INTERNATIONAL STANDARD

ISO

21127

Second edition
2014-10-15

Information and documentation — A reference ontology for the interchange of cultural heritage information

Information et documentation — Une ontologie de référence pour l'échange d'informations du patrimoine culturel

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 46, *Information and documentation*, Subcommittee SC 4, *Technical interoperability*, in collaboration with the International Council of Museums Committee for Documentation (ICOM CIDOC).

This second edition cancels and replaces the first edition (ISO 21127:2006), which has been technically revised.

Introduction

This International Standard is the culmination of more than a decade of standards development work by the International Committee for Documentation (CIDOC) of the International Council of Museums (ICOM). Work on this International Standard began in 1996 under the auspices of the ICOM-CIDOC Documentation Standards Working Group. The document[1]) provided by CIDOC formed the basis for ISO 21127 which was first published in 2006. While the initial impetus for the work came from the museum community, it has since spread to encompass other types of cultural heritage institution. This International Standard has been appropriated and extended to meet the needs of other institutions dealing with cultural heritage.

The primary purpose of this International Standard is to offer a conceptual basis for the mediation of information between cultural heritage organizations such as museums, libraries, and archives. This International Standard aims to provide a common reference point against which divergent and incompatible sources of information can be compared and, ultimately, harmonized.

ISO 21127 is an ontology[2])[1] for cultural heritage information: a formal representation of the conceptual scheme, or "world view", underlying the database applications and documentation systems that are used by cultural heritage institutions. It is important to note that this International Standard aims to clarify the logic of what cultural heritage institutions do in fact document; it is not intended as a normative specification of what they *should* document. The primary role of this International Standard is to enable information exchange and integration between heterogeneous sources of cultural heritage information. It aims to provide the semantic definitions and clarifications needed to transform disparate, localized information sources into a coherent global resource, be it within an institution, an intranet, or on the Internet.

The specific aims of this International Standard are to

— serve as a common language for domain experts and IT developers when formulating requirements,

— serve as a formal language for the identification of common information contents in different data formats; in particular to support the implementation of automatic data transformation algorithms from local to global data structures without loss of meaning. These transformation algorithms are useful for data exchange, data migration from legacy systems, data information integration, and mediation of heterogeneous sources,

— support associative queries against integrated resources by providing a global model of the basic classes and their associations to formulate such queries, and

— provide developers of information systems with a guide to good practice in conceptual modelling.

The ISO 21127 ontology is expressed as a series of interrelated concepts with definitions. This presentation is similar to that used for a thesaurus. However, the ontology is not intended as a terminology standard and does not set out to define the terms that are typically used as data in cultural heritage documentation. Although the presentation provided here is complete, it is an intentionally compact and concise presentation of the ontology's 86 classes and 137 unique properties. It does not attempt to articulate the inheritance of properties by subclasses throughout the class hierarchy (this would require the declaration of several thousand properties, as opposed to 137). However, this definition does contain all the information needed to infer and automatically generate a full declaration of all properties, including inherited properties.

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1)   The CIDOC CRM Special Interest Group continues to maintain a version of this original document, usually known as the "CIDOC Conceptual Reference Model" or CIDOC CRM.

2)   In the sense used in computer science, i.e. it describes in a formal language the relevant explicit and implicit concepts and the relationships between them.

Information and documentation — A reference ontology for the interchange of cultural heritage information

1 Scope

This International Standard establishes guidelines for the exchange of information between cultural heritage institutions. In simple terms, this can be defined as the information managed by museums, libraries, and archives.

A more detailed definition can be articulated by defining both the intended scope, a broad and maximally inclusive definition of general principles, and the practical scope, which is defined by reference to a set of specific museum documentation standards and practices.

The intended scope of this International Standard is defined as the exchange and integration of heterogeneous scientific documentation relating to museum collections. This definition requires further elaboration.

— The term "scientific documentation" is intended to convey the requirement that the depth and quality of descriptive information that can be handled by this International Standard need to be sufficient for serious academic research. This does not mean that information intended for presentation to members of the general public is excluded, but rather that this International Standard is intended to provide the level of detail and precision expected and required by museum professionals and researchers in the field.

— The term "museum collections" is intended to cover all types of material collected and displayed by museums and related institutions, as defined by ICOM[3]. This includes collections, sites, and monuments relating to fields such as social history, ethnography, archaeology, fine and applied arts, natural history, history of sciences and technology.

— The documentation of collections includes the detailed description of individual items within collections, groups of items, and collections as a whole. This International Standard is specifically intended to cover contextual information (i.e. the historical, geographical, and theoretical background that gives museum collections much of their cultural significance and value).

— The exchange of relevant information with libraries and archives, and harmonization with their models, falls within the intended scope of this International Standard.

— Information required solely for the administration and management of cultural institutions, such as information relating to personnel, accounting, and visitor statistics, falls outside the intended scope of this International Standard.

The practical scope[4] of this International Standard is the set of reference standards for museum documentation that have been used to guide and validate its development. This International Standard covers the same domain of discourse as the union of these reference documents; consequently, for any data that is correctly encoded in accordance with any of these reference documents, a form of encoding can be created that is both compatible with the current standard and which entails no semantic loss.

2 Conformance

Users intending to take advantage of the semantic interoperability offered by this International Standard should ensure conformance with the relevant data structures. Conformance pertains either to data

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3) The ICOM Statutes provide a definition of the term "museum" at <http://icom.museum/statutes.html#2>.

4) The practical scope of the CIDOC CRM, including a list of the relevant museum documentation standards, is discussed in more detail on the CIDOC CRM website at < http://cidoc-crm.org/scope.html >.

to be made accessible in an integrated environment or intended for transport to other environments. Any encoding of data in a formal language that preserves the relations of the classes, properties, and inheritance rules defined by this International Standard, is regarded as conformant.

Conformance with this International Standard does not require complete matching of all local documentation structures, nor that all concepts and structures present in this International Standard be implemented. This International Standard is intended to allow room both for extensions, needed to capture the full richness of cultural information, and for simplification, in the interests of economy. A system will be deemed partially conformant if it supports a subset of subclasses and subproperties defined by this International Standard. Designers of the system should publish details of the constructs that are supported.

The focus of this International Standard is the exchange and mediation of structured information. It does not require the interpretation of unstructured (free text) information into a structured, logical form. Unstructured information is supported, but falls outside the scope of conformance considerations.

Any documentation system will be deemed conformant with this International Standard, regardless of the internal data structures it uses; if a deterministic logical algorithm can be constructed, that transforms data contained in the system into a directly compatible form without loss of meaning. No assumptions are made as to the nature of this algorithm. "Without loss of meaning" signifies that designers and users of the system are satisfied that the data representation corresponds to the semantic definitions provided by this International Standard.

3   Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
class
category of items that share one or more common traits

Note 1 to entry: Class traits serve as criteria to identify items that belong to the class. These traits need not be explicitly formulated in logical terms, but can be described in a text (called a scope note) that refers to a common conceptualization of domain experts. The sum of these traits is called the intension of the class. A class can be the domain or range of none, one, or more properties formally defined in a model. The formally defined properties need not be part of the intension of their domains or ranges; such properties are optional. An item that belongs to a class is called an instance of this class. A class is associated with an open set of real-life instances known as the extension of the class. Here, "open" is used in the sense that it is generally beyond our capabilities to know all instances of a class in the world and, indeed, that the future can bring new instances into being at any time (open world). Therefore, a class cannot be defined by enumerating its instances. A class plays a role analogous to a grammatical *noun*, and can be completely defined without reference to any other construct (unlike properties, which need to have an unambiguously defined domain and range). For example, "Person" is a class. A "Person" can have the property of being a *member of* a "Group", but this is not a necessary condition for being a "Person". We will never know all "Persons" who have lived in the past, and there will be more "Persons" in the future. Classes are usually organized as a *class hierarchy*. The relationship between a subclass and its superclass is known as the *IsA* relationship (a concatenation of the words "is a"). For example, a ship *IsA* vehicle.

3.2
complement
⟨of a class A⟩ set of all instances of its superclass, B, that are not instances of class A

Note 1 to entry: In terms of set theory, the complement of a class is the extension of the superclass minus the extension of the class. Compatible extensions of this International Standard need not declare any class as the complement of one or more other classes. To do so would violate the goal of describing an open world. For example, for all possible cases of human *gender,* "male" need not be declared as the complement of "female" or vice versa.

3.3
disjoint
having no common instances in any possible world

Note 1 to entry: Classes are disjoint if the intersection of their extensions is necessarily an empty set.

Note 2 to entry: See also 5.4.

3.4
domain
class for which a property is formally defined

Note 1 to entry: Instances of a property are applicable to instances of its domain class. A property needs to have exactly one domain, though the domain class can always contain instances for which the property is not instantiated. The domain class is analogous to the grammatical *subject* of a phrase while the property is analogous to the *verb*. Which class is selected as the domain and which as the range is arbitrary, as is the choice between active or passive voice. Property names in ISO 21127 are designed to be semantically meaningful and grammatically correct when read from domain to range. The inverse property name, given in parentheses, is also designed to be semantically meaningful and grammatically correct when read from range to domain.

3.5
extension
set of all real life instances belonging to a class that fulfil the criteria of its intension

Note 1 to entry: The extension of a class is an "open" set in the sense that it is generally beyond our capabilities to know all instances of a class in the world. The future can bring new instances into being at any time (open world). An information system can, at any point in time, refer to some instances of a class, which form a subset of its extension.

Note 2 to entry: See also 5.6.

3.6
inheritance
duplication of properties from a class to its subclasses

Note 1 to entry: Inheritance of properties from superclasses to subclasses entails that if an item *x* is an instance of a class A, then all properties that need hold for the instances of any of the superclasses of A need also hold for item *x*, and that all optional properties that can hold for the instances of any of the superclasses of A can also hold for item *x*.

3.7
instance
item having properties that meet the criteria of the intension of the class

Note 1 to entry: "The Mona Lisa" is an instance of the class of *E22 Man-Made Object*. An instance of a property is a factual relation between an instance of the domain and an instance of the range of the property that matches the criteria of the intension of the property. For example, "the Louvre is current owner of the Mona Lisa" is an instance of the property "is current owner of". One aspect of the open world assumption is that the number of class instances declared in a given information system is usually less than the total number of instances in the real world. You, for example, are an instance of "person", but you are not mentioned in all information systems describing "persons".

3.8
intension
intended meaning of a class

Note 1 to entry: The intension of a class consists of one or more common traits shared by all instances of the class. These need not be explicitly formulated in logical terms, but can simply be described in a text (a scope note) that refers to a conceptualization shared by domain experts.

3.9
interoperability
capability of different information systems to communicate some of their contents

Note 1 to entry: Interoperability can imply that

a)   two systems can exchange information, and/or

b)   multiple systems can be accessed with a single method.

Note 2 to entry: Generally, *syntactic* interoperability is distinguished from *semantic* interoperability. *Syntactic* interoperability means that the information encoding and the access protocols of the relevant systems are compatible, so that information can be processed as described above without error. However, syntactic interoperability alone does not ensure that each system processes the data in a manner consistent with the intended meaning. For example, one system may contain a table called "actor" while another system uses the name "agent". Even if data from the two tables can be combined in a common data format, it will nonetheless remain separated unless the semantic equivalence of the two tables is established. Semantic interoperability requires more than compatible data formats. ISO 21127 presupposes existing *syntactic* interoperability and is concerned only with adding *semantic* interoperability.

3.10
monotonic
⟨of a knowledge base⟩ having a set of conclusions derived through inference rules that does not reduce, irrespective of whatever additional propositions can be inserted

Note 1 to entry: Monotonic reasoning is a term derived from knowledge representation. In practical terms, as experts enter correct statements to an information system, the system need not regard any of the existing statements as invalid. The ISO 21127 ontology is designed for monotonic reasoning and so enables conflict-free merging of huge stores of knowledge.

Note 2 to entry: See also 5.1.

3.11
multiple inheritance
possibility for a class to have more than one immediate superclass

Note 1 to entry: The extension of a class with multiple immediate superclasses is a subset of the intersection of all extensions of its superclasses. The intension of a class with multiple immediate superclasses extends the intensions of all its superclasses, i.e. its *traits* are more restrictive than any of its superclasses. If multiple inheritance is used, the resulting "class hierarchy" is a directed graph and not a tree structure. If it is represented as an indented list, then some classes will inevitably be repeated at different positions in the hierarchy. For example, "person" is both an "actor" and a "biological object".

3.12
open world
assumption that the information stored in a knowledge base is incomplete with respect to the universe of discourse it aims to describe

Note 1 to entry: A term derived from knowledge representation. The incompleteness of a knowledge base can be due to the inability of the maintainer to provide sufficient information, or to more fundamental problems of cognition in the system's domain. Such problems are characteristic of cultural information systems since our records about the past are necessarily incomplete. In addition, some items cannot be clearly assigned to a given class. In particular, the absence of a certain trait for an item described in the system does not necessarily entail that the item does not possess the trait. For example, if one item is described as "biological object" and another as "physical object", this does not imply that the latter is not also a "biological object". Therefore, complements of a class with respect to a superclass cannot be *derived* in general from an information system based on the open world assumption.

3.13
primitive concept
concept that is declared and for which the meaning is clear, but which cannot be derived from other concepts

Note 1 to entry: Primitive concept is a term derived from knowledge representation. For example, *mother* can be described as a female who has given birth to a child, so *mother* is not a primitive concept. *Event* however is a primitive concept. ISO 21127 is composed primarily of primitive concepts.

3.14
property
named characteristic of a class to which values can be assigned

Note 1 to entry: A property is characterized by an intension, which is conveyed by a scope note. A property plays a role analogous to a *verb* in that it needs to be defined with reference to both a domain and range, which are analogous to the *subject* and *object* in a phrase (unlike classes, which can be defined independently). Which class is selected as the domain and which as the range, is arbitrary, as is the choice between active and passive voice. In other words, a property can be interpreted in both directions, with two distinct but related interpretations. For example, "E24 Physical man-made thing *depicts* E1 Entity" is equivalent to "E1 Entity *is depicted by E24* Physical man-made thing". Properties can themselves have properties that relate to other classes (This feature is used in this model only in order to describe dynamic subtyping of properties.) Properties can also be *specialized* in the same manner as classes, resulting in *IsA* relationships between subproperties and their superproperties.

3.15
query
request for information from an information system expressed so that the response can be calculated automatically

3.16
query containment
query *X* contains another query *Y* if, for each possible population of a database, the answer set to query *X* also contains the answer set to query *Y*

Note 1 to entry: If query *X* and *Y* were classes, then *X* would be a superclass of *Y*.

3.17
range
class that comprises all the potential values of a property

Note 1 to entry: The value of a property at a given time is an instance of the class assigned as the range of the property. A property is intended to have exactly one range class. A rough analogy can be drawn between the subject-verb-object structure of a basic proposition and the domain-property-range structure defined in the standard. The range class corresponds to the grammatical object. Which class is selected as domain, and which as range, is arbitrary, as is the choice between active and passive voice. Property names in ISO 21127 are designed to be semantically meaningful and grammatically correct when read from domain to range. The inverse property name, given in parentheses, is designed to be semantically meaningful and grammatically correct when read from range to domain.

3.18
scope note
textual description of the intension of a class or property

Note 1 to entry: Scope notes are not formal modelling constructs but are provided to help explain the intended meaning and application of the classes and properties. Basically, they refer to a conceptualization shared by domain experts and disambiguate different possible interpretations. Illustrative examples of classes and properties are also provided with the scope notes for explanatory purposes.

3.19
shortcut
formally defined single property that represents a *deduction* or *join* of a data path in the ontology

Note 1 to entry: The scope notes of shortcut properties provide a verbal description of the equivalent deduction. Shortcuts are introduced for those cases where common documentation practice refers only to the deduction rather than to the fully developed path. For example, museums often only record the "dimension" of an object without documenting the E16 measurement that observed it. The International Standard allows shortcuts as cases of less detailed knowledge, while preserving in its schema the relationship to the full information.

Note 2 to entry: See also 5.3.

3.20
strict inheritance
properties inheritance that allows no exceptions

Note 1 to entry: Some systems can declare that "elephants are grey" and regard a white elephant as an exception. Under strict inheritance rules it would hold that if all elephants were indeed grey, then a white elephant could not be an elephant. Obviously not all elephants are grey; being grey is not part of the intension of the concept elephant but an optional property. The International Standard applies strict inheritance as a normalization principle.

3.21
subclass
specialization of another class, i.e. the superclass

Note 1 to entry: A subclass inherits *all* the properties of its superclass (i.e. strict inheritance), in addition to having none, one, or more additional properties of its own. A subclass can have more than one immediate superclass, and consequently inherits the properties of all of its superclasses (i.e. multiple inheritance). A subclass has an *IsA* relationship to its superclass(es): every instance of the subclass is also, by definition, an instance of the superclass(es). For example, every "person" *IsA* "biological object".

3.22
subproperty
specialization of another property, i.e. the superproperty

Note 1 to entry: All instances of a subproperty are also instances of its superproperty. The intension of a subproperty extends the intension of its superproperty, i.e. its *traits* are more restrictive than that of its superproperty. The domain of a subproperty is a subclass of the domain of its superproperty. The range of a subproperty is a subclass of the range of its superproperty. Instances of a subproperty inherit the definition of *all* of the properties declared for its superproperty without exceptions (strict inheritance), in addition to having none, one, or more properties of their own.

Note 2 to entry: A subproperty can have more than one immediate superproperty and consequently inherits the properties of all of its superproperties (multiple inheritance). The *IsA relationship* or *specialization* between two or more properties gives rise to the structure we call a *property hierarchy.* The *IsA relationship* is transitive and shall not be cyclic. In some object-oriented languages, including C++, there is no equivalent to the specialization of properties.

3.23
superclass
generalization of one or more other classes, i.e. the subclasses

Note 1 to entry: A superclass *subsumes* all instances of its subclasses, and can also have additional instances that do not belong to any of its subclasses. The intension of the superclass is less restrictive than any of its subclasses. The *subsumption relationship* or *generalization* is the inverse of the *IsA relationship* or *specialization*. In some contexts (e.g. the programming language C++) the term *parent class* is used synonymously with superclass. For example, "biological object *subsumes* person" is synonymous with "biological object is a *superclass* of person". Fewer properties are needed to identify an item as a "biological object" than to identify it as a "person".

3.24
superproperty
generalization of one or more other properties, i.e. the subproperties

Note 1 to entry: A superproperty *subsumes* all instances of its subproperties, and can also have additional instances that do not belong to any of its subproperties. The intension of the superproperty is less restrictive than any of its subproperties. The *subsumption relationship* or *generalization* is the inverse of the *IsA relationship* or *specialization*.

4 Structure and presentation

4.1 Property quantifiers

Quantifiers for properties are provided for the purpose of semantic clarification only, and should *not* be treated as implementation recommendations. This International Standard has been designed

to accommodate alternative opinions and incomplete information; *all* properties should therefore be implemented as optional and repeatable for their domain and range ["many to many (0,*n*:0,*n*)"]. The term "cardinality constraints" is avoided here as it typically pertains to implementations.

Table 1 lists all possible property quantifiers occurring in this International Standard according to their notation, together with a textual explanation. In order to provide optimal clarity, two widely accepted notations are used in this International Standard, i.e. one verbal, the other numerical. The verbal notation uses phrases such as "one to many", and the numerical notation expressions such as "(0,*n*:0,1)". The terms "one", "many", and "necessary" are fairly intuitive; the term "dependent" is less obvious. It denotes a situation where a range instance cannot exist without an instance of the respective property. In other words, the property is "necessary" for its range.

Table 1 — Property quantifiers

Quantifier	Description
many to many (0,*n*:0,*n*)	Unconstrained: an individual domain instance and range instance of this property can have zero, one, or more instances of the property. In other words, the property is optional and repeatable for its domain and range.
one to many (0,*n*:0,1)	An individual domain instance of this property can have zero, one, or more instances of the property, but an individual range instance cannot be referenced by more than one instance of this property. In other words, the property is optional for its domain and range, but repeatable for its domain only. This situation is sometimes called a "fan-out".
many to one (0,1:0,*n*)	An individual domain instance of this property can have zero or one instance of the property, but an individual range instance can be referenced by zero, one, or more instances of the property. In other words, the property is optional for its domain and range, but repeatable for its range only. This situation is sometimes called a "fan-in".
many to many, necessary (1,*n*:0,*n*)	An individual domain instance of this property can have one or more instances of the property, but an individual range instance can have zero, one, or more instances of the property. In other words, the property is necessary and repeatable for its domain, and optional and repeatable for its range.
one to many, necessary (1,*n*:0,1)	An individual domain instance of this property can have one or more instances of the property, but an individual range instance cannot be referenced by more than one instance of the property. In other words, the property is necessary and repeatable for its domain, and optional but not repeatable for its range. This situation is sometimes called a "fan-out".
many to one, necessary (1,1:0,*n*)	An individual domain instance of this property shall have exactly one instance of the property, but an individual range instance can be referenced by zero, one, or more instances of the property. In other words, the property is necessary and not repeatable for its domain, and optional and repeatable for its range. This situation is sometimes called a "fan-in".
one to many, dependent (0,*n*:1,1)	An individual domain instance of this property can have zero, one, or more instances of the property, but an individual range instance shall be referenced by exactly one instance of the property. In other words, this property is optional and repeatable for its domain, but necessary and not repeatable for its range. This situation is sometimes called a "fan-out".
one to many, necessary, dependent (1,*n*:1,1)	An individual domain instance of this property can have one or more instances of the property, but an individual range instance shall be referenced by exactly one instance of the property. In other words, the property is necessary and repeatable for its domain, and necessary but not repeatable for its range. This situation is sometimes called a "fan-out".
many to one, necessary, dependent (1,1:1,*n*)	An individual domain instance of this property shall have exactly one instance of the property, but an individual range instance can be referenced by one or more instances of the property. In other words, this property is necessary and not repeatable for its domain, and necessary and repeatable for its range. This situation is sometimes called a "fan-in".

Table 1 *(continued)*

Quantifier	Description
one to one (1,1:1,1)	An individual domain instance and range instance of this property shall have exactly one instance of the property. In other words, the property is necessary and not repeatable for its domain and for its range.
NOTE Some properties are defined as being necessary for their domain or as being dependent for their range. If such properties are not specified for an instance of the respective domain or range, it means that the property exists, but that the value on one side of the property is unknown. In the case of optional properties, no distinction is made between a value being unknown or the property not being applicable at all. For example, one can know that an object has an owner, but not know who the owner is, or know that an object has no owner. The model makes no distinction between these two cases. A textual note can be used for clarification if needed.	

4.2   Naming conventions

The following naming conventions have been applied hereafter.

— Classes are identified by numbers[5] preceded by the letter "E" (historically, classes were sometimes referred to as "Entities"), and are named using noun phrases (nominal groups) in title case (initial capitals). For example, *E63 Beginning of Existence*.

— Properties are identified by numbers preceded by the letter "P," and are named in both directions, using verbal phrases in lower case. Properties with the character of states are named in the present tense, such as "has type", whereas properties relating to events are named in past tense, such as "carried out". For example, *P126 employed (was employed in)*.

— Property names should be read in their non-parenthetical form for the domain-to-range direction, and in parenthetical form for the range-to-domain direction.

— Properties with a range that is a subclass of *E59 Primitive Value* (such as *E1 Entity.P3 has note: E62 String*) have no parenthetical name form as reading the property name in the range-to-domain direction is not regarded as meaningful.

— Properties that have identical domain and range are either symmetric or transitive. Instantiating a symmetric property implies that the relation holds for both the domain-to-range and the range-to-domain directions. An example of this is *E53 Place.P122 borders with: E53 Place*. The names of symmetric properties have no parenthetical form, because reading in the range-to-domain direction is the same as the domain-to-range reading. Transitive asymmetric properties, such as *E4 Period.P9 consists of (forms part of): E4 Period*, do have a parenthetical form that relates to the meaning of the inverse direction.

— The choice of property domains, and hence the order of their names, is established in accordance with the following priority list:

a)   temporal entity and its subclasses;

b)   thing and its subclasses;

c)   actor and its subclasses;

d)   other.

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5)   Some gaps are present in the numbering sequence used for classes and properties. This is intentional: numbers assigned in previous versions of the standard to deprecated classes and properties have not been re-used.

5 Modelling principles

5.1 Monotonicity

Because this International Standard's primary role is the meaningful integration of information in an open world, it aims to be monotonic in the sense of domain theory. Existing constructs, and deductions made from them, shall always remain valid and well-formed, i.e. even if new constructs and extensions are added.

For example, one can add a subclass of *E7 Activity* to describe the use of a certain name for a place over a certain time span by a particular group. By this extension, no existing *IsA relationships* or property inheritances are compromised.

In addition, this International Standard aims to enable the formal preservation of monotonicity when augmenting a compatible system. Existing instances, their properties, and deductions made from them, should always remain valid and well-formed even as new instances are added to the system.

For example, if someone describes correctly that an item is an instance of *E19 Physical Object* and, subsequently, it is correctly characterized as an instance of *E20 Biological Object*, the system should not stop treating it as an instance of *E19 Physical Object*.

In order to formally preserve monotonicity in cases where opinions diverge, all formally defined properties should be implemented with unconstrained cardinality (many:many) so that conflicting instances of properties are merely accumulated. Knowledge stored in a conformant system can thus serve as a research base, accumulating relevant alternative opinions around well-defined entities. Conclusions about the truth or falsehood of the instances stored remain the subject of open-ended scientific or scholarly hypothesis building.

For example, "El Greco" and even "King Arthur" should be treated as instances of *E21 Person* and be dealt with as existing within the domain of discourse once they are entered into a knowledge base. Alternative opinions about properties, such as their birthplace and the details of their lives, can be accumulated without decisions concerning their veracity being required during data compilation.

5.2 Minimality

Although the scope of this International Standard is very broad, the ontology itself is constructed as economically as possible.

— A class is not declared unless it is required as the domain or range of a property not appropriate to its superclass, or it is a key concept in the *practical scope*.

— Classes and properties that share a superclass are *non-exclusive* by default. For example, an object can be both an instance of *E20 Biological Object* and *E22 Man-made Object*.

— Classes and properties are either primitive, or constitute key concepts in the practical scope.

— Complements of classes are not declared.

5.3 Shortcuts

Some properties are declared as shortcuts of longer, more comprehensively articulated paths that connect the same domain and range classes as the shortcut property through one or more intermediate classes. For example, the property *E18 Physical Thing.P52 has current owner: E39 Actor*, is a shortcut for a fully articulated path from *E18 Physical Thing* through *E8 Acquisition* to *E39 Actor*. An instance of the fully-articulated path always implies an instance of the shortcut property. However, the inverse might not be true; an instance of the fully-articulated path cannot always be inferred from an instance of the shortcut property.

5.4   Disjointness

5.4.1   General

Classes are disjoint if they share no common instances in any possible world. There are many examples of disjoint classes in the standard.

A comprehensive declaration of all possible disjoint class combinations afforded by the standard has not been provided here; it would be of questionable practical utility and would easily become inconsistent with the goal of providing a concise definition. However, the two following examples of disjoint class pairs are fundamental to an effective comprehension of the ontology.

5.4.2   E2 Temporal Entity is disjoint from E77 Persistent Item

Instances of the class *E2 Temporal Entity* perdure, whereas instances of the class *E77 Persistent Item* endure. Even though instances of *E77 Persistent Item* have a limited existence in time, they are fundamentally different in nature from instances of *E2 Temporal Entity* because they preserve their identity between events. Declaring enduring and perduring entities as disjoint classes is consistent with the distinctions made in data structures that fall within the standard's practical scope.

5.4.3   E18 Physical Thing is disjoint from E28 Conceptual Object

Instances of *E18 Physical Thing* and *E28 Conceptual Object* differ in many fundamental ways; for example, the production of instances of *E18 Physical Thing* implies the incorporation of physical material, whereas the production of instances of *E28 Conceptual Object* does not. Similarly, instances of *E18 Physical Thing* cease to exist when destroyed, whereas an instance of *E28 Conceptual Object* perishes only when it is forgotten and its last physical carrier is destroyed.

5.5   Types

Virtually all structured descriptions of museum objects begin with a unique object identifier and information about the "type" of the object, often in a set of fields with names like "classification", "category", "object type", "object name", etc. All these fields are used for terms that declare the object belongs to a particular category of items. The class E55 Type comprises concepts denoted by terms. Instances of E55 Type represent concepts (universals) in contrast to instances of Appellation which are used to name instances of ISO 21127 classes.

E55 Type provides an interface to domain specific ontologies and thesauri. These can be represented as subclasses of E55 Type, forming hierarchies of terms, i.e. instances of E55 Type linked through P127 *has broader term (has narrower term)*. Such hierarchies can be extended with additional properties.

For this purpose, the standard provides high-level properties to allow for fine-grained classification by means of terminology (this is a common practice used in many information systems). The class *E1 Entity* is the domain of the property *P2 has type (is type of)*, which has the range *E55 Type*. Consequently, every class in the standard, with the exception of *E59 Primitive Value*, inherits the property *P2 has type (is type of)*. This provides a general mechanism for simulating a specialization of the classification of instances to any level of detail, by linking to external vocabulary sources, thesauri, classification schema, or ontologies. Analogous to the function of the P2 has type (is type of), some properties in the standard are associated with an additional property. These are numbered with a '.1' extension. The range of these properties of properties always falls under E55 Type. Their purpose is to simulate a specialization of their parent property through the use of property subtypes declared as instances of E55 Type. They do not appear in the property hierarchy list but are included as part of the property declarations and referred to in the class declarations. For example, P62.1 mode of depiction: E55 Type is associated with E24 Physical Man-made Thing. P62 depicts (is depicted by): E1 Entity.

The class *E55 Type* also serves as the range of properties that relate to categorical knowledge commonly found in cultural documentation. For example, the property *P125 used object of type (was type of object used in)* enables the ontology to express statements such as "this casting was produced using a mould", meaning that an unknown or unmentioned "mould" was used. This enables the specific instance of the

casting to be associated with the entire set of manufacturing devices known as moulds. Further, objects of type "mould" can be related through *P2 has type (is type of)* to the same term. This indirect relationship can actually help in detecting an unknown object in an integrated environment. On the other hand, a particular mould can be directly associated with a casting through *P16 used specific object (was used for)*. Statistical questions as to how many objects in a certain collection were made with moulds can be answered correctly by following both paths through P16-P2 and P125. This consistent treatment of categorical knowledge enhances the ontology's ability to integrate cultural information.

In addition to being an interface to external thesauri and classification systems, E55 Type is an ordinary class in the standard and a subclass of E28 Conceptual Object. E55 Type and its subclasses inherit all properties from this superclass. Thus, together with the class E83 Type Creation, the scholarly or scientific process that ensures a type is exhaustively described and appropriately named can be modelled within the standard. 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. This is very 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 "original element" or "holotype".

Finally, types that are instances of E55 Type and its subclasses are used to characterize the instances of a class, and hence, refine the meaning of the class. A type "artist" can be used to characterize persons through *P2 has type (is type of)*. On the other hand, in an art history application of the standard, it can be adequate to extend the class E21 Person with a subclass *E21.xx* Artist. What is the difference between the type "artist" and the class Artist? From an everyday conceptual point of view, there is no difference. Both denote the concept "artist" and identify the same set of persons. Thus, in this setting, a type could be seen as a class and the class of types can be seen as a metaclass. Since current systems do not provide an adequate control of user defined metaclasses, ISO 21127 prefers to model instances of E55 Type as if they were particulars, with the relationships described in the previous paragraphs.

Users can decide to implement a concept either as a subclass extending the ISO 21127 class system or as an instance of E55 Type. A new subclass should only be created in case the concept is sufficiently stable and associated with additional explicitly modelled properties specific to it. Otherwise, an instance of E55 Type provides more flexibility of use. Users who want to describe a discourse not only using a concept extending the standard but also describing the history of this concept itself, might choose to model the same concept both as subclass and as an instance of E55 Type with the same name. Similarly, it should be regarded as good practice to foresee for each term hierarchy refining an ISO 21127 class, a term equivalent of this class as top term: a term hierarchy for instances of E21 Person should begin with "Person".

5.6   Extensions

Since the intended scope of this International Standard is a subset of the "real" world, it is potentially unlimited. Consequently, the model has been designed to be extensible through linkage with external classification systems.

For extensions with the ontology to remain compatible, data structured using an extension shall also remain valid as an instance of an existing class or property. In practical terms, this implies query containment*:* any query based on concepts defined by this International Standard should retrieve the same result set, whether or not extensions have been implemented. For example, a query such as "list all events" should recall all instances that fall within the scope of *E5 Event*, regardless of how they are classified by extended semantics.

A sufficient condition for the compatibility of an extension to this International Standard is that existing classes subsume all classes of the extension, and that all properties of the extension are either subsumed by existing properties, or are part of a path for which an existing property is a shortcut.

5.7   Coverage of intended scope

Of necessity, some concepts covered by this International Standard are less thoroughly elaborated than others: *E39 Actor* and *E30 Right*, for example. This is a natural consequence of staying within the

practical scope in an intrinsically unlimited domain of discourse. These "underdeveloped" concepts can be considered as hooks for compatible extensions.

The ontology provides a number of mechanisms to ensure that coverage of the intended scope is nonetheless complete.

a) Existing high-level classes can be extended, either structurally as subclasses or dynamically using the type hierarchy.

b) Existing high-level properties can be extended, either structurally as subproperties or in some cases dynamically, using properties of properties that allow subtyping.

c) Additional information that falls outside the semantics formally defined by this International Standard can be recorded as unstructured data using *E1 Entity.P3 has note: E62 String*.

With mechanisms a) and b), the existing concepts subsume and thereby cover the extensions.

With mechanism c), information is accessible at the appropriate point in the respective knowledge base. This approach is preferable when detailed, targeted queries are not expected. In general, only those concepts used for formal querying need to be explicitly modelled.

6 Class declarations

All classes are declared in this Clause using the following format.

— Class names are presented as headings in bold face, preceded by the class' unique identifier.

— The line **Subclass of** declares the superclass of the class from which it inherits properties.

— The line **Superclass of** is a cross-reference to the subclasses of this class.

— The line **Scope note** contains the textual definition of the concept the class represents.

— The line **Properties** declares the list of the class' properties.

— Each property is represented by its unique identifier, its forward and reverse names, and the range class that it links to, separated by a colon.

— Inherited properties are not represented.

— Properties of properties are shown indented and in parentheses beneath their respective domain property.

E1 Entity

Subclass of	
Superclass of	E2 Temporal Entity
	E52 Time-Span
	E53 Place
	E54 Dimension
	E77 Persistent Item
Scope note	This class comprises all things in the universe of discourse of the ontology.
	It is an abstract concept providing for three general properties:
	a) identification by name or appellation, notably by a preferred identifier;
	b) classification by type, allowing further refinement of the specific subclass to which an instance belongs;
	c) 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 ontology are directly or indirectly specializations of E1 Entity.
Examples	The earthquake in Lisbon 1755 (E5)
Properties	P1 is identified by (identifies): E41 Appellation
	P2 has type (is type of): E55 Type
	P3 has note: E62 String
	(P3.1 has type: E55 Type)
	P48 has preferred identifier (is preferred identifier of): E42 Identifier
	P137 exemplifies (is exemplified by): E55 Type
	(P137.1 in the taxonomic role: E55 Type)

E2 Temporal Entity

Subclass of	E1 Entity
Superclass of	E3 Condition State
	E4 Period
Scope note	This class comprises all phenomena, such as instances of E4 Period and E5 Event, which happen over a limited extent in time.
	In some contexts, these are also called perdurants. This class is disjoint from E77 Persistent Item. E2 Temporal Entity is an abstract class and has no direct instances. It 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)
	The earthquake in Lisbon 1755 (E5)
	The Peterhof Palace near Saint Petersburg being in ruins from 1944 to 1946 (E3)
Properties	P4 has time-span (is time-span of): E52 Time-Span
	P114 is equal in time to: E2 Temporal Entity
	P115 finishes (is finished by): E2 Temporal Entity
	P116 starts (is started by): E2 Temporal Entity
	P117 occurs during (includes): E2 Temporal Entity
	P118 overlaps in time with (is overlapped in time by): E2 Temporal Entity
	P119 meets in time with (is met in time by): E2 Temporal Entity
	P120 occurs before (occurs after): E2 Temporal Entity

E3 Condition State

Subclass of	E2 Temporal Entity
Superclass of	
Scope note	This class comprises the states of objects characterized by a certain condition over a time span.
	Instances of this class describe the prevailing physical condition of any material object or feature during a specific E52 Time Span. 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 "Amber Room" in Tsarskoje Selo being completely reconstructed from summer 2003 until now
	The Peterhof Palace near Saint Petersburg being in ruins from 1944 to 1946
	The condition of my turkey in the oven at 14:30 on 25 December, 2002 (P2 has type E55 Type "still not cooked")
Properties	P5 consists of (forms part of): E3 Condition State

E4 Period

Subclass of	E2 Temporal Entity
Superclass of	E5 Event
Scope note	This class comprises sets of coherent phenomena or cultural manifestations bounded in time and space.
	It is the social or physical coherence of these phenomena that identify an E4 Period and not the associated spatio-temporal bounds. These bounds are a mere approximation of the actual process of growth, spread, and retreat. Consequently, different periods can overlap and coexist in time and space, such as when a nomadic culture exists in the same area as a sedentary culture.
	Typically, this class is used to describe prehistoric or historic periods such as the "Neolithic Period", the "Ming Dynasty", or the "McCarthy Era". There are however 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.
	There are two different conceptualisations of "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 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
	European Bronze Age
	Italian Renaissance
	Thirty Years War
	Sturm und Drang
	Cubism
Properties	P7 took place at (witnessed): E53 Place
	P8 took place on or within (witnessed): E19 Physical Object
	P9 consists of (forms part of): E4 Period
	P10 falls within (contains): E4 Period
	P132 overlaps with: E4 Period
	P133 is separated from: E4 Period

E5 Event

Subclass of	E4 Period
Superclass of	E7 Activity
	E63 Beginning of Existence
	E64 End of Existence
Scope note	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)
	The destruction of Herculaneum by volcanic eruption in 79 AD (E6)
	World War II (E7)
	The Battle of Stalingrad (E7)
	The Yalta Conference (E7)
	My birthday celebration 28–6–1995 (E7)
	The falling of a tile from my roof last Sunday
	The CIDOC Conference 2003 (E7)
Properties	P11 had participant (participated in): E39 Actor
	P12 occurred in the presence of (was present at): E77 Persistent Item

E6 Destruction

Subclass of	E64 End of Existence
Superclass of	
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 can 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.
	a) If the matter remaining from the destruction is not documented, the event is modelled solely as E6 Destruction.
	b) 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.
	c) 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
	The destruction of Nineveh (E6, E7)
	The breaking of a champagne glass yesterday by my dog
Properties	P13 destroyed (was destroyed by): E18 Physical Thing

E7 Activity

Subclass of	E5 Event
Superclass of	E8 Acquisition
	E9 Move
	E10 Transfer of Custody
	E11 Modification
	E13 Attribute Assignment
	E65 Creation
	E66 Formation
	E85 Joining
	E86 Leaving
	E87 Curation
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
	The Yalta Conference
	My birthday celebration 28–6–1995
	The writing of "Faust" by Goethe (E65)
	The formation of the Bauhaus 1919 (E66)
	The people of Iraq giving the name 'Quyunjig' to the place identified by the TGN as "7017998"
Properties	P14 was carried out by (performed): E39 Actor
	(P14.1 in the role of: E55 Type)
	P15 was influenced by (influenced): E1 Entity
	P16 used specific object (was used for): E70 Thing
	(P16.1 mode of use: E55 Type)
	P17 was motivated by (motivated): E1 Entity
	P19 was intended use of (was made for): E71 Man-Made Thing
	(P19.1 mode of use: E55 Type)
	P20 had specific purpose (was purpose of): E5 Event
	P21 had general purpose (was purpose of): E55 Type
	P32 used general technique (was technique of): E55 Type
	P33 used specific technique (was technique of): E29 Design or Procedure
	P125 used object of type (was type of object used in): E55 Type
	P134 continued (was continued by): E7 Activity

E8 Acquisition

Subclass of	E7 Activity
Superclass of	
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 instances of E30 Right, nor does it require the donor and/or recipient to be included, known, or even to exist. Depending on the circumstances, it can describe
	a)　　the beginning of ownership,
	b)　　the end of ownership,
	c)　　the transfer of ownership,
	d)　　the acquisition from an unknown source, or
	e)　　the loss of title due to destruction of the item.
	It can 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. ISO 21127 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 collection of a hammerhead shark, *genus Sphyrna* (Carchariniformes), by John Steinbeck and Edward Ricketts at Puerto Escondido in the Gulf of Mexico on March 25th, 1940
	The acquisition of El Greco's "The Apostles Peter and Paul" by the State Hermitage in Saint Petersburg
	The loss of my stuffed *Fringilla coelebs* due to insect damage last year
Properties	P22 transferred title to (acquired title through): E39 Actor
	P23 transferred title from (surrendered title through): E39 Actor
	P24 transferred title of (changed ownership through): E18 Physical Thing

E9 Move

Subclass of	E7 Activity
Superclass of	
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 can also be documented to consist of other moves [through 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
	The movement of the exhibition "Treasures of Tutankhamen" 1976 to 1979
Properties	P25 moved (moved by): E19 Physical Object
	P26 moved to (was destination of): E53 Place
	P27 moved from (was origin of): E53 Place

E10 Transfer of Custody

Subclass of	E7 Activity
Superclass of	
Scope note	This class comprises transfers of physical custody of objects between instances of E39 Actor.
	E10 Transfer of Custody does not require the donor and/or recipient to be included, known, or even to exist. Depending on the circumstances, it can describe
	a) the beginning of custody,
	b) the end of custody,
	c) the transfer of custody, or
	d) 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 interpretation of the museum notion of "accession" differs between institutions. ISO 21127 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
Properties	P28 transferred custody from (surrendered custody through): E39 Actor
	P29 transferred custody to (received custody through): E39 Actor
	P30 transferred custody of (changed custody through): E18 Physical Thing

E11 Modification

Subclass of	E7 Activity
Superclass of	E12 Production
	E79 Part Addition
	E80 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 can be consumed or destroyed in a modification event, and that others can 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 properties of the design or procedure, rather than through P126 employed (was employed in) E57 Material.

Examples	The construction of the SS Great Britain (E12)
	The impregnation of the Vasa warship in Stockholm for preservation after 1956
	The transformation of the Enola Gay into a museum exhibit before 1995 (E11, E81)
	The last renewal of the gold coating of the Toshogu shrine in Nikko, Japan
Properties	P31 has modified (was modified by): E24 Physical Man-Made Thing
	P126 employed (was employed in): E57 Material

E12 Production

Subclass of	E11 Modification
	E63 Beginning of Existence
Superclass of	
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 can make it a voting token. The original potsherd might not be worth documenting, in contrast to the inscribed one.
	This entity can be collective, e.g. the printing of a thousand books 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
	The recasting of the Little Mermaid at the harbour of Copenhagen
	Rembrandt creating the seventh state of his etching "Woman sitting half-dressed beside a stove", 1658, identified by Bartsch Number 197 (E12, E65, E81)
Properties	P108 has produced (was produced by): E24 Physical Man-Made Thing

E13 Attribute Assignment

Subclass of	E7 Activity
Superclass of	E14 Condition Assessment
	E15 Identifier Assignment
	E16 Measurement
	E17 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 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 characterized as "shortcuts" of this action. This redundant modelling of two alternative views is preferred because many implementations might have good reasons to model either the action or the shortcut, 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
Properties	P140 assigned attribute to (received attribute through): E1 Entity
	P141 assigned (was assigned by): E1 Entity

E14 Condition Assessment

Subclass of	E13 Attribute Assignment
Superclass of	
Scope note	This class describes the act of assessing the state of preservation of an object during a particular period.
	The condition assessment can be carried out by inspection, measurement, or through historical research. This class is used to document circumstances of the respective assessment that is 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
Properties	P34 concerned (was assessed by): E18 Physical Thing
	P35 has identified (was identified by): E3 Condition State

E15 Identifier Assignment

Subclass of	E13 Attribute Assignment
Superclass of	
Scope note	This class comprises activities that result in the allocation of an identifier to an instance of E1 Entity. An E15 Identifier Assignment can include the creation of the identifier from multiple constituents, which themselves can be instances of E41 Appellation. The syntax and kinds of constituents to be used can 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 organization can be expressed by using the property E1 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 through the P2 has type property.
Examples	Replacement of the inventory number, TA959a, by GE34604 for a 17th century lamentation cloth at the Museum Benaki, Athens Assigning the author and uniform title heading "Goethe, Johann Wolfgang von, 1749-1832. Faust. 1. Theil." to a work On June 1st 2001, assigning the personal name heading "Guillaume, de Machaut, ca. 1300-1377" to Guillaume de Machaut
Properties	P37 assigned (was assigned by): E42 Identifier P38 deassigned (was deassigned by): E42 Identifier P142 used constituent (was used in): E90 Symbolic Object

E16 Measurement

Subclass of	E13 Attribute Assignment
Superclass of	
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 can 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 can be judged at a later stage, or research continued on the associated documents. The date of the event is important for dimensions that can 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)
Properties	P39 measured (was measured by): E70 Thing P40 observed dimension (was observed in): E54 Dimension

E17 Type Assignment

Subclass of	E13 Attribute Assignment
Superclass of	
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 Lamentation cloth, October 2nd
	The determination of a cactus in Martin Doerr's garden as *Cereus hildmannianus* K.Schum., July 2003
Properties	P41 classified (was classified by): E1 Entity
	P42 assigned (was assigned by): E55 Type

E18 Physical Thing

Subclass of	E72 Legal Object
Superclass of	E19 Physical Object
	E24 Physical Man-Made Thing
	E26 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 ontology 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.
	The ontology is generally not concerned with amounts of matter in fluid or gaseous states.
Examples	The Cullinan Diamond (E19)
	The cave "Ideon Andron" in Crete (E26)
	The Mona Lisa (E22)
Properties	P44 has condition (is condition of): E3 Condition State
	P45 consists of (is incorporated in): E57 Material
	P46 is composed of (forms part of): E18 Physical Thing
	P49 has former or current keeper (is former or current keeper of): E39 Actor
	P50 has current keeper (is current keeper of): E39 Actor
	P51 has former or current owner (is former or current owner of): E39 Actor
	P52 has current owner (is current owner of): E39 Actor
	P53 has former or current location (is former or current location of): E53 Place
	P58 has section definition (defines section): E46 Section Definition
	P59 has section (is located on or within): E53 Place

E19 Physical Object

Subclass of	E18 Physical Thing
Superclass of	E20 Biological Object
	E22 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",[2] i.e. naturally defined objects.
	The decision as to what is documented as a complete item, rather than by its parts or components, can be purely administrative or can be a result of the acquisition history of the item.
Examples	John Smith
	Aphrodite of Milos
	The Palace of Knossos
	The Cullinan Diamond
	Apollo 13 at the time of launch
Properties	P54 has current permanent location (is current permanent location of): E53 Place
	P55 has current location (currently holds): E53 Place
	P56 bears feature (is found on): E26 Physical Feature
	P57 has number of parts: E60 Number

E20 Biological Object

Subclass of	E19 Physical Object
Superclass of	E21 Person
Scope note	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
	Tutankhamen
	Boukephalas
	Petrified dinosaur excrement PA1906–344
Properties	

E21 Person

Subclass of	E20 Biological Object E39 Actor
Superclass of	
Scope note	This class comprises real persons who live or are assumed to have lived. Legendary figures that might 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 ontology does not propose a specific form to support reasoning about possible identity.
Examples	Tutankhamen Nelson Mandela
Properties	

E22 Man-Made Object

Subclass of	E19 Physical Object E24 Physical Man-Made Thing
Superclass of	E84 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) The Portland Vase The Coliseum
Properties	

E24 Physical Man-Made Thing

Subclass of	E18 Physical Thing E71 Man-Made Thing
Superclass of	E22 Man-Made Object E25 Man-Made Feature E78 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 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)
	The Channel Tunnel (E25)
	The Historical Collection of the Museum Benaki in Athens (E78)
Properties	P62 depicts (is depicted by): E1 Entity
	(P62.1 mode of depiction: E55 Type)
	P65 shows visual item (is shown by): E36 Visual Item
	P128 carries (is carried by): E90 Symbolic Object

E25 Man-Made Feature

Subclass of	E24 Physical Man-Made Thing
	E26 Physical Feature
Superclass of	
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 a "cup-and-ring" carving on bedrock is regarded as instance of E25 Man-Made Feature.
Examples	The Manchester Ship Canal
	Michael Jackson's nose following plastic surgery
Properties	

E26 Physical Feature

Subclass of	E18 Physical Thing
Superclass of	E25 Man-Made Feature
	E27 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 can have a one-dimensional, two-dimensional, 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 can be identified (or sometimes removed) carrying the complete feature.
	This definition coincides with the definition of "fiat objects", [2] 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
	Albrecht Duerer's signature on his painting of Charles the Great
	The damage to the nose of the Great Sphinx in Giza
	Michael Jackson's nose prior to plastic surgery
Properties	

E27 Site

Subclass of	E26 Physical Feature
Superclass of	
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
	Knossos
	The Apollo 11 landing site
	Heathrow Airport
	The submerged harbour of the Minoan settlement of Gournia, Crete
Properties	

E28 Conceptual Object

Subclass of	E71 Man-Made Thing
Superclass of	E55 Type
	E89 Propositional Object
	E90 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 might 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 can 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 to Joy"
	The definition of "ontology" in the Oxford English Dictionary
	News of the victory at marathon carried by the famous runner
Properties	P149 is identified by (identifies): E75 Conceptual Object Appellation

E29 Design or Procedure

Subclass of	E73 Information Object
Superclass of	
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 can result in the modification or production of instances of E24 Physical Man-Made Thing. Instances of E29 Design or Procedure can be structured in parts and sequences or depend on others. This is modelled using P69 is associated with. Designs or procedures can be seen as one of the following: — a schema for the activities it describes; — a schema of the products that result from their application; — an independent intellectual product that might have never been applied, such as Leonardo da Vinci's famous plans for flying machines. Because designs or procedures can never be applied or only partially executed, the ontology models a loose relationship between the plan and the respective product.
Examples	The ISO standardization procedure The musical notation for Beethoven's "Ode to Joy" The architectural drawings for the Kölner Dom in Cologne, Germany The drawing found on Folio 860 of the Codex Atlanticus from Leonardo da Vinci, 1486 to 1490, kept in Biblioteca Ambrosiana in Milan
Properties	P68 foresees use of (use foreseen by): E57 Material P69 is associated with: E29 Design or Procedure (P69.1 has type: E55 Type)

E30 Right

Subclass of	E89 Propositional Object
Superclass of	
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 21127 Ownership of the "Mona Lisa" by the Louvre
Properties	

E31 Document

Subclass of	E73 Information Object
Superclass of	E32 Authority Document
Scope note	This class comprises identifiable immaterial items that make propositions about reality. These propositions can be expressed in text, graphics, images, audiograms, and videograms, or by other similar means. Documentation databases are regarded as a special case of E31 Document.

Examples	The Encyclopaedia Britannica (E32)
	The photo of the Allied Leaders at Yalta published by UPI, 1945
	The Doomsday Book
Properties	P70 documents (is documented in): E1 Entity

E32 Authority Document

Subclass of	E31 Document
Superclass of	
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
	The Getty Art and Architecture Thesaurus
	The CIDOC Conceptual Reference Model
Properties	P71 lists (is listed in): E1 Entity

E33 Linguistic Object

Subclass of	E73 Information Object
Superclass of	E34 Inscription
	E35 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 ontology 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 ontology. These should be treated 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
	The lyrics of the song "Blue Suede Shoes"
	The text of the Jabberwocky by Lewis Carroll
	The text of "Doktoro Jekyll kaj Sinjoro Hyde" (an Esperanto translation of Dr. Jekyll and Mr. Hyde)
Properties	P72 has language (is language of): E56 Language
	P73 has translation (is translation of): E33 Linguistic Object

E34 Inscription

Subclass of	E33 Linguistic Object
	E37 Mark
Superclass of	
Scope note	This class comprises recognizable short texts that can be 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 is *not* intended to describe the idiosyncratic characteristics of an individual physical embodiment of an inscription, but the underlying prototype. The physical embodiment is modelled in the ontology as E25 Physical Man-Made Feature.
	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" as found on signs placed in the lawns of Balliol College
	The text published in Corpus Inscriptionum Latinarum V 895
	"Kilroy was here"
Properties	

E35 Title

Subclass of	E33 Linguistic Object
	E41 Appellation
Superclass of	
Scope note	This class comprises the names assigned to works, such as texts, artworks, or pieces of music.
	Titles function as *proper nouns* 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 can 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"
	"Mona Lisa"
	"La Pie, Effet de Neige"
	"The Magpie"
	"Lucy in the Sky with Diamonds"
Properties	

E36 Visual Item

Subclass of	E73 Information Object
Superclass of	E37 Mark
	E38 Image
Scope note	This class comprises the intellectual or conceptual aspects of recognizable 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 can 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 E36 Visual Item class 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 the depicted subjects (E1 Entity) can be regarded as a shortcut 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 E1 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)
Properties	P138 represents (has representation): E1 Entity
	(P138.1 mode of representation: E55 Type)

E37 Mark

Subclass of	E36 Visual Item
Superclass of	E34 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
	©
	☺
Properties	

E38 Image

Subclass of	E36 Visual Item
Superclass of	
Scope note	This class comprises distributions of form, tone, and colour that can 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 can 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 might differ in size and carrier and might 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 are at first appearance.
Examples	The front side of all Swiss 20 CHF notes
	The image depicted on all reproductions of the Mona Lisa
Properties	

E39 Actor

Subclass of	E77 Persistent Item
Superclass of	E21 Person
	E74 Group
Scope note	This class comprises people, either individually or in groups, who have the potential to perform intentional actions for which they can be held responsible.
	The ontology 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 McKellen (E21)
Properties	P74 has current or former residence (is current or former residence of): E53 Place
	P75 possesses (is possessed by): E30 Right
	P76 has contact point (provides access to): E51 Contact Point
	P131 is identified by (identifies): E82 Actor Appellation

E40 Legal Body

Subclass of	E74 Group
Superclass of	
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
	Open World Systems
	The National Museum of Denmark
Properties	

E41 Appellation

Subclass of	E90 Symbolic Object
Superclass of	E35 Title
	E42 Identifier
	E44 Place Appellation
	E49 Time Appellation
	E51 Contact Point
	E75 Conceptual Object Appellation
	E82 Actor Appellation
Scope note	This class comprises all 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 within a certain context.
	Instances of E41 Appellation do not identify things by their meaning, even if they happen to have one, but 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 regarded as equivalent, regardless of the things they denote.
	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 recognized.
	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)
	"Spigelia marilandica (L.) L." (not the species, just the name)
	"information science" (not the science itself, but the name used to refer to the subject matter in an English-speaking context)
Properties	P139 has alternative form: E41 Appellation
	(P139.1 has type: E55 Type)

E42 Identifier

Subclass of	E41 Appellation
Superclass of	
Scope note	This class comprises strings or codes assigned to instances of E1 Entity in order to identify them uniquely within the context of one or more organizations. 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)
Properties	

E44 Place Appellation

Subclass of	E41 Appellation
Superclass of	E45 Address
	E46 Section Definition
	E47 Spatial Coordinates
	E48 Place Name
Scope note	This class comprises any sort of identifier characteristically used to refer to an E53 Place.
	Instances of E44 Place Appellation can vary in their degree of precision and their meaning can vary over time, i.e. the same instance of E44 Place Appellation can 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 Coordinates, and parts of buildings can all be considered as instances of E44 Place Appellation.
Examples	"Vienna"
	"CH-1211, Genève"
	"Aquae Sulis Minerva"
	"Bath"
	"Cambridge"
	"The Other Place"
	"The City"
Properties	

E45 Address

Subclass of	E44 Place Appellation
	E51 Contact Point
Superclass of	
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"
Properties	

E46 Section Definition

Subclass of	E44 Place Appellation
Superclass of	
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, and 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 (compare 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 Reference [3].)
Examples	"The entrance lobby to the Ripley Center"
	"The poop deck of H.M.S. Victory"
	"The Venus de Milo's left buttock"
	"Left inner side of my box"
Properties	

E47 Spatial Coordinates

Subclass of	E44 Place Appellation
Superclass of	
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"
Properties	

E48 Place Name

Subclass of	E44 Place Appellation
Superclass of	
Scope note	This class comprises particular and common forms of E44 Place Appellation.
	Place Names can change their application over time: the name of an E53 Place can change, and a name can be reused for a different E53 Place. Instances of E48 Place Name are typically subject to place name gazetteers.[4]
Examples	"Greece"
	"Athens"
	"Geneva"
	"Lac Léman"
Properties	

E49 Time Appellation

Subclass of	E41 Appellation
Superclass of	E50 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 can vary in their degree of precision, and they can 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"
	"1st half of the 20th century"
	"Quaternary"
	"1215 Hegira"
	"Last century"
Properties	

E50 Date

Subclass of	E49 Time Appellation
Superclass of	
Scope note	This class comprises specific forms of E49 Time Appellation.
	Dates can vary in their degree of precision.
Examples	"1900"
	"4-4-1959"
	"19-MAR-1922"
	"19640604"
Properties	

E51 Contact Point

Subclass of	E41 Appellation
Superclass of	E45 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, 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 to access, through http requests, resources stored on a machine. Since the accessed machine acts on behalf of the E39 Actor providing the service, a URL can sometimes be considered as an instance of E51 Contact Point for the E39 Actor in question.
Examples	"+41 22 418 5571"
	"weasel@paveprime.com"
Properties	

E52 Time-Span

Subclass of	E1 Entity
Superclass of	
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 can 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 to 16h22 4th July 1945
	9.30 am 1.1.1999 to 2.00 pm 1.1.1999
	duration of the Ming Dynasty
Properties	P78 is identified by (identifies): E49 Time Appellation
	P79 beginning is qualified by: E62 String
	P80 end is qualified by: E62 String
	P81 ongoing throughout: E61 Time Primitive
	P82 falls at some time within: E61 Time Primitive
	P83 had at least duration (was minimum duration of): E54 Dimension
	P84 had at most duration (was maximum duration of): E54 Dimension
	P86 falls within (contains): E52 Time-Span

E53 Place

Subclass of	E1 Entity
Superclass of	
Scope note	This class comprises extents in space, in particular on the surface of the earth, in the pure sense of physics, i.e. 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 can 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, i.e. 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 can 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 - > < -
Properties	P87 is identified by (identifies): E44 Place Appellation
	P88 consists of (forms part of): E53 Place
	P89 falls within (contains): E53 Place
	P121 overlaps with: E53 Place
	P122 borders with: E53 Place

E54 Dimension

Subclass of	E1 Entity
Superclass of	
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 can be recorded as 4,5 cm–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 g/cc
	luminescence: 56 ISO lumens
	tin content: 0,46 %
	height at the withers: 15 hands
	calibrated C14 date: 2460–2720 years
Properties	P90 has value: E60 Number
	P91 has unit (is unit of): E58 Measurement Unit

E55 Type

Subclass of	E28 Conceptual Object
Superclass of	E56 Language
	E57 Material
	E58 Measurement Unit
Scope note	This class comprises concepts denoted by terms from thesauri and controlled vocabularies used to characterize and classify instances of classes. Instances of E55 Type represent concepts, in contrast to instances of E41 Appellation which are used to name instances of classes.
	E55 Type provides an interface to domain specific ontologies and thesauri. These can be represented as subclasses of E55 Type, forming hierarchies of terms, i.e. instances of E55 Type linked together through P127 has broader term (has narrower term). Such hierarchies can be extended with additional properties.
Examples	weight, length, depth (types of E54 Dimension)
	portrait, sketch, animation (types of E38 Image)
	French, English, German (types of E56 Language)
	excellent, good, poor (types of E3 Condition State)
	Ford Model T, chop stick (types of E22 Man-Made Object)
	cave, doline, scratch (types of E26 Physical Feature)
	poem, short story (types of E33 Linguistic Object)
	wedding, earthquake, skirmish (types of E5 Event)
Properties	P127 has broader term (has narrower term): E55 Type

E56 Language

Subclass of	E55 Type
Superclass of	
Scope note	This class is a specialization of E55 Type and comprises 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".
	Internationally or nationally agreed codes and terminology should be used to denote instances of E56 Language, such as those defined in ISO 639-3:2007.

Examples	el (Greek)
	en (English)
	eo (Esperanto)
	es (Spanish)
	fr (French)
Properties	

E57 Material

Subclass of	E55 Type
Superclass of	
Scope note	This class is a specialization of E55 Type and comprises the concepts of materials.
	Instances of E57 Material can 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".
	Internationally or nationally agreed codes and terminology should be used.
Examples	brick
	gold
	aluminium
	polycarbonate
	resin
Properties	

E58 Measurement Unit

Subclass of	E55 Type
Superclass of	
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.[7] Archaic Measurement Units used in historical records should be preserved.

Examples	cm centimetre
	km kilometre
	m metre
	m/s metres per second
	A ampere
	GRD Greek Drachma
	°C
Properties	

E59 Primitive Value

Subclass of	
Superclass of	E60 Number
	E61 Time Primitive
	E62 String
Scope note	This class comprises primitive values used as documentation elements, which are not further elaborated upon within the model.
	As such, they are not considered as elements within our universe of discourse. No specific implementation recommendations are made. It is recommended that the primitive value system from the implementation platform be used to substitute for this class and its subclasses.
Examples	ABCDEFG
	3,14
	0
	1921–01–01
Properties	

E60 Number

Subclass of	E59 Primitive Value
Superclass of	
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 Coordinates, even though their encoding can 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 can be combined with numbers expressing distances to yield new identifiers, e.g. 1924–01–31 + 2 days = 1924–02–02. Compare E54 Dimension.
Examples	5
	3+2i
	1,5 e-04
	(0,5, −0,7, 88)
Properties	

E61 Time Primitive

Subclass of	E59 Primitive Value
Superclass of	
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 to 1997
	13 May 1768
	2000/01/01 00:00:59,7
	85th century BC
Properties	

E62 String

Subclass of	E59 Primitive Value
Superclass of	
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
Properties	

E63 Beginning of Existence

Subclass of	E5 Event
Superclass of	E12 Production
	E65 Creation
	E66 Formation
	E67 Birth
	E81 Transformation
Scope note	This class comprises events that bring into existence any E77 Persistent Item.
	It can 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 both a *terminus post quem* and a *terminus ante quem*.
Examples	The birth of my child
	The birth of Snoopy, my dog
	The formation of the iceberg that sank the Titanic
	The construction of the Eiffel Tower
Properties	P92 brought into existence (was brought into existence by): E77 Persistent Item

E64 End of Existence

Subclass of	E5 Event
Superclass of	E6 Destruction
	E68 Dissolution
	E69 Death
	E81 Transformation
Scope note	This class comprises events that end the existence of any E77 Persistent Item.
	It can 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 post quem* and a *terminus ante quem*. In cases where substance from an E77 Persistent Item continues to exist in a new form, the process should 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 356 BC
Properties	P93 took out of existence (was taken out of existence by): E77 Persistent Item

E65 Creation

Subclass of	E7 Activity
	E63 Beginning of Existence
Superclass of	E83 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
	The drafting of U.N. Resolution 1441
Properties	P94 has created (was created by): E28 Conceptual Object

E66 Formation

Subclass of	E7 Activity
	E63 Beginning of Existence
Superclass of	
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 mean 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
	The conspiring of the murderers of Caesar
Properties	P95 has formed (was formed by): E74 Group

E67 Birth

Subclass of	E63 Beginning of Existence
Superclass of	
Scope note	This class comprises all human births. E67 Birth is a biological event focusing 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 can describe more details and the complexity of motherhood since the advent 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
Properties	P96 by mother (gave birth): E21 Person
	P97 from father (was father for): E21 Person
	P98 brought into life (was born): E21 Person

E68 Dissolution

Subclass of	E64 End of Existence
Superclass of	
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
	The liquidation of Enron Corporation
Properties	P99 dissolved (was dissolved by): E74 Group

E69 Death

Subclass of	E64 End of Existence
Superclass of	
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
	The death of Senator Paul Wellstone
Properties	P100 was death of (died in): E21 Person

E70 Thing

Subclass of	E77 Persistent Item
Superclass of	E71 Man-Made Thing E72 Legal Object
Scope note	This general class comprises usable discrete, identifiable, instances of E77 Persistent Item that can be documented as single units. They can be either intellectual products or physical things, and are characterized by relative stability. They can, for instance, either have a solid physical form, an electronic encoding, or they can be a logical concept or structure.
Examples	My photograph collection (E78) The ISO logo (E29) The cave of Dirou, Mani, Greece (E27) The pint of milk in my refrigerator The plan of the Strassburger Muenster The stuffed thing on the top of Otto Hahn's desk
Properties	P43 has dimension (is dimension of): E54 Dimension P101 had as general use (was use of): E55 Type P130 shows features of (features are also found on): E70 Thing (P130.1 kind of similarity: E55 Type)

E71 Man-Made Thing

Subclass of	E70 Thing
Superclass of	E24 Physical Man-Made Thing E28 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 can, for instance, have a solid physical form, an electronic encoding, or they can be logical concepts or structures.
Examples	Beethoven's 5th Symphony (E73) Michelangelo's David Einstein's Theory of General Relativity (E73) The taxon *Fringilla coelebs Linnaeus,1758* (E55)
Properties	P102 has title (is title of): E35 Title (P102.1 has type: E55 Type) P103 was intended for (was intention of): E55 Type

E72 Legal Object

Subclass of	E70 Thing
Superclass of	E18 Physical Thing
	E90 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 generally true for instances of 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 might 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 standard.
Examples	The Cullinan diamond
	The text entitled "Definition of the CIDOC Conceptual Reference Model Version 2.1" (E73)
Properties	P104 is subject to (applies to): E30 Right
	P105 right held by (has right on): E39 Actor

E73 Information Object

Subclass of	E89 Propositional Object
	E90 Symbolic Object
Superclass of	E29 Design or Procedure
	E31 Document
	E33 Linguistic Object
	E36 Visual Item
Scope note	This class comprises identifiable immaterial items, such as 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.
	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, in file "BM000038850.JPG" from the Clayton Herbarium in London
	E. A. Poe's "The Raven"
	The movie "The Seven Samurai" by Akira Kurosawa
	The Maxwell Equations
Properties	

E74 Group

Subclass of	E39 Actor
Superclass of	E40 Legal Body
Scope note	This class comprises any gatherings or organizations of two or more people 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.
	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 artefact, 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
	The Navajo
	The Greeks
	The peace protestors in New York City on February 15, 2003
	Exxon-Mobil
	King Solomon and his wives
	The President of the Swiss Confederation
Properties	P107 has current or former member (is current or former member of): E39 Actor
	(P107.1 kind of member: E55 Type)

E75 Conceptual Object Appellation

Subclass of	E41 Appellation
Superclass of	
Scope note	This class comprises all specific identifiers used as names to refer to intellectual products or standardized patterns.
Examples	"ISBN 3-7913-1418-1"
	"ISO 2788:1986(E)"
	"The Maxwell Equations"
	"The Complete Works of Shakespeare"
Properties	

E77 Persistent Item

Subclass of	E1 Entity
Superclass of	E39 Actor
	E70 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, i.e. 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 lifespan, affecting both material composition and form, yet preserve their identity by other criteria. Similarly, inanimate objects can 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 can 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 of the E77 Persistent Item class are temporal objects such as periods, events and acts, and descriptive properties.
Examples	Leonardo da Vinci
	Stonehenge
	The hole in the ozone layer
	The first law of thermodynamics
	The Bermuda Triangle
Properties	

E78 Collection

Subclass of	E24 Physical Man-Made Thing
Superclass of	
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.
	Items can be added or removed from an E78 Collection in pursuit of this plan. This class should not be confused with the E39 Actor maintaining the E78 Collection who is often referred to using the name of the E78 Collection (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 Collection. 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
	Mikael Heggelund Foslie's coralline red algal Herbarium at the Museum of Natural History and Archaeology, Trondheim, Norway
Properties	P109 has current or former curator (is current or former curator of): E39 Actor

E79 Part Addition

Subclass of	E11 Modification
Superclass of	
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 artefacts 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
	The addition of the painting "Room in Brooklyn" by Edward Hopper to the collection of the Museum of Fine Arts, Boston
Properties	P110 augmented (was augmented by): E24 Physical Man-Made Thing
	P111 added (was added by): E18 Physical Thing

E80 Part Removal

Subclass of	E11 Modification
Superclass of	
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 jewellery or cultural artefacts 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
Properties	P112 diminished (was diminished by): E24 Physical Man-Made Thing
	P113 removed (was removed by): E18 Physical Thing

E81 Transformation

Subclass of	E63 Beginning of Existence
	E64 End of Existence
Superclass of	
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 preserve some recognizable substance from the initial item(s) but which have a fundamentally different nature and 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 initial E77 Persistent Item 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 reuse of historical buildings or ruins, fires leaving buildings in ruins, taxidermy of specimens in natural history, and the reorganization of a corporate body into a new one.
Examples	The death and mummification of Tutankhamen (transformation of Tutankhamen from a living person to a mummy)
Properties	P123 resulted in (resulted from): E77 Persistent Item
	P124 transformed (was transformed by): E77 Persistent Item

E82 Actor Appellation

Subclass of	E41 Appellation
Superclass of	
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 can 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 US Social Security Number "246-14-2304"
	"The Artist Formerly Known as Prince"
	"The Master of the Flemish Madonna"
	"Raphael's Workshop"
	"The Brontë Sisters"
	"The International Council of Museums"
	"ICOM"
Properties	

E83 Type Creation

Subclass of	E65 Creation
Superclass of	
Scope note	This class comprises activities formally defining new classes 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 "prologue," and the exemplary specimens as "original element" or "holotype".
Examples	Creation of the taxon *Penicillium brefeldianum*
	Addition of class E84 Information Carrier to the CIDOC CRM
Properties	P135 created type (was created by): E55 Type
	P136 was based on (supported type creation): E1 Entity
	(P136.1 in the taxonomic role: E55 Type)

E84 Information Carrier

Subclass of	E22 Man-Made Object
Superclass of	
Scope note	This class comprises all instances of E22 Man-Made Object that are explicitly designed to act as persistent physical carriers of instances of E73 Information Object.
	This allows a relationship to be asserted between an E19 Physical Object and its immaterial information contents. An E84 Information Carrier might or might not contain information, e.g. a diskette. Note that any E18 Physical Thing can carry information, such as an inscription. However, unless it was specifically designed for this purpose, it is not an E84 Information Carrier. Therefore, the property P128 carries (is carried by) applies to E18 Physical Thing in general.
Examples	The Rosetta Stone
	My paperback copy of "Crime & Punishment"
	The computer disk at ICS-FORTH that stores the Definition of the CIDOC CRM
Properties	

E85 Joining

Subclass of	E7 Activity
Superclass of	
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.
	Typical scenarios include becoming a member of a social organization, becoming an 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
	The inauguration of Mikhail Sergeyevich Gorbachev as leader of the Union of Soviet Socialist Republics (USSR) in 1985
	The implementation of the membership treaty between EU and Denmark January 1, 1973
Properties	P143 joined (was joined by): E39 Actor
	P144 joined with (gained member by): E74 Group
	(P144.1 kind of member: E55 Type)

E86 Leaving

Subclass of	E7 Activity
Superclass of	
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.
	Typical scenarios include the termination of membership in a social organization, ending 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
	George Washington's leaving office in 1797
	The implementation of the treaty regulating the termination of Greenland's membership in EU between EU, Denmark and Greenland February 1, 1985
Properties	P145 separated (left by): E39 Actor
	P146 separated from (lost member by): E74 Group

E87 Curation

Subclass of	E7 Activity
Superclass of	
Scope note	This class comprises activities that contribute to the management, preservation, and evolution of instances of E78 Collection, in accordance with 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 such as 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 to form a collection is regarded as an instance of E12 Production Event, while the activities of evolving, preserving, and promoting a collection are regarded as instances of E87 Curation.
Examples	The curation of Mikael Heggelund Foslie's red algal Herbarium 1876 to 1909 (when Foslie died), now at the Museum of Natural History and Archaeology, Norway
Properties	P147 curated (was curated by): E78 Collection

E89 Propositional Object

Subclass of	E28 Conceptual Object
Superclass of	E73 Information Object
	E30 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 mental 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
	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 1945 (E38)
Properties	P67 refers to (is referred to by): E1 Entity
	(P67.1 has type: E55 Type)
	P129 is about (is subject of): E1 Entity
	P148 has component (is component of): E89 Propositional Object

E90 Symbolic Object

Subclass of	E28 Conceptual Object
	E72 Legal Object
Superclass of	E73 Information Object
	E41 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 can 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 might or might not have a specific meaning, for example an arbitrary character string.

| 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" (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) |
|---|---|
| Properties | P106 is composed of (forms part of): E90 Symbolic Object |

7 Property declarations

All properties are declared in this clause 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 **Subproperty of** is a cross-reference to any superproperties the property can have.

— The line **Superproperty of** is a cross-reference to any subproperties the property can have.

— The line **Quantification** declares the possible number of occurrences for domain and range class instances for the property. Possible values are: one to one, one to many, many to one, many to many.

— The line **Scope note** contains the textual definition of the predicate the property represents.

— The line **Examples** provides illustrative examples showing how the property should be used.

— The line **Properties**, when present, declares properties of the property.

P1 is identified by (identifies)

Domain	E1 Entity
Range	E41 Appellation
Superproperty of	E1 Entity. P48 has preferred identifier (is preferred identifier of): E42 Identifier
E52 Time-Span. P78 is identified by (identifies): E49 Time Appellation
E53 Place. P87 is identified by (identifies): E44 Place Appellation
E71 Man-Made Thing. P102 has title (is title of): E35 Title
E39 Actor. P131 is identified by (identifies): E82 Actor Appellation
E28 Conceptual Object. P149 is identified by (identifies): E75 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.
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)

P2 has type (is type of)

Domain	E1 Entity
Range	E55 Type
Superproperty of	E1 Entity. P137 exemplifies (is exemplified by): E55 Type
Quantification	many to many (0,n:0,n)
Scope note	This property allows sub-typing of entities, a form of specialization, through the use of a terminological hierarchy, or thesaurus.
	The standard is intended to focus on the high-level entities and relationships needed to describe data structures. Consequently, it does not specialize entities any further than is required for this immediate purpose. However, entities in the IsA hierarchy of the ontology can be specialized into any number of sub-entities, which can be defined in the E55 Type hierarchy. E51 Contact Point, for example, can be specialized into "e-mail address", "telephone number", "post office box", "URL", etc.; none of which figures explicitly in the class hierarchy. Sub-typing obviously requires consistency between the meaning of the terms assigned and the more general intent of the entity in question.
Examples	www.cidoc.icom.museum (E51) *has type* URL (E55)

P3 has note

Domain	E1 Entity
Range	E62 String
Superproperty of	E52 Time-Span. P79 beginning is qualified by: E62 String
	E52 Time-Span. P80 end is qualified by: E62 String
Quantification	one to many (0,n:0,1)
Scope note	The "has note" property is a container for all informal descriptions about an object that have not been expressed in terms of ontology constructs.
	In particular, it captures the characterization of the item itself, its internal structures, appearance, etc.
	Like property P2, "has type", this property is a consequence of the restricted focus of the standard. The aim is not to capture, in a structured form, *everything* that can be said about an item; indeed, the formalism of the standard 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 characterization. The P3.1 "has type" property of "has note" allows differentiation of specific notes, e.g. "construction", "decoration" etc.
	An item can have many notes, but a note is attached to a specific item.

Examples	Coffee mug, OXCMS:1983.1.1 (E19) *has note* chipped at edge of handle (E62) *has type* Condition (E55)
Properties	P3.1 has type: E55 Type

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

Domain	E2 Temporal Entity
Range	E52 Time-Span
Quantification	many to one, necessary, dependent (1,1:1,*n*)
Scope note	This property describes the temporal confinement of an instance of 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 "timeline" 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 might exist alternative opinions about it, which we would express by assigning multiple Time-Spans. Related temporal entities can share a Time-Span. Time-Spans can 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)

P5 consists of (forms part of)

Domain	E3 Condition State
Range	E3 Condition State
Quantification	one to many (0,*n*:0,1)
Scope note	This property describes the decomposition of 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 might 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" can be decomposed into the individual stages of decay.
Examples	The ruined state of the Parthenon (E3) *consists of* a blown up state (E3) as a result of the explosion in 1687

P7 took place at (witnessed)

Domain	E4 Period
Range	E53 Place
Superproperty of	E9 Move. P26 moved to (was destination of): E53 Place
	E9 Move. P27 moved from (was origin of): E53 Place
Quantification	many to many, necessary (1,*n*:0,*n*)
Scope note	This property describes the spatial location of an instance of E4 Period.
	The related E53 Place should be seen as an approximation of the geographical area within which the phenomena that characterize the period in question occurred. P7 does not convey any meaning other than spatial positioning (generally on the surface of the earth). For example, the period "Révolution française" can be said to have taken place in "France", the "Victorian" period might be said to have taken place in "Britain" and its colonies, as well as other parts of Europe and north America.
	A period can take place at multiple locations.
Examples	The period "Révolution française" (E4) *took place at* France (E53)

P8 took place on or within (witnessed)

Domain	E4 Period
Range	E19 Physical Object
Quantification	many to many (0,n:0,n)
Scope note	This property describes the location of an instance of E4 Period with respect to an E19 Physical Object.
	P8 is a shortcut of a path defining an E53 Place with respect to the geometry of an object. Compare *E46 Section Definition.*
	This property is in effect a special case of P7 took place at. It describes a period that can be located with respect to the space defined by an E19 Physical Object, such as a ship or a building. The precise geographical location of the object during the period in question might be unknown or unimportant.
	For example, the French and German armistice of 22 June 1940 was signed in the same railway carriage as the armistice of 11 November 1918.
Examples	The coronation of Queen Elizabeth II (E7) *took place on or within* Westminster Abbey (E19)

P9 consists of (forms part of)

Domain	E4 Period
Range	E4 Period
Quantification	one to many, (0,n:0,1)
Scope note	This property describes the decomposition of an instance of E4 Period into discrete, subsidiary periods.
	The sub-periods into which the period is decomposed form a logical whole, although the entire picture might not be completely known, and the sub-periods are *constitutive* of the general period.
Examples	Cretan Bronze Age (E4) *consists of* Middle Minoan (E4)

P10 falls within (contains)

Domain	E4 Period
Range	E4 Period
Quantification	many to many (0,n:0,n)
Scope note	This property describes an instance of E4 Period that falls within the E53 Place and E52 Time-Span of another.
	The difference with *P9 consists of* is subtle. Unlike *P9 consists of*, *P10 falls within* does not imply any logical connection between the two periods and it can refer to a period of a completely different type.
Examples	The Great Plague (E4) *falls within* The Gothic period (E4)

P11 had participant (participated in)

Domain	E5 Event
Range	E39 Actor
Subproperty of	E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item

Superproperty of	E7 Activity. P14 was carried out by (performed): E39 Actor
	E67 Birth. P96 by mother (gave birth): E21 Person
	E68 Dissolution. P99 dissolved (was dissolved by): E74 Group
	E85 Joining. P143 joined (was joined by): E39 Actor
	E85 Joining. P144 joined with (gained member by): E74 Group
	E86 Leaving. P145 separated (left by): E39 Actor
	E86 Leaving. P146 separated from (lost member by): E74 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 lifeline of the related E39 Actor with the E53 Place and E52 Time-Span 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)

P12 occurred in the presence of (was present at)

Domain	E5 Event
Range	E77 Persistent Item
Superproperty of	E5 Event. P11 had participant (participated in): E39 Actor
	E7 Activity. P16 used specific object (was used for): E70 Thing
	E9 Move. P25 moved (moved by): E19 Physical Object
	E11 Modification. P31 has modified (was modified by): E24 Physical Man-Made Thing
	E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item
	E64 End of Existence. P93 took out of existence (was taken out of existence by): E77 Persistent Item
	E79 Part Addition. P111 added (was added by): E18 Physical Thing
	E80 Part Removal. P113 removed (was removed by): E18 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 E52 Time-Span of an event. For example, an object can be the desk, now in a museum on which a treaty was signed. The presence of an immaterial thing implies the presence of at least one of its carriers.
Examples	Deckchair 42 (E19) *was present at* The sinking of the Titanic (E5)

P13 destroyed (was destroyed by)

Domain	E6 Destruction
Range	E18 Physical Thing
Subproperty of	E64 End of Existence. P93 took out of existence (was taken out of existence by): E77 Persistent Item
Quantification	one to many, necessary (1,n:0,1)

Scope note	This property allows specific 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 can in fact continue to exist. A destruction event can be contiguous with a production event that brings into existence a derived object composed partly of matter from the destroyed object.
Examples	The Tay Bridge Disaster (E6) *destroyed* The Tay Bridge (E22)

P14 was carried out by (performed)

Domain	E7 Activity
Range	E39 Actor
Subproperty of	E5 Event. P11 had participant (participated in): E39 Actor
Superproperty of	E8 Acquisition. P22 transferred title to (acquired title through): E39 Actor
	E8 Acquisition. P23 transferred title from (surrendered title through): E39 Actor
	E10 Transfer of Custody. P28 transferred custody from (surrendered custody through): E39 Actor
	E10 Transfer of Custody. P29 transferred custody to (received custody through): E39 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) *was carried out by* Michaelangelo Buonaroti (E21) *in the role of* master craftsman (E55)
Properties	P14.1 in the role of: E55 Type

P15 was influenced by (influenced)

Domain	E7 Activity
Range	E1 Entity
Superproperty of	E7 Activity. P16 used specific object (was used for): E70 Thing
	E7 Activity. P17 was motivated by (motivated): E1 Entity
	E7 Activity. P134 continued (was continued by): E7 Activity
	E83 Type Creation. P136 was based on (supported type creation): E1 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 might have had some bearing upon it.
	The property has more specific subproperties.
Examples	The designing of the Sydney Harbour Bridge (E7) *was influenced by* the Tyne Bridge (E22)

P16 used specific object (was used for)

Domain	E7 Activity
Range	E70 Thing
Subproperty of	E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
	E7 Activity. P15 was influenced by (influenced): E1 Entity

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Superproperty of	E7 Activity. P33 used specific technique (was used by): E29 Design or Procedure
	E79 Part Addition. P111 added (was added by): E18 Physical Thing
	E15 Identifier Assignment. P142 used constituent (was used in): E41 Appellation
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, 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. The use of a particular name by a given group of people over a period of time to identify a thing or place such as a settlement also qualifies as an instance of this property. In such cases, the people understanding and using the name are the "physical carriers".
	The P16.1 "mode of use" property of "used specific object" allows the precise manner of use to be differentiated, e.g. "incorporated", "formed from", "tool", etc.
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 referring to the place identified by the TGN as "7017998" (E7) *used specific object* "Quyunjig" (E44) *mode of use* Current; Vernacular (E55)
Properties	P16.1 mode of use: E55 Type

P17 was motivated by (motivated)

Domain	E7 Activity
Range	E1 Entity
Subproperty of	E7 Activity. P15 was influenced by (influenced): E1 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 can call for a celebration, an order from headquarters can start a military manoeuvre.
Examples	The resignation of the chief executive (E7) *was motivated by* the collapse of SwissAir (E68)
	The coronation of Elizabeth II (E7) *was motivated by* the death of George VI (E69)

P19 was intended use of (was made for)

Domain	E7 Activity
Range	E71 Man-Made 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 P103 was intended for (was intention of)].
	P19.1 mode of use allows the mode of use to be refined.
Examples	Lady Diana Spencer's wedding dress (E71) *was made for* Wedding of Prince Charles and Lady Diana Spencer (E7) *mode of use* To Be Worn (E55)
Properties	P19.1 mode of use: E55 Type

P20 had specific purpose (was purpose of)

Domain	E7 Activity
Range	E5 Event
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property describes the relationship between a preparatory activity and the event that it is intended as a 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 the activity succeeded in achieving its aim. If it does not succeed, such as the setting of a trap that did not catch anything, the unrealized intention should be documented using *P21 had general purpose (was purpose of): E55 Type* and/or *P33 used specific technique (was technique of): E29 Design or Procedure.*
Examples	Van Eyck's pigment grinding in 1432 (E7) *had specific purpose* the painting of the Ghent alter piece (E12)

P21 had general purpose (was purpose of)

Domain	E7 Activity
Range	E55 Type
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property describes an intentional relationship between an E7 Activity and some general goal or purpose.
	This can involve activities intended as preparation for some type of activity or event. *P21 had general purpose (was purpose of)* differs from *P20 had specific purpose (was purpose of)* in that no specific 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)

P22 transferred title to (acquired title through)

Domain	E8 Acquisition
Range	E39 Actor
Subproperty of	E7 Activity. P14 was carried out by (performed): E39 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 can 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 Amoudruz collection by the Geneva Ethnography Museum (E8) *transferred title to* Geneva Ethnography Museum (E74)

P23 transferred title from (surrendered title through)

Domain	E8 Acquisition
Range	E39 Actor
Subproperty of	E7 Activity. P14 was carried out by (performed): E39 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 Amoudruz collection by the Geneva Ethnography Museum (E8) *transferred title from* Heirs of Amoudruz (E74)

P24 transferred title of (changed ownership through)

Domain	E8 Acquisition
Range	E18 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 needs to refer to at least one transferred item.
Examples	Acquisition of the Amoudruz collection by the Geneva Ethnography Museum (E8) *transferred title of* Amoudruz Collection (E78)

P25 moved (moved by)

Domain	E9 Move
Range	E19 Physical Object
Subproperty of	E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
Quantification	many to many, necessary (1,*n*:0,*n*)
Scope note	This property identifies the E19 Physical Object that is moved during a move event. The property implies the object's passive participation. In reality, a move needs to concern at least one object.
Examples	"Impression sunrise" (E22) *moved by* preparations for the First Impressionist Exhibition (E9)

P26 moved to (was destination of)

Domain	E9 Move
Range	E53 Place
Subproperty of	E4 Period. P7 took place at (witnessed): E53 Place
Quantification	many to many, necessary (1,*n*:0,*n*)
Scope note	This property identifies the destination of an E9 Move. A move will be linked to a destination, such as the move of an artefact from storage to display. A move can be linked to many terminal instances of E53 Place. In this case, the move describes a distribution of a set of objects. The area of the move includes the origin, route, and destination.
Examples	The movement of the Tutankhamen Exhibition (E9) *moved to* The British Museum (E53)

P27 moved from (was origin of)

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

Scope note	This property identifies the starting 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 can be linked to many origins. In this case the move describes the picking-up of a set of objects. The area of the move includes the origin, route, and destination.
Examples	The movement of the Tutankhamen Exhibition (E9) *moved from* The Egyptian Museum in Cairo (E53)

P28 transferred custody from (surrendered custody through)

Domain	E10 Transfer of Custody
Range	E39 Actor
Subproperty of	E7 Activity. P14 was carried out by (performed): E39 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 can be surrendered involuntarily, e.g. through accident, loss, or theft.
	In reality, custody is either transferred to someone or from someone, or both.
Examples	The delivery of the paintings by Secure Deliveries Inc. to the National Gallery (E10) *transferred custody from* The Secure Deliveries Inc. crew (E40)

P29 transferred custody to (received custody through)

Domain	E10 Transfer of Custody
Range	E39 Actor
Subproperty of	E7 Activity. P14 was carried out by (performed): E39 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 can be received involuntarily or illegally, e.g. through accident, unsolicited donation, or theft.
	In reality, custody is either transferred to someone or from someone, or both.
Examples	The delivery of the paintings by Secure Deliveries Inc. to the National Gallery (E10) *transferred custody to* Representatives of The National Gallery (E40)

P30 transferred custody of (changed custody through)

Domain	E10 Transfer of Custody
Range	E18 Physical Thing
Quantification	many to many, necessary (1,*n*:0,*n*)
Scope note	This property identifies an instance or instances 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 can be transferred involuntarily or illegally, e.g. 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)

P31 has modified (was modified by)

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

P32 used general technique (was technique of)

Domain	E7 Activity
Range	E55 Type
Subproperty of	E7 Activity. P125 used object of type (was type of object used in): E55 Type
Quantification	many to many (0,n:0,n)
Scope note	This property identifies the technique that was employed in an act of modification.
	These techniques should be drawn from an external E55 Type hierarchy of consistent terminology of general techniques such as embroidery, oil painting, etc. Specific techniques can be further described as instances of E29 Design or Procedure.
Examples	Ornamentation of silver cup 113 (E11) *used general technique* gold-plating (E55) (Design or Procedure Type)

P33 used specific technique (was technique of)

Domain	E7 Activity
Range	E29 Design or Procedure
Subproperty of	E7 Activity. P16 used specific object (was used for): E70 Thing
Quantification	many to many (0,n:0,n)
Scope note	This property identifies a specific E29 Design or Procedure in order to carry out an instance of E7 Activity or parts of it.
	The property differs from P32 in that the E29 Design or Procedure referred to is specific and documented rather than simply being a term in the E55 Type hierarchy. Typical examples would include intervention plans for conservation.
Examples	Ornamentation of silver cup 232 (E11) *used specific technique* "Instructions for golden chase work" by John Smith (E29)
	Rebuilding of the Reichstag (E11) *used specific technique* Architectural plans by Foster and Partners (E29)

P34 concerned (was assessed by)

Domain	E14 Condition Assessment
Range	E18 Physical Thing
Subproperty of	E13 Attribute Assignment. P140 assigned attribute to (received attribute through): E1 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 can 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 even extant.
Examples	1997 condition assessment of the silver collection (E14) *concerned* silver cup 232 (E22)

P35 has identified (was identified by)

Domain	E14 Condition Assessment
Range	E3 Condition State
Subproperty of	E13 Attribute Assignment. P141 assigned (was assigned by): E1 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)

P36 registered (was registered by) <u>**DEPRECATED PROPERTY**</u>

Domain	E15 Identifier Assignment
Range	E19 Physical Object
Subproperty of	E13 Attribute Assignment. P140 assigned attribute to (received attribute through): E1 Entity
Quantification	many to one, necessary (1,1:0,n)
Scope note	This property has been deprecated and should no longer be used. It is included here for information only.
Examples	

P37 assigned (was assigned by)

Domain	E15 Identifier Assignment
Range	E42 Identifier
Subproperty of	E13 Attribute Assignment. P141 assigned (was assigned by): E1 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 can 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)

P38 deassigned (was deassigned by)

Domain	E15 Identifier Assignment
Range	E42 Identifier
Subproperty of	E13 Attribute Assignment. P141 assigned (was assigned by): E1 Entity
Quantification	many to many (0,n:0,n)
Scope note	This property records the identifier that was deassigned from an instance of E1 Entity.
	Deassignment of an identifier might be necessary when an object is taken out of an inventory, a new numbering system is introduced, or items are merged or split up.
	The same identifier can be deassigned on more than one occasion.
Examples	31 July 2001 Identifier Assignment of the silver cup OXCMS:2001.1.32 (E15) *deassigned* "232" (E42)

P39 measured (was measured by)

Domain	E16 Measurement
Range	E1 Entity
Subproperty of	E13 Attribute Assignment. P140 assigned attribute to (received attribute through): E1 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 Entity to which it is applied. An instance of E1 Entity can be measured more than once. Material and immaterial things and processes can 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)

P40 observed dimension (was observed in)

Domain	E16 Measurement
Range	E54 Dimension
Subproperty of	E13 Attribute Assignment. P141 assigned (was assigned by): E1 Entity
Quantification	many to many, necessary (1,n:0,n)
Scope note	This property records the dimension that was observed in a Measurement activity.
	Dimension can be any quantifiable aspect of a Thing. Weight, image colour depth, and monetary value are dimensions in this sense. One Measurement activity can determine more than one Dimension of one object.
	Dimensions can be determined either by direct observation or using recorded evidence. In the latter case, the Thing measured does need to be present or extant.
	Even though knowledge of the value of a dimension requires measurement, the dimension can be an object of discourse prior to, or even without any measurement being made.
Examples	31 August 1997 measurement of height of silver cup 232 (E16) *observed dimension* silver cup 232 height (E54) *P91 has unit* mm (E58), *P90 has value* 224 (E60)

P41 classified (was classified by)

Domain	E17 Type Assignment
Range	E1 Entity
Subproperty of	E13 Attribute Assignment. P140 assigned attribute to (received attribute through): E1 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 an entity can be assigned a type through type assignment. Type assignment events allow a more detailed path from E1 Entity through P41, E17 Type Assignment, *P42 assigned* to E55 Type for assigning types to objects compared to the shortcut offered by P2 *has type*.
Examples	31 August 1997 classification of silver cup 232 (E17) *classified* silver cup 232 (E22)

P42 assigned (was assigned by)

Domain	E17 Type Assignment
Range	E55 Type
Subproperty of	E13 Attribute Assignment. P141 assigned (was assigned by): E1 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 Entity through *P41 classified*, E17 Type Assignment, P42 to E55 Type for assigning types to objects compared to the shortcut offered by P2 *has type*.
	For example, a fragment of an antique vessel could be assigned the type "attic red figured belly handled amphora" by expert A. The same fragment could be assigned the type "shoulder handled amphora" by expert B.
	A Type can be intellectually constructed independent from assigning an instance of it.
Examples	31 August 1997 classification of silver cup 232 (E17) *assigned* goblet (E55)

P43 has dimension (is dimension of)

Domain	E70 Thing
Range	E54 Dimension
Quantification	one to many, dependent (0,*n*:1.1)
Scope note	This property records an 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) *P91 has unit* mm (E58), *P90 has value* 224 (E60)

P44 has condition (is condition of)

Domain	E18 Physical Thing
Range	E3 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 E3 Condition State is specific to an instance of E18 Physical Thing.
Examples	Silver cup 232 (E22) *has condition* oxidation traces were present in 1997 (E3)

P45 consists of (is incorporated in)

Domain	E18 Physical Thing
Range	E57 Material
Quantification	many to many, necessary (1,*n*:0,*n*)
Scope note	This property identifies the instances of E57 Material of which an instance of E18 Physical Thing is composed.
	All physical things consist of physical materials. P45 allows the different materials to be recorded. *P45 consists of* refers here to observed material as opposed to the consumed raw material.
	A material, such as a theoretical alloy, might not have any physical instances.
Examples	Silver cup 232 (E22) *consists of* silver (E57)

P46 is composed of (forms part of)

Domain	E18 Physical Thing
Range	E18 Physical Thing
Superproperty of	E19 Physical Object. P56 bears feature (is found on): E26 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, can be further analysed into sub-components, thereby creating a hierarchy of part decomposition. An instance of E18 Physical Thing can be shared between multiple wholes, for example two buildings can share a common wall.
	This property is intended to describe specific components that are individually documented, rather than general aspects. Overall descriptions of the structure of an instance of E18 Physical Thing are captured by the P3 has note property.
	The instances of E57 Material of which an instance of E18 Physical Thing is composed should be documented using P45 consists of.
Examples	The Royal carriage (E22) *forms part of* the Royal train (E22)
	The Hog's Back (E24) *forms part of* the Fosseway (E24)

P47 is identified by (identifies) <u>DEPRECATED PROPERTY</u>

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

Scope note	This property has been deprecated and should no longer be used. It is included here for information only.
Examples	

P48 has preferred identifier (is preferred identifier of)

Domain	E1 Entity
Range	E42 Identifier
Subproperty of	E1 Entity. P1 is identified by (identifies): E41 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 Entity at the time this property was recorded. More than one preferred identifier might have been assigned to an item over time. Use of this property requires an external mechanism for assigning temporal validity to the respective instance. P48 has preferred identifier (is preferred identifier of) is a shortcut for the path from E1 Entity through *P140 assigned attribute to (received attribute through),* E15 Identifier Assignment, *P37 assigned* to E42 Identifier. The fact that an identifier is the preferred one *within a given context* should be expressed by assigning a suitable E55 Type to the specific 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)

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

Domain	E18 Physical Thing
Range	E39 Actor
Superproperty of	E18 Physical Thing. P50 has current keeper (is current keeper of): E39 Actor E78 Collection. P109 has current or former curator (is current or former curator of): E39 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. The distinction with *P50 has current keeper* is that P49 leaves open the question as to whether the specified keepers are *current.* P49 is a shortcut for the more detailed path from E18 Physical Thing through *P30 transferred custody of,* E10 Transfer of Custody, *P28 transferred custody from* or *P29 transferred custody to* to E39 Actor.
Examples	Paintings of The Iveagh Bequest (E18) *has former or current keeper* Secure Deliveries Inc. (E40)

P50 has current keeper (is current keeper of)

Domain	E18 Physical Thing
Range	E39 Actor
Subproperty of	E18 Physical Thing. P49 has former or current keeper (is former or current keeper of): E39 Actor
Quantification	many to many (0,*n*:0,*n*)

Scope note	This property is intended to identify the E39 Actor or Actors who have custody of an instance of E18 Physical Thing at the present time. This information cannot be assumed to remain valid indefinitely, its reliability can depend on the time the property was instantiated.
	P50 has current keeper is a shortcut for the more detailed path from E18 Physical Thing through *P30 transferred custody of*, E10 Transfer of Custody, *P29 transferred custody to* to E39 Actor.
Examples	Paintings of The Iveagh Bequest (E18) *has current keeper* The National Gallery (E40)

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

Domain	E18 Physical Thing
Range	E39 Actor
Superproperty of	E18 Physical Thing. P52 has current owner (is current owner of): E39 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 that P51 does not indicate whether the specified owners are *current.* P51 is a shortcut for the more detailed path from E18 Physical Thing through *P24 transferred title of*, E8 Acquisition, *P23 transferred title from,* or *P22 transferred title to* E39 Actor.
Examples	Paintings of the Iveagh Bequest (E18) *has former or current owner* Lord Iveagh (E21)

P52 has current owner (is current owner of)

Domain	E18 Physical Thing
Range	E39 Actor
Subproperty of	E18 Physical Thing. P51 has former or current owner (is former or current owner of): E39 Actor
	E72 Legal Object. P105 right held by (has right on): E39 Actor
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property is intended to identify the E21 Person, E74 Group, or E40 Legal Body who is the owner of an instance of E18 Physical Thing at the present time. This information cannot be assumed to remain valid indefinitely, its reliability can depend on the time the property was instantiated.
	P52 is a shortcut for the more detailed path from E18 Physical Thing through *P24 transferred title of*, E8 Acquisition, *P22 transferred title to* E39 Actor, if and only if this acquisition event is the most recent.
Examples	Paintings of the Iveagh Bequest (E18) *has current owner* English Heritage (E40)

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

Domain	E18 Physical Thing
Range	E53 Place
Superproperty of	E19 Physical Object. P55 has current location (currently holds): E53 Place
Quantification	many to many, necessary (1,*n*:0,*n*)

Scope note	This property allows an instance of E53 Place to be associated as the former or current location of an instance of E18 Physical Thing.
	In the case of E19 Physical Object, the property does not allow any indication of the time span during which the physical object was located at this place, nor if this is the current location.
	In the case of immobile objects, the place would normally correspond to the place of creation.
	P53 is a shortcut. A more detailed representation can make use of the fully developed (i.e. indirect) path from E19 Physical Object through *P25 moved*, 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)

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

Domain	E19 Physical Object
Range	E53 Place
Quantification	many to one (0,1:0,*n*)
Scope note	This property is intended to record the permanent location that is foreseen, at the present time, for an instance of E19 Physical Object. This information cannot be assumed to remain valid indefinitely, its reliability can depend on the time the property was instantiated.
	P54 is similar to *P55 has current location.* However, it indicates the E53 Place currently reserved for an object, such as the permanent storage location or a permanent exhibit location. The object can be temporarily removed from the permanent location, for example, when used in temporary exhibitions or loaned to another institution. The object can never actually be located at its permanent location.
Examples	Silver cup 232 (E22) *has current permanent location* Shelf 3.1, Store 2, Museum of Oxford (E53)

P55 has current location (currently holds)

Domain	E19 Physical Object
Range	E53 Place
Subproperty of	E18 Physical Thing. P53 has former or current location (is former or current location of): E53 Place
Quantification	many to one (0,1:0,*n*)
Scope note	This property is intended to record the present location of an instance of E19 Physical Object. This information cannot be assumed to remain valid indefinitely, its reliability can depend on the time the property was instantiated.
	This property is a specialization of P53. 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 is a shortcut. A more detailed representation can make use of the fully developed (i.e. indirect) path from E19 Physical Object through *P25 moved*, 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)

P56 bears feature (is found on)

Domain	E19 Physical Object
Range	E26 Physical Feature
Subproperty of	E18 Physical Thing. P46 is composed of (forms part of): E18 Physical Thing
Quantification	one to many, dependent (0,n:1,1)
Scope note	This property describes an E26 Physical Feature found on an E19 Physical Object. It does not specify the location of the feature on the object.
	P56 is a shortcut. A more detailed representation can make use of the fully developed (i.e. indirect) path from E19 Physical Object through *P59 has section*, E53 Place, *P53 is former or current location of* to E26 Physical Feature.
	An E27 Site should be considered as an E26 Physical Feature on the surface of the Earth.
Examples	Silver cup 232 (E22) *bears feature* 32 mm scratch on silver cup 232 (E26)

P57 has number of parts

Domain	E19 Physical Object
Range	E60 Number
Quantification	many to one (0,1:0,n)
Scope note	This property documents the E60 Number of parts of which an instance of E19 Physical Object is composed.
	This can 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 can be decomposed into their components and constituents using *P46 is composed of* and *P45 consists of.* This allows each element to be described individually.
Examples	Chess set 233 (E22) *has number of parts* 33 (E60)

P58 has section definition (defines section)

Domain	E18 Physical Thing
Range	E46 Section Definition
Quantification	one to many, dependent (0,n:1,1)
Scope note	This property links an area (section) named by an E46 Section Definition to the instance of E18 Physical Thing upon which it is found.
	The ontology 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, E46 Section Definition, *P87 is identified by* that allows a more precise definition of a location found on an object than the shortcut *P59 has section*.
Examples	HMS Victory (E22) *has section definition* "poop deck of HMS Victory" (E46)

P59 has section (is located on or within)

Domain	E18 Physical Thing
Range	E53 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 can be subdivided into arbitrary regions.
	P59 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* to E53 Place.
Examples	HMS Victory (E22) *has section* HMS Victory section B347.6 (E53)

P62 depicts (is depicted by)

Domain	E24 Physical Man-Made Thing
Range	E1 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.
	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* to E1 Entity. *P62.1 mode of 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)
Properties	P62.1 mode of depiction: E55 Type

P65 shows visual item (is shown by)

Domain	E24 Physical Man-Made Thing
Range	E36 Visual Item
Subproperty of	E24 Physical Man-Made Thing. P128 carries (is carried by): E90 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* in that it associates an item of E24 Physical Man-Made Thing with a visual representation. However, *P65 shows visual item* differs from the *P62 depicts* property in that it makes no claims about what the E36 Visual Item is deemed to *represent*. E36 Visual Item identifies a recognizable image or visual symbol, regardless of what this image represents.
	For example, all recent British coins bear a portrait of Queen Elizabeth II, a fact that is correctly documented using P62 *depicts*. Different portraits have been used at different periods, however. *P65 shows visual item* can be used to refer to a *particular* portrait.
	P65 shows visual item can also be used for instances of E36 Visual Item such as signs, marks, and symbols, for example, the "Maltese Cross" or the "copyright symbol" that have no particular representational content.
	This property is part of the fully developed path from E24 Physical Man-Made Thing through *P65 shows visual item*, E36 Visual Item, *P138 represents* to E1 Entity, which is shortcut by *P62 depicts*.
Examples	My T-shirt (E22) *shows visual item* Mona Lisa (E38)

P67 refers to (is referred to by)

Domain	E89 Propositional Object
Range	E1 Entity
Superproperty of	E29 Design or Procedure. P68 foresees use of (use foreseen by): E57 Material
	E31 Document. P70 documents (is documented in): E1 Entity
	E32 Authority Document. P71 lists (is listed in): E1 Entity
	E89 Propositional Object. P129 is about (is subject of): E1 Entity
	E36 Visual Item. P138 represents (has representation): E1 Entity
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 Entity.
	This differs from *P129 is about*, which describes the primary subject or subjects of the E89 Propositional Object.
	P67 has the P67.1 has type link to an instance of E55 Type. This is intended to allow a more detailed description of the type of reference.
Examples	The eBay auction listing for 4 July 2002 (E73) *refers to* silver cup 232 (E22) *has type* item for sale (E55)
Properties	P67.1 has type: E55 Type

P68 foresees use of (use foreseen by)

Domain	E29 Design or Procedure
Range	E57 Material
Superproperty of	E89 Propositional Object. P67 refers to (is referred to by): E1 Entity
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property describes the anticipated use of an E57 Material by an E29 Design or Procedure.
	E29 Designs or 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 required on a particular occasion when an E29 Design or Procedure was executed.
Examples	Procedure for soda glass manufacture (E29) *foresees use of* soda (E57)

P69 is associated with

Domain	E29 Design or Procedure
Range	E29 Design or Procedure
Quantification	many to many (0,*n*:0,*n*)
Scope note	This symmetric property describes the association of an E29 Design or Procedure with other Designs or Procedures.
	Any instance of E29 Design or Procedure can be associated with other designs or procedures.
	The P69.1 has type property of P69 allows the nature of the association to be specified; examples of types of association between instances of E29 Design or Procedure include: whole-part, sequence, prerequisite, etc.

Examples	Procedure for glass blowing (E29) *is associated with* procedure for glass heating (E29)
Properties	P69.1 has type: E55 Type

P70 documents (is documented in)

Domain	E31 Document
Range	E1 Entity
Subproperty of	E89 Propositional Object. P67 refers to (is referred to by): E1 Entity
Quantification	many to many, necessary (1,*n*:0,*n*)
Scope note	This property describes the entities that are documented by instances of E31 Document.
	Documents can describe any conceivable entity, hence the link to the highest-level entity in the class hierarchy. This property is intended for cases where a reference is regarded as being of a documentary character, in the scholarly or scientific sense.
Examples	The British Museum catalogue (E31) *documents* the British Museum's Collection (E78)

P71 lists (is listed in)

Domain	E32 Authority Document
Range	E1 Entity
Subproperty of	E89 Propositional Object. P67 refers to (is referred to by): E1 Entity
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property documents a source E32 Authority Document for elements of terminology or conceptual systems.
Examples	The Art and Architecture Thesaurus (E32) *lists* alcazars (E55)

P72 has language (is language of)

Domain	E33 Linguistic Object
Range	E56 Language
Quantification	many to many, necessary (0,*n*:0,*n*)
Scope note	This property describes the E56 Language of an E33 Linguistic Object.
	Instances of E33 Linguistic Object are composed in one or more human languages. This property allows these languages to be documented.
Examples	The Canterbury Tales (E33*) has language* Middle English (1100–1500) (E56)

P73 has translation (is translation of)

Domain	E33 Linguistic Object
Range	E33 Linguistic Object
Subproperty of	E70 Thing. P130 shows features of (features are also found on): E70 Thing
Quantification	one to many (0,*n*:0,1)
Scope note	This property describes the source and target of instances of E33 Linguistic 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.
Examples	"Les Baigneurs" (E35) *has translation* "The Bathers" (E35)

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

Domain	E39 Actor
Range	E53 Place
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property describes the current or former E53 Place of residence of an E39 Actor.
	The residence can be either the Place where the Actor resides, or a legally registered address of any kind.
Examples	Queen Elizabeth II (E39) *has current or former residence* Buckingham Palace (E53)

P75 possesses (is possessed by)

Domain	E39 Actor
Range	E30 Right
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property identifies former or current instances of E30 Right held by an E39 Actor.
Examples	Michael Jackson (E21) *possesses* Intellectual property rights on the Beatles' back catalogue (E30)

P76 has contact point (provides access to)

Domain	E39 Actor
Range	E51 Contact Point
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property identifies 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)

P78 is identified by (identifies)

Domain	E52 Time-Span
Range	E49 Time Appellation
Subproperty of	E1 Entity. P1 is identified by (identifies): E41 Appellation
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property identifies an E52 Time-Span using an E49 Time Appellation.
Examples	The time span 1926 to 1988 (E52) *is identified by* "Showa" (Japanese time appellation) (E49)

P79 beginning is qualified by

Domain	E52 Time-Span
Range	E62 String
Subproperty of	E1 Entity. P3 has note: E62 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 can be certainty, precision, source, etc.
Examples	The time span of the Holocene (E52) *beginning is qualified by* approximately (E62)

P80 end is qualified by

Domain	E52 Time-Span
Range	E62 String
Subproperty of	E1 Entity. P3 has note: E62 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 can be certainty, precision, source, etc.
Examples	The time span of the Holocene (E52) *end is qualified by* approximately (E62)

P81 ongoing throughout

Domain	E52 Time-Span
Range	E61 Time Primitive
Quantification	many to one, necessary (1,1:0,*n*)
Scope note	This property describes the minimum period of time covered by an E52 Time-Span.
	Since Time-Spans might not have precisely known temporal extents, the ontology 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 standard as application-specific or system-specific date intervals, and are not further analysed.
Examples	The time span of the development of the CIDOC CRM (E52) *ongoing throughout* 1996–2002 (E61)

P82 falls at some time within

Domain	E52 Time-Span
Range	E61 Time Primitive
Quantification	many to one, necessary (1,1:0,*n*)
Scope note	This property describes the maximum period of time within which an E52 Time-Span falls.
	Since Time-Spans might not have precisely known temporal extents, the ontology 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 standard as application-specific or system-specific date intervals, and are not further analysed.
Examples	The time span of the development of the CIDOC CRM (E52) *falls at some time within* 1992-infinity (E61)

P83 had at least duration (was minimum duration of)

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

P84 had at most duration (was maximum duration of)

Domain	E52 Time-Span
Range	E54 Dimension
Quantification	one to one (1,1:1,1)
Scope note	This property describes the maximum length of time covered by an E52 Time-Span.
	It allows an E52 Time-Span to be associated with an E54 Dimension representing its maximum duration (i.e. its outer boundary) independently from the actual beginning and end.
Examples	The time span of the Battle of Issos 333 B.C.E. (E52) *had at most duration* Battle of Issos maximum duration (E54) *P91 has unit* day (E58) *P90 has value* 2 (E60)

P86 falls within (contains)

Domain	E52 Time-Span
Range	E52 Time-Span
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property describes the inclusion relationship between two instances of 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.
Examples	The time span of the Apollo 11 moon mission (E52) *falls within* the time span of the reign of Queen Elizabeth II (E52)

P87 is identified by (identifies)

Domain	E53 Place
Range	E44 Place Appellation
Subproperty of	E1 Entity. P1 is identified by (identifies): E41 Appellation
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property identifies an E53 Place using an E44 Place Appellation.
Examples	The location of the Duke of Wellington's House (E53) *is identified by* "No 1 London" (E45)

P88 consists of (forms part of)

Domain	E53 Place
Range	E53 Place
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property identifies an E53 Place that forms part of another Place.
	It supports the notion that a Place can be subdivided into one or more constituent parts. It implies both spatial and contextual containment relationships between the two Places.
Examples	The area covered by the London Borough of Islington in 1976 (E53) *forms part of* the area covered by Greater London in 1976 (E53)

P89 falls within (contains)

Domain	E53 Place
Range	E53 Place
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property identifies the instances of E53 Place that fall within the area covered by another Place.
	It addresses spatial containment only and no "whole-part" relationship between the two places is implied.
Examples	The area covered by the World Heritage Site of Stonehenge (E53) *falls within* the area of Salisbury Plain (E53)

P90 has value

Domain	E54 Dimension
Range	E60 Number
Quantification	many to one, necessary (1,1:0,*n*)
Scope note	This property allows an E54 Dimension to be approximated by an E60 Number primitive.
Examples	Height of silver cup 232 (E54) *has value* 226 (E60)

P91 has unit (is unit of)

Domain	E54 Dimension
Range	E58 Measurement Unit
Quantification	many to one, necessary (1,1:0,*n*)
Scope note	This property shows the type of unit an E54 Dimension was expressed in.
Examples	Height of silver cup 232 (E54) *has unit* mm (E58)

P92 brought into existence (was brought into existence by)

Domain	E63 Beginning of Existence
Range	E77 Persistent Item
Subproperty of	E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
Superproperty of	E65 Creation. P94 has created (was created by): E28 Conceptual Object
	E66 Formation. P95 has formed (was formed by): E74 Group
	E67 Birth. P98 brought into life (was born): E21 Person
	E12 Production. P108 has produced (was produced by): E24 Physical Man-Made Thing
	E81 Transformation. P123 resulted in (resulted from): E77 Persistent Item
Quantification	one to many, necessary, dependent (1,*n*:1,1)
Scope note	This property allows 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.
Examples	The birth of Smokey Bear (E63) *brought into existence* Smokey Bear (E20)

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

Domain	E64 End of Existence
Range	E77 Persistent Item
Subproperty of	E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
Superproperty of	E6 Destruction. P13 destroyed (was destroyed by): E18 Physical Thing
	E68 Dissolution. P99 dissolved (was dissolved by): E74 Group
	E69 Death. P100 was death of (died in): E21 Person
	E81 Transformation. P124 transformed (was transformed by): E77 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. instances of E70 Thing, E72 Legal Object, E39 Actor, E41 Appellation, E51 Contact Point, and E55 Type. For many Persistent Items, we can infer that they should have ceased to exist after a certain date if the maximum life span is known. An End of Existence event can often be assumed to have taken place even if it might have gone unnoticed (such as when the last representative of an indigenous nation forgets some secret knowledge).
Examples	The death of Smokey Bear on November 9, 1976 (E64) *took out of existence* Smokey Bear (E20)

P94 has created (was created by)

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

P95 has formed (was formed by)

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

Scope note	This property links the founding or 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)

P96 by mother (gave birth)

Domain	E67 Birth
Range	E21 Person
Subproperty of	E5 Event. P11 had participant (participated in): E39 Actor
Quantification	many to one, necessary (1,1:0,1)
Scope note	This property links 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 *brought into life (was born)* (P98). This is not intended for use with general natural history material, only people. There is no explicit method for modelling conception and gestation except by using extensions.
Examples	The birth of Queen Elizabeth II (E67) *by mother* Queen Mother (E21)

P97 from father (was father for)

Domain	E67 Birth
Range	E21 Person
Quantification	many to many, necessary (1,*n*:0,*n*)
Scope note	This property links 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 *by mother (gave birth)* (P96)]. The Person being born is linked to the Birth with the property *brought into life (was born)* (P98).
	This is not intended for use with general natural history material, only people. There is no explicit method for modelling conception and gestation except by using extensions.
	A Birth event is normally (but not always) associated with one biological father.
Examples	The birth of Queen Elizabeth II (E67) *from father* King George VI (E21)

P98 brought into life (was born)

Domain	E67 Birth
Range	E21 Person
Subproperty of	E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item
Quantification	one to many, dependent (0,*n*:1,1)
Scope note	This property links an E67 Birth 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 other than by using extensions.
Examples	The birth of Queen Elizabeth II (E67) *brought into life* Queen Elizabeth II (E21)

P99 dissolved (was dissolved by)

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

P100 was death of (died in)

Domain	E69 Death
Range	E21 Person
Subproperty of	E64 End of Existence. P93 took out of existence (was taken out of existence by): E77 Persistent Item
Quantification	one to many, necessary (1,n:0,n)
Scope note	This property links an E69 Death event to the E21 Person that died.
	A Death event can involve multiple people, for example, in the case of a battle or disaster.
	This is not intended for use with general natural history material, only people.
Examples	Mozart's death (E69) *was death of* Mozart (E21)

P101 had as general use (was use of)

Domain	E70 Thing
Range	E55 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 provides a generic link between things, both physical and immaterial, and methods and techniques of use. Thus, it might be asserted that a baseball bat had sport as general use, but had a specific use for threatening people during the Great Train Robbery.
Examples	Tony Gill's Ford Mustang (E22) *had as general use* transportation (E55)

P102 has title (is title of)

Domain	E71 Man-Made Thing
Range	E35 Title
Subproperty of	E1 Entity. P1 is identified by (identifies): E41 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.
	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.
	The *has type* property of the *has title* property enables the relationship between the Title and the Man-Made Thing to be further clarified, for example, if the Title was a given Title, a supplied Title, etc.

Examples	The first book of the Old Testament (E33) *has title* "Genesis" (E35) *has type* translated (E55)
Properties	P102.1 has type: E55 Type

P103 was intended for (was intention of)

Domain	E71 Man-Made Thing
Range	E55 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 establishes a relationship between specific man-made things, both physical and immaterial, and types of intended methods and techniques of use. Note: A link between specific man-made things and a *specific* use activity should be expressed using *P19 was intended use of.*
Examples	This plate (E22) *was intended for* destruction at a wedding reception (E55)

P104 is subject to (applies to)

Domain	E72 Legal Object
Range	E30 Right
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property links a particular 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.*
Examples	The Beatles' back catalogue (E72) *is subject to* reproduction right on The Beatles' back catalogue (E30)

P105 right held by (has right on)

Domain	E72 Legal Object
Range	E39 Actor
Superproperty of	E18 Physical Thing. P52 has current owner (is current owner of): E39 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)* since ownership is a specific right that can be held with respect to an object.
	P105 right held by (has right on) is a shortcut of the fully developed path from E72 Legal Object through *P104 is subject to (applies to)*, E30 Right, *P75 possesses (is possessed by),* to E39 Actor.
Examples	The Beatles' back catalogue (E73) *right held by* Michael Jackson (E21)

P106 is composed of (forms part of)

Domain	E90 Symbolic Object
Range	E90 Symbolic Object
Quantification	many to many (0,*n*:0,*n*)

Scope note	This property associates an instance of E90 Symbolic Object with component parts (such as text fragments or image details) that are themselves instances of E90 Symbolic Object.
Examples	This Scope note P106 (E33) *is composed of* "text fragments" (E33)
	"recognizable" (E90) *is composed of* "ecognizabl" (E90)

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

Domain	E74 Group
Range	E39 Actor
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property relates an E39 Actor to the E74 Group of which they are a member.
	Groups, Legal Bodies, and Persons can 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 from E74 Group through P144 joined with (gained member by), E85 Joining, P143 joined (was joined by) to 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 Elizabeth and Prince Philip (E74) *has current or former member* Prince Philip (E21) P107.1 *kind of member* husband (E55)
Properties	P107.1 kind of member: E55 Type

P108 has produced (was produced by)

Domain	E12 Production
Range	E24 Physical Man-Made Thing
Subproperty of	E11 Modification. P31 has modified (was modified by): E24 Physical Man-Made Thing
	E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item
Quantification	one to many, necessary, dependent (1,*n*:1,1)
Scope note	This property identifies the E24 Physical Man-Made Thing that came into existence as a result of an E12 Production.
	The identity of an instance of Physical Man-Made Thing is not defined by its matter, but by its existence as a subject of documentation. An E12 Production event can result in the creation of multiple instances of Physical Man-Made Thing.
Examples	The building of Rome (E12) *has produced* the Coliseum (E22)

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

Domain	E78 Collection
Range	E39 Actor
Subproperty of	E18 Physical Thing. P49 has former or current keeper (is former or current keeper of): E39 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 over-all curatorial responsibility for an E78 Collection.
	This property is effectively a shortcut. It does not allow a history of curation to be recorded. This would require use of an Event assigning responsibility for a Collection to a curator.
Examples	The Robert Opie Collection (E78) *has current or former curator* Robert Opie (E39)
	Mikael Heggelund Foslie's coralline red algal herbarium (E78) *has current or former curator* Mikael Heggelund Foslie (E21)

P110 augmented (was augmented by)

Domain	E79 Part Addition
Range	E24 Physical Man-Made Thing
Subproperty of	E11 Modification. P31 has modified (was modified by): E24 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 insertion of the final nail (E79) *augmented* Coffin of George VI (E24)

P111 added (was added by)

Domain	E79 Part Addition
Range	E18 Physical Thing
Subproperty of	E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
	E7 Activity. P16 used specific object (was used for): E70 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)

P112 diminished (was diminished by)

Domain	E80 Part Removal
Range	E24 Physical Man-Made Thing
Subproperty of	E11 Modification. P31 has modified (was modified by): E24 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 an E80 Part Removal activity normally concerns only one E24 Physical Man-Made Thing, it is possible to imagine circumstances under which more than one item might be diminished by a single E80 Part Removal activity.
Examples	The coffin of Tutankhamen (E22) *was diminished by* The opening of the coffin of Tutankhamen (E80)

P113 removed (was removed by)

Domain	E80 Part Removal
Range	E18 Physical Thing
Subproperty of	E5 Event. P12 occurred in the presence of (was present at): E77 Persistent Item
Quantification	many to many, necessary (1,n:0,n)
Scope note	This property identifies the E18 Physical Thing that is removed during an E80 Part Removal activity.
Examples	The opening of the coffin of Tutankhamen (E80) *removed* The mummy of Tutankhamen (E20,E22)

P114 is equal in time to

Domain	E2 Temporal Entity
Range	E2 Temporal Entity
Quantification	many to many (0,n:0,n)
Scope note	This symmetric property allows instances of E2 Temporal Entity with the same E52 Time-Span to be equated.
	This is only necessary if the Time-Span is unknown (otherwise, the equivalence can be calculated).
	This property is the same as the "equal" relationship of Allen's[10] temporal logic.
Examples	The destruction of the Villa Justinian Tempus (E6) *is equal in time to* the death of Maximus Venderus (E69)

P115 finishes (is finished by)

Domain	E2 Temporal Entity
Range	E2 Temporal Entity
Quantification	many to many (0,n:0,n)
Scope note	This property allows the ending point for an E2 Temporal Entity to be situated by reference to the ending point of another Temporal Entity of longer duration.
	This is only necessary if the Time-Span is unknown (otherwise, the relationship can be calculated).
	This property is the same as the "finishes/finished-by" relationships of Allen's[10] temporal logic.
Examples	Late Bronze Age (E4) *finishes* Bronze Age (E4)

P116 starts (is started by)

Domain	E2 Temporal Entity
Range	E2 Temporal Entity
Quantification	many to many (0,n:0,n)
Scope note	This property allows the starting point for an E2 Temporal Entity to be situated by reference to the starting point of another Temporal Entity of longer duration.
	This is only necessary if the Time-Span is unknown (otherwise, the relationship can be calculated).
	This property is the same as the "starts/started-by" relationships of Allen's[10] temporal logic.
Examples	Early Bronze Age (E4) *starts* Bronze Age (E4)

P117 occurs during (includes)

Domain	E2 Temporal Entity
Range	E2 Temporal Entity
Quantification	many to many (0,n:0,n)
Scope note	This property allows the entire 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 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[10] temporal logic.
Examples	Middle Saxon period (E4) *occurs during* Saxon period (E4)

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

Domain	E2 Temporal Entity
Range	E2 Temporal Entity
Quantification	many to many (0,n:0,n)
Scope note	This property identifies an overlap between the instances of E52 Time-Span of two Temporal Entities.
	It implies a temporal order between the two entities, e.g. if A overlaps in time B, then A shall start before B, and B shall 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[10] temporal logic.
Examples	The Iron Age (E4) *overlaps in time with* the Roman period (E4)

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

Domain	E2 Temporal Entity
Range	E2 Temporal Entity
Quantification	many to many (0,n:0,n)
Scope note	This property indicates that one E2 Temporal Entity immediately follows another.
	It implies a particular order between the two entities, e.g. if A meets in time with B, then A shall 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[10] temporal logic.
Examples	Early Saxon Period (E4) *meets in time with* Middle Saxon Period (E4)

P120 occurs before (occurs after)

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

Scope note	This property identifies the relative chronological sequence of two Temporal Entities.
	It implies that a temporal gap exists between the end of A and the start of B. This property is only necessary if the relevant Time-Spans are unknown (otherwise, the relationship can be calculated).
	This property is the same as the "before/after" relationships of Allen's[10] temporal logic.
Examples	Early Bronze Age (E4) *occurs before* Late Bronze age (E4)

P121 overlaps with

Domain	E53 Place
Range	E53 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[10] operators, which are purely temporal.
Examples	The territory of the United States (E53) *overlaps with* the Arctic (E53)

P122 borders with

Domain	E53 Place
Range	E53 Place
Quantification	many to many (0,n:0,n)
Scope note	This symmetric property allows the instances of E53 Place which share common borders to be related as such.
	This property is purely spatial, in contrast to Allen[10] operators, which are purely temporal.
Examples	Scotland (E53) *borders with* England (E53)

P123 resulted in (resulted from)

Domain	E81 Transformation
Range	E77 Persistent Item
Subproperty of	E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item
Quantification	many to many, necessary (1,n:0,n)
Scope note	This property identifies the 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 shared E81 Transformation event.
Examples	The transformation of the Venetian Loggia in Heraklion into a city hall (E81) *resulted in* the City Hall of Heraklion (E22)
	The death and mummification of Tutankhamen (E81) *resulted in* the mummy of Tutankhamen (E22 and E20)

P124 transformed (was transformed by)

Domain	E81 Transformation
Range	E77 Persistent Item
Subproperty of	E64 End of Existence. P93 took out of existence (was taken out of existence by): E77 Persistent Item
Quantification	one to many, necessary (1,*n*:0,1)
Scope note	This property identifies the E77 Persistent Item or items that cease to exist due to an E81 Transformation.
	They are 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 shared E81 Transformation event.
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 Tutankhamen (E81) *transformed* the ruling pharaoh Tutankhamen (E21)

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

Domain	E7 Activity
Range	E55 Type
Superproperty of	E7 Activity. P32 used general technique (was technique of): E55 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)

P126 employed (was employed in)

Domain	E11 Modification
Range	E57 Material
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property identifies E57 Material employed in an E11 Modification. The 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)

P127 has broader term (has narrower term)

Domain	E55 Type
Range	E55 Type
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property identifies a super-Type to which an E55 Type is related.
	It allows Types to be organized into hierarchies. This is the sense of "broader term generic (BTG)" as defined in ISO 2788.[9]
Examples	Dime (E55) *has broader term* coin (E55)

P128 carries (is carried by)

Domain	E24 Physical Man-Made Thing
Range	E90 Symbolic Object
Subproperty of	E70 Thing. P130 shows features of (features are also found on): E70 Thing
Superproperty of	E24 Physical Man-Made Thing. P65 shows visual item (is shown by): E36 Visual Item
Quantification	many to many (0,n:0,n)
Scope note	This property identifies an E90 Symbolic Object carried by an instance of E24 Physical Man-Made Thing. In general, this would be an E84 Information Carrier. *P65 shows visual item* is a specialization of P128 which should be used for carrying visual items.
Examples	Matthew's paperback copy of Reach for the Sky (E84) *carries* the text of Reach for the Sky (E33)

P129 is about (is subject of)

Domain	E89 Propositional Object
Range	E1 Entity
Subproperty of	E89 Propositional Object. P67 refers to (is referred to by): E1 Entity
Quantification	many to many (0,n:0,n)
Scope note	This property identifies an instance of E1 Entity that is the subject of an E89 Propositional Object, in the sense of "aboutness" used in library science. This differs from *P67 refers to*, which refers to an E1 Entity, in that it describes the primary subject or subjects of the E89 Propositional Object.
Examples	Reach for the Sky (E33) *is about* Douglas Bader (E21)

P130 shows features of (features are also found on)

Domain	E70 Thing
Range	E70 Thing
Superproperty of	E33 Linguistic Object. P73 has translation (is translation of): E33 Linguistic Object E24 Physical Man-Made Thing. P128 carries (is carried on): E90 Symbolic Object
Quantification	many to many (0,n:0,n)
Scope note	This property generalizes the notions of "copy of" and "similar to" into a dynamic, asymmetric relationship, where the domain expresses the derivative, if such a direction can be established. Otherwise, the relationship is symmetric. It is a shortcut of *P15 was influenced by* in a creation or production, if such a reason for the similarity can be verified. Moreover, it expresses similarity in cases that can be stated between two objects only, without historical knowledge about its reasons. *P130.1 kind of similarity* allows the nature of the similarity to be refined.
Examples	The Parthenon Frieze displayed in the Acropolis Museum in Athens (E22) *shows features of* the original blocks from the Parthenon Frieze in the British Museum (E22). *kind of similarity*: Copy (E55)
Properties	P130.1 kind of similarity: E55 Type

P131 is identified by (identifies)

Domain	E39 Actor
Range	E82 Actor Appellation
Subproperty of	E1 Entity. P1 is identified by (identifies): E41 Appellation

Quantification	many to many (0,*n*:0,*n*)
Scope note	This property identifies a name used specifically to identify an E39 Actor.
Examples	Tyler Withersopp IV (E39) *is identified by* US social security number "619-17-4204" (E82)

P132 overlaps with

Domain	E4 Period
Range	E4 Period
Quantification	many to many (0,*n*:0,*n*)
Scope note	This symmetric property allows instances of E4 Period that overlap both temporally and spatially to be related, i.e. they share some spatio-temporal extent. This property does not imply any ordering or sequence between the two periods, either spatial or temporal.
Examples	The Urnfield period (E4*) overlaps with* the Hallstatt period (E4)

P133 is separated from

Domain	E4 Period
Range	E4 Period
Quantification	many to many (0,*n*:0,*n*)
Scope note	This symmetric property allows instances of E4 Period that do not overlap both temporally and spatially, to be related, i.e. they do not share any spatio-temporal extent. This property does not imply any ordering or sequence between the two periods either spatial or temporal.
Examples	The Hallstatt period (E4) *is separated from* the La Tène period (E4)

P134 continued (was continued by)

Domain	E7 Activity
Range	E7 Activity
Subproperty of	E7 Activity. P15 was influenced by (influenced): E1 Entity
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property allows two activities to be related where the domain is considered as an intentional continuation of the range. Used multiple times, this allows a chain of related activities to be created which follow each other in sequence.
Examples	The construction of the Kölner Dom (Cologne Cathedral) in the 19th century, adapting the initial plans so as to preserve the intended appearance (E7) *continued* the construction of the Kölner Dom (Cologne Cathedral) (E7), that was abandoned in the 15th century

P135 created type (was created by)

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

Scope note	This property identifies the E55 Type that is created in an E83 Type Creation activity.
Examples	The description of a new ribbon worm species by Bürger (E83) *created type* Lineus coxinus (Bürger, 1892)

P136 was based on (supported type creation)

Domain	E83 Type Creation
Range	E1 Entity
Subproperty of	E7 Activity. P15 was influenced by (influenced): E1 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".
	The *P136.1 in the taxonomic role* property renders the specific relationship of the item 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	The creation of the taxon "Serratula glauca" by Linné in 1753 (E83) *was based on* Object BM000576251 of the Clayton Herbarium (E20) *in the taxonomic role* of holotype as an Original Element (E55)
Properties	P136.1 in the taxonomic role: E55 Type

P137 exemplifies (is exemplified by)

Domain	E1 Entity
Range	E55 Type
Subproperty of	E1 Entity. P2 has type (is type of): E55 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 renders the specific relationship of the exemplar 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 (E55)
Properties	P137.1 in the taxonomic role: E55 Type

P138 represents (has representation)

Domain	E36 Visual Item
Range	E1 Entity
Subproperty of	E89 Propositional Object. P67 refers to (is referred to by): E1 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 can be represented visually. This property is part of the fully developed path from E24 Physical Man-Made Thing through *P65 shows visual item*, E36 Visual Item, P138 to E1 Entity that is shortcut by *P62 depicts*. *P138.1 mode of representation* allows the nature of the representation to be refined.
Examples	The design on the reverse of the Swiss coin held by the Department of Coins and Medals of the British Museum under registration number 2009,1101.137 (E36) *represents* Helvetia (E28) *mode of representation* Profile (E55)
Properties	P138.1 mode of representation: E55 Type

P139 has alternative form

Domain	E41 Appellation
Range	E41 Appellation
Quantification	many to many (0,*n*:0,*n*)
Scope note	This property establishes a relationship of equivalence between two instances of E41 Appellation, *independently from any item identified by them.* The property is a dynamic, asymmetric relationship, where the domain expresses a derivative, if such a direction can be established. Otherwise, the relationship is symmetric.
	The equivalence shall apply to *all* cases of use of an instance of E41 Appellation. Multiple names assigned to an object that are not *always* synonymous should be instantiated as repeated values of the "is identified by" property. This property is *not* transitive.
	P139.1 has type allows the type of derivation, such as "transliteration from Latin 1 to ASCII", to be refined.
Examples	"Martin Doerr" (E82) *has alternative form* "Martin Dörr" (E82) *has type* Alternative spelling (E55)
	"Гончарова, Наталья Сергеевна" (E82) *has alternative form* "Gončarova, Natal'â Sergeevna" (E82) *has type* ISO 9:1995 transliteration (E55)
	"Αθήνα" (E41) *has alternative form* "Athina" *has type* Transcription (E55)
Properties	P139.1 has type: E55 Type

P140 assigned attribute to (received attribute through)

Domain	E13 Attribute Assignment
Range	E1 Entity
Superproperty of	E14 Condition Assessment. P34 concerned (was assessed by): E18 Physical Thing
	E16 Measurement. P39 measured (was measured by): E70 Thing
	E17 Type Assignment. P41 classified (was classified by): E1 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* silver cup 232 (E19)

P141 assigned (was assigned by)

Domain	E13 Attribute Assignment
Range	E1 Entity
Superproperty of	E14 Condition Assessment. P35 has identified (was identified by): E3 Condition State
	E15 Identifier Assignment. P37 assigned (was assigned by): E42 Identifier
	E15 Identifier Assignment. P38 deassigned (was deassigned by): E42 Identifier
	E16 Measurement. P40 observed dimension (was observed in): E54 Dimension
	E17 Type Assignment. P42 assigned (was assigned by): E55 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" (E42)

P142 used constituent (was used in)

Domain	E15 Identifier Assignment
Range	E90 Symbolic Object
Subproperty of	E7 Activity. P16 used specific object (was used for): E70 Thing
Quantification	many to many (0,n:0,n)
Scope note	This property associates the event of assigning an instance of E42 Identifier to an entity, with the instances of E90 Symbolic Object that were used as elements of the identifier.
Examples	On June 1, 2001 assigning the personal name heading "Guillaume, de Machaut, ca. 1300-1377" (E15) *used constituent* "Guillaume, de Machaut" (E82)
	On June 1, 2001 assigning the personal name heading "Guillaume, de Machaut, ca. 1300-1377" (E15) *used constituent* "ca. 1300-1377" (E49)

P143 joined (was joined by)

Domain	E85 Joining
Range	E39 Actor
Subproperty of	E5 Event. P11 had participant (participated in): E39 Actor
Quantification	many to many, necessary (1,*n*:0,*n*)
Scope note	This property identifies the instance of E39 Actor that becomes member of an E74 Group in an E85 Joining.
	Joining events allow for describing people becoming members of a group with a more detailed path from E74 Group through *P144 joined with (gained member by),* E85 Joining, *P143 joined (was joined by)* to 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 Gorbatchev (E21)
	The implementation of the membership treaty January 1, 1973 between EU and Denmark (E85) *joined* Denmark (E40)

P144 joined with (gained member by)

Domain	E85 Joining
Range	E74 Group
Subproperty of	E5 Event. P11 had participant (participated in): E39 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 *P144 joined with (gained member by),* E85 Joining, *P143 joined (was joined by)* to 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) *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) *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)
Properties	P144.1 kind of member: E55 Type

P145 separated (left by)

Domain	E86 Leaving
Range	E39 Actor
Superproperty of	E5 Event. P11 had participant (participated in): E39 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 (E86) *separated* Sir Isaac Newton (E21)
	George Washington's leaving office in 1797 (E86) *separated* George Washington (E21)
	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)

P146 separated from (lost member by)

Domain	E86 Leaving
Range	E74 Group
Superproperty of	E5 Event. P11 had participant (participated in): E39 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 (E86) *separated from* the Convention Parliament (E40)
	George Washington's leaving office in 1797 (E86) *separated from* the office of President of the United States (E40)
	The implementation of the treaty regulating the termination of Greenland membership in EU between EU, Denmark and Greenland February 1, 1985 (E86) *separated from* EU (E40)

P147 curated (was curated by)

Domain	E87 Curation
Range	E78 Collection
Quantification	many to many, necessary (1,*n*:0,*n*)
Scope note	This property associates an instance of E87 Curation with the instance of E78 Collection that is the subject of the curation activity.
Examples	The activities (E87) of the Benaki Museum *curated* the dolls and games of urban and folk manufacture dating from the 17th to the 20th century, from England, France, and Germany that were acquired for the Toys, Games, and Childhood Collection (E78) of the Museum
	The activities (E87) of the Historical Museum of Crete, Heraklion, Crete, *curated* the permanent Numismatic Collection (E78)
	Mikael Heggelund Foslie's activities (E87) *curated* Mikael Foslie's coralline red algal Herbarium (E78)

P148 has component (is component of)

Domain	E89 Propositional Object
Range	E89 Propositional Object
Quantification	many to many (0,n:0,n)
Scope note	This property associates an instance of E89 Propositional Object with a component part that is, of itself, an instance of E89 Propositional Object.
Examples	Dante's "Divina Commedia" (E89) *has component* Dante's "Inferno" (E89)

P149 is identified by (identifies)

Domain	E28 Conceptual Object
Range	E75 Conceptual Object Appellation
Superproperty of	E1 Entity. P1 is identified by (identifies): E41 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)

Annex A
(informative)

Class hierarchy

Although they do not provide comprehensive definitions, graphical representations of the class hierarchy can significantly aid comprehension and navigation of the ontology, and are therefore provided below.

The class hierarchy presented in Figures A.1 to A.5 has the following format.

— Each class is represented as a rectangle containing a unique class identifier, consisting of a number preceded by the letter "E" (originally denoting "entity," although now replaced with the term "class").

— The English name of the class appears to the right of the class identifier.

— Properties are listed in their domain class.

— Each property is represented by a unique property identifier, consisting of a number preceded by the letter "P" (denoting "property"), followed by the English name of the property for use in reading from domain to range and, in parentheses, the English name for use in reading from range to domain. The range of each property is given immediately after the property name.

— Arrows between classes indicate the structure of the IsA hierarchy.

— Figures A.2 to A.5 can be read as *expansions* from specific classes shown in Figure A.1.

— Some classes appear in more than one Figure.

Figure A.1 — E1 Entity

E7 Activity

P14 was carried out by (performed): E39 Actor
P15 was influenced by (influenced): E1 Entity
P16 used specific object (was used for): E70 Thing
P17 was motivated by (motivated): E1 Entity
P19 was intended use of (was made for): E71 Man-Made Thing
P20 had specific purpose (was purpose of): E5 Event
P21 had general purpose (was purpose of): E55 Type
P32 used general technique (was technique of): E55 Type
P33 used specific technique (was technique of): E29 Design or Procedure
P125 used object of type (was type of object used in): E55 Type
P134 continued (was continued by): E7 Activity

E66 Formation

P95 has formed (was formed by): E74 Group

E85 Joining

P143 joined (was joined by): E39 Actor
P144 joined with (gained member by): E74 Group

E86 Leaving

P145 separated (left by): E39 Actor
P146 separated from (lost member by): E74 Group

E87 Curation

P147 curated (was curated by): E78 Collection

E8 Acquisition

P22 transferred title to (acquired title through): E39 Actor
P23 transferred title from (surrendered title through): E39 Actor
P24 transferred title of (changed ownership through): E18 Physical Thing

E9 Move

P25 moved (moved by): E19 Physical Object
P26 moved to (was destination of): E53 Place
P27 moved from (was origin of): E53 Place

E10 Transfer of custody

P28 transferred custody from (surrendered custody through): E39 Actor
P29 transferred custody to (received custody through): E39 Actor
P30 transferred custody of (changed custody through): E18 Physical Thing

E13 Attribute Assignment

P140 assigned attribute to (received attribute through): E1 Entity
P141 assigned (was assigned by): E1 Entity

E11 modification

P31 has modified (was modified by): E24 Physical Man-Made Thing
P126 employed (was employed in): E57 Material

E65 Creation

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

E83 Type Creation

P135 created type (was created by): E55 Type
P136 was based on (supported type creation): E1 Entity

E14 Condition Assessment

P34 concerned (was assessed by): E18 Physical Thing
P35 has identified (was identified by): E3 Condition State

E12 Production

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

E15 Identifier Assignment

P37 assigned (was assigned by): E42 Identifier
P38 deassigned (was deassigned by): E42 Identifier
P142 used constituent (was used in): E90 Symbolic Object

E79 Part Addition

P110 augmented (was augmented by): E24 Physical Man-Made Thing
P111 added (was added by): E18 Physical Thing

E16 Measurement

P39 measured (was measured by): E70 Thing
P40 observed dimension (was observed in): E54 Dimension

E80 Part Removal

P112 diminished (was diminished by): E24 Physical Man-Made Thing
P113 removed (was removed by): E18 Physical Thing

E17 Type Assignment

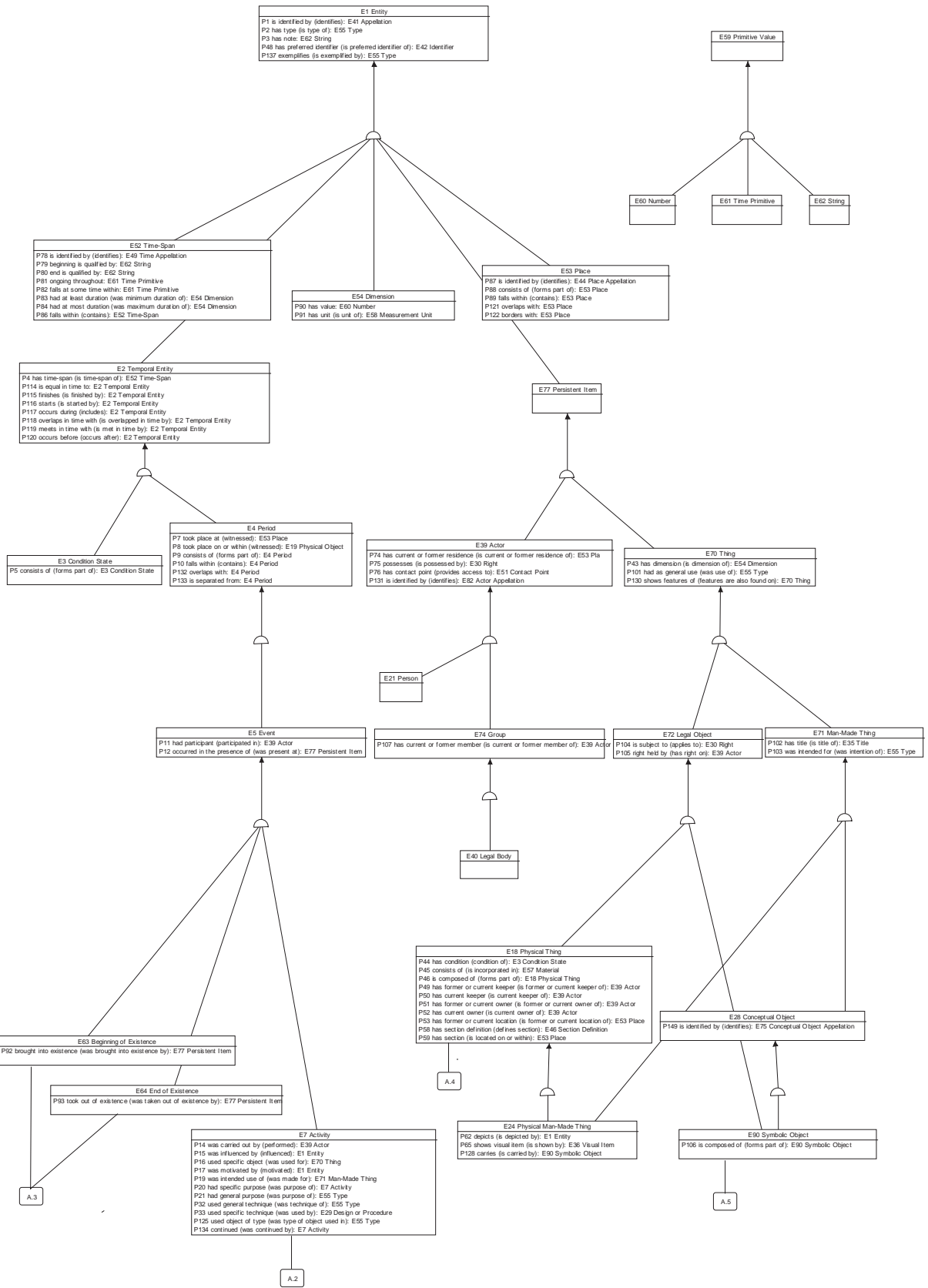P41 classified (was classified by): E1 Entity
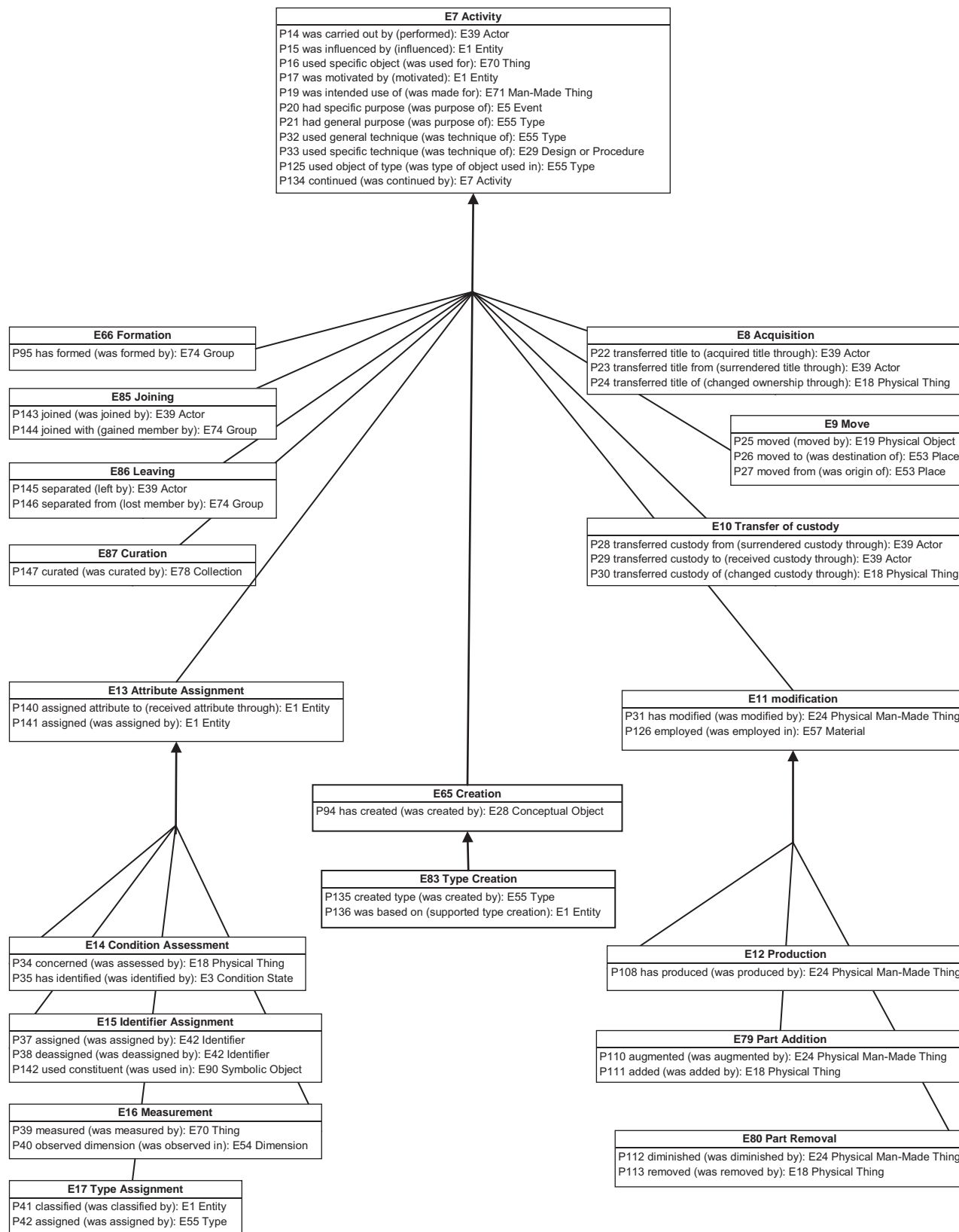P42 assigned (was assigned by): E55 Type

Figure A.2 — E7 Activity

Figure A.3 — E63 Beginning of Existence and E64 End of Existence

E18 Physical Thing

P44 has condition (is condition of): E3 Condition State
P45 consists of (is incorporated in): E57 Material
P46 is composed of (forms part of): E18 Physical Thing
P49 has former or current keeper (is former or current keeper of): E39 Actor
P50 has current keeper (is current keeper of): E39 Actor
P51 has former or current owner (is former or current owner of): E39 Actor
P52 has current owner (is current owner of): E39 Actor
P53 has former or current location (is former or current location of): E53 Place
P58 has section definition (defines section): E46 Section Definition
P59 has section (is located on or within): E53 Place

E24 Physical Man-made Thing

P62 depicts (is depicted by): 1 Entity
P65 shows visual item (is shown by): E36 Visual Item
P128 carries (is carried by): E90 Symbolic Object

E19 Physical Object

P54 has current permanent location (is current permanent location of): E53 Place
P55 has current location (currently holds): E53 Place
P56 bears feature (is found on): E26 Physical Feature
P57 has number of parts: E60 Number

E26 Physical Feature

E20 Biological Object

E22 Man-made Object

E78 Collection

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

E25 Man-made Feature

E27 Site

E21 Person

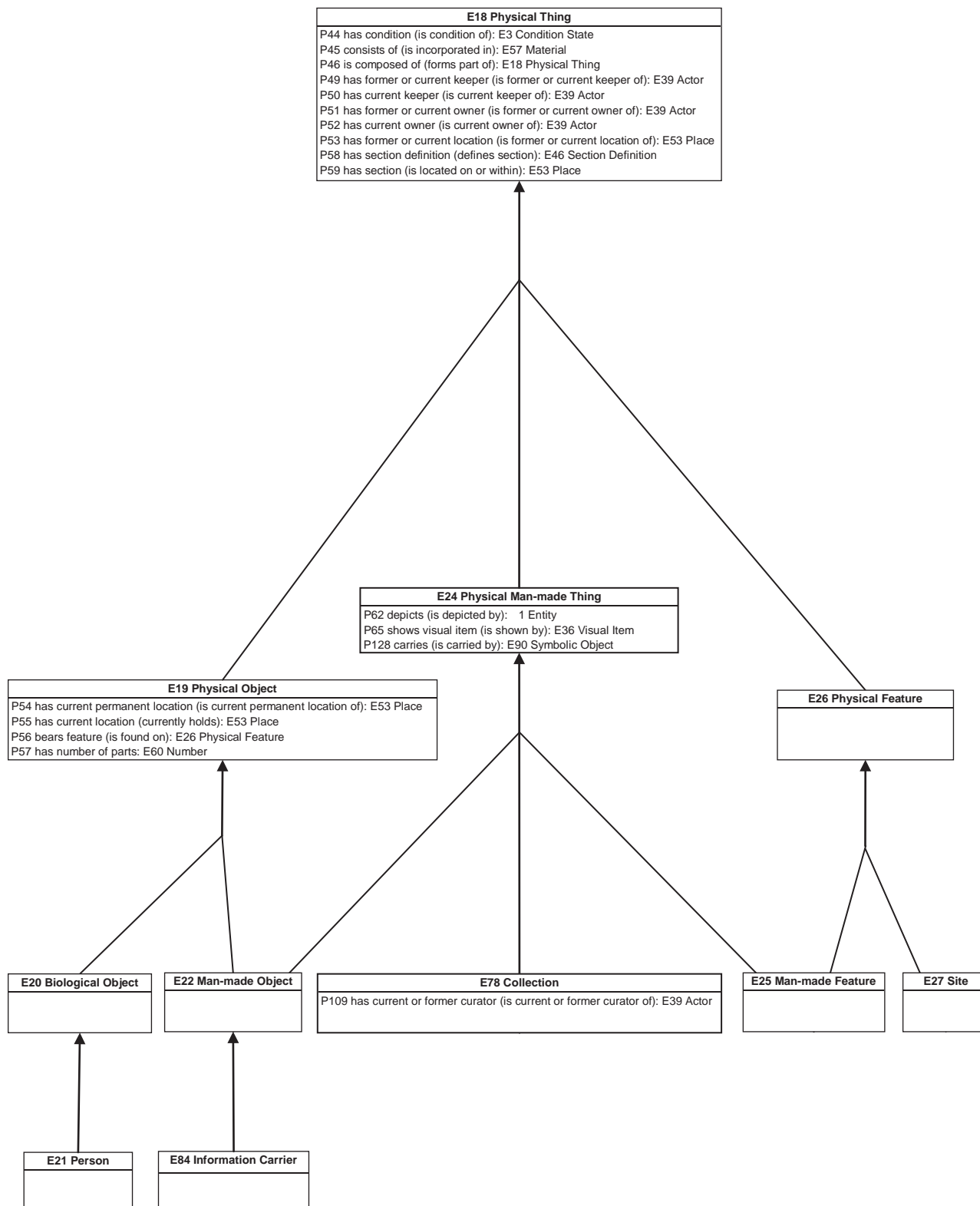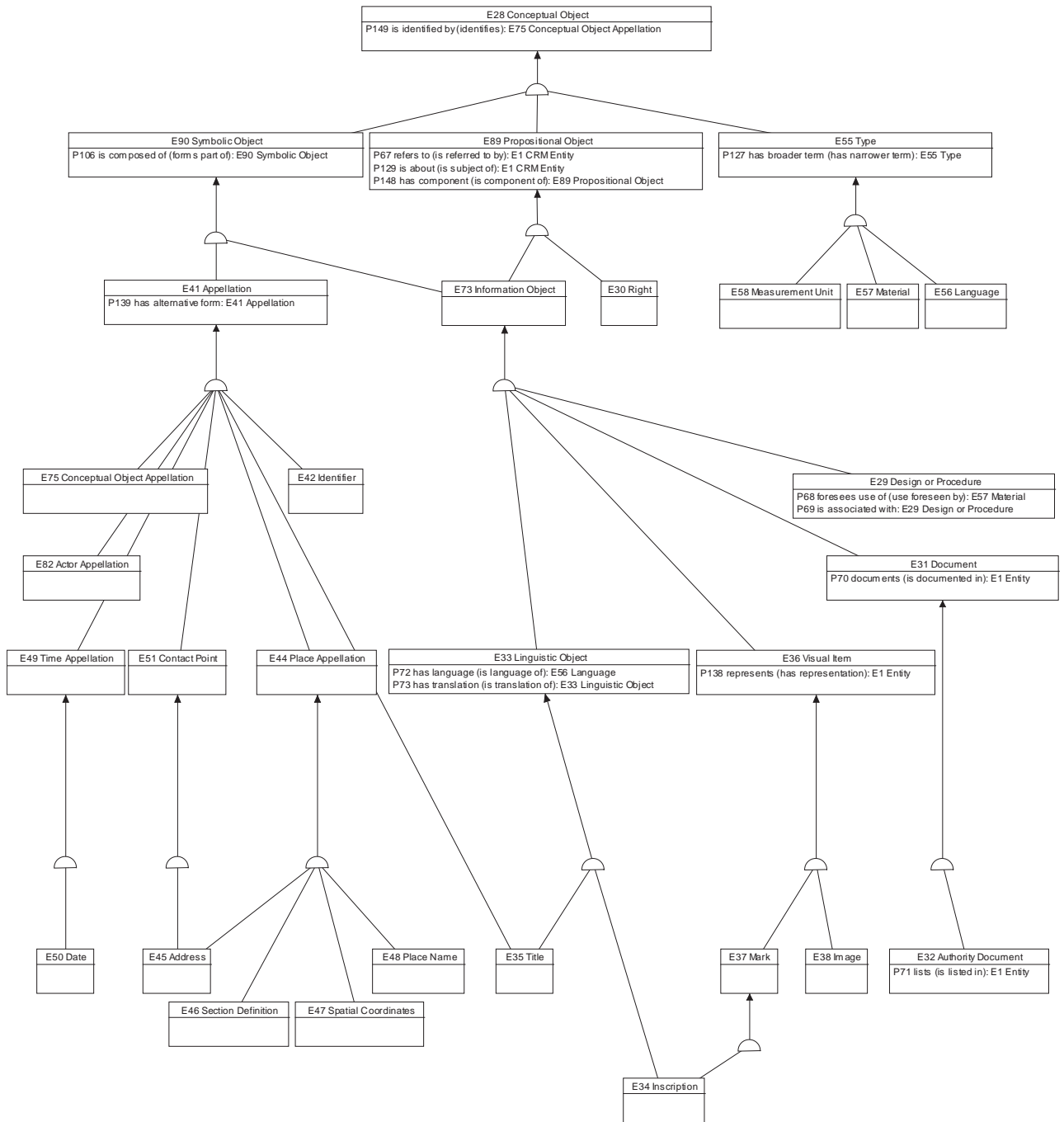**E84 Information Carrier**

Figure A.4 — E18 Physical Thing

Figure A.5 — E28 Conceptual Object

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ICS 35.240.30

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