

LRM_{oo} (formerly FRBR_{oo})
object-oriented definition and mapping from
IFLA LRM

Prepared by the IFLA LRM_{oo} Working Group
with the CIDOC CRM Special Interest Group

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1. Introduction

This document contains a comprehensive description of the object-oriented definition of IFLA LRM, a model in the form of a formal ontology interpreting IFLA LRM. The IFLA Library Reference Model (IFLA LRM) was approved as an IFLA standard in August 2017. IFLA LRM consolidates and succeeds the three models in the IFLA FR family of conceptual models (FRBR, FRAD, FRSAD).

FRBR_{oo} version 2.4, approved as an IFLA standard in 2016, reflected the three IFLA entity-relationship models in a formulation designed as a compatible extension to the museum community's model, the CIDOC Conceptual Reference Model (CIDOC CRM). The role of the LRM_{oo} model is to provide a similar equivalent for IFLA LRM.

LRM_{oo} is developed from FRBR_{oo} version 2.4, but taking into account decisions made in IFLA LRM, continuing the mutual influence and cycles of development between the models (Riva & Žumer 2018).

CIDOC CRM had a major release (version 7.1) in 2021 which will be used for its next ISO version. LRM_{oo} is also taking the opportunity to integrate this latest CRM release, including modifications to terminology and style that have been recently adopted in the CRM family.

The document comprises the following sections:

- Section 1, Introduction, describes the rationale, history and methodology of the development of this model.
- Section 2, Scope, clarifies both what the model includes and what is not included.
- Section 3, Status, provides information relating to the formal adoption process of the document.
- Section 4, Description of the Model, explains the model in context from a functional perspective with the help of a comprehensive graphical representation of all constructs, and describes the format conventions for the formal specifications found in sections 6 and 7.
- Section 5, Class and Property Hierarchies, puts LRM_{oo} in context with CIDOC CRM. Since the object-oriented model reuses, wherever appropriate, large parts of ISO 21127, the CIDOC Conceptual Reference Model, this section also provides a comprehensive list of all constructs used from CIDOC CRM version 7.1.2. Some of these constructs appear only in the mapping in section 8 and not in section 2, because they are generic in nature.
- Sections 6 and 7 list the complete class and property definitions that make up the model. Whereas the description in section 4 serves an overall understanding, these sections are the reference for the individual declarations.
- Section 8 describes the mapping of the IFLA LRM entity-relationship model to the object-oriented model LRM_{oo}. This section defines the transition from one form to the other, and serves as information for further understanding of the intended meaning of the object-oriented definition. It is also a proof that the object-oriented form is an alternative view of the IFLA LRM model, and a proof of completeness of the object-oriented form with respect to the original.
- Section 9 provides a temporary home for classes and properties declared in FRBR_{oo} that are intended to transition to the new CRM_{soc}, the model for Social Phenomena.
- Section 10 lists all classes and properties declared in FRBR_{oo} and aligns them with the LRM_{oo} model, and provides migration instructions.
- Section 11 provides a brief bibliography.

2. Scope

The LRM₀₀ model includes all classes and properties required, in addition to classes and properties already declared in CIDOC CRM, to express the concepts covered by IFLA LRM. Unlike in FRBR₀₀, no classes that are exact equivalences of CIDOC CRM classes are declared, even when those classes are required as direct equivalences to IFLA LRM classes. LRM₀₀ is strictly an extension of CIDOC CRM and cannot be implemented without using key classes and properties from CIDOC CRM.

LRM₀₀ generally refrains from expanding on IFLA LRM with additional refinements for particular types of resources. In contrast, in FRBR₀₀ some aspects were modelled in great detail, for example performing and recording of performances. This level of detail led to a rather lengthy model, with 48 classes and 72 properties, which was deemed too complex and led to the desire to establish a “core” FRBR₀₀ model. In addition, these specialized subclasses of F1 Work or F2 Expression were redundant as their properties were semantically equivalent to the properties of their superclasses, just declared with different labels. Some entity types and properties were therefore deprecated, but the expressivity of LRM₀₀ is not reduced with respect to FRBR₀₀. All these aspects can be fully represented with more general supertypes in LRM₀₀ or CIDOC CRM.

3. Status

Draft version 0.9 includes all proposals approved up to and including CIDOC CRM SIG meeting #53, May 10-13, 2022, and editorial modifications made for consistency. **The document has not yet been release for a formal IFLA world-wide review.**

Once completed, the document will be approved by the CIDOC CRM SIG, the IFLA Bibliographic Conceptual Models Review Group, and then submitted for IFLA standards approval.

Certain classes and properties previously declared in FRBR₀₀ version 2.4 are intended to transition to other CRM family models, rather than remain in LRM₀₀. However, these models are not, for various reasons, at a stage where they can publish these classes and properties. Thus, the existing declarations are retained in this model document, with minimal editing for consistency, to maintain a transition path for implementers, until the appropriate destination models are ready.

This includes the linkage to the PRESS₀₀ model: the class F18 Serial Work and its property *R11 issuing rule*. F18 Serial Work should be implemented only in conjunction with an implementation of PRESS₀₀, as the class is not otherwise used within LRM₀₀.

Several classes and properties are intended for CRM_{soc}, the model for social phenomena. Their full declarations are found in section 9 of this document.

A special case is property *R34 has validity period*, whose destination is still under discussion. The class F34 Controlled Vocabulary is maintained in this model solely as the domain for R34, and is not otherwise to be implemented.

4. Description of the Model

[PR: This text taken from and slightly adapted from revised CIDOC CRM text in:

<https://docs.google.com/document/d/1-h5rfqBtdtMhWLkqUfi2c7fPdnUW2f0W/edit#>]

The CIDOC CRM is an ontology in the sense used in computer science. More specifically, the model is expressed in terms of the primitives of semantic data modelling. As such, it consists of:

- classes, which represent general notions in the domain of discourse, such as the CIDOC CRM class E21 Person which represents the notion of person;
- properties, which represent the binary relations that link the individuals in the domain of discourse, such as the CIDOC CRM property *P152 has parent* linking a person to one of the person's parents.
- properties of properties (“*.1 properties*”), such as the property *P14.1 in the role of*, of the CIDOC CRM property *P14 carried out by (performed)*.

They do not appear in the property hierarchy list, but are included as part of their base property declaration and are referred to in the class declarations. They all have the implicit quantification “many to many”.

[PR: need to insert definitions of the terms transitive, symmetric and reflexive before this point]

Inheritance and Transitivity

CIDOC CRM, and its extensions, is formulated as a class system with inheritance. A property P with domain A and range B will also be a property between any possible subclasses of A and of B. In many cases there will be a common subclass C of both A and B. In these cases, when the property is restricted to C, that is, with C as domain and range, the restricted property could be transitive. For instance, an E73 Information Object can be incorporated into an E90 Symbolic Object and thus an information object can be incorporated in another information object.

In the definition of the model the transitive properties are explicitly marked as such in the scope notes. All unmarked properties should be considered as not transitive.

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 via one or more intermediate classes. For example, the property E18 Physical Thing. *P52 has current owner (is current owner of)*: 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 may not be true; an instance of the fully-articulated path cannot always be inferred from an instance of the shortcut property inside the frame of the actual knowledge base.

4.1. Overview of the Model

LRM₀₀ declares 17 classes and 34 properties, in addition to those used from CIDOC CRM. In comparison, IFLA LRM has 11 entities, 37 attributes and 36 relationships.

The core of the model is the WEMI (Work, Expression, Manifestation, Item) classes which were first defined in FRBR, and the relationships linking them together. As an object-oriented model, LRM₀₀ brings out the events that result in the creation of instances of the WEMI classes, using specific creation classes that are linked to the WEMI classes by specific properties. These creation classes are subclasses of the CIDOC CRM classes E65 Creation or E12 Production, and in turn both of these classes are subclasses of the basic E7 Activity class. Since instances of E39 Actor (to which the IFLA LRM entity LRM-E6 Agent is mapped) can *P14i carry out* instances of E7 Activity, an agent can be linked to the creation or modification of any WEMI instance. This is illustrated in the following figure. Not illustrated in the figure is that any E7 Activity can also be linked to a specific instance of E52 Place or E53 Time-span.

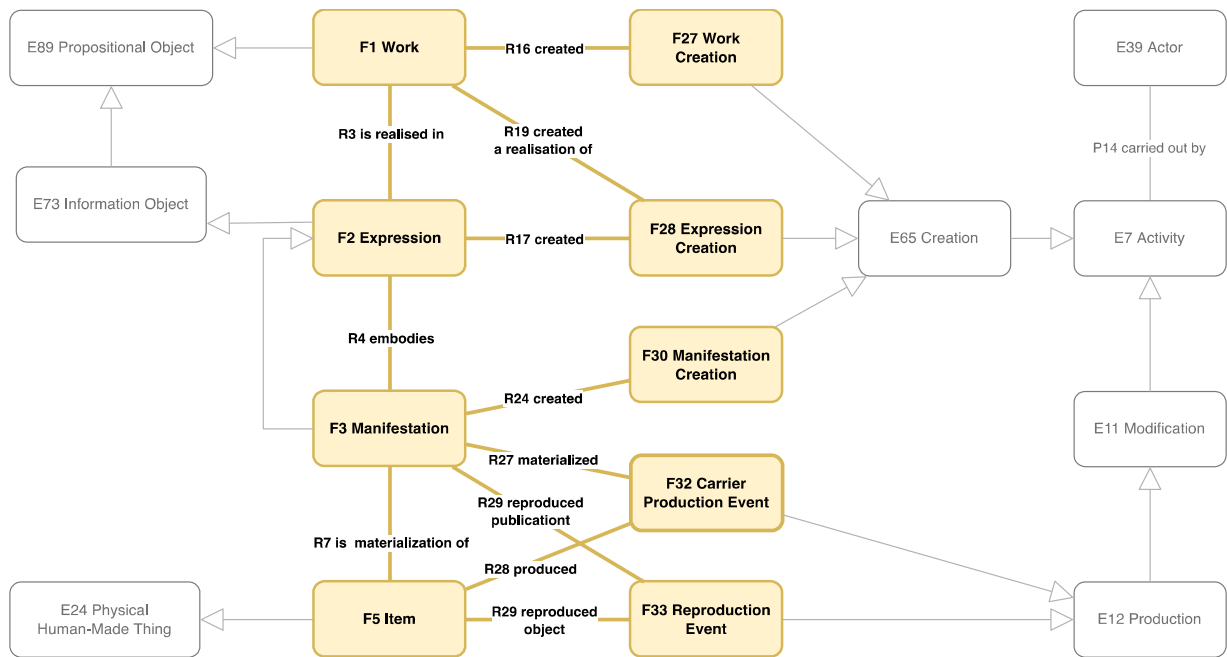
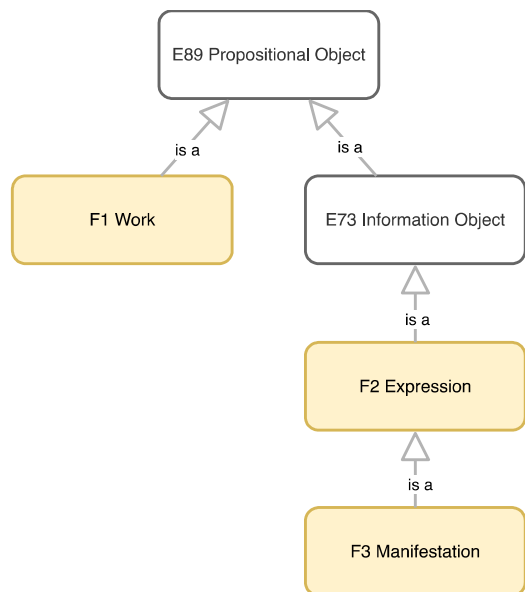


Figure 1. Main LRM_{oo} classes and properties and their connections to CIDOC CRM classes

Manifestation as subtype of Expression

Inheritance is a construct frequently used in modelling and the isA (inheritance) relationship is used to define one class as a more specialized version of another. An inherited class also implies a subset, since any instance of class B also counts as an instance of class A. A property that is defined for a class, will also apply on any subtype of this class. It is worth underlining that inheritance is a modelling construct, it is a relationship between types of things. In IFLA LRM, inheritance is used to simplify the modelling of attributes and relationships. Most notably, all IFLA LRM entities inherit the generic LRM-E1 Res entity type, and the entity type LRM-E6 Agent is introduced as a common supertype for LRM-E7 Person and LRM-E8 Collective Agent (which is a superclass of Corporate Body etc.).

In LRM_{oo}, F1 Work is defined as a subtype of CRM E89 Propositional Object, and F2 Expression as a subtype of CRM E73 Information Object. F3 Manifestation is defined as a subtype of F2 Expression (and so implicitly also a subtype of CRM E73 Information Object). The latter is a notable change from FRBR_{oo} where Manifestation (called F3 Manifestation-Product Type) was defined as subclass of CRM E55 Type, which was neither intuitive nor convenient. The main reasoning for inheriting Expression, is that the substance of manifestations is both the content and the form of its presentation. In most cases, it is explicitly stated that a manifestation embodies one or more expressions, but there are cases when it is natural to consider the manifestation as an expression that is elaborated with full presentation. Advantages of this solution is that it allows for convenient implementation of aggregates and other cases where the manifestation as a whole can be associated with a work, without introducing redundant additional expressions for the whole. This also aligns well with the direct relationship between manifestation and work that is implemented in some vocabularies for library data. However, this is not intended to replace the use of *R4 embodies (is embodied in)* as the proper mechanism for describing the contents of a manifestation.



This change made it possible to label the properties of F3 Manifestation in a manner more consistent with IFLA LRM. An example is the equivalent of LRM-R3 *is embodied in (embodies)*. In IFLA LRM this is defined with domain: Expression and range: Manifestation. In LRM₀₀, although the domain and range are reversed, R4 is also labelled *embodies (is embodied in)*. In contrast, in FRBR₀₀, the same property was labelled *R4 carriers provided by (comprises carriers of)*, seeming very different although the meaning was the same as LRM-R3.

Revised event for the creation of F1 Work

In the FRBR₀₀ model the entity type F27 Work Conception implicitly put the emphasis on the beginning of the creation process, the “spark of inspiration”, which is rarely known and documented. The F27 Work Creation in LRM₀₀, on the other hand, comprises activities by which instances of F1 Work come into existence and can serve to document the period a work was coming into existence and the circumstances of it, when these are known. In many cases Work Creation coincides with the existence of the first known complete expression of that work. This approach is closer to IFLA LRM, which models the outcomes of creation processes.

The same approach is also used in F28 Expression Creation, which comprises activities that result in instances of F2 Expression coming into existence. An instance of expression is considered to be created when it is captured on a carrier other than the creator’s brain. The creation of an instance of expression coincides with the creation of the first instance of F3 Manifestation that *R4 embodies (is embodied in)* this instance of expression.

Integration of expressions into new works

Integration of pre-existing expressions into expressions of new works, although a frequent occurrence, is an aspect still missing from IFLA LRM. Examples include poems put to music or reusing music in new compositions. In LRM₀₀ this is covered by two properties, *R74 uses expression of (has expression used in)* and *R75 incorporates (is incorporated in)*. The latter is a relationship between expressions, where the first expression includes as an integral part the second expression (which is a realisation of a different work). *R74 uses expression of* deals with the work level: all expressions of the first work will include some expression of the second. A well known example is Beethoven’s 9th Symphony, which uses an expression of ‘An die Freude’ by Friedrich Schiller (but it can be any language version).

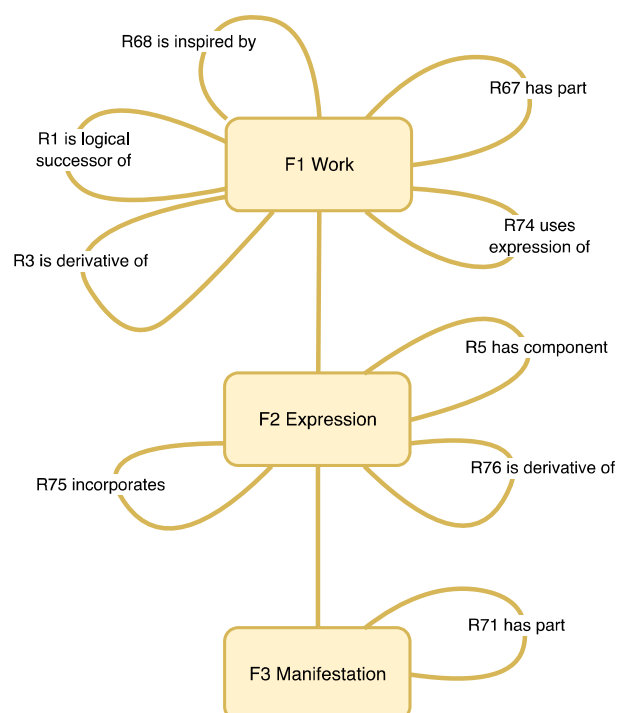
Representative attributes

The work attribute LRM-E2-A2 Representative expression attribute was introduced in IFLA LRM to enable specifying essential characteristics of a work (such as original language, original instrument, intended audience), associated with the canonic expression, most often the one considered original. In LRM₀₀, this is achieved with the property *R73 takes representative attribute from (bears representative attribute for)*, which associates a work with the representative expression, the one that the attributes are taken from.

Work properties

Some properties were added to LRM₀₀ to enable full mapping to IFLA LRM relationships. *R68 is inspired by (is inspiration for)* was added as a direct equivalent of the IFLA LRM inspiration relationship LRM-R21 between two works. *R76 is derivative of (has derivative)* is declared as the equivalent to the IFLA LRM relationship LRM-R24. This property is connecting two expressions and it enables recording the exact derivation chain, when known. It is an important addition to the more general work-to-work derivation relationship, *R2 is derivative of (has derivative)*, which was already declared in FRBR₀₀ and corresponds to the IFLA LRM transformation relationship LRM-R22.

The work-to-work property *R67 has part (forms part of)* is a new property, equivalent to IFLA LRM relationship LRM-R18, subproperty of *R10 has*



member (is member of). It allows modelling structural composition of works as opposed to R10, which also covers alternative content.

4.2. Naming conventions

LRM₀₀ follows the naming conventions that have been applied throughout the CIDOC CRM family of models:

- Classes are identified by numbers preceded by the letter “F”, and are named using noun phrases (nominal groups) using title case (initial capitals). For example, F28 Expression Creation.
- Properties are identified by numbers preceded by the letter “R,” 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 *R4 embodies*, whereas properties related to events are named in past tense, such as *R19 created a realisation of (was realised through)*.
- The letters “F” and “R” were chosen during the development of FRBR₀₀ and are to be understood as the first two letters of “FRBR”. This choice does not have any other meaning. They correspond respectively to the letters “E” and “P” in the CIDOC CRM naming conventions, where “E” historically meant “entity” (although the CIDOC CRM “entities” are now consistently called “classes”), and “P” means “property”.
- Since LRM₀₀ developed from FRBR₀₀, the same identifiers already assigned to classes and properties in FRBR₀₀ are retained when those classes and properties continue to be defined in LRM₀₀. The identifiers for those classes and properties defined in FRBR₀₀ that are deprecated in LRM₀₀ are not reused, even though this results in gaps in the numbering. All classes and properties newly declared in LRM₀₀ are assigned the next available identifier at the end of the sequence.
- 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. Reading a property in range-to-domain direction is equivalent to the inverse of that property. Following a current notational practice in OWL knowledge representation language, inverse properties are represented in this text by adding a letter “i” following the identification number and the parenthetical form of the full property name, such as *R1i has successor*, which is the inverse of *R1 is logical successor of (has successor)*.
- Properties with a range that is a subclass of CIDOC CRM class E59 Primitive Value (such as E1 CRM Entity. *P3 has note*: E62 String, for example) have no parenthetical name form, because 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 same 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 consist of (forms part of)*: E4 Period, have a parenthetical form that relates to the meaning of the inverse direction.
- The choice of the domain of properties, and hence the order of their names, are established in accordance with the following priority list:
 - E2 Temporal Entity and its subclasses
 - E70 Thing and its subclasses
 - E39 Actor and its subclasses
 - Other

[PR: Note sure this is always true!]

- Properties of properties are identified by “R”, followed by the number of the base property extended with “.1” and are named in one direction using a verbal phrase in lower case in the present tense. For example: the property *R2.1 has type* of the property *R2 is derivative of (has derivative)*.

4.3. Property quantifiers

Quantifiers for properties are provided for the purpose of semantic clarification only, and should **not** be treated as implementation recommendations. Therefore the term “cardinality constraints” is avoided here, as it typically pertains to implementations.

The following table lists all possible property quantifiers occurring in the CIDOC CRM family of models by their notation, together with an explanation in plain words. In order to provide optimal clarity, two widely accepted notations are used redundantly in this document, a verbal and a numeric one. The verbal notation uses phrases such as “one to many”, and the numeric one, expressions such as “(0,n:0,1)”. While the terms “one”, “many” and “necessary” are quite intuitive, the term “dependent” 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. (Meghini, C. & Doerr, M., 2018)

| | |
|---|---|
| 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 this property. In other words, this 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 this property, but an individual range instance cannot be referenced by more than one instance of this property. In other words, this property is optional for its domain and range, but repeatable for its domain only. In some contexts this situation is 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 this property, but an individual range instance can be referenced by zero, one or more instances of this property. In other words, this property is optional for its domain and range, but repeatable for its range only. In some contexts this situation is 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 this property, but an individual range instance can have zero, one or more instances of this property. In other words, this 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 this property, but an individual range instance cannot be referenced by more than one instance of this property. In other words, this property is necessary and repeatable for its domain, and optional but not repeatable for its range. In some contexts this situation is called a “fan-out”. |
| many to one, necessary (1,1:0,n) | An individual domain instance of this property must have exactly one instance of this property, but an individual range instance can be referenced by zero, one or more instances of this property. In other words, this property is necessary and not repeatable for its domain, and optional and repeatable for its range. In some contexts this situation is 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 this property, but an individual range instance must be referenced by exactly one instance of this property. In other words, this property is optional and repeatable for its domain, but necessary and not repeatable for its range. In some contexts this situation is called a “fan-out”. |
| many to many, necessary, dependent (1,n:1,n) | An individual domain instance and range instance of this property can have one or more instances of this property. In other words, this property is necessary and repeatable for its domain and for its range. |
| one to many, necessary, dependent (1,n:1,1) | An individual domain instance of this property can have one or more instances of this property, but an individual range instance must be referenced by exactly one instance of this property. In other words, this property is necessary and repeatable for its domain, and necessary but not repeatable for its range. In some contexts this situation is called a “fan-out”. |
| many to one, necessary, dependent (1,1:1,n) | An individual domain instance of this property must have exactly one instance of this property, but an individual range instance can be referenced by one or more instances of this property. In other words, this property is necessary and not repeatable for its domain, and necessary and repeatable for its range. In some contexts this situation is called a “fan-in”. |

**one to one
(1,1:1,1)** An individual domain instance and range instance of this property must have exactly one instance of this property. In other words, this property is necessary and not repeatable for its domain and for its range.

The CIDOC CRM family of models defines some dependencies between properties and the classes that are their domains or ranges. These can be one or both of the following:

- the property is necessary for the domain
- the property is necessary for the range, or, in other words, the range is dependent on the property.

The possible kinds of dependencies are defined in the table above. Note that if a dependent property is not specified for an instance of the respective domain or range, it means that the property exists, but the value on one side of the property is unknown. In the case of optional properties, the methodology proposed does not distinguish between a value being unknown or the property not being applicable at all. For example, one may know that an object has an owner, but the owner is unknown. In the CIDOC CRM family of models this case cannot be distinguished from the fact that the object has no owner at all. Of course, such details can always be specified by a textual note.

Note that the quantification of all properties of properties, “.1” properties, is “many-to-many” and, therefore, does not appear explicitly in their definitions.

4.4. Presentation conventions

All instances of E41 Appellation are presented within single quotation marks, whether they are used for themselves or just to refer to the things they name. Any punctuation mark that follows an instance of E41 Appellation is placed outside the single quotation marks, as it does not belong to the appellation itself.

Furthermore, all references to instances of E90 Symbolic Object in the form of a content model are presented within single quotation marks, such as ‘abc’. By content model we mean the symbol sequence the symbolic object consists of.

British spelling is used throughout the original English version of this document, except for occasional quotations and examples.

Double quotation marks are used to indicate an informal name or term. E.g.: The “lower member” consists of sandstone with minor shale.

5. Class and Property Hierarchies

Although they do not provide comprehensive definitions, compact monohierarchical presentations of the class and property isA hierarchies have been found to significantly aid in the comprehension and navigation of LRM₀₀, and are therefore provided below.

The class hierarchy presented below has the following format:

- Each line begins with a unique class identifier, consisting of a number preceded by the letter “F”.
- A series of em dashes (“—”) follows the unique class identifier, indicating the hierarchical position of the class in the isA hierarchy.
- The English label of the class appears to the right of the em dashes.
- The index is ordered by hierarchical level, in a “depth first” manner, from the smaller to the larger subhierarchies.
- Classes that appear in more than one position in the class hierarchy as a result of multiple inheritance are shown first in roman typeface, then in italic typeface.

The property hierarchy presented below has the following format:

- Each line begins with a unique property identifier, consisting of a number preceded by the letter “R”.
- A series of em dashes (“—”) follows the unique property identifier, indicating the hierarchical position of the property in the isA hierarchy.
- The English label of the property appears to the right of the em dashes, followed by its inverse name in parentheses for reading in the range to domain direction.
- The domain class for which the property is declared.
- The range class that the property references.
- The index is ordered by hierarchical level, in a “depth first” manner, from the smaller to the larger subhierarchies, and by property number between equal siblings.
- Properties that appear in more than one position in the property hierarchy as a result of multiple inheritance are shown in an italic typeface.

In LRM₀₀ class and property hierarchies aligned with CIDOC CRM class and property hierarchies, distinct layouts are used for classes and properties from LRM₀₀, on the one hand, and for classes and properties from CIDOC CRM, on the other hand.

5.1. LRM_{oo} class hierarchy

[PR: updated up to 2022-05-12; includes SIG#53 proposals and results and e-votes]

| | | | |
|---------------------|---|------------------------------------|--------------------|
| F1 | Work | | |
| F18 | — | Serial Work [PRESS _{oo}] | |
| F2 | Expression | | |
| F3 | — | Manifestation | |
| F34 | — | Controlled Vocabulary [deprecated] | |
| F5 | Item | | |
| F12 | Nomen | | |
| F27 | Work Creation | | |
| F28 | Expression Creation | | |
| F30 | — | Manifestation Creation | |
| F33 | — | — | Reproduction Event |
| F31 | Performance | | |
| F32 | Carrier Production Event | | |
| F33 | <i>Reproduction Event</i> | | |
| F34 | <i>Controlled Vocabulary [deprecated]</i> | | |
| F36 | Script Conversion | | |
| F55 | Collective Agent | | |
| F11 | — | Corporate Body | |
| F39 | — | Family | |

5.2. LRM₀₀ class hierarchy, aligned with portions of the CIDOC CRM class hierarchy

LRM₀₀ class hierarchy with CIDOC CRM 7.2.1 direct superclasses added as the first columns.

[PR: updated up to 2022-05-12; includes SIG#53 proposals and results and e-votes]

| | | | | | |
|-----|---------------------------|-----|---|------------------------------------|---------------------------|
| E89 | Propositional Object | F1 | Work | | |
| | | F18 | — | Serial Work [PRESS ₀₀] | |
| E73 | Information Object | F2 | Expression | | |
| | | F3 | — | Manifestation | |
| | | F34 | — | Controlled Vocabulary [deprecated] | |
| E24 | Physical Human-Made Thing | F5 | Item | | |
| E89 | Propositional Object | F12 | Nomen | | |
| E65 | Creation | F27 | Work Creation | | |
| E65 | Creation | F28 | Expression Creation | | |
| | | F30 | — | Manifestation Creation | |
| | | F33 | — | — | Reproduction Event |
| E12 | Production | F28 | <i>Expression Creation</i> | | |
| | | F30 | — | <i>Manifestation Creation</i> | |
| | | F33 | — | — | <i>Reproduction Event</i> |
| E7 | Activity | F31 | Performance | | |
| E12 | Production | F32 | Carrier Production Event | | |
| E12 | Production | F33 | <i>Reproduction Event</i> | | |
| E29 | Design or Procedure | F34 | <i>Controlled Vocabulary [deprecated]</i> | | |
| E32 | Authority Document | F34 | <i>Controlled Vocabulary [deprecated]</i> | | |
| E29 | Design or Procedure | F36 | Script Conversion | | |
| E74 | Group | F55 | Collective Agent | | |
| | | F11 | — | Corporate Body | |
| | | F39 | — | Family | |

5.3. List of CIDOC CRM classes used in LRM₀₀

In this section, we present as a list, the classes of the CIDOC CRM Conceptual Reference Model version 7.1.2 referred to by LRM₀₀. The classes that appear indirectly in the LRM₀₀ model, i.e. either as superclasses of classes defined in the model, or as the domain or range of referred CRM properties are marked in bold. The list includes classes required by the mapping of IFLA LRM entities found in section 8.1.

Since LRM₀₀ refers to and reuses, wherever appropriate, large parts of ISO 21127, the CIDOC Conceptual Reference Model, this section provides a comprehensive list of all classes used from ISO 21127, CIDOC CRM version 7.1.2. Use in this context includes: appearance in the mapping from IFLA LRM in section 8 or as an element of a path expression in a mapping statement, reference as immediate superclass.

| Class | Class Label |
|--------------|---------------------------|
| E1 | CRM Entity |
| E7 | Activity |
| E11 | Modification |
| E12 | Production |
| E13 | Attribute Assignment |
| E18 | Physical Thing |
| E19 | Physical Object |
| E21 | Person |
| E22 | Human-Made Object |
| E24 | Physical Human-Made Thing |
| E25 | Human-Made Feature |
| E28 | Conceptual Object |
| E29 | Design or Procedure |
| E30 | Right |
| E32 | Authority Document |
| E33 | Linguistic Object |
| E36 | Visual Item |
| E39 | Actor |
| E41 | Appellation |
| E42 | Identifier |
| E51 | Contact Point |
| E52 | Time-span |

| Class | Class Label |
|--------------|----------------------|
| E53 | Place |
| E54 | Dimension |
| E55 | Type |
| E56 | Language |
| E58 | Measurement Unit |
| E60 | Number |
| E61 | Time Primitive |
| E62 | String |
| E65 | Creation |
| E66 | Formation |
| E70 | Thing |
| E71 | Human-Made Thing |
| E72 | Legal Object |
| E73 | Information Object |
| E74 | Group |
| E78 | Curated Holding |
| E89 | Propositional Object |
| E90 | Symbolic Object |
| E94 | Space Primitive |
| E99 | Product Type |

5.4. LRM₀₀ property hierarchy

[revised 2022-05-04; includes SIG#53 proposals and results and e-votes]

Range entities from CIDOC CRMbase are in bold.

| Property id | Property Name | Entity – Domain | Entity – Range |
|--------------------|---|------------------------|-----------------------|
| R1 | is logical successor of (has successor) | F1 Work | F1 Work |
| R3 | is realised in (realises) | F1 Work | F2 Expression |
| R4 | embodies (is embodied in) | F3 Manifestation | F2 Expression |

| | | | | |
|-----|-----|---|------------------------------|---------------------------------|
| R5 | | has component (is component of) | F2 Expression | F2 Expression |
| R7 | | is materialization of (is materialized in) | F5 Item | F3 Manifestation |
| R8 | | combines (is combined to form) | F12 Nomen | F12 Nomen |
| R10 | | has member (is member of) | F1 Work | F1 Work |
| — | R67 | has part (is part of) | F1 Work | F1 Work |
| R11 | | has issuing rule (is issuing rule of) [PRESS _{oo}] | F18 Serial Work | E29 Design or Procedure |
| R15 | | has fragment (is fragment of) | F2 Expression | E90 Symbolic Object |
| R16 | | created (was created by) | F27 Work Creation | F1 Work |
| R17 | | created (was created by) | F28 Expression Creation | F2 Expression |
| — | R24 | created (was created through) | F30 Manifestation Creation | F3 Manifestation |
| R19 | | created a realisation of (was realised through) | F28 Expression Creation | F1 Work |
| R27 | | materialized (was materialized by) | F32 Carrier Production Event | F3 Manifestation |
| R28 | | produced (was produced by) | F32 Carrier Production Event | F5 Item |
| R29 | | reproduced object (was object reproduced by) | F33 Reproduction Event | F5 Item |
| R30 | | reproduced publication (was publication reproduced by) | F33 Reproduction Event | F3 Manifestation |
| R33 | | has content | F12 Nomen | E62 String |
| R34 | | has validity period (is validity period of) | F34 Controlled Vocabulary | E52 Time-Span |
| R35 | | is specified by (specifies) | F12 Nomen | F2 Expression |
| R36 | | uses script conversion (is script conversion used in) | F12 Nomen | F36 Script Conversion |
| R54 | | has language (is language of) | F12 Nomen | E56 Language |
| R56 | | is related to (is related to) | F12 Nomen | F12 Nomen |
| R66 | | included performed version of (had a performed version through) | F31 Performance | E89 Propositional Object |
| R68 | | is inspiration for (was inspired by) | F1 Work | F1 Work |
| — | R2 | is derivative of (has derivative) | F1 Work | F1 Work |

| | | | |
|-----|--|------------------|----------------------|
| R69 | has physical form (is physical form of) | F3 Manifestation | E55 Type |
| R70 | has dimension (is dimension of) | F3 Manifestation | E54 Dimension |
| R71 | has part (is part of) | F3 Manifestation | F3 Manifestation |
| R73 | takes representative attribute from (bears representative attribute for) | F1 Work | F2 Expression |
| R74 | uses expression of (has expression used in) | F1 Work | F1 Work |
| R75 | incorporates (is incorporated in) | F2 Expression | F2 Expression |
| R76 | is derivative of (has derivative) | F2 Expression | F2 Expression |

5.5. LRM₀₀ property hierarchy, aligned with portions of the CIDOC CRM property hierarchy

[PR: not ready]

5.6. List of CIDOC CRM properties used in LRM₀₀

In this section, we present as a list, the properties of CIDOC CRM version 7.1.2 referred to by LRM₀₀. The properties that appear indirectly in the LRM₀₀ model, i.e. as superproperties of properties defined in the model, are marked in bold.

Since LRM₀₀ refers to and reuses, wherever appropriate, large parts of ISO 21127, the CIDOC Conceptual Reference Model, this section provides a comprehensive list of all properties used from ISO 21127, CIDOC CRM version 7.1.2. Use in this context includes: appearance in the mapping from IFLA LRM in section 8, or as an element of a path expression in a mapping statement, or reference as immediate superproperty.

[PR: to be revised, use latest CRMbase, v.7.1.2 and final mapping]

6. LRM_{oo} Class Declarations

The classes of LRM_{oo} are comprehensively declared in this section using the following format:

- Class labels are presented as headings in bold face, preceded by the class' unique identifier;
- The line "Subclass of:" declares the superclass of the class, being the class from which this class inherits properties;
- The line "Superclass of:" is a cross-reference to the subclasses of this class;
- The label "Scope note:" precedes the textual definition of the concept the class represents;
- The label "Examples:" precedes a list of examples of instances of this class. If the example is also an instance of a subclass of this class, the unique identifier of the subclass is added in parenthesis. If the example instantiates two classes, the unique identifiers of both classes are added in parenthesis. Examples may be followed by an explanation in brackets.
- The label "Properties:" declares the list of the class's properties (that is, the properties of which the class is the domain);
- Each property is represented by its unique identifier, its forward and reverse labels, and the range class that it links to, separated by a colon;
- Inherited properties are not represented;
- Properties of properties (.1 properties) are provided indented and in parentheses beneath their respective domain property.

F1 Work

Subclass of: E89 Propositional Object

Superclass of: [F18](#) Serial Work [PRESS_{oo} class]

Scope note: This class comprises distinct intellectual ideas conveyed in artistic and intellectual creations, such as poems, stories or musical compositions.

A Work is the outcome of an intellectual process of one or more persons. Inherent to the notion of work is the existence of recognisable realizations of the work in the form of one or more expressions. Works are often regarded as finished and discrete e.g. when declared as such by the creator of the work or based on the elaboration or logical coherence of its content. However, works may be recognized as existing but unfinished e.g. if the creators deliberately or accidentally never explicitly finished a particular Expression but have left behind partial expressions.

In the absence of explicit information about the initial conception, which is rarely available, the first expression created constitutes witness of the beginning of existence of a Work.

A Work can evolve over time, such as through revised editions. A Work may be elaborated by one or more Actors simultaneously, in parallel, or over time. Additional expressions of a Work can continue to be created over time.

The boundaries of a Work have nothing to do with the value of the intellectual achievement but only with the dominance of a concept.

The main purpose of this class is to enable bringing together intellectually equivalent Expressions in order to display to a user all available alternatives of the same intellectual or artistic content.

Examples:

- Agatha Christie's 'Murder on the Orient Express' [novel].
- Mary Shelley's 'Frankenstein, or, The Modern Prometheus' [novel].
- Ursula K. Le Guin's 'The Earthsea trilogy' [set of novels].
- Ursula K. Le Guin's 'The Tombs of Atuan' [novel which is part of the 'Earthsea' trilogy].
- Homer's 'Odyssey' [ancient Greek epic poem].
- Dante's 'Divina Commedia' [narrative poem].
- William Shakespeare's 'The Tragedy of Hamlet, Prince of Denmark' [play].
- Henry Gray's 'Anatomy of the human body' [scholarly work / reference work].
- René Goscinny and Albert Uderzo's 'Astérix le Gaulois' [cartoon].
- The 'Dewey Decimal Classification' (DDC) [library classification system].
- The Ordnance Survey's 1:50 000 'Landranger series' [collection of maps].
- Ludwig van Beethoven's 'Symphony No. 9 in D minor' [symphony].
- Johann Sebastian Bach's 'Goldberg variations' [compositions for keyboard].
- John Lennon and Paul McCartney's 'I want to hold your hand' [song].
- François Truffaut's 'Jules et Jim' [movie].
- Alfred Hitchcock's 'Psycho' [movie].
- Auguste Rodin's 'Le penseur' ('The thinker') [art].
- Pablo Picasso's 'Guernica' [art].
- Katsushika Hokusai's '神奈川沖浪裏' ('The Great Wave') [art].

Properties: [R1](#) is logical successor of (has successor): [F1](#) Work

[R2](#) is derivative of (has derivative): [F1](#) Work

(R2.1 has type: [E55](#) Type)

[R3](#) is realised in (realises): [F2](#) Expression

[R10](#) has member (is member of): [F1](#) Work

[R67](#) has part (forms part of): [F1](#) Work

[R68](#) is inspired by (is inspiration for): [F1](#) Work

[R73](#) takes representative attribute from (bears representative attribute for): [F2](#) Expression

[R74](#) uses expression of (has expression used in): [F1](#) Work

F2 Expression

Subclass of: E73 Information Object

Superclass of: F3 Manifestation

F34 Controlled Vocabulary [deprecated]

Scope note: This class comprises the intellectual or artistic realisations of Works in the form of identifiable immaterial objects, such as texts, poems, jokes, musical or choreographic notations, movement pattern, sound pattern, images, multimedia objects, or any combination of such forms. The substance of F2 Expression is signs.

An Expression is the outcome of the intellectual or creative process of realizing a Work. Subsequent expressions conveying the same work may be created over time.

Expressions do not depend on a specific physical carrier and can exist on one or more carriers simultaneously. As far as bibliographic practice is concerned, only instances of F2 Expression that are externalised on physical carriers other than both the creator's brain and an auditor's brain are taken into account.

The form of F2 Expression is an inherent characteristic of the F2 Expression. Differences in form imply different Expressions (e.g., from text to spoken word, a transcript of a recording). Similarly, differences in language or means of performance imply different Expressions (e.g., translations or arrangements for different instruments). Thus, if a text is revised or modified, the result is considered to be a new F2 Expression. While theoretically any change in signs will result in a new Expression, conventionally the context and use will determine the rules for distinguishing among expressions.

An instance of F2 Expression which includes spoken or written text may be multiply instantiated as an instance of E33 Linguistic Object. This allows for the association of the E56 Language of the text with the instance of F2 Expression by using the property P72 has language (is language of).

Examples:

- The original text (in English) by Agatha Christie for her novel 'Murder on the Orient Express'.
- The German text of 'Murder on the Orient Express' (as translated by Elisabeth van Bebber and published with the title 'Mord im Orientexpress').
- The text of the abridged English version of 'Murder on the Orient Express' (as published by HarperCollins).
- The narrated English text of 'Murder on the Orient Express' by David Suchet.
- The English text of Homer's 'Odyssey' translated by Robert Fagles.
- The English text of Homer's 'Odyssey' translated by Richmond Lattimore.
- 'Dewey Decimal Classification', 23rd edition (DDC23) [English edition].
- 'Classification décimale de Dewey', 23e édition [French translation of DDC23]
- The performance of Bach's 'Goldberg variations' by Angela Hewitt at the St. Thomas Church (Leipzig Germany) in November 2020
- The performance of Bach's 'Goldberg variations' by Angela Hewitt in Christuskirche (Berlin) on 14-17 December 2015.
- The musical score for Bach's 'Goldberg variations' (as published by Balthasar Schmid in 1741).
- Beethoven's original score for Symphony No. 9 (as expressed by Beethoven's original hand-written manuscript held by the Berlin State Library).
- The score for Beethoven's Symphony No. 9 that was edited by Jonathan Del Mar and published by Bärenreiter in 1997.
- The original cut of Hitchcock's movie 'Psycho'.

- The censored version of Hitchcock's movie 'Psycho' that was released in Britain (with stabbing sounds and visible nude shots removed).
- The first plaster version of 'The Thinker' sculpture made by August Rodin around 1881
- Large scale version of Auguste Rodin's 'The Thinker' created at the fonderie 'Alexis Rudier' in 1904.

Properties: [R5](#) has component (is component of): [F2](#) Expression
[R15](#) has fragment (is fragment of): E90 Symbolic Object
[R75](#) incorporates (is incorporated in): [F2](#) Expression
[R76](#) is derivative of (has derivative): [F2](#) Expression
(R76.1 has type: E55 Type)

F3 Manifestation

Subclass of: [F2](#) Expression

Scope note: This class comprises products rendering one or more Expressions. A Manifestation is defined by both the overall content and the form of its presentation. The substance of F3 Manifestation is not only signs, but also the manner in which they are presented to be consumed by users, including the kind of media adopted.

An F3 Manifestation is the outcome of a publication process where one or more F2 Expressions are prepared for public dissemination, but it may also be a unique form created directly on some material carrier without the intent of being formally published.

An instance of F3 Manifestation typically incorporates one or more instances of F2 Expression representing a distinct logical content and all additional input by a publisher such as text layout and cover design. Additionally an F3 Manifestation can be identified by the physical features for the medium of distribution, if applicable. For example, publications in the form of hard-cover and paperback editions would be two distinct instances of F3 Manifestation, even though authorial and editorial content are otherwise identical in both publications.

In the case of industrial products such as printed books or music CDs, but also digital material, an instance of F3 Manifestation can be regarded as the prototype for all copies of it. In these cases, an instance of F3 Manifestation specifies all of the features or traits that instances of F5 Item display in order to be copies of a particular publication. In the case of industrial products, instances of F3 Manifestation are also instances of E99 Product Type, normally nowadays identified by characteristic identifiers such as ISBN numbers.

Examples:

- The publication 'Murder on the Orient Express / Agatha Christie', published by Collins Crime Club in 1934.
- The publication of 'Murder on the Orient Express / Agatha Christie', published by HarperCollins in 2017.
- The publication 'Mord im Orientexpress : ein Hercule-Poirot-Roman / Agatha Christie', published by Deutscher Bücherbund in 1975.
- The publication 'Murder on The Orient Express / Agatha Christie', narrated by David Suchet, audio book (audio CD) published by HarperCollins in 2005.
- The HTML-version of Homer's 'Odyssey' with English text by S. H. Butcher and A. Lang, online available from the Gutenberg Project.
- The publication 'The Illustrated Odyssey', published by Sidgwick & Jackson Ltd in 1980, containing the translated text by E.V. Rieu, an introduction by Jacquetta Hawkes and photographs by Tim Mercer.
- The publication 'The Odyssey of Homer' published by Harper & Row in 1967, containing an introduction and the English translation of the Greek poem by Richmond Lattimore.
- The CD publication 'Bach Goldberg Variations', published by Hyperion Records in 2016, containing a CD with Angela Hewitt's performances of Bach's 'Goldberg Variations' recorded

in Christuskirche (Berlin) on 14-17 December 2015 and a booklet with an introduction to the music by Angela Hewitt in English, French and German.

- The manuscript known as ‘The Book of Kells’.
- The publication containing a text entitled ‘Pop Culture’ (authored by a person named ‘Richard Memeteau’), issued in 2014 by the publisher named ‘Zones’ and distributed in EPUB2 format by a distributor named ‘Editis’ and identified by ISBN ‘978-2-35522-085-2’.
- The publication entitled Alfred Hitchcock’s Psycho: 60th Anniversary Edition, containing one blue ray disc with two cuts of the movie, released in 2020.

Properties: [R4](#) embodies (is embodied in): [F2](#) Expression
[R69](#) has physical form (is physical form of): E55 Type
[R70](#) has dimension (is dimension of): E54 Dimension
[R71](#) has part (is part of): [F3](#) Manifestation

F5 Item

Subclass of: E24 Physical Human-Made Thing

Scope note: This class comprises physical objects (printed books, scores, CDs, DVDs, CD-ROMS, etc.) that were produced by (P186i) an industrial process involving a given instance of F3 Manifestation. As a result, all the instances of F5 Item associated with a given instance of F3 Manifestation are expected to carry the content defined in that instance of F3 Manifestation, although some or even all of them may happen to carry a content that significantly differs from it, due to either an accident in the course of industrial production, or subsequent physical modification or degradation.

An instance of F5 Item that consists of a physical object or set of objects with clear physical boundaries is also an instance of E22 Human-Made Object. An instance of F5 Item that is stored on a part of a larger physical support (such as an electronic file among others on a disc) can also be considered to be an instance of E25 Human-Made Feature.

The notion of F5 Item is only relevant with regard to the production process, from a bibliographic point of view. Cultural heritage institutions’ holdings are a distinct notion: a holding certainly can be equal to an instance of F5 Item, but it also can be either “bigger” than one (e.g., when two instances of F5 Item are bound together (in the case of printed books)), or “smaller” than one (e.g., for incomplete holdings, such as when only one CD from a two-CD set is held). From an operational point of view, cultural heritage institutions typically do *not* deal with instances of F5 Item, but with storage units, although for libraries in most cases this is not significant because each item corresponds with a single storage unit. When this is not the case, the linkage between items and storage units can be easily accounted for through the E19 Physical Object class from CIDOC CRM, and the relationships between storage units and instances of F5 Item recorded through the *P46 is composed of (forms part of)* property from CIDOC CRM. If needed, an instance of E19 Physical Object can be typed as a storage unit through the *P2 has type (is type of)* property.

Examples:

- The copy of Murder on the Orient Express / Agatha Christie, HarperCollins 2017, that is held by the Deichman public library in Oslo, Norway, and which is identified by inventory number ‘9138513’.
- John Smith’s copy of ‘Murder on the Orient Express / Agatha Christie’, HarperCollins 2017, with the owner’s ex libris stamped on the inside of the cover page.
- The copy of the first edition of Bach’s ‘Goldberg variations’ held by the National Library in France with corrections made by the composer, and additional music in the form of fourteen canons on the Goldberg ground.
- The manuscript known as the ‘Book of Kells’ (owned by Trinity College in Dublin)
- The bronze statue of Auguste Rodin’s ‘The Thinker’, cast at the fonderie Alexis Rudier in 1904 held at the Musée Rodin in Paris, France since 1922.

- The ebook ‘Pop Culture’ by Richard Memeteau in EPUB2 format, received by the National Library of France through digital legal deposit on 1st February 2016 to which the legal deposit number DLN-20160201-6 has been assigned. In the catalogue, this item is identified with a unique number: LNUM20553886
- The copy of the electronic file named ‘cidoc_crm_v.7.1.1.pdf’ on my hard drive containing the text of version 7.1.1 of the ‘Definition of the CIDOC Conceptual Reference Model’

Properties: [R7](#) is materialization of (is materialized in): [F3](#) Manifestation

F11 Corporate Body

Subclass of: [F55](#) Collective Agent

Scope note: This class comprises organisations and groups of two or more people and/or organisations acting as a unit.

To be considered an instance of F11 Corporate Body a gathering of people needs to bear a name and exhibit organisational characteristics sufficient to allow the body as a whole to participate in the creation, modification or production of an E73 Information Object. Groups such as conferences, congresses, expeditions, exhibitions, festivals, fairs, etc. are modelled as F11 Corporate Bodies when they are named and can take collective action, such as approving a report or publishing their proceedings.

Examples:

- The International Machaut Society
- The British Library
- The Jackson Five
- The Regional Municipality of Ottawa-Carleton
- Symposium on Glaucoma

F12 Nomen

Subclass of: E89 Propositional Object

Scope note: This class comprises associations between an instance of any class, and signs or arrangements of signs that are used to refer to and identify that instance.

Signs include alphanumeric characters, ideograms, notations such as chemical structure symbols, sound symbols, etc. The scripts or type sets for the symbols used to compose an instance of F12 Nomen have to be sufficiently specified. Spelling variants are regarded as different nomens, whereas the use of different fonts (visual representation variants) or different digital encodings do not change the identity.

An arbitrary combination of signs or symbols cannot be regarded as an appellation or designation until it is associated with something in some context. In that sense, the F12 Nomen class can be understood as the reification of a relationship between an instance of E1 CRM Entity and an instance of E41 Appellation. Two instances of F12 Nomen can happen to be associated with equivalent strings and yet remain distinct, as long as they refer to distinct instances of E1 CRM Entity. Furthermore, two instances of F12 Nomen referring to the same instance of E1 CRM Entity may be associated with equivalent strings, and remain distinct as long as they are associated with distinct properties of the F12 Nomen class (for example, having the same spelling in different languages, or being defined in different controlled vocabularies).

An instance of F12 Nomen associates a combination of signs with an instance of E1 CRM Entity on the basis of a cultural or linguistic convention: by associating a string with anything, the instance of F12 Nomen establishes a meaning that is not inherent in the instance of E62 String that is associated with it. Depending on context of use, nomens associated with equivalent strings can be associated with instances of different things in the real world even within the same language (polysemy and homonymy). Conversely, the same thing can be referred to through any number of nomens (synonymy). In the controlled environment of a bibliographic information system, though, homonymy is avoided

Instances of F12 Nomen are assigned and associated with instances of E1 CRM Entity either formally (such as by bibliographic agencies) or informally through common usage. When they are assigned formally, the construction of the instances of E62 String that represent them may follow predetermined rules.

Examples:

- ‘杜甫’ as the name for a Chinese poet of the 8th century, rendered in simplified Chinese characters
- ‘Du Fu’ as the name for a Chinese poet of the 8th century, rendered in Pinyin romanised form
- ‘Tu Fu’ as the name for a Chinese poet of the 8th century, rendered in another romanised form
- ‘Thơ Đô Phủ’ as the name for a Chinese poet of the 8th century, rendered in a Vietnamese form
- ‘جامعة صفاقس’ as the name for Sfax University (Tunisia), rendered in Arabic in Arabic script
- ‘Ġāmi‘at Ṣafāqīs’ as the name for Sfax University (Tunisia), rendered in transliterated Arabic
- ‘Université de Sfax’ as the name for Sfax University (Tunisia), rendered in French
- ‘3-[(2S)-1-methylpyrrolidin-2-yl]pyridine’ as the term for nicotine, rendered in the IUPAC nomenclature of organic chemistry
- ‘Murders in the rue Morgue’ as the title of the textual work by Edgar Allan Poe, in English
- ‘Poe, Edgar Allan, 1809-1849. Murders in the rue Morgue’ as the name of the textual work, formulated as a controlled author/title access point appropriate for an English language catalogue
- ‘modelling’ as the term for the activity, in English using British spelling
- ‘modeling’ as the term for the activity, in English using American spelling
- ‘Maxwell equations’ as the term for these equations, formulated as the preferred subject access point from LCSH, <http://lccn.loc.gov/sh85082387>, as of 27 March 2012 [date of last update]
- ‘Equations, Maxwell’ as the term for these equations, formulated as a variant subject access point, from the same source
- ‘Gontcharova, Nathalie (1881-1962)’ as the name of the Russian artist, formulated as an preferred access point from the authority file of the National Library of France, <http://catalogue.bnf.fr/ark:/12148/cb119547494/PUBLIC>, as of 11 March 2015 [date of last update]
- ‘Gončarova, Natal’â Sergeevna (1881-1962)’ as the name of the Russian artist, formulated as a variant access point for a personal name, transliterated using ISO 9:1995 ‘Information and documentation — Transliteration of Cyrillic characters into Latin characters — Slavic and non-Slavic languages’, from the same source
- ‘Гончарова, Наталья Сергеевна (1881-1962)’ as the name of the Russian artist, formulated as a variant access point in Cyrillic script, from the same source
- ‘595.7’ as a classification number for insects (the taxonomic class Insecta), in the 23rd edition of the Dewey Decimal Classification
- ‘Insecta’ as a term for insects (the taxonomic class Insecta), used as the caption for the class ‘595.7’ in the English language 23rd edition of the Dewey Decimal Classification
- ‘spa’ as a code to designate the language Spanish, drawn from the ‘Codes for the representation of names of languages — Part 2: Alpha-3 code’ (ISO 639-2:1998)

Properties:

[R8](#) combines (is combined to form): F12 Nomen

[R33](#) has content: E62 String

R35 is specified by (specifies): F2 Expression

R36 uses script conversion (is script conversion used in): F36 Script Conversion

R54 has language (is language of): E56 Language

R56 has related form (is related form of): F12 Nomen

(R56.1 has type: E55 Type)

F18 Serial Work [*PRESS_{oo}*]

[Editor's note: Transfer this class, along with its property R11, to *PRESS_{oo}* once version 2.0 has a stable draft. It will link up to *LRM_{oo}* via the superclass F1 Work. Implement this class only in conjunction with an implementation of *PRESS_{oo}*.]

Subclass of: [F1](#) Work

Scope note: This class comprises works that are, or have been, planned to result in sequences of Expressions or Manifestations with common features. Whereas a work can acquire new members during the time it evolves, Expressions and Manifestations are identified with a certain state achieved at a particular point in time. Therefore there is in general no single Expression or Manifestation representing a complete serial work, unless the serial work has ended.

Serial Works may or may not have a plan for an overall expression.

The retrospective reprinting of all issues of a Serial Work at once, in the form of a monograph, is regarded to be another member of the F1 Work, which contains the Serial Work and the Work realised in the monograph. This does not make the monograph part of the Serial Work.

Examples:

- The periodical entitled 'The UNESCO Courier', ISSN '0041-5278'
- The periodical entitled 'Courrier de l'UNESCO', ISSN '0304-3118' [French edition of the periodical titled 'The UNESCO Courier', ISSN '0041-5278']
- The series entitled 'L'évolution de l'humanité', ISSN '0755-1843' [a monograph series comprising volumes that were published from 1920 on, and some of which were reprinted, with different physical features and rearranged in a different order, from 1968 on, in a distinct series also entitled 'L'évolution de l'humanité', ISSN '0755-1770']

Properties: [R11](#) has issuing rule (is issuing rule of): [E29](#) Design or Procedure

F27 Work Creation

Subclass of: E65 Creation

Scope note: This class comprises activities by which instances of F1 Work come into existence. An instance of F27 Work Creation can serve to document the period a work was coming into existence and the circumstances of it, when these are known.

An instance of F27 Work Creation marks the initial creation of an instance of F1 Work through expressions or other externalisations that are sufficiently elaborated so that the characteristic conceptual identity of the work could be recognized as existing.

In many cases this will coincide with the first known complete externalisation of an expression of the work. In other cases, the initial creation of an instance of F1 Work may be inferred from multiple, or later, expressions or other forms of evidence. For instance, commissioning of a work may explicitly be agreed on after the presentation of an already complete and detailed elaboration of the work that was not made public. Performances may be prior to written expressions, as in the case of Shakespeare's works.

The work, as an intellectual construction, may evolve from its initial creation onwards, until the last known expression of it.

An instance of E39 Actor with which a work is associated through the chain of properties F1 Work. *R16i was created by*: F27 Work Creation. *P14 carried out by (performed)*: E39 Actor corresponds to the notion of the "creator" of the work.

In the situation where an expression of one instance of F1 Work serves as source material for the creation of the first expression of a new instance of F1 Work, the relationship between the works is indicated using the property *R2 is derivative of (has derivative)* between the two instances of F1 Work.

Examples:

- Agatha Christie creating 'Murder on the Orient Express'.

- Mary Shelley creating ‘Frankenstein, or, The Modern Prometheus’.
- Dante creating the poem ‘Divina Commedia’.
- William Shakespeare creating ‘The Tragedy of Hamlet, Prince of Denmark’.
- René Goscinny and Albert Uderzo’s (collaboratively) creating ‘Astérix le Gaulois’.
- Ludwig van Beethoven’s composing his Symphony No. 9.
- Johan Sebastian Bach composing the ‘Goldberg variations’.
- The making of ‘Jules et Jim’, directed by François Truffaut.
- The making of ‘Psycho’, directed by Alfred Hitchcock.
- August Rodin creating ‘Le Penseur’ (The Thinker)
- Picasso creating ‘Guernica’.

Properties: [R16](#) created (was created by): [F1](#) Work

F28 Expression Creation

Subclass of: [E12](#) Production

[E65](#) Creation

Superclass of: [F30](#) Manifestation Creation

Scope note: This class comprises activities that result in instances of F2 Expression coming into existence. An instance of F2 Expression is considered to be created when it is captured on a carrier other than the creator’s brain.

Although F2 Expression is an abstract entity, a conceptual object, the creation of an expression inevitably also affects the physical world: when you scribble the first draft of a poem on a sheet of paper, you produce an instance of F3 Manifestation and an instance of F5 Item. F28 Expression Creation is a subclass of E12 Production because the recording of the expression causes a physical modification of the E18 Physical Thing that serves as the carrier. The creation of an instance of F2 Expression coincides with the creation of the first instance of F3 Manifestation that *R4 embodies (is embodied in)* this instance of F2 Expression.

The *P2 has type (is type of)* property can be used to specify the type of the instance of F28 Expression Creation (i.e., activities such as translating, revising, or arranging music are types of creation process). The type of the process is distinct from the type of result even though the typology frequently used for instances of the resulting F2 Expressions may imply the category of the instance of the F28 Expression Creation.

An instance of F28 Expression Creation may use as source material one or more specific instances of F2 Expression. When the source expression is documented this is also expressed by the property *R76 is derivative of (has derivative)*.

Examples:

- Agatha Christie writing the original manuscript for ‘Murder on the Orient Express’.
- Elisabeth van Bebbler creating the German translation of ‘Murder on the Orient Express’.
- Angela Hewitt performing the ‘Goldberg Variations’ at the St. Thomas Church (Leipzig Germany) in November 2020.
- Angela Hewitt performing the ‘Goldberg Variations’ in Christuskirche (Berlin) on 14-17 December 2015 (for a CD production).
- Beethoven scripting the original score for the 9th symphony.
- Jonathan Del Mar editing and creating the score for Beethoven’s 9th symphony (as published by Bärenreiter in 1997).
- The making of the original cut of Hitchcock’s movie ‘Psycho’.
- The making of the censored version of Hitchcock’s movie ‘Psycho’ that was released in Britain.
- August Rodin making the first plaster version of ‘The Thinker sculpture
- The making of the large-scale version of ‘The Thinker’ by the ‘Fonderie Alexis Rudier’ in 1904

Properties: R17 created (was created by): F2 Expression
[R19](#) created a realisation of (was realised through): F1 Work

F30 Manifestation Creation

Subclass of: [F28](#) Expression Creation

Superclass of: [F33](#) Reproduction Event

Scope note: This class comprises the activities of selecting, arranging and presenting one or more instances of F2 Expression on a carrier or other persistent presentation means with the purpose of communicating it to some public. It includes the specification of the presentation as to sensory impression (such as visual appearance or audio rendition).

Examples:

- The process of creating the publication ‘Murder on the Orient Express / Agatha Christie’, published by HarperCollins in 2017, including deciding the format, typesetting the text, designing the cover and other features of the publication.
- The process of making the HTML-version of the English text of Homer’s Odyssey (translated by S. H. Butcher and A. Lang), which is available online from the Gutenberg Project.
- The process of making the engraved copper plates for the first edition of Bach’s ‘Goldberg variations’ by Balthasar Schmid.
- The process of making the CD publication ‘Bach Goldberg Variations’, published by Hyperion Records in 2016, including the process of recording the performance, editing, and typesetting the booklet, and other design of the overall publication.

Properties: [R24](#) created (was created through): [F3](#) Manifestation

F31 Performance

Subclass of: [E7](#) Activity

Scope note: This class comprises activities that follow the directions of a plan for any kind of performance, such as a theatrical play, an expression of a choreographic work or a musical work; i.e., they are intended to communicate directly or indirectly to an audience.

Such activities can be identified at various levels of granularity, and can be contiguous or not. Any individual performance (with or without intermissions) is a single instance of F31 Performance. In addition, a complete run of performances can also be seen as an instance of F31 Performance, with individual performances as parts. A complete run of performances may comprise an original run plus any of its extensions and tours.

Note that a performance plan may be more or less elaborate, and may even foresee just improvisation.

Examples:

- performing the first performance of a Yiddish translation of the textual work entitled ‘King Lear’, as directed by Sergei Radlov, in Moscow, at the Moscow State Jewish Theatre, on February 10, 1935 [individual performance]
- performing the ballet entitled ‘Rite of spring’, as choreographed by Pina Bausch, in Avignon, at the Popes’ Palace, on July 7, 1995 [individual performance]
- performing the operatic work entitled ‘Dido and Aeneas’, as directed by Edward Gordon Craig and conducted by Martin Shaw, in London, Hampstead Conservatoire, on May 17, 18, and 19, 1900 [run of performances]

Properties: [R66](#) included performed version of (had a performed version through): [E89](#) Propositional Object

F32 Carrier Production Event

Subclass of: [E12](#) Production

Scope note: This class comprises activities that result in instances of F5 Item coming into existence. Both the production of a series of physical objects (printed books, scores, CDs, DVDs, CD-ROMs, etc.) and the creation of a new copy of a file on an electronic carrier are regarded as instances of F32 Carrier Production Event.

Typically, the production of copies of a publication (no matter whether it is a book, a sound recording, a DVD, a cartographic resource, etc.) strives to produce items all as similar as possible to a prototype that displays all the features that all the copies of the publication should also display, which is reflected in the property *R27 materialized*: F3 Manifestation.

Examples:

- The printing and binding of copies of the paperback edition of the HarperCollins 2017 publication ‘Murder on the Orient Express / Agatha Christie’, by CPI Ltd (UK).
- The printing of copies of the score of Bach’s Goldberg Variations by Balthasar Schmid in 1741.
- The casting of Auguste Rodin’s The Thinker at the fonderie Alexis Rudier in 1904.
- The production of the items of the CD publication ‘Bach Goldberg Variations’, published by Hyperion Records in 2016, including the printing of CDs, the printing of the booklet and cover, assembling the parts etc.

Properties: [R27](#) materialized (was materialized by): [F3](#) Manifestation

[R28](#) produced (was produced by): [F5](#) Item

F33 Reproduction Event

Subclass of: [E12](#) Production

[F30](#) Manifestation Creation

Scope note: This class comprises activities that consist in producing items of a new instance of F3 Manifestation that preserve both the content and layout found on items of a pre-existing instance of F3 Manifestation. The individual instance or instances of F5 Item that was or were used as a source for this process may be precisely identified or not. Such activities result in products known as facsimiles, reproductions, reprints, reissues, or new releases.

Examples:

- The 2014 publication of Daniel Wilson’s ‘Caliban: the missing link’ by Cambridge University Press [a facsimile edition of the 1873 publication by Macmillan]
- The 2015 publication of Harry Partch’s ‘Two studies on ancient Greek scales’ by Schott [which reproduces Harry Partch’s holograph manuscript]
- The 2007 publication of Hubert Reeve’s ‘Malicorne: réflexions d’un observateur de la nature’ published by Éditions du Seuil as number 179 in the series ‘Points. Science’ (ISBN ‘978-2-02-096760-0’) [a reprint edition of the 1990 publication by Éditions du Seuil in the series ‘Science ouverte’ (ISBN ‘2-02-012644-3’)]

Properties: [R29](#) reproduced object (was object reproduced by): [F5](#) Item

[R30](#) reproduced publication (was publication reproduced by): [F3](#) Manifestation

F34 Controlled Vocabulary

[Editor’s note: Expect to deprecate this class once its sole property, R34, is transferred to another family model.]

Subclass of: [E29](#) Design or Procedure

[E32](#) Authority Document

[F2](#) Expression

Scope note: This class comprises documents that establish controlled terminology (nomina) for consistent use. They may also describe relationships between entities and controlled terminology and relationships between entities. Note that any meaningful change in a Controlled vocabulary that affects the validity status of its elements defines a new release (instance of F2 Expression) of the Controlled vocabulary. Note that identifiers created following a rule in a Controlled vocabulary are to be regarded as being taken from this Controlled vocabulary, even though not explicitly spelled out. This definition of Controlled vocabulary reflects current library practice and not the use of the term in general. Knowledge Organisation Systems (KOS) are regarded as special cases of F34 Controlled Vocabulary.

Examples:

- LCSH February 20 to March 19 2012
- DDC 19 [19th English edition, published only in print by Forest Press in 1979]

Properties: [R34](#) has validity period (is validity period of): [E52](#) Time-Span

F36 Script Conversion

Subclass of: E29 Design or Procedure

Scope note: This class comprises rule sets for converting signs or arrangements of signs from one script or type set to another.

Examples:

- the rules for the transliteration of the Cyrillic script into Latin script codified in ISO 9:1995 'Information and documentation — Transliteration of Cyrillic characters into Latin characters — Slavic and non-Slavic languages'

F39 Family

Subclass of: [F55](#) Collective Agent

Scope note: This class comprises groups of two or more persons presented as a family and justified by relationships of birth, marriage, adoption, civil union, or similar social or legal status and an assumed common tradition, including examples such as royal families, dynasties, houses of nobility, etc.

Examples:

- House of Tudor
- the brothers Grimm

F55 Collective Agent

Subclass of: E74 Group

Superclass of: [F11](#) Corporate Body
[F39](#) Family

Scope note: This class comprises recognizable groups or organizations of persons that have the potential of acting as a unit to produce some intentional result of bibliographic interest for which they can be collectively considered responsible.

A group of people becomes an instance of F55 Collective Agent when it identifies itself by a name that identifies it within an appropriate context and exhibits sufficient organizational characteristics to permit it to perform actions that reflect agency. Groups that are constituted as meetings, conferences, congresses, expeditions, festivals, fairs, etc. are examples of F55 Collective Agent as long as they self-identify by a specific name, rather than being referred to by a generic description of the gathering, and can act as a unit (such as by publishing their

proceedings, or approving a report). These collective actions may be performed by representatives selected by the whole, rather than by all individual members acting together.

Collective Agents may be members of other Collective Agents, although directly or indirectly all Collective Agents are composed of persons. The membership of many types of Collective Agents will continue to evolve over time. A Collective Agent may continue to exist even if it has no members for a time (for example, a committee whose members all resign prior to the expiration of their terms but then a new complement of members is appointed).

Instances of F55 Collective Agent include instances of its subclass F11 Corporate Body: commercial or corporate entities and other legally registered bodies, as well as organizations and associations, musical, artistic or performing groups, governments, and any of their sub-units.

Married couples and other concepts of family (instances of F39 Family) are instances of a subclass of F55 Collective Agent.

In the wider sense, this class also comprises holders of official positions viewed collectively, independent of the current holder of the office, such as the president of a country. In such cases, it is possible that the instance of F55 Collective Agent has only ever had a single member.

A group of persons known by/using a joint pseudonym (i.e., a name that seems indicative of an individual but that is actually adopted as a persona by two or more people acting together) is a case of F55 Collective Agent.

Examples:

- International Federation of Library Associations and Institutions (F11)
- 81st World Library and Information Conference (F11)
- Bibliothèque nationale de France (F11)
- Exxon-Mobil (F11)
- The Beatles (F11)
- The brothers Grimm (F39)
- The President of the Swiss Confederation
- Nicolas Bourbaki [collective pseudonym of a group of 20th century French mathematicians also known as the Association des collaborateurs de Nicolas Bourbaki]
- Ellery Queen [joint pseudonym for detective fiction of cousins Frederic Dannay and Manfred Bennington Less who also wrote separately]

7. LRM₀₀ Property Declarations

The properties of LRM₀₀ are comprehensively declared in this section using the following format:

- Property labels 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 “Shortcut of:” declares the chain of CIDOC CRM and/or LRM₀₀ properties of which the LRM₀₀ property is a shortcut, whenever it cannot be simply declared as a subproperty of a pre-existing property (note however that when an LRM₀₀ property is *both* a subproperty of a pre-existing property *and* a shortcut, the detailed path of which it is a shortcut is only mentioned in the scope note);
- The line “Is covered by shortcut:” declares the CIDOC CRM property that constitutes a shortcut for a more detailed path of which the LRM₀₀ property is a part; [does not appear]
- The line “Subproperty of:” is a cross-reference to any superproperties the property may have, in either CIDOC CRM or LRM₀₀. All LRM₀₀ properties that fall under the scope of the CIDOC CRM are, either directly or indirectly, subproperties of at least one CIDOC CRM property. However, this line remains empty for LRM₀₀ properties that are shortcuts of more developed paths that involve CIDOC CRM properties and/or their LRM₀₀ subproperties;
- The line “Superproperty of:” is a cross-reference to any subproperties the property may have;
- The line “Quantification:” declares the possible number of occurrences for domain and range class instances for the property. Possible values are enumerated in section 4.3;
- The label “Scope note:” precedes the textual definition of the concept the property represents;
- The label “Examples:” precedes a list of examples of instances of this property;
- The label “Properties:” introduces any properties the property may have (.1 properties).
- In some cases the superproperty of a property is listed as *Out of CIDOC CRM Scope*. This indicates that the property that should be the superproperty is outside of the coverage of CIDOC CRM.

R1 is logical successor of (has successor)

Domain: [F1](#) Work

Range: [F1](#) Work

Subproperty of: E70 Thing. P130 shows features of (features are also found on): E70 Thing

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

Scope note: This property associates an instance of F1 Work which logically continues the content of another instance of F1 Work with the latter. This property is not transitive. It is asymmetric and irreflexive.

Examples:

- Ursula K. Le Guin's novel 'The Tombs of Atuan' (F1), *is logical successor of* Ursula K. Le Guin's novel 'A Wizard of Earthsea' (F1).
- Miguel de Cervantes' 'Segunda Parte del Ingenioso Cavallero Don Quixote de la Mancha' *is logical successor of* Miguel de Cervantes' 'El ingenioso hidalgo Don Quixote de la Mancha'.
- The TV series 'Breaking Bad' (F1) *is logical successor of* the TV series 'Better Call Saul' (F1).
- The first 'Star Wars' trilogy (F1), 1977-1983, is logical successor of the second 'Star Wars' trilogy (F1), 1999-2005.

[Note that the logical order does not follow, in either of the two last examples, the chronological or order of creation]

R2 is derivative of (has derivative)

Domain: [F1](#) Work

Range: [F1](#) Work

Subproperty of: [R68](#) is inspiration for (was inspired by): [F1](#) Work

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

Scope note: This property associates an instance of F1 Work which modifies the content of another instance of F1 Work with the latter. This property is transitive, asymmetric and irreflexive.

The inverse of this property is equivalent to the developed path: F1 Work(1). *R3 is realised in:* F2 Expression(1). *P16i was used for:* F28 Expression Creation. *R17 created:* F2 Expression(2). *R3i realises:* F1 Work(2). That is, F1 Work(1). *R2i has derivative:* F1 Work (2), without needing to specify the specific expressions involved in the derivation.

The property *R2.1 has type* of this property allows for specifying the kind of derivation, such as adaptation, summarisation, etc.

Examples:

- The movie 'Murder on the Orient Express' directed by Kenneth Branagh (F1), is derivative of the novel 'Murder on the Orient Express' by Agatha Christie, with *has type* movie adaptation (E55).
- The movie 'A Clockwork Orange' directed by Stanley Kubrick (F1), is derivative of the novel 'A Clockwork Orange' by Anthony Burgess, with *has type* movie adaptation (E55).
- Seth Grahame-Smith's novel 'Pride and prejudice and zombies' is a derivative of Jane Austen's novel 'Pride and prejudice', with *has type* parody (E55).

Properties: R2.1 has type: E55 Type

R3 is realised in (realises)

Domain: [F1](#) Work

Range: [F2](#) Expression

Subproperty of: E70 Thing. P130 shows features of (features are also found on): E70 Thing

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

Scope note: This property associates an instance of F2 Expression with an instance of F1 Work.

This property expresses the association that exists between an expression and the work that this expression conveys. Our factual knowledge of how a given work is historically realised into expressions is often limited. Therefore, this property makes it possible to express the association between an instance of F2 Expression and the instance of F1 Work it conveys without identifying the particular instances of F2 Expression that were part of a chain of derivation from the source.

Examples:

- Agatha Christie's work entitled 'Murder on the Orient Express' (F1) *is realised in* the original text written by Agatha Christie for the novel (F2).
- Agatha Christie's work entitled 'Murder on the Orient Express' (F1) *is realised in* the German translation created by Elisabeth van Bebber (F2).
- Agatha Christie's work entitled 'Murder on the Orient Express' (F1) *is realised in* the narration of the English text by David Suchet (F2).
- Dante's work entitled 'Inferno' (F1) *is realised in* the Italian text of Dante's 'Inferno' as found in the authoritative critical edition 'La Commedia secondo l'antica issolu' 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) (F2).
- Johann Sebastian Bach's 'Goldberg variations' (F1) *is realised in* the score of The Goldberg variation (as published by Balthasar Schmid in 1741) (F2).
- August Rodin's work 'The Thinker' (F1) *is realised in* the first plaster version of 'The thinker' (F2) that August Rodin made around 1881
- August Rodin's work 'The Thinker' (F1) *is realised in* the large-scale version of 'The thinker' (F2) created at the fonderie Alexis Rudier in 1904.

R4 embodies (is embodied in)

Domain: [F3](#) Manifestation

Range: [F2](#) Expression

Subproperty of: E73 Information Object. P165 incorporates (is incorporated in): E90 Symbolic Object

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

Scope note: This property associates an instance of F3 Manifestation with one or more instances of F2 Expression which are rendered by this instance of F3 Manifestation. The manifestation formats the expression(s) in the way they are to be presented to some public, including specifying the intended sensory impression (such as visual appearance or audio rendition).

Examples:

- The publication 'Murder on the Orient Express / Agatha Christie', published by Collins Crime Club in 1934 (F3) *embodies* the original text in English by Agatha Christie (F2).
- The publication 'Mord im Orientexpress: ein Hercule-Poirot-Roman / Agatha Christie', published by Deutscher Bücherbund in 1975 (F3) *embodies* the German translation by Elisabeth van Bebber (F2).
- The publication 'The Illustrated Odyssey', published by Sidgwick & Jackson Ltd in 1980, *embodies* the translated text by E.V. Rieu (F2), the introductory text by Jacquetta Hawkes (F2) and photographs by Tim Mercer (F2).

- The publication entitled Alfred Hitchcock’s *Psycho*: 60th Anniversary Edition which was released in 2020 (F3), *embodies* the original cut of the movie (F2) and the censored version that was released in Britain (F2).
- The publication identified by ISBN ‘2-222-00835-2’ (F3) *embodies* the text of Marin Mersenne’s ‘*Harmonie universelle*’ (F2).
- The CD publication ‘*Bach Goldberg Variations*’, published by Hyperion Records in 2016 (F3), *embodies* Angela Hewitt’s performances of Bach’s ‘*Goldberg Variations*’ recorded in Christuskirche (Berlin) on 14-17 December 2015.

R5 has component (is component of)

Domain: [F2](#) Expression

Range: [F2](#) Expression

Subproperty of: E89 Propositional Object. P148 has component (is component of): E89 Propositional Object

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

Scope note: This property associates an instance of an F2 Expression X with a structural component Y that conveys a part of the overall work realized by X, such as volumes, chapters, or sections. This property is transitive, asymmetric and irreflexive.

Any part of an expression that conveys complete propositions, such as a single phrase, can be documented using the more general property *P148 has component (is component of)*.

Any part of an expression that does not completely follow meaningful boundaries, such as lines or pages of text or portions visible on images, can be documented using the property *P106 is composed of (forms part of)*, and not with *R5 has component (is component of)*. Fragments, in particular, can be documented with the more specific property *R15 has fragment (is fragment of)*.

This property does not cover the relationship that exists between expressions that are realisations of different works, where one is re-used in a new, larger expression. Such a relationship is modelled by *R75 incorporates (is incorporated in)*.

Examples:

- The musical notation for Bach’s ‘*Goldberg Variations*’ (F2) *has component* the musical notation for ‘*Variatio 1. a 1 Clav*’ (F2).
- The Italian text of Dante’s textual work entitled ‘*Divina Commedia*’ (F2) *has component* the Italian text of Dante’s textual work entitled ‘*Inferno*’ (F2).
- The musical notation of Mozart’s *Singspiel* entitled ‘*Die Zauberflöte*’ (F2) *has component* the musical notation of Mozart’s aria entitled ‘*Der Hölle Rache*’, also known as ‘*The Queen of the Night’s Aria*’ (F2).
- The visual content of the map entitled ‘*Wales – The Midlands – South West England*’, scale 1:400,000, issued by Michelin in 2005 (F2) *has component* the visual content of the inset entitled ‘*Liverpool*’, scale 1:200,000, set within the compass of the map titled ‘*Wales – The Midlands – South West England*’, scale 1:400,000, issued by Michelin in 2005 (F2).

R7 is materialization of (is materialized in)

Domain: [F5](#) Item

Range: [F3](#) Manifestation

Subproperty of: [E18](#) Physical Thing. [P128](#) carries (is carried by): [E90](#) Symbolic Object

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

Scope note: This property associates an instance of F3 Manifestation with an instance of F5 Item that is one of its exemplars or its only exemplar.

Instances of F5 Item correspond to the kinds of physical unit(s) specified in the manifestation, regardless of possible later changes.

Even though an item may exhibit defects with respect to the intended manifestation, it is still regarded to carry the manifestation, as long as it is produced or made accessible as a functional item by its creators.

Examples:

- The item held by the Deichman public library in Oslo, identified by inventory number ‘9138513’ (F5) *is materialization of* the publication Murder on the Orient Express / Agatha Christie, HarperCollins 2017 (F3).
- The item held by the National Library of France and identified by shelf mark ‘Res 8 P 10’ (F5) *is materialization of* the edition of Amerigo Vespucci’s textual and cartographic work entitled ‘Mundus novus’ issued in Paris ca. 1503-1504 (F3).

R8 combines (is combined to form)

Domain: [F12](#) Nomen

Range: [F12](#) Nomen

Shortcut of: [F12](#) Nomen (1). R33 has content: E62 String (1). P190i is symbolic content of: E90 Symbolic Object (1): P106 is composed of: E90 Symbolic Object (2). P190 has symbolic content: E62 String (2). R33i is content of: [F12](#) Nomen (2)

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

Scope note: This property associates an instance of F12 Nomen with another instance of F12 Nomen where the string of the domain instance of F12 Nomen includes the complete symbolic content of the string of the range instance of F12 Nomen. This property is not transitive. It is asymmetric and irreflexive.

Examples:

- ‘The Adoration of the Shepherds (Coventry)’ as a controlled access point for the work (F12) *combines* ‘The Adoration of the Shepherds’ as the preferred title of the work (F12).
- ‘The Adoration of the Shepherds (Coventry)’ as a controlled access point for the work (F12) *combines* ‘Coventry’ as a term that refers to a place (F12).
- ‘Guillaume, de Machaut, ca. 1300-1377’ as a controlled access point for the French composer and poet (F12) *combines* ‘ca. 1300-1377’ as term that refers to a time-span (F12).
- ‘Guillaume, de Machaut, ca. 1300-1377’ as a controlled access point for the French composer and poet (F12) *combines* ‘Guillaume de Machaut’ as the name for a person (F12).
- ‘Univerza v Ljubljani. Oddelek za bibliotekarstvo’ as a controlled access point for a corporate body (F12) *combines* ‘Univerza v Ljubljani’ as a controlled access point for a parent corporate body (F12).
- ‘Univerza v Ljubljani. Oddelek za bibliotekarstvo’ as a controlled access point for a corporate body (F12) *combines* ‘Oddelek za bibliotekarstvo’ the preferred name that refers to a subordinate corporate body (F12).
- ISBN-10 ‘978-002-002-0’ as an identifier for the publication entitled ‘Nigeria’s international economic relations’ (F12) *combines* ‘978’ as a code indicating the Nigerian ISBN Agency (F12).
- ISBN-10 ‘978-002-002-0’ as an identifier for the publication entitled ‘Nigeria’s international economic relations’ *combines* ‘002’ as a code indicating the Nigerian Institute of International Affairs (F12).
- ISBN-10 ‘978-002-002-0’ as an identifier for the publication entitled ‘Nigeria’s international economic relations’ *combines* ‘002’ as a code for the publication entitled ‘Nigeria’s international economic relations’ (F12).
- ‘History -- France -- 14th century’ as a controlled subject term for the concept (F12) *combines* ‘History’ as the preferred term for the concept (F12). [Subject term constructed according to the order and syntax prescribed in the Library of Congress Subject Headings (LCSH) subject headings language]
- ‘History -- France -- 14th century’ as a controlled subject term for the concept (F12) *combines* ‘France’ as the preferred term for the country (F12). [Subject term constructed according to the order and syntax prescribed in the Library of Congress Subject Headings (LCSH) subject headings language]

- ‘History -- France -- 14th century’ as a controlled subject term for the concept (F12) *combines* ‘14th century’ as the preferred term for the time-span (F12). [Subject term constructed according to the order and syntax prescribed in the Library of Congress Subject Headings (LCSH) subject headings language]
- ‘595.7096’ as a classification number for insects in Africa (F12) *combines* ‘595.7’ as the classification number for the taxonomic class Insecta (insects) (F12). [Classification number according to the 23rd edition of the Dewey Decimal Classification (DDC23)]
- ‘595.7096’ as a classification number for insects in Africa (F12) *combines* ‘096’ as the notation corresponding to the continent Africa (F12). [Classification number constructed using the geographic regions table in the 23rd edition of the Dewey Decimal Classification (DDC23)]
- ‘Orange (Colour)’ as a controlled subject term for the concept (F12) *combines* ‘Orange’ the English language term for the colour (F12). [Terms combined according to the syntax of the Art and Architecture Thesaurus (AAT)]
- ‘Orange (Colour)’ as a controlled subject term for the concept (F12) *combines* ‘Colour’ the English language term for the concept (F12). [Terms combined according to the syntax of the Art and Architecture Thesaurus (AAT)]

R10 has member (is member of)

Domain: [F1](#) Work

Range: [F1](#) Work

Subproperty of: [E89](#) Propositional Object. [P148](#) has component (is component of): [E89](#) Propositional Object

Superproperty of: [F1](#) Work. R67 has part (is part of): [F1](#) Work

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

Scope note: This property associates an instance of F1 Work with another instance of F1 Work that forms a part of it. This property is transitive, asymmetric and irreflexive. An instance of F1 Work may neither directly nor indirectly be a member of itself. Instances of F1 Work that are not members of one another may not share a common member.

Examples:

- Ursula K. Le Guin’s textual work ‘The Earthsea trilogy’ (F1) *has member* Ursula K. Le Guin’s textual work ‘The tombs of Atuan’ (F1).
- Johann Sebastian Bach’s musical work ‘Goldberg Variations’ (F1) *has member* the musical work entitled ‘Variatio I. a 1 Clav’ (F1).
- Dante Alighieri’s textual work entitled ‘Divina Commedia’ (F1) *has member* Dante Alighieri’s textual work entitled ‘Inferno’ (F1).
- Miguel de Cervantes’ textual work entitled ‘Don Quixote’ (F1) *has member* Miguel de Cervantes’ textual work entitled ‘El ingenioso hidalgo Don Quixote de la Mancha’ (F1).
- Miguel de Cervantes’ textual work entitled ‘Don Quixote’ (F1) *has member* Miguel de Cervantes’ textual work entitled ‘Segunda Parte del Ingenioso Cavallero Don Quixote de la Mancha’ (F1).
- J.R.R. Tolkien’s textual work ‘The Lord of the Rings’ (F1) *has member* J.R.R. Tolkien’s textual work ‘The Two Towers’ (F1).
- Cormac McCarthy’s textual work ‘The Border Trilogy’ (F1) *has member* Cormac McCarthy’s textual work ‘All the Pretty Horses’ (F1).
- Giovanni Battista Piranesi’s graphic work entitled ‘Carceri’ (F1) *has member* Giovanni Battista Piranesi’s graphic work entitled ‘Carcere XVI: the pier with chains’ (F1)
- Ludwig van Beethoven’s musical work entitled ‘Symphony No. 9’ (F1) *has member* Ludwig van Beethoven’s musical work ‘Finale’ (4th movement) (F1).
- Auguste Rodin’s ‘Portes d’enfer’ (F1) *has member* Auguste Rodin’s ‘Le penseur’(F1).

R11 has issuing rule (is issuing rule of) [*PRESS_{oo}*]

[Editor's note: Transfer this property to *PRESS_{oo}* once version 2.0 has a stable draft. Implement this property only in conjunction with an implementation of *PRESS_{oo}*.]

Domain: [F18](#) Serial Work

Range: E29 Design or Procedure

Shortcut of: [F18](#) Serial Work. [R19i](#) was realised through: [F30](#) Manifestation Creation. P16 used specific object (was used for): E29 Design or Procedure

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

Scope note: This property associates an instance of F18 Serial Work with the instance of E29 Design or Procedure that specifies the issuing policy planned by this instance of F18 Serial Work, such as sequencing pattern, expected frequency and expected regularity.

Examples:

- The serial entitled 'Quarterly journal of pure and applied mathematics', identified by ISSN '1549-6724' (F18) *has issuing rule* to be issued every three months, on a regular basis, with each issue being numbered according to the pattern 'Vol. 1, no. 1 (2005)' that was observed by the Library of Congress's cataloguers on an exemplar of the first issue (E29).

R15 has fragment (is fragment of)

Domain: [F2](#) Expression

Range: E90 Symbolic Object

Subproperty of: E90 Symbolic Object. P106 is composed of (forms part of): E90 Symbolic Object

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

Scope note: This property associates an instance of E90 Symbolic Object with an instance of F2 Expression of which it is a fragment. The fragment is not itself an instance of F2 Expression as it does not express any instance of F1 Work. When the fragment consists of intelligible words it is an instance of E33 Linguistic Object.

An instance of E90 Symbolic Object can be extracted from an instance of F2 Expression due to an accident, such as loss of material over time, e.g. the only remaining manuscript of an ancient text being partially eaten by worms, or due to deliberate isolation, such as excerpts taken from a text by the compiler of a collection of excerpts.

An instance of E90 Symbolic Object is only considered a fragment of an instance of F2 Expression when related to its occurrence in a known or assumed whole by the *R15 has fragment (is fragment of)* property. The size of an instance of E90 Symbolic Object ranges from more than 99% of an instance of F2 Expression to tiny bits (a few words from a text, one bar from a musical composition, one detail from a still image, a two-second clip from a video, etc.).

Examples:

- The ancient Greek text of the four stanzas from an ode by Sappho (E33) that were quoted by Pseudo-Longinus in his textual work entitled 'On the sublime' *is fragment of* the complete ancient Greek text, now irremediably lost, of Sappho's ode currently identified as Sappho's poem #2 (F2).
- The statement 'fasc. 111' (E33) (abridgement for 'fascicle no. 111') indicating the sequential position of the publication identified by ISBN '2-7018-0037-4' within the series entitled 'Bibliothèque des Écoles françaises d'Athènes et de Rome' and identified by ISSN '0257-4101' *is fragment of* the overall content of the publication identified by ISBN '2-7018-0037-4' (F3).
- The phrase 'Beati pauperes spiritu' (E33) *is fragment of* the Latin text of the Gospel according to St. Matthew (F2). [excerpt from Matthew 5,3]
- The stanza 'Nel mezzo del cammin di nostra vita / mi ritrovai per una selva oscura / ché la diritta via era smarrita' (E33) *is fragment of* the Italian text of Dante Alighieri's 'Inferno' and 'Divina Commedia' (F2).

- The widely recognized ominous four-note opening motif (E73) *is fragment of* Beethoven's Fifth Symphony (F2).
- The illuminated initial P on folio 27r (E36) *is fragment of* 'Erec et Enide de Chrétien de Troyes' (F2).
- The melting clock (E36) *is fragment of* the painting 'Persistence of Memory' by Salvador Dali, 1931 (F2).

R16 created (was created by)

Domain: [F27](#) Work Creation

Range: [F1](#) Work

Subproperty of: E65 Creation. P94 has created (was created by): E28 Conceptual Object

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

Scope note: This property associates the initial creation of a work and the instance of F1 Work that was created.

Examples:

- Agatha Christie creating 'Murder on the Orient Express' (F27), *created* the work 'Murder on the Orient Express' (F1)
- Mary Shelley creating 'Frankenstein, or, The Modern Prometheus' (F27), *created* the work 'Frankenstein, or, The Modern Prometheus' (F1).
- Dante creating the poem 'Divina Commedia' (F27), *created* the work 'Divina Commedia' (F1).
- William Shakespeare creating 'The Tragedy of Hamlet, Prince of Denmark' (F27), *created* the work 'The Tragedy of Hamlet, Prince of Denmark' (F1),
- René Goscinny and Albert Uderzo's (collaboratively) creating 'Astérix le Gaulois' (F27), *created* the work 'Astérix le Gaulois' (F1).
- The work creation event of Ludwig van Beethoven's composing his 'Symphony No. 9' (F27), *created* the work 'Beethoven's Symphony No. 9' (F1).
- Sebastian Bach composing the 'Goldberg variations' (F27), *created* the work 'Goldberg variations' (F1).
- The making of 'Jules et Jim', directed by François Truffault (F27), *created* the work 'Jules et Jim' (F1).
- The making of 'Psycho', directed by Alfred Hitchcock (F27), *created* the work 'Psycho' (F1).
- August Rodin creating 'Le Penseur' (The Thinker) (F27), *created* the work 'Le Penseur' (The Thinker) (F1).
- Picasso *creating* 'Guernica' (F27), *created* the work 'Guernica' (F1).

R17 created (was created by)

Domain: [F28](#) Expression Creation

Range: [F2](#) Expression

Subproperty of: E65 Creation. P94 has created (was created by): E28 Conceptual Object

Superproperty of: [F30](#) Manifestation Creation. [R24](#) created (was created through): [F3](#) Manifestation

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

Scope note: This property associates an instance of F2 Expression that was externalised during a particular instance of F28 Expression Creation event with that particular creation event. An instance of expression creation creates an instance of expression and also creates any expressions that are parts of that expression.

Examples:

- Agatha Christie creating the text for her novel 'Murder on the Orient Express' (F28) *created* the original English text of Agatha Christie's 'Murder on the Orient Express' (F2).

- Elisabeth van Bebbler creating the text of her translation of Agatha Christie's Murder on the Orient Express (F28) *created* the German text of Agatha Christie's 'Murder on the Orient Express' (F2).
- Beethoven composing the 9th symphony (F28) *created* the original score for the 9th Symphony.
- The making of the censored version of Hitchcock's movie 'Psycho' (F28) *created* the original version (cut) of the movie (F2) that was released in Britain.
- The making of the first plaster version of 'The Thinker' sculpture by August Rodin (F28) *created* the plaster version of 'The Thinker' (F2).
- The making of the large-scale version of 'The Thinker' by the Fonderie Alexis Rudier in 1904 (F28) *created* the large-scale version of 'The Thinker' (F2).

R19 created a realisation of (was realised through)

Domain: [F28](#) Expression Creation

Range: [F1](#) Work

Subproperty of: E7 Activity. P16 used specific object (was used for): E70 Thing

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

Scope note: This property associates an instance of F28 Expression Creation with the instance of F1 Work which was externalised in an instance of F2 Expression created by this creation event.

Examples:

- Agatha Christie writing the text for her novel 'Murder on the Orient Express' (F28) *created* a realization of Agatha Christie's 'Murder on the Orient Express' (F2).
- Elisabeth van Bebbler creating the text of her translation of Agatha Christie's Murder on the Orient Express (F28) *created* a realization of Agatha Christie's 'Murder on the Orient Express' (F2).
- Beethoven composing the 9th symphony (F28) *created* a realization of Beethoven's 9th Symphony.
- The making of the censored version of Hitchcock's movie 'Psycho' (F28) *created a realization of* Hitchcock's movie 'Psycho'.
- August Rodin making the first plaster version of 'The Thinker sculpture *created a realization of* August Rodin's 'The Thinker'.
- The making of the large-scale version of 'The Thinker' by the Fonderie Alexis Rudier in 1904 (F28) *created a realization of* August Rodin's 'The Thinker'.

R24 created (was created through)

Domain: [F30](#) Manifestation Creation

Range: [F3](#) Manifestation

Subproperty of: [F28](#) Expression Creation. [R17](#) created (was created by): [F2](#) Expression

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

Scope note: This property associates the instance of F3 Manifestation that was created during a particular instance of F30 Manifestation Creation with that instance of F30 Manifestation Creation event.

Examples:

- The process of creating the publication 'Murder on the Orient Express / Agatha Christie' as published by HarperCollins in 2017 (F30), *created* 'Murder on the Orient Express / Agatha Christie' published by HarperCollins in 2017 (F3).
- The process of making the HTML-version of the English text of Homer's Odyssey (as available online from the Gutenberg Project) (F30) *created* the HTML-version of the English text of Homer's Odyssey (F3).

- The process of making the CD publication ‘Bach Goldberg Variations’ (as published by Hyperion Records in 2016) (F30), *created* ‘Bach Goldberg Variations’, published by Hyperion Records in 2016 (F3).

R27 materialized (was materialized by)

Domain: [F32](#) Carrier Production Event

Range: [F3](#) Manifestation

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 an instance of F32 Carrier Production Event with the set of signs provided by the publisher to be carried by all of the produced items (i.e., the instances of F5 Item) and any other physical features foreseen as integral to the instance of F3 Manifestation that is materialised.

Examples:

- The production of copies of the paperback edition of the HarperCollins 2017 publication ‘Murder on the Orient Express / Agatha Christie’ (F32) *materialized* the publication ‘Murder on the Orient Express / Agatha Christie’ published by HarperCollins 2017 (F3).
- The printing of the score of Bach’s Goldberg Variations by Balthasar Schmid in 1741 (F32), *materialized* the publication Bach’s Goldberg Variations as published by Balthasar Schmid in 1741 (F3).

R28 produced (was produced by)

Domain: [F32](#) Carrier Production Event

Range: [F5](#) Item

Subproperty of: [E12](#) Production. [P108](#) has produced (was produced by): [E24](#) Physical Human-Made Thing

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

Scope note: This property associates an instance of F32 Carrier Production Event with any one of the produced items (i.e., the instances of F5 Item).

Examples:

- The production of copies of the paperback edition of the HarperCollins 2017 publication ‘Murder on the Orient Express / Agatha Christie’ (F32) the copy (item) of this publication that is held by the Deichman public library in Oslo, Norway, and which is identified by inventory number ‘9138513’ (F5).
- The printing of the score of Bach’s Goldberg Variations by Balthasar Schmid in 1741 (F32), *materialized* the copy of this score (item) that is held by the National Library in France (F5).
- The second print run, occurring in 1978, of the publication dated of 1972 and entitled ‘The complete poems of Stephen Crane, edited with an introduction by Joseph Katz’ (identified by ISBN ‘0-8014-9130-4’) (F32) *produced* Universitätsbibliothek Passau’s holding identified by call number ‘00/HT 4801.978 K2’ (F5).

R29 reproduced object (was object reproduced by)

Domain: [F33](#) Reproduction Event

Range: [F5](#) Item

Subproperty of: E7 Activity. P16 used specific object (was used for): E70 Thing

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

Scope note: This property associates an instance of F33 Reproduction Event with an instance of F5 Item it reproduces.

Examples:

- The activity performed by Schott when producing the 2015 publication of Harry Partch's 'Two studies on ancient Greek scales' (F33) *reproduced object* Harry Partch's holograph manuscript of 'Two studies on ancient Greek scales' (F5).

R30 reproduced publication (was publication reproduced by)

Domain: [F33](#) Reproduction Event

Range: [F3](#) Manifestation

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

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

Scope note: This property associates an instance of F33 Reproduction Event with an instance of F3 Manifestation it reproduces.

Examples:

- The activity performed by Cambridge University Press when producing the 2014 publication of Daniel Wilson's 'Caliban: the missing link' (F33) *reproduced publication* the 1873 publication of Daniel Wilson's 'Caliban: the missing link' by Macmillan (F3).
- The activity performed by Éditions du Seuil when producing the 2007 publication of Hubert Reeve's 'Malicorne: réflexions d'un observateur de la nature' as number 179 in the series 'Points. Science' (identified by ISBN '978-2-02-096760-0') (F33) *reproduced publication* the 1990 publication by Éditions du Seuil in the series 'Science ouverte' (identified by ISBN '2-02-012644-3') (F3).

R33 has content

Domain: [F12](#) Nomen

Range: E62 String

Subproperty of: E1 CRM Entity. P3 has note: E62 String

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

Scope note: This property associates an instance of F12 Nomen with a sign or arrangement of signs that is used to refer to something through that instance of F12 Nomen.

Examples:

- The English word 'poison' as a term for toxic substances, in written form in the Latin alphabet (F12) *has content* the letters p, o, i, s, o, n with no intervening spaces (E62).
- The English word 'poison' as a term for toxic substances, notated in the International Phonetic Alphabet (F12) *has content* the string of characters [ˈpɔɪzən] (E62).
- The French word 'poison' as a term for toxic substances, in written form in the Latin alphabet (F12) *has content* the letters p, o, i, s, o, n with no intervening spaces (E62).
- The French word 'poison' as a term for toxic substances, notated in the International Phonetic Alphabet (F12) *has content* the string of characters [pwaˈzɔ̃] (E62).

R34 has validity period (is validity period of)

[[Editor's note](#): Transfer this property to an appropriate CRM family model once there is a stable draft of one. In another model the domain will be a more general class and the scope will be framed more broadly, since many other expressions have validity periods, such as laws, building standards, maps, other normative documents, etc.]

Domain: [F34](#) Controlled Vocabulary

Range: E52 Time-Span

Subproperty of: Out of CIDOC CRM Scope

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

Scope note: This property associates an instance of F34 Controlled Vocabulary with the instance of E52 Time-Span describing the period for which the particular expression of the controlled vocabulary was regarded as valid by its maintainers. Each change of validity status of a nomen within the controlled vocabulary should be associated with a release change of the controlled vocabulary. The individual time-span of a validity state of a nomen would be the union of the time-spans of the controlled vocabulary in which the nomen was declared to have the particular validity status (provisional, accepted, obsolete, etc.).

Examples:

- LCSH February 20 to March 19 2012 (F34) *has validity period* February 20 to March 19 2012 (E52).
- DDC 19 (F34) *has validity period* 1979 to 1989 (E52).

R35 is specified by (specifies)

Domain: [F12](#) Nomen

Range: [F2](#) Expression

Subproperty of: E1 CRM Entity [P67i](#) is referred to by: E89 Propositional Object

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

Scope note: This property associates an instance of F12 Nomen with an instance of F2 Expression which documents, defines or provides evidence for the particular nomen in the stated sense.

Examples:

- ‘acoustic surface wave device’ as a term for the device (F12) *is specified by* INSPEC Thesaurus version January 1973 (F2).
- ‘595.7’ as a classification number for the taxonomic class Insecta (insects) (F12) *is specified by* the 23rd edition of the Dewey Decimal Classification (DDC) (F2).
- ‘Martin Doerr’ as the name of co-chair of the CIDOC CRM SIG (F12) *is specified by* the statement on the title page of the Definition of the ‘CIDOC Conceptual Reference Model’, Version 7.1.1, April 2021 (F2).

R36 uses script conversion (is script conversion used in)

Domain: [F12](#) Nomen

Range: [F36](#) Script Conversion

Shortcut of: F12 Nomen. R17i was created by (created): E65 Creation. P33 used specific technique (was used by): E29 Design or Procedure

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

Scope note: This property associates an instance of F12 Nomen with an instance of F36 Script Conversion that is used to create the E62 String used in that instance of F12 Nomen from the string used in another instance of F12 Nomen that co-refers with the first nomen (the instances of F12 Nomen are related via the *R56 has related form (is related form of)* property). The source of this conversion may or may not be explicitly mentioned.

Examples:

- ‘Du Fu’ as the name for a Chinese poet of the 8th century (F12) *uses script conversion* Pinyin (F36).
- ‘Čajkovskij, Petr Il’ič’ as the name of the Russian composer (F12) *uses script conversion* ‘ISO 9 Information and documentation — Transliteration of Cyrillic characters into Latin characters — Slavic and non-Slavic languages’ (F36).

R54 has language (is language of)

Domain: [F12](#) Nomen

Range: E56 Language

Subproperty of: E1 CRM Entity. P2 has type (is type of): E55 Type

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

Scope note: This property associates an instance of F12 Nomen with an instance of E56 Language which is the language used for or associated with the nomen.

Examples:

- ‘Colón Cristóbal’ as a name of the explorer and navigator (F12) *has language* Spanish [encoded as ‘spa’ in ISO 639-2] (E56).
- ‘Columbus Christopher’ as a name of the explorer and navigator (F12) *has language* English [encoded as ‘eng’ in ISO 639-2] (E56).
- ‘Conseil international des musées’ as a name of ICOM, the International Council of Museums (F12) *has language* French [encoded as ‘fre’ in ISO 639-2] (E56).
- ‘Internationaler Museumsrat’ as a name of ICOM, the International Council of Museums (F12) *has language* German [encoded as ‘ger’ in ISO 639-2] (E56).
- ‘Union européenne’ as a name of the European Union (F12) *has language* French [encoded as ‘fre’ in ISO 639-2] (E56).
- ‘Vienna’ as a name of the city which is the capital of Austria (F12) *has language* English [encoded as ‘eng’ in ISO 639-2] (E56).
- ‘Organic chemistry’ as a term for the branch of chemistry concerned with organic compounds (F12) *has language* English [encoded as ‘eng’ in ISO 639-2] (E56).

R56 has related form (is related form of)

Domain: [F12](#) Nomen

Range: [F12](#) Nomen

Shortcut of: E89 Propositional Object (1). P67 refers to: E1 CRM Entity. P67i is referred to by: E89 Propositional Object (2)

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

Properties: R56.1 has type: [E55](#) Type

Scope note: This property associates an instance of F12 Nomen with another instance of F12 Nomen which co-refers to the same instance of E1 CRM Entity. This property is not transitive. It is symmetric and irreflexive.

The property *R56.1 has type* allows for specifying the particular kind of relationship that holds between the domain nomen and the range nomen, such as by being a derivation, an alternative, a lexical variant, etc. Typing the association may cause loss of symmetry.

Examples:

- ‘Čajkovskij, Petr Il’ič’ as the name of the Russian composer (F12) *has related form* ‘Пётр Ильич Чайковский’ as the name of the Russian composer (F12), with *has type* transliteration (E55).
- ‘The Lord of the Rings’ as the title of the work by J.R.R. Tolkien (F12) *has related form* ‘Le Seigneur des anneaux’ as the title of the work by J.R.R. Tolkien (F12), with *has type* original language (E55).
- ‘IFLA’ as the name of the international association in the library field (F12) *has related form* ‘International Federation of Library Associations and Institutions’ as the name of the international association in the library field (F12), with *has type* acronym (E55).
- ‘Siam’ as the name of the country in South Asia (F12) *has related form* ‘Thailand’ as the name of the country in South Asia (F12).

- ‘595.7’ as a classification number referring to the taxonomic class insects (F12) *has related form* ‘Insecta’ as a term referring to the taxonomic class insects (F12). [The latter being the caption for the Dewey Decimal Classification number in the English language 23rd edition.]

R66 included performed version of (had a performed version through)

Domain: [F31](#) Performance

Range: E89 Propositional 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 an instance of F31 Performance with a product of the mind that was performed in the course of that instance of F31 Performance.

According to the level of knowledge available about the performance, the range of this property can actually be specialised as either an instance of F1 Work (if nothing is known as to which specific expression of the work was performed), or an instance of F2 Expression (if there is a reasonable amount of certainty as to which specific expression—e.g., a well identified translation of a play—of the work was performed).

In addition to being a subproperty of *P16 used specific object (was used for)*, this property also is a shortcut of the fully developed path that goes from F31 Performance to F1 Work through: *P33 used specific technique (was used by)*: E29 Design or Procedure. *P165 incorporates*: F2 Expression. *R3i realises*. In this fully developed path, the specific instance of F2 Expression can be precisely identified and described for its own sake, or it can just be known to have necessarily existed.

Optionally, if the CRM extension including Activity Plans is implemented in conjunction with LRM_{oo}, greater precision can be obtained in documenting the instance of E29 Design or Procedure that specifies the activities planned for the instance of F31 Performance by using the specific class for Activity Plans and its related properties. This class is a subclass of E29 Design or Procedure specific to plans for activities, which includes performances.

Examples:

- The performance of ‘Hamlet’ on 17 June 1909 in Berlin, Deutsches Theater, by Alexander Moissi, directed by Max Reinhardt (F31) *included performed version of* William Shakespeare’s work ‘Hamlet’ (F1). [Note: the specific German translation that was performed is not mentioned in the documentation available from <http://www.glopad.org/pi/en/record/production/1001207>]
- The performance of ‘Hamlet’ on 6 June 1964 in Zurich, Schauspielhaus, by Compagnia Proclermer-Albertazzi, directed by Franco Zeffirelli (F31) *included performed version of* Gerardo Guerrieri’s Italian translation (F2) of William Shakespeare’s work ‘Hamlet’.

R67 has part (forms part of)

Domain: [F1](#) Work

Range: [F1](#) Work

Subproperty of: [F1](#) Work. R10 has member (is member of): [F1](#) Work

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

Scope note: This property associates an instance of F1 Work with another instance of F1 Work that forms part of it in a complementary role to other sibling parts, conceived at some point in time to form together a logical whole, such as the parts of a trilogy. This property is transitive, asymmetric and irreflexive.

In contrast, the property *R10 has member (is member of)* may, for instance, also associate with the overall instance of F1 Work translations, adaptations and other derivative works that do not form a logical whole with sibling parts.

Examples:

- Dante Alighieri's textual work entitled 'Divina Commedia' (F1) *has part* Dante Alighieri's textual work entitled 'Inferno' (F1).
- Miguel de Cervantes' textual work entitled 'Don Quixote' (F1) *has part* Miguel de Cervantes' textual work entitled 'El ingenioso hidalgo Don Quixote de la Mancha' (F1).
- Miguel de Cervantes' textual work entitled 'Don Quixote' (F1) *has part* Miguel de Cervantes' textual work entitled 'Segunda Parte del Ingenioso Cavallero Don Quixote de la Mancha' (F1).
- J.R.R. Tolkien's textual work 'The Lord of the Rings' (F1) *has part* J.R.R. Tolkien's textual work 'The Two Towers' (F1).
- Cormac McCarthy's textual work 'The Border Trilogy' (F1) *has part* Cormac McCarthy's textual work 'All the Pretty Horses' (F1).
- Giovanni Battista Piranesi's graphic work entitled 'Carceri' (F1) *has part* Giovanni Battista Piranesi's graphic work entitled 'Carcere XVI: the pier with chains' (F1)
- Ludwig van Beethoven's musical work entitled 'Symphony No. 9' (F1) *has part* Ludwig van Beethoven's musical work 'Finale' (4th movement) (F1).

R68 is inspired by (is inspiration for)

Domain: [F1](#) Work

Range: [F1](#) Work

Shortcut of: [F1](#) Work(2). R16i was created by: [F27](#) Work Creation. P15 was influenced by: [F1](#) Work(1)

Subproperty of: [E70](#) Thing. [P130](#) shows features of (features are also found on): [E70](#) Thing

Superproperty of: [F1](#) Work. R2 is derivative of (has derivative): [F1](#) Work

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

Scope note: This property associates an instance of F1 Work with another instance of F1 Work whose content was inspired by that instance of F1 Work. The content of the range work instance served in some way as a source of ideas for the domain work instance. Neither instance of F1 Work may be a part of the other. This property is not transitive. It is irreflexive.

Examples:

- The musical 'West Side Story' (F1) *is inspired by* the play 'Romeo and Juliet' by William Shakespeare (F1).
- The play 'Rosencrantz and Guildenstern are Dead' by Tom Stoppard (F1) *is inspired by* the play 'The Tragedy of Hamlet, Prince of Denmark' by William Shakespeare (F1).
- The musical work 'The Great Gate of Kiev' (F1) from 'Pictures at an Exhibition' by Modest Mussorgsky *is inspired by* the painting 'Plan for a City Gate in Kiev' (F1) by Viktor Hartmann.
- The board game 'War of the Ring' by Roberto Di Meglio, Marco Maggi and Francesco Nepitello (F1) *is inspired by* the literary work 'The Lord of the Rings' by J.R.R. Tolkien (F1).
- The literary work 'Girl with a Pearl Earring' by Tracy Chevalier (F1) *is inspired by* the painting 'Girl with a Pearl Earring' by Johannes Vermeer (F1).

R69 has physical form (is physical form of)

Domain: [F3](#) Manifestation

Range: [E55](#) Type

Subproperty of: [E1](#) CRM Entity. P2 has type (is type of): [E55](#) Type

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

Scope note: This property associates an instance of F3 Manifestation with an instance of E55 Type describing the kind of physical form that characterizes instances of F5 Item carrying this F3 Manifestation.

In the case of instances of manifestations intended to be rendered by mediation (such as with electronic devices), the form also indicates the kind of equipment and software tools necessary.

Examples:

- The publication entitled ‘A clockwork orange’ by Anthony Burgess, published by Penguin Books Ltd in 2008, identified by ISBN ‘0141037229’ (F3) *has physical form* Printed book (E55).
- The sound recording entitled ‘The Glory (????) of the human voice’, identified by label and label number ‘RCA Victor Gold Seal GD61175’, containing recordings of musical works performed by Florence Foster Jenkins (F3) *specifies physical form* Compact Disc (E55).
- The photograph of Billie Holiday by Carl Van Vechten dated 23 March 1949, owned by the Library of Congress and identified by call number LOT 12735, no. 524 [P&P] (F3) *has physical form* Gelatin silver print (E55).
- The Long Play record entitled ‘Help!’ by The Beatles, released by Parlophone, 6 August 1965, with catalogue number PMC1255 (F3) *has physical form* Vinyl Long Play record (E55).
- The ebook ‘Christianity: the first three thousand years’ by Diarmaid MacCulloch published by Viking in 2010 and identified by the ISBN ‘978-1-101-18999-3’ (F3) *has physical form* EPUB for Kobo ebook reader (E55).

R70 has dimension (is dimension of)

Domain: [F3](#) Manifestation

Range: [E54](#) Dimension

Subproperty of: [E70](#) Thing. P43 has dimension (is dimension of): [E54](#) Dimension

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

Scope note: This property associates an instance of F3 Manifestation with an instance of E54 Dimension that describes aspects of its symbolic content, such as word counts, or describes the kind of physical form that characterizes instances of F5 Item carrying this F3 Manifestation, such as number of pages.

This inference is an induction along the path that can be modelled as: F3 Manifestation. *R7i is materialized in*: F5 Item. *P43 has dimension (is dimension of)*: E54 Dimension.

It can happen that a given item, or subset of items, originally produced, or intended to be produced, with a certain value for a particular kind of dimension, has a different value for this kind of dimension by accident. This fact should be recorded as a property of F5 Item, and not of F3 Manifestation.

Examples:

- The publication (printed book) entitled ‘Functional Requirements for Bibliographic Records: final report’, published by K. G. Saur in 1998, identified by ISBN ‘3-598-11382-X’ (F3) *has dimension* height (E54) which *has value (P90)* 24 (E60) and *has unit (P91)* cm (E58).
- The publication (printed book) entitled ‘A clockwork orange’ by Anthony Burgess, published by Penguin Books Ltd in 2008, identified by ISBN ‘0141037229’ (F3) *has dimension* number of pages (E54) which *has value (P90)* 176 (E60).
- The publication (Blu-ray box set) entitled ‘Marvel Agents of S.H.I.E.L.D. the Complete Fourth Season’ produced by abc Studios, released in 2018 and identified by EAN ‘8717418521622’ (F3) *has dimension* number of discs (E54) which *has value (P90)* 6 (E60).
- The jigsaw puzzle entitled ‘Map of the New York city subway system’, designed by Stephen J. Voorhies and released around 1954 by the Union Dimes Savings Bank (F3) *has dimension* length and height (E54) which *has note (P3)* ‘46 x 29 cm’ (E62).
- The jigsaw puzzle entitled ‘Map of the New York city subway system’, designed by Stephen J. Voorhies and released around 1954 by the Union Dimes Savings Bank (F3) *has dimension* number of pieces (E54) which *has value (P90)* 76 (E60).

R71 has part (is part of)

Domain: [F3](#) Manifestation

Range: [F3](#) Manifestation

Subproperty of: [E89](#) Propositional Object. [P148](#) has component (is component of): [E89](#) Propositional Object

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

Scope note: This property associates an instance of F3 Manifestation with a structural part of it that is itself an instance of F3 Manifestation. This property is transitive, asymmetric and irreflexive.

Examples:

- The publication (set of 3 books) containing J.R.R. Tolkien's 'The Lord of the rings' identified by ISBN '0618260587' (F3) *has part* the publication containing J.R.R. Tolkien's 'The two towers' identified by ISBN '0618260595' (F3).
- The compact disc publication issued by Deutsche Grammophon in 1998 and consisting of a recording of Richard Wagner's 'Der fliegende Holländer' as performed in 1991 by Plácido Domingo, Cheryl Studer et al., and conducted by Giuseppe Sinopoli (F3) *has part* a publication consisting of the printed program notes and libretto (F3).
- The compact disc publication issued as a 2-CD set identified as 'M2K 42270' by CBS Records in 1987 and consisting of recordings of J. S. Bach's concertos for keyboard/clavier and strings performed by Glenn Gould (F3) *has part* the compact disc publication identified as 'DIDC 10370' consisting of the Glenn Gould recordings of Bach's Concertos nos. 1-4 (F3).

R73 takes representative attribute from (bears representative attribute for)

Domain: [F1](#) Work

Range: [F2](#) Expression

Shortcut of: [F1](#) Work. P140i was attributed by: E13 Attribute Assignment. P16 uses specific object: [F2](#) Expression

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

Scope note: This property associates an instance of F1 Work with instances of F2 Expression that bear attributes which are used to characterize the work. The instance of F2 Expression in question must be one that realizes that instance of F1 Work. An instance of F2 Expression may or may not serve as source of representative expression attributes for its associated instance of F1 Work. If it does, it may provide one attribute or many. Only one or more than one of the instances of F2 Expression associated with an instance of F1 Work may provide attributes that characterize that instance of F1 Work. The representative expression attributes can all come from the same expression or from more than one expressions.

Examples:

- The work 'Reading for life, a first book for adults and their tutors', by Virginia French Allen (F1) *takes representative attribute from* the expression first published in 1987 by Spring Institute for International Studies, ISBN '094072300X' (F2). [One attribute is the value for intended audience, which is adult literacy learners in the English language, another attribute is the language English.]
- The expression of the work 'Piglet has a bath', by A.A. Milne, with illustrations by Ernest H. Shepard, realised in the edition published on sealed plastic pages by Dutton Children's Books in 1998, ISBN '0525460926' *bears representative attribute for* the work 'Piglet has a bath', by A.A. Milne. [One attribute is the language English; another is the value for intended audience which is children.]
- The expression of the work 'Fugue in G Minor, BWV 1000', by J. S. Bach (F1) *takes representative attribute from* the original expression (F2) (as composed around 1723). [The attribute is lute as the mode of performance; it is now mostly performed on the guitar.]

R74 uses expression of (has expression used in)

Domain: [F1](#) Work

Range: [F1](#) Work

Subproperty of: E70 Thing. P130 shows features of (features are also found on): E70 Thing

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

Scope note: This property associates an instance of F1 Work with another instance of F1 Work where all expressions of the former will include some expression of the latter. This property is not transitive. It is irreflexive. This property represents the generalized relationship between works that is described at the expression level using *R75 incorporates (is incorporated in)*.

Examples:

- Ludwig van Beethoven's 'Symphony No. 9' (F1) *uses expression of* the poem 'An die Freude' by Friedrich Schiller (F1).
- Franz Schubert's kunstlied 'Erlkönig' (F1) *uses expression of* the poem 'Erlkönig' by Johann Wolfgang von Goethe (F1).
- The symphonic poem 'Vltava' by Bedřich Smetana (F1) *uses expression of* the melody 'La Mantovana' attributed to Giuseppe Cenci (F1).

R75 incorporates (is incorporated in)

Domain: [F2](#) Expression

Range: [F2](#) Expression

Subproperty of: E73 Information Object. P165 incorporates (is incorporated in): E90 Symbolic Object

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

Scope note: This property associates an instance of F2 Expression with an instance of F2 Expression that is an integral part of the first, but where the latter realises a different instance of F1 Work from the first. This property is transitive, asymmetric and irreflexive.

Examples:

- The 1964 recording of Beethoven's 'Symphony No. 9' by Leonard Bernstein and the New York Philharmonic (F2) *incorporates* the German text of the poem 'An die Freude' by Friedrich Schiller (F2).
- Franz Schubert's score for the kunstlied 'Erlkönig' that was created in 1815 (F2) *incorporates* the German text of the poem 'Erlkönig' by Johann Wolfgang von Goethe (F2).
- Pyotr Ilyich Tchaikovsky's graduation cantata performed by Leslie Head and the Kensington Symphony Orchestra in 1978 (F2) *incorporates* a Russian translation of the poem 'An die Freude' by Friedrich Schiller (F2).

R76 is derivative of (has derivative)

Domain: [F2](#) Expression

Range: [F2](#) Expression

Subproperty of: E70 Thing. P130 shows features of (features are also found on): E70 Thing

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

Scope note: This property associates an instance of F2 Expression with another instance of F2 Expression which was its source or one of its sources. This property is not transitive. It is asymmetric and irreflexive.

This property is also a shortcut of the fully developed path: F2 Expression (1). *P16i was used for*: F28 Expression Creation. *R17 created*: F2 Expression (2).

The property *R76.1 has type* of this property allows for specifying the kind of derivation, such as translation, revision, etc.

Examples:

- Elisabeth van Bebbber's German text of Agatha Christie's 'Murder on the Orient Express' (F2) *is derivative of* the original text written by Agatha Christie for the novel (F2), with has type translation (E55).

- The text of Agatha Christie's Murder on the Orient Express Abridged (as published by HarperCollins) F2 *is derivative of* the original text written by Agatha Christie for the novel (F2), with has type abridgement (E55).
- The musical score for Dmitry Sitkovetsky's Goldberg Variations arranged for string (F2) *is derivative of* the musical score for Johann Sebastian Bach's 'Goldberg variations' (F2), with has type arrangement (E55).
- The score for Beethoven's 9th Symphony edited by Jonathan Del Mar (F2) *is derivation of* Beethoven's original score for the 9th Symphony (F2), with has type revision (E55).

Properties: R76.1 has type: E55 Type

8. IFLA LRM to LRM_{oo} mapping

The mapping is divided into three sections, respectively the IFLA LRM entities, attributes, and relationships. Each IFLA LRM element is identified by its LRM ID and name, and the definitions are given. However, for the IFLA LRM scope notes, consult the IFLA LRM model definition.

The mappings preferentially use LRM_{oo} constructs, else the most specific CIDOC CRM construct that corresponds. Mappings do not use any classes or properties from any other CRM family model. The classes and properties to be transferred to CRM_{oo} and listed in section 9 are not used. In the cases where the FRAD mapping found in FRBR_{oo} ver. 2.4 used these classes, this mapping uses their CIDOC CRM superclasses.

In some cases, the granularity of the models differ and more than one mapping in CIDOC CRM applies, depending on the situation covered by the IFLA LRM definition. For these IFLA LRM attributes or relationships, more than one mapping is given, and the condition governing the choice is briefly described in the column preceding the mapping.

IFLA LRM entities are always mapped to classes, either in LRM_{oo} or in CIDOC CRM. IFLA LRM attributes are always mapped to a property. This property is presented with a domain corresponding to the IFLA LRM entity that the attribute is the attribute of. The IFLA LRM entity may be a subclass of the actual domain of the property. The mapping is given as a path and the property label is given only in the direction that corresponds with its use. IFLA LRM relationships are also mapped to a property or a path, presented in the direction that corresponds to the IFLA LRM domain-to-range.

Multiple instantiation in the mapping: In some cases the domain must be multiply instantiated as a specific CRM class for the relevant property to be valid. For example, *P72 has language* requires a domain of E33 Linguistic Object. To indicate the language of an F2 Expression, that instance of expression must also be an instance of E33 Linguistic Object to be valid as the domain of *P72 has language* and be connected to an instance of E56 Language. This multiple instantiation requirement is given in parentheses after the class.

Mappings to range E55 Type:

- If the values of E55 Type concerned are to come from a particular kind of categorization, that categorization is indicated in curly brackets.

For example, LRM-E1-A1 Res-Category: the E55 Type is to be drawn from a categorization of types of Res. This is notated: E55 Type {Res:Category}.

- If a specific value of E55 Type is intended, this is indicated with an equals sign and a string in quotes.

For example, E55 Type = “representative” is used to state that the expression used by *R73 takes representative attribute from* in the mapping for the work attribute LRM-E2-A2 Representative expression attribute must have been assigned the value “representative”. This side-branch of the path is all enclosed in curly brackets.

Notes on specific mappings

LRM-E2-A2 Representative expression attribute: This is mapped in two parts. First, using the property *R73 takes representative attribute from* to select the F2 Expression node, and then in addition, complete by selecting the value from any appropriate attribute (mapped as a property) of that instance of F2 Expression.

Extent: A complete mapping for each dimension being recorded must specify three things:

- The specific dimension being recorded, a value of E54 Dimension, e.g. height
- The numeric value found for that dimension, a value of E60 Number connected to E54 Dimension via *P90 has value*, e.g. 28
- The type of units that are being applied to the measurement to determine the numeric value, a value of E58 Measurement Unit connected to E54 Dimension via *P91 has unit*, e.g. cm
- That both *P90 has value* and *P91 has unit* must be present and that the same instance of E54 Dimension is the domain of both properties, is indicated by “and” in the mapping.

Association relationships: The general association relationships LRM-R1, LRM-R33, and LRM-R35, involving LRM-E1 Res, are so broad that they are broader than any CRM properties. Thus they are not mapped. The intention in LRM_{oo} is that more specific refinements of these relationships would be implemented.

8.1. IFLA LRM Entities

| LRM ID | LRM Name | LRM Definition | Mapping |
|---------|------------------|---|----------------------|
| LRM-E1 | Res | Any entity in the universe of discourse | E1 CRM Entity |
| LRM-E2 | Work | The intellectual or artistic content of a distinct creation | F1 Work |
| LRM-E3 | Expression | A distinct combination of signs conveying intellectual or artistic content | F2 Expression |
| LRM-E4 | Manifestation | A set of all carriers that are assumed to share the same characteristics as to intellectual or artistic content and aspects of physical form. That set is defined by both the overall content and the production plan for its carrier or carriers | F3 Manifestation |
| LRM-E5 | Item | An object or objects carrying signs intended to convey intellectual or artistic content | F5 Item |
| LRM-E6 | Agent | An entity capable of deliberate actions, of being granted rights, and of being held accountable for its actions | E39 Actor |
| LRM-E7 | Person | An individual human being | E21 Person |
| LRM-E8 | Collective Agent | A gathering or organization of <i>persons</i> bearing a particular name and capable of acting as a unit | F55 Collective Agent |
| LRM-E9 | Nomen | An association between an entity and a designation that refers to it | F12 Nomen |
| LRM-E10 | Place | A given extent of space | E53 Place |
| LRM-E11 | Time-span | A temporal extent having a beginning, an end and a duration | E52 Time-span |

8.2. IFLA LRM Attributes

| LRM ID | LRM Entity | LRM Name | LRM Definition | Condition | Mapping |
|-----------|------------|----------|---|-----------|---|
| LRM-E1-A1 | Res | Category | A type to which the <i>res</i> belongs | | E1 CRM Entity. P2 has type: E55 Type {Res:Category} |
| LRM-E1-A2 | Res | Note | Any kind of information about a <i>res</i> that is not recorded through the use of specific attributes and/or relationships | | E1 CRM Entity. P3 has note: E62 String |

| LRM ID | LRM Entity | LRM Name | LRM Definition | Condition | Mapping |
|-----------|---------------|-------------------------------------|---|---------------------------|---|
| LRM-E2-A1 | Work | Category | A type to which the <i>work</i> belongs | | F1 Work. P2 has type: E55 Type {Work:Category} |
| LRM-E2-A2 | Work | Representative expression attribute | An attribute which is deemed essential in characterizing the <i>work</i> and whose values are taken from a representative or canonical <i>expression</i> of the <i>work</i> | | F1 Work. R73 takes representative attribute from: F2 Expression {P2 has type: E55 Type = "representative"} + F2 Expression {any appropriate property} |
| LRM-E3-A1 | Expression | Category | A type to which the <i>expression</i> belongs | | F2 Expression. P2 has type: E55 Type {Expression:Category} |
| LRM-E3-A2 | Expression | Extent | A quantification of the extent of the <i>expression</i> | | F2 Expression. P43 has dimension: E54 Dimension. P90 has value: E60 Number, and P91 has unit: E58 Measurement Unit |
| LRM-E3-A3 | Expression | Intended audience | A class of users for which the <i>expression</i> is intended | | F2 Expression. P103 was intended for: E55 Type {Personal characteristic} |
| LRM-E3-A4 | Expression | Use rights | A class of use restrictions to which the <i>expression</i> is submitted | | F2 Expression. P104 is subject to: E30 Right |
| LRM-E3-A5 | Expression | Cartographic scale | A ratio of distances in a cartographic <i>expression</i> to the actual distances they represent | | F2 Expression (instantiated as E36 Visual Item. {P2 has type: E55 Type = "cartographic image"}). P2 has type: E55 Type {Cartographic scale} |
| LRM-E3-A6 | Expression | Language | A language used in the <i>expression</i> | | F2 Expression (instantiated as E33 Linguistic Object). P72 has language: E56 Language |
| LRM-E3-A7 | Expression | Key | A pitch structure (musical scale, ecclesiastic mode, raga, maqam, etc.), that characterizes the <i>expression</i> | | F2 Expression. P2 has type: E55 Type {Key} |
| LRM-E3-A8 | Expression | Medium of performance | A combination of performing tools (voices, instruments, ensembles, etc.) stated, intended, or actually used in the <i>expression</i> | stated or intended medium | F2 Expression. P103 was intended for: E55 Type {Medium of performance} |
| | | | | actual medium | F2 Expression. R66i had a performed version through: F31 Performance. P125 used object of type: E55 Type {Medium of performance} |
| LRM-E4-A1 | Manifestation | Category of carrier | A type of material to which all physical carriers of the <i>manifestation</i> are assumed to belong | | F3 Manifestation. R69 has physical form: E55 Type {Category of carrier} |
| LRM-E4-A2 | Manifestation | Extent | A quantification of the extent observed on a physical carrier of the <i>manifestation</i> and assumed to be observable on all | | F3 Manifestation. R70 has dimension: E54 Dimension. P90 has value: E60 Number, and P91 has unit: E58 Measurement Unit |

| LRM ID | LRM Entity | LRM Name | LRM Definition | Condition | Mapping |
|-----------|---------------|-------------------------|--|------------------------|--|
| | | | physical carriers of the <i>manifestation</i> | | |
| LRM-E4-A3 | Manifestation | Intended audience | A class of users for which the physical carriers of the <i>manifestation</i> are intended | | F3 Manifestation. P103 was intended for: E55 Type {Personal characteristic} |
| LRM-E4-A4 | Manifestation | Manifestation statement | A statement appearing in exemplars of the <i>manifestation</i> and deemed to be significant for users to understand how the resource represents itself | | F3 Manifestation. P3 has note {P3.1 has type: E55 Type = "manifestation statement"}; E62 String |
| LRM-E4-A5 | Manifestation | Access conditions | Information as to how any of the carriers of the <i>manifestation</i> are likely to be obtained | | F3 Manifestation. P3 has note {P3.1 has type: E55 Type = "access conditions"}; E62 String |
| LRM-E4-A6 | Manifestation | Use rights | A class of use and/or access restrictions to which all carriers of the <i>manifestation</i> are assumed to be submitted | | F3 Manifestation. P104 is subject to: E30 Right |
| LRM-E5-A1 | Item | Location | The collection and/or institution in which the <i>item</i> is held, stored, or made available for access | normal shelf location | F5 Item. P54 has current permanent location: E53 Place |
| | | | | current shelf location | F5 Item. P55 has current location: E53 Place |
| | | | | collection | F5 Item. P46i forms part of: E78 Curated Holding. {P109 has current or former curator: E39 Actor} |
| | | | | institution | F5 Item. P50 has current keeper: E39 Actor |
| LRM-E5-A2 | Item | Use rights | A class of use and/or access restrictions to which the <i>item</i> is submitted | | F5 Item. P104 is subject to: E30 Right |
| LRM-E6-A1 | Agent | Contact information | Information useful for communicating with or getting in contact with the <i>agent</i> | | E39 Actor. P76 has contact point: E41 Appellation. {P2 has type: E55 Type = "contact point"} |
| LRM-E6-A2 | Agent | Field of activity | A field of endeavour, area of expertise, etc., in which the <i>agent</i> is engaged or was engaged | | E39 Actor. P14i performed: E7 Activity. P2 has type: E55 Type {Sphere of activity} |
| LRM-E6-A3 | Agent | Language | A language used by the <i>agent</i> when creating an expression | | E39 Actor. P14 carried out (P14.1 in the role of: E55 Type = "creator"); F28 Expression Creation. R17 created: F2 Expression (instantiated as E33 Linguistic Object). P72 has language: E56 Language |

| LRM ID | LRM Entity | LRM Name | LRM Definition | Condition | Mapping |
|-----------|------------|-------------------------|--|--------------------------|--|
| | | | | | E39 Actor. P14 carried out: E7 Activity. P2 has type: E55 Type {Creating expressions in Language [fill in the specific language]} |
| LRM-E7-A1 | Person | Profession / Occupation | A profession or occupation in which the <i>person</i> works or worked | long-term identification | E21 Person. P2 has type: E55 Type {Professional category} |
| | | | | specific activity | E21 Person. P14i performed: E7 Activity. P2 has type: E55 Type {Occupational activity} |
| LRM-E9-A1 | Nomen | Category | A type to which the <i>nomen</i> belongs a) the type of thing named b) the source in which the <i>nomen</i> is attested c) the function of the <i>nomen</i> | | F12 Nomen. P2 has type: E55 Type {Nomen:Category} |
| LRM-E9-A2 | Nomen | Nomen string | The combination of signs that forms an appellation associated with an entity through the <i>nomen</i> | | F12 Nomen. R33 has content: E62 String |
| RM-E9-A3 | Nomen | Scheme | The scheme in which the <i>nomen</i> is established | | F12 Nomen. R35 is specified by: F2 Expression. {P2 has type: E55 Type = "controlled vocabulary or knowledge organization system"} |
| LRM-E9-A4 | Nomen | Intended audience | A class of users for which the <i>nomen</i> is considered appropriate or preferred | | F12 Nomen. P103 was intended for: E55 Type {Personal characteristic} |
| LRM-E9-A5 | Nomen | Context of use | Information as to the context(s) in which a <i>nomen</i> is used by the <i>agent</i> who is referred to through it | | F12 Nomen. P16i was used for: E7 Activity {P14 carried out by: E39 Actor. P67i is referred to by: F12 Nomen}. P2 has type: E55 {Type of context} |
| LRM-E9-A6 | Nomen | Reference source | A source in which there is evidence for the use of the <i>nomen</i> | | F12 Nomen. R35 is specified by: F2 Expression |
| LRM-E9-A7 | Nomen | Language | The language in which the <i>nomen</i> is attested | | F12 Nomen. R54 has language: E56 Language |
| LRM-E9-A8 | Nomen | Script | The script in which the <i>nomen string</i> is notated | | F12 Nomen. P2 has type: E55 Type {Script} |
| LRM-E9-A9 | Nomen | Script conversion | The rule, system, or standard that was used to create a <i>nomen string</i> of a <i>nomen</i> that is derived on the basis of a | | F12 Nomen {P2 has type: E55 Type = "transliterated"}. R36 uses script conversion: F36 |

| LRM ID | LRM Entity | LRM Name | LRM Definition | Condition | Mapping |
|------------|------------|-----------|--|-----------|---|
| | | | <i>nomen string</i> of another, distinct <i>nomen</i> whose <i>nomen string</i> is notated in another, distinct script | | Script Conversion |
| LRM-E10-A1 | Place | Category | A type to which the <i>place</i> belongs | | E53 Place. P2 has type: E55 Type {Place:Category} |
| LRM-E10-A2 | Place | Location | A delimitation of the physical territory of the <i>place</i> | | E53 Place. P168 is defined by: E94 Space Primitive |
| LRM-E11-A1 | Time-span | Beginning | A value for the time at which the <i>time-span</i> started, expressed in a precise way in an authoritative external system to allow temporal positioning of events | | E52 Time-Span. P82 at some time within: E61 Time Primitive/xsd:DateTime |
| LRM-E11-A2 | Time-span | Ending | A value for the time at which the <i>time-span</i> ended, expressed in a precise way in an authoritative external system to allow temporal positioning of events | | E52 Time-Span. P82 at some time within: E61 Time Primitive/xsd:DateTime |

8.3. IFLA LRM Relationships

| LRM ID | LRM Domain | Name (inverse) | LRM Range | LRM Definition | Condition | Mapping |
|--------|---------------|---|---------------|---|-----------|---|
| LRM-R1 | Res | is associated with (is associated with) | Res | This relationship links two <i>res</i> that have an association of any kind | | no mapping (too broad), use specific properties |
| LRM-R2 | Work | is realized through (realizes) | Expression | This relationship links a <i>work</i> with any of the <i>expressions</i> which convey the same intellectual or artistic content | | F1 Work. R3 is realised in: F2 Expression |
| LRM-R3 | Expression | is embodied in (embodies) | Manifestation | This relationship links an <i>expression</i> with a <i>manifestation</i> in which the <i>expression</i> appears | | F2 Expression. R4i is embodied in: F3 Manifestation |
| LRM-R4 | Manifestation | is exemplified by (exemplifies) | Item | This relationship connects a <i>manifestation</i> with any <i>item</i> that reflects the characteristics of that <i>manifestation</i> | | F3 Manifestation. R7i is materialized in: F5 Item |

| LRM ID | LRM Domain | Name (inverse) | LRM Range | LRM Definition | Condition | Mapping |
|---------|---------------|-------------------------------------|-----------|---|---------------|---|
| LRM-R5 | Work | was created by (created) | Agent | This relationship links a <i>work</i> to an <i>agent</i> responsible for the creation of the intellectual or artistic content | | F1 Work. R16i was created by: F27 Work Creation. P14 carried out by {P14.1 in the role of: E55 Type = "creator"}: E39 Actor |
| LRM-R6 | Expression | was created by (created) | Agent | This relationship links an <i>expression</i> to an <i>agent</i> responsible for the realization of a <i>work</i> | | F2 Expression. R17i was created by: F28 Expression Creation. P14 carried out by {P14.1 in the role of: E55 Type = "creator"}: E39 Actor |
| LRM-R7 | Manifestation | was created by (created) | Agent | This relationship links a <i>manifestation</i> to an <i>agent</i> responsible for creating the <i>manifestation</i> | | F3 Manifestation. R24i was created through: F30 Manifestation Creation. P14 carried out by: E39 Actor |
| LRM-R8 | Manifestation | was manufactured by (manufactured) | Agent | This relationship links a <i>manifestation</i> to an <i>agent</i> responsible for the fabrication, production or manufacture of the <i>items</i> of that <i>manifestation</i> | | F3 Manifestation. R27i was materialized by: F32 Carrier Production Event. P14 carried out by: E39 Actor |
| LRM-R9 | Manifestation | is distributed by (distributes) | Agent | This relationship links a <i>manifestation</i> to an <i>agent</i> responsible for making <i>items</i> of that <i>manifestation</i> available | | F3 Manifestation. P104 is subject to: E30 Right {P2 has type: E55 Type = "distribution"}. P75i is possessed by: E39 Actor |
| LRM-R10 | Item | is owned by (owns) | Agent | This relationship links an <i>item</i> to an <i>agent</i> that is or was the owner or custodian of that <i>item</i> | ownership | F5 Item. P51 has former or current owner: E39 Actor |
| | | | | | custodianship | F5 Item. P49 has former or current keeper: E39 Actor |
| LRM-R11 | Item | was modified by (modified) | Agent | This relationship links an <i>item</i> to an <i>agent</i> that made changes to this particular <i>item</i> without creating a new <i>manifestation</i> | | F5 Item. P31i was modified by: E11 Modification. P14 carried out by: E39 Actor |
| LRM-R12 | Work | has as subject (is subject of) | Res | This relationship links a <i>work</i> to its topic(s) | | F1 Work. P129 is about: E1 CRM Entity |
| LRM-R13 | Res | has appellation (is appellation of) | Nomen | This relationship links an entity with a sign or combination of signs or symbols through which that entity is referred to within a | | E1 CRM Entity. P67i is referred to by: F12 Nomen |

| LRM ID | LRM Domain | Name (inverse) | LRM Range | LRM Definition | Condition | Mapping |
|---------|------------|--|-----------|---|-----------|--|
| | | | | given scheme or context | | |
| LRM-R14 | Agent | assigned (was assigned by) | Nomen | This relationship links an <i>agent</i> with a particular <i>nomen</i> that was assigned by this <i>agent</i> | | E39 Actor. P14i performed: E13 Attribute Assignment. P141 assigned: F12 Nomen |
| LRM-R15 | Nomen | is equivalent to (is equivalent to) | Nomen | This is the relationship between two <i>nomens</i> which are appellations of the same <i>res</i> | | F12 Nomen. R56 has related form: F12 Nomen |
| LRM-R16 | Nomen | has part (is part of) | Nomen | This relationship indicates that the <i>nomen string</i> of the domain <i>nomen</i> is constructed using the <i>nomen string</i> of another <i>nomen</i> as a component | | F12 Nomen. R8 combines: F12 Nomen |
| LRM-R17 | Nomen | is derivation of (has derivation) | Nomen | This relationship indicates that one <i>nomen</i> was used as the basis for another <i>nomen</i> , both of which are appellations of the same <i>res</i> | | F12 Nomen. R56i is related form of {R56.1 has type E55 Type = "derivation"}: F12 Nomen |
| LRM-R18 | Work | has part (is part of) | Work | This is the relationship between two <i>works</i> , where the content of one is a component of the other | | F1 Work. R67 has part: F1 Work |
| LRM-R19 | Work | precedes (succeeds) | Work | This is the relationship of two <i>works</i> where the content of the second is a logical continuation of the first | | F1 Work. R1i has successor: F1 Work |
| LRM-R20 | Work | accompanies / complements (is accompanied / complemented by) | Work | This is the relationship between two <i>works</i> which are independent, but can also be used in conjunction with each other as complements or companions | | F1 Work. P19i was made for: E7 Activity. P19 was intended use of: F1 Work (<i>can be extended with</i> P19.1 mode of use: E55 Type) |
| LRM-R21 | Work | is inspiration for (is inspired by) | Work | This is the relationship between two <i>works</i> where the content of the first served as the source of ideas for the second | | F1 Work. R68 is inspiration for: F1 Work |

| LRM ID | LRM Domain | Name (inverse) | LRM Range | LRM Definition | Condition | Mapping |
|---------|---------------|---|---------------|--|-----------|---|
| LRM-R22 | Work | is a transformation of (was transformed into) | Work | This relationship indicates that a new <i>work</i> was created by changing the scope or editorial policy (as in a serial or aggregating <i>work</i>), the genre or literary form (dramatization, novelization), target audience (adaptation for children), or style (paraphrase, imitation, parody) of a previous <i>work</i> | | F1 Work. R2 is derivative of: F1 Work |
| LRM-R23 | Expression | has part (is part of) | Expression | This is a relationship between two <i>expressions</i> where one is a component of the other | | F2 Expression. R5 has component: F2 Expression |
| LRM-R24 | Expression | is derivation of (has derivation) | Expression | This relationship indicates that of two <i>expressions</i> of the same <i>work</i> , the second was used as the source for the other | | F2 Expression. R76 is derivative of: F2 Expression |
| LRM-R25 | Expression | was aggregated by (aggregated) | Expression | This relationship indicates that a specific <i>expression</i> of a <i>work</i> was chosen as part of the plan of an aggregating <i>expression</i> | | F2 Expression. R74i is incorporated in: F2 Expression |
| LRM-R26 | Manifestation | has part (is part of) | Manifestation | This is a relationship between two <i>manifestations</i> where one is a component of the other | | F3 Manifestation. R71 has part: F3 Manifestation |
| LRM-R27 | Manifestation | has reproduction (is reproduction of) | Manifestation | This is the relationship between two <i>manifestations</i> providing the end-user with exactly the same content and where an earlier <i>manifestation</i> has provided a source for the creation of a subsequent <i>manifestation</i> , such as facsimiles, reproductions, reprints, and reissues | | F3 Manifestation. R30i was publication reproduced in: F33 Reproduction Event. R24 created: F3 Manifestation |
| LRM-R28 | Item | has reproduction (is reproduction of) | Manifestation | This is the relationship between an <i>item</i> of one <i>manifestation</i> and | | F5 Item. R29i was object reproduced by: F33 Reproduction Event. R24 created: F3 |

| LRM ID | LRM Domain | Name (inverse) | LRM Range | LRM Definition | Condition | Mapping |
|---------|------------------|---|------------------|--|-----------|--|
| | | | | another <i>manifestation</i> providing the end-user with exactly the same content and where a specific <i>item</i> has provided a source for the creation of a subsequent <i>manifestation</i> | | Manifestation |
| LRM-R29 | Manifestation | has alternate (has alternate) | Manifestation | This relationship involves <i>manifestations</i> that effectively serve as alternatives for each other | | F3 Manifestation. R4 embodies: F2 Expression. R4i is embodied by: F3 Manifestation |
| LRM-R30 | Agent | is member of (has member) | Collective Agent | This is a relationship between an <i>agent</i> and a <i>collective agent</i> that the <i>agent</i> joined as a member | | E39 Actor. P107i is current or former member of: F55 Collective Agent |
| LRM-R31 | Collective Agent | has part (is part of) | Collective Agent | This is a relationship between two <i>collective agents</i> where one is a component of the other | | F55 Collective Agent. P107 has current or former member: F55 Collective Agent |
| LRM-R32 | Collective Agent | precedes (succeeds) | Collective Agent | This is a relationship between two <i>collective agents</i> where the first was transformed into the second | | F55 Collective Agent. P151i participated in: E66 Formation. P151 was formed from: F55 Collective Agent |
| LRM-R33 | Res | has association with (is associated with) | Place | This relationship links any entity with a given extent of space | | no mapping (too broad), use specific properties |
| LRM-R34 | Place | has part (is part of) | Place | This is a relationship between two <i>places</i> where one is a component of the other | | E53 Place. P89i contains: E53 Place |
| LRM-R35 | Res | has association with (is associated with) | Time-span | This relationship links any entity with a temporal extent | | no mapping (too broad), use specific properties |
| LRM-R36 | Time-span | has part (is part of) | Time-span | This is a relationship between two <i>time-spans</i> where one is a component of the other | | E52 Time-Span. P86i contains: E52 Time-Span |

9. FRBR₀₀ Classes and Properties transferred to CRM_{soc}

The classes and properties declared in this section were declared in FRBR₀₀ v.2.4 and have not been deprecated. However, they are not necessary for an implementation of LRM₀₀. They should be implemented as a transition mechanism for implementations of the superseded model FRBR₀₀ v.2.4 that requires them. They are intended to be transferred to CRM_{soc}.

| | |
|-----|-------------------|
| F38 | Character |
| F51 | Pursuit |
| F52 | Name Use Activity |

| Property id | Property Name | Class – Domain | Class – Range |
|-------------|---|-----------------------|-----------------|
| R45 | assigned to (was assigned by) | F52 Name Use Activity | E1 CRM Entity |
| R57 | is based on (is basis for) | F38 Character | E39 Actor |
| R58 | has fictional member (is fictional member of) | F38 Character | F38 Character |
| R59 | had typical subject (was typical subject of) | F51 Pursuit | E1 CRM Entity |
| R60 | used to use language (was language used by) | F51 Pursuit | E56 Language |
| R61 | occurred in kind of context (was kind of context for) | F52 Name Use Activity | E55 Type |
| R62 | was used for membership in (was context for) | F52 Name Use Activity | E74 Group |
| R63 | named (was named by) | F52 Name Use Activity | E1 CRM Entity |
| R64 | used name (was name used by) | F52 Name Use Activity | E41 Appellation |

9.1. Class declarations of classes transferred to CRM_{soc}

F38 Character

Subclass of: [E28](#) Conceptual Object

Scope note: This class comprises fictional or iconographic individuals or groups of individuals (including families) appearing in works in a way relevant as subjects. Characters may be purely fictitious or based on real persons or groups, but as characters they may exhibit properties that would be inconsistent with a real person or group. Rather than merging characters with real persons, they should be described as disjoint, but related entities.

Examples:

- Harry Potter [in J.K. Rowling’s series of novels and the films based on them]
- Sinuhe the Egyptian [in Mika Waltari’s novel]
- The Knights of the Round Table [in fiction]

Properties: [R57](#) is based on (is basis for): [E39](#) Actor

[R58](#) has fictional member (is fictional member of): [F38](#) Character

F51 Pursuit

Subclass of: [E7](#) Activity

Scope note: This class comprises periods of continuous activity of an Actor in a specific professional or creative domain or field.

Examples:

- Natalya Goncharova working as a set and costume designer, painter, illustrator and poet in Russia and France in the first half of the 20th century
- Satyajit Ray working as a film maker, writer, composer and graphic designer in India in the second half of the 20th century
- Folger Shakespeare Library in Washington studying the works of William Shakespeare
- M. & N. Hanhart working in lithographic publishing (1839-1882)

Properties: [R59](#) had typical subject (was typical subject of): [E1](#) CRM Entity

[R60](#) used to use language (was language used by): [E56](#) Language

(R60.1 has type of use: [E55](#) Type)

F52 Name Use Activity

Subclass of: [E13](#) Attribute Assignment

Scope note: This class comprises periods of continuous use of a specific instance of E41 Appellation for a particular instance of E1 CRM Entity by an E39 Actor. It includes in particular the use of the name by its carrier. Characteristically, actors performing an activity may choose a particular appellation for themselves in the context of this activity. Such cases should be modelled by additionally classifying these activities as instances of F52 Name Use Activity.

It is possible to specify the type of name use, through the *P2 has type (is type of)* property, e.g.: use of a pseudonym, use of a married name, use of a birth name, use of a blended name, use of a religious name.

Examples:

- using the pseudonym ‘Prince’ until 1993, and again from 2000 on
- using the pseudonym ‘Love Symbol’ from 1993 to 2000
- using the pseudonym ‘Lewis Carroll’ when authoring works of fiction (*P2 has type E55 Type {use of a pseudonym}*)
- using the name ‘Charles Dodgson’ when authoring works of mathematics and logics (*P2 has type E55 Type {use of a birth name}*)
- using the name ‘Mother Teresa’ instead of ‘Agnes Gonxha Bojaxhiu’ when becoming head of the Missionaries of Charity (*P2 has type E55 Type {use of a religious name}*)
- using the name ‘Elizabeth Barrett Browning’ instead of ‘Elizabeth Barrett Barrett’ after marrying Robert Browning (*P2 has type E55 Type {use of a married name}*)
- using the name ‘Antonio Villaraigosa’ instead of ‘Antonio Villar’ after marrying Corina Raigosa (*P2 has type E55 Type {use of a blended name}*) [*comment*: When former mayor of Los Angeles Antonio Villar and Corina Raigosa got married in 1987, the two spouses decided they would merge their two last names into one.]

Properties: [R45](#) assigned to (was assigned by): [E1](#) CRM Entity

[R61](#) occurred in kind of context (was kind of context for): [E55](#) Type

[R62](#) was used for membership in (was context for): [E74](#) Group

[R63](#) named (was named by): [E1](#) CRM Entity

[R64](#) used name (was name used by): [E41](#) Appellation

9.2. Property declarations of properties transferred to CRMsoc

R45 assigned to (was assigned by)

Domain: [F52](#) Name Use Activity

Range: [E1](#) CRM Entity

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

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

Scope note: This property identifies the entity to which an actor, such as a bibliographic agency, assigned an instance of E42 Identifier.

Examples:

- Assigning the controlled access point ‘The Adoration of the Shepherds (Coventry)’ (F52) *assigned to* the anonymous textual work otherwise simply known as ‘The Adoration of the Shepherds’ (F1). [assignment of an Identifier to a Work]
- Assigning the controlled access point ‘Rite of spring (Choreographic Work: Bausch)’ (F52) *assigned to* Pina Bausch’s choreographic work entitled ‘Rite of spring’ (F1). [assignment of an Identifier to a Work]
- Assigning the controlled access point ‘King Kong (1933)’ (F52) *assigned to* the motion picture directed in 1933 by Merian C. Cooper and Ernest B. Schoedsack, entitled ‘King Kong’ (F1). [assignment of an Identifier to a Work]
- Assigning the controlled access point ‘Guillaume, de Machaut, ca. 1300-1377’ (F52) *assigned to* Guillaume de Machaut (E21). [assignment of an Identifier to a Person]
- Assigning the controlled access point ‘Univerza v Ljubljani. Oddelek za bibliotekarstvo’ (F52) *assigned to* the Department for library science of the University of Ljubljana (F11). [assignment of an Identifier to a Corporate Body]

R57 is based on (is basis for)

Domain: [F38](#) Character

Range: [E39](#) Actor

Shortcut of: [F38](#) Character. P94i was created by (has created): [E65](#) Creation. P17 was motivated by (motivated): [E39](#) Actor

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

Scope note: This property associates an instance of F38 Character with an instance of E39 Actor that the character is motivated by or is intended to represent. An instance of F38 Character may be based on a combination of features taken from several actors. This property is a shortcut of the more fully developed path from E28 Conceptual Object, restricted to F38 Character, through the inverse of *P94 has created (was created by)*: E65 Creation. *P17 was motivated by (motivated)* to E1 CRM Entity restricted to E39 Actor.

Examples:

- The Character ‘Sinuhe’ (F38) in Mika Waltari’s ‘Sinuhe the Egyptian: A Novel’ *is based on* Sinuhe (E21). [Documented in the autobiographic narrative in fragments carried by The Ramesside Papyrus, Pap. Berlin 10499, Pap. Berlin 3022, The Amherst fragments (m-q) and other Egyptian sources.]
- The Character ‘Alexander’ (F38) in Mary Renault’s ‘Fire from Heaven’ *is based on* Alexander the Great of Macedon (356-323) (E21).

R58 has fictional member (is fictional member of)

Domain: [F38](#) Character

Range: [F38](#) Character

Subproperty of: Out of CIDOC CRM Scope
Quantification: many to many (0,n:0,n)
Scope note: This property associates an instance of F38 Character representing a group with another instance of F38 Character that is presented in relevant fiction as a member of the fictional group.

Examples:

- Argonauts (F38) *has fictional member* Jason (F38).

R59 had typical subject (was typical subject of)

Domain: [F51](#) Pursuit
Range: [E1](#) CRM Entity
Subproperty of: [E65](#) Creation. [P94](#) has created (was created by): [E89](#) Propositional Object. P129 is about (is subject of): [E1](#) CRM Entity
Quantification: many to many (0,n:0,n)
Scope note: This property associates an instance of F51 Pursuit with the instance of E1 CRM Entity that is the typical subject of the associated activity, such as an area of expertise in which the actor is engaged or was engaged.

Examples:

- John Dover Wilson's activity as a Shakespeare scholar (F51) *had typical subject* William Shakespeare (F10).

R60 used to use language (was language used by)

Domain: [F51](#) Pursuit
Range: [E56](#) Language
Shortcut of: [E65](#) Creation. [P94](#) has created (was created by): E33 Linguistic Object. P72 has language (is language of): [E56](#) Language
Quantification: many to many (0,n:0,n)
Scope note: This property associates an instance of F51 Pursuit with the instance of E56 Language that was characteristically used for the products of the associated activity.

The property *R60.1 has type of use* allows for specifying a particular form of use.

Examples:

- Samuel Beckett's activity as author of English texts (F51) *used to use language* eng [English] (E56) with *has type of use* Authorship (E55).
- Samuel Beckett's activity as author of French texts (F51) *used to use language* fre [French] (E56) with *has type of use* Authorship (E55).
- Samuel Beckett's activity as translator of English texts into French (F51) *used to use language* fre [French] (E56) with *has type of use* Translation – target language (E55).
- Samuel Beckett's activity as translator of English texts (F51) *used to use language* eng [English] (E56) with *has type of use* Translation – source language (E55).

Properties: R60.1 has type of use: [E55](#) Type

R61 occurred in kind of context (was kind of context for)

Domain: [F52](#) Name Use Activity
Range: [E55](#) Type

Shortcut of: [F52](#) Name Use Activity. P9i forms part of: [F51](#) Pursuit. P2 has type (is type of): [E55](#) Type

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

Scope note: This property associates an instance of F52 Name Use Activity with the instance of E55 Type that characterises the kind of role or context within which the associated name was used.

Examples:

- Charles Lutwidge Dodgson using the name ‘Lewis Carroll’ (F52) *occurred in kind of context* writing for children (E55).
- Charles Lutwidge Dodgson using the name ‘Charles Dodgson’ (F52) *occurred in kind of context* writing in mathematics (E55).

R62 was used for membership in (was context for)

Domain: [F52](#) Name Use Activity

Range: [E74](#) Group

Shortcut of: [E7](#) Activity. P17 was motivated by (motivated): E85 Joining. P144 joined with (gained member by): [E74](#) Group

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

Scope note: This property associates an instance of F52 Name Use Activity with the instance of E74 Group that characterises the context within which the associated name was used for membership in that group.

Examples:

- Using the name ‘John Paul I’ (F52) *was used for membership in* the corporate body identified in the Library of Congress’s authority file as ‘Catholic Church. Pope’ (E74).

R63 named (was named by)

Domain: [F52](#) Name Use Activity

Range: [E1](#) CRM Entity

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

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

Scope note: This property associates an instance of F52 Name Use Activity with the instance of E1 CRM Entity that the associated name was used for.

Examples:

- The recording of the MARC 21 field ‘110 2_ |a Canadian Academic Centre in Italy’ (F52) *named* the instance of F11 Corporate Body represented by the Library of Congress authority record number n 85118480.
- The appearance of the name ‘Centro accademico canadese in Italia’ on the title page of the book ‘Lo Scavo di S. Giovanni di Ruoti ed il periodo tardoantico in Basilicata’ published in 1983 (F52) *named* the instance of F11 Corporate Body represented by the Library of Congress authority record number n 85118480.
- The statement ‘The International Federation of Library Associations and Institutions (IFLA) is the leading international body representing the interests of library and information services and their users’ (F52) cited from the ‘About IFLA’ page of the website <http://www.ifla.org/> *named* the instance of F11 Corporate Body represented by the Library of Congress authority record number n 78004438.

R64 used name (was name used by)

Domain: [F52](#) Name Use Activity

Range: [E41](#) Appellation

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

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

Scope note: This property associates an instance of F52 Name Use Activity with the instance of E41 Appellation that was used for the associated entity.

Examples:

- The appearance of the name 'Lewis Carroll' on the title page of 'Le avventure d'Alice nel paese delle meraviglie', published in 1872 in London by Macmillan and Co. (F52) *used name* 'Lewis Carroll' (E41).
- The appearance of the name 'Centro accademico canadese in Italia' on the title page of the book 'Lo Scavo di S. Giovanni di Ruoti ed il periodo tardoantico in Basilicata' published in 1983 (F52) *used name* 'Centro accademico canadese in Italia' (E41).
- The appearance of the name 'Canadian Academic Centre in Italy' on page 6 of the book 'Lo Scavo di S. Giovanni di Ruoti ed il periodo tardoantico in Basilicata' published in 1983 (F52) *used name* 'Canadian Academic Centre in Italy' (E41).
- The appearance of the name 'IFLA' as an acronym for 'The International Federation of Library Associations and Institutions' in the sentence 'The International Federation of Library Associations and Institutions (IFLA) is the leading international body representing the interests of library and information services and their users' cited from the 'About IFLA' page of the website <http://www.ifla.org/> (F52) *used name* 'IFLA' (E41).

10. Migration from FRBR₀₀ to LRM₀₀

This section consists of a comprehensive list of the classes and properties that were declared in the last approved version of FRBR₀₀ (version 2.4, 2015) and provides the corresponding LRM₀₀ class or property. The last column indicates briefly whether the class or property was retained or deprecated in LRM₀₀. For those classes and properties that were retained in a transformed version, the change (which might involve renaming) is briefly indicated. For the deprecated classes and properties, the corresponding class or property (or appropriate path) to substitute when implementing LRM₀₀ is noted in the second column, with a brief explanation in the last column. This substitute class, property or path is in a number of cases drawn from CIDOC CRM. The classes and properties listed in section 9 above as to be transferred to CRMsoc are simply indicated as ‘See CRMsoc’ in the LRM₀₀ column.

10.1. Migration of FRBR₀₀ Classes

| FRBR ₀₀ ver 2.4 | LRM ₀₀ ver 0.9 | Changes for LRM ₀₀ |
|-------------------------------|--|---|
| F1 Work | F1 Work | Retained, editorial scope note revision |
| F2 Expression | F2 Expression | Retained, editorial scope note revision |
| F3 Manifestation Product Type | Use F3 Manifestation <u>and</u> multiply instantiate as E99 Product Type | Revised to be more general, renamed as Manifestation, now a subclass of E2 Expression. Requires E99 Product Type to express the product type aspects. Merged in F24 Publication Expression, revised scope note |
| F4 Manifestation Singleton | Use F3 Manifestation <u>with</u> R7i is materialized in: F5 Item | Deprecated. Merged with F3 Manifestation and requires a single instance of F5 Item to be instantiated |
| F5 Item | F5 Item | Retained, expanded scope note |
| F6 Concept | Use E28 Conceptual Object | Deprecated classes exactly equivalent to CRM classes |
| F7 Object | Use E18 Physical Thing | Deprecated classes exactly equivalent to CRM classes |
| F8 Event | Use E4 Period | Deprecated classes exactly equivalent to CRM classes |
| F9 Place | Use E52 Place | Deprecated classes exactly equivalent to CRM classes |
| F10 Person | Use E21 Person | Deprecated classes exactly equivalent to CRM classes |
| F11 Corporate Body | F11 Corporate Body | Retained, modified superclass to F55 Collective Agent |
| F12 Nomen | F12 Nomen | Considerably modified Merged in F35 Nomen Use Statement |
| F13 Identifier | Use E42 Identifier Else use F12 Nomen | Deprecated classes exactly equivalent to CRM classes |
| F14 Individual Work | Use superclass F1 Work | Deprecated unneeded subclasses of F1 Work |
| F15 Complex Work | Use superclass F1 Work | Deprecated unneeded subclasses of F1 Work |

| FRBR₀₀ ver 2.4 | LRM₀₀ ver 0.9 | Changes for LRM₀₀ |
|----------------------------------|---|--|
| F16 Container Work | Use superclass F1 Work | Deprecated unneeded subclasses of F1 Work |
| F17 Aggregation Work | Use superclass F1 Work | Deprecated unneeded subclasses of F1 Work |
| F18 Serial Work | F18 Serial Work Else use superclass F1 Work | Now a direct subclass of F1 Work Implement only in conjunction with PRESS ₀₀ |
| F19 Publication Work | Use superclass F1 Work | Deprecated unneeded subclasses of F1 Work |
| F20 Performance Work | Use superclass F1 Work | Deprecated unneeded subclasses of F1 Work |
| F21 Recording Work | Use superclass F1 Work | Deprecated unneeded subclasses of F1 Work |
| F22 Self-Contained Expression | Use superclass F2 Expression | Deprecated, merged into its superclass F2 Expression |
| F23 Expression Fragment | Use E90 Symbolic Object | Deprecated |
| F24 Publication Expression | Use F3 Manifestation | Merged with F3 Manifestation which is modified to be a subclass of F2 Expression |
| F25 Performance Plan | Use superclass F2 Expression <u>and</u> multiply instantiate as E29 Design or Procedure | Deprecated unneeded subclass of F2 Expression. Requires E29 Design or Procedure to express the plan aspects |
| F26 Recording | Use superclass F2 Expression | Deprecated unneeded subclass of F2 Expression |
| F27 Work Conception | F27 Work Creation | Retained, renamed, revised scope note to focus on creation rather than inception of the F1 Work |
| F28 Expression Creation | F28 Expression Creation | Retained, editorial scope note revision |
| F29 Recording Event | Use superclass F28 Expression Creation | Deprecated unneeded subclass of F28 Expression Creation |
| F30 Publication Event | F30 Manifestation Creation | Retained, renamed Manifestation Creation, revised scope note |
| F31 Performance | F31 Performance | Retained, minor editorial scope note revision |
| F32 Carrier Production Event | F32 Carrier Production Event | Retained, editorial scope note revision |
| F33 Reproduction Event | F33 Reproduction Event | Retained, editorial scope note revision. Added superclass F30 Manifestation Creation |
| F34 KOS | F34 Controlled Vocabulary Prefer use of superclass F2 Expression | Renamed Controlled Vocabulary Retained only as domain of R34 has validity period If R34 is not implemented, prefer use of superclass F2 Expression |
| F35 Nomen Use Statement | Use F12 Nomen | Merged into revised F12 Nomen |

| FRBR ₀₀ ver 2.4 | LRM ₀₀ ver 0.9 | Changes for LRM ₀₀ |
|---|--|---|
| F36 Script Conversion | F36 Script Conversion | Retained |
| F38 Character | See CRM _{soc} | Moved to other family model |
| F39 Family | F39 Family | Retained, modified superclass to F55 Collective Agent |
| F40 Identifier Assignment | Use E15 Identifier Assignment | Deprecate classes exactly equivalent to CRM classes |
| F41 Representative Manifestation Assignment | Use E13 Attribute Assignment to label an instance of manifestation as representative of the expression | Deprecated, use the superclass to assign the type (P2 has type: E55 Type = “representative”) to the F3 Manifestation |
| F42 Representative Expression Assignment | Use E13 Attribute Assignment to label an instance of expression as representative of the work | Deprecated, use the superclass to assign the type (P2 has type: E55 Type = “representative”) to the F2 Expression |
| F43 Identifier Rule | Use superclass E29 Design or Procedure <u>and</u> multiply instantiate as F2 Expression | Deprecated unneeded subclass |
| F44 Bibliographic Agency | Use superclass F11 Corporate Body | Deprecated unneeded subclass |
| F50 Controlled Access Point | Use superclass F12 Nomen | Deprecated unneeded subclass |
| F51 Pursuit | See CRM _{soc} | Moved (used to map profession / occupation attributes) |
| F52 Name Use Activity | See CRM _{soc} | Moved, revised scope note (used in mapping of context of use attribute) |
| F53 Material Copy | Use F5 Item <u>and</u> multiply instantiate as E25 Human-Made Feature | Deprecated overly specialized class in favour of multiple instantiation |
| F54 Utilised Information Carrier | Use subclass F5 Item <u>and</u> multiply instantiate as E22 Human-Made Object | Deprecated unneeded superclass in favour of multiple instantiation |
| New | F55 Collective Agent | Created to map LRM-E8 Collective Agent New class, subclass of E74 Group, superclass of F11 Corporate Body and F39 Family |

10.2. Migration of FRBR₀₀ Properties

List of Deprecated properties

R6 carries (is carried by)

R9 is realised in (realises)

R12 is realised in (realises)
R13 is realised in (realises)
R18 created (was created by)
R20 recorded (was recorded through)
R21 created (was created through)
R22 created a realisation of (was realised through)
R23 created a realisation of (was realised through)
R25 performed (was performed in)
R26 produced things of type (was produced by)
R31 is reproduction of (has reproduction)
R32 is warranted by (warrants)
R37 states as nomen (is stated as nomen in)
R38 refers to thema (is thema of)
R39 is intended for (is target audience in)
R40 has representative expression (is representative expression for)
R41 has representative manifestation product type (is representative manifestation product type for)
R42 is representative manifestation singleton for (has representative manifestation singleton)
R43 carried out by (performed)
R44 carried out by (performed)
R46 assigned (was assigned by)
R48 assigned to (was assigned by)
R49 assigned (was assigned by)
R50 assigned to (was assigned by)
R51 assigned (was assigned by)
R52 used rule (was the rule used in)
R53 assigned (was assigned by)
R55 has nomen form (is nomen form in)
R65 recorded aspects of (had aspects recorded through)

CLP45 should consist of (should be incorporated in)
CLP104 subject to (applies to)
CLP105 right held by (right on)
CLR6 should carry (should be carried by)

11. Bibliography

[FRBR₀₀] Definition of FRBR₀₀ : a conceptual model for bibliographic information in object-oriented formalism / International Working Group on FRBR and CIDOC CRM Harmonisation; editors: Chryssoula Bekiari, Martin Doerr, Patrick Le Boeuf, Pat Riva. Version 2.4. November 2015. At:

<https://repository.ifla.org/handle/123456789/659>

[CIDOC CRM] Definition of the CIDOC Conceptual Reference Model / produced by the ICOM/CIDOC Documentation Standards Group, continued by the CIDOC CRM Special Interest Group; current main editors: Chryssoula Bekiari, George Bruseker, Martin Doerr, Christian-Emil Ore, Stephen Stead, Athanasios Velios. Version 7.2.1. February 2022. At: <https://www.cidoc-crm.org/Version/version-7.2.1>

[IFLA LRM] IFLA Library Reference Model : a conceptual model for bibliographic information / Pat Riva, Patrick Le Boeuf and Maja Žumer, Consolidation Editorial Group of the IFLA FRBR Review Group. 2017. At: <https://repository.ifla.org/handle/123456789/40>

[Riva & Žumer 2018] FRBR₀₀, the IFLA Library Reference Model, and now LRM₀₀ : a circle of development / Pat Riva & Maja Žumer. Committee on Standards Open Program *Impact of recently approved IFLA standards*, World Library and Information Congress, 84th IFLA General Conference and Assembly, Kuala Lumpur, Malaysia, August 24-30, 2018. At: <http://library.ifla.org/2130/1/074-riva-en.pdf>
