97](#_P97_from_father_(was father for)) from father (was father for): [E21](#_E21_Person) Person

[P98](#_P98_brought_into_life (was born)) brought into life (was born): [E21](#_E21_Person) Person

### E68 Dissolution

Subclass of: [E64](#_E64_End_of_Existence) End of Existence

Scope note: This class comprises the events that result in the formal or informal termination of an E74 Group of people.

If the dissolution was deliberate, the Dissolution event should also be instantiated as an E7 Activity.

Examples:

* the fall of the Roman Empire
1. Whittington, H., *The Fall of the Roman Empire*, London, Frederick Muller, 1964.
* the liquidation of Enron Corporation
1. Atlas, R.D., ‘Enron’s collapse: The Options; A Trend Toward Liquidation, Not Company Reorganization’, *The New York Times*, 30 November, 2001.

In First Order Logic:

 E68(x) ⊃ E64(x)

Properties:

[P99](#_P99_dissolved_(was_dissolved by)) dissolved (was dissolved by): [E74](#_E74_Group) Group

### E69 Death

Subclass of: [E64](#_E64_End_of_Existence) End of Existence

Scope note: This class comprises the deaths of human beings.

If a person is *killed*, their death should be instantiated as E69 Death and as E7 Activity. The death or perishing of other living beings should be documented using E64 End of Existence.

Examples:

* the murder of Julius Caesar (E69,E7)
1. Irwin, W. A., The Julius Caesar Murder Case, New York; London, D. Appleton-Century Co., 1935.
* the death of Senator Paul Wellstone
1. Monast, J. Tao, B., ‘In Memoriam: Senator Paul Wellstone’, *Georgetown international environmental law review*, vol. 15, part 2, 2003, pp. 133-134.

In First Order Logic:

 E69(x) ⊃ E64(x)

Properties:

[P100](#_P100_was_death_of (died in)) was death of (died in): [E21](#_E21_Person) Person

### E70 Thing

Subclass of: [E77](#_E77_Persistent_Item) Persistent Item

Superclass of: [E71](#_E71_Man-Made_Thing) Man-Made Thing

 [E72](#_E72_Legal_Object) Legal Object

Scope note: This general class comprises discrete, identifiable, instances of E77 Persistent Item that are documented as single units, that either consist of matter or depend on being carried by matter and are characterized by relative stability.

They may be intellectual products or physical things. They may for instance have a solid physical form, an electronic encoding, or they may be a logical concept or structure.

Examples:

* my photograph collection (E78)
* the bottle of milk in my refrigerator (E22)
* the plan of the Strassburger Muenster (E29)
* the thing on the top of Otto Hahn’s desk (E19)
* the form of the no-smoking sign (E36)
* the cave of Dirou, Mani, Greece (E27)
1. Unexplored *Peloponnese*, Road Editions, 2005.

In First Order Logic:

 E70(x) ⊃ E77(x)

Properties

[P43](#_P43_has_dimension_(is dimension of)) has dimension (is dimension of): [E54](#_E54_Dimension) Dimension

[P101](#_P101_had_as_general use (was use of) had as general use (was use of): [E55](#_E55_Type) Type

[P130](#_P130_shows_features_of (features ar) shows features of (features are also found on): [E70](#_E70_Thing) Thing

([P130.1](#_Properties:_P130.1_kind_of similari) kind of similarity: [E55](#_E55_Type) Type)

### E71 Man-Made Thing

Subclass of: [E70](#_E70_Thing) Thing

Superclass of: [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

 [E28](#_E28_Conceptual_Object) Conceptual Object

Scope note: This class comprises discrete, identifiable man-made items that are documented as single units.

These items are either intellectual products or man-made physical things, and are characterized by relative stability. They may for instance have a solid physical form, an electronic encoding, or they may be logical concepts or structures.

Examples:

* Beethoven’s 5th Symphony (E73)
1. Lockwood, L., *Beethoven's symphonies: an artistic vision*, New York, W. W. Norton & Company, 2015.
* Michelangelo’s David
1. Paoletti, J. T., *Michelangelo's David: Florentine history and civic identity*, New York: Cambridge University Press, 2015.
* Einstein’s Theory of General Relativity (E73)
1. Hartle, J. B., *Gravity: an introduction to Einstein's general relativity*, San Francisco; London, Addison-Wesley, c2003.
* the taxon *‘Fringilla coelebs* Linnaeus,1758’ (E55)
1. Sinkevicius, S., Narusevicius, V., ‘Investigation of anaphase aberrations in Chaffinch (Fringilla coelebs Linnaeus, 1758) populations from different regions of Lithuania’, *Acta zoologica Lituanica* vol. 12, part 1, 2002, pp. 3-9.

In First Order Logic:

 E71(x) ⊃ E70(x)

Properties

[P102](#_P102_has_title_(is title of)) has title (is title of): [E35](#_E35_Title) Title

([P102.1](#_Properties:_P102.1_has_type: E55 Ty) has type: [E55](#_E55_Type) Type)

[P103](#_P103_was_intended_for (was intentio) was intended for (was intention of): [E55](#_E55_Type) Type

### E72 Legal Object

Subclass of: [E70](#_E70_Thing) Thing

Superclass of: [E18](#_E18_Physical_Thing) Physical Thing

[E90](#_E90_Symbolic_Object) Symbolic Object

Scope note: This class comprises those material or immaterial items to which instances of E30 Right, such as the right of ownership or use, can be applied.

This is true for all E18 Physical Thing. In the case of instances of E28 Conceptual Object, however, the identity of the E28 Conceptual Object or the method of its use may be too ambiguous to reliably establish instances of E30 Right, as in the case of taxa and inspirations. Ownership of corporations is currently regarded as out of scope of the CRM.

Examples:

* the Cullinan diamond (E19)
1. Scarratt K., Shor R., ‘The Cullinan Diamond Centennial: A History and Gemological Analysis Of Cullinans I And II.’ Gem and Gemology, vol. 42, no. 2, 2006, pp.120-132.
* definition of the CIDOC Conceptual Reference Model Version 2.1 (E73)
1. ISO 21127:2014, *Information and documentation — A reference ontology for the interchange of cultural heritage information*, 2014.

In First Order Logic:

 E72(x) ⊃ E70(x)

Properties:

[P104](#_P104_is_subject_to (applies to)) is subject to (applies to): [E30](#_E30_Right) Right

[P105](#_P105_right_held_by (has right on)) right held by (has right on): [E39](#_E39_Actor) Actor

### E73 Information Object

Subclass of: [E89](#_E89_Propositional_Object) Propositional Object

[E90](#_E90_Symbolic_Object) Symbolic Object

Superclass of: [E29](#_E29_Design_or_Procedure) Design or Procedure

[E31](#_E31_Document) Document

[E33](#_E33_Linguistic_Object) Linguistic Object

[E36](#_E36_Visual_Item) Visual Item

Scope note: This class comprises identifiable immaterial items, such as a poems, jokes, data sets, images, texts, multimedia objects, procedural prescriptions, computer program code, algorithm or mathematical formulae, that have an objectively recognizable structure and are documented as single units. The encoding structure known as a "named graph" also falls under this class, so that each "named graph" is an instance of an E73 Information Object.

An E73 Information Object does not depend on a specific physical carrier, which can include human memory, and it can exist on one or more carriers simultaneously.

Instances of E73 Information Object of a linguistic nature should be declared as instances of the E33 Linguistic Object subclass. Instances of E73 Information Object of a documentary nature should be declared as instances of the E31 Document subclass. Conceptual items such as types and classes are not instances of E73 Information Object, nor are ideas without a reproducible expression.

Examples:

* image BM000038850.JPG from the Clayton Herbarium in London
* E. A. Poe's "The Raven"
1. *Poe*, E. A., *The Raven*, Glasgow, 1869.
* the movie "The Seven Samurai" by Akira Kurosawa
1. *Mellen*, J., *Seven samurai*, London: BFI Pub., 2002.
* the Maxwell Equations
1. *Huray*, P.G., *Maxwell's equations*, Oxford: Wiley-Blackwell, 2010.
* The Getty AAT as published as Linked Open Data, accessed 1/10/2014

In First Order Logic:

 E73(x) ⊃ E89(x)

 E73(x) ⊃ E90(x)

Properties:

### E74 Group

Subclass of: [E39](#_E39_Actor) Actor

Superclass of: [E40](#_E40_Legal_Body) Legal Body

Scope note: This class comprises any gatherings or organizations of E39 Actors that act collectively or in a similar way due to any form of unifying relationship. In the wider sense this class also comprises official positions which used to be regarded in certain contexts as one actor, independent of the current holder of the office, such as the president of a country. In such cases, it may happen that the Group never had more than one member. A joint pseudonym (i.e., a name that seems indicative of an individual but that is actually used as a persona by two or more people) is a particular case of E74 Group..

A gathering of people becomes an E74 Group when it exhibits organizational characteristics usually typified by a set of ideas or beliefs held in common, or actions performed together. These might be communication, creating some common artifact, a common purpose such as study, worship, business, sports, etc. Nationality can be modelled as membership in an E74 Group (cf. HumanML markup). Married couples and other concepts of family are regarded as particular examples of E74 Group.

Examples:

* the impressionists
1. *Wilson*, M., *The Impressionists*, Oxford, Phaidon, 1983.
* the Navajo
1. *Correll*, J. Lee (ed.), *Welcome to the land of the Navajo, Window rock*, Arizona, Museum & research dept., Navajo Tribe, 1972.
* the Greeks
1. *Williams*, S. A., *The Greeks*, Wayland, 1993.
* the peace protestors in New York City on February 15 2003
* Exxon-Mobil
1. ‘*Exxon* Mobil Corp’, *Mergent's dividend achievers*, vol. 3, no. 3, 2006, pp. 97-97.
* King Solomon and his wives
1. *Thieberger*, F., *King Solomon*, Oxford, London, East and West Library, 1947.
* The President of the Swiss Confederation
* Nicolas Bourbaki
1. *Aczel*, A. D., *The artist and the mathematician: the story of Nicolas Bourbaki, the genius mathematician who never existed*, London, High Stakes, 2007.
* Betty Crocker
1. *Betty Crocker vegetarian cooking*, Hoboken, N.J., Wiley, 2012.
* Ellery Queen
1. *Ellery* Queen, *Ellery Queen's Book of Mystery Stories, etc*., London, 1964.

In First Order Logic:

 E74(x) ⊃ E39(x)

Properties:

[P107](#_P107_has_current_or former member () has current or former member (is current or former member of): [E39](#_E39_Actor) Actor

 (P107.1 *kind of member*: [E55](#_E55_Type) Type)

### E75 Conceptual Object Appellation

Subclass of: [E41](#_E41_Appellation) Appellation

Scope note: This class comprises all appellations specific to intellectual products or standardized patterns.

This class comprises appellations that are by their form or syntax specific to identifying instances of
E28 Conceptual Object, such as intellectual products, standardized patterns etc.

Examples:

* “ISBN 3-7913-1418-1”
* “ISO 2788-1986 (F)”
* “DOI=10.1109/MIS.2007.103”

In First Order Logic:

 E75(x) ⊃ E41(x)

### E77 Persistent Item

Subclass of: [E1](#_E1_CRM_Entity) CRM Entity

Superclass of: [E39](#_E39_Actor) Actor

[E70](#_E70_Thing) Thing

Scope note: This class comprises items that have a persistent identity, sometimes known as “endurants” in philosophy.

They can be repeatedly recognized within the duration of their existence by identity criteria rather than by continuity or observation. Persistent Items can be either physical entities, such as people, animals or things, or conceptual entities such as ideas, concepts, products of the imagination or common names.

The criteria that determine the identity of an item are often difficult to establish -; the decision depends largely on the judgement of the observer. For example, a building is regarded as no longer existing if it is dismantled and the materials reused in a different configuration. On the other hand, human beings go through radical and profound changes during their life-span, affecting both material composition and form, yet preserve their identity by other criteria. Similarly, inanimate objects may be subject to exchange of parts and matter. The class E77 Persistent Item does not take any position about the nature of the applicable identity criteria and if actual knowledge about identity of an instance of this class exists. There may be cases, where the identity of an E77 Persistent Item is not decidable by a certain state of knowledge.

The main classes of objects that fall outside the scope the E77 Persistent Item class are temporal objects such as periods, events and acts, and descriptive properties.

Examples:

* Leonard da Vinci
1. Strano, T., *Leonard da Vinci*, Milano, 1953.
* Stonehenge
1. Richards, J., *Stonehenge*, Swindon, English Heritage, 2005.
* the hole in the ozone layer
1. Hufford, D. J., Horwitz, P., ‘Fixing the Hole in the Ozone Layer: A Success in the Making’, *Natural resources & environment*, vol. 19, no. 4, 2005, pp. 8-14.
* the First Law of Thermodynamics
1. Craig, N. C. Gislason, E. A., ‘First Law of Thermodynamics; Irreversible and Reversible Processes’, *Journal of chemical education*, vol. 79, part 2, 2002, p. 193.
* the Bermuda Triangle
1. Dolan, J. W., ‘The Bermuda Triangle’, *LC GC North America*, vol. 23, no. 4, 2005, pp. 370-375.

In First Order Logic:

 E77(x) ⊃ E1(x)

### E78 Curated Holding

Subclass of: [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

Scope note: This class comprises aggregations of instances of E18 Physical Thing that are assembled and maintained (“curated” and “preserved,” in museological terminology) by one or more instances of E39 Actor over time for a specific purpose and audience, and according to a particular collection development plan. Typical instances of curated holdings are museum collections, archives, library holdings and digital libraries. A digital library is regarded as an instance of E18 Physical Thing because it requires keeping physical carriers of the electronic content.

Items may be added or removed from an E78 Curated Holding in pursuit of this plan. This class should not be confused with the E39 Actor maintaining the E78 Curated Holding often referred to with the name of the E78 Curated Holding (e.g. “The Wallace Collection decided…”).

Collective objects in the general sense, like a tomb full of gifts, a folder with stamps or a set of chessmen, should be documented as instances of E19 Physical Object, and not as instances of E78 Curated Holding. This is because they form wholes either because they are physically bound together or because they are kept together for their functionality.

Examples:

* the John Clayton Herbarium
* the Wallace Collection
1. Ingamells. J., *The Wallace collection*, London, Scala, 1990.
* Mikael Heggelund Foslie’s coralline red algae Herbarium at Museum of Natural History and Archaeology, Trondheim, Norway

In First Order Logic:

 E78(x) ⊃ E24(x)

Properties:

[P109](#_P109_has_current_or former curator ) has current or former curator (is current or former curator of): [E39](#_E39_Actor) Actor

### E79 Part Addition

Subclass of: [E11](#_E11_Modification) Modification

Scope note: This class comprises activities that result in an instance of E24 Physical Man-Made Thing being increased, enlarged or augmented by the addition of a part.

Typical scenarios include the attachment of an accessory, the integration of a component, the addition of an element to an aggregate object, or the accessioning of an object into a curated E78 Collection. Objects to which parts are added are, by definition, man-made, since the addition of a part implies a human activity. Following the addition of parts, the resulting man-made assemblages are treated objectively as single identifiable wholes, made up of constituent or component parts bound together either physically (for example the engine becoming a part of the car), or by sharing a common purpose (such as the 32 chess pieces that make up a chess set). This class of activities forms a basis for reasoning about the history and continuity of identity of objects that are integrated into other objects over time, such as precious gemstones being repeatedly incorporated into different items of jewellery, or cultural artifacts being added to different museum instances of E78 Collection over their lifespan.

Examples:

* the setting of the koh-i-noor diamond into the crown of Queen Elizabeth the Queen Mother
1. Dalrymple, W., *Koh-i-Noor : the history of the world's most infamous diamond*, London, Bloomsbury Publishing, 2017.
* the addition of the painting “Room in Brooklyn” by Edward Hopper to the collection of the Museum of Fine Arts, Boston

In First Order Logic:

 E79(x) ⊃ E11(x)

Properties:

[P110](#_P110_augmented_(was_augmented by)) augmented (was augmented by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

[P111](#_P111_added_(was_added by)) added (was added by): [E18](#_E18_Physical_Thing) Physical Thing

### E80 Part Removal

Subclass of: [E11](#_E11_Modification) Modification

Scope note: This class comprises the activities that result in an instance of E18 Physical Thing being decreased by the removal of a part.

Typical scenarios include the detachment of an accessory, the removal of a component or part of a composite object, or the deaccessioning of an object from a curated E78 Collection. If the E80 Part Removal results in the total decomposition of the original object into pieces, such that the whole ceases to exist, the activity should instead be modelled as an E81 Transformation, i.e. a simultaneous destruction and production. In cases where the part removed has no discernible identity prior to its removal but does have an identity subsequent to its removal, the activity should be regarded as both E80 Part Removal and E12 Production. This class of activities forms a basis for reasoning about the history, and continuity of identity over time, of objects that are removed from other objects, such as precious gemstones being extracted from different items of jewelry, or cultural artifacts being deaccessioned from different museum collections over their lifespan.

Examples:

* the removal of the engine from my car
* the disposal of object number 1976:234 from the collection

In First Order Logic:

 E80(x) ⊃ E11(x)

Properties:

[P112](#_P112_diminished_(was_diminished by)) diminished (was diminished by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

[P113](#_P113_removed_(was_removed by)) removed (was removed by): [E18](#_E18_Physical_Thing) Physical Thing

### E81 Transformation

Subclass of: [E63](#_E63_Beginning_of_Existence) Beginning of Existence

[E64](#_E64_End_of_Existence) End of Existence

Scope note: This class comprises the events that result in the simultaneous destruction of one or more than one E77 Persistent Item and the creation of one or more than one E77 Persistent Item that preserves recognizable substance from the first one(s) but has fundamentally different nature or identity.

Although the old and the new instances of E77 Persistent Item are treated as discrete entities having separate, unique identities, they are causally connected through the E81 Transformation; the destruction of the old E77 Persistent Item(s) directly causes the creation of the new one(s) using or preserving some relevant substance. Instances of E81 Transformation are therefore distinct from re-classifications (documented using E17 Type Assignment) or modifications (documented using E11 Modification) of objects that do not fundamentally change their nature or identity. Characteristic cases are reconstructions and repurposing of historical buildings or ruins, fires leaving buildings in ruins, taxidermy of specimen in natural history and the reorganization of a corporate body into a new one.

Examples:

* the death and mummification of Tut-Ankh-Amun (transformation of Tut-Ankh-Amun from a living person to a mummy) (E69,E81,E7)

In First Order Logic:

 E81(x) ⊃ E63(x)

 E81(x) ⊃ E64(x)

Properties:

[P123](#_P123_resulted_in_(resulted from)) resulted in (resulted from): [E77](#_E77_Persistent_Item) Persistent Item

[P124](#_P124_transformed_(was_transformed b) transformed (was transformed by): [E77](#_E77_Persistent_Item) Persistent Item

### E82 Actor Appellation

Subclass of: [E41](#_E41_Appellation) Appellation

Scope note: This class comprises any sort of name, number, code or symbol characteristically used to identify an E39 Actor.

An E39 Actor will typically have more than one E82 Actor Appellation, and instances of E82 Actor Appellation 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 E82 Actor Appellation to an instance of either E21 Person or E74 Group/E40 Legal Body. If this is not possible, the distinction can be made through the use of the *P2 has type* mechanism.

Examples:

* “John Doe”
* “Doe, J”
* “the U.S. Social Security Number 246-14-2304”
* “the Artist Formerly Known as Prince”
* “the Master of the Flemish Madonna”
* “Raphael’s Workshop”
1. Oshio, Y., *After Raphael: Raphael and printmaking: an analysis of the organisation of printmaking in Raphael's workshop*, PhD Thesis, University of Cambridge, 2003.
* “the Brontë Sisters”
1. Bentley, P. E., *The Brontë sisters, London*, Longman, for the British Council*,* 1971
* “ICOM”
1. Gerstenblith, P., Shapiro, D., ‘International Council of Museums”, *International journal of cultural property*, vol. 7, no. 1, 1998, pp. 215-222.
* “International Council of Museums”
1. Gerstenblith, P., Shapiro, D., ‘International Council of Museums”, International journal of cultural property, vol. 7, no. 1, 1998, pp. 215-222.

In First Order Logic:

 E82(x) ⊃ E41(x)

### E83 Type Creation

Subclass of: [E65](#_E65_Creation) Creation

Scope note: This class comprises activities formally defining new types of items.

It is typically a rigorous scholarly or scientific process that ensures a type is exhaustively described and appropriately named. In some cases, particularly in archaeology and the life sciences, E83 Type Creation requires the identification of an exemplary specimen and the publication of the type definition in an appropriate scholarly forum. The activity of E83 Type Creation is central to research in the life sciences, where a type would be referred to as a “taxon,” the type description as a “protologue,” and the exemplary specimens as “orgininal element” or “holotype”.

Examples:

* creation of the taxon *'Penicillium brefeldianum* B. O. Dodge' (1933)
* addition of class E84 Information Carrier to the CIDOC CRM

In First Order Logic:

 E83(x) ⊃ E65(x)

Properties:

[P135](#_P135_created_type_(was created by)) created type (was created by): [E55](#_E55_Type) Type

[P136](#_P136_was_based_on (supported type c) was based on (supported type creation): [E1](#_E1_CRM_Entity) CRM Entity

([P136.1](#_Properties:_P136.1_in_the taxonomic) in the taxonomic role: [E55](#_E55_Type) Type)

### E84 Information Carrier

Subclass of: [E22](#_E22_Man-Made_Object) Man-Made Object

Scope note: This class comprises all instances of E22 Man-Made Object that are explicitly designed to act as persistent physical carriers for instances of E73 Information Object.

An E84 Information Carrier may or may not contain information, e.g., a diskette. Note that any E18 Physical Thing may carry information, such as an E34 Inscription. However, unless it was specifically designed for this purpose, it is not an Information Carrier. Therefore the property *P128 carries (is carried by)* applies to E18 Physical Thing in general.

Examples:

* the Rosetta Stone
1. Parkinson, R. B., *The Rosetta Stone*, London, British Museum, 2005.
* my paperback copy of Crime & Punishment
* the computer disk at ICS-FORTH that stores the canonical Definition of the CIDOC CRM

In First Order Logic:

 E84(x) ⊃ E22(x)

### E85 Joining

Subclass of: [E7](#_E7_Activity) Activity

Scope note: This class comprises the activities that result in an instance of E39 Actor becoming a member of an instance of E74 Group. This class does not imply initiative by either party. It may be the initiative of a third party.

Typical scenarios include becoming a member of a social organisation, becoming employee of a company, marriage, the adoption of a child by a family and the inauguration of somebody into an official position.

Examples:

* The election of Sir Isaac Newton as Member of Parliament for the University of Cambridge to the Convention Parliament of 1689
1. Gleick, J., *Isaac Newton*, London, Fourth Estate, 2003.
* The inauguration of Mikhail Sergeyevich Gorbachev as leader of the Union of Soviet Socialist Republics (USSR) in 1985
1. Butson, T., *Mikhail Gorbachev*, New York, Chelsea House, 1986.
* The implementation of the membership treaty between EU and Denmark January 1. 1993

In First Order Logic:

 E85(x) ⊃ E7(x)

Properties:

[P143](#_P143_joined_(was_joined by)) joined (was joined by): [E39](#_E39_Actor) Actor

[P144](#_P144_joined_with_(gained member by)) joined with (gained member by) [E74](#_E74_Group) Group

 (P144.1 *kind of member*: [E55](#_E55_Type) Type)

### E86 Leaving

Subclass of: [E7](#_E7_Activity) Activity

Scope note: This class comprises the activities that result in an instance of E39 Actor to be disassociated from an instance of E74 Group. This class does not imply initiative by either party. It may be the initiative of a third party.

Typical scenarios include the termination of membership in a social organisation, ending the employment at a company, divorce, and the end of tenure of somebody in an official position.

Examples:

* The end of Sir Isaac Newton’s duty as Member of Parliament for the University of Cambridge to the Convention Parliament in 1702
1. Gleick, J., Isaac Newton, London, Fourth Estate, 2003.
* George Washington’s leaving office in 1797
1. Jones, R. F., *George Washington*, Boston, Twayne Publishers, 1979.
* The implementation of the treaty regulating the termination of Greenland’s membership in EU between EU, Denmark and Greenland February 1. 1985

In First Order Logic:

 E86(x) ⊃ E7(x)

Properties:

[P145](#_P145_separated_(left_ by)) separated (left by) [E39](#_E39_Actor) Actor

[P146](#_P146_separated_from_(lost member by) separated from (lost member by) [E74](#_E74_Group) Group

### E87 Curation Activity

Subclass of: [E7](#_E7_Activity) Activity

Scope note: This class comprises the activities that result in the continuity of management and the preservation and evolution of instances of E78 Collection, following an implicit or explicit curation plan.

It specializes the notion of activity into the curation of a collection and allows the history of curation to be recorded.

Items are accumulated and organized following criteria like subject, chronological period, material type, style of art etc. and can be added or removed from an E78 Collection for a specific purpose and/or audience. The initial aggregation of items of a collection is regarded as an instance of E12 Production Event while the activity of evolving, preserving and promoting a collection is regarded as an instance of E*87 Curation Activity.*

Examples:

* The curation of Mikael Heggelund Foslie’s coralline red algae Herbarium 1876 – 1909 (when Foslie died), now at Museum of Natural History and Archaeology, Norway

In First Order Logic:

 E87(x) ⊃ E7(x)

Properties:

[P147](#_P147_curated_(was_curated by)) curated (was curated by): [E78](#_E78_Collection) Collection

### E89 Propositional Object

Subclass of: [E28](#_E28_Conceptual_Object) Conceptual Object

Superclass of: [E73](#_E73_Information_Object) Information Object

 [E30](#_E30_Right) Right

Scope note: This class comprises immaterial items, including but not limited to stories, plots, procedural prescriptions, algorithms, laws of physics or images that are, or represent in some sense, sets of propositions about real or imaginary things and that are documented as single units or serve as topic of discourse.

This class also comprises items that are “about” something in the sense of a subject. In the wider sense, this class includes expressions of psychological value such as non-figural art and musical themes. However, conceptual items such as types and classes are not instances of E89 Propositional Object. This should not be confused with the definition of a type, which is indeed an instance of E89 Propositional Object.

Examples:

* Maxwell’s Equations
1. Huray, P.G., Maxwell's equations, Oxford: Wiley-Blackwell, 2010.
	* + The ideational contents of Aristotle’s book entitled ‘Metaphysics’ as rendered in the Greek texts translated in … Oxford edition…
* The underlying prototype of any “no-smoking” sign (E36)
* The common ideas of the plots of the movie "The Seven Samurai" by Akira Kurosawa and the movie “The Magnificent Seven” by John Sturges
* The image content of the photo of the Allied Leaders at Yalta published by UPI, 1945 (E38)

In First Order Logic:

 E89(x) ⊃ E28(x)

Properties:

[P148](#_P148_has_component) has component (is component of): [E89](#_E89_Propositional_Object) Propositional Object

[P67](#_P67_refers_to_(is referred to by)) refers to (is referred to by): [E1](#_E1_CRM_Entity) CRM Entity

([P67.1](#_P67_refers_to_(is referred to by)) has type: [E55](#_E55_Type) Type)

[P129](#_P129_is_about_(is subject of)) is about (is subject of): [E1](#_E1_CRM_Entity) CRM Entity

### E90 Symbolic Object

Subclass of: [E28](#_E28_Conceptual_Object) Conceptual Object

 [E72](#_E72_Legal_Object) Legal Object

Superclass of: [E73](#_E73_Information_Object) Information Object

 [E41](#_E41_Appellation) Appellation

Scope note:

This class comprises identifiable symbols and any aggregation of symbols, such as characters, identifiers, traffic signs, emblems, texts, data sets, images, musical scores, multimedia objects, computer program code or mathematical formulae that have an objectively recognizable structure and that are documented as single units.

It includes sets of signs of any nature, which may serve to designate something, or to communicate some propositional content.

An instance of E90 Symbolic Object does not depend on a specific physical carrier, which can include human memory, and it can exist on one or more carriers simultaneously. An instance of E90 Symbolic Object may or may not have a specific meaning, for example an arbitrary character string.

In some cases, the content of an instance of E90 Symbolic Object may completely be represented by a serialized digital content model, such as a sequence of ASCII-encoded characters, an XML or HTML document, or a TIFF image. The property *P3 has note* allows for the description of this content model. In order to disambiguate which symbolic level is the carrier of the meaning, the property *P3.1 has type* can be used to specify the encoding (e.g. "bit", "Latin character", RGB pixel).

Examples:

* ‘ecognizabl’
* The “no-smoking” sign (E36)
* “BM000038850.JPG” (E75)
* image BM000038850.JPG from the Clayton Herbarium in London (E38)
* The distribution of form, tone and colour found on Leonardo da Vinci’s painting named “Mona Lisa” in daylight (E38)
* The Italian text of Dante’s “Divina Commedia” as found in the authoritative critical edition *La Commedia secondo l’antica vulgata a cura di Giorgio Petrocchi*, Milano: Mondadori, 1966-67 (= Le Opere di Dante Alighieri, Edizione Nazionale a cura della Società Dantesca Italiana, VII, 1-4) (E33)

In First Order Logic:

 E90(x) ⊃ E28(x)

 E90(x) ⊃ E72(x)

Properties:

[P106](#_P106_is_composed_of (forms part of)) is composed of (forms part of): [E90](#_E90_Symbolic_Object) Symbolic Object

### E92 Spacetime Volume

Subclass of: [E1](#_E1_CRM_Entity) CRM Entity

Superclass of: [E4](#_E4_Period) Period

 [E18](#_E18_Physical_Thing) Physical Thing

[E93](#_E93_Presence) Presence

Scope note: This class comprises 4 dimensional point sets (volumes) in physical spacetime regardless its true geometric form. They may derive their identity from being the extent of a material phenomenon or from being the interpretation of an expression defining an extent in spacetime. Intersections of instances of E92 Spacetime Volume, Place and Timespan are also regarded as instances of E92 Spacetime Volume. An instance of E92 Spacetime Volume is either contiguous or composed of a finite number of contiguous subsets. Its boundaries may be fuzzy due to the properties of the phenomena it derives from or due to the limited precision up to which defining expression can be identified with a real extent in spacetime. The duration of existence of an instance of a spacetime volume is trivially its projection on time.

Examples:

* the spacetime Volume of the Event of Caesar’s murder
* the spacetime Volume where and when the carbon 14 dating of the "Schoeninger Speer II" in 1996 took place
* the spatio-temporal trajectory of the H.M.S. Victory from its building to its actual location
* the spacetime volume defined by a polygon approximating the Danube river flood in Austria between 6th and 9th of August 2002

In First Order Logic:

 E92(x) ⊃ E1(x)

Properties:

[P10](#_P10_falls_within_(contains)) falls within (contains): [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

[P132](#_P132_overlaps_with) spatiotemporally overlaps with: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

[P133](#_P133_is_separated_from) spatiotemporally separated from: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

[P160](#_P160_(Px5)_) has temporal projection: [E52](#_E52_Time-Span) Time-Span

[P161](#_P161_(Px6)_) has spatial projection: [E53](#_E53_Place) Place

### E93 Presence

Subclass of: [E92](#_E92_Spacetime_Volume) Spacetime Volume

Scope note: This class comprises instances of E92 Spacetime Volume, whose arbitrary temporal extent has been chosen in order to determine the spatial extent of a phenomenon over the chosen time-span. Respective phenomena may, for instance, be historical events or periods, but can also be physical things seen in their diachronic existence and extent. In other words, instances of this class fix a slice of a Spacetime Volume in time.

The temporal extent typically is predetermined by the researcher so as to focus the investigation particularly on finding the spatial extent of the phenomenon by testing for its characteristic features. There are at least two basic directions such investigations might take. The investigation may wish to determine where something was during some time or it may wish to reconstruct the total passage of a phenomenon’s Spacetime Volume through an examination of discrete presences. Observation and measurement of features indicating the presence or absence of a phenomenon in some space allows for the progressive approximation of spatial extents through argumentation typically based on inclusion, exclusion and various overlaps.

In First Order Logic:

 E93(x) ⊃ E92(x)

Properties:

[P164](#_P164_(Px9)_is) during (was time-span of): [E52](#_E52_Time-Span) Time Span

[P166](#_P166_was_a) was a presence of (had presence): [E92](#_E91_Co-Reference_Assignment) Space Time Volume

[P167](#_P167_was_at) at (was place of): [E53](#_E53_Place) Place

### E94 Space Primitive

Subclass of: [E59](#_E59_Primitive_Value) Primitive Value

Scope Note: This class comprises instances of E59 Primitive Value for space that should be implemented with appropriate validation, precision and references to spatial coordinate systems to express geometries on or relative to earth, or any other stable constellations of matter, relevant to cultural and scientific documentation.

An E94 Space Primitive defines an E53 Place in the sense of a declarative place as elaborated in CRMgeo (Doerr and Hiebel 2013), which means that the identity of the place is derived from its geometric definition. This declarative place allows for the application of all place properties to relate phenomenal places to their approximations expressed with geometries.

Definitions of instances of E53 Place using different spatial reference systems always result in definitions of different instances of E53 place approximating each other.

Instances of E94 Space Primitive provide the ability to link CRM encoded data to the kinds of geometries used in maps or Geoinformation systems. They may be used for visualisation of the instances of E53 Place they define, in their geographic context and for computing topological relations between places based on these geometries.

Note that it is possible for a place to be defined by phenomena causal to it or other forms of identification rather than by an instance of E94 Space Primitive. In this case, this property must not be used for approximating the respective instance of E53 Place with an instance of E94 Space Primitive. E94 Space Primitive is not further elaborated upon within this model. Compatibility with OGC standards are recommended.

Examples:

* Coordinate Information in GML like <gml:Point gml:id="p21" srsName="http://www.opengis.net/def/crs/EPSG/0/4326"> <gml:coordinates>45.67, 88.56</gml:coordinates> </gml:Point>
* Coordinate Information in lat, long 48,2 13,3
* Well Known Text like POLYGON ((30 10, 40 40, 20 40, 10 20, 30 10))

In First Order Logic:

 E94(x) ⊃ E59(x)

Properties:

### E95 Spacetime Primitive

Subclass of: [E59](#_E59_Primitive_Value) Primitive Value

Scope Note: This class comprises instances of E59 Primitive Value for spacetime volumes that should be implemented with appropriate validation, precision, interval logic and reference systems to express date ranges and geometries relevant to cultural documentation. A Spacetime Primitive may consist of one expression including temporal and spatial information like in GML or a different form of expressing spacetime in an integrated way like a formula containing all 4 dimensions.

An E95 Spacetime Primitive defines an E92 Spacetime Volume in the sense of a declarative spacetime volume as defined in CRMgeo (Doerr & Hiebel 2013), which means that the identity of the spacetime volume is derived from its geometric and temporal definition. This declarative spacetime volume allows for the application of all E92 Spacetime Volume properties to relate phenomenal spacetime volumes of periods and physical things to propositions about their spatial and temporal extents.

Definitions of spacetime volumes using different spacetime reference systems always result in definitions of different spacetime volumes approximating each other.

Note that it is possible for a spacetime volume to be defined by phenomena causal to it or other forms of identification rather than by an instance of E95 Spacetime Primitive. In this case, this property must not be used for approximating the respective instance of E92 Spacetime volume with an instance of E95 Spacetime Primitive.

E95 Spacetime Primitive is not further elaborated upon within this model. Compatibility with OGC standards are recommended.

Examples:

* Spatial and temporal information in KML for the maximum extent of the Byzantine Empire

<Placemark>

 <name> Byzantine Empire </name>

 <styleUrl>#style\_1</styleUrl>

 <TimeSpan>

 <begin>330</begin>

 <end>1453</end>

 </TimeSpan>

<Polygon><altitudeMode>clampToGround</altitudeMode><outerBoundaryIs><LinearRing>

<coordinates>18.452787460,40.85553626,0 17.2223187,40.589098,........0 17.2223,39.783

</coordinates>

</Polygon>

</Placemark>

Properties:

[P169](#_P169_defines_spacetime) defines spacetime volume (spacetime volume is defined by): E92 Spacetime Volume

### E96 Purchase

Subclass of: E8 Acquisition

Superclass of:

Scope note: This class comprises transfers of legal ownership from one or more instances of E39 Actor to one or more different instances of E39 Actor, where the transferring party is completely compensated by the payment of a monetary amount. In more detail, a purchase agreement establishes a fixed monetary obligation at its initialization on the receiving party, to the giving party. An instance of E96 Purchase begins with the contract or equivalent agreement and ends with the fulfilment of all contractual obligations. In the case that the activity is abandoned before both parties have fulfilled these obligations, the activity is not regarded as an instance of E96 Purchase.

 This class is a very specific case of the much more complex social business practices of exchange of goods and the creation and satisfaction of related social obligations. Purchase activities which define individual sales prices per object can be modelled by instantiating E96 Purchase for each object individually and as part of an overall E96 Purchase transaction

Properties:

P179 had sales price (was sales price of)): E97 Monetary Amount

### E97 Monetary Amount

Subclass of: E54 Dimension

Scope note: This class comprises quantities of monetary possessions or obligations in terms of their nominal value with respect to a particular currency. These quantities may be abstract accounting units, the nominal value of a heap of coins or bank notes at the time of validity of the respective currency, the nominal value of a bill of exchange or other documents expressing monetary claims or obligations.

Properties:

 P180 has currency (was\_currency\_of): E98 Currency

 P181 has amount : E60 Number

Example:

* Christies’ hammer price for “Vase with Fifteen Sunflowers” (E97) has currency British Pounds (E98)

### E98 Currency

Subclass of: E55 Type

Scope note: This class comprises the units in which a monetary system supported, by an administrational authority or other community, quantifies and compares all monetary amounts declared in this unit arithmetically. The unit of a monetary system must describe a nominal value which is kept constant by its authority and an associated banking system, and not by market value. For instance, one may pay with grams of gold, but the respective monetary amount may be agreed on as the gold price in US dollars the day of the payment. Under this definition, British pounds, U.S. dollars, and European euros are examples of currency, but “grams of gold” are not. One monetary system has only one currency. Instances of this class must not be confused with coin denominations, such as “Dime” or “Sestertius”. Non-monetary exchange of values in terms of quantities of a particular type of goods, such as cows, do not constitute a currency.

Examples: “As” (Roman mid republic)

 “Euro”,

1. Temperton, P., *The euro*, Chichester, Wiley, c1997.

“US Dollar”

1. Rose, H., *The US dollar and its role as a reserve currency*, London, British-North American Research Association, 1978.

# CIDOC CRM Property Declarations

The properties of the CRM are comprehensively declared in this section using the following format:

* Property names are presented as headings in bold face, preceded by unique property identifiers;
* The line “Domain:” declares the class for which the property is defined;
* The line “Range:” declares the class to which the property points, or that provides the values for the property;
* The line “Superproperty of:” is a cross-reference to any subproperties the property may have;
* The line “Quantification:” declares the possible number of occurrences for domain and range class instances for the property. Possible values are: 1:many, many:many, many:1;
* The line “Scope note:” contains the textual definition of the concept the property represents;
* The line “Examples:” contains a bulleted list of examples of instances of this property. If the example is also instance of a subproperty of this property, the unique identifier of the subclass is added in parenthesis. If the example instantiates two properties, the unique identifiers of both properties is added in parenthesis.

The line “Examples:” provides illustrative examples showing how the property should be used.

### P1 is identified by (identifies)

Domain: [E1](#_E1_CRM_Entity) CRM Entity

Range: [E41](#_E41_Appellation) Appellation

Superproperty of: [E1](#_E1_CRM_Entity) CRM Entity. [P48](#_P48_has_preferred) has preferred identifier (is preferred identifier of): [E42](#_E42_Object_Identifier) Identifier

 [E52](#_E52_Time-Span) Time-Span. [P78](#_P78_is_identified) is identified by (identifies): [E49](#_E49_Time_Appellation) Time Appellation

 [E53](#_E53_Place) Place. [P87](#_P87_is_identified_by (identifies)) is identified by (identifies): [E44](#_E44_Place_Appellation) Place Appellation

 [E71](#_E71_Man-Made_Thing) Man-Made Thing. [P102](#_P102_has_title_(is title of)) has title (is title of): [E35](#_E35_Title) Title

 [E39](#_E39_Actor) Actor. [P131](#_P131_is_identified_by (identifies)) is identified by (identifies): [E82](#_E82_Actor_Appellation) Actor Appellation

 [E28](#_E28_Conceptual_Object) Conceptual Object.[P149](#_P149_is_identified) is identified by (identifies): [E75](#_E75_Conceptual_Object_Appellation) Conceptual Object 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 instances of E53 Place. 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.

*P1 is identified by (identifies)*, is a shortcut for the path from ‘*E1 CRM Entity*’ through ‘*P140i was attributed by’*, ‘E15 Identifier Assignment’, ‘*P37 assigned*’*,‘*E42 Identifier’, ‘P139 has alternative form’ to ‘E41 Appellation’.

Examples:

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

In First Order Logic:

 P1(x,y) ⊃ E1(x)

 P1(x,y) ⊃ E41(y)

### P2 has type (is type of)

Domain: [E1](#_E1_CRM_Entity) CRM Entity

Range: [E55](#_E55_Type) Type

Superproperty of. [E1](#_E1_CRM_Entity) CRM Entity.[P137](#_P137_is_exemplified_by (exemplifies) exemplifies (is exemplified by):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 by specialised into any number of sub entities, which can be defined in the E55 Type hierarchy. 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:

 “enquiries@cidoc-crm.org” (E51) *has type* e-mail address (E55)

In First Order Logic:

 P2(x,y) ⊃ E1(x)

 P2(x,y) ⊃ E55(y)

### P3 has note

Domain: [E1](#_E1_CRM_Entity) CRM Entity

Range: [E62](#_E62_String) String

Superproperty of: [E52](#_E52_Time-Span) Time-Span. [P79](#_P79_beginning_is_qualified by) beginning is qualified by: [E62](#_E62_String) String

 [E52](#_E52_Time-Span) Time-Span. [P80](#_P80_end_is_qualified by) end is qualified by: [E62](#_E62_String) String

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

Scope note: This property is a container for all informal descriptions about an object that have not been 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 (is type of)*, 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 *P3.1 has type* property of *P3 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)

In First Order Logic:

 P3(x,y) ⊃ E1(x)

 P3(x,y) ⊃ E62(y)

 P3(x,y,z) ⊃ [P3(x,y) ∧ E55(z)]

Properties: P3.1 has type: [E55](#_E55_Type) Type

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

Domain: [E2](#_E2_Temporal_Entity) Temporal Entity

Range: [E52](#_E52_Time-Span) Time-Span

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

Scope note: This property describes the temporal confinement of an instance of an E2 Temporal Entity.

The related E52 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)

In First Order Logic:

 P4(x,y) ⊃ E2(x)

 P4(x,y) ⊃ E52(y)

### P5 consists of (forms part of)

Domain: [E3](#_E3_Condition_State) Condition State

Range: [E3](#_E3_Condition_State) Condition State

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

Scope note: This property describes the decomposition of an E3 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.

This property is transitive.

Examples:

The Condition State of the ruined Parthenon (E3) *consists of* the bombarded state after the explosion of a Venetian shell in 1687 (E3)[[1]](#footnote-1)

In First Order Logic:

 P5(x,y) ⊃ E3(x)

 P5(x,y) ⊃ E3(y)

### P7 took place at (witnessed)

Domain: [E4](#_E4_Period) Period

Range: [E53](#_E53_Place) Place

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

Scope note: This property describes the spatial location of an instance of E4 Period.

The related E53 Place should be seen as a wider approximation of the geometric area within which the phenomena that characterise the period in question occurred, see below. *P7took place at (witnessed)* does not convey any meaning other than spatial positioning (frequently on the surface of the earth). For example, the period “Révolution française” can be said to have taken place in “France in 1789”; 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. An instance of E4 Period can take place at multiple non-contiguous, non-overlapping locations.

It is a shortcut of the more fully developed path from E4 Period through *P161 has spatial projection*, E53 Place, *P89 falls within*  to E53 Place. E4 Period is a subclass of E92 Spacetime Volume. By the definition of *P161 has spatial projection* an instance of E4 Period takes place on all its spatial projections, that is, instances of E53 Place. Something happening at a given place can also be considered to happen at a larger place containing the first. For example, the assault on the Bastille July 14th 1789 took place in the area covered by Paris in 1789 but also in the area covered by France in 1789.

Examples:

* the period “Révolution française” (E4) *took place at* the area covered by France in 1789 (E53)

In First Order Logic:

 P7(x,y) ⊃ E4(x)

 P7(x,y) ⊃ E53(y)

### P8 took place on or within (witnessed)

Domain: [E4](#_E4_Period) Period

Range: [E18](#_E19_Physical_Object) Physical Thing

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

Scope note: This property describes the location of an instance of E4 Period with respect to an E19 Physical Object.

P8 took place on or within (witnessed) is a shortcut of the more fully developed path from ‘*E4 Period*’ through ‘*P7 took place at*,’ ‘*E53 Place*’, ‘*P156 occupies’,* to ‘*E18 Physical Thing*’.

It describes a period that can be located with respect to the space defined by an E19 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)

In First Order Logic:

 P8(x,y) ⊃ E4(x)

 P8(x,y) ⊃ E18(y)

### P9 consists of (forms part of)

Domain: [E4](#_E4_Period) Period

Range: [E4](#_E4_Period) Period

Subproperty of: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume. [P132](#_P132_overlaps_with) spatiotemporally overlaps with.:[E92](#_E91_Co-Reference_Assignment) Spacetime Volume

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

Scope note: This property associates an instance of E4 Period with another instance of E4 Period that is defined by a subset of the phenomena that define the former. Therefore the spacetime volume of the latter must fall within the spacetime volume of the former.

This property is transitive.

Examples:

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

In First Order Logic:

 P9(x,y) ⊃ E4(x)

 P9(x,y) ⊃ E4(y)

 P9(x,y) ⊃ P10(y,x)

### P10 falls within (contains)

Domain: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

Range: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

Subproperty of: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume. [P132](#_P132_overlaps_with) spatiotemporally overlaps with.:[E92](#_E91_Co-Reference_Assignment) Spacetime Volume

Superproperty of: [E93](#_E93_Spacetime_Snapshot) Presence. [P166](#_P166_was_a) was a presence of (had presence): [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

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

Scope note: This property associates an instance of E92 Spacetime Volume with another instance of E92 Spacetime Volume that falls within the latter. In other words, all points in the former are also points in the latter.

This property is transitive.

Examples:

* the Great Plague (E4) *falls within* The Gothic period (E4)

In First Order Logic:

 P10(x,y) ⊃ E92(x)

 P10(x,y) ⊃ E92(y)

### P11 had participant (participated in)

Domain: [E5](#_E5_Event) Event

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E5](#_E5_Event) Event. [P12](#_P12_occurred_in_the presence of (wa) occurred in the presence of (was present at): [E77](#_E77_Persistent_Item) Persistent Item

Superproperty of: [E7](#_E7_Activity) Activity. [P14](#_P14_carried_out_by (performed)) carried out by (performed): [E39](#_E39_Actor) Actor

 [E67](#_E67_Birth) Birth. [P96](#_P96_by_mother_(gave birth)) by mother (gave birth): [E21](#_E21_Person) Person

 [E68](#_E68_Dissolution) Dissolution. [P99](#_P99_dissolved_(was_dissolved by)) dissolved (was dissolved by): [E74](#_E74_Group) Group

[E85](#_E85_Joining) Joining.[P143](#_P143_joined_(was_joined by)) joined (was joined by): [E39](#_E39_Actor) Actor

[E85](#_E85_Joining) Joining.[P144](#_P144_joined_with_(gained member by)) joined with (gained member by): [E74](#_E74_Group) Group

[E86](#_E86_Leaving) Leaving.[P145](#_P145_separated_(left_ by)) separated (left by):[E39](#_E39_Actor) Actor

[E86](#_E86_Leaving) Leaving.[P146](#_P146_separated_from_(lost member by) separated from (lost member by):[E74](#_E74_Group) Group

[P151](#_P151_was_formed_1) was formed from: [E74](#_E74_Group) Group

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

Scope note: This property describes the active or passive participation of instances of E39 Actors in an E5 Event.

It connects the life-line of the related E39 Actor with the E53 Place and E50 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)
* Maria (E21) *participated in* Photographing of Maria (E7)

In First Order Logic:

 P11(x,y) ⊃ E5(x)

 P11(x,y) ⊃ E39(y)

 P11(x,y) ⊃ P12(x,y)

### P12 occurred in the presence of (was present at)

Domain: [E5](#_E5_Event) Event

Range: [E77](#_E77_Persistent_Item) Persistent Item

Superproperty of: [E5](#_E5_Event) Event. [P11](#_P11_had_participant_(participated i) had participant (participated in): [E39](#_E39_Actor) Actor

[E7](#_E7_Activity) Activity. [P16](#_P16_used_specific_object (was used ) used specific object (was used for): [E70](#_E70_Thing) Thing

 [E9](#_E9_Move) Move. [P25](#_P25_moved_(moved_by)) moved (moved by): [E19](#_E19_Physical_Object) Physical Object

 [E11](#_E11_Modification) Modification. [P31](#_P31_has_modified_(was modified by)) has modified (was modified by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

 [E63](#_E63_Beginning_of_Existence) Beginning of Existence. [P92](#_P92_brought_into_existence (was bro) brought into existence (was brought into existence by): [E77](#_E77_Persistent_Item) Persistent Item

[E64](#_E64_End_of_Existence) End of Existence. [P93](#_P93_took_out_of existence (was take) took out of existence (was taken out of existence by): [E77](#_E77_Persistent_Item) Persistent Item

[E79](#_E79_Part_Addition) Part Addition.[P111](#_P111_added_(was) added (was added by): [E18](#_E18_Physical_Thing) Physical Thing

[E80](#_E80_Part_Removal) Part Removal.[P113](#_P113_removed_(was) removed (was removed by): [E18](#_E18_Physical_Thing) Physical Thing

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

Scope note: This property describes the active or passive presence of an E77 Persistent Item in an E5 Event without implying any specific role.

It connects the history of a thing with the E53 Place and E50 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)

In First Order Logic:

 P12(x,y) ⊃ E5(x)

 P12(x,y) ⊃ E77(y)

### P13 destroyed (was destroyed by)

Domain: [E6](#_E6_Destruction) Destruction

Range: [E18](#_E18_Physical_Thing) Physical Thing

Subproperty of: [E64](#_E64_End_of_Existence) End of Existence. [P93](#_P93_took_out_of existence (was take) took out of existence (was taken out of existence by): [E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property allows specific instances of E18 Physical Thing that have been destroyed to be related to a destruction event.

Destruction implies the end of an item’s life as a subject of cultural documentation – the physical matter of which the item was composed may in fact continue to exist. A destruction event may be contiguous with a Production 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)

In First Order Logic:

 P13 (x,y) ⊃ E6 (x)

 P13 (x,y) ⊃ E18(y)

 P13 (x,y) ⊃ P93(x,y)

### P14 carried out by (performed)

Domain: [E7](#_E7_Activity) Activity

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E5](#_E5_Event) Event. [P11](#_P11_had_participant_(participated i) had participant (participated in): [E39](#_E39_Actor) Actor

Superproperty of: [E8](#_E8_Acquisition) Acquisition. [P22](#_P22_transferred_title_to (acquired ) transferred title to (acquired title through): [E39](#_E39_Actor) Actor

 [E8](#_E8_Acquisition) Acquisition. [P23](#_P23_transferred_title_from (surrend) transferred title from (surrendered title through): [E39](#_E39_Actor) Actor

[E10](#_E10_Transfer_of_Custody) Transfer of Custody. [P28](#_P28_custody_surrendered_by (surrend) custody surrendered by (surrendered custody through): [E39](#_E39_Actor) Actor

[E10](#_E10_Transfer_of_Custody) Transfer of Custody. [P29](#_P29_custody_received_by (received c) custody received by (received custody through): [E39](#_E39_Actor) Actor

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

Scope note: This property describes the active participation of an E39 Actor in an E7 Activity.

It implies causal or legal responsibility. The *P14.1 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) *carried out by* Michaelangelo Buonaroti (E21) *in the role of* master craftsman (E55)

In First Order Logic:

 P14 (x,y) ⊃ E7(x)

 P14 (x,y)⊃ E39(y)

 P14 (x,y) ⊃ P11(x,y)

 P14(x,y,z) ⊃ [P14(x,y) ∧ E55(z)]

Properties: P14.1 in the role of: [E55](#_E55_Type) Type

### P15 was influenced by (influenced)

Domain: [E7](#_E7_Activity) Activity

Range: [E1](#_E1_CRM_Entity) CRM Entity

Superproperty of: [E7](#_E7_Activity) Activity. [P16](#_P16_used_specific_object (was used ) used specific object (was used for): [E70](#_E70_Thing) Thing

[E7](#_E7_Activity) Activity. [P17](#_P17_was_motivated_by (motivated)) was motivated by (motivated): [E1](#_E1_CRM_Entity) CRM Entity

[E7](#_E7_Activity) Activity. [P134](#_P134_continued_(was_continued by)) continued (was continued by): [E7](#_E7_Activity) Activity

[E83](#_E83_Type_Creation) Type Creation. [P136](#_P136_was_based_on (supported type c) was based on (supported type creation): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This is a high level property, which captures the relationship between an E7 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)

In First Order Logic:

 P15 (x,y) ⊃ E7(x)

 P15 (x,y) ⊃ E1(y)

### P16 used specific object (was used for)

Domain: [E7](#_E7_Activity) Activity

Range: [E70](#_E70_Thing) Thing

Subproperty of: [E5](#_E5_Event) Event. [P12](#_P12_occurred_in_the presence of (wa) occurred in the presence of (was present at): [E77](#_E77_Persistent_Item) Persistent Item

[E7](#_E7_Activity) Activity. [P15](#_P15_was_influenced_by (influenced)) was influenced by (influenced): [E1](#_E1_CRM_Entity) CRM Entity

Superproperty of:[E7](#_E7_Activity) Activity.[P33](#_P33_used_specific_technique (was us) used specific technique (was used by):[E29](#_E29_Design_or_Procedure) Design or Procedure

[E15](#_E15_Identifier_Assignment) Identifier Assignment. [P142](#_P142_used_constituent) used constituent (was used in): [E90](#_E90_Symbolic_Object) Symbolic Object

[E79](#_E79_Part_Addition) Part Addition. [P111](#_P111_added_(was_added by)) added (was added by):[E18](#_E18_Physical_Thing) Physical Thing

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 E7 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.

Another example is the use of a particular name by a particular group of people over some span to identify a thing, such as a settlement. In this case, the physical carriers of this name are at least the people understanding its use.

Examples:

* the writing of this scope note (E7) *used specific object* Nicholas Crofts’ computer (E22) *mode of use* Typing Tool; Storage Medium (E55)
* the people of Iraq calling the place identified by TGN ‘7017998’ (E7) used specific object “Quyunjig” (E44) *mode of use Current*; Vernacular (E55)

In First Order Logic:

 P16 (x,y) ⊃ E7(x)

 P16 (x,y) ⊃ E70(y)

 P16 (x,y) ⊃ P12(x,y)

 P16 (x,y) ⊃ P15(x,y)

 P16(x,y,z) ⊃ [P16(x,y) ∧ E55(z)]

Properties: P16.1 mode of use: [E55](#_E55_Type) Type

### P17 was motivated by (motivated)

Domain: [E7](#_E7_Activity) Activity

Range: [E1](#_E1_CRM_Entity) CRM Entity

Subproperty of: [E7](#_E7_Activity) Activity. [P15](#_P15_was_influenced_by (influenced)) was influenced by (influenced): [E1](#_E1_CRM_Entity) 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 E7 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)

In First Order Logic:

 P17(x,y) ⊃ E7(x)

 P17(x,y) ⊃ E1(y)

 P17 (x,y) ⊃ P15(x,y)

### P19 was intended use of (was made for):

Domain: [E7](#_E7_Activity) Activity

Range: [E71](#_E71_Man-Made_Thing) Man-Made Thing

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

Scope note: This property relates an E7 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 (was use of)*).

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)

In First Order Logic:

 P19(x,y) ⊃ E7(x)

 P19(x,y) ⊃ E71(y)

 P19(x,y,z) ⊃ [P19(x,y) ∧ E55(z)]

Properties: P19.1 mode of use: [E55](#_E55_Type) Type

### P20 had specific purpose (was purpose of)

Domain: [E7](#_E7_Activity) Activity

Range: [E5](#_E5_Event) Event

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

Scope note: This property identifies the relationship between a preparatory activity and the event it is intended to be preparation for.

This includes activities, orders and other organisational actions, taken in preparation for other activities or events.

*P20 had specific purpose (was purpose of)* implies that an activity succeeded in achieving its aim. If it does not succeed, such as the setting of a trap that did not catch anything, one may document the unrealized intention using *P21 had general purpose (was purpose of):E55 Type* and/or *P33 used specific technique (was used by): E29 Design or Procedure*.

Examples:

* Van Eyck’s pigment grinding in 1432 (E7) *had specific purpose* the painting of the Ghent altar piece (E12)

In First Order Logic:

 P21(x,y) ⊃ E7(x)

 P21(x,y) ⊃ E55(y)

### P21 had general purpose (was purpose of)

Domain: [E7](#_E7_Activity) Activity

Range: [E55](#_E55_Type) Type

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

Scope note: This property describes an intentional relationship between an E7 Activity and some general goal or purpose.

This may involve activities intended as preparation for some type of activity or event. *P21had general purpose (was purpose of)* differs from *P20 had specific purpose (was purpose of)* in that no occurrence of an event is implied as the purpose.

Examples:

* Van Eyck’s pigment grinding (E7) *had general purpose* painting (E55)
* The setting of trap 2742 on May 17th 1874 (E7) *had general purpose* Catching Moose (E55) (Activity type

In First Order Logic:

 P21(x,y) ⊃ E7(x)

 P21(x,y) ⊃ E55(y)

### P22 transferred title to (acquired title through)

Domain: [E8](#_E8_Acquisition) Acquisition

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E7](#_E7_Activity) Activity. [P14](#_P14_carried_out) carried out by (performed): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the E39 Actor that acquires the legal ownership of an object as a result of an E8 Acquisition.

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)

In First Order Logic:

 P22(x,y) ⊃ E8(x)

 P22(x,y) ⊃ E39(y)

 P22 (x,y) ⊃ P14(x,y)

### P23 transferred title from (surrendered title through)

Domain: [E8](#_E8_Acquisition) Acquisition

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E7](#_E7_Activity) Activity. [P14](#_P14_carried_out_by (performed)) carried out by (performed): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the E39 Actor or Actors who relinquish legal ownership as the result of an E8 Acquisition.

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)

In First Order Logic:

 P23(x,y) ⊃ E8(x)

 P23(x,y) ⊃ E39(y)

 P23 (x,y) ⊃ P14(x,y)

### P24 transferred title of (changed ownership through)

Domain: [E8](#_E8_Acquisition) Acquisition

Range: [E18](#_E18_Physical_Thing) Physical Thing

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

Scope note: This property identifies the E18 Physical Thing or things involved in an E8 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)

In First Order Logic:

 P24(x,y) ⊃ E8(x)

 P24(x,y) ⊃ E18(y)

### P25 moved (moved by)

Domain: [E9](#_E9_Move) Move

Range: [E19](#_E19_Physical_Object) Physical Object

Subproperty of: [E5](#_E5_Event) Event. [P12](#_P12_occurred_in_the presence of (wa) occurred in the presence of (was present at): [E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property identifies an instance of E19 Physical Object that was moved by a move event. A move must concern at least one object.

The property implies the object’s passive participation. For example, Monet’s painting “Impression sunrise” was moved for the first Impressionist exhibition in 1874.

Examples:

* Monet´s “Impression sunrise” (E22) *moved by* preparations for the First Impressionist Exhibition (E9)

In First Order Logic:

 P25(x,y) ⊃ E9(x)

 P25(x,y) ⊃ E19(y)

 P25(x,y) ⊃ P12(x,y)

### P26 moved to (was destination of)

Domain: [E9](#_E9_Move) Move

Range: [E53](#_E53_Place) Place

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

Scope note: This property identifies a destination of a E9 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 instances of E53 Place by multiple instances of this property. In this case the move describes a distribution of a set of objects. The area of the move includes the origin(s), route and destination(s).

Therefore the described destination is an instance of E53 Place which *P89 falls within (contains)* the instance of E53 Place the move *P7 took place at.*

Examples:

* the movement of the Tut-Ankh-Amun Exhibition (E9) *moved to* The British Museum (E53)

In First Order Logic:

 P26(x,y) ⊃ E9(x)

P26(x,y) ⊃ E53(y)

 P26(x,y) ⊃ (∃z)[ E53(z) ∧ P7(x,z) ∧ P89(y,z)]

### P27 moved from (was origin of)

Domain: [E9](#_E9_Move) Move

Range: [E53](#_E53_Place) Place

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

Scope note: This property identifies a starting E53 Place of an E9 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 starting instances of E53 Place by multiple instances of this property. In this case the move describes the picking up of a set of objects. The area of the move includes the origin(s), route and destination(s).

Therefore the described origin is an instance of E53 Place which *P89 falls within (contains)* the instance of E53 Place the move *P7 took place at.*

Examples:

* the movement of the Tut-Ankh-Amun Exhibition (E9) *moved from* The Egyptian Museum in Cairo (E53)

In First Order Logic:

 P27(x,y) ⊃ E9(x)

P27(x,y) ⊃ E53(y)

 P27(x,y) ⊃ (∃z)[ E53(z) ∧ P7(x,z) ∧ P89(y,z)]

### P28 custody surrendered by (surrendered custody through)

Domain: [E10](#_E10_Transfer_of_Custody) Transfer of Custody

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E7](#_E7_Activity) Activity. [P14](#_P14_carried_out_by (performed)) carried out by (performed): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the E39 Actor or Actors who surrender custody of an instance of E18 Physical Thing in an E10 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).

In First Order Logic:

 P28(x,y) ⊃ E10(x)

 P28(x,y) ⊃ E39(y)

 P28(x,y) ⊃ P14(x,y)

### P29 custody received by (received custody through)

Domain: [E10](#_E10_Transfer_of_Custody) Transfer of Custody

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E7](#_E7_Activity) Activity. [P14](#_P14_carried_out_by (performed)) carried out by (performed): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the E39 Actor or Actors who receive custody of an instance of E18 Physical Thing in an E10 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)

In First Order Logic:

 P29 (x,y) ⊃ E10(x)

 P29 (x,y) ⊃ E39(y)

 P29(x,y) ⊃ P14(x,y)

### P30 transferred custody of (custody transferred through)

Domain: [E10](#_E10_Transfer_of_Custody) Transfer of Custody

Range: [E18](#_E18_Physical_Thing) Physical Thing

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

Scope note: This property identifies an item or items of E18 Physical Thing concerned in an E10 Transfer of Custody activity.

The property will typically describe the object that is handed over by an E39 Actor to another Actor’s custody. On occasion, physical custody may be transferred involuntarily or illegally – through accident, unsolicited donation, or theft.

Examples:

the delivery of the paintings by Secure Deliveries Inc. to the National Gallery (E10) *transferred custody* *of* paintings from The Iveagh Bequest (E19)

In First Order Logic:

 P30 (x,y) ⊃ E10(x)

 P30 (x,y) ⊃ E18(y)

### P31 has modified (was modified by)

Domain: [E11](#_E11_Modification) Modification

Range: [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

Subproperty of: [E5](#_E5_Event) Event. [P12](#_P12_occurred_in_the presence of (wa) occurred in the presence of (was present at): [E77](#_E77_Persistent_Item) Persistent Item

Superproperty of: [E12](#_E12_Production) Production. [P108](#_P108_has_produced_(was produced by)) has produced (was produced by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

 [E79](#_E79_Part_Addition) Part Addition. [P110](#_P110_augmented_(was_augmented by)) augmented (was augmented by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

 [E80](#_E80_Part_Removal) Part Removal. [P112](#_P112_diminished_(was_diminished by)) diminished (was diminished by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

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

Scope note: This property identifies the E24 Physical Man-Made Thing modified in an E11 Modification.

If a modification is applied to a non-man-made object, it is regarded as an E22 Man-Made Object from that time onwards.

Examples:

* rebuilding of the Reichstag (E11) *has modified* the Reichstag in Berlin (E24)

In First Order Logic:

 P31(x,y) ⊃ E11(x)

 P31(x,y) ⊃ E24(y)

 P31(x,y) ⊃ P12(x,y)

### P32 used general technique (was technique of)

Domain: [E7](#_E7_Activity) Activity

Range: [E55](#_E55_Type) Type

Subproperty of: [E7](#_E7_Activity) Activity. [P125](#_P125_used_object) used object of type (was type of object used in): [E55](#_E55_Type) Type

Superproperty of:

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

Scope note: This property identifies the technique or method that was employed in an activity.

These techniques should be drawn from an external E55 Type hierarchy of consistent terminology of general techniques or methods such as embroidery, oil-painting, carbon dating, etc. Specific documented techniques should be described as instances of E29 Design or Procedure. This property identifies the technique that was employed in an act of modification.

Examples:

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

In First Order Logic:

 P32(x,y) ⊃ E7(x)

 P32(x,y) ⊃ E55(y)

 P32(x,y) ⊃ P125(x,y)

### P33 used specific technique (was used by)

Domain: [E7](#_E7_Activity) Activity

Range: [E29](#_E29_Design_or_Procedure) Design or Procedure

Subproperty of: [E7](#_E7_Activity) Activity. [P16](#_P16_used_specific_object (was used ) used specific object (was used for): [E70](#_E70_Thing) Thing

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

Scope note: This property identifies a specific instance of E29 Design or Procedure in order to carry out an instance of E7 Activity or parts of it.

The property differs from P32 used general technique (was technique of) in that P33 refers to an instance of E29 Design or Procedure, which is a concrete information object in its own right rather than simply being a term or a method known by tradition.

Typical examples would include intervention plans for conservation or the construction plans of a building

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)

In First Order Logic:

 P33(x,y) ⊃ E7(x)

 P33(x,y) ⊃ E29(y)

 P33(x,y) ⊃ P16(x,y)

### P34 concerned (was assessed by)

Domain: [E14](#_E14_Condition_Assessment) Condition Assessment

Range: [E18](#_E18_Physical_Thing) Physical Thing

Subproperty of: [E13](#_E13_Attribute_Assignment) Attribute Assignment. [P140](#_P140_assigned_attribute_to (was att) assigned attribute to (was attributed by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property identifies the E18 Physical Thing that was assessed during an E14 Condition Assessment activity.

Conditions may be assessed either by direct observation or using recorded evidence. In the latter case the E18 Physical Thing does not need to be present or extant.

Examples:

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

In First Order Logic:

 P34(x,y) ⊃ E14(x)

 P34(x,y) ⊃ E18(y)

 P34(x,y) ⊃ P140(x,y)

### P35 has identified (was identified by)

Domain: [E14](#_E14_Condition_Assessment) Condition Assessment

Range: [E3](#_E3_Condition_State) Condition State

Subproperty of: [E13](#_E13_Attribute_Assignment) Attribute Assignment. [P141](#_P141_assigned_(was_assigned by)) assigned (was assigned by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property identifies the E3 Condition State that was observed in an E14 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)

In First Order Logic:

 P35(x,y) ⊃E14(x)

 P35(x,y) ⊃ E3(y)

 P35(x,y) ⊃ P141(x,y)

### P37 assigned (was assigned by)

Domain: [E15](#_E15_Identifier_Assignment) Identifier Assignment

Range: [E42](#_E42_Object_Identifier) Identifier

Subproperty of: [E13](#_E13_Attribute_Assignment) Attribute Assignment. [P141](#_P141_assigned_(was_assigned by)) assigned (was assigned by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property records the identifier that was assigned to an item in an Identifier Assignment activity.

The same identifier may be assigned on more than one occasion.

An 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)

In First Order Logic:

 P37(x,y) ⊃ E15(x)

 P37(x,y) ⊃ E42(y)

 P37(x,y) ⊃ P141(x,y)

### P38 deassigned (was deassigned by)

Domain: [E15](#_E15_Identifier_Assignment) Identifier Assignment

Range: [E42](#_E42_Object_Identifier) Identifier

Subproperty of: [E13](#_E13_Attribute_Assignment) Attribute Assignment. [P141](#_P141_assigned_(was_assigned by)) assigned (was assigned by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property records the identifier that was deassigned from an instance of E1 CRM Entity.

Deassignment of an identifier may be necessary when an item is taken out of an inventory, a new numbering system is introduced or items 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)

In First Order Logic:

 P38(x,y) ⊃ E15(x)

 P38(x,y) ⊃ E42(y)

 P38(x,y) ⊃ P141(x,y)

### P39 measured (was measured by)

Domain: [E16](#_E16_Measurement) Measurement

Range: [E1](#_E1_CRM_Entity) CRM Entity

Subproperty of: [E13](#_E13_Attribute_Assignment) Attribute Assignment. [P140](#_P140_assigned_attribute_to (was att) assigned attribute to (was attributed by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property associates an instance of E16 Measurement with the instance of E1 CRM Entity to which it applied. An instance of E1 CRM Entity may be measured more than once. Material and immaterial things and processes may be measured, e.g. the number of words in a text, or the duration of an event.

Examples:

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

In First Order Logic:

 P39(x,y) ⊃ E16(x)

 P39(x,y) ⊃ E1(y)

 P39(x,y) ⊃ P140(x,y)

### P40 observed dimension (was observed in)

Domain: [E16](#_E16_Measurement) Measurement

Range: [E54](#_E54_Dimension) Dimension

Subproperty of: [E13](#_E13_Attribute_Assignment) Attribute Assignment. [P141](#_P141_assigned_(was_assigned by)) assigned (was assigned by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property records the dimension that was observed in an E16 Measurement Event.

E54 Dimension can be any quantifiable aspect of E70 Thing. 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 measured Thing does not 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) *has unit* mm (E58), *has value* 224 (E60)

In First Order Logic:

 P40(x,y) ⊃ E16(x)

 P40(x,y)⊃ E54(y)

 P40(x,y) ⊃ P141(x,y)

### P41 classified (was classified by)

Domain: [E17](#_E17_Type_Assignment) Type Assignment

Range: [E1](#_E1_CRM_Entity) CRM Entity

Subproperty of: [E13](#_E13_Attribute_Assignment) Attribute Assignment. [P140](#_P140_assigned_attribute_to (was att) assigned attribute to (was attributed by): [E1](#_E1_CRM_Entity) 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 an E17 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 CRM Entity’* through *‘P41i was classified by’, ‘E17 Type Assignment’, ‘P42 assigned’, to ‘E55 Type’* for assigning types to objects compared to the shortcut offered by *P2* *has type (is type of)*.

Examples:

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

In First Order Logic:

 P41(x,y) ⊃ E17(x)

 P41(x,y) ⊃ E1(y)

 P41(x,y) ⊃ P140(x,y)

### P42 assigned (was assigned by)

Domain: [E17](#_E17_Type_Assignment) Type Assignment

Range: [E55](#_E55_Type) Type

Subproperty of: [E13](#_E13_Attribute_Assignment) Attribute Assignment. [P141](#_P141_assigned_(was_assigned by)) assigned (was assigned by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property records the type that was assigned to an entity by an E17 Type Assignment activity.

Type assignment events allow a more detailed path from ‘*E1 CRM Entity’* through *‘P41i was classified by’, ‘E17 Type Assignment’, ‘P42 assigned’, to ‘E55 Type’* for assigning types to objects compared to the shortcut offered by *P2* *has type (is type of)*.

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)

In First Order Logic:

 P42(x,y) ⊃ E17(x)

 P42(x,y)⊃ E55(y)

 P42(x,y) ⊃ P141(x,y)

### P43 has dimension (is dimension of)

Domain: [E70](#_E70_Thing) Thing

Range: [E54](#_E54_Dimension) Dimension

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

Scope note: This property records a E54 Dimension of some E70 Thing.

It is a shortcut of the more fully developed path from ‘*E70 Thing’* through *‘P39 measured’, ‘E16 Measurement’, ‘P40 observed dimension’,* to *‘E54 Dimension’*. It offers no information about how and when an E54 Dimension was established, nor by whom.

An instance of E54 Dimension is specific to an instance of E70 Thing.

Examples:

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

In First Order Logic:

 P43(x,y) ⊃ E70(x)

 P43(x,y) ⊃ E54(y)

### P44 has condition (is condition of)

Domain: [E18](#_E18_Physical_Thing) Physical Thing

Range: [E3](#_E3_Condition_State) Condition State

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

Scope note: This property records an E3 Condition State for some E18 Physical Thing.

It is a shortcut of the more fully developed path from ‘*E18 Physical Thing’* through *‘P34 concerned’, ‘E14 Condition Assessment’, ‘P35 has identified’,* to *‘E3 Condition State’*. It offers no information about how and when the E3 Condition State was established, nor by whom.

An instance of Condition State is specific to an instance of Physical Thing.

Examples:

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

In First Order Logic:

 P44(x,y) ⊃ E18(x)

 P44(x,y) ⊃ E3(y)

### P45 consists of (is incorporated in)

Domain: [E18](#_E18_Physical_Thing) Physical Thing

Range: [E57](#_E57_Material) Material

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

Scope note: This property identifies the instances of E57 Materials of which an instance of E18 Physical Thing is composed.

All physical things consist of physical materials. *P45 consists of (is incorporated in)* allows the different Materials to be recorded. *P45 consists of (is incorporated in)* refers here to observed Material as opposed to the consumed raw material.

A Material, such as a theoretical alloy, may not have any physical instances.

Examples:

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

In First Order Logic:

 P45(x,y) ⊃ E18(x)

 P45(x,y) ⊃ E57(y)

### P46 is composed of (forms part of)

Domain: [E18](#_E18_Physical_Thing) Physical Thing

Range: [E18](#_E18_Physical_Thing) Physical Thing

Subproperty of: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume. [P132](#_P132_overlaps_with) spatiotemporally overlaps with: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

Superproperty of:[E19](#_E19_Physical_Object) Physical Object. [P56](#_P56_bears_feature_(is found on):) bears feature (is found on): [E26](#_E26_Physical_Feature) Physical Feature

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

Scope note: This property allows instances of E18 Physical Thing to be analysed into component elements.

Component elements, since they are themselves instances of E18 Physical Thing, may be further analysed into sub-components, thereby creating a hierarchy of part decomposition. An instance of E18 Physical Thing may be shared between multiple wholes, for example two buildings may share a common wall. This property does not specify when and for how long a component element resided in the respective whole. If a component is not part of a whole from the beginning of existence or until the end of existence of the whole, the classes E79 Part Addition and E90 Part Removal can be used to document when a component became part of a particular whole and/or when it stopped being a part of it. For the time-span of being part of the respective whole, the component is completely contained in the place the whole occupies.

This property is intended to describe specific components that areindividually documented, rather than general aspects. Overall descriptions of the structure of an instance of E18 Physical Thing are captured by the *P3* *has note* property.

The instances of E57 Material of which an item of E18 Physical Thing is composed should be documented using *P45* *consists of (is incorporated in)*.

Examples:

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

In First Order Logic:

 P46(x,y) ⊃ E18(x)

P46(x,y) ⊃ E18(y)

P46(x,y) ⊃ P132(x,y)

P46(x,y) ⊃ (∃uzw)[E93(u) ∧ P166 (x,u) ∧ E52(z) ∧ P164(u,z) ∧ E93(w) ∧ P166 (y,w) ∧

P164(w,z) ∧ P10(w,u)]

### P48 has preferred identifier (is preferred identifier of)

Domain: [E1](#_E1_CRM_Entity) CRM Entity

Range: [E42](#_E42_Identifier) Identifier

Subproperty of: [E1](#_E1_CRM_Entity) CRM Entity.[P1](#_P1_is_identified) is identified by (identifies): [E41](#_E41_Appellation) Appellation

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

Scope note: This property records the preferred E42 Identifier that was used to identify an instance of E1 CRM Entity at the time this property was recorded.

More than one preferred identifier may have been assigned to an item over time.

Use of this property requires an external mechanism for assigning temporal validity to the respective CRM instance.

The fact that an identifier is a preferred one for an organisation can be better expressed in a context independent form by assigning a suitable E55 Type to the respective instance of E15 Identifier Assignment using the *P2 has type* property.

Examples:

* the pair of Lederhosen donated by Dr Martin Doerr (E22) *has preferred identifier* “OXCMS:2001.1.32” (E42)

In First Order Logic:

 P48(x,y) ⊃ E1(x)

 P48(x,y) ⊃ E42(y)

 P48(x,y) ⊃ P1(x,y)

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

Domain: [E18](#_E18_Physical_Thing) Physical Thing

Range: [E39](#_E39_Actor) Actor

Superproperty of: [E18](#_E18_Physical_Thing) Physical Thing. [P50](#_P50_has_current_keeper (is current ) has current keeper (is current keeper of): [E39](#_E39_Actor) Actor

 [E78](#_E78_Collection) Collection.[P109](#_P109_has_current) has current or former curator (is current or former curator of):[E39](#_E39_Actor) Actor

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

Scope note: This property identifies the E39 Actor or Actors who have or have had custody of an instance of E18 Physical Thing at some time. This property leaves open the question if parts of this physical thing have been added or removed during the time-spans it has been under the custody of this actor, but it is required that at least a part which can unambiguously be identified as representing the whole has been under this custody for its whole time. The way, in which a representative part is defined, should ensure that it is unambiguous who keeps a part and who the whole and should be consistent with the identity criteria of the kept instance of E18 Physical Thing.

The distinction with *P50 has current keeper (is current keeper of)* is that *P49 has former or current keeper (is former or current keeper of)* leaves open the question as to whether the specified keepers are current.

*P49 has former or current keeper (is former or current keeper of)* is a shortcut for the more detailed path from ‘*E18 Physical Thing’* through *‘P30 transferred custody of’, ‘E10 Transfer of Custody’, ‘P28 custody surrendered by’ or ‘P29 custody received by’* to *‘ E39 Actor’*.

Examples:

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

In First Order Logic:

 P49(x,y) ⊃ E18(x)

 P49(x,y) ⊃ E39(y)

### P50 has current keeper (is current keeper of)

Domain: [E18](#_E18_Physical_Thing) Physical Thing

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E18](#_E18_Physical_Thing) Physical Thing. [P49](#_P49_has_former_or current keeper (i) has former or current keeper (is former or current keeper of): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the E39 Actor or Actors who had custody of an instance of E18 Physical Thing at the time of validity of the record or database containing the statement that uses this property.

*P50 has current keeper (is current keeper of)* is a shortcut for the more detailed path from ‘*E18 Physical Thing’* through*, ‘P30i custody transferred trhough’, ‘E10 Transfer of Custody’, ‘P29 custody received by’ ,to ‘E39 Actor’.*

Examples:

* paintings from The Iveagh Bequest (E18) *has current keeper*  The National Gallery (E40)

In First Order Logic:

 P50(x,y) ⊃ E18(x)

 P50(x,y) ⊃ E39(y)

 P50(x,y) ⊃ P49(x,y)

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

Domain: [E18](#_E18_Physical_Thing) Physical Thing

Range: [E39](#_E39_Actor) Actor

Superproperty of: [E18](#_E18_Physical_Thing) Physical Thing. [P52](#_P52_has_current_owner (is current o) has current owner (is current owner of): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the E39 Actor that is or has been the legal owner (i.e. title holder) of an instance of E18 Physical Thing at some time.

The distinction with *P52 has current owner (is current owner of)* is that *P51 has former or current owner (is former or current owner of)* does not indicate whether the specified owners are current. *P51 has former or current owner (is former or current owner of)* is a shortcut for the more detailed path from ‘*E18 Physical Thing’* through *‘P24i changed ownership through’, ‘E8 Acquisition’, ‘P23 transferred title from’, or ‘P22 transferred title to’,*to *‘E39 Actor*.’

Examples:

* paintings from the Iveagh Bequest (E18) *has former or current owner*  Lord Iveagh (E21)

In First Order Logic:

 P51(x,y) ⊃ E18(x)

 P51(x,y) ⊃ E39(y)

### P52 has current owner (is current owner of)

Domain: [E18](#_E18_Physical_Thing) Physical Thing

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E18](#_E18_Physical_Thing) Physical Thing. [P51](#_P51_has_former_or current owner (is) has former or current owner (is former or current keeper of): [E39](#_E39_Actor) Actor

 [E72](#_E72_Legal_Object) Legal Object.[P105](#_P105_right_held) right held by (has right on):[E39](#_E39_Actor) Actor

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

Scope note: This property identifies the E21 Person, E74 Group or E40 Legal Body that was the owner of an instance of E18 Physical Thing at the time of validity of the record or database containing the statement that uses this property.

*P52 has current owner (is current owner of)* is a shortcut for the more detailed path from ‘*E18 Physical Thing through’, ‘P24i changed ownership through, ‘E8 Acquisition’, ‘P22 transferred title to’, 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)

In First Order Logic:

 P52 (x,y) ⊃ E18(x)

 P52 (x,y) ⊃ E39(y)

 P52(x,y) ⊃ P51(x,y)

 P52(x,y) ⊃ P105(x,y)

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

Domain: [E18](#_E18_Physical_Thing) Physical Thing

Range: [E53](#_E53_Place) Place

Superproperty of: [E19](#_E19_Physical_Object) Physical Object.[P55](#_P55_has_current_location (currently) has current location (currently holds): [E53](#_E53_Place) Place

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

Scope note: This property allows an instance of E53 Place to be associated as the former or current location of an instance of E18 Physical Thing.

In the case of E19 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 has former or current location* (*is former or current location of)* is a shortcut. A more detailed representation can make use of the fully developed (i.e. indirect) path from ‘*E19 Physical Object’,* though*, ‘P25i moved by’, ‘E9 Move’, ‘P26 moved to’* or *‘P27 moved from’, to ‘ E53 Place’*.

Examples:

* silver cup 232 (E22) *has former or current location* Display Case 4, Room 23, Museum of Oxford (E53)

In First Order Logic:

 P53(x,y) ⊃ E18(x)

 P53(x,y) ⊃ E53(y)

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

Domain: [E19](#_E19_Physical_Object) Physical Object

Range: [E53](#_E53_Place) Place

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

Scope note: This property records the foreseen permanent location of an instance of E19 Physical Object at the time of validity of the record or database containing the statement that uses this property.

*P54 has current permanent location (is current permanent location of)* is similar to *P55 has current location (currently holds).* However, it indicates the E53 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)

In First Order Logic:

 P54(x,y) ⊃ E19(x)

 P54(x,y) ⊃ E53(y)

### P55 has current location (currently holds)

Domain: [E19](#_E19_Physical_Object) Physical Object

Range: [E53](#_E53_Place) Place

Subproperty of: [E18](#_E18_Physical_Thing) Physical Thing. [P53](#_P53_has_former_or current location ) has former or current location (is former or current location of): [E53](#_E53_Place) Place

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

Scope note: This property records the location of an E19 Physical Object at the time of validity of the record or database containing the statement that uses this property.

This property is a specialisation of *P53* *has former or current location (is former or current location of).* It indicates that the E53 Place associated with the E19 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 has current location (currently holds)* is a shortcut. A more detailed representation can make use of the fully developed (i.e. indirect) path from ‘*E19 Physical Object’,*through*, ‘P25i moved by’, ‘E9 Move’, ‘P26 moved to’, 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)

In First Order Logic:

 P55(x,y) ⊃ E19(x)

 P55(x,y) ⊃ E53(y)

 P55(x,y) ⊃ P53(x,y)

### P56 bears feature (is found on)

Domain: [E19](#_E19_Physical_Object) Physical Object

Range: [E26](#_E26_Physical_Feature) Physical Feature

Subproperty of: [E18](#_E18_Physical_Thing) Physical Thing. [P46](#_P46_is_composed_of (forms part of)) is composed of (forms part of**)**: [E18](#_E18_Physical_Thing) Physical Thing

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

Scope note: This property links an instance of E19 Physical Object to an instance of E26 Physical Feature that it bears.

An E26 Physical Feature can only exist on one object. One object may bear more than one E26 Physical Feature. An E27 Site should be considered as an E26 Physical Feature on the surface of the Earth.

An instance B of E26 Physical Feature being a detail of the structure of another instance A of E26 Physical Feature can be linked to B by use of the property P46 is composed of (forms part of). This implies that the subfeature B is P56i found on the same E19 Physical Object as A.

P56 bears feature (is found on) is a shortcut. A more detailed representation can make use of the fully developed (i.e. indirect) path ‘*E19 Physical Object’,*through*, ‘P59 has section’, ‘E53 Place’, ‘P53i is former or current location of’,* to*, ‘E26 Physical Feature’*.

Examples:

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

In First Order Logic:

 P56(x,y) ⊃E19(x)

 P56(x,y) ⊃ E26(y)

 P56(x,y) ⊃ P46(x,y)

### P57 has number of parts

Domain: [E19](#_E19_Physical_Object) Physical Object

Range: [E60](#_E60_Number) Number

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

Scope note: This property documents the E60 Number of parts of which an instance of E19 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 (forms parts of)* and *P45 consists of (is incorporated in)*. This allows each element to be described individually.

Examples:

* chess set 233 (E22) *has number of* *parts* 33 (E60)

In First Order Logic:

 P57(x,y) ⊃ E19(x)

 P57(x,y) ⊃ E60(y)

### P58 has section definition (defines section)

Domain: [E18](#_E18_Physical_Thing) Physical Thing

Range: [E46](#_E46_Section_Definition) Section Definition

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

Scope note: This property links an area (section) named by a E46 Section Definition to the instance of E18 Physical Thing upon which it is found.

The CRM handles sections as locations (instances of E53 Place) within or on E18 Physical Thing that are identified by E46 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 Physical Thing’* through *‘P58 has section definition’, ‘E46 Section Definition, P87 is identified by, E44 Place Appellation* that allows a more precise definition of a location found on an object than the shortcut *P59 has section (is located on or within)*.

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

Examples:

* HMS Victory (E22) *has section definition* “poop deck of HMS Victory” (E46)

In First Order Logic:

 P58(x,y) ⊃ E18(x)

 P58(x,y) ⊃ E46(y)

### P59 has section (is located on or within)

Domain: [E18](#_E18_Physical_Thing) Physical Thing

Range: [E53](#_E53_Place) Place

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

Scope note: This property links an area to the instance of E18 Physical Thing upon which it is found.

It is typically used when a named E46 Section Definition is not appropriate.

E18 Physical Thing may be subdivided into arbitrary regions.

*P59 has section (is located on or within)* is a shortcut. If the E53 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 Thing through P58 has section definition, E46 Section Definition, P87 is identified by E44 Place Appellation.* A Place can only be located on or within one Physical Object.

Examples:

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

In First Order Logic:

 P59(x,y) ⊃ E18(x)

 P59(x,y) ⊃ E53(y)

### P62 depicts (is depicted by)

Domain: [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

Range: [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property identifies something that is depicted by an instance of E24 Physical Man-Made Thing. Depicting is meant in the sense that an E24 Physical Man-Made Thing intentionally shows, through its optical qualities or form, a representation of the entity depicted. Photographs are by default regarded as being intentional in this sense. Anything that is designed to change the properties of the depiction, such as an e-book reader, is specifically excluded. The property does not pertain to inscriptions or any other information encoding.

This property is a shortcut of the more fully developed path from E24 Physical Man-Made Thing through *P65 shows visual item*, E36 Visual Item, *P138 represents,*  E1CRM Entity. P138.1 mode of representation “depiction” allows the nature of the depiction to be refined.

Examples:

* The painting “La Liberté guidant le peuple” by Eugène Delacroix (E84) *depicts* the French “July Revolution” of 1830 (E7)
* the 20 pence coin held by the Department of Coins and Medals of the British Museum under registration number 2006,1101.126 (E24) *depicts* Queen Elizabeth II (E21) *mode of depiction* Profile (E55)

In First Order Logic:

 P62(x,y) ⊃ E24(x)

 P62(x,y) ⊃ E1(y)

 P62(x,y,z) ⊃ [P62(x,y) ∧ E55(z)]

Properties: P62.1 mode of depiction: [E55](#_E55_Type) Type

### P65 shows visual item (is shown by)

Domain: [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

Range: [E36](#_E36_Visual_Item) Visual Item

Subproperty of: [E18](#_E18_Physical_Thing) Physical Thing. [P128](#_P128_carries_(is_carried by)) carries (is carried by): [E90](#_E90_Symbolic_Object) Symbolic Object

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

Scope note: This property documents an E36 Visual Item shown by an instance of E24 Physical Man-Made Thing.

This property is similar to *P62 depicts (is depicted by)* in that it associates an item of E24 Physical Man-Made Thing with a visual representation. However, *P65 shows visual item (is shown by)* differs from the *P62 depicts (is depicted by)* property in that it makes no claims about what the E36 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 (is depicted by)*. Different portraits have been used at different periods, however. *P65 shows visual item (is shown by)* can be used to refer to a particular portrait.

*P65 shows visual item (is shown by)* 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 E24 Physical Man-Made Thing , *P65 shows visual item*, E36 Visual Item, *P138 represents,*E1 CRM Entity which is shortcut by*, P62* *depicts (is depicted by)*.

Examples:

* My T-Shirt (E22) *shows visual item* Mona Lisa (E38)

In First Order Logic: P65(x,y) ⊃ E24(x)

 P65(x,y) ⊃ E36(y)

 P65(x,y) ⊃ P128(x,y)

### P67 refers to (is referred to by)

Domain: [E89](#_E89_Propositional_Object) Propositional Object

Range: [E1](#_E1_CRM_Entity) CRM Entity

Superproperty of: [E31](#_E31_Document) Document. [P70](#_P70_documents_(is_documented in)) documents (is documented in): [E1](#_E1_CRM_Entity) CRM Entity

 [E32](#_E32_Authority_Document) Authority Document. [P71](#_P71_lists_(is_listed in)) lists (is listed in): [E1](#_E1_CRM_Entity) CRM Entity

 [E89](#_E89_Propositional_Object) Propositional Object. [P129](#_P129_is_about_(is subject of)) is about (is subject of): [E1](#_E1_CRM_Entity) CRM Entity

 [E36](#_E36_Visual_Item) Visual Item. [P138](#_P138_represents_(has_representation) represents (has representation): [E1](#_E1_CRM_Entity) CRM Entity

 [E29](#_E29_Design_or_Procedure) Design or Procedure.[P68](#_P68_foresees_use) foresees use of (use foreseen by): [E57](#_E57_Material) Material

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

Scope note: This property documents that an E89 Propositional Object makes a statement about an instance of E1 CRM Entity. *P67 refers to (is referred to by)* 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 is about (is subject of)*, which describes the primary subject or subjects of the E89 Propositional Object.

Examples:

the eBay auction listing of 4 July 2002 (E73) *refers to* silver cup 232 (E22) *has type* item for sale (E55)

In First Order Logic:

 P67(x,y) ⊃ E89(x)

 P67(x,y) ⊃ E1(y)

 P67(x,y,z) ⊃ [P67(x,y) ∧ E55(z)]

Properties: P67.1 has type: [E55](#_E55_Type) Type

### P68 foresees use of (use foreseen by)

Domain: [E29](#_E29_Design_or_Procedure) Design or Procedure

Range: [E57](#_E57_Material) Material

Subproperty of: [E89](#_E89_Propositional_Object) Propositional Object. [P67](#_P67_refers_to) refers to (is referred to by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property identifies an E57 Material foreseeen to be used by an E29 Design or Procedure.

E29 Designs and procedures commonly foresee the use of particular E57 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 E57 Materials that were used on a particular occasion when an instance of E29 Design or Procedure was executed.

Examples:

* procedure for soda glass manufacture (E29) *foresees use of* soda (E57)

In First Order Logic:

 P68(x,y) ⊃ E29(x)

 P68(x,y) ⊃ E57(y)

 P68(x,y) ⊃ P67(x,y)

### P69 has association with (is associated with)

Domain: [E29](#_E29_Design_or_Procedure) Design or Procedure

Range: [E29](#_E29_Design_or_Procedure) Design or Procedure

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

Scope note: This property generalises relationships like whole-part, sequence, prerequisite or inspired by between instances of E29 Design or Procedure. Any instance of E29 Design or Procedure may be associated with other designs or procedures. The property is considered to be symmetrical unless otherwise indicated by *P69.1 has type*.

The *P69.1 has type* property of *P69 has association* *with* allows the nature of the association to be specified reading from domain to range; examples of types of association between instances of E29 Design or Procedure include: has part, follows, requires, etc.

The property can typically be used to model the decomposition of the description of a complete workflow into a series of separate procedures.

This property is transitive.

Examples:

* Procedure for glass blowing (E29) *has association with* procedure for glass heating (E29)
* The set of instructions for performing Macbeth in Max Reinhardt's production in 1916 in Berlin at Deutsches Theater (E29) has association with the scene design drawing by Ernst Stern reproduced at http://www.glopad.org/pi/fr/record/digdoc/1003814 (E29) has type has part (E55)
* Preparation of parchment (E29) *has association with* soaking and unhairing of skin (E29) *has type* ‘has part’ (E55). Preparation of parchment (E29) *has association with* stretching of skin (E29) *has type* ‘has part’ (E55). Stretching of skin (E29) *has association with* soaking and unhairing of skin (E29) *has type* ‘follows’ (E55).
* The plan for reassembling the temples at Abu Simbel (E29) has association with the plan for storing and transporting the blocks (E29) has type 'follows' (E55)'.

In First Order Logic:

 P69 (x,y) ⊃ E29(x)

 P69 (x,y) ⊃ E29(y)

 P69(x,y,z) ⊃ [P69(x,y) ∧ E55(z)]

 P69(x,y) ⊃P69(y,x)

Properties: P69.1 has type: [E55](#_E55_Type) Type

### P70 documents (is documented in)

Domain: [E31](#_E31_Document) Document

Range: [E1](#_E1_CRM_Entity) CRM Entity

Subproperty of: [E89](#_E89_Propositional_Object) Propositional Object. [P67](#_P67_refers_to) refers to (is referred to by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property describes the CRM Entities documented by instances of E31 Document.

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)

In First Order Logic:

 P70 (x,y) ⊃ E31(x)

 P70 (x,y) ⊃ E1(y)

 P70(x,y) ⊃ P67(x,y)

### P71 lists (is listed in)

Domain: [E32](#_E32_Authority_Document) Authority Document

Range: [E1](#_E1_CRM_Entity) CRM Entity

Subproperty of: [E89](#_E89_Propositional_Object) Propositional Object. [P67](#_P67_refers_to_(is referred to by)) refers to (is referred to by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property documents a source E32 Authority Document for an instance of an E1 CRM Entity.

Examples:

* the Art & Architecture Thesaurus (E32) *lists* alcazars (E55)

In First Order Logic:

 P71(x,y) ⊃ E32(x)

 P71(x,y) ⊃ E1(y)

 P71(x,y) ⊃ P67(x,y)

### P72 has language (is language of)

Domain: [E33](#_E33_Linguistic_Object) Linguistic Object

Range: [E56](#_E56_Language) Language

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

Scope note: This property describes the E56 Language of an E33 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)

In First Order Logic:

 P72(x,y) ⊃ E33(x)

 P72(x,y) ⊃ E56(y)

### P73 has translation (is translation of)

Domain: [E33](#_E33_Linguistic_Object) Linguistic Object

Range: [E33](#_E33_Linguistic_Object) Linguistic Object

Subproperty of: [E70](#_E70_Thing) Thing. [P130](#_P130_shows_features_of (features ar)i features are also found on: [E70](#_E70_Thing) Thing

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

Scope note: This property describes the source and target of instances of E33Linguistic Object 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.

This property is transitive

Examples:

* “Les Baigneurs” (E33) *has translation* “The Bathers” (E33)

In First Order Logic:

 P73(x,y) ⊃ E33(x)

 P73(x,y) ⊃ E33(y)

 P73(x,y) ⊃ P130(y,x)

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

Domain: [E39](#_E39_Actor) Actor

Range: [E53](#_E53_Place) Place

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

Scope note: This property describes the current or former E53 Place of residence of an E39 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)

In First Order Logic:

 P74(x,y) ⊃ E39(x)

 P74(x,y) ⊃ E53(y)

### P75 possesses (is possessed by)

Domain: [E39](#_E39_Actor) Actor

Range: [E30](#_E30_Right) Right

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

Scope note: This property identifies former or current instances of E30 Rights held by an E39 Actor.

Examples:

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

In First Order Logic:

 P75(x,y) ⊃ E39(x)

 P75(x,y) ⊃ E30(y)

### P76 has contact point (provides access to)

Domain: [E39](#_E39_Actor) Actor

Range: [E51](#_E51_Contact_Point) Contact Point

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

Scope note: This property identifies an E51 Contact Point of any type that provides access to an E39 Actor by any communication method, such as e-mail or fax.

Examples:

* RLG (E40) *has contact point* “bl.ric@rlg.org” (E51)

In First Order Logic:

 P76(x,y) ⊃ E39(x)

 P76(x,y) ⊃ E51(y)

### P78 is identified by (identifies)

Domain: [E52](#_E52_Time-Span) Time-Span

Range: [E49](#_E49_Time_Appellation) Time Appellation

Subproperty of: [E1](#_E1_CRM_Entity) CRM Entity. [P1](#_P1_is_identified) is identified by (identifies): [E41](#_E41_Appellation_1) Appellation

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

Scope note: This property identifies an E52 Time-Span using an E49Time Appellation.

Examples:

* the time span 1926 to 1988 (E52) *is identified by* “Showa” (Japanese time appellation) (E49)

In First Order Logic:

 P78(x,y) ⊃ E52(x)

 P78(x,y) ⊃ E49(y)

 P78(x,y) ⊃ P1(x,y)

### P79 beginning is qualified by

Domain: [E52](#_E52_Time-Span) Time-Span

Range: [E62](#_E62_String) String

Subproperty of: [E1](#_E1_CRM_Entity) CRM Entity. [P3](#_P3_has_note) has note: [E62](#_E62_String) String

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

Scope note: This property qualifies the beginning of an E52 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)

In First Order Logic:

 P79 (x,y) ⊃ E52 (x)

 P79 (x,y) ⊃ E62(y)

 P79(x,y) ⊃ P3(x,y)

### P80 end is qualified by

Domain: [E52](#_E52_Time-Span) Time-Span

Range: [E62](#_E62_String) String

Subproperty of: [E1](#_E1_CRM_Entity) CRM Entity. [P3](#_P3_has_note) has note: [E62](#_E62_String) String

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

Scope note: This property qualifies the end of an E52 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)

In First Order Logic:

 P80(x,y) ⊃ E52(x)

 P80(x,y) ⊃ E62(y)

 P80(x,y) ⊃ P3(x,y)

### P81 ongoing throughout

Domain: [E52](#_E52_Time-Span) Time-Span

Range: [E61](#_E61_Time_Primitive) Time Primitive

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

Scope note: This property describes the minimum period of time covered by an E52 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 an E61 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)

In First Order Logic:

 P81 (x,y) ⊃ E52(x)

 P81 (x,y) ⊃ E61(y)

### P82 at some time within

Domain: [E52](#_E52_Time-Span) Time-Span

Range: [E61](#_E61_Time_Primitive) Time Primitive

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

Scope note: This property describes the maximum period of time within which an E52 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 an E61 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)

In First Order Logic:

 P82 (x,y) ⊃ E52(x)

 P82 (x,y) ⊃ E61(y)

### P83 had at least duration (was minimum duration of)

Domain: [E52](#_E52_Time-Span) Time-Span

Range: [E54](#_E54_Dimension) Dimension

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

Scope note: This property describes the minimum length of time covered by an E52 Time-Span.

It allows an E52 Time-Span to be associated with an E54 Dimension representing it’s minimum duration (i.e. it’s 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) *has* *unit (P91)* day (E58) *has value (P90)* 1 (E60)

In First Order Logic:

 P83(x,y) ⊃ E52(x)

 P83(x,y) ⊃ E54(y)

### P84 had at most duration (was maximum duration of)

Domain: [E52](#_E52_Time-Span) Time-Span

Range: [E54](#_E54_Dimension) Dimension

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

Scope note: This property describes the maximum length of time covered by an E52 Time-Span.

It allows an E52 Time-Span to be associated with an E54 Dimension representing it’s maximum duration (i.e. it’s 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) *has unit* *(P91)* day (E58) *has value (P90)* 2 (E60)

In First Order Logic:

 P84(x,y) ⊃ E52(x)

 P84(x,y) ⊃ E54(y)

### P86 falls within (contains)

Domain: [E52](#_E52_Time-Span) Time-Span

Range: [E52](#_E52_Time-Span) Time-Span

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

Scope note: This property describes the inclusion relationship between two instances of E52 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.

This property is transitive.

Examples:

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

In First Order Logic:

 P86(x,y) ⊃ E52(x)

 P86(x,y) ⊃ E52(y)

### P87 is identified by (identifies)

Domain: [E53](#_E53_Place) Place

Range: [E44](#_E44_Place_Appellation) Place Appellation

Subproperty of: [E1](#_E1_CRM_Entity) CRM Entity. [P1](#_P1_is_identified) is identified by (identifies): [E41](#_E41_Appellation) Appellation

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

Scope note: This property identifies an E53 Place using an E44 Place Appellation.

Examples of Place Appellations used to identify Places include instances of E48 Place Name, addresses, E47 Spatial Coordinates etc.

Examples:

* the location of the Duke of Wellington’s House (E53) *is identified by* “No 1 London” (E45)

In First Order Logic:

 P87(x,y) ⊃ E53(x)

 P87(x,y) ⊃ E44(y)

 P87(x,y) ⊃ P1(x,y)

### P89 falls within (contains)

Domain: [E53](#_E53_Place) Place

Range: [E53](#_E53_Place) Place

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

Scope note: This property identifies an instance of E53 Place that falls wholly within the extent of another E53 Place.

It addresses spatial containment only, and does not imply any relationship between things or phenomena occupying these places.

This property is transitive.

Examples:

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

In First Order Logic:

 P89(x,y) ⊃ E53(x)

 P89(x,y) ⊃ E53(y)

### P90 has value

Domain: [E54](#_E54_Dimension) Dimension

Range: [E60](#_E60_Number) Number

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

Scope note: This property allows an E54 Dimension to be approximated by an E60 Number primitive.

Examples:

* height of silver cup 232 (E54) *has value* 226 (E60)

In First Order Logic:

 P90(x,y) ⊃ E54(x)

 P90(x,y) ⊃ E60(y)

### P91 has unit (is unit of)

Domain: [E54](#_E54_Dimension) Dimension

Range: [E58](#_E58_Measurement_Unit) Measurement Unit

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

Scope note: This property shows the type of unit an E54 Dimension was expressed in.

Examples:

* height of silver cup 232 (E54) *has* *unit* mm (E58)

In First Order Logic:

 P91(x,y) ⊃ E54(x)

 P91(x,y) ⊃ E58(y)

### P92 brought into existence (was brought into existence by)

Domain: [E63](#_E63_Beginning_of_Existence) Beginning of Existence

Range: [E77](#_E77_Persistent_Item) Persistent Item

Subproperty of: [E5](#_E5_Event) Event. [P12](#_P12_occurred_in_the presence of (wa) occurred in the presence of (was present at): [E77](#_E77_Persistent_Item) Persistent Item

Superproperty of: [E65](#_E65_Creation) Creation. [P94](#_P94_has_created_(was created by)) has created (was created by): [E28](#_E28_Conceptual_Object) Conceptual Object

 [E66](#_E66_Formation) Formation. [P95](#_P95_has_formed_(was formed by)) has formed (was formed by): [E74](#_E74_Group) Group

 [E67](#_E67_Birth) Birth. [P98](#_P98_brought_into_life (was born)) brought into life (was born): [E21](#_E21_Person) Person

 [E12](#_E12_Production) Production. [P108](#_P108_has_produced_(was produced by)) has produced (was produced by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

 [E81](#_E81_Transformation) Transformation. [P123](#_P123_resulted_in_(resulted from)) resulted in (resulted from): [E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property allows an E63 Beginning of Existence event to be linked to the E77 Persistent Item brought into existence by it.

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

Examples:

* the birth of Mozart (E67*) brought into existence* Mozart (E21)

In First Order Logic:

 P92(x,y) ⊃ E63(x)

 P92(x,y) ⊃ E77(y)

 P92(x,y) ⊃ P12(x,y)

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

Domain: [E64](#_E64_End_of_Existence) End of Existence

Range: [E77](#_E77_Persistent_Item) Persistent Item

Subproperty of: [E5](#_E5_Event) Event. [P12](#_P12_occurred_in_the presence of (wa) occurred in the presence of (was present at): [E77](#_E77_Persistent_Item) Persistent Item

Superproperty of: [E6](#_E6_Destruction) Destruction. [P13](#_P13_destroyed_(was_destroyed by)) destroyed (was destroyed by): [E18](#_E18_Physical_Thing) Physical Thing

 [E68](#_E68_Dissolution) Dissolution. [P99](#_P99_dissolved_(was_dissolved by)) dissolved (was dissolved by): [E74](#_E74_Group) Group

 [E69](#_E69_Death) Death. [P100](#_P100_was_death_of (died in)) was death of (died in): [E21](#_E21_Person) Person

 [E81](#_E81_Transformation) Transformation. [P124](#_P124_transformed_(was_transformed b) transformed (was transformed by): [E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property allows an E64 End of Existence event to be linked to the E77 Persistent Item taken out of existence by it.

In the case of immaterial things, the E64 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. E70 Thing, E72 Legal Object, E39 Actor, E41 Appellation, E51 Contact Point and E55 Type. 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)

In First Order Logic:

 P93 (x,y) ⊃ E64(x)

 P93 (x,y) ⊃ E77(y)

 P93(x,y) ⊃ P12(x,y)

### P94 has created (was created by)

Domain: [E65](#_E65_Creation) Creation

Range: [E28](#_E28_Conceptual_Object) Conceptual Object

Subproperty of: [E63](#_E63_Beginning_of_Existence) Beginning of Existence. [P92](#_P92_brought_into_existence (was bro) brought into existence (was brought into existence by): [E77](#_E77_Persistent_Item) Persistent Item

Superproperty of: [E83](#_E83_Type_Creation) Type Creation. [P135](#_P135_created_type_(was created by)) created type (was created by): [E55](#_E55_Type) Type

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

Scope note: This property allows a conceptual E65 Creation to be linked to the E28 Conceptual Object created by it.

It represents the act of conceiving the intellectual content of the E28 Conceptual Object. It does not represent the act of creating the first physical carrier of the E28 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)

In First Order Logic:

 P94(x,y) ⊃ E65(x)

 P94(x,y) ⊃ E28(y)

 P94(x,y) ⊃ P92(x,y)

### P95 has formed (was formed by)

Domain: [E66](#_E66_Formation) Formation

Range: [E74](#_E74_Group) Group

Subproperty of: [E63](#_E63_Beginning_of_Existence) Beginning of Existence. [P92](#_P92_brought_into_existence (was bro) brought into existence (was brought into existence by): [E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property links the founding or E66 Formation for an E74 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)

In First Order Logic:

 P95(x,y) ⊃ E66(x)

 P95(x,y) ⊃ E74(y)

 P95(x,y) ⊃ P92(x,y)

### P96 by mother (gave birth)

Domain: [E67](#_E67_Birth) Birth

Range: [E21](#_E21_Person) Person

Subproperty of: [E5](#_E5_Event) Event. [P11](#_P11_had_participant_(participated i) had participant (participated in): [E39](#_E39_Actor) Actor

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

Scope note: This property links an E67 Birth event to an E21 Person as a participant in the role of birth-giving mother.

Note that biological fathers are not necessarily participants in the Birth (see *P97* *from father (was father for)*). The Person being born is linked to the Birth with the property *P98* *brought into life (was born)*. 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 *P11* *had participant (participated in)*.

Examples:

* the birth of Queen Elizabeth II (E67) *by mother* Queen Mother (E21)

In First Order Logic:

 P96(x,y) ⊃ E67(x)

 P96(x,y) ⊃ E21(y)

 P96(x,y) ⊃ P11(x,y)

### P97 from father (was father for)

Domain: [E67](#_E67_Birth) Birth

Range: [E21](#_E21_Person) Person

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

Scope note: This property links an E67 Birth event to an E21 Person in the role of biological father.

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

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 biological father.

Examples:

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

In First Order Logic:

 P97(x,y) ⊃ E67(x)

 P97(x,y) ⊃ E21(y)

### P98 brought into life (was born)

Domain: [E67](#_E67_Birth) Birth

Range: [E21](#_E21_Person) Person

Subproperty of: [E63](#_E63_Beginning_of_Existence) Beginning of Existence. [P92](#_P92_brought_into_existence (was bro) brought into existence (was brought into existence by): [E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property links an E67Birth event to an E21 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)

In First Order Logic:

 P98(x,y) ⊃ E67(x)

 P98(x,y) ⊃ E21(y)

 P98(x,y) ⊃ P92(x,y)

### P99 dissolved (was dissolved by)

Domain: [E68](#_E68_Dissolution) Dissolution

Range: [E74](#_E74_Group) Group

Subproperty of: [E5](#_E5_Event) Event. [P11](#_P11_had_participant_(participated i) had participant (participated in): [E39](#_E39_Actor) Actor

[E64](#_E64_End_of_Existence) End of Existence. [P93](#_P93_took_out_of existence (was take) took out of existence (was taken out of existence by): [E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property links the disbanding or E68 Dissolution of an E74 Group to the Group itself.

Examples:

* the end of The Hole in the Wall Gang (E68) *dissolved* The Hole in the Wall Gang (E74)

In First Order Logic:

 P99(x,y) ⊃ E68(x)

 P99(x,y) ⊃ E74(y)

 P99(x,y) ⊃ P11(x,y)

 P99(x,y) ⊃ P93(x,y)

### P100 was death of (died in)

Domain: [E69](#_E69_Death) Death

Range: [E21](#_E21_Person) Person

Subproperty of: [E64](#_E64_End_of_Existence) End of Existence. [P93](#_P93_took_out_of existence (was take) took out of existence (was taken out of existence by): [E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property links an E69 Death event to the E21 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)

In First Order Logic:

 P100(x,y) ⊃ E69(x)

 P100(x,y) ⊃ E21(y)

 P100(x,y) ⊃ P93(x,y)

 P101(x,y) ⊃ E70(x)

 P101(x,y) ⊃ E55(y)

### P101 had as general use (was use of)

Domain: [E70](#_E70_Thing) Thing

Range: [E55](#_E55_Type) Type

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

Scope note: This property links an instance of E70 Thing to an E55 Type of usage.

It allows the relationship between particular things, both physical and immaterial, and general methods and techniques of use to be documented. 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)

In First Order Logic:

 P101(x,y) ⊃ E70(x)

 P101(x,y) ⊃ E55(y)

### P102 has title (is title of)

Domain: [E71](#_E71_Man-Made_Thing) Man-Made Thing

Range: [E35](#_E35_Title) Title

Subproperty of: [E1](#_E1_CRM_Entity) CRM Entity. [P1](#_P1_is_identified) is identified by (identifies): [E41](#_E41_Appellation) Appellation

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

Scope note: This property describes the E35 Title applied to an instance of E71 Man-Made Thing. The E55 Type of Title is assigned in a sub property.

The *P102.1* *has type* property of the *P102* *has title (is title of)* property enables the relationship between the Title and the thing 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)

In First Order Logic:

 P102(x,y) ⊃ E71(x)

 P102(x,y) ⊃ E35(y)

 P102(x,y,z) ⊃ [P102(x,y) ∧ E55(z)]

 P102(x,y) ⊃ P1(x,y)

Properties: P102.1 has type: [E55](#_E55_Type) Type

### P103 was intended for (was intention of)

Domain: [E71](#_E71_Man-Made_Thing) Man-Made Thing

Range: [E55](#_E55_Type) Type

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

Scope note: This property links an instance of E71 Man-Made Thing to an E55 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 (was made for).*

Examples:

* this plate (E22) *was intended for* being destroyed at wedding reception (E55)

In First Order Logic:

 P103(x,y) ⊃ E71(x)

 P103(x,y) ⊃ E55(y)

### P104 is subject to (applies to)

Domain: [E72](#_E72_Legal_Object) Legal Object

Range: [E30](#_E30_Right) Right

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

Scope note: This property links a particular E72 Legal Object to the instances of E30 Right to which it is subject.

The Right is held by an E39 Actor as described by *P75* *possesses (is possessed by)*.

Examples:

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

In First Order Logic:

 P104(x,y) ⊃ E72(x)

 P104(x,y) ⊃ E30(y)

### P105 right held by (has right on)

Domain: [E72](#_E72_Legal_Object) Legal Object

Range: [E39](#_E39_Actor) Actor

Superproperty of: [E18](#_E18_Physical_Thing) Physical Thing .[P52](#_P52_has_current_owner (is current o) has current owner (is current owner of): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the E39 Actor who holds the instances of E30 Right to an E72 Legal Object.

 It is a superproperty of *P52 has current owner (is current owner of)* because ownership is a right that is held on the owned object.

*P105 right held by (has right on)* is a shortcut of the fully developed path E72 Legal Object,*P104 is subject to*, E30 Right, *P75i is possessed by,* E39 Actor.

Examples:

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

In First Order Logic:

 P105(x,y) ⊃ E72(x)

 P105(x,y) ⊃ E39(y)

### P106 is composed of (forms part of)

Domain: [E90](#_E90_Symbolic_Object) Symbolic Object

Range: [E90](#_E90_Symbolic_Object) Symbolic Object

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

Scope note: This property associates an instance of E90 Symbolic Object with a part of it that is by itself an instance of E90 Symbolic Object, such as fragments of texts or clippings from an image.

This property is transitive.

Examples:

* This Scope note P106 (E33) is composed of fragments of texts (E33)
* ‘recognizable’ P106 (E90) is composed of ‘ecognizabl’ (E90)

In First Order Logic:

 P106(x,y) ⊃ E90(x)

 P106(x,y) ⊃ E90(y)

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

Domain: [E74](#_E74_Group) Group

Range: [E39](#_E39_Actor) Actor

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

Scope note: This property relates an E39 Actor to the E74 Group of which that E39 Actor is a member.

Groups, Legal Bodies and Persons, may all be members of Groups. A Group necessarily consists of more than one member.

This property is a shortcut of the more fully developed path *E74 Group , P144i gained member by, E85 Joining, P143 joined , E39 Actor*

The property P107.1 *kind of member* can be used to specify the type of membership or the role the member has in the group.

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)
* The married couple Queen Elisabeth and Prince Phillip (E74) *has current or former member* Prince Phillip (E21) with P107.1 *kind of member* husband (E55 Type)

In First Order Logic:

 P107(x,y) ⊃ E74(x)

 P107(x,y) ⊃ E39(y)

 P107(x,y,z) ⊃ [P107(x,y) ∧ E55(z)]

Properties: P107.1 *kind of member*: [E55](#_E55_Type) Type

### P108 has produced (was produced by)

Domain: [E12](#_E12_Production) Production

Range: [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

Subproperty of: [E11](#_E11_Modification) Modification. [P31](#_P31_has_modified_(was modified by)) has modified (was modified by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

[E63](#_E63_Beginning_of_Existence) Beginning of Existence. [P92](#_P92_brought_into_existence (was bro) brought into existence (was brought into existence by): [E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property identifies the E24 Physical Man-Made Thing that came into existence as a result of an E12 Production.

The identity of an instance of E24 Physical Man-Made Thing is not defined by its matter, but by its existence as a subject of documentation. An E12 Production can result in the creation of multiple instances of E24 Physical Man-Made Thing.

Examples:

* The building of Rome (E12) *has* *produced* Τhe Colosseum (E22)

In First Order Logic:

 P108(x,y) ⊃ E12(x)

 P108(x,y) ⊃ E24(y)

 P108(x,y) ⊃ P31(x,y)

 P108(x,y) ⊃ P92(x,y)

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

Domain: [E78](#_E78_Collection) Collection

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E18](#_E18_Physical_Thing) Physical Thing.[P49](#_P49_has_former) has former or current keeper (is former or current keeper of): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the E39 Actor or Actors who assume or have assumed overall curatorial responsibility for an E78 Collection.

It does not allow a history of curation to be recorded. This would require use of an Event initiating a curator being responsible for a Collection.

Examples:

* the Robert Opie Collection (E78) *has current or former curator* Robert Opie (E39)
* the Mikael Heggelund Foslie’s coralline red algae Herbarium (E78) *has current or former curator* Mikael Heggelund Foslie

In First Order Logic:

 P109(x,y) ⊃ E78(x)

 P109(x,y) ⊃ E39(y)

 P109(x,y) ⊃ P49(x,y)

### P110 augmented (was augmented by)

Domain: [E79](#_E79_Part_Addition) Part Addition

Range: [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

Subproperty of: [E11](#_E11_Modification) Modification. [P31](#_P31_has_modified_(was modified by)) has modified (was modified by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

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

Scope note: This property identifies the E24 Physical Man-Made Thing that is added to (augmented) in an E79 Part Addition.

Although a Part Addition event normally concerns only one item of Physical Man-Made Thing, 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)

In First Order Logic:

 P110(x,y) ⊃ E79(x)

 P110(x,y) ⊃ E24(y)

 P110(x,y) ⊃ P31(x,y)

### P111 added (was added by)

Domain: [E79](#_E79_Part_Addition) Part Addition

Range: [E18](#_E18_Physical_Thing) Physical Thing

Subproperty of: [E5](#_E5_Event) Event. [P12](#_P12_occurred_in) occurred in the presence of (was present at):[E77](#_E77_Persistent_Item) Persistent Item

 [E7](#_E7_Activity) Activity.[P16](#_P16_used_specific_object (was used ) used specific object (was used for):[E70](#_E70_Thing) Thing

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

Scope note: This property identifies the E18 Physical Thing that is added during an E79 Part Addition activity

Examples:

* the insertion of the final nail (E79) *added* the last nail in George VI’s coffin (E18)

In First Order Logic:

 P111(x,y) ⊃ E79(x)

 P111(x,y) ⊃ E18(y)

 P111(x,y) ⊃ P12(x,y)

 P111(x,y) ⊃ P16(x,y)

### P112 diminished (was diminished by)

Domain: [E80](#_E80_Part_Removal) Part Removal

Range: [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

Subproperty of: [E11](#_E11_Modification) Modification. [P31](#_P31_has_modified_(was modified by)) has modified (was modified by): [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing

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

Scope note: This property identifies the E24 Physical Man-Made Thing that was diminished by E80 Part Removal.

Although a Part removal activity normally concerns only one item of Physical Man-Made Thing, 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)

In First Order Logic:

 P112(x,y) ⊃ E80(x)

 P112(x,y) ⊃ E24(y)

 P112(x,y) ⊃ P31(x,y)

### P113 removed (was removed by)

Domain: [E80](#_E80_Part_Removal) Part Removal

Range: [E18](#_E18_Physical_Thing) Physical Thing

Subproperty of: [E5](#_E5_Event) Event. [P12](#_P12_occurred_in) occurred in the presence of (was present at):[E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property identifies the E18 Physical Thing that is removed during an E80 Part Removal activity.

Examples:

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

In First Order Logic:

 P113(x,y) ⊃ E80(x)

 P113(x,y) ⊃ E18(y)

 P113(x,y) ⊃ P12(x,y)

### P114 is equal in time to

Domain: [E2](#_E2_Temporal_Entity) Temporal Entity

Range: [E2](#_E2_Temporal_Entity) Temporal Entity

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

Scope note: This symmetric property allows the instances of E2 Temporal Entity with the same E52 Time-Span to be equated.

This property 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 (Allen, 1983, pp. 832-843).

This property is transitive.

Examples:

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

In First Order Logic:

 P114(x,y) ⊃ E2(x)

 P114(x,y) ⊃ E2(y)

 P114(x,y) ⊃ P114(y,x)

### P115 finishes (is finished by)

Domain: [E2](#_E2_Temporal_Entity) Temporal Entity

Range: [E2](#_E2_Temporal_Entity) Temporal Entity

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

Scope note: This property identifies a situation in which the ending point of an instance of E2 Temporal Entity is equal to the ending point of another temporal entity of longer duration. There is no causal relationship implied by this property.

This property is only necessary if the time span is unknown (otherwise the relationship can be calculated). This property is the same as the "finishes / finished-by" relationships of Allen’s temporal logic (Allen, 1983, pp. 832-843).

This property is transitive.

Examples:

* Late Bronze Age (E4) *finishes* Bronze Age (E4)

In First Order Logic:

 P115(x,y) ⊃ E2(x)

 P115(x,y) ⊃ E2(y)

### P116 starts (is started by)

Domain: [E2](#_E2_Temporal_Entity) Temporal Entity

Range: [E2](#_E2_Temporal_Entity) Temporal Entity

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

Scope note: This property allows the starting point for a E2 Temporal Entity to be situated by reference to the starting point of another temporal entity of longer duration.

This property is only necessary if the time span is unknown (otherwise the relationship can be calculated). This property is the same as the "starts / started-by" relationships of Allen’s temporal logic (Allen, 1983, pp. 832-843).

This property is transitive.

Examples:

Early Bronze Age (E4) *starts* Bronze Age (E4)

In First Order Logic:

 P116(x,y) ⊃ E2(x)

 P116(x,y) ⊃ E2(y)

### P117 occurs during (includes)

Domain: [E2](#_E2_Temporal_Entity) Temporal Entity

Range: [E2](#_E2_Temporal_Entity) Temporal Entity

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

Scope note: This property allows the entire E52 Time-Span of an E2 Temporal Entity to be situated within the Time-Span of another temporal entity that starts before and ends after the included temporal entity.

This property is only necessary if the time span is unknown (otherwise the relationship can be calculated). This property is the same as the "during / includes" relationships of Allen’s temporal logic (Allen, 1983, pp. 832-843).

This property is transitive.

Examples:

* Middle Saxon period (E4) *occurs during* Saxon period (E4)

In First Order Logic:

 P117(x,y) ⊃ E2(x)

 P117(x,y) ⊃ E2(y)

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

Domain: [E2](#_E2_Temporal_Entity) Temporal Entity

Range: [E2](#_E2_Temporal_Entity) Temporal Entity

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

Scope note: This property identifies an overlap between the instances of E52 Time-Span of two instances of E2 Temporal Entity.

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).

This property is the same as the "overlaps / overlapped-by" relationships of Allen’s temporal logic (Allen, 1983, pp. 832-843).

Examples:

* the Iron Age (E4) *overlaps in time with* the Roman period (E4)

In First Order Logic:

 P118(x,y) ⊃ E2(x)

 P118(x,y) ⊃ E2(y)

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

Domain: [E2](#_E2_Temporal_Entity) Temporal Entity

Range: [E2](#_E2_Temporal_Entity) Temporal Entity

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

Scope note: This property indicates that one E2 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).

This property is the same as the "meets / met-by" relationships of Allen’s temporal logic (Allen, 1983, pp. 832-843).

Examples:

* Early Saxon Period (E4) *meets in time with* Middle Saxon Period (E4)

In First Order Logic:

 P119(x,y) ⊃ E2(x)

 P119(x,y) ⊃ E2(y)

### P120 occurs before (occurs after)

Domain: [E2](#_E2_Temporal_Entity) Temporal Entity

Range: [E2](#_E2_Temporal_Entity) 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).

This property is the same as the "before / after" relationships of Allen’s temporal logic (Allen, 1983, pp. 832-843).

This property is transitive.

Examples:

* Early Bronze Age (E4) *occurs before* Late Bronze age (E4)

In First Order Logic:

 P120(x,y) ⊃ E2(x)

 P120(x,y) ⊃ E2(y)

### P121 overlaps with

Domain: [E53](#_E53_Place) Place

Range: [E53](#_E53_Place) Place

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

Scope note: This symmetric property allows the instances of E53 Place 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)
* **The maximal extent of the Greek Kingdom (E53) *overlaps with* the maximal extent of the Ottoman Empire(E53)**

In First Order Logic:

 P121(x,y) ⊃ E53(x)

 P121(x,y) ⊃ E53(y)

 P121(x,y) ⊃ P121(y,x)

### P122 borders with

Domain: [E53](#_E53_Place) Place

Range: [E53](#_E53_Place) Place

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

Scope note: This symmetric property allows the instances of E53 Place 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)

In First Order Logic:

 P122(x,y) ⊃ E53(x)

 P122(x,y) ⊃ E53(y)

 P122(x,y) ⊃ P122(y,x)

### P123 resulted in (resulted from)

Domain: [E81](#_E81_Transformation) Transformation

Range: [E77](#_E77_Persistent_Item) Persistent Item

Subproperty of: [E63](#_E63_Beginning_of_Existence) Beginning of Existence. [P92](#_P92_brought_into) brought into existence (was brought into existence by): [E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property identifies the E77 Persistent Item or items that are the result of an E81 Transformation.

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.

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 Tut-Ankh-Amun (E22 and E20)

In First Order Logic:

 P123(x,y) ⊃ E81(x)

 P123(x,y) ⊃ E77(y)

 P123(x,y) ⊃ P92(x,y)

### P124 transformed (was transformed by)

Domain: [E81](#_E81_Transformation) Transformation

Range: [E77](#_E77_Persistent_Item) Persistent Item

Subproperty of: [E64](#_E64_End_of) End of Existence. [P93](#_P93_took_out) took out of existence (was taken out of existence by): [E77](#_E77_Persistent_Item) Persistent Item

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

Scope note: This property identifies the E77 Persistent Item or items that cease to exist due to a E81 Transformation.

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 Pharao Tut-Ankh-Amun (E21)

In First Order Logic:

 P124(x,y) ⊃ E81(x)

 P124(x,y) ⊃ E77(y)

 P124(x,y) ⊃ P93(x,y)

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

Domain: [E7](#_E7_Activity) Activity

Range: [E55](#_E55_Type) Type

Superproperty of: [E7](#_E7_Activity) Activity.[P32](#_P32_used_general_technique (was tec) used general technique (was technique of): [E55](#_E55_Type) Type

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

Scope note: This property defines the kind of objects used in an E7 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)

In First Order Logic:

 P125(x,y) ⊃ E7(x)

 P125(x,y) ⊃ E55(y)

### P126 employed (was employed in)

Domain: [E11](#_E11_Modification) Modification

Range: [E57](#_E57_Material) Material

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

Scope note: This property identifies E57 Material employed in an E11 Modification.

The E57 Material used during the E11 Modification does not necessarily become incorporated into the E24 Physical Man-Made Thing that forms the subject of the E11 Modification.

Examples:

* the repairing of the Queen Mary (E11) *employed* Steel (E57)
* distilled water (E57) *was employed in* the restoration of the Sistine Chapel (E11)

In First Order Logic:

 P126(x,y) ⊃ E11(x)

 P126(x,y) ⊃ E57(y)

### P127 has broader term (has narrower term)

Domain: [E55](#_E55_Type) Type

Range: [E55](#_E55_Type) Type

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

Scope note: This property identifies a super-Type to which an E55 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

This property is transitive.

Examples:

* dime (E55) *has broader term* coin (E55)

In First Order Logic:

 P127(x,y) ⊃ E55(x)

 P127(x,y) ⊃ E55(y)

### P128 carries (is carried by)

Domain: [E18](#_E24_Physical_Man-Made_Thing) Physical Thing

Range: [E90](#_E90_Symbolic_Object) Symbolic Object

Subproperty of: [E70](#_E70_Thing) Thing.[P130](#_P130_shows_features) shows features of (features are also found on):[E70](#_E70_Thing) Thing

Superproperty of: [E24](#_E24_Physical_Man-Made_Thing) Physical Man-Made Thing. [P65](#_P65_shows_visual_item (is shown by)) shows visual item (is shown by): [E36](#_E36_Visual_Item) Visual Item

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

Scope note: This property identifies an E90 Symbolic Object carried by an instance of E18 Physical Thing.

Examples:

* Matthew’s paperback copy of Reach for the Sky (E84) *carries* the text of Reach for the Sky (E73)

In First Order Logic:

 P128(x,y) ⊃ E18(x)

 P128(x,y) ⊃ E90(y)

 P128(x,y) ⊃ P130(x,y)

### P129 is about (is subject of)

Domain: [E89](#_E89_Propositional_Object) Propositional Object

Range: [E1](#_E1_CRM_Entity) CRM Entity

Subproperty: [E89](#_E89_Propositional_Object) Propositional Object. [P67](#_P67_refers_to_(is referred to by)) refers to (is referred to by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property documents that an E89 Propositional Object has as subject an instance of E1 CRM Entity.

This differs from P67 refers to (is referred to by), which refers to an E1 CRM Entity, in that it describes the primary subject or subjects of an E89 Propositional Object.

Examples:

* The text entitled ‘Reach for the sky’ (E33*) is about* Douglas Bader (E21)

In First Order Logic:

 P129(x,y) ⊃ E89(x)

 P129(x,y) ⊃ E1(y)

 P129(x,y) ⊃ P67(x,y)

### P130 shows features of (features are also found on)

Domain: [E70](#_E70_Thing) Thing

Range: [E70](#_E70_Thing) Thing

Superproperty of: [E33](#_E33_Linguistic_Object) Linguistic Object. [P73](#_P73_has_translation_(is translation)i has translation (is translation of): [E33](#_E33_Linguistic_Object) Linguistic Object

 [E18](#_E18_Physical_Thing) Physical Thing. [P128](#_P128_carries_(is) carries (is carried by): [E90](#_E90_Symbolic_Object) Symbolic Object

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

Scope note: This property generalises the notions of "copy of" and "similar to" into a directed relationship, where the domain expresses the derivative or influenced item and the range the source or influencing item, if such a direction can be established. The property can also be used to express similarity in cases that can be stated between two objects only, without historical knowledge about its reasons. The property expresses a symmetric relationship in case no direction of influence can be established either from evidence on the item itself or from historical knowledge. This holds in particular for siblings of a derivation process from a common source or non-causal cultural parallels, such as some weaving patterns.

The *P130.1* *kind of similarity* property of the *P130 shows features of (features are also found on)* property enables the relationship between the domain and the range to be further clarified, in the sense from domain to range, if applicable. For example, it may be expressed if both items are product “of the same mould”, or if two texts “contain identical paragraphs”.

If the reason for similarity is a sort of derivation process, i.e., that the creator has used or had in mind the form of a particular thing during the creation or production, this process should be explicitly modelled. In these cases, *P130 shows features of* can be regarded as a shortcut of such a process. However, the current model does not contain any path specific enough to infer this property. Specializations of the CIDOC CRM may however be more explicit, for instance describing the use of moulds etc.

In First Order Logic:

 P130 (x,y) ⊃ E70(x)

 P130 (x,y) ⊃ E70(y)

 P130(x,y,z) ⊃ [P130(x,y) ∧ E55(z)]

 P130(x,y) ⊃ P130(y,x)

Properties: P130.1 kind of similarity: [E55](#_E55_Type) Type

### P131 is identified by (identifies)

Domain: [E39](#_E39_Actor) Actor

Range: [E82](#_E82_Actor_Appellation) Actor Appellation

Subproperty of: [E1](#_E1_CRM_Entity) CRM Entity. [P1](#_P1_is_identified) is identified by (identifies): [E41](#_E41_Appellation) Appellation

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

Scope note: This property identifies a name used specifically to identify an E39 Actor.

This property is a specialisation of *P1 is identified by (identifies)* is identified by.

Examples:

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

In First Order Logic:

 P131(x,y) ⊃ E39(x)

 P131(x,y) ⊃ E82(y)

 P131(x,y) ⊃ P1(x,y)

### P132 spatiotemporally overlaps with

Domain: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

Range: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

Superproperty of: [E18](#_E18_Physical_Thing) Physical Thing. [P46](#_P46_is_composed) is composed of (forms part of): [E18](#_E18_Physical_Thing) Physical Thing

[E4](#_E4_Period) Period.[P9](#_P9_consists_of_(forms_part_of)) consists of (forms part of): [E4](#_E4_Period) Period

[E92](#_E91_Co-Reference_Assignment) Spacetime Volume.P10 falls within (contains): [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

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

Scope note: This symmetric property associates two instances of E92 Spacetime Volume that have some of their extent in common.

Examples:

* the “Urnfield” period (E4*) spatiotemporally overlaps with* the “Hallstatt” period (E4)
* Yale Peabody Collection of Artefacts(E78) *spatiotemporally overlaps with* Cuzco Museum(E27) [after repatriation]
* Catedral de Nuestra Señora de la Asunción (E92) *spatiotemporally overlaps with* Great Mosque of Córdoba (E92)
* The facade of the Roman temple acquired by Hearst (E92) *spatiotemporally overlaps with* the Hearst Neptune Pool (E92)

In First Order Logic:

 P132(x,y) ⊃ E92(x)

 P132(x,y) ⊃ E92(y)

 P132(x,y) ⊃ P132(y,x)

 P132(x,y) ⊃ ¬P133(x,y)

### P133 is spatiotemporally separated from

Domain: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

Range: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

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

Scope note: This symmetric property associates two instances of E92 Spacetime Volume that have no extent in common.

Examples:

* the “Hallstatt” period (E4) *is spatiotemporally separated from* the “La Tène” era (E4)
* Parthenon Marbles (E22) *is spatiotemporally separated from* Acropolis Museum (E27) [through expropriation]
* Kingdom of Greece (1831-1924) (E92) *is spatiotemporally separated from* Ottoman Empire (1299-1922) (E92)
* The path of the army of Alexander (335-323 B.C.) (E92) *is spatiotemporally separated from* the Mauryan Empire (E92)

In First Order Logic:

 P133(x,y) ⊃ E92(x)

 P133(x,y) ⊃ E92(y)

 P133(x,y) ⊃ P133(y,x)

 P133(x,y) ⊃ ¬P132(x,y)

### P134 continued (was continued by)

Domain: [E7](#_E7_Activity) Activity

Range: [E7](#_E7_Activity) Activity

Subproperty of: [E7](#_E7_Activity) Activity. [P15](#_P15_was_influenced_by (influenced)) was influenced by (influenced): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property associates two instances of E7 Activity, where the domain is considered as an intentional continuation of the range. A continuation of an activity may happen when the continued activity is still ongoing or after the continued activity has completely ended. The continuing activity may have started already before it decided to continue the other one. Continuation implies a coherence of intentions and outcomes of the involved activities.

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)

In First Order Logic:

 P134(x,y) ⊃ E7(x)

 P134(x,y)⊃ E7(y)

 P134(x,y) ⊃ P15(x,y)

### P135 created type (was created by)

Domain: [E83](#_E83_Type_Creation) Type Creation

Range: [E55](#_E55_Type) Type

Subproperty: [E65](#_E65_Creation) Creation. [P94](#_P94_has_created_(was created by)) has created (was created by): [E28](#_E28_Conceptual_Object) Conceptual Object

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

Scope note: This property identifies the E55 Type, which is created in an E83Type Creation activity.

Examples:

* The description of a new ribbon worm species by Bürger (E83) *created type* ‘*Lineus coxinus* (Bürger, 1892)’ (E55)

In First Order Logic:

 P135(x,y) ⊃ E83(x)

 P135(x,y) ⊃ E55(y)

 P135(x,y) ⊃ P94(x,y)

### P136 was based on (supported type creation)

Domain: [E83](#_E83_Type_Creation) Type Creation

Range: [E1](#_E1_CRM_Entity) CRM Entity

Subproperty of: [E7](#_E7_Activity) Activity. [P15](#_P15_was_influenced_by (influenced)) was influenced by (influenced): [E1](#_E1_CRM_Entity) 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 E55 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 the plant species ‘*Serratula glauca* Linné, 1753.’ (E83) *was based on* Object BM000576251 of the Clayton Herbarium (E20) *in the taxonomic role* original element (E55)

In First Order Logic:

 P136(x,y) ⊃ E83(x)

 P136(x,y) ⊃ E1(y)

 P136(x,y,z) ⊃ [P136(x,y) ∧ E55(z)]

 P136(x,y) ⊃ P15(x,y)

Properties: P136.1 in the taxonomic role: [E55](#_E55_Type) Type

### P137 exemplifies (is exemplified by)

Domain: [E1](#_E1_CRM_Entity) CRM Entity

Range: [E55](#_E55_Type) Type

Subproperty of: [E1](#_E1_CRM_Entity) CRM Entity. [P2](#_P2_has_type) has type (is type of):[E55](#_E55_Type) Type

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

Scope note: This property allows an item to be declared as a particular example of an E55 Type or taxon

 The *P137.1 in the taxonomic role* property of *P137 exemplifies (is exemplified by)* allows differentiation of taxonomic roles. 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 (E83) itself, but selected in a later phase.

Examples:

* Object BM000098044 of the Clayton Herbarium (E20) *exemplifies Spigelia marilandica* (L.) L. (E55) *in the taxonomic role* lectotype

In First Order Logic:

 P137(x,y) ⊃ E1(x)

 P137(x,y) ⊃ E55(y)

 P137(x,y,z) ⊃ [P137(x,y) ∧ E55(z)]

 P137(x,y) ⊃ P2(x,y)

Properties: P137.1 in the taxonomic role: [E55](#_E55_Type) Type

### P138 represents (has representation)

Domain: [E36](#_E36_Visual_Item) Visual Item

Range: [E1](#_E1_CRM_Entity) CRM Entity

Subproperty of: [E89](#_E73_Information_Object) Propositional Object. [P67](#_P67_refers_to_(is referred to by)) refers to (is referred to by): [E1](#_E1_CRM_Entity) CRM Entity

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

Scope note: This property establishes the relationship between an E36 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 Thing through *P65 shows visual item (is shown by),* E36 Visual Item, *P138 represents (has representation)* to E1 CRM Entity, which is shortcut by *P62depicts (is depicted by)*. P138.1 mode of representation allows the nature of the representation to be refined.

This property is also used for the relationship between an original and a digitisation of the original by the use of techniques such as digital photography, flatbed or infrared scanning. Digitisation is here seen as a process with a mechanical, causal component rendering the spatial distribution of structural and optical properties of the original and does not necessarily include any visual similarity identifiable by human observation."

Properties: P138.1 mode of representation: [E55](#_E55_Type) Type

Examples:

* the digital file found at <http://www.emunch.no/N/full/No-MM_N0001-01.jpg> (E36) represents page 1 of Edward Munch's manuscript MM N 1, Munch-museet (E73) mode of representation Digitisation(E55)
* The 3D model VAM\_A.200-1946\_trace\_1M.ply (E73) represents Victoria & Albert Museum’s Madonna and child sculpture (visual work) A.200-1946 (E22) mode of representation 3D surface (E55)

In First Order Logic:

 P138(x,y) ⊃ E36(x)

 P138(x,y) ⊃ E1(y)

 P138(x,y,z) ⊃ [P138(x,y) ∧ E55(z)]

 P138(x,y) ⊃ P67(x,y)

### P139 has alternative form

Domain: [E41](#_E41_Appellation) Appellation

Range: [E41](#_E41_Appellation) Appellation

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

Scope note: This property establishes a relationship of equivalence between two instances of E41 Appellation independent from any item identified by them. It is a dynamic asymmetric relationship, where the range expresses the derivative, if such a direction can be established. Otherwise, the relationship is symmetric. The relationship is not transitive.

The equivalence applies to all cases of use of an instance of E41 Appellation. Multiple names assigned to an object, which are not equivalent for all things identified with a specific instance of E41 Appellation, should be modelled as repeated values of *P1 is identified by (identifies)*.

*P139.1 has type* allows the type of derivation, such as “transliteration from Latin 1 to ASCII” be refined..

Examples:

* + "Martin Doerr" (E41) *has alternative form* "Martin Dörr" (E41) *has type* Alternate spelling (E55)
	+ "Гончарова, Наталья Сергеевна" (E41) *has alternative form* "Gončarova, Natal´â Sergeevna" (E41) *has type* ISO 9:1995 transliteration (E55)
	+ “Αθήνα” has alternative form “Athina” has type transcription.

In First Order Logic:

 P139(x,y) ⊃ E41(x)

 P139 (x,y) ⊃ E41(y)

 P139(x,y,z) ⊃ [P139(x,y) ∧ E55(z)]

 P139(x,y) ⊃ P139(y,x)

Properties: P139.1 has type: [E55](#_E55_Type) Type

### P140 assigned attribute to (was attributed by)

Domain: [E13](#_E13_Attribute_Assignment) Attribute Assignment

Range: [E1](#_E1_CRM_Entity) CRM Entity

Superproperty of:[E14](#_E14_Condition_Assessment) Condition Assessment. [P34](#_P34_concerned_(was_assessed by)) concerned (was assessed by): [E18](#_E18_Physical_Thing) Physical Thing

[E16](#_E16_Measurement) Measurement. [P39](#_P39_measured_(was_measured by):) measured (was measured by): [E70](#_P70_documents_(is_documented in)) Thing

[E17](#_E17_Type_Assignment) Type Assignment. [P41](#_P41_classified_(was_classified by)) **classified (was classified by):** [E1](#_E1_CRM_Entity) **CRM Entity**

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

Scope note: This property indicates the item to which an attribute or relation is assigned.

Examples:

* February 1997 Current Ownership Assessment of Martin Doerr’s silver cup (E13) *assigned attribute to* Martin Doerr’s silver cup (E19)
* 01 June 1997 Identifier Assignment of the silver cup donated by Martin Doerr (E15) *assigned attribute to* silver cup 232 (E19)

In First Order Logic:

 P140(x,y) ⊃ E13(x)

 P140(x,y) ⊃ E1(y)

### P141 assigned (was assigned by)

Domain: [E13](#_E13_Attribute_Assignment) Attribute Assignment

Range: [E1](#_E1_CRM_Entity) CRM Entity

Superproperty of:[E14](#_E14_Condition_Assessment) Condition Assessment. [P35](#_P35_has_identified_(was identified ) has identified (identified by): [E3](#_E3_Condition_State) Condition State

 [E15](#_E15_Identifier_Assignment) Identifier Assignment. [P37](#_P37_assigned_(was_assigned by)) assigned (was assigned by): [E42](#_E42_Object_Identifier) Identifier

 [E15](#_E15_Identifier_Assignment) Identifier Assignment. [P38](#_P38_deassigned_(was_deassigned by)) deassigned (was deassigned by): [E42](#_E42_Object_Identifier) Identifier

[E16](#_E16_Measurement) Measurement. [P40](#_P40_observed_dimension_(was observe) observed dimension (was observed in): [E54](#_E54_Dimension) Dimension

 [E17](#_E17_Type_Assignment) Type Assignment. [P42](#_P42_assigned_(was_assigned by)) **assigned (was assigned by):** [E55](#_E55_Type) **Type**

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

Scope note: This property indicates the attribute that was assigned or the item that was related to the item denoted by a property P140 assigned attribute to in an Attribute assignment action.

Examples:

* February 1997 Current Ownership Assessment of Martin Doerr’s silver cup (E13) *assigned* Martin Doerr (E21)
* 01 June 1997 Identifier Assignment of the silver cup donated by Martin Doerr (E15) *assigned* object identifier 232

In First Order Logic:

 P141(x,y) ⊃ E13(x)

 P141(x,y) ⊃ E1(y)

### P142 used constituent (was used in)

Domain: [E15](#_E15_Identifier_Assignment) Identifier Assignment

Range: [E90](#_E90_Symbolic_Object) Symbolic Object

Subproperty of: [E7](#_E7_Activity) Activity. [P16](#_P16_used_specific) used specific object (was used for): [E70](#_E70_Thing) Thing

Quantification: (0:n,0:n)

Scope note: This property associates the event of assigning an instance of E42 Identifier with the instances of E90 Symbolic Object that were used as constituents of the identifier.

Examples:

* On June 1, 2001 assigning the personal name identifier “Guillaume, de Machaut, ca. 1300-1377” (E15) *used constituent* “ca. 1300-1377” (E49)
* Assigning a uniform title to the anonymous textual work known as ‘The Adoration of the Shepherds’(E15) *used constituent* ‘Coventry’ (E48)
* Assigning a uniform title to Pina Bausch’s choreographic work entitled ‘Rite of spring’ (E15) *used constituent* ‘(Choreographic Work: Bausch)’(E90)
* Assigning a uniform title to the motion picture directed in 1933 by Merian C. Cooper and Ernest B. Schoedsack and entitled ‘King Kong’ (E15) *used constituent* ‘1933’ (E50)
* Assigning the corporate name identifier ‘Univerza v Ljubljani. Oddelek za bibliotekarstvo’ to The Department for library science of the University of Ljubljana (E15) *used constituent* ‘Univerza v Ljubljani’ (E42)

In First Order Logic:

 P142(x,y) ⊃ E15(x)

 P142(x,y) ⊃ E90(y)

 P142(x,y) ⊃ P16(x,y)

### P143 joined (was joined by)

Domain: [E85](#_E85_Joining) Joining

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E5](#_E5_Event) Event. [P11](#_P11_had_participant_(participated i) had participant (participated in): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the instance of E39 Actor that becomes member of a E74 Group in an E85 Joining.

 Joining events allow for describing people becoming members of a group with the more detailed path E74 Group, *P144i gained member by*, E85 Joining, *P143 joined ,* E39 Actor, compared to the shortcut offered by *P107 has current or former member (is current or former member of).*

Examples:

* The election of Sir Isaac Newton as Member of Parliament to the Convention Parliament of 1689 (E85) *joined* Sir Isaac Newton (E21)
* The inauguration of Mikhail Sergeyevich Gorbachev as leader of the Union of Soviet Socialist Republics (USSR) in 1985 (E85) *joined* Mikhail Sergeyevich Gorbachev (E21)
* The implementation of the membership treaty January 1. 1973 between EU and Denmark (E85) joined Denmark (E40)

In First Order Logic:

 P143(x,y) ⊃ E85(x)

 P143(x,y) ⊃ E39(y)

 P143(x,y) ⊃ P11(x,y)

### P144 joined with (gained member by)

Domain: [E85](#_E85_Joining) Joining

Range: [E74](#_E74_Group) Group

Subproperty of: [E5](#_E5_Event) Event. [P11](#_P11_had_participant_(participated i) had participant (participated in): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the instance of E74 Group of which an instance of E39 Actor becomes a member through an instance of E85 Joining.

Although a Joining activity normally concerns only one instance of E74 Group, it is possible to imagine circumstances under which becoming member of one Group implies becoming member of another Group as well.

Joining events allow for describing people becoming members of a group with a more detailed path from E74 Group through, P144i gained member by, E85 Joining, P143 joined , E39 Actor, compared to the shortcut offered by P107 has current or former member (is current or former member of).

The property P144.1 *kind of member* can be used to specify the type of membership or the role the member has in the group.

Examples:

* The election of Sir Isaac Newton as Member of Parliament to the Convention Parliament of 1689 ([E85](#_E85_Joining)) *joined with* the Convention Parliament (E40)
* The inauguration of Mikhail Sergeyevich Gorbachev as Leader of the Union of Soviet Socialist Republics (USSR) in 1985 (E85) *joined with* the office of Leader of the Union of Soviet Socialist Republics (USSR) (E40) with *P144.1 kind of member* President (E55)
* The implementation of the membership treaty January 1. 1973 between EU and Denmark (E85) *joined with* EU (E40)

In First Order Logic:

 P144(x,y) ⊃ E85(x)

 P144(x,y)⊃ E74(y)

 P144(x,y,z) ⊃ [P144(x,y) ∧ E55(z)]

 P144(x,y) ⊃ P11(x,y)

Properties: P144.1 *kind of member*: [E55](#_E55_Type) Type

### P145 separated (left by)

Domain: [E86](#_E86_Leaving) Leaving

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E5](#_E5_Event) Event. [P11](#_P11_had_participant_(participated i) had participant (participated in): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the instance of E39 Actor that leaves an instance of E74 Group through an instance of E86 Leaving.

Examples:

* The end of Sir Isaac Newton’s duty as Member of Parliament for the University of Cambridge to the Convention Parliament in 1702 *separated* Sir Isaac Newton
* George Washington’s leaving office in 1797 *separated* George Washington
* The implementation of the treaty regulating the termination of Greenland membership in EU between EU, Denmark and Greenland February 1. 1985 (E86) *separated* Greenland (E40)

In First Order Logic:

 P145(x,y) ⊃ E86(x)

 P145(x,y) ⊃ E39(y)

 P145(x,y) ⊃ P11(x,y)

### P146 separated from (lost member by)

Domain: [E86](#_E86_Leaving) Leaving

Range: [E74](#_E74_Group) Group

Subproperty of: [E5](#_E5_Event) Event. [P11](#_P11_had_participant_(participated i) had participant (participated in): [E39](#_E39_Actor) Actor

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

Scope note: This property identifies the instance of E74 Group an instance of E39 Actor leaves through an instance of E86 Leaving.

Although a Leaving activity normally concerns only one instance of E74 Group, it is possible to imagine circumstances under which leaving one E74 Group implies leaving another E74 Group as well.

Examples:

* The end of Sir Isaac Newton’s duty as Member of Parliament for the University of Cambridge to the Convention Parliament in 1702 *separated from* the Convention Parliament
* George Washington’s leaving office in 1797 *separated from* the office of President of the United States
* The implementation of the treaty regulating the termination of Greenland membership in EU between EU, Denmark and Greenland February 1. 1985 *separated from* EU (E40)

In First Order Logic:

 P146(x,y) ⊃ E86(x)

 P146(x,y) ⊃ E74(y)

 P146(x,y) ⊃ P11(x,y)

### P147 curated (was curated by)

Domain: [E87](#_E87___ Curation Activity) Curation Activity

Range: [E78](#_E78_Collection) Collection

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

Scope note: This property associates an instance of E87 Curation Activity with the instance of E78 Collection or collections with that is subject of that curation activity following some implicit or explicit curation plan.

Examples:

* The activities (E87) by the Benaki Museum *curated* the acquisition of dolls and games of urban and folk manufacture dating from the 17th to the 20th century, from England, France and Germany for the “Toys, Games and Childhood Collection (E78) of the Museum
* The activities (E87) **of the** Historical Museum of Crete, Heraklion, Crete, *curated* the development of the permanent **Numismatic Collection** **(E78)**
* **The activities (E87) by Mikael Heggelund Foslie *curated*** the Mikael Heggelund Foslie’s coralline red algae Herbarium

In First Order Logic:

 P147(x,y) ⊃ E87(x)

 P147(x,y) ⊃ E78(y)

### P148 has component (is component of)

Domain: [E89](#_E89_Propositional_Object) Propositional Object

Range: [E89](#_E89_Propositional_Object) Propositional Object

Quantification: (0:n,0:n)

Scope note: This property associates an instance of E89 Propositional Object with a structural part of it that is by itself an instance of E89 Propositional Object.

This property is transitive

Examples:

Dante’s “Divine Comedy” (E89) *has component* Dante’s “Hell” (E89)

In First Order Logic:

 P148(x,y) ⊃ E89(x)

 P148(x,y) ⊃ E89(y)

### P149 is identified by (identifies)

Domain: [E28](#_E28_Conceptual_Object) Conceptual Object

Range: [E75](#_E75_Conceptual_Object) Conceptual Object Appellation

Subproperty of: [E1](#_E1_CRM_Entity) CRM Entity. [P1](#_P1_is_identified) is identified by (identifies): [E41](#_E41_Appellation) Appellation

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

Scope note: This property identifies an instance of E28 Conceptual Object using an instance of E75 Conceptual Object Appellation.

Examples:

The German edition of the CIDOC CRM (E73) *is identified* *by* ISBN 978-3-00-030907-6 (E75)

In First Order Logic:

 P149(x,y) ⊃ E28(x)

 P149(x,y) ⊃ E75(y)

 P149(x,y) ⊃ P1(x,y)

### P150 defines typical parts of (defines typical wholes for)

Domain: E55 Type

Range: E55 Type

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

Scope note: This property associates an instance of E55 Type “A” with an instance of E55 Type “B”, when items of type “A” typically form part of items of type “B”, such as “car motors” and “cars”. The property is in general not transitive.

It allows types to be organised into hierarchies based on one type describing a typical part of another. This property is equivalent to "broader term partitive (BTP)" as defined in ISO 2788 and “broaderPartitive” in SKOS.

Examples:

Car motors (E55) *defines typical parts of* cars (E55)

In First Order Logic:

 P150(x,y) ⊃ (E55 Type)

 P150(x,y) ⊃ E55(y)

### P151 was formed from (participated in)

Domain: [E66](#_E66_Formation) Formation

Range: [E74](#_E74_Group) Group

Subproperty of: [E5](#_E5_Event) Event. [P11](#_P11_had_participant) had participant (participated in): [E39](#_E39_Actor) Actor

Quantification: (0,n:0:n)

Scope note: This property associates an instance of E66 Formation with an instance of E74 Group from which the new group was formed preserving a sense of continuity such as in mission, membership or tradition.

Examples:

* The formation of the House of Bourbon-Conti in 1581 (E66) *was formed from* House of Condé (E74)

In First Order Logic:

 P151(x,y) ⊃ E66(x)

 P151(x,y) ⊃ E74(y)

 P151(x,y) ⊃ P11(x,y)

### P152 has parent (is parent of)

Domain: [E21](#_E21_Person) Person

Range: [E21](#_E21_Person) Person

Subproperty of:

Quantification: (2,n:0:n)

Scope note: This property associates an instance of E21 Person with another instance of E21 Person who plays the role of the first instance’s parent, regardless of whether the relationship is biological parenthood, assumed or pretended biological parenthood or an equivalent legal status of rights and obligations obtained by a social or legal act. This property is, among others, a shortcut of the fully developed paths from ‘*E21Person’ through ‘P98i was born’, ‘E67 Birth’, ‘P96 by mother’ to ‘E21 Person’,* and from ‘*E21Person’ through ‘P98i was born’, ‘E67 Birth’, ‘P97 from father’ to ‘E21 Person’*.

Examples:

* Gaius Octavius (E29) has parent Julius Caesar (E29)
* Steve Jobs (E29) has parent Joanne Simpson (biological mother)(E29)
* Steve Jobs (E29) has parent Clara Jobs (adoption mother) (E29)​

In First Order Logic:

 P152(x,y) ⊃ E21(x)

 P152(x,y) ⊃ E21(y)

### P156 occupies (is occupied by)

Domain: [E18](#_E18_Physical_Thing) Physical Thing

Range: [E53](#_E53_Place) Place

Subproperty of: [E92](#_E92_Spacetime_Volume) Spacetime Volume. [P161](#_P161_has_spatial) has spatial projection: [E53](#_E53_Place) Place

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

Scope note: This property describes the largest volume in space that an instance of E18 Physical Thing has occupied at any time during its existence, with respect to the reference space relative to itself. This allows you to describe the thing itself as a place that may contain other things, such as a box that may contain coins. In other words, it is the volume that contains all the points which the thing has covered at some time during its existence. In the case of an E26 Physical Feature the default reference space is the one in which the object that bears the feature or at least the surrounding matter of the feature is at rest. In this case there is a 1:1 relation of E26 Feature and E53 Place. For simplicity of implementation multiple inheritance (E26 Feature IsA E53 Place) may be a practical approach.

For instances of E19 Physical Objects the default reference space is the one which is at rest to the object itself, i.e. which moves together with the object. We include in the occupied space the space filled by the matter of the physical thing and all its inner spaces.

This property is a subproperty of P161 has spatial projection because it refers to its own domain as reference space for its range, whereas P161 has spatial projection may refer to a place in terms of any reference space. For some instances of E18 Physical Object the relative stability of form may not be sufficient to define a useful local reference space, for instance for an amoeba. In such cases the fully developed path to an external reference space and using a temporal validity component may be adequate to determine the place they have occupied.

In contrast to P156 occupies, the property P53 has former or current location identifies an instance of E53 Place at which a thing is or has been for some unspecified time span. Further it does not constrain the reference space of the referred instance of P53 Place.

In First Order Logic:

 P156 (x,y) = [E18(x) ∧ E53(y) ∧ P161(x,y) ∧ P157(y,x)]

### P157 is at rest relative to (provides reference space for)

Domain: [E53](#_SP3_Reference_Space) Place

Range: [E18](#_E18_Physical_Thing) Physical Thing

Superproperty of: [E53](#_E53_Place) Place. P59i is located on or within: [E18](#_E18_Physical_Thing) Physical Thing

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

Scope note: This property associates an instance of E53 Place with the instance of E18 Physical Thing that determines a reference space for this instance of E53 Place by being at rest with respect to this reference space. The relative stability of form of an E18 Physical Thing defines its default reference space. The reference space is not spatially limited to the referred thing. For example, a ship determines a reference space in terms of which other ships in its neighbourhood may be described. Larger constellations of matter, such as continental plates, may comprise many physical features that are at rest with them and define the same reference space.

Examples:

* The spatial extent of the municipality of Athens in 2014 (E53) *is at rest relative to* The Royal Observatory in Greenwich (E25)
* The place where Lord Nelson died on H.M.S. Victory (E53) *is at rest relative to* H.M.S. Victory (E22)

In First Order Logic:

 P157(x,y) ⊃ E53(x)

 P157(x,y) ⊃ E18(y)

### P160 has temporal projection (is temporal projection of)

Domain: [E92](#_E92_Spacetime_Volume) Spacetime Volume

Range: [E52](#_E52_Time-Span) Time-Span

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

Scope note: This property describes the temporal projection of an instance of an E92 Spacetime Volume. The property P4 has time-span is the same as P160 has temporal projection if it is used to document an instance of E4 Period or any subclass of it.

Example:

In First Order Logic:

 P160(x,y) ⊃ E92(x)

 P160(x,y)⊃ E52(y)

### P161 has spatial projection (is spatial projection of)

Domain: [E92](#_E92_Spacetime_Volume) Spacetime Volume

Range: [E53](#_E53_Place) Place

Superproperty of: [E18](#_E18_Physical_Thing) Physical Thing. [P156](#_P153_assigned_co-reference) occupies (is occupied by): [E53](#_E53_Place) Place

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

Scope note: This property associates an instance of an E92 Spacetime Volume with an instance of E53 Place that is the result of the spatial projection of the instance of the E92 Spacetime Volume on a reference space.

In general there can be more than one useful reference space (for reference space see *p156 occupies* and *p157 is at rest relative to*) to describe the spatial projection of a spacetime volume, for example, in describing a sea battle, the difference between the battle ship and the seafloor as reference spaces. Thus it can be seen that the projection is not unique.

 The spatial projection is the actual spatial coverage of a spacetime volume, which normally has fuzzy boundaries except Spacetime volumes which are geometrically defined in the same reference system as the range of this property are an exception to this and do not have fuzzy boundaries. Modelling explicitly fuzzy spatial projections serves therefore as a common topological reference of different spatial approximations rather than absolute geometric determination, for instance for relating outer or inner spatial boundaries for the respective spacetime volumes.

 In case the domain of an instance of *P161 has spatial projection* is an instance of E4 Period, the spatial projection describes all areas that period was ever present at, for instance, the Roman Empire. In case the domain of an instance of *P161 has spatial projection* is an instance of E19 Physical Object, the spatial projection has to be understood as the complete path along which the object has or has been moved during its existence.

This property is part of the fully developed path from E4 Period through *P161 has spatial projection*, E53 Place, *P89 falls within (contains)* to E53 Place, which in turn is shortcut by *P7took place at (witnessed.)*

Example:

The Roman Empire *P161 has spatial projection* all areas ever claimed by Rome.

In First Order Logic:

 P161(x,y) ⊃ E92(x), P161(x,y) ⊃ E53(y)

### P164 during (was time-span of)

Domain: [E93](#_E93_Spacetime_Snapshot) Presence

Range: [E52](#_E52_Time-Span) Time-Span

Subproperty of: [E92](#_E92_Spacetime_Volume) Spacetime Volume.[P160](#_P160__has) has temporal projection: [E52](#_E52_Time-Span) Time-Span

Quantification: (1,1 :0,n)

Scope note: This property relates an instance of E93 Presence with the chosen instance of E52 Time-Span that defines the time-slice of the spacetime volume that this instance of E93 Presence is related to by the property *P166 was a presence of (had presence)*.

Examples:

2016-02-09 (E52) *was time-span of* the last day of the 2016 Carnival in Cologne (E93).

In First Order Logic:

 P164 (x,y) ⊃ E93(x)

 P164 (x,y) ⊃ E52(y)

### P165 incorporates (is incorporated in)

Domain: [E73](#_E73_Information_Object) Information Object

Range: [E90](#_E90_Symbolic_Object_1) Symbolic Object

Subproperty of: [E90](#_E90_Symbolic_Object_1) Symbolic Object. [P106](#_P106_is_composed_) is composed of (forms part of): [E90](#_E90_Symbolic_Object_1) Symbolic Object

Quantification: (0,n :0,n)

Scope note: This property associates an instance of E73 Information Object with an instance of E90 Symbolic Object (or any of its subclasses) that was included in it.

This property makes it possible to recognise the autonomous status of the incorporated signs, which were created in a distinct context, and can be incorporated in many distinct self-contained expressions, and to highlight the difference between structural and accidental whole-part relationships between conceptual entities.

It accounts for many cultural facts that are quite frequent and significant: the inclusion of a poem in an anthology, the re-use of an operatic aria in a new opera, the use of a reproduction of a painting for a book cover or a CD booklet, the integration of textual quotations, the presence of lyrics in a song that sets those lyrics to music, the presence of the text of a play in a movie based on that play, etc.

In particular, this property allows for modelling relationships of different levels of symbolic specificity, such as the natural language words making up a particular text, the characters making up the words and punctuation, the choice of fonts and page layout for the characters.

When restricted to information objects, that is, seen as a property with E73 Information Object as domain and range the property is transitive.

A digital photograph of a manuscript page incorporates the text of the manuscript page

Examples:

* The content of Charles-Moïse Briquet’s ‘Les Filigranes: dictionnaire historique des marques du papier’ (E32) P165 incorporates the visual aspect of the watermark used around 1358-61 by some Spanish papermaker(s) and identified as ‘Briquet 4019’ (E37)
* The visual content of Jacopo Amigoni’s painting known as ‘The Singer Farinelli and friends’ (E38) *P165 incorporates* the musical notation of Farinelli’s musical work entitled ‘La Partenza’ (E73)
* The visual content of Nicolas Poussin’s painting entitled ‘Les Bergers d’Arcadie’ (E38) *P165 incorporates* the Latin phrase ‘Et in Arcadia ego’ (E33)

In First Order Logic:

 P165(x,y) ⊃ E73(x)

 P165(x,y) ⊃ E90(y)

 P165(x,y) ⊃ P106(x,y)

### P166 was a presence of (had presence)

Domain: [E93](#_E93_Spacetime_Snapshot) Presence

Range: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

Subproperty of: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume. [P10](#_P10_falls_within_(contains)) falls within (contains): [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

Quantification: (1,1 : 0,n)

Scope note: This property associates an instance of E93 Presence with the instance of E92 Spacetime Volume of which it represents a temporal restriction (i.e.: a time-slice). Instantiating this property constitutes a necessary part of the identity of the respective instance of E93 Presence.

In First Order Logic:

 P166(x,y) ⊃ E93(x),

 P166(x,y) ⊃ E92(y),

 P166(x,y) ⊃ P10(x,y)

### P167 at (was place of)

Domain: [E93](#_E93_Spacetime_Snapshot) Presence

Range: [E53](#_E53_Place) Place

Quantification:

Scope note: This property associates an instance of E93 Presence with an instance of E53 Place that geometrically includes the spatial projection of the respective instance of E93 Presence. Besides others, this property may be used to state in which space an object has been for some known time, such as a room of a castle or in a drawer. It may also be used to describe a confinement of the spatial extent of some realm during a known time-span. It is a shortcut of the more fully developed path from E93 Presence through P161 has spatial projection, E53 Place, P89 falls within (contains) to E53 Place.

In First Order Logic:

 P167(x,y) ⊃ E93(x), P167(x,y) ⊃ E53(y), P167(x,y) ⊃ (∃z)[ E53(z) ∧ P161(x,z) ∧ P89(z,y)]

### P168 place is defined by (defines place)

Domain: [E53](#_E53_Place) Place

Range: [E94](#_E94_Space_Primitive) Space Primitive

Quantification: (0,n:1,1)

Scope note: This property associates an instance of E53 Place with an instance of E94 Space Primitive that defines it. Syntactic variants or use of different scripts may result in multiple instances of E94 Space Primitive defining exactly the same place. Transformations between different reference systems always result in new definitions of places approximating each other and not in alternative definitions.

In First Order Logic:

 P168(x,y) ⊃ E53(x)

 P168(x,y) ⊃ E94(y)

### P169 defines spacetime volume (spacetime volume is defined by)

Domain: [E95](#_E95_Spacetime_Primitive) Spacetime Primitive

Range: [E92](#_E91_Co-Reference_Assignment) Spacetime Volume

Scope note: This property associates an instance of E95 Spacetime Primitive with the instance of E92 Spacetime Volume it defines. {reference to CRMgeo.. check where references need to be made}

### P170 defines time (time is defined by)

Domain: [E61](#_E61_Time_Primitive)Time Primitive

Range: [E52](#_E53_Place) Time Span

Scope note: This property associates an instance of E61 Time Primitive with the instance of [E52](#_E53_Place) Time Span it defines.

### P171 at some place within

Domain: [E53](#_E53_Place) Place

Range: [E94](#_E94_Space_Primitive) Space Primitive

Scope note: This property describes the maximum spatial extent within which an E53 Place falls. Since instances of E53 Places may not have precisely known spatial extents, the CRM supports statements about maximum spatial extents of E53 Places. This property allows an instance of an E53 Places’s maximum spatial extent (i.e. its outer boundary) to be assigned an E94 Space Primitive value.

*P171 at some place within* is a shortcut of P89 falls within , P168, … (to be formulated by George) through a not represented declarative Place as defined in CRMgeo (Doerr and Hiebel 2013) to a Space Primitive.

Space Primitives are treated by the CRM as application or system specific spatial intervals, and are not further analysed. Does not belong to property.

Examples:

* the spatial extent of the Acropolis of Athens (E53) is *at some place within* POLYGON ((37.969172 23.720787, 37.973122 23.721495 37.972741 23.728994, 37.969299 23.729735, 37.969172 23.720787)) (Exx)

### P172 contains

Domain: [E53](#_E53_Place) Place

Range: [E94](#_E94_Space_Primitive) Space Primitive

Scope note: This property describes a minimum spatial extent which is contained within an E53 Place. Since instances of E53 Place may not have precisely known spatial extents, the CRM supports statements about minimum spatial extents of instances of E53 Place. This property allows an instance of E53 Places’s minimum spatial extent (i.e. its inner boundary or a point being within a Place) to be assigned an E94 Space Primitive value.

P172 *contains* is a shortcut through a P89i, P168 (to be formulated george. ).

Examples:

* the spatial extent of the Acropolis of Athens (E53) *contains* POINT (37.971431 23.725947) (E94)

### P173 starts before the end of (ends after the start of)

Domain: E2 Temporal Entity

Range: E2 Temporal Entity

Superproperty of: E7 Activity. P134 continued by (was continued by): E7 Activity

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

Scope note: This property associates instances of E7 Activity, representing the temporal topology implied among the activities’

Time-Span, in order for an intentional continuation relation to hold between them. The domain is continued by the range and therefore the range activity is influenced by the domain one.

The main temporal primitive that fully expresses a continuation in time requires the starting time point of the domain activity to be before the ending time point of the range. Since, discrete endpoints extracted from a continuous spectrum (such as time) carry a level of imprecision, temporal endpoints are by nature vague, in terms of real phenomena. Consequently, adapting the fuzzy temporal interval model, we accept that the temporal endpoints are represented by fuzzy layers, which demarcate the possible time region in which the true endpoint exists. Consequently, the absolute comparative operators that form the temporal primitive is generalized in order to carry a fuzzy interpretation.

The final form of the temporal primitive states that the domain activity must have its starting time point before or at the ending time point of the range. It is worth noting that the inclusion of the the equality operator does not violate the initial temporal condition of continuation in time, since it refers to fuzzy zones overlap.



### P174 starts before (starts after the start of)

Domain: E2 Temporal Entity

Range: E2 Temporal Entity

Subproperty of: E2 Temporal Entity. P173 starts before the end of (ends after the start of): E2 Temporal Entity

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

Scope note: This property allows the starting time point of an E7 Activity to be situated before the starting time point of another Activity.

This property can be expressed using a set of possible Allen operators { Allen, 1983} such as: {before, meets, overlaps, starts, started-by, includes, finished-by, equals}. The temporal primitive is implied when the starting time point of the domain activity is before (or at) the start of the range. Time equality is considered as an overlap over fuzzy boundary zones, and serves the interpretation of time imprecision.

 

### P175 starts within (includes the start of)

Domain: E2 Temporal Entity

Range: E2 Temporal Entity

Subproperty of: E2 Temporal Entity. P173 starts before the end of (ends after the start of): E2 Temporal Entity

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

Scope note: This property allows the starting time point of an E7 Activity to be situated during the time extent of another Activity.

This property expresses a set of all of the following possible Allen operators {Allen, 1983} such as: {met-by, overlapped-by, started-by, starts, during, finishes, equals}. The temporal primitive is implied when the starting time point of the domain activity is after (or at) the start of the range and before (or at) the end of the range. Time equality is considered to be an overlap over fuzzy boundary zones, and serves the representation of time imprecision.

 

### P176 ends before (starts after the end of)

Domain: E2 Temporal Entity

Range: E2 Temporal Entity

Subproperty of: E2 Temporal Entity. P173 starts before the end of (ends after the start of): E2 Temporal Entity

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

Scope note: This property allows the ending time point of an E7 Activity to be situated before the starting time point of another Activity.

This property expresses a clear before association. Including the fuzzy interpretation, the corresponding Allen operator set that expresses this property is {before, meets}. The temporal primitive is implied when the ending point of the domain activity is before (or at) the starting point of the range. Time equality is considered as an overlap over fuzzy boundary zones, and serves the representation of time imprecision.

 

### P177 ends within (includes the end of)

Domain: E2 Temporal Entity

Range: E2 Temporal Entity

Subproperty of: E2 Temporal Entity. P173 starts before the end of (ends after the start of): E2 Temporal Entity

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

Scope note: This property allows the ending time point of an E7 Activity to be situated during the time extent of another Activity. ends within (Aend < Bend &Aend > Bstart)

This property can be expressed using a set of possible Allen operators such as: {meets, overlaps, starts, during, finishes, finished-by, equals}. The temporal primitive is implied when the ending point of the domain activity is after (or at) the starting point of the range and before (or at) the end of the range. Time inequality is considered to be a non-overlap over the fuzzy boundary zones, and serves the representation of time imprecision. [There must not be an overlap between the fuzzy boundary zones.]



### P178 ends after or with (ends before or at the end of)

Domain: E2 Temporal Entity

Range: E2 Temporal Entity

Subproperty of: E2 Temporal Entity. P173 starts before the end of (ends after the start of): E2 Temporal Entity

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

Scope note: This property allows the ending time point of an E7 Activity to be situated after the ending time point of another Activity. This is part of a set of temporal primitives.

This property can be expressed using a set of possible Allen operators such as: {meets, overlaps, starts, finishes, finished-by, equals}. This property is implied when the ending point of the domain activity is after (or at) the end of the range. Time equality is considered as an overlap over fuzzy boundary zones, and serves the interpretation of time imprecision.

 

### P179 had sales price (was sales price of)

Domain: E96 Purchase

Range: E97 Monetary Amount

Subproperty of: E8 Acquisition: P?? had consideration (): E70 Thing

Scope note: This property establishes the relationship between an instance of E96 Purchase and the instance of E97 Monetary Amount that forms the compensation for the transaction.

Examples:

• The sale of Vincent van Gogh’s “Vase with Fifteen Sunflowers” on 1987/03/30 (E96) had sales price Christies’ hammer price for “Vase with Fifteen Sunflowers” (E97)

### P180 has currency (was currency of)

Domain: E97 Monetary Amount

Range: E98 Currency

Subproperty of: P91 has unit (is unit of)

Superproperty of:

Scope note: This property establishes the relationship between an instance of E97 Monetary Amount and the currency that it is measured in.

Examples:

• Christies’ hammer price for “Vase with Fifteen Sunflowers” (E97) has currency British Pounds (E98)

### P181 has amount

Domain: E97 Monetary Amount

Range: E60 Number

Subproperty of: P90 has value

Scope note: This property establishes the relationship between an instance of E97 Monetary Amount and the amount of currency that it consists of.

Examples:

* Christies hammer price for “Vase with Fifteen Sunflowers” (E97) *has amount* 24,750,000 (E60)

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 APPENDIX

# Editorial notes

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| --- | --- | --- | --- | --- | --- |
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Creation Date: 11-07-1998

Last Modified: 24-10-2003

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 2003.

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:

A general introduction to the model (as before)

The hierarchy of entities as an indented list (as before)

The hierarchy of properties as an indented list

The definition of each entity

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 metamodelling 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 Annex 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.

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1. The Venetians in Athens and the Destruction of the Parthenon in 1687,·Theodor E. Mommsen, American Journal of Archaeology, Vol. 45, No. 4 (Oct. - Dec., 1941), pp. 544-5 [↑](#footnote-ref-1)