FRBR

object-oriented definition and mapping to FRBR$_{ER}$ (Version 1.0.2)

International Working Group on FRBR and CIDOC CRM Harmonisation

Supported by Delos NoE

Editors:
Chryssoula Bekiari
Martin Doerr
Patrick Le Bœuf

Contributors:
Trond Aalberg, Jérôme Barthélémy, Guillaume Boutard, Günther Görz, Dolores Iorizzo, Max Jacob, Carlos Lamsfus, Mika Nyman, João Oliveira, Christian Emil Ore, Allen H. Renear, Pat Riva, Richard Smiraglia, Stephen Stead, Maja Žumer

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Foreword

This document contains a comprehensive description of the object-oriented definition of FRBR, a model in the form of a formal ontology interpreting FRBR for specific purposes, as analysed below. The document comprises the following sections:

- Section 1, The Introduction, describes the rationale, history and methodology of the development of this model.
- Section 2, The Description of the Model, explains the model in context from a functional perspective with the help of a comprehensive graphical representation of all constructs, describes the format conventions for the formal specifications and lists the complete class and property definitions that make up the model. Whereas the first serves an overall understanding, the second is the reference for the individual declarations. Here a first reading may stop.
- Section 3 describes the mapping of the entity-relationship model of FRBR to the object-oriented one. 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 FRBR, and a proof of completeness of the object-oriented form with respect to the original.
- Since the object-oriented model reuses, wherever appropriate, large parts of ISO21127, the CIDOC Conceptual Reference Model, section 4 provides a comprehensive list of all constructs used from ISO21127, together with their definitions following the version 5.0.4 maintained by CIDOC. Some of these constructs appear only in the mapping in section 3 and not in section 2, because they are generic in nature.
- Section 5 contains an extension of the object-oriented model that gives an account of the identifier creation processes in cataloguing practice. It goes beyond FRBR, but the authors found it particularly useful to reflect cataloguing practice and the bibliographic notion of identity in context with the FRBR concepts. A generic part of it is going to be proposed as amendment to ISO21127.

1 Introduction

This document is the definition of **FRBR**[1] object-oriented version, harmonised with CIDOC CRM, hereafter referred to as **FRBR$_{OO}$**, a formal ontology intended to capture and represent the underlying semantics of bibliographic information and to facilitate the integration, mediation, and interchange of bibliographic and museum information. Such a common view is necessary to provide interoperable information systems for those users interested in accessing common or related content. Beyond that, it results in a formalisation which is more suited for the implementation of FRBR concepts with object-oriented tools, and which facilitates the testing and adoption of FRBR concepts in implementations with different functional specifications and different environments. It applies empirical analysis and ontological structure to the entities and processes associated with works, to their properties, and to the relationships among them. Thereby it reveals a web of interrelationships, which is also applicable to information objects in non-bibliographic arenas[2], and is useful to justify the need of information elements in different environments.

The FRBR model was originally designed as an entity-relationship model by a study group appointed by the International Federation of Library Associations and Institutions (IFLA) during the period 1991-1997, and was published in 1998. The original entity-relationship definition of FRBR is referred to hereafter as FRBR$_{ER}$.

Quite independently, the CIDOC CRM[3] model was being developed from 1996 under the auspices of the ICOM-CIDOC (International Council for Museums – International Committee on Documentation) Documentation Standards Working Group. The definition of the CIDOC CRM model has now become ISO standard 21127.

The idea that both the library and museum communities might benefit from harmonising the two models was first expressed in 2000, on the occasion of ELAG's (European Library Automation Group) 24th Library Systems Seminar in Paris, with Nicholas Crofts and Dan Matei drafting on the spot a preliminary object-oriented representation of the FRBR model entities roughly mapped to CIDOC CRM classes. This idea grew up in the following years and eventually led to the formation in 2003 of the International Working Group on FRBR/CIDOC CRM Harmonisation, that brings together representatives from both communities with the common goals of: a) Expressing the IFLA FRBR model with the concepts, tools, mechanisms, and notation conventions provided by the CIDOC CRM, and: b) Aligning (possibly even merging) the two object-oriented models thus obtained.

The International Working Group on FRBR/CIDOC CRM Harmonisation, chaired by Martin Doerr (ICS FORTH, Greece) and Patrick Le Bœuf (BnF, France), is affiliated at the same time to the IFLA FRBR Review Group and the CIDOC CRM Special Interest Group (CRM-SIG). The present definition of FRBR$_{OO}$ was developed through email exchange among members of the Working Group, and more importantly during the following series of meetings:

– Meeting #1: 2003, Nov. 12-14, Paris;
– Meeting #2: 2004, March 22-25, Heraklion, Greece;
– Meeting #3: 2005, February 14-16, London;
– Meeting #4: 2005, July 4-6, Heraklion, Greece;
– Meeting #5: 2005, November 16-18, Nuremberg, Germany;
– Meeting #6: 2006, March 27-29, London;
– Meeting #7: 2006, June 26-29, Trondheim, Norway;
– Meeting #8: 2006, October 25-27, Heraklion, Greece;
– Meeting #9: 2007, March 14-16, Paris;
– Meeting #10: 2007, July 9-10, Edinburgh, Scotland;
– Meeting #11: 2007, December 4-7, Nuremberg, Germany;
– Meeting #12: 2008, May 12-15, Heraklion, Greece;
– Meeting #13: 2008, November 5-7, London;
– Meeting #14: 2009, May 20-22, London;
– Meeting #15: 2010, January 27, Helsinki;
– Meeting #16: 2010, December 20-22, Nuremberg;

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[1] "FRBR" stands for: "Functional Requirements for Bibliographic Records," after the name of the IFLA Study Group that developed the model. However, current use and understanding of the FRBR model go well beyond that, and the term "FRBR" has now turned to a noun in its own right, used without particular intention to refer to "functionalities," nor to "requirements," but rather to the *semantics* of bibliographic records. The *Final Report on Functional Requirements for Bibliographic Records* published in 1998 contained both a study on functional requirements for bibliographic records, and a description of the model known today as "FRBR."

[2] Coleman, Anita S. 2002. Scientific models as works. *Cataloging & classification quarterly* 33n3/4: 129-59.

[3] "CIDOC CRM" stands for "Comité international de documentation [= International Committee on Documentation] Conceptual Reference Model," which, when isolated from any context, is not particularly meaningful (CIDOC is affiliated to ICOM, the International Council of Museums). Just like FRBR, the acronym, rather meaningless by itself, has now turned to a noun in its own right.

- Meeting #17: 2011, May 17-20, Heraklion, Greece.
- Meeting#18:2011, November 14-17, Amsterdam, Netherlands

More information on the activities of the Group can be found on http://archive.ifla.org/VII/s13/wgfrbr/FRBR-CRMdialogue_wg.htm and on http://cidoc.ics.forth.gr/frbr_inro.html.
We express our gratitude to the European funded Project DELOS NoE for providing financial help for several of these meetings.

1.1 Purposes

This model attempts to represent FRBR by modelling in a sufficiently consistent way the conceptualisation of the reality behind library practice, as it is apparent from or implicit in FRBR. It is important to keep in mind that the aim is not to transform the IFLA FRBR model into something totally different or better, nor of course to reject it or replace it – but to express the conceptualisation of FRBR with the object-oriented methodology instead of the entity-relationship methodology, as an alternative. Nor is it the intention to force museums' concerns and viewpoints into the bibliographic universe, or libraries' concerns and viewpoints into the museum universe. Rather, the point is to identify the common ground in the universe both sides share and to ensure mutual benefit by pursuing the following objectives.

1.1.1 A common view of cultural heritage information

The main goal is to reach a common view of cultural heritage information with respect to modelling, standards, recommendations, and practices. Libraries and museums are memory institutions – both strive to preserve cultural heritage objects, and information about such objects, and they often share the same users. Besides, the boundary between them is often blurred: libraries hold a number of museum objects and museums hold a number of library objects; the cultural heritage objects preserved in both types of institutions were created in the same cultural context or period, sometimes by the same agents, and they provide evidence of comparable cultural features. It seems therefore appropriate to build a common conceptualisation of the information gathered by the two types of organisations about cultural heritage.

1.1.2 A verification of FRBR's internal consistency

Expressing the FRBR model in a different formalism than the one in which it was originally developed provides a means to evaluate the model in terms of its internal consistency. It is also a good opportunity to correct some semantic inconsistencies or inaccuracies in the formulation of FRBR that may be regarded as negligible when $FRBR_{ER}$ is only used in a library catalogue context, but that prove to be quite crucial from the moment one strives to design an overall model for the integration of cultural heritage related information.

1.1.3 An enablement of information interoperability and integration

Mediation tools and Semantic Web activities require an integrated, shared ontology for the information accumulated by both libraries and museums for all the collections that they hold, seen as a continuum from highly standardised products such as books, CDs, DVDs, etc., to raw materials such as plants or stones[4], through "in-between" objects such as draft manuscripts or engraving plates. In addition, such typical "library objects" as books can be about museum objects, and museum objects can represent events or characters found in books (e.g., '*Ophelia's death*') and descriptions of museum objects in museum databases may contain references to bibliographic resources that mention those museum objects: such interrelationships should be either integrated in common information storage, or at least virtually integrated through mediation devices that allow a query to be simultaneously launched on distinct information depositories, which requires common semantic tools such as $FRBR_{OO}$ plugged into CIDOC CRM. Besides, CIDOC CRM is explicitly compatible in formalism with the World Wide Web Consortium's Resource Description Framework (RDF), which can only be beneficial for FRBR.

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[4] Natural history museums also are witnesses of "cultural features." A frog in a museum is not a testimony of "what a frog is," but of what a human culture, at a given point in time and space, thinks a frog is.

1.1.4 An opportunity for mutual enrichment for FRBR and CIDOC CRM

The CIDOC CRM model is influenced by the process of FRBR's re-formulation as well. Modelling bibliographic information highlights some issues that may have been overlooked during the development of CIDOC CRM, and the way such issues were addressed in $FRBR_{OO}$ resulted in some cases in making changes in the CIDOC CRM model. These changes are so significant that an anticipated revision of the ISO standard 21127 was required.

1.1.5 An extension of the scope of FRBR and the CIDOC CRM

The harmonisation between the two models is also an opportunity to extend the scope of the CIDOC CRM to bibliographic information, which paves the way for extensions to other domains and formats, such as EAD, TEI, MPEG7, just to name a few. Consequently, it also extends the scope of FRBR to cultural materials, since FRBR inherits all concepts of the CIDOC CRM, and opens the way for FRBR to benefit from further extensions of the scope of CIDOC CRM, such as the scientific heritage of observations and experiments.

1.1.6 Sources

The main source for the task of translating FRBR into the object-oriented formalism was, quite naturally, the IFLA *Final Report* that contains the complete definition of $FRBR_{ER}$ itself:

> IFLA Study Group on the functional requirements for bibliographic records. *Functional requirements for bibliographic records:* final report [printed text]. Munich, Germany: K. G. Saur, 1998. Also available online from World Wide Web: <http://www.ifla.org/en/publications/functional-requirements-for-bibliographic-records>.

Common awareness of the *Definition of the CIDOC Conceptual Reference Model* provides the required conceptual and technical background:

> ICOM/CIDOC Documentation Standards Group; & CIDOC CRM Special Interest Group. *Definition of the CIDOC Conceptual Reference Model:* version 4.0, April 2004 [electronic resource]. [Heraklion, Greece]: [ICS-FORTH], 2004. Available online at: <http://cidoc.ics.forth.gr/docs/cidoc_crm_version_4.0.doc>, or: <http://cidoc.ics.forth.gr/docs/cidoc_crm_version_4.0.pdf>.

All drafts of the FRAD model ("Functional Requirements for Authority Data") that the IFLA FRANAR Group made publicly available on IFLANET were also used to establish the present document. However, a formal mapping from FRAD to $FRBR_{OO}$ will be undertaken only once the FRAD model has been officially approved and published by IFLA.

> IFLA Working Group on Functional Requirements and Numbering of Authority Records. [*Web page*] [electronic resource]. [The Hague, Netherlands]. Available online from World Wide Web: <http://archive.ifla.org/VII/d4/wg-franar.htm>.

When the FRSAR model ("Functional Requirements for Subject Authority Records") has been developed, it will also be incorporated in $FRBR_{OO}$.

> IFLA Working Group on Functional Requirements for Subject Authority Records. [*Web page*] [electronic resource]. [The Hague, Netherlands]. Available online from World Wide Web: <http://archive.ifla.org/VII/s29/wgfrsar.htm>.

1.1.7 Understanding the attributes and relationships

The methodology consisted in a thorough examination of all attributes and relationships declared in $FRBR_{ER}$. During its meetings, the International Working Group on FRBR/CIDOC CRM Harmonisation strove to extract their semantics as accurately as possible, to express them as "properties" in the sense of CIDOC CRM, and to compare them with possibly existing CIDOC CRM properties. Entities, or classes in the terminology adopted by the CIDOC CRM, play a nearly secondary role as the maximal sets of things for which a property is applicable.

1.1.8 Transforming attributes into properties

The CIDOC CRM model declares no "attributes" at all (except implicitly in its "scope notes" for classes), but regards any information element as a "property" (or "relationship") between two classes. The semantics extracted from FRBR$_{ER}$ attributes are therefore rendered in FRBR$_{OO}$ as properties, according to the same principles as the CIDOC CRM model.

1.1.9 By-product 1: Re-contextualising bibliographic entities

The process of interpreting the precise semantic value of each individual attribute declared in FRBR$_{ER}$ and expressing that semantic value in CRM-like structures resulted also in two by-products.

The first by-product was that it proved necessary to explain and model the general context within which the bibliographic entities isolated in FRBR$_{ER}$ come into being. FRBR$_{ER}$ envisions bibliographic entities as static, ever-existing things that come from nowhere, and overlooks the complicated path from the initial idea for a new work in a creator's mind to the physical item in a user's hands through the dramatically important decision-making on behalf of publishers, as this complicated path is not explicitly reflected in data actually stored in bibliographic databases and library catalogues, which constituted the domain of reference of the FRBR Study Group. As a matter of fact, bibliographic records *do* contain some implicit information about that complicated path and the relationships it implies between and among bibliographic objects; FRBR$_{OO}$ digs that implicit information out of bibliographic structures, e.g. the precise meaning of "date of publication".

1.1.10 By-product 2: Adding a bibliographic flavour to CIDOC CRM

The second by-product was that the analysis provided for bibliographic processes in FRBR$_{OO}$ paved the way to the introduction of refinements into CIDOC CRM, so that the museum community's model could give a better account for mass production phenomena (such as the printing of engravings, for instance), or the relation between creating immaterial content and physical carrier. Further, it introduces a basic model of intellectual conception and derivation applicable to all art forms, which the museum community has been hesitating so far to formally analyse.

1.2 Differences between FRBR$_{ER}$ and FRBR$_{OO}$

1.2.1 Introduction of temporal entities, events and time processes

Temporal entities (i.e., phenomena, "perdurants" in philosophy) play a central role in the CIDOC CRM model, as they are the only means to relate objects (either conceptual or physical) to time-spans, locations, and agents. Since FRBR$_{OO}$ borrows structures from the CIDOC CRM to express the concepts declared in FRBR$_{ER}$, 'temporal entities' had inevitably to be introduced into FRBR$_{OO}$. Besides, some FRBR commentators had already made the point that time issues are insufficiently addressed in FRBR$_{ER}$[5]; the task of harmonising FRBR with the CIDOC CRM was an opportunity to fix that. Temporal entities were introduced into FRBR$_{OO}$ by declaring some of the classes of FRBR$_{OO}$ as subclasses of the following classes from CIDOC CRM: E65 Creation, E12 Production, and E13 Attribute Assignment.

Figure 1 show how the classes F27 Work Conception and F28 Expression Creation serve to link an E39 Actor, a E52 Time and a E53 Place to the F1 Work, F2 Expression and F4 Manifestation Singleton that are created by those processes. In the lower part of the figure the work elaboration process is shown along a time axis. First, the activity F27 Work Conception produces an idea, then the F28 Expression Creation activity produces

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[5] HEANEY, Michael. *Time is of the essence:* some thoughts occasioned by the papers contributed to the International Conference on the Principles and Future Development of AACR [on line]. Oxford: Bodleian Library, 1997 [cited 19 January 2008]. Available from World Wide Web: <http://www.bodley.ox.ac.uk/users/mh/time978a.htm>.

LAGOZE, Carl. Business unusual: how "event-awareness" may breathe life into the catalog?. In: *Conference on bibliographic control in the new millennium* [on line]. Washington: Library of Congress, October 19, 2000 [cited 19 January 2008]. Available from Internet: <http://lcweb.loc.gov/catdir/bibcontrol/lagoze_paper.html>.

FITCH, Kent. *ALEG Data Model. Inventory* [on line]. [Brisbane]: AustLit Gateway, revised 27 July 2000 [cited 26 March 2004]. Available from World Wide Web: <http://www.austlit.edu.au:7777/DataModel/inventory.html>.

DOERR, Martin; HUNTER, Jane; LAGOZE, Carl. Towards a core ontology for information integration. In: *Journal of Digital Information* [on line]. 2003-04-09, Vol. 4, No. 1 [cited 19 January 2008]. Available from World Wide Web: <http://journals.tdl.org/jodi/article/view/92/91>.

simultaneously an F2 Expression and its first manifestation (in the form of a F4 Manifestation Singleton), which together realise a work (F1).

Work and Time
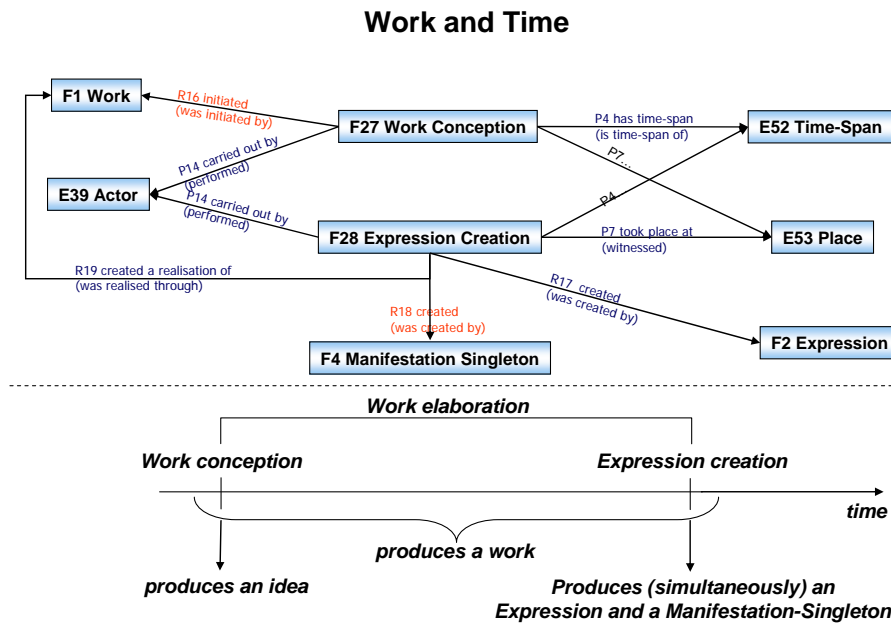
Figure 1

1.2.2 Refinement of group 1 entities

The text of FRBR$_{ER}$ in some cases admits of multiple interpretations which introduce some logical inconsistencies, in particular with regard to its "Group 1 entities," those entities that account for the content of a catalogue record.

The Work entity such as defined in FRBR$_{ER}$ seemed to cover various realities with distinct properties. While the main interpretation intended by the originators of FRBR$_{ER}$ seems to have been that of a set of concepts regarded as commonly shared by a number of individual sets of signs (or "Expressions"), other interpretations were possible as well: that of the set of concepts expressed in one particular set of signs, independently of the materialisation of that set of signs; and that of the overall abstract content of a given publication. FRBR$_{OO}$ retains the vague notion of "Work" as a superclass for the various possible ways of interpreting the FRBR$_{ER}$ definitions: F14 Individual Work corresponds to the concepts associated to one complete set of signs (i.e., one individual instance of F22 Self-Contained Expression); F19 Publication Work comprises publishers' intellectual contribution to a given publication; and F15 Complex Work is closer to what seems to have been the main interpretation intended in FRBR$_{ER}$. Additionally, a further subclass is declared for F1 Work: F16 Container Work, which provides a framework for conceptualising works that consist in gathering sets of signs or fragments of sets of signs, of various origins ("aggregates"). Just like any product of the human mind, a Work necessarily begins to exist in the material world at a given point in time (even if it is a recollection of a Platonic form); this is the reason why FRBR$_{OO}$ introduces the notion of F27 Work Conception. It makes the meaning of the FRBR$_{ER}$ attribute '4.2.3 date of Work' explicit. This class is not intended to convey any other meaning than the following: any instance of F1 Work begins to exist at a given point in time. That point in time is not necessarily documented in databases; indeed, it is very rarely precisely known, and creators themselves are often unable to say exactly when they first had the initial idea for a novel, a painting, a symphony, etc. However, one can always point to some temporal boundaries. F27 Work Conception is indispensable for the internal logical consistency of the model.

The Expression entity is relatively clear in FRBR$_{ER}$, at least from a purely conceptual point of view. However, the need was felt for a distinction between expressions that convey the complete idea of the work they realise, and expressions that convey only a fragment of it: that is, between instances of F22 Self-Contained

Expression and instances of F23 Expression Fragment.

The Manifestation entity was defined in FRBR$_{ER}$ in such a way that its definition could be interpreted as covering something physical and conceptual at the same time: it was defined in turn as the "physical embodiment" of an expression of a work and as an entity that represents all the physical objects that bear the same characteristics. Discussion with members of the original FRBR Study Group[6] showed that the Manifestation entity was actually meant as an entity all instances of which are *sets;* and sets, in the mathematical sense of the term, can have more than one member, or just one member (in which case they are called singletons). For the sake of clarification, the Working Group felt the need to split the Manifestation entity into two distinct classes, corresponding to the two possible ways of interpreting the ambiguous definition provided for Manifestation in FRBR$_{ER}$, namely F3 Manifestation Product Type and F4 Manifestation Singleton. Whereas F3 Manifestation Product Type is declared as a subclass of the CIDOC CRM class E55 Type, and therefore as a subclass, too, of the CIDOC CRM class E28 Conceptual Object (a merely abstract notion), F4 Manifestation Singleton is declared as a subclass of the CIDOC CRM class E24 Physical Man-Made Thing, and therefore as a subclass, too, of the CIDOC CRM class E18 Physical Thing.

The Item entity did not pose any particular problem in FRBR$_{ER}$; but splitting Manifestation into F3 Manifestation Product Type and F4 Manifestation Singleton obliged the Working Group to rethink the articulation between F4 Manifestation Singleton and F5 Item.

All in all, here is a picture of how original FRBR$_{ER}$ entities relate to the classes declared in FRBR$_{OO}$:
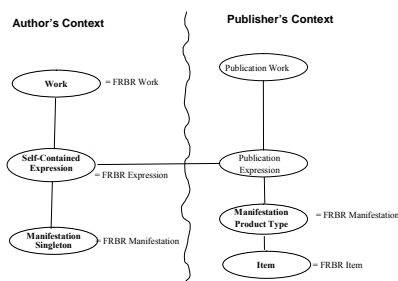
Figure 2

Figure 2 shows how the original FRBR$_{ER}$ entities relate to the classes declared in FRBR$_{OO}$, particularly the "split" of the FRBR$_{ER}$ Manifestation entity into F3 Manifestation Product Type and F4 Manifestation Singleton. In addition, the figure also shows how FRBR$_{OO}$ makes explicit the publisher's intellectual contribution, which is not modelled in FRBR$_{ER}$. Manifestation Product Type embodies a Publication Expression, which in turn comprises both the author's Expression and the realisation of a Publication Work.

In figure 3 the FRBR$_{OO}$ model of the realisation of a work by an expression is illustrated with a specific example. The overall work is Walt Whitman's *Leaves of grass* (an instance of F15 Complex Work), which has as a member the "deathbed edition," itself an instance of F15 Complex Work. The F14 Individual Work which corresponds to the abstract content of the French translation by Leon Bazalgette of that edition is in turn a member of the F15 Complex Work of the "deathbed edition." The F28 Expression Creation event which produced the translation simultaneously created a realisation of that translation and created the instance of F22 Self-Contained Expression which is the text of that translation.

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[6] Tom Delsey and Beth Dulabahn participated in the Working Group's first meeting in Paris in 2003.

Work Realisation example
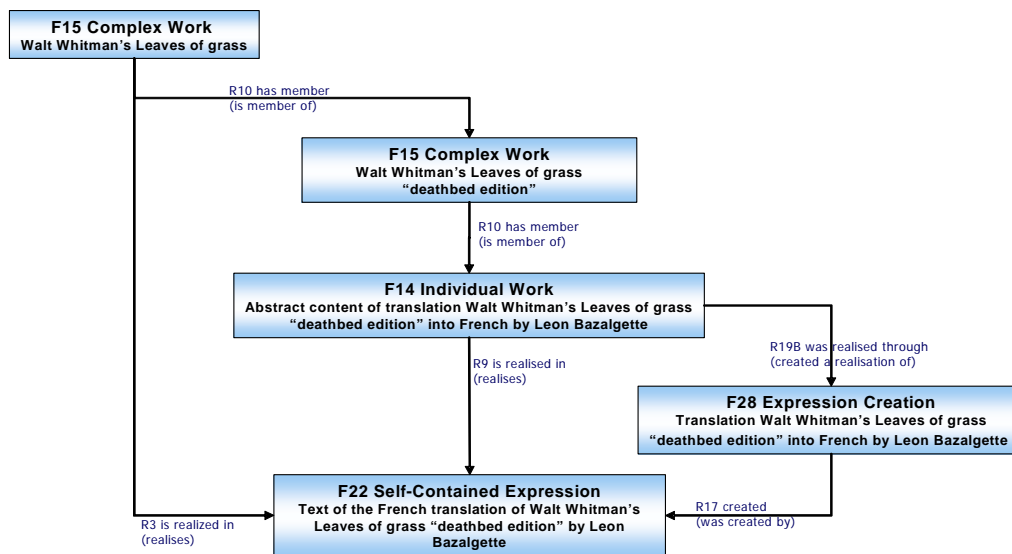
Figure 3

1.2.3 Analysis of creation and production processes

It proved necessary to analyse creation and production processes, in order to enable a better understanding of interrelations and temporal order.

In particular, the notion of "first externalisation" of a set of signs or expression (and, through the expression, the first externalisation of the individual work realised in the expression) is fully modelled in $FRBR_{OO}$. It is regarded at the same time as a subclass of the creation of something conceptual, and the production of something physical, because the creation of an expression inevitably also affects the physical world, as the recording of the expression causes a physical modification of the object on which it is being recorded. The spatio-temporal circumstances under which the expression is created are necessarily the same spatio-temporal circumstances under which the carrier of the newly created expression is produced. This double phenomenon of conceptual creation/physical production can be represented by the schema presented in figure 4. F28 Expression Creation, which is a subclass of E65 Creation, produces, on the conceptual level, an F14 Individual Work through the property R19 created a realisation of, and through R17 created, the F22 Self-Contained Expression which realises that work. Operating simultaneously on the physical level, F28 Expression Creation, a subclass of E12 Production, produces, through R18 created, the F4 Manifestation Singleton which P128 carries the F22 Self-Contained Expression.

Conceptual level   *Physical level*
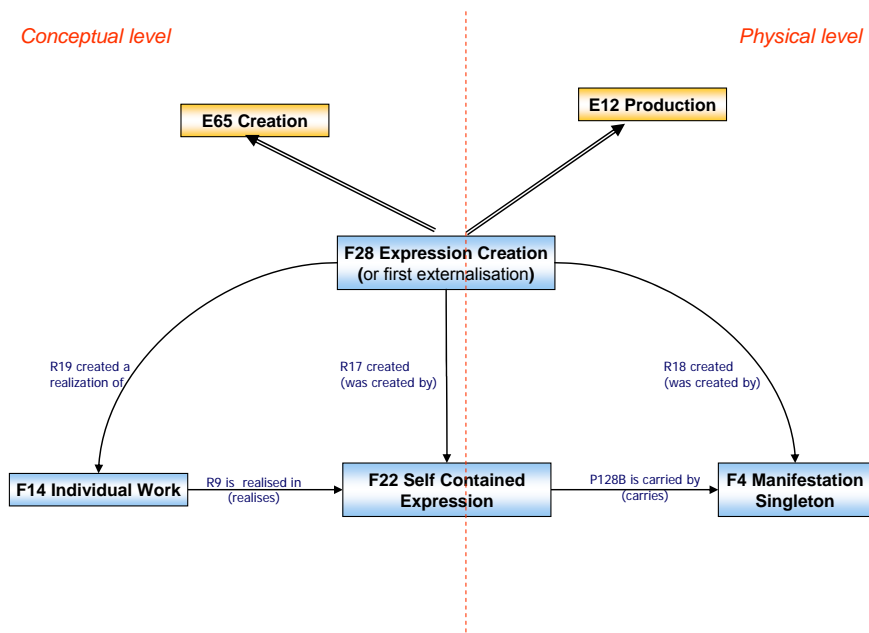
Figure 4

Another topic that is modelled in FRBR$_{OO}$ is the distinction that has to be made between the process of physical publishing and the process of electronic publishing which is illustrated in figure 5. The F5 Items created through physical publishing are the results of an industrial process. As such they are produced by an F32 Carrier Production Event and carry an F24 Publication Expression, yet are also examples of an F3 Manifestation-Product Type which *CLR6 should carry* the F24 Publication Expression. In electronic publishing, in contrast, the F5 Items, which are copies on local carriers, still carry the F24 Publication Expression and are produced by an F32 Carrier Production Event without there being any F3 Manifestation-Product Type involved in the process. The instances of E29 Design or Procedure involved in the two processes differ: for physical publishing it can be characterised as "how to produce" while for electronic publishing as "how to download."

Physical - Electronic Publishing

Physical Publishing

F30 Publication Event	

P94B was created by

makes accessible:
"how to produce"

R24 created(was created through)

E29 Design or Procedure

F24 Publication Expression

CLR6 should carry (should be carried by)

F3 Manifestation-Product Type

P16B was used for

R27B was used by (used as source material)

R26 produced things of type (was produced by)

R6 carries (is carried by)

R7 is example of (has example)

F32 Carrier Production Event

R28 produced (was produced by)

F5 Item

"Result of an industrial process"

- -

Electronic Publishing

F30 Publication Event

P94B was created by

makes accessible:
"how to download"

R24 created(was created through)

E29 Design or Procedure

F24 Publication Expression

P16B was used for

R27B was used by (used as source material)

R6 carries (is carried by)

F32 Carrier Production Event

R28 produced (was produced by)

F5 Item

"copy on local carrier"

Figure 5

2   Description of the Model

This section explains the model in context from a functional perspective with the help of a comprehensive graphical representation of all constructs, describes the format conventions for the formal specifications, and lists the complete class and property definitions that make up the model. The graphical representation (section 2.1) serves an overall understanding, while the list of definitions (sections 2.6 and 2.7) is the reference for the individual declarations.

2.1 Graphic Overview of the Object-Oriented Definition of FRBR

In this section, $FRBR_{OO}$ is presented in a sequence which follows the intellectual work from Work through Expression to Manifestation. In contrast to $FRBR_{ER}$, a dynamic view of the respective processes of Expression Creation and of the Publication Work is also presented. Finally, the dimension of intellectual contributions made by incorporating parts of an Expression in another one is demonstrated using the example of the performing arts. This dimension is only marginally analysed in $FRBR_{ER}$.

Work and Expression, static view
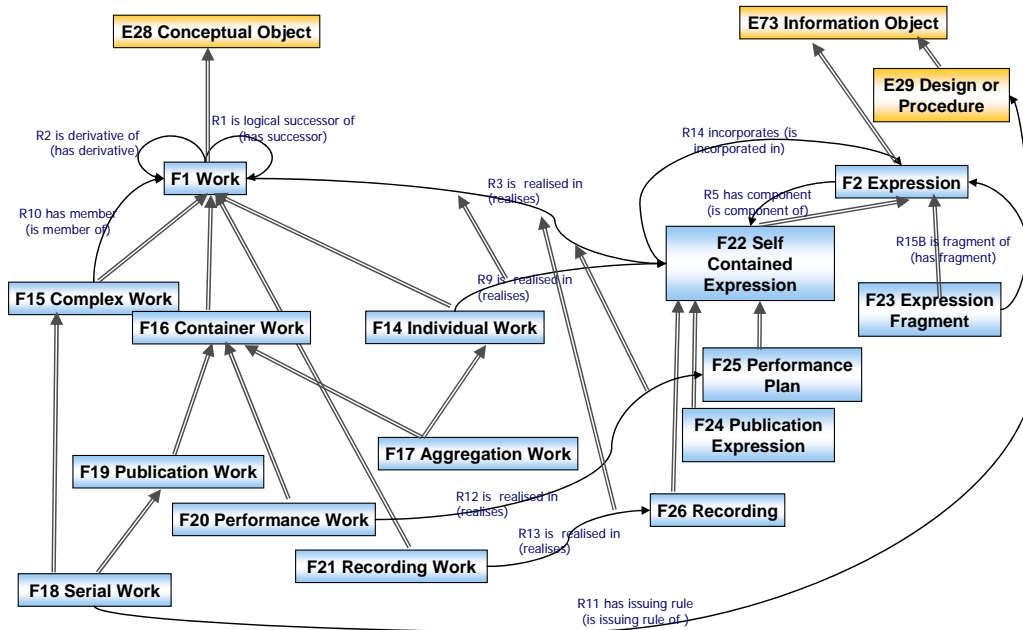
Figure 6

Figure 6 shows the relations that exist between "works" and "expressions" and the subclasses of both concepts, independently from any dynamic aspects involving the activities of creation and modification. It shows an analysis of the original FRBR$_{ER}$ concepts Work and Expression into the more detailed ones that appear only indirectly in FRBR$_{ER}$ via attributes that are specific to these detailed concepts rather than to Work and Expression in general. The reader may find the actual relation of these concepts to the FRBR$_{ER}$ attributes in section 5.3 below.

In detail:

a. The concepts that make up a work are realised as complete sets of signs. This fact is modelled as: F1 Work *R3 is realised in (realises)* F22 Self-Contained Expression.

b. A set of signs may not convey the complete concept of a work; it may just be a fragment of a larger set of signs. This fact is modelled as: F2 Expression *R15 has fragment (is fragment of)*. F23 Expression Fragment

c. A complete set of signs may be a structural part of a larger set of signs. This fact is modelled as: F2 Expression *R5 has component (is component of)* F22 Self-Contained Expression.

d. A work can present itself as a "continuation" of some other work. This fact is modelled as: F1 Work *R1 is logical successor of (has successor)* F1 Work.

e. A work can present itself as "derived" from another work, in many possible ways. This fact is modelled as: F1 Work *R2 is derivative of (has derivative)* F1 Work *R2.1 has type* E55 Type [of derivation].

f. The notion of "work" is actually a vague one, which covers three more specific notions:
   o The sum of concepts conveyed by just one complete set of signs. This is modelled as: F14 Individual Work *is a* F1 Work, and F14 Individual Work *R9 is realised in (realises)* F22 Self-Contained Expression.
   o The concept of re-using some already existing material or of using some event (either natural or involving human activity) in order to produce some new creation. This is modelled as: F16 Container Work *is a* F1 Work, F1 Work *R3 is realised in (realises)* F22 Self-Contained Expression, and (unless a natural event is being used) F22 Self-Contained Expression *R14 incorporates (is incorporated in)* F2 Expression.
   o The conceptual unity observed across a number of complete sets of signs, which makes it possible to organise publications into "bibliographic families." This is modelled as: F15 Complex Work *is a* F1 Work, and F15 Complex Work *R10 has member (is member of)* F1 Work.

g. Additionally, a work can be recognised as being composed of several structural parts. This is also

modelled as: F15 Complex Work *is a* F1 Work, and F15 Complex Work *R10 has member (is member of)* F1 Work.

h. Works that re-use some already existing material or use some event, either natural or involving human activity (i.e., instances of F16 Container Work), are further subdivided into:

   o Works that aggregate already existing expressions of other works. This is modelled as: F17 Aggregation Work *is a* F16 Container Work, F17 Aggregation Work *is a* F14 Individual Work, F14 Individual Work *R9 is realised in (realises)* F22 Self-Contained Expression, and F22 Self-Contained Expression *R14 incorporates (is incorporated in)* F2 Expression.

   o Works that consist in establishing all the features of recordings of sounds and/or images (either natural or involving human activity). This is modelled as: F21 Recording Work *is a* F1 Work, F21 Recording Work *R13 is realised in (realises)* F26 Recording, and F26 Recording *is a* F22 Self-Contained Expression.

   o Works that consist in establishing all the features of a performance. This is modelled as: F20 Performance Work *is a* F16 Container Work, F20 Performance Work *R12 is realised in (realises)* F25 Performance Plan, and F25 Performance Plan *is a* F22 Self-Contained Expression.

   o Works that consist in establishing all the features of a publication. This is modelled as: F19 Publication Work *is a* F16 Container Work, F19 Publication Work *R3 is realised in (realises)* F24 Publication Expression, and F24 Publications Expression *is a* F22 Self-Contained Expression.

   o Works that consist in establishing all the features of serials are a specific case of the latter; but serials have particular constraints as to their frequency of issuance, numbering pattern, etc. This is modelled as: F18 Serial Work *is a* F19 Publication Work, and F18 Serial Work *R11 has issuing rule (is issuing rule of)* E29 Design or Procedure [a CIDOC CRM class].
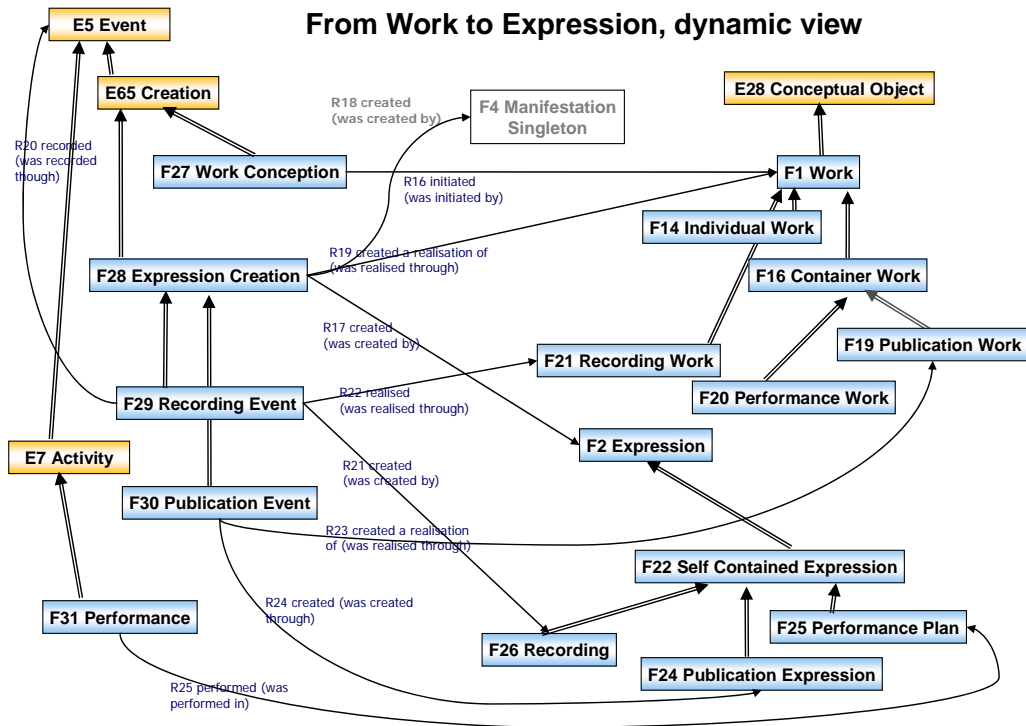
Figure 7

Figure 7 shows the dynamic process through which products of the mind come into being.

− An instance of F1 Work begins to exist from the very moment an individual has the initial idea that triggers a creative process in his or her mind. This is modelled as: F27 Work Conception *R16 initiated*

(was initiated by) F1 Work. (Note however that the F27 Work Conception class is not necessarily meant to be implemented in any system; it was declared only because it was needed in the model from a logical point of view and because sometimes there exist historical sources documenting such facts. Library catalogues and bibliographies typically would not store any information about the circumstances under which, for instance, a writer had the initial sparkle for a new novel).

– Unless a creator leaves at least one physical sketch for his or her work, the very existence of that instance of F1 Work goes unnoticed, and there is nothing to be catalogued. At least one instance of F2 Expression that *R3B realises* the instance of F1 Work has to be created. This is modelled as: F28 Expression Creation *R19 created a realisation of (was realised through)* F1 Work, and F28 Expression Creation *R17 created (was created by)* F2 Expression. Except for oral tradition and recording in human memory, this very first instance of the respective F2 Expression would be created ***simultaneously*** on a physical carrier, typically as a unique item or as an electronic file on a specific computer. This is modelled as: F28 Expression Creation *R18 created (was created by)* F4 Manifestation Singleton, as detailed in Figures 8 and 9.

– Sound recordings and moving images are particular cases of expressions, in that they involve both external events (the "things" being recorded, either performances of works or just natural events) and decisions made by one or more than one individual (sound engineer, movie director…). This is modelled as: F29 Recording Event *R20 recorded (was recorded through)* E5 Event, F29 Recording Event *R22 realised (was realised through)* F21 Recording Work (i.e., the artistic and technical decisions made about the recording material to be used, the location of microphones and/or cameras, the use of filters, lighting, framing, etc.), and F29 Recording Event *R21 created (was created by)* F26 Recording (i.e., the set of either analogue or digital signs that are inevitably infixed on a carrier at the time they are produced – just like any other kind of expression – but are likely to be conveyed on any other carrier without losing their identity as a distinct expression).

– Publishers make decisions about all the features of a new product, and determine the complete set of signs that will be found on it. This is modelled as: F30 Publication Event *R23 created a realisation of (was realised through)* F19 Publication Work (i.e., a publisher's concept of a given publication), and F30 Publication Event *R24 created (was created through)* F24 Publication Expression (i.e., the set of *all the signs* present on a given publication, including book cover, title page, page numbers, copyright statement, CD liner notes, text found on a DVD container, etc.).

– Performers make decisions about all the features their performance should display (whether it is an improvisation or it involves some pre-existing work such as a play or a musical composition), and may express these decisions as explicit instructions. This is modelled as: F31 Performance (i.e., the performing activity itself) *R25 performed (was performed in)* F25 Performance Plan (i.e., the set of instructions for a specific performance, which *R14 incorporates* the text of a play, the content of a musical score, etc.).

From Expression to Publication
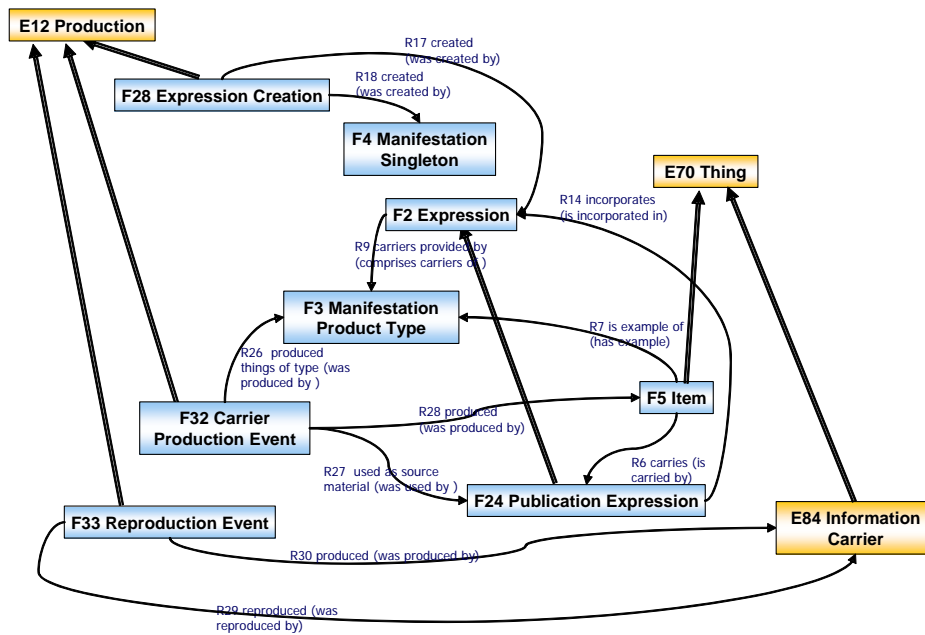
Figure 8

Figure 8 shows how products of the mind are communicated among human beings through physical carriers that eventually become part of the cultural heritage preserved in memory institutions such as libraries, archives, and museums.

Authorial output:
– A creator elaborates an expression (it can be a text, a musical score, a drawing, a map, etc.). This process is modelled as: F28 Expression Creation *R17 created (was created by)* F2 Expression.
– The creator externalises that expression by transforming bits of the physical world into physical carriers of his or her creation. This is modelled as: F28 Expression Creation *R18 created (was created by)* F4 Manifestation Singleton (e.g., a draft manuscript).

Editorial product:
– A publisher elaborates the overall content of a new publication: F30 Publication Event *R24 created (was created through)* F24 Publication Expression (see Figure 2).
– That overall content incorporates the authorial expression such as that found, for instance, on a manuscript provided by the author: F24 Publication Expression *R14 incorporates (is incorporated in)* F2 Expression.

Printing/manufacturing:
– The publisher sends to a manufacturer the overall content of the publication (a mechanical or paste-up, or, most often nowadays, desktop publishing files), along with instructions as to how exemplars of the publication should be manufactured: F32 Carrier Production Event *R27 used as source material (was used by)* F24 Publication Expression.
– As a consequence, all exemplars of the publication are supposed to be similar, i.e., can be identified as belonging to the same type: F32 Carrier Production Event *R26 produced things of type (was produced by)* F3 Manifestation Product Type.
– As a consequence, both the author's expression and the publisher's expression are to be found on all exemplars belonging to that type: F2 Expression *R9 carriers provided by (comprises carriers of)* F3 Manifestation Product Type.
– The manufacturing process results in physical objects, the exemplars themselves: F32 Carrier Production Event *R28 produced (was produced by)* F5 Item.
– Any exemplar is representative for the publication of which it is an exemplar: F5 Item *R7 is example of (has example)* F3 Manifestation Product Type.

- Under normal conditions, any exemplar should display the same overall content defined by the publisher: F5 Item *R6 carries (is carried by)* F24 Publication Expression.

Reproduction:
- Any information carrier can be reproduced by processes that render a similar item to the original used: F33 Reproduction Event *R29 reproduced (was reproduced by)* E84 Information Carrier. This should not be confused with resuming the actual production process itself.
- This process results in a new instance of E84 Information Carrier: F33 Reproduction Event *R30 produced (was produced by)* E84 Information Carrier.

Expression and Manifestation
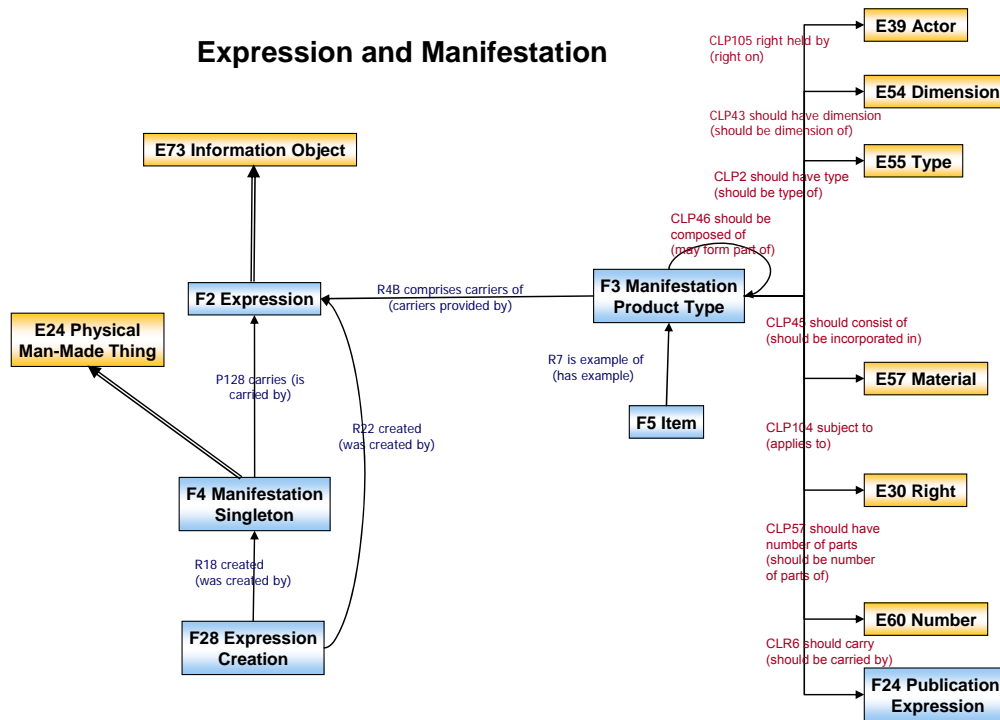
Figure 9

Figure 9 shows how FRBR$_{OO}$ renders the meaning of the FRBR$_{ER}$ Manifestation entity and its attributes.

Manifestation is split into F4 Manifestation Singleton (a unique, physique object) and F3 Manifestation Product Type (a publication, i.e., an abstract notion only recognisable through its physical exemplars).

Every time a writer drafts a new expression on paper (or on the hard disk of a computer, etc.), that process results simultaneously in the creation of a new information object and the production of a new physical man-made thing: F28 Expression Creation *R22 created (was created by)* F2 Expression, *and* F28 Expression Creation *R18 created (was created by)* F4 Manifestation Singleton. (Not all manuscripts, however, are necessarily produced by an instance of F28 Expression Creation: a perfect copy of a brief text, made by a highly trained scribe from an original, and checked several times with the original to contain no alteration of the text, could be regarded as just the result of an instance of E12 Production; but as a rule, no two mediaeval manuscripts carry exactly the same text).

Once an authorial expression has been published, the publishing process has created a *type* of physical objects that carry that authorial expression: F2 Expression *R4 carriers provided by (comprises carriers of)* F3 Manifestation Product Type.

As an abstraction, a publication cannot be said to have such physical characteristics as the material it "consists of" or its "number of pages"; these physical characteristics are found by a cataloguer on one of its exemplars, and the cataloguer extrapolates this to all other exemplars of that publication which will normally display the same physical characteristics. This is modelled in FRBR$_{OO}$ as a series of "CLP" properties, i.e., "class properties" or physical properties that apply to an abstract type only through the physical things that exemplify that abstract type:

F3 Manifestation Product Type *CLP45 should consist of (should be incorporated in)* E57 Material, *CLP57 should have number of parts* E60 Number, etc.

Performing Arts : Added Value Chain
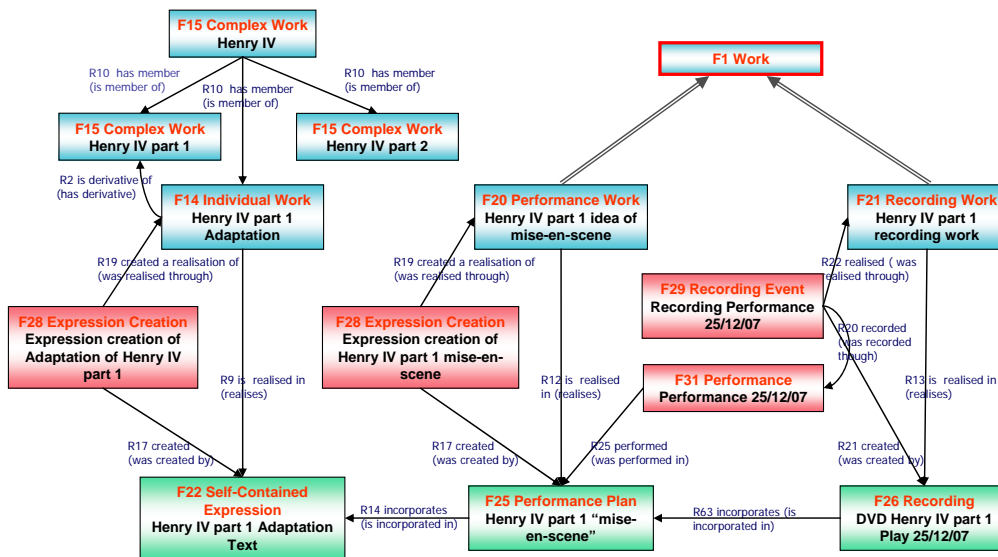
Figure 10

Figure 10 lingers on the way FRBR$_{OO}$ models live performing arts. In contrast to the other figures, it makes use of a concrete example. It demonstrate how successive intellectual processes incorporate Expressions from previous ones, add new elements of different natures, and thereby "add value" to the previous steps. In this sense, the performance adds movement and sound to a text, the recording adds points of view or ways of seeing. In a detailed example:

Shakespeare's *Henry IV* is a play in 2 parts: each part is itself an autonomous play, but form nevertheless parts of a larger overall F15 Complex Work.

The text of *Henry IV Part 1* is adapted in order to be performed; this process results in a new text, an instance of F22 Self-Contained Expression.

The text of this adaptation is incorporated in the stage director's instructions for performance, which realise his or her concept of a mise-en-scène of *Henry IV*.

The play is performed on December 25, 2007.

That performance is filmed.

The resulting recording, which in turn incorporates some aspects of the stage director's performing instructions, in addition to the adapted text of *Henry IV Part 1,* is infixed on a DVD.

Similar considerations hold for the contributions of an editor, illustrator and graphics designer to a manuscript, or the compiling of a collection of poems to the texts selected.

Figure 10 demonstrates three fundamental relationships between instances of F1 Work:

- Continuation or completion of a topic (such as *Henry IV* part 1 and part 2)
- Derivation of an existing Expression in an alternative form (such as original and adaptation)
- Incorporation of an unaltered part of the contents of an Expression (such as play text and performance recording).

2.2 Naming conventions

All the classes declared were given both a name and an identifier constructed according to the conventions

used in the CIDOC CRM model. For classes that identifier consists of the letter F followed by a number. Resulting properties were also given a name and an identifier, constructed according to the same conventions. That identifier consists of the letter R followed by a number, which in turn is followed by the letter "B" every time the property is mentioned "backwards", i.e., from target to domain. "F" and "R" are to be understood as the first two letters of "FRBR" and do not have any other meaning. They correspond respectively to letters "E" and "P" in the CIDOC CRM naming conventions, where "E" originally meant "entity" (although the CIDOC CRM "entities" are now consistently called "classes"), and "P" means "property". Whenever CIDOC CRM classes are used in FRBR$_{OO}$, they are named by the name they have in the original CIDOC CRM. A number of properties are identified by the letters "CLP" and a number; "CLP" stands for "CLass Property" and such properties are taken from Meta-CRM; all of them have F3 Manifestation Product Type as domain, and they indicate that all the exemplars of a given publication "are supposed to" or "should" display the features of the publication they belong to. The publication itself, being an abstract notion, cannot have physical qualities such as, for instance, a given number of pages, but meta-properties are a mechanism borrowed from CIDOC CRM and Meta-CRM that makes it possible to express that a publication is characterised by the number of pages that all of its exemplars, under "ideal" conditions, "should have."

All classes and properties that were borrowed directly from the CIDOC CRM are named as in CIDOC CRM, i.e., with an identifier beginning with either "E" if it is a class, or "P" if it is a property, and with the original appellation for the class or property in CIDOC CRM.

The choice of the domain of properties, and hence the order of their names, are established in accordance with the following priority list:
- Temporal Entity and its subclasses
- Thing and its subclasses
- Actor and its subclasses
- Other

2.3 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 this document 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.

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".
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.

Some properties are defined as being **necessary** for their **domain** or as being **dependent** from their **range,** following the definitions in the table above. Note that if such a 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 by the FRBR$_{OO}$ does not distinguish between a value being unknown or the property not being applicable at all.

2.4 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.

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.*

2.5 Class & 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 the FRBRoo, 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 hyphens ("-") follows the unique class identifier, indicating the hierarchical position of the class in the IsA hierarchy.
–   The English name of the class appears to the right of the hyphens.
–   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 in an 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 hyphens ("-") follows the unique property identifier, indicating the hierarchical position of

the property in the IsA hierarchy.

– The English name of the property appears to the right of the hyphens, 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.

2.5.1 FRBR$_{OO}$ Class Hierarchy

F1	Work			
F14	—	Individual Work		
F17	—	—	Aggregation Work	
F15	—	Complex Work		
F18	—	—	Serial Work	
F16	—	Container Work		
F17	—	—	*Aggregation Work*	
F19	—	—	Publication Work	
F18	—	—	—	*Serial Work*
F20	—	—	Performance Work	
F21	—	Recording Work		
F2	Expression			
F22	—	Self-Contained Expression		
F24	—	—	Publication Expression	
F25	—	—	Performance Plan	
F26	—	—	Recording	
F23	—	Expression Fragment		
F3	Manifestation Product Type			
F4	Manifestation Singleton			
F5	Item			
F6	Concept			
F7	Object			
F8	Event			
F9	Place			
F10	Person			
F11	Corporate Body			
F12	Name			
F13	—	Identifier		
F27	Work Conception			
F28	Expression Creation			
F29	—	Recording Event		
F30	—	Publication Event		
F31	Performance			
F32	Carrier Production Event			
F33	Reproduction Event			

2.5.2 FRBR$_{OO}$ Class Hierarchy aligned with (part of) CIDOC CRM Class Hierarchy

E1	CRM Entity								
E2	-	Temporal Entity							
E3	-	-	Condition State						
E4	-	-	Period =F8 Event						
E5	-	-	-	Event					
E7	-	-	-	-	Activity				
F31	-	-	-	-	-	Performance			
E11	-	-	-	-	-	Modification			
E12	-	-	-	-	-	-	Production		
F28	-	-	-	-	-	-	-	Expression Creation	
F29	-	-	-	-	-	-	-	-	Recording Event
F30	-	-	-	-	-	-	-	-	Publication Event
F32	-	-	-	-	-	-	-	Carrier Production Event	
F33	-	-	-	-	-	-	-	Reproduction Event	
E65	-	-	-	-	-	Creation			
E83	-	-	-	-	-	-	Type Creation		
F27	-	-	-	-	-	-	Work Conception		
F28	-	-	-	-	-	-	*Expression Creation*		
F29	-	-	-	-	-	-	-	*Recording Event*	
F30	-	-	-	-	-	-	-	*Publication Event*	
E63	-	-	-	-	Beginning of Existence				
E12	-	-	-	-	-	*Production*			
F28	-	-	-	-	-	-	*Expression Creation*		
F29	-	-	-	-	-	-	-	*Recording Event*	
F30	-	-	-	-	-	-	-	*Publication Event*	
F32	-	-	-	-	-	-	*Carrier Production Event*		
F33	-	-	-	-	-	-	*Reproduction Event*		
E65	-	-	-	-	-	*Creation*			
E83	-	-	-	-	-	-	*Type Creation*		
F27	-	-	-	-	-	-	*Work Conception*		
F28	-	-	-	-	-	-	*Expression Creation*		
F29	-	-	-	-	-	-	-	*Recording Event*	
F30	-	-	-	-	-	-	-	*Publication Event*	
E77	-	Persistent Item							
E70	-	-	Thing						
E72	-	-	-	Legal Object					
F3	-	-	-	Manifestation Product Type					
E18	-	-	-	Physical Thing = F7 Object					
E19	-	-	-	-	Physical Object				
E20	-	-	-	-	-	Biological Object			
E21	-	-	-	-	-	-	Person =F10 Person		
E22	-	-	-	-	-	Man-Made Object			
E84	-	-	-	-	-	-	Information Carrier		
F5	-	-	-	-	-	-	-	Item	
E24	-	-	-	-	-	Physical Man-Made Thing			

```
F4    -   -   -   -   -       -       Manifestation Singleton
E22   -   -   -   -   -       -       Man-Made Object
E84   -   -   -   -   -       -   -   Information Carrier
F5    -   -   -   -   -       -   -   Item
E90   -   -   -   -   Symbolic Object
E73   -   -   -   -   -   Information Object
F2    -   -   -   -   -   -   Expression
F22   -   -   -   -   -   -   -   Self-Contained Expression
F24   -   -   -   -   -   -   -   -   Publication Expression
F25   -   -   -   -   -   -   -   -   Performance Plan
F26   -   -   -   -   -   -   -   -   Recording
F23   -   -   -   -   -   -   -   Expression Fragment
E29   -   -   -   -   -   -   Design or Procedure
F25   -   -   -   -   -   -   -   Performance Plan
F43                           Identifier Rule
E41   -   -   -   -   -   Appellation = F12 Name
F13   -   -   -   -   -   -   Identifier = E42 Identifier
E71   -   -   -   Man-Made Thing
E28   -   -   -   -   Conceptual Object = F6 Concept
E55   -   -   -   -   -   Type
F3    -   -   -   -   -   -   Manifestation Product Type
E89   -   -   -   -   -   Propositional Object
F1    -   -   -   -   -   -   Work
F14   -   -   -   -   -   -   -   Individual Work
F17   -   -   -   -   -   -   -   -   Aggregation Work
F15   -   -   -   -   -   -   -   Complex Work
F18   -   -   -   -   -   -   -   -   Serial Work
F16   -   -   -   -   -   -   -   Container Work
F19   -   -   -   -   -   -   -   -   Publication Work
F18   -   -   -   -   -   -   -   -   -   Serial Work
F20   -   -   -   -   -   -   -   -   Performance Work
F17   -   -   -   -   -   -   -   -   -   Aggregation Work
F21   -   -   -   -   -   -   -   Recording Work
E73   -   -   -   -   -   -   Information Object
F2    -   -   -   -   -   -   -   Expression
F22   -   -   -   -   -   -   -   -   Self-Contained Expression
F24   -   -   -   -   -   -   -   -   -   Publication Expression
F25   -   -   -   -   -   -   -   -   -   Performance Plan
F26   -   -   -   -   -   -   -   -   -   Recording
F23   -   -   -   -   -   -   -   -   Expression Fragment
E29   -   -   -   -   -   -   -   Design or Procedure
F25   -   -   -   -   -   -   -   -   Performance Plan
F43                               Identifier Rule
E90   -   -   -   -   -   Symbolic Object
E73   -   -   -   -   -   -   Information Object
F2    -   -   -   -   -   -   -   Expression
F22   -   -   -   -   -   -   -   -   Self-Contained Expression
F24   -   -   -   -   -   -   -   -   -   Publication Expression
F25   -   -   -   -   -   -   -   -   -   Performance Plan
```

F26 - - - - - - - - *Recording*

F23 - - - - - - - - *Expression Fragment*

E29 - - - - - - - *Design or Procedure*

F25 - - - - - - - *Performance Plan*

F43 *Identifier Rule*

E41 - - - - - - *Appellation =F12 Name*

E42 - - - - - - *Identifier = F13 Identifier*

E24 - - - - *Physical Man-Made Thing*

F4 - - - - *Manifestation Singleton*

E22 - - - - *Man-Made Object*

E84 - - - - - *Information Carrier*

F5 - - - - - - *Item*

E39 - - Actor

E74 - - - Group

F11 - - - - Corporate Body

E21 - - - *Person* = *F10 Person*

E53 - Place = F9 Place

2.5.3 FRBR_{OO} Property Hierarchy

Property id		Property Name	Entity – Domain	Entity – Range
R1		is logical successor of (has successor)	F1 Work	F1 Work
R2		is derivative of (has derivative)	F1 Work	F1 Work
R3		is realised in (realises)	F1 Work	F22 Self-Contained Expression
	R9	is realised in (realises)	F14 Individual Work	F22 Self-Contained Expression
-	R12	is realised in (realises)	F20 Performance Work	F25 Performance Plan
-	R13	is realised in (realises)	F21 Recording Work	F26 Recording
R4		carriers provided by (comprises carriers of)	F2 Expression	F3 Manifestation Product Type
R5		has component (is component of)	F2 Expression	F22 Self-Contained Expression
R6		carries (is carried by)	F5 Item	F24 Publication Expression
R7		is example of (has example)	F5 Item	F3 Manifestation Product Type
R8		consists of (forms part of)	F13 Identifier	F12 Name
R10		has member (is member of)	F15 Complex Work	F1 Work
R11		has issuing rule (is issuing rule of)	F18 Serial Work	E29 Design or Procedure
R14		incorporates (is incorporated in)	F22 Self-Contained Expression	F2 Expression
R15		has fragment (is fragment of)	F2 Expression	F23 Expression Fragment
R16		initiated (was initiated by)	F27 Work Conception	F1 Work
R17		created (was created by)	F28 Expression Creation	F2 Expression
	R21	created (was created through)	F29 Recording Event	F26 Recording
-	R24	created (was created through)	F30 Publication Event	F24 Publication Expression
- R18		created (was created by)	F28 Expression Creation	F4 manifestation Singleton
R19		created a realisation of (was realised through)	F28 Expression Creation	F1 Work
-	R22	created a realisation of (was realised through)	F29 Recording Event	F21 Recording Work
	R23	created a realisation of (was realised through)	F30 Publication Event	F19 Publication work
R20		recorded (was recorded through)	F29 Recording Event	E5 Event
R25		performed (was performed in)	F31 Performance	F25 Performance Plan

R26	produced things of type (was produced by)	F32 Carrier Production Event	F3 Manifestation Product Type
R27	used as source material (was used by)	F32 Carrier Production Event	F24 Publication Expression
R28	produced (was produced by)	F32 Carrier Production Event	F5 Item
R29	reproduced (was reproduced by)	F33 Reproduction Event	E84 Information Carrier
R30	produced (was produced by)	F33 Reproduction Event	E84 Information Carrier
R31	is reproduction of (has reproduction)	E84 Information Carrier	E84 Information Carrier
CLP2	should have type (should be type of)	F3 Manifestation Product Type	E55 Type
CLP43	should have dimension (should be dimension of)	F3 Manifestation Product Type	E54 Dimension
CLP45	should consist of (should be incorporated in)	F3 Manifestation Product Type	E57 Material
CLP46	should be composed of (may form part of)	F3 Manifestation Product Type	F3 Manifestation Product Type
CLP57	should have number of parts	F3 Manifestation Product Type	E60 Number
CLP104	subject to (applies to)	F3 Manifestation Product Type	E30 Right
CLP105	right held by (right on)	F3 Manifestation Product Type	E39 Actor
CLR6	should carry (should be carried by)	F3 Manifestation Product Type	F24 Publication Expression

2.5.4 FRBR$_{OO}$ Property Hierarchy aligned with (part of) CIDOC CRM Property Hierarchy

Property id	Property Name	Entity – Domain	Entity - Range
P2	has type (is type of)	E1 CRM Entity	E55 Type
R7	- is example of (has example)	F5 Item	F3 Manifestation Product Type
P12	occurred in the presence of (was present at)	E5 Event	E77 Persistent Item
P16	- used specific object (was used for)	E7 Activity	E70 Thing
R19	- - created a realisation of (was realised through)	F28 Expression Creation	F1 Work
R22	- - - created a realisation of (was realised through)	F29 Recording Event	F21 Recording Work
R23	- - - created a realisation of (was realised through)	F30 Publication Event	F19 Publication work
R27	- - used as source material (was used by)	F32 Carrier Production Event	F24 Publication Expression
R29	- - reproduced (was reproduced by)	F33 Reproduction Event	E84 Information Carrier
P33	- - used specific technique (was used by)	E7 Activity	E29 Design or Procedure
R25	- - - performed (was performed in)	F31 Performance	F25 Performance Plan
P31	- has modified (was modified by)	E11 Modification	E24 Physical Man-Made Thing
P108	- - has produced (was produced by)	E12 Production	E24 Physical Man-Made Thing
R18	- - - created (was created by)	F28 Expression Creation	F4 manifestation Singleton
R28	- - - produced (was produced by)	F32 Carrier Production Event	F5 Item
R30	- - - produced (was produced by)	F33 Reproduction Event	E84 Information Carrier
P92	- brought into existence (was brought into existence by)	E63 Beginning of Existence	E77 Persistent Item
P94	- - has created (was created by)	E65 Creation	E28 Conceptual Object
R16	- - - initiated (was initiated by)	F27 Work Conception	F1 Work
R17	- - - created (was created by)	F28 Expression Creation	F2 Expression
R21	- - - - created (was created through)	F29 Recording Event	F26 Recording
R24	- - - - created (was created through)	F30 Publication Event	F24 Publication Expression
P108	*- - has produced (was produced by)*	*E12 Production*	*E24 Physical Man-Made Thing*
R18	*- - - created (was created by)*	*F28 Expression Creation*	*F4 manifestation Singleton*
R28	*- - - produced (was produced by)*	*F32 Carrier Production Event*	*F5 Item*
R30	*- - - produced (was produced by)*	*F33 Reproduction Event*	*E84 Information Carrier*
P15	was influenced by (influenced)	*E7 Activity*	E1 CRM Entity
P16	*- used specific object (was used for)*	*E7 Activity*	*E70 Thing*
R19	*- - created a realisation of (was realised through)*	*F28 Expression Creation*	*F1 Work*
R22	*- - - created a realisation of (was realised through)*	*F29 Recording Event*	*F21 Recording Work*
R23	*- - - created a realisation of (was realised through)*	*F30 Publication Event*	*F19 Publication work*
R27	*- - used as source material (was used by)*	*F32 Carrier Production Event*	*F24 Publication Expression*
R29	*- - reproduced (was reproduced by)*	*F33 Reproduction Event*	*E84 Information Carrier*
P33	*- - used specific technique (was used by)*	*E7 Activity*	*E29 Design or Procedure*
R25	*- - - performed (was performed in)*	*F31 Performance*	*F25 Performance Plan*
P106	is composed of (forms part of)	E90 Symbolic Object	E90 Symbolic Object
R8	- consists of (forms part of)	F13 Identifier	F12 Name
R14	- incorporates (is incorporated in)	F22 Self-Contained Expression	F2 Expression
R15	- has fragment (is fragment of)	F2 Expression	F23 Expression Fragment
P128	carries (is carried by)	E24 Physical Man-Made Thing	E73 Information Object
R6	- carries (is carried by)	F5 Item	F24 Publication Expression
P130	shows features of (features are also found on)	E70 Thing	E70 Thing
R1	- is logical successor of (has successor)	F1 Work	F1 Work
R2	- is derivative of (has derivative)	F1 Work	F1 Work
R3	- is realised in (realises)	F1 Work	F22 Self-contained Expression
R9	- - is realised in (realises)	F14 Individual Work	F22 Self-Contained Expression
R12	- - is realised in (realises)	F20 Performance Work	F25 Performance Plan
R13	- - is realised in (realises)	F21 Recording Work	F26 Recording
R31	- is reproduction of (has reproduction)	E84 Information Carrier	E84 Information Carrier

Property id	Property Name	Entity – Domain	Entity - Range
P148	has component (is component of)	E89 Propositional Object	E89 Propositional Object
R5	- has component (is component of)	F2 Expression	F22 Self-Contained Expression
R10	- has member (is member of)	F15 Complex Work	F1 Work
R14	- incorporates (is incorporated in)	F22 Self-Contained Expression	F2 Expression

2.6 FRBR$_{OO}$ Class Declaration

The classes of FRBR$_{OO}$ are comprehensively declared in this section using the following format:

- Class names are presented as headings in bold face, preceded by the class's unique identifier;
- The line "Subclass of:" declares the superclass of the class from which it inherits properties;
- The line "Superclass of:" is a cross-reference to the subclasses of this class;
- The line "Scope note:" contains the textual definition of the concept the class represents;
- The line "Examples:" contains a bulleted list of examples of instances of this class. If the example is also 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 is added in parenthesis. Non-fictitious examples may be followed by an explanation in brackets.
- The line "Properties:" declares the list of the class's properties;
- Each property is represented by its unique identifier, its forward and reverse names, and the range class that it links to, separated by colons;
- Inherited properties are not represented;
- Properties of properties are provided indented and in parentheses beneath their respective domain property.

F1 Work

Subclass of:	E89 Propositional Object
Superclass of:	F14 Individual Work
	F15 Complex Work
	F16 Container Work
	F21 Recording Work

Scope note: This class comprises the sums of concepts which appear in the course of the coherent evolution of an original idea into one or more expressions that are dominated by the original idea. The substance of Work is concepts. A Work may be elaborated by one or more Actors simultaneously or over time. A Work may have members that constitute components of the overall concept or that are alternatives to other members of the work. Members of a work may or may not represent the concept of the Work as a whole; for instance a translation reinterprets the whole, a volume of a trilogy represents a part of the concept.

A Work can be either *individual* or *complex*. If it is individual its concept is completely realised in a single F22 Self-Contained Expression. If it is complex its concept is embedded in an F15 Complex Work. An F15 Complex Work consists of members that are either F15 Complex Works themselves or F14 Individual Works. The member relationship of Work is based on the members respecting the same concept, and should not be confused with the structural parts of an expression, that might be taken from other work(s).

A Work is the product of an intellectual process of one or more persons, yet only indirect evidence about it is at our hands. This can be contextual information such as the existence of an order for a work, reflections of the creators themselves that are documented somewhere, and finally the expressions of the work created. As ideas normally take shape during discussion, elaboration and implementation, it is not reasonable to assume that a work starts with a complete concept. Moreover, it can be very difficult or impossible to define the whole of the concept of a work at some given time. The only objective evidence for such a notion can be based on a stage of expressions at a given time. In this sense, self-contained expressions serve as a kind of "snap-shots" of a work.

A Work may aggregate expressions of other works into a new expression. For instance, an anthology of poems is regarded as a work in its own right that makes use of expressions of the individual poems that have been selected and ordered as part of an intellectual process. This does not make the contents of the aggregated expressions part of this work, but only parts of the resulting expression.

Examples:	Abstract content of Giovanni Battista Piranesi's 'Carcere XVI: the pier with chains: 1st state' (F14)
	'La Porte de l'Enfer' by Auguste Rodin conceived between 1880 and 1917 (F15)
	'Hamlet' by William Shakespeare (F15)
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): F22 Self-Contained Expression

F2 Expression

Subclass of:	E73 Information Object
Superclass of:	F22 Self-Contained Expression`
	F23 Expression Fragment

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 that have objectively recognisable structures. The substance of F2 Expression is signs.

Expressions cannot exist without a physical carrier, but do not depend on a specific physical carrier and can exist on one or more carriers simultaneously. Carriers may include human memory.

Inasmuch as the form of F2 Expression is an inherent characteristic of the F2 Expression, any change in form (e.g., from alpha-numeric notation to spoken word, a poem created in capitals and rendered in lower case) is a new F2 Expression. Similarly, changes in the intellectual conventions or instruments that are employed to express a *work* (e.g., translation from one language to another) result in the creation of a new F2 Expression. Thus, if a text is revised or modified, the resulting F2 Expression is considered to be a new F2 Expression. Minor changes, such as corrections of spelling and punctuation, etc., are normally considered variations within the same F2 Expression. On a practical level, the degree to which distinctions are made between variant *expressions* of a *work* will depend to some extent on the nature of the F1 Work itself, and on the anticipated needs of users.

The genre of the work may provide an indication of which features are essential to the expression. In some cases, aspects of physical form, such as typeface and page layout, are not integral to the intellectual or artistic realisation of the *work* as such, and therefore are not distinctive criteria for the respective expressions. For another work features such as layout may be essential. For instance, the author or a graphic designer may wrap a poem around an image.

An expression of a work may include expressions of other works within it. For instance, an anthology of poems is regarded as a work in its own right that makes use of expressions of the individual poems that have been selected and ordered as part of an intellectual process. This does not make the contents of the aggregated expressions part of this work, but only parts of the resulting expression.

If an instance of F2 Expression is of a specific form, such as text, image, etc., it may be simultaneously instantiated in the specific classes representing these forms in CIDOC CRM. Thereby one can make use of the more specific properties of these classes, such as language (which is applicable to linguistic objects only).

Examples: The Italian text of Dante's 'Divina Commedia' as found in the authoritative critical edition '*La Commedia secondo l'antica vulgata a cura di Giorgio Petrocchi*', Milano: Mondadori, 1966-67 (= Le Opere di Dante Alighieri, Edizione Nazionale a cura della Società Dantesca Italiana, VII, 1-4) (F22)

The Italian text of Dante's 'Inferno' as found in the same edition (F22)

Nel mezzo del cammin di nostra vita
mi ritrovai per una selva oscura
ché la diritta via era smarrita [the Italian text of the first stanza of Dante's 'Inferno' and 'Divina Commedia'] (F23)

The signs which make up Christian Morgenstern's 'Fisches Nachtgesang' [a poem consisting simply of "-" and "˘" signs, arranged in a determined combination] (F22)

Properties: R4 carriers provided by (comprises carriers of): F3 Manifestation Product Type
R5 has component (is component of): F22 Self-Contained Expression
R15 has fragment (is fragment of): F23 Expression Fragment

F3 Manifestation Product Type

Subclass of: E55 Type
E72 Legal Object

Scope note: This class comprises the definitions of publication products.

An instance of F3 Manifestation Product Type is the "species", and all copies of a given object are "specimens" of it. An instance of F3 Manifestation Product Type defines all of the features or traits that instances of F5 Item normally display in order that they may be recognised as copies of a particular publication. However, due to production problems or subsequent events, one or more instances of F5 Item may not exhibit all these features or traits; yet such instances still retain their relationship to the same instance of F3 Manifestation Product Type.

The features that characterise a given instance of F3 Manifestation Product Type include: one instance of F24 Publication Expression, containing one or more than one instance of F2 Expression, reflecting the authors' content of the manifestation and all additional input by the publisher; and the appropriate types of physical features for that form of the object. For example, hardcover and paperback are two distinct publications (i.e. two distinct instances of F3 Manifestation Product Type) even though authorial and editorial content are otherwise identical in both publications. The activity of cataloguing aims at the most accurate listing of features or traits of an instance of F3 Manifestation Product Type that are sufficient to distinguish it from another instance of F3 Manifestation Product Type. In this sense, it may be said that a typical bibliographic record for a publication (not a manuscript) reflects the notion of F3 Manifestation Product Type.

Examples: The publication product containing the text entitled 'Harmonie universelle' (authored by the person named 'Marin Mersenne'), issued in 1636 in Paris by the publisher named 'Sébastien Cramoisy'

The publication product containing a modern reprint of Marin Mersenne's 'Harmonie universelle', issued in 1986 in Paris by the publisher named 'Les éditions du CNRS', and identified by ISBN '2-222-00835-2'

The publication product containing the third edition of the combination of texts and graphics titled 'Codex Manesse: die Miniaturen der großen Heidelberger Liederhandschrift, herausgegeben und erläutert von Ingo F. Walther unter Mitarbeit von Gisela Siebert', issued by the publisher named 'Insel-Verlag' in 1988

The publication product containing the cartographic resource titled 'Ordnance Survey Explorer Map 213, Aberystwyth & Cwm Rheidol', issued in May 2005 by the publisher named 'Ordnance Survey' and identified by ISBN '0-319-23640-4' (folded), 1:25,000 scale

The publication product containing the recordings of musical works performed by the person named 'Florence Foster Jenkins' gathered under the title 'The Glory (????) of the human voice', identified by label and label number 'RCA Victor Gold Seal GD61175' *(Note: the four question marks within parentheses belong to the title itself)*

Properties: CLP2 should have type (should be type of): E55 Type
CLP43 should have dimension (should be dimension of): E54 Dimension
CLP45 should consist of (should be incorporated in): E57 Material
CLP46 should be composed of (may form part of): F3 Manifestation Product Type
CLP57 should have number of parts: E60 Number
CLP104 subject to (applies to): E30 Right
CLP105 right held by (right on): E39 Actor
CLR6 should carry (should be carried by): F24 Publication Expression

F4 Manifestation Singleton

Subclass of: E24 Physical Man-Made Thing

Scope note: This class comprises physical objects that each carry an instance of F2 Expression, and that were produced as unique objects, with no siblings intended in the course of their production. It should be noted that if all but one copy of a given publication are destroyed, then that copy does not become an instance of F4 Manifestation Singleton, because it was produced together with sibling copies, even though it now happens to be unique. Examples of instances of F4 Manifestation Singleton include manuscripts, preparatory sketches and the final clean draft sent by an author or a composer to a publisher.

Examples: The manuscript known as 'The Book of Kells'

The manuscript score of Charles Racquet's 'Organ fantasy', included in Marin Mersenne's personal copy of his own 'Harmonie universelle' [Marin Mersenne planned a second edition of his 'Harmonie universelle' after it had been first published in 1636, and he asked the composer Charles Racquet to compose his organ fantasy especially for that planned second edition; but Mersenne died before he could finish and publish the second edition and Racquet's score remained until the 20th century as a manuscript addition to Mersenne's copy, held in Paris by the Library of the Conservatoire national des arts et métiers]

Marin Mersenne's personal copy, held in Paris by the Library of the Conservatoire national des

arts et métiers, of his own 'Harmonie universelle', containing all of his manuscript additions for a planned second edition that never took place before his death, but that served as a basis for the modern reprint published in 1986

Properties:

F5 Item

Subclass of:	E84 Information Carrier
Scope note:	This class comprises physical objects (printed books, scores, CDs, DVDs, CD-ROMS, etc.) that carry a F24 Publication Expression and were produced by an industrial process involving a F3 Manifestation Product Type.
Examples:	Marin Mersenne's personal copy of his own 'Harmonie universelle' without any manuscript addition and without Charles Racquet's manuscript score, as a mere witness of the 1st edition of 'Harmonie universelle', Paris, 1636 [the same physical object can be regarded at the same time as an instance of F5 Item inasmuch as it is a witness of a publication, and as an instance of F4 Manifestation Singleton inasmuch as it contains manuscript annotations and additions and as it served as the basis for a subsequent production process]
	Any other copy of the original edition of Marin Mersenne's 'Harmonie universelle', Paris, 1636
	Any copy of the modern reprint publication of Marin Mersenne's 'Harmonie universelle', Paris, 1986, ISBN '2-222-00835-2'
Properties:	R6 carries (is carried by): F24 Publication Expression
	R7 is example of (has example): F3 Manifestation Product Type

F6 Concept

Equal to:	E28 Conceptual Object
Scope note:	An abstract notion or idea. [FRBR$_{ER}$] Includes fields of knowledge, disciplines, schools of thought, etc. Includes philosophies, religions, political ideologies, etc. Includes theories, processes, techniques, practices, etc. *[Definition from the FRAD draft model, unchanged]*
	This class comprises non-material products of our minds and other human produced data that have become objects of a discourse about their identity, circumstances of creation or historical implication. The production of such information may have been supported by the use of technical devices such as cameras or computers.
	Characteristically, instances of this class are created, invented or thought by someone, and then may be documented or communicated between persons. Instances of E28 Conceptual Object have the ability to exist on more than one particular carrier at the same time, such as paper, electronic signals, marks, audio media, paintings, photos, human memories, etc.
	They cannot be destroyed. They exist as long as they can be found on at least one carrier or in at least one human memory. Their existence ends when the last carrier and the last memory are lost. *[Scope note for E28 Conceptual Object in CIDOC CRM version 5.0.1]*
Examples:	Mankind [as a concept]
	Natural history of whales
	Cultural history of Wales
	The appreciation of Victor Hugo's works in Germany between 1870 and 1914

Properties**:**

F7 Object

Equal to: E18 Physical Thing

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

[This is the beginning of scope note for E18 Physical Object in CIDOC CRM version 5.0.1]

Examples: Buckingham Palace
The *Lusitania*
Apollo 11
The Eiffel Tower

Properties**:**

F8 Event

Equal to: E4 Period

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

It is the social or physical coherence of these phenomena that identify an E4 Period and not the associated spatio-temporal bounds. These bounds are a mere approximation of the actual process of growth, spread and retreat. Consequently, different periods can overlap and coexist in time and space, such as when a nomadic culture exists in the same area as a sedentary culture.

Typically this class is used to describe prehistoric or historic periods such as the 'Neolithic Period', the 'Ming Dynasty' or the 'McCarthy Era'. There are however no assumptions about the scale of the associated phenomena. In particular all events are seen as synthetic processes consisting of coherent phenomena. Therefore E4 Period is a superclass of E5 Event. For example, a modern clinical E67 Birth can be seen as both an atomic E5 Event and as an E4 Period that consists of multiple activities performed by multiple instances of E39 Actor.

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

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

[This is the Scope note for E4 Period in CIDOC CRM version 5.0.1]

[Note that in CIDOC CRM, E12 Production, E13 Attribute Assignment, and E65 Creation are indirect subclasses of E4 Period = F8 Event; as a consequence, F8 Event is an indirect superclass of: F27 Work Conception, F28 Expression Creation, F40 Identifier Assignment, F41 Representative Manifestation Assignment, F42 Representative Expression Assignment, F32 Carrier Production Event, F33 Reproduction Event, and F30 Publication Event]

Examples: The battle of Trafalgar

Printing for the publisher named 'Doubleday' in 2003 all the copies of the first print run of the novel entitled 'Da Vinci Code' (F32)

Having the initial idea that eventually resulted in the existence of the opera entitled 'Der fliegende Holländer' (F27)

Creating for Mozart's 41st symphony the uniform title that was thereafter consistently used to refer unambiguously to that symphony everywhere in the Library of Congress's catalogue (F40)

Properties**:**

F9 Place

Equal to:	E53 Place
Scope note:	This class comprises extents in space, in particular on the surface of the earth, in the pure sense of physics: independent from temporal phenomena and matter. The instances of E53 Place are usually determined by reference to the position of immobile objects such as buildings, cities, mountains, rivers, or dedicated geodetic marks. A Place can be determined by combining a frame of reference and a location with respect to this frame. It may be identified by one or more instances of E44 Place Appellation.

It is sometimes argued that instances of E53 Place are best identified by global coordinates or absolute reference systems. However, relative references are often more relevant in the context of cultural documentation and tend to be more precise. In particular, we are often interested in position in relation to large, mobile objects, such as ships. For example, the Place at which Nelson died is known with reference to a large mobile object – H.M.S Victory. A resolution of this Place in terms of absolute coordinates would require knowledge of the movements of the vessel and the precise time of death, either of which may be revised, and the result would lack historical and cultural relevance.

Any object can serve as a frame of reference for E53 Place determination. The model foresees the notion of a section of an E19 Physical Object as a valid E53 Place determination. *[Scope Note for E53 Place in CIDOC CRM version 5.0.1]*

Note that Places may be determined by the location of historical or contemporary objects, geographic features, events or geo-political units.

Examples:	The area referred to as 'Lutèce'
	The area referred to as 'verso of the title page of the Library of Congress's copy of the 1st edition of the novel entitled 'Da Vinci Code'

Properties**:**

F10 Person

Equal to:	E21 Person
Scope note:	This class comprises real persons who live or are assumed to have lived. *[Beginning of scope note for E21 Person in CIDOC CRM version 5.0.1]* F10 Person covers the notion of persona.
Examples:	Margaret Atwood
	Hans Christian Andersen
	Queen Victoria

F11 Corporate Body

Subclass of:	E74 Group
Superclass of:	
Scope note:	This class comprises organisations and groups of two or more people and/or organisations acting as a unit.

To be considered an 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 Name

Equal to:	E41 Appellation
Superclass of:	F13 Identifier

Scope note: This class comprises all sequences of signs of any nature, either meaningful or not, that are used or can be used to refer to and identify a specific instance of some class within a certain context. Instances of E41 Appellation do not identify things by their meaning even if they happen to have one, but by convention, tradition, or agreement. Instances of E41 Appellation are cultural constructs; as such, they have a context, a history, and a use in time and space by some group of users. *[Beginning of Scope Note for E41 Appellation in CIDOC CRM version 5.0.1]*

Examples: '杜甫' (E82) [the name of a Chinese poet of the 8th century, in Chinese characters]

'Du Fu' (E82) [Pinyin romanised form of the name of a Chinese poet of the 8th century]

'Tu Fu' (E82) [another romanised form of the name of a Chinese poet of the 8th century]

'Thơ Đô Phủ' (E82) [Vietnamese form of the name of a Chinese poet of the 8th century]

'جامعة صفاقس' (E82) [Arabic name of the Sfax University (Tunisia), in Arabic script]

'Ǧāmiʿaȉ Ṣafāqis' (E82) [Arabic name of the Sfax University (Tunisia), transliterated]

'Université de Sfax' (E82) [French name of the Sfax University (Tunisia)]

'Murders in the rue Morgue' (E35) [English title of a textual work]

'Poe, Edgar Allan, 1809-1849. Murders in the rue Morgue' (F13) [controlled author/title heading for a textual work]

'modelling' [not the activity, just the written signs that represent its English name in British spelling]

'modeling' [not the activity, just the written signs that represent its English name in American spelling]

Properties**:**

F13 Identifier

Subclass of:	F12 Name
Equal to:	E42 Identifier

Scope note: This class comprises strings or codes assigned to instances of E1 CRM Entity in order to identify them uniquely and permanently within the context of one or more organisations. Such codes are often known as inventory numbers, registration codes, etc. and are typically composed of alphanumeric sequences. The class E42 Identifier is not normally used for machine-generated identifiers used for automated processing unless these are also used by human agents. *[Adapted from the Scope Note of CIDOC CRM E42 Identifier ver. 5.0.1]*

F13 Identifier covers the notion of "controlled access points" in library practice – both preferred forms and cross references. A cross reference may not identify uniquely an entity, but can be shared by two entities; however, as it displays the same structural characteristics as preferred controlled access points, it is still regarded in the model as an instance of F13 Identifier.

Examples: ISSN '0041-5278' (F13)

ISRC 'FIFIN8900116' (F13)

Shelf mark 'Res 8 P 10' (E42)

'Guillaume de Machaut (1300?-1377)' (F13) [a controlled personal name heading that follows the French rules]

'Guillaume, de Machaut, ca. 1300-1377' (F13) [a controlled personal name heading that follows the AACR rules]

'Rite of spring (Choreographic work: Bausch)' (F13)

Properties: R8 consists of (forms part of): F12 Name

F14 Individual Work

Subclass of: F1 Work

Superclass of: F17 Aggregation Work

Scope note: This class comprises works that are realised by one and only one self-contained expression, i.e., works representing the concept as expressed by precisely this expression, and that do not have other works as parts.

Inherent to the notion of work is the completion of recognisable outcomes of the work. These outcomes, i.e. the Self-Contained Expressions, are regarded as the symbolic equivalents of Individual Works, which form the atoms of a complex work. Normally creators would characterise an outcome of a work as finished. In other cases, one could recognise an outcome of a work as complete from the elaboration or logical coherence of its content, or if there is any historical knowledge about the creator deliberately or accidentally never finishing (completing) that particular expression. In all those cases, one would regard the corresponding expression as equivalent to one Individual Work.

Examples: Abstract content of Giovanni Battista Piranesi's 'Carcere XVI: the pier with chains: 1st state'

Abstract content of Giovanni Battista Piranesi's 'Carcere XVI: the pier with chains: 2nd state' [explanation: these are two states of the same etching, but with so many and so significant differences between them that they can scarcely be recognised as conveying the same work; more generally speaking, each individual state of an etching, as a Self-Contained Expression, conveys its own F14 Individual Work (even if the differences are not so blatant as in the case of 'Carcere XVI'), and is regarded as part of the larger, abstract F15 Complex Work that encompasses all distinct states of the same etching]

Abstract content of the recording made of performances of Johann Sebastian Bach's 'Toccata in C minor BWV 911' by Glenn Gould on May 15 & 16, 1979, in Toronto, Eaton's Auditorium

Properties: R9 is realised in (realises): F22 Self-Contained Expression

F15 Complex Work

Subclass of: F1 Work

Superclass of: F18 Serial Work

Scope note: This class comprises works that have more than one work as members.

The members of a Complex Work may constitute components of the overall concept or be alternatives to other members of the work. In practice, no clear line can be drawn between parallel and subsequent processes in the evolution of a work. One part may not be finished when another is already revised. An initially monolithic work may be taken up and evolve in pieces. The member relationship of Work is based on the conceptual relationship, and should not be confused with the internal structural parts of an individual expression. The fact that an expression may contain parts from other work(s) does not make the expressed work complex. For instance, an anthology for which only one version exists is not a complex work.

The boundaries of a Complex Work have nothing to do with the value of the intellectual achievement but only with the dominance of a concept. Thus, derivations such as translations are regarded as belonging to the same Complex Work, even though in addition they constitute

an Individual Work themselves. In contrast, a Work that significantly takes up and merges concepts of other works so that it is no longer dominated by the initial concept is regarded as a new work. In cataloguing practice, detailed rules are established prescribing which kinds of derivation should be regarded as crossing the boundaries of a complex work. Adaptation and derivation graphs allow the recognition of distinct sub-units, i.e. a complex work contained in a larger complex work.

As a Complex Work can be taken up by any creator who acquires the spirit of its concept, it is never finished in an absolute sense.

Examples:

Work entitled 'La Porte de l'Enfer' by Auguste Rodin

Work entitled 'Hamlet' by William Shakespeare

Work entitled 'Der Ring der Nibelungen' by Richard Wagner

Work entitled 'Carceri d'invenzione' by Giovanni Battista Piranesi

Work entitled 'Mass in B minor BWV 232' by Johann Sebastian Bach

Properties: R10 has member (is member of): F1 Work

F16 Container Work

Subclass of: F1 Work

Superclass of: F17 Aggregation Work
F19 Publication Work
F20 Performance Work

Scope note: This class comprises works whose essence is to enhance or add value to expressions from one or more other works without altering them, by the selection, arrangement and/or addition of features of different form, such as layout to words, recitation and movement to texts, instrumentation to musical scores etc. This does not make the contents of the incorporated expressions part of the Container Work, but only part of the resulting expression. Container Work may include the addition of new, original parts to the incorporated expressions, such as introductions, graphics, etc.

A new version of a container work does not make the resulting complex work a Container Work as well. The inclusion of expressions from a complex work in a Container Work does not make the Container Work itself complex.

Examples: The aggregation and arrangement concept of the anthology entitled 'American Women Poets of the Nineteenth Century: An Anthology', edited by Cheryl Walker and published by Rutgers University Press in July 1992 [an F17 Aggregation Work]

The concept for the layout created by printer Guido Morris for the text of Michael Hamburger's English translation of 12 poems by Georg Trakl for publication in 1952 [an F19 Publication Work]

The concept by the publisher named 'Dell' of issuing together, in 2002, three novels entitled 'The Partner', 'The Street Lawyer', and 'A time to kill', by the author named 'John Grisham', with just the statement 'Three #1 bestsellers by John Grisham' as a collective title [an F19 Publication Work]

The concept of Sergei Radlov's mise-en-scène of a Yiddish translation of the textual work entitled 'King Lear' in Moscow in 1935 [an F20 Performance Work]

The concept of putting together the English text of 'King Lear' and a Spanish translation thereof in a bilingual edition of 'King Lear' [an F17 Aggregation Work]

F17 Aggregation Work

Subclass of: F16 Container Work
F14 Individual Work

Superclass of:

Scope note: This class comprises works whose essence is the selection and/or arrangement of expressions of one or more other works. This does not make the contents of the aggregated expressions part of this work, but only part of the resulting expression. F17 Aggregation Work may include additional original parts.

An expression of a work may include expressions of other works within it. For instance, an anthology of poems is regarded as a work in its own right that makes use of expressions of the individual poems that have been selected and ordered as part of an intellectual process.

A new version of an aggregate work does not make the resulting complex work an aggregate work as well. The inclusion of expressions from a complex work in an aggregation work does not make the aggregation work itself complex.

Examples: The aggregation and arrangement concept of the anthology entitled 'American Women Poets of the Nineteenth Century: An Anthology', edited by Cheryl Walker and published by Rutgers University Press in July 1992

The aggregation and arrangement concept of the Web site named 'IFLANET'

The aggregation and arrangement concept of the collection of articles entitled 'Marij Kogoj (1892-1992): zbornik referatov s kolokvija ob stoletnici skladateljevega rojstva 7.10.1992 v Ljubljani = Marij Kogoj (1892-1992): proceedings from the colloquium held in Ljubljana at the centenary of the composer's birth on October 7th, 1992' and edited by a person named 'Ivan Klemenčič'

Properties**:**

F18 Serial Work

Subclass of: F15 Complex Work
                 F19 Publication Work

Scope note: This class comprises works that are, or have been, planned to result in sequences of manifestations with common features. Whereas a work can acquire new members over 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 is 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 a Complex Work, which contains the Serial Work and the Individual 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

F19 Publication Work

Subclass of: F16 Container Work

Superclass of: F18 Serial Work

Scope note: This class comprises works that have been planned to result in a manifestation product type and that pertain to the rendering of expressions from other works.

Examples: The concept of publishing Stephen Crane's complete poems (as edited by Joseph Katz), which includes the idea that every time a stanza jumps over a page change, the statement '[NO STANZA BREAK]' should be printed as a warning for readers that the new page continues the same stanza

The concept, on behalf of publisher named 'Verlag Neue Kunsthandlung', of issuing together, around 1925, three formerly independent publications ('Emil Orlik' by Max Osborn – vol. 2 within the series named 'Graphiker der Gegenwart', published in 1920; 'Anders Zorn' by Paul Friedrich – vol. 10 within the series named 'Graphiker der Gegenwart', published in 1924; and 'Max Slevogt' by Julius Elias – vol. 11 within the series named 'Graphiker der Gegenwart', published in 1923) as one, new publication, entitled '102 Bilder aus der Sammlung *Graphiker der Gegenwart*'

The concept, on behalf of publisher named 'Dell', of issuing together in 2002 three novels, titled 'The partner', 'The street lawyer', and 'A time to kill', by author named 'John Grisham', with just the statement 'Three #1 bestsellers by John Grisham' as a collective title

Properties**:**

F20 Performance Work

Subclass of: F16 Container Work

Superclass of:

Scope note: This class comprises the sets of concepts for rendering a particular or a series of like performances.

F20 Performance Work is declared as a subclass of F16 Container Work. This implies that the incorporated expressions (such as the text of the staged play, the text of the argument for the ballet, the recorded music to be used for the ballet, or the content of the musical score to be used for a concert, etc.) are not by themselves a part of the expression of this F1 Work. Rather, an expression (F25 Performance Plan) of the instructions the stage production, choreography or musical performance consists of *incorporates* (R14) that textual or musical content. In other words, the text of 'Hamlet' is not a component of the concepts that underlie a given mise-en-scène of 'Hamlet', but any staging directions (F25 Performance Plan) that convey a given director's vision of 'Hamlet' must necessarily incorporate the text of 'Hamlet'.

Examples: The conceptual content of Sergei Radlov's mise-en-scène of a Yiddish translation of the textual work entitled 'King Lear' in Moscow in 1935

The conceptual content of Pina Bausch's choreography of the ballet entitled 'Rite of spring' in Wuppertal in 1975

The conceptual content of Bruno Walter's performance of Gustav Mahler's 9th symphony in 1961

The conceptual content of the "performance handbook" for Luigi Nono's musical work entitled 'À Pierre'

Properties: R12 is realised in (realises): F25 Performance Plan

F21 Recording Work

Subclass of: F1 Work

Superclass of:

Scope note: This class comprises works that conceptualise the capturing of features of perdurants. The characteristics of the manifestation of a recording work are those of the product of the capture process. The characteristics of any other works recorded are distinct from those of the recording work itself*.* In the case where the recorded perdurant expresses some Work, the respective instance of F21 is also an F16 Container Work

Examples: The concept of recording the Swedish 17th century warship Vasa in August 1959 to April 1961

The concept of documenting the Live Aid concerts July 13, 1985, London, Philadelphia, Sydney and Moscow

Properties**:**   R13 is realised in (realises): F26 Recording

F22 Self-Contained Expression

Subclass of: F2 Expression

Superclass of: F24 Publication Expression
                 F25 Performance Plan
                 F26 Recording

Scope note: This class comprises the immaterial realisations of individual works at a particular time that are regarded as a complete whole. The quality of wholeness reflects the intention of its creator that this expression should convey the concept of the work. Such a whole can in turn be part of a larger whole.

                 Inherent to the notion of work is the completion of recognisable outcomes of the work. These outcomes, i.e. the Self-Contained Expressions, are regarded as the symbolic equivalents of Individual Works, which form the atoms of a complex work. A Self-Contained Expression may contain expressions or parts of expressions from other work, such as citations or items collected in anthologies. Even though they are incorporated in the Self-Contained Expression, they are not regarded as becoming members of the expressed container work by their inclusion in the expression, but are rather regarded as foreign or referred elements.

                 F22 Self-Contained Expression can be distinguished from F23 Expression Fragment in that an F23 Expression Fragment was not intended by its creator to make sense by itself. Normally creators would characterise an outcome of a work as finished. In other cases, one could recognise an outcome of a work as complete from the elaboration or logical coherence of its content, or if there is any historical knowledge about the creator deliberately or accidentally never finishing (completing) that particular expression. In all those cases, one would regard an expression as self-contained.

Examples: The Italian text of Dante's 'Inferno' as found in the authoritative critical edition *La Commedia secondo l'antica vulgata a cura di Giorgio Petrocchi*, Milano: Mondadori, 1966-67 (= Le Opere di Dante Alighieri, Edizione Nazionale a cura della Società Dantesca Italiana, VII, 1-4)

                 The musical notation of Franz Schubert's lied known as 'Ave Maria'

                 The musical notation of Franz Schubert's lieder cycle entitled 'Seven Songs after Walter Scott's The Lady of the Lake', of which 'Ave Maria' is a distinct part

                 The musical notation of Franz Liszt's piano transcription of Franz Schubert's lied known as 'Ave Maria'

Properties: R14 incorporates (is incorporated in): F2 Expression

F23 Expression Fragment

Subclass of: F2 Expression

Scope note: This class comprises parts of Expressions and these parts are not Self-contained Expressions themselves.

                 The existence of an instance of F23 Expression Fragment can be due to accident, such as loss of material over time, e.g. the only remaining manuscript of an antique 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 F23 Expression Fragment is only identified with respect to its occurrence in a known or assumed whole. The size of an instance of F23 Expression Fragment ranges from more than 99% of an instance of F22 Self-Contained 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 movie, etc.).

Examples: The only remnants of Sappho's poems

                 The words 'Beati pauperes spiritu' (excerpted from Matthew's Gospel 5,3 in Latin translation)

Properties:

F24 Publication Expression

Subclass of: [F22](#) Self-Contained Expression

Scope note: This class comprises complete sets of signs present in publications, reflecting publishers' final decisions as to both content and layout of the publications.

Examples: The text, its layout and the textual and graphic (Saur's logo on p. [i]) content of front and back cover, spine (spine title), and p. [i-iv] of the publication entitled 'Functional Requirements for Bibliographic Records: final report', published by K. G. Saur in 1998, identified by ISBN '3-598-11382-X'

The overall content of the book identified by ISBN '0-8014-9130-4': the text of Stephen Crane's complete poems as edited by Joseph Katz, the numbering system introduced by Joseph Katz in order to identify each individual poem by Stephen Crane, page numbers, the text of Joseph Katz's dedication, preface, acknowledgements, and introduction, the table of contents, the index of first lines, the statements found on title page, back of title page (including CIP bibliographic record), cover front, back front, and spine, and the layout of the publication; for one of Stephen Crane's longer poems, printed on p. 142-143, a statement reads at bottom of p. 142: '[NO STANZA BREAK]': obviously, this statement does not belong to the Self-Contained Expression intended by Stephen Crane, and presumably not to the one intended by editor Joseph Katz either, but was more probably added by the publishing team, due to characteristics of the layout of the publication: a cautious reader can easily interpret '[NO STANZA BREAK]' as non-belonging to the poem itself, but an OCR process would not make the distinction between the text of the poem and the statement made by the publisher; '[NO STANZA BREAK]' belongs to the Publication Expression, although it does not belong to the Self-Contained Expression intended by Stephen Crane and Joseph Katz

The overall content of the LP sound recording identified by label and label number 'CBS 34-61237': a recorded performance of Terry Riley's musical work 'In C', the text of liner notes by Paul Williams translated into French by Bernard Weinberg, technical statements such as 'Stereo,' publisher's logo, series logo, title and statement of responsibility on front, back, and spine of the cover and on the recording itself, duration statement, cover art by G. Joly, overall layout, etc.; a special, shunting sound was added at the end of side one and beginning of side two, as Terry Riley's work is in the form of a continuous musical flow without any interruption and the technical possibilities of vinyl LPs did not allow the complete performance to be contained on just one side: that special, shunting sound was not intended in Riley's score nor in the performance but was added by the publisher (with or without Riley's consent, this detail is not documented), and as such it is part of the Publication Expression although it is not part of the composer's and the performers' Self-Contained Expression (this shunting sound was no longer needed in subsequent releases on CD)

The overall content of the DVD entitled 'The Aviator (2-Disc Full Screen Edition)', released in 2004: Martin Scorsese's movie itself; layout of the box and the two DVDs contained in the box; pictures on the DVDs themselves; English, Spanish, and French subtitles; English and French audio tracks; and bonuses: commentaries by director Martin Scorsese, editor Thelma Schoonmaker, and producer Michael Mann; a deleted scene ('Howard Tells Ava About His Car Accident'); and featurettes 'A Life Without Limits: The Making of The Aviator'; 'The Role of Howard Hughes in Aviation History'; 'Modern Marvels: Howard Hughes, A Documentary by the History Channel'; 'The Visual Effects of The Aviator'; 'The Affliction of Howard Hughes: Obsessive Compulsive Disorder'; 'The Age of Glamour: The Hair And Makeup of The Aviator'; 'Costuming The Aviator: The Work of Sandy Powell'; 'Constructing The Aviator: The Work of Dante Ferretti'; 'An evening with Leonardo DiCaprio and Alan Alda'; 'OCD Panel Discussion With Leonardo DiCaprio, Martin Scorsese, and Howard Hughes' Widow Terry Moore'; 'Still Gallery'; 'Scoring The Aviator: The Work Of Howard Shore'; and 'The Wainwright Family – Loudon, Rufus and Martha'

Properties**:**

F25 Performance Plan

Subclass of: [F22](#) Self-Contained Expression
                [E29](#) Design or Procedure

Superclass of:

Scope note: This class comprises sets of directions to which individual performances of theatrical, choreographic, or musical works and their combinations should conform.

In the case of theatrical performances, such directions incorporate, but are not limited nor reducible to, the text of a given version of the play performed (e.g., a translated text, some passages of which are deliberately omitted, with some rephrased lines, etc.).

In the case of choreographic performances, such directions may incorporate, but are neither limited nor reducible to, the notation of choreographic movements in systems such as labanotation.

In the case of musical performances, such directions may incorporate, but are neither limited nor reducible to, the musical score. In case of electronic music, they may incorporate software instructions.

These directions may or may not completely determine the form of the intended performance. Depending on the nature of the directions, the form of the intended performance, such as the sets of movements or the sound characteristics, may or may not be predictable from the directions.

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

Examples: The set of instructions for the production of a Yiddish translation of the textual work entitled 'King Lear', as directed by Sergei Radlov in Moscow in 1935

The set of instructions for the production of the ballet entitled 'Rite of spring', as choreographed by Pina Bausch in Wuppertal in 1975

The set of instructions by Bruno Walter for performing Gustav Mahler's 9th symphony, delivered by him to the Columbia Symphony Orchestra during rehearsals in Hollywood in 1961 (as partially documented in the CD entitled 'Bruno Walter conducts and talks about Mahler symphony No. 9: rehearsal & performance')

The set of instructions contained in the "performance handbook" for Luigi Nono's musical work entitled 'À Pierre'

Properties:

F26 Recording

Subclass of: F22 Self-Contained Expression

Superclass of:

Scope note: This class comprises expressions which are created in instances of F29 Recording Event. A recording is intended to convey (and preserve) the content of one or more events.

Examples: The set of signs that make up the third alternate take of the musical work entitled 'Blue Hawaii' as performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961

Properties:

F27 Work Conception

Subclass of: E65 Creation

Scope note: This class comprises the births of original ideas. It marks the initiation of the creation of a work. This class should be used where there is historical evidence of the initiation before the appearance of physical evidence for the F1 Work. This does not always correlate with the date assigned in common library practice to the work; which is usually a later event.

Examples: Richard Wagner's having the initial idea of composing the opera entitled 'Der fliegende Holländer' during a stormy sea crossing in July/August 1839

Oscar Wilde's having by May 1897 the initial idea of writing his poem entitled 'The ballad of the Reading gaol', inspired by his stay in the Reading prison from November 20, 1895 to May 18, 1897, and the execution of Charles Thomas Woolridge on July 7, 1896

Properties: R16 initiated (was initiated by): F1 Work

F28 Expression Creation

Subclass of: E12 Production
E65 Creation

Superclass of: F29 Recording Event
F30 Publication Event

Scope note: This class comprises activities that result in instances of F2 Expression coming into existence. This class characterises the externalisation of an Individual Work.

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 F4 Manifestation Singleton; F28 Expression Creation is a subclass of E12 Production because the recording of the expression causes a physical modification of the carrying E18 Physical Thing. The work becomes manifest by being expressed on a physical carrier different from the creator's mind. The spatio-temporal circumstances under which the expression is created are necessarily the same spatio-temporal circumstances under which the first F4 Manifestation Singleton is produced. The mechanisms through which *oral tradition* (of myths, tales, music, etc.) operates are not further investigated in this model. As far as bibliographic practice is concerned, only those instances of F2 Expression that are externalised on physical carriers other than both the creator's mind and the auditor's mind are taken into account (for a discussion of the modelling of oral traditions, see: Nicolas, Yann. 'Folklore Requirements for Bibliographic Records: oral traditions and FRBR.' In: *Cataloging & Classification Quarterly* (2005). Vol. 39, No. 3-4. P. 179-195).

Examples: The creation of the original manuscript score of 'Uwertura tragiczna' by Andrzej Panufnik in 1942 in Warsaw

The reconstruction from memory of the manuscript score of 'Uwertura tragiczna' by Andrzej Panufnik in 1945 after the original score was destroyed during the war

The recording of the third alternate take of 'Blue Hawaii' performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 [each individual take is a distinct instance of F2 Expression]

Properties: R17 created (was created by): F2 Expression
R18 created (was created by): F4 Manifestation Singleton
R19 created a realisation of (was realised through): F1 Work

F29 Recording Event

Subclass of: F28 Expression Creation

Superclass of:

Scope note: This class comprises activities that intend to convey (and preserve) the content of events in a recording, such as a live recording of a performance, a documentary, or other capture of a perdurant. Such activities may follow the directions of a recording plan. They may include postproduction.

Examples: The making of the recording of the third alternate take of the musical work titled 'Blue Hawaii' as performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961

Properties: R20 recorded (was recorded through): E5 Event
R21 created (was created through): F26 Recording
R22 created a realisation of (was realised through): F21 Recording Work

F30 Publication Event

Subclass of: F28 Expression Creation

Scope note: This class comprises the activities of publishing. Such an event includes the creation of an F24 Publication Expression and setting up the means of production. The end of this event is regarded as the date of publication, regardless of whether the carrier production is started. Publishing can be either physical or electronic. Electronic publishing is regarded as making an instance of F24 Publication Expression available in electronic form on a public network. Electronic Publishing

does not mean producing a physical F5 Item by partially electronic means. Making an electronic file available on a physical carrier can be regarded as equivalent to setting up the means of production; downloading the file is regarded as the electronic equivalent of F32 Carrier Production Event.

Examples: Publishing Amerigo Vespucci's 'Mundus novus' in Paris ca. 1503-1504

Establishing in 1972 the layout, features, and prototype for the publication of 'The complete poems of Stephen Crane, edited with an introduction by Joseph Katz' (ISBN '0-8014-9130-4'), which served for a second print run in 1978

Making available online the article by Allen Renear, Christopher Phillippe, Pat Lawton, and David Dubin, entitled 'An XML document corresponds to which FRBR Group 1 entity?' <http://conferences.idealliance.org/extreme/html/2003/Lawton01/EML2003Lawton01.html>

Properties: R23 created a realisation of (was realised through): F19 Publication Work
R24 created (was created through): F24 Publication Expression

F31 Performance

Subclass of: E7 Activity

Superclass of:

Scope note: This class comprises activities that follow the directions of a performance plan, 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: R25 performed (was performed in): F25 Performance Plan

F32 Carrier Production Event

Subclass of: E12 Production

Scope note: This class comprises activities that result in instances of F5 Item coming into existence. The creation of a new copy of a file on an electronic carrier is also regarded as a 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 property *R27 used as source material* F24 Publication Expression.

Examples: The printing of copies of the 3rd edition of 'Codex Manesse: die Miniaturen der großen Heidelberger Liederhandschrift, herausgegeben und erläutert von Ingo F. Walther unter Mitarbeit von Gisela Siebert', Insel-Verlag, 1988 [a fac-simile edition of an illuminated mediaeval manuscript]

The printing of copies of the 'Ordnance Survey Explorer Map 213, Aberystwyth & Cwm

Rheidol', ISBN 0-319-23640-4 (folded), 1:25,000 scale, released in May 2005 [a cartographic resource]

The production of copies of the sound recording titled 'The Glory (????) of the human voice', RCA Victor Gold Seal GD61175, containing recordings of musical works performed by Florence Foster Jenkins [a sound recording; the question marks in parentheses belong to the original title]

My clicking now on the link <http://cidoc.ics.forth.gr/docs/cidoc_crm_version_4.0.pdf>, and thus downloading on my PC a reproduction of the electronic file titled 'Definition of the CIDOC Conceptual Reference Model… version 4.0' that is stored on the ICS FORTH's servers in Heraklion, Crete

The second print run, in 1978, of 'The complete poems of Stephen Crane, edited with an introduction by Joseph Katz' (ISBN '0-8014-9130-4'), a publication dated 1972 [publication of a printed text]

Properties: R26 produced things of type (was produced by): F3 Manifestation Product Type
R27 used as source material (was used by): F24 Publication Expression
R28 produced (was produced by): F5 Item

F33 Reproduction Event

Subclass of: E12 Production

Scope note: This class comprises activities that consist in making copies, more or less mechanically, of an instance of E84 Information Carrier (such as an F5 Item or an F4 Manifestation Singleton which is also instance of E84 Information Carrier), preserving the expression carried by it. A Reproduction Event results in new instances of E84 Information Carrier coming into existence. In general, the copy will have different attributes from the original and they are therefore not regarded as siblings.

This class makes it possible to account for the legal distinction between private copying for the purpose of "fair use," and mass production for the purpose of dissemination.

It can prove difficult to determine where to draw the line between F33 Reproduction Event and F32 Carrier Production Event in cases where multiple copies are produced. In this case, the copies, but not the original, may be regarded as instances of F5 Item. It is the existence of an explicit production plan that makes the difference. As a consequence, F33 Reproduction Event and F32 Carrier Production Event are not declared as *disjoint,* which makes it possible to account for such situations that could be regarded as instances of both Production Event and Reproduction Event.

Examples: My photocopying now for my own private use an exemplar of the article entitled 'Federal Court's Ruling Against Photocopying Chain Will Not Destroy "Fair Use"' by Kenneth D. Crews, issued in 'Chronicle of higher education', 17 April 1991, A48

The BnF's producing in 1997 the microfilm identified by call number 'Microfilm M-12169' of the exemplar identified by shelf mark 'Res 8 P 10' of Amerigo Vespucci's 'Mundus novus' published in Paris ca. 1503-1504

The BnF's reproducing in 2001 the exemplar identified by call number 'NC His Master's Voice HC 20' of a 78 rpm phonogram released by Gramophone in 1932, as part of the CD identified by call number 'SDCR 2120'

The BnF's making in 2003 a digitisation, identified by call number 'IFN 7701015', of the collection of drawings (held by the BnF) that were made by Étienne-Louis Boullée in 1784 for his project of a 'Newton Cenotaph'

Properties: R29 reproduced (was reproduced by): E84 Information Carrier
R30 produced (was produced by): E84 Information Carrier

2.7 FRBR Property Declaration

The properties of FRBR_{OO} are comprehensively declared in this section using the following format:

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

R1 is logical successor of (has successor)

Domain: F1 Work
Range: F1 Work
Superproperty of:
Subproperty of: E70 Thing. P130 shows features of (features are also found on): E70 Thing
Quantification: (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.

Examples: Albrecht Dürer's woodcut from 'The Large Woodcut Passion' entitled 'The Agony in the Garden' (F1, conceived ca 1496-98) *R1 is logical successor of* Albrecht Dürer's woodcut from 'The Large Woodcut Passion' entitled 'The Last Supper' (F1, dated 1510)

The first 'Star wars' trilogy (1977-1983) *R1 is logical successor of* The second 'Star wars' trilogy (1999-2005) *[Note that the* logical *order does not follow, in this case, the* chronological *order]*

R2 is derivative of (has derivative)

Domain: F1 Work
Range: F1 Work
Superproperty of:
Subproperty of: E70 Thing. P130 shows features of (features are also found on): E70 Thing
Quantification: (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. The property *R2.1 has type* of this property allows for specifying the kind of derivation, such as adaptation, summarisation etc.

Examples: William Schuman's orchestration of Charles Ives's 'Variations on America' (F15) *R2 is derivative of* Charles Ives's 'Variations on America' (F15) *R2.1 has type* orchestration (E55)

Charles Ives's musical work entitled 'Variations on America' (F15) *R2 is derivative of* The musical work titled 'America' (F15) *R2.1 has type* variations (E55)

The musical work entitled 'America' (F15) *R2 is derivative of* The musical work entitled 'God save the King' (F15) *R2.1 has type* same tune with different lyrics (E55)

Properties: R2.1 has type: E55 Type

R3 is realised in (realises)

Domain: F1 Work
Range: F22 Self-contained Expression
Superproperty of: F14 Individual Work. R9 is realised in (realises): F22 Self-Contained Expression
                 F20 Performance Work. R12 is realised in (realises): F25 Performance Plan
                 F21 Recording Work. R13 is realised in (realises): F26 Recording
                 F1 Work.R40 has representative expression (is representative expression for): F22 Self-Contained Expression
Subproperty of: E70 Thing. P130 shows features of (features are also found on): E70 Thing
Quantification: (0:n,1:1)

Scope note: This property associates an instance of F22 Self-Contained Expression with an instance of F1 Work.

This property expresses the association that exists between an expression (F22) and the work that this expression conveys. The semantics of the association will be different depending on what specific subtype of F1 Work the work is an instance of. If the work is an instance of F14 Individual Work, the F22 Self-Contained Expression completely conveys the individual work. If the work is an instance of F15 Complex work, the F22 Self-Contained Expression conveys an alternative member of the complex work.

Our factual knowledge of how a given work is realised into an expression is often limited and this property makes it possible to express the association between instances of F22 Self-

Contained Expression and the work it conveys without using the more developed paths.

Examples: Dante's work entitled 'Inferno' (F15) *R3 is realised in* The Italian text of Dante's 'Inferno' as found in the authoritative critical edition *La Commedia secondo l'antica vulgata a cura di Giorgio Petrocchi*, Milano: Mondadori, 1966-67 (= Le Opere di Dante Alighieri, Edizione Nazionale a cura della Società Dantesca Italiana, VII, 1-4) (F22)

R4 carriers provided by (comprises carriers of)

Domain: F2 Expression
Range: F3 Manifestation Product Type
Superproperty of: F2 Expression.R41 has representative manifestation product type (is representative manifestation product type for): F3 Manifestation Product Type
Subproperty of: E73 Information Object.P128B is carried by: E24 Physical Man-Made Thing.P2 has type:E55 Type
Quantification: (1:n,0,n)

Scope note: This property associates a publication, i.e. an instance of F3 Manifestation Product Type, with an instance of F2 Expression, which all exemplars of that publication should carry, as long as they are recognised as complete exemplars of that publication. Typically, this property is observed on one exemplar of a publication, and extrapolated to all other exemplars of the same publication. This property is a shortcut of: F2 Expression R14B is incorporated in F24 Publication Expression CLR6B should be carried by F3 Manifestation Product Type.

Examples: The text of Marin Mersenne's 'Harmonie universelle' (F22) *R4 carriers provided by* Publication identified by ISBN '2-222-00835-2' (F3)

A recording of the Atrium Musicæ Ensemble's performance of a fragment of Euripides' textual and musical work entitled 'Orestes' (F26) *R4 carriers provided by* The CD entitled 'Musique de la Grèce antique = Ancient Greek music = Griechische Musik der Antike', released in 2000 and identified by UPC/EAN '794881601622' (F3)

R5 has component (is component of)

Domain: F2 Expression
Range: F22 Self-Contained Expression
Superproperty of:
Subproperty of: E89 Propositional Object. P148 is composed of (forms part of): E89 Propositional Object
Quantification: (0:n,0:n)

Scope note: This property associates an F2 Expression X with a structural component Y that conveys in itself the complete concept of a work that is member of (R10) the overall work realized by X.

It does not cover the relationship that exists between pre-existing expressions that are re-used in a new, larger expression and that new, larger expression. Such a relationship is modelled by R14 incorporates.

Examples: The Italian text of Dante's textual work entitled 'Divina Commedia' (F22) *R5 has component* The Italian text of Dante's textual work entitled 'Inferno' (F22)

The musical notation of Mozart's Singspiel entitled 'Die Zauberflöte' (F22) *R5 has component* The musical notation of Mozart's aria entitled 'Der Hölle Rache', also known as 'The Queen of the Night's Aria' (F22)

The visual content of the map entitled 'Wales – The Midlands – South West England', scale 1:400,000, issued by Michelin in 2005 (F22) *R5 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 (F22)

R6 carries (is carried by)

Domain: F5 Item
Range: F24 Publication Expression
Superproperty of:

Subproperty of: E24 Physical Man-Made Thing .P128 carries (is carried by):E73 Information Object
Quantification: (1:1,0:n)

Scope note: This property associates an instance of F5 Item with the unique instance of F24 Publication Expression it carries.

Examples: The British Library's holding identified by shelfmark 'DSC 9078.177 vol 19' (F5) *R6 carries* The entire content (text, layout, publisher logo, etc.) of the publication entitled 'Functional Requirements for Bibliographic Records: final report', issued by publisher named 'K. G. Saur' in 1998 (F24)

R7 is example of (has example)

Domain: F5 Item
Range: F3 Manifestation Product Type
Superproperty of:
Subproperty of: E1 CRM Entity. P2 has type: E55 Type
Quantification: (1:1,0:n)

Scope note: This property associates a publication with one of its exemplars.

It is a shortcut of the more developed path: F5 Item *R28B was produced by* F32 Carrier Production *R26 produced things of type (was produced by): F3 Manifestation Product Type.*

Examples: The item held by the National Library of France and identified by shelf mark 'Res 8 P 10' (F5) *R7 is example of* The edition of Amerigo Vespucci's textual and cartographic work entitled 'Mundus novus' issued in Paris ca. 1503-1504 (F3)

R8 consists of (forms part of)

Domain: F13 Identifier
Range: F12 Name
Superproperty of:
Subproperty of: E90 Symbolic Object.P106 is composed of (forms part of): E90 Symbolic Object
Quantification: (0:n,0:n)

Scope note: This property associates an instance of F13 Identifier with any one of the meaningful parts it is composed of, which are themselves instances of F12 Name. In particular, date expressions (i.e. instances of E50 Date) are regarded as names.

Examples: Uniform title 'The Adoration of the Shepherds (Coventry)' (F13) *R8 consists of* 'The Adoration of the Shepherds' (E35 Title), and *R8 consists of* 'Coventry' (E48 Place Name – i.e., the name of an F9 Place)

Uniform title 'Rite of spring (Choreographic Work : Bausch)' (F13) *R8 consists of* 'Rite of spring' (E35 Title), *R8 consists of* 'Choreographic Work' (F12 Name for an E55 Type), and *R8 consists of* 'Bausch' (F12 Name for an F10 Person)

Uniform title 'King Kong (1933)' (F13) *R8 consists of* 'King Kong' (E35 Title), and *R8 consists of* '1933' (E50 Date, subclass of E41 Appellation)

Personal name heading 'Guillaume, de Machaut, ca. 1300-1377' (F13 Identifier for an F10 Person) *R8 consists of* 'Guillaume, de Machaut' (F12 Name for an F10 Person), and *R8 consists of* 'ca. 1300-1377' (E49 Time Apellation for an E52 Time-Span [P79 beginning is qualified by E62 String "ca."])

Corporate name heading 'Univerza v Ljubljani. Oddelek za bibliotekarstvo' (F13 Identifier for a F11 Corporate Body) *R8 consists of* 'Univerza v Ljubljani' (F13 Identifier for a F11 Corporate Body), and *R8 consists of* 'Oddelek za bibliotekarstvo' (F12 Name for a F11 Corporate Body)

ISBN '978-002-002-0' (F47) *R8 consists of* Prefix '978' for the Nigerian ISBN Agency (F12 Name for a F11 Corporate Body), and *R8 consists of* code '002' for the Nigerian Institute of International Affairs (F12 Name for a F11 Corporate Body), and *R8 consists of* code '002' for the publication entitled 'Nigeria's international economic relations' (F12 Name for a F3 Manifestation Product Type)

R9 is realised in (realises)

Domain: F14 Individual Work
Range: F22 Self-Contained Expression
Subproperty of: F1 Work. R3 is realised in (realises): F22 Self-contained Expression
Quantification: (1:1,1:1)

Scope note: This property associates an F14 Individual Work with the unique F22 Self-Contained Expression that completely conveys it.

It is a short cut for the more developed path: F14 Individual Work *R19B was realised through* F28 Expression Creation *R17 created* F22 Self-Contained Expression.

Examples: Abstract content of Giovanni Battista Piranesi's graphic work entitled 'Carcere XVI: the pier with chains: 2nd state' (F14) *R9 is realised in* Giovanni Battista Piranesi's graphic work entitled 'Carcere XVI: the pier with chains: 2nd state' (F22)

Abstract content of the English text of the 1855 edition of Walt Whitman's textual work entitled 'Leaves of Grass' (F14) *R9 is realised in* the English text of the 1855 edition of Walt Whitman's textual work entitled 'Leaves of Grass' (F22)

R10 has member (is member of)

Domain: F15 Complex Work
Range: F1 Work
Superproperty of:
Subproperty of: E89 Propositional Object. P148 has component (is component of): E89 Propositional Object
Quantification: (2:n,0:n)

Scope note: This property associates an instance of F15 Complex Work with an instance of F1 Work that forms part of it. The Work becomes complex by the fact that it has other instances of Work as members.

Examples: Dante's textual work entitled 'Divina Commedia' (F15) *R10 has member* Dante's textual work entitled 'Inferno' (F15)

Dante's textual work entitled 'Inferno' (F15) *R10 has member* The abstract content of the pseudo-old French text of Émile Littré's translation entitled 'L'Enfer mis en vieux langage françois et en vers' [a 19th century translation of Dante's 'Inferno' into old French] published in Paris in 1879 (F14)

Giovanni Battista Piranesi's graphic work entitled 'Carceri' (F15) *R10 has member* Giovanni Battista Piranesi's graphic work entitled 'Carcere XVI: the pier with chains' (F15)

Giovanni Battista Piranesi's graphic work entitled 'Carcere XVI: the pier with chains' (F15) *R10 has member* The abstract content of Giovanni Battista Piranesi's graphic work entitled 'Carcere XVI: the pier with chains: 2nd state' (F14)

R11 has issuing rule (is issuing rule of)

Domain: F18 Serial Work
Range: E29 Design or Procedure
Superproperty of:
Subproperty of: E70 Thing. P16B was used for: E7 Activity. P33 used specific technique: E29 Design or Procedure
Quantification: (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 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) *R11 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)

R12 is realised in (realises)

Domain: F20 Performance Work
Range: F25 Performance Plan
Superproperty of:
Subproperty of: F1 Work. R3 is realised in (realises): F22 Self-contained Expression
Quantification: (0:n,1:1)

Scope note: This property associates an instance of F20 Performance Work with an instance of F25 Performance Plan that consists of signs (words, figures, etc.) which express the directions the instance of F20 Performance Work consists of.

Examples: The concept of Sergei Radlov's mise-en-scène of a Yiddish translation of the textual work entitled 'King Lear' in Moscow in 1935 (F20) *R12 is realised in* The set of instructions for the production of a Yiddish translation of the textual work entitled 'King Lear', as directed by Sergei Radlov in Moscow in 1935 (F25)

The concept of Pina Bausch's choreography of the ballet entitled 'Rite of spring' in Wuppertal in 1975 (F20) *R12 is realised in* The set of instructions for the production of the ballet entitled 'Rite of spring', as choreographed by Pina Bausch in Wuppertal in 1975 (F25)

The concept of Bruno Walter's performance of Gustav Mahler's 9th symphony in 1961 (F20) *R12 is realised in* The set of instructions by Bruno Walter for performing Gustav Mahler's 9th symphony, delivered by him to the Columbia Symphony Orchestra during rehearsals in Hollywood in 1961 (as partially documented in the CD entitled 'Bruno Walter conducts and talks about Mahler symphony No. 9: rehearsal & performance') (F25)

The concept of the "performance handbook" for Luigi Nono's musical work entitled 'À Pierre' (F20) *R12 is realised in* The set of instructions contained in the performance handbook for Luigi Nono's musical work entitled 'À Pierre' (F25)

R13 is realised in (realises)

Domain: F21 Recording Work
Range: F26 Recording
Superproperty of:
Subproperty of: F1 Work. R3 is realised in (realises): F22 Self-contained Expression
Quantification: (0:n,0:1)

Scope note: This property associates an instance of F21 Recording Work with an instance of F26 Recording realising the instance of F21 Recording work. This is a shortcut of the more elaborated path through R22 *was realised through*, F29 Recording Event and R21 *created*, which should be used when information about the recording event is available.

Examples: The concept of the third alternate take of the musical work entitled 'Blue Hawaii' as performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 (F21) *R13 is realised in* The set of signs that make up the third alternate take of the musical work entitled 'Blue Hawaii' as performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 (F26)

R14 incorporates (is incorporated in)

Domain: F22 Self-Contained Expression
Range: F2 Expression
Superproperty of:
Subproperty of: E90 Symbolic Object. P106 is composed of (forms part of): E90 Symbolic Object
                 E89 Propositional Object. P148 is composed of (forms part of): E89 Propositional Object
Quantification: (0:n,0:n)

Scope note: This property associates an instance of F22 Self-Contained Expression with an instance of F2 Expression that was included in it and that is a realisation of an independent work. The incorporated expression may be self-contained or fragmentary.

This property makes it possible to recognise the autonomous status of the incorporated expression, which was created in a distinct context, and can be incorporated in many distinct

self-contained expressions, and to highlight the difference between structural and accidental whole-part relationships between conceptual entities.

It accounts for many cultural facts that are quite frequent and significant: the inclusion of a poem in an anthology, the re-use of an operatic aria in a new opera, the use of a reproduction of a painting for a book cover or a CD booklet, the integration of textual quotations, the presence of lyrics in a song that sets those lyrics to music, the presence of the text of a play in a movie based on that play, etc.

Examples: The text of the present version of the FRBR$_{OO}$ definition (F22) *R14 incorporates* The beginning of the Scope Note for E4 Period in the CIDOC CRM definition, version 4.4 (F23)

The text of the anthology entitled 'American Women Poets of the Nineteenth Century: An Anthology', edited by Cheryl Walker and published by Rutgers University Press in July 1992 (F22) *R14 incorporates* The text of the poem entitled 'Acquainted with Grief' and authored by Helen Hunt Jackson

The sonic content of the CD entitled 'Great moments of Lucia Popp' issued by EMI Music International in 1996 and identified by UPC/EAN '0724356577022' (F24) *R14 incorporates* The recorded performance of Mozart's aria entitled 'Der Hölle Rache' (also known as 'The Queen of the Night's Aria') by Lucia Popp accompanied by the Philharmonia orchestra conducted by Otto Klemperer in London, Kingsway Hall, between March 24, 1964 and April 10, 1964 (F26)

The set of instructions for the production of 'King Lear', directed by Sergei Radlov in Moscow in 1935 (F25) *R14 incorporates* The Yiddish text of 'King Lear' as translated by Shmuel Galkin (F22)

The set of instructions for the production of 'King Lear', directed by Sergei Radlov in Moscow in 1935 (F25) *R14 incorporates* the musical content of the score of the incidental music composed by Lev Pulver (F22)

The set of instructions for the production of 'King Lear', directed by Sergei Radlov in Moscow in 1935 (F25) *R14 incorporates* The visual items (E36) shown in Alexander Tyschler's scene settings and the models built by him for these settings (F22 and E36)

The set of instructions for the production of the ballet 'Rite of spring', as choreographed by Pina Bausch in Wuppertal in 1975 (F25) *R14 incorporates* the musical score of Igor Stravinsky's musical work 'Rite of spring' (F22)

R15 has fragment (is fragment of)

Domain: F2 Expression
Range: F23 Expression Fragment
Superproperty of:
Subproperty of: E90 Symbolic Object. P106 is composed of (forms part of): E90 Symbolic Object.

Quantification: (0:n,0:n)

Scope note: This property associates the fragment of an expression and the expression of which it is a fragment.

Examples: The ancient Greek text of the four stanzas from an ode by Sappho that were quoted by Pseudo-Longinus in his textual work entitled 'On the sublime' (F23) *R15B is fragment of* The complete ancient Greek text, now irremediably lost, of Sappho's ode currently identified as Sappho's poem #2 (F22)

The statement 'fasc. 111' (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' (F23) *R15B is fragment of* The overall content of the publication identified by ISBN '2-7018-0037-4' (F24)

R16 initiated (was initiated by)

Domain: F27 Work Conception
Range: F1 Work
Superproperty of:

Subproperty of: E65 Creation. P94 created (was created by): E28 Conceptual Object
Quantification: (0:1,1:n)

Scope note: This property associates the first conception of a work and the work itself that ensued from a given initial idea.

It is usually not recorded in cataloguing practice as it is only exceptionally documented in real life but is required in this semantic model as it marks the origin of the causality chain that results in a work's coming into existence.

Examples: The creative spark that motivated Richard Wagner, during a stormy sea crossing in July/August 1839, to compose an opera (F27) *R16 initiated* Richard Wagner's opera entitled 'Der fliegende Holländer' (F15)

The creative spark that motivated Oscar Wilde, by May 1897, to write a poem inspired by his stay in the Reading prison in 1895-1897 (F27) *R16 initiated* Oscar Wilde's poem entitled 'The ballad of the Reading gaol' (F15)

R17 created (was created by)

Domain: F28 Expression Creation
Range: F2 Expression
Superproperty of:F29 Recording Event. R21 created (was created by): F26 Recording
            F30 Publication Event. R24 created (was created through): F24 Publication Expression
Subproperty of: E65 Creation. P94 created (was created by): E28 Conceptual Object
Quantification: (1:1,1:n)

Scope note: This property associates the expression that was first externalised during a particular creation event with that particular creation event.

Examples: Richard Wagner's writing the original manuscript of his opera entitled 'Der fliegende Holländer' (F28) *R17 created* the notational content of the original manuscript of Richard Wagner's opera entitled 'Der fliegende Holländer' (F22)

Oscar Wilde's writing the original manuscript of his poem entitled 'The ballad of the Reading gaol' (F28) *R17 created* the English text of Oscar Wilde's poem entitled 'The ballad of the Reading gaol' (F22)

R18 created (was created by)

Domain: F28 Expression Creation
Range: F4 Manifestation Singleton
Superproperty of:
Subproperty of: E12 Production. P108 produced (was produced by): E24 Physical Man-Made Thing
Quantification: (1:n,0:1)

Scope note: This property associates an instance of F28 Expression Creation with the first physical objects in which the resulting instance of F2 Expression was embodied.

Examples: Emily Dickinson's creating the text of one of the several extant versions of her poem known as 'Safe in their alabaster chambers' (F28) *R18 created* The manuscript now identified as 'Massachusetts Cambridge Harvard University Houghton Library bMS Am 1118.3 (203c, 203d)' (F4)

Emily Dickinson's creating the text of another one of the several extant versions of her poem known as 'Safe in their alabaster chambers' (F28) *R18 created* The manuscript now identified as 'Massachusetts Cambridge Harvard University Houghton Library bMS Am 1118.5 (74c)' (F4)

The recording of the third alternate take of the musical work entitled 'Blue Hawaii' performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 (F28) *R18 created* The master tape of the 3rd alternate take of the musical work entitled 'Blue Hawaii' performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 (F4) (each individual take is a distinct expression)

The resource (a drawing) held by the New York Public Library and identified by call number '*MGZGB Far P Cop 1' (F4) *R18B was created by* The creation, by the artist named 'Peter

Farmer', of a costume design for the character named 'War' in the Act III Masque of the seasons, in the Festival Ballet of London production of the choreographic work entitled 'Coppélia', with choreography by Jack Carter after Petipa (F28)

R19 created a realisation of (was realised through)

Domain:	F28 Expression Creation
Range:	F1 Work
Superproperty of:	F29 Recording Event. R22 created a realisation of (was realised through):F21 Recording Work
	F30 Publication Event.R23 created a realisation of (was realised through):F19 Publication Work
Subproperty of:	E7 Activity. P16 used specific object (was used for): E70 Thing
Quantification:	(1:n,1:1)

Scope note: This property associates an instance of F28 Expression Creation with the corresponding instance of F14 Individual Work or an instance of F15 Complex Work of which the corresponding instance of F14 Individual Work is a member.

Examples: Giovanni Battista Piranesi's creating the image identified as 'Carcere XVI: the pier with chains: 2nd state' (F28) *R19 created a realisation of* The concept of Giovanni Battista Piranesi's graphic work entitled 'Carcere XVI: the pier with chains: 2nd state' (F14)

Recording Glenn Gould's performance of Johann Sebastian Bach's musical work entitled 'Toccata in C minor BWV 911' on May 15 & 16, 1979, in Toronto, Eaton's Auditorium (F29) *R19 created a realisation of* The concept of the recorded performance of Johann Sebastian Bach's musical work entitled 'Toccata in C minor BWV 911' by Glenn Gould on May 15 & 16, 1979, in Toronto, Eaton's Auditorium (F21)

R20 recorded (was recorded through)

Domain:	F29 Recording Event
Range:	E5 Event
Superproperty of:	
Subproperty of:	E7 Activity.P15 was influenced by (influenced) E5 Event.P9B forms part of: E5 Event.P9 consists of: E5 Event
Quantification:	(1:n,0:n)

Scope note: This property associates an instance of F29 Recording Event with the instance of E5 Event which was captured.

Examples: The making of the recording of the third alternate take of the musical work entitled 'Blue Hawaii' as performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 (F29) *R20 recorded* Elvis Presley's performance of the musical work entitled 'Blue Hawaii' in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 (F31)

R21 created (was created through)

Domain:	F29 Recording Event
Range:	F26 Recording
Superproperty of:	
Subproperty of:	F28 Expression Creation. R17 created (was created by): F2 Expression
Quantification:	(1:n,1:n)

Scope note: This property associates an instance of F29 Recording Event with the instance of F26 Recording that was created.

Examples: The making of the recording of the third alternate take of the musical work entitled 'Blue Hawaii' as performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 (F29) *R21 created* The set of signs that make up the third alternate take of the musical work entitled 'Blue Hawaii' as performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 (F26)

R22 created a realisation of (was realised through)

Domain: F29 Recording Event
Range: F21 Recording Work
Superproperty of:
Subproperty of: F28 Expression Creation. R19 created a realisation of (was realised through): F1 Work
Quantification: (0:1,0:n)

Scope note: This property associates an instance of F29 Recording Event with the instance of F21 Recording Work it realised.

Examples: The making of the recording of the third alternate take of the musical work entitled 'Blue Hawaii' as performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 (F29) R22 created a realisation of the concept of the third alternate take of the musical work entitled 'Blue Hawaii' as performed by Elvis Presley in Hollywood, Calif.

R23 created a realisation of (was realised through)

Domain: F30 Publication Event
Range: F19 Publication Work
Superproperty of:
Subproperty of: F28 Expression Creation. R19 created a realisation of (was realised through): F1 Work
Quantification: (0:1,0:n)

Scope note: This property associates an instance of F30 Publication Event with the instance of F19 Publication Work it realised.

Examples: Establishing in 1972 the layout, features, and prototype for the publication of Stephen Crane's complete poems (F30) *R23 created a realisation of* Cornell University Press's concepts for an edition of Stephen Crane's complete poems (F19)

R24 created (was created through)

Domain: F30 Publication Event
Range: F24 Publication Expression
Superproperty of:
Subproperty of: F28 Expression Creation. R17 created (was created by): F2 Expression
Quantification: (1:n,1:n)

Scope note: This property associates the instance of F24 Publication Expression that was created during a particular F30 Publication Event.

Examples: Establishing in 1972 the layout, features, and prototype for the publication of Stephen Crane's complete poems (F30) *R24 created* The set of signs and instructions as to manufacturing established by Cornell University Press for a publication of Stephen Crane's complete poems (F24)

R25 performed (was performed in)

Domain: F31 Performance
Range: F25 Performance Plan
Superproperty of:
Subproperty of: E7 Activity. P33 used specific technique (was used by): E29 Design or Procedure
Quantification: (0:n,0:n)

Scope note: This property associates an instance of F31 Performance with the instance of F25 Performance Plan to which all those participating in the performance were supposed to conform.

Examples: Performing the first performance of a Yiddish translation of 'King Lear', as directed by Sergei Radlov, in Moscow, at the Moscow State Jewish Theatre, on February 10, 1935 (F31) *R25 performed* the set of instructions for the production of a Yiddish translation of 'King Lear', directed by Sergei Radlov in Moscow in 1935 (F25)

                  Performing the ballet 'Rite of spring', as choreographed by Pina Bausch, in Avignon, at the Popes' Palace, on July 7, 1995 (F31) *R25 performed* the set of instructions for the production of

the ballet 'Rite of spring', as choreographed by Pina Bausch (F25)

R26 produced things of type (was produced by)

Domain: F32 Carrier Production Event
Range: F3 Manifestation Product Type
Superproperty of:
Subproperty of: E12 Production.P108 produced: E24 Physical Man-MadeThing. P2 has type: E55 Type
Quantification: (1:n,0:n)

Scope note: This property associates an instance of F32 Carrier Production Event with the instance of F3 Manifestation Product Type it produced items of.

Examples: The production of copies of the publication entitled 'Codex Manesse: die Miniaturen der großen Heidelberger Liederhandschrift, herausgegeben und erläutert von Ingo F. Walther unter Mitarbeit von Gisela Siebert', 3rd edition, Insel-Verlag, 1988 (F32) *R26 produced things of type* The publication identified as 'Codex Manesse: die Miniaturen der großen Heidelberger Liederhandschrift, herausgegeben und erläutert von Ingo F. Walther unter Mitarbeit von Gisela Siebert', 3rd edition, Insel-Verlag, 1988 (F3)

The production of copies of the publication entitled 'Ordnance Survey Explorer Map 213, Aberystwyth & Cwm Rheidol', ISBN '0-319-23640-4' (folded), 1:25,000 scale, released in May 2005 (F32) *R26 produced things of type* The publication identified by ISBN '0-319-23640-4' (F3)

The production of copies of the sound recording entitled 'The Glory (????) of the human voice', RCA Victor Gold Seal GD61175, containing recordings of musical works performed by Florence Foster Jenkins (F32) *R26 produced things of type* The publication entitled 'The Glory (????) of the human voice' and identified by the label and label number 'RCA Victor Gold Seal GD61175' (F3)

The production of a second print run, in 1978, of the publication titled 'The complete poems of Stephen Crane, edited with an introduction by Joseph Katz' (identified by ISBN '0-8014-9130-4') (F32) *R26 produced things of type* The publication, dated 1972, titled 'The complete poems of Stephen Crane, edited with an introduction by Joseph Katz' (identified by ISBN '0-8014-9130-4') (F3)

R27 used as source material (was used by)

Domain: F32 Carrier Production Event
Range: F24 Publication Expression
Superproperty of:
Subproperty of: E7 Activity. P16 used specific object (was used for): E70 Thing
Quantification: (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.

Examples: The production of copies of the publication identified by ISBN '1-86197-612-7' (F32) *R27 used as source material* The final set of signs sent by the publisher named 'Profile Books' to its printer for the production of copies of the publication identified by ISBN '1-86197-612-7' (F24)

R28 produced (was produced by)

Domain: F32 Carrier Production Event
Range: F5 Item
Superproperty of:
Subproperty of: E12 Production. P108 has produced (was produced by): E24 Physical Man-Made Thing
Quantification: (0: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 publication entitled 'Codex Manesse: die Miniaturen der großen

Heidelberger Liederhandschrift, herausgegeben und erläutert von Ingo F. Walther unter Mitarbeit von Gisela Siebert', 3rd edition, Insel-Verlag, 1988 (F32) *R28 produced* The National Library of France's holding identified by shelf mark 'C-1604(2)' (F5)

The production of copies of the publication entitled 'Ordnance Survey Explorer Map 213, Aberystwyth & Cwm Rheidol', ISBN 0-319-23640-4 (folded), 1:25,000 scale, released in May 2005 (F32) *R28 produced* The National Library of Wales' holding identified by holding information 'MAP, STORFA/STACK ; FLAT MAP, C16 (20/1), Sheet 213, c.135/5/2' (F5)

The production of copies of the sound recording entitled 'The Glory (????) of the human voice', RCA Victor Gold Seal GD61175 (F32) *R28 produced* The London Public Library's holding identified by call number 'R J416.Gl' (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) *R28 produced* Universitätsbibliothek Passau's holding identified by call number '00/HT 4801.978 K2' (F5)

R29 reproduced (was reproduced by)

Domain: F33 Reproduction Event
Range: E84 Information Carrier
Superproperty of:
Subproperty of: E7 Activity. P16 used specific object (was used for): E70 Thing
Quantification: (1:n,0:n)

Scope note: This property associates an instance of F33 Reproduction Event with an instance of E84 Information Carrier it reproduces.

Examples: Making a photocopy of an exemplar of Eran Guter's dissertation entitled 'Where languages end: Ludwig Wittgenstein at the crossroads of music, language, and the world' (F33) *R29 reproduced* One of the original exemplars of Eran Guter's dissertation (E84)

R30 produced (was produced by)

Domain: F33 Reproduction Event
Range: E84 Information Carrier
Superproperty of:
Subproperty of: E12 Production. P108 produced (was produced by): E24 Physical Man-Made Thing
Quantification: (1:n,0:1)

Scope note: This property associates an instance of F33 Reproduction Event with an instance of E84 Information Carrier it produces.

Examples: Making a photocopy of an exemplar of Eran Guter's dissertation entitled 'Where languages end: Ludwig Wittgenstein at the crossroads of music, language, and the world' (F33) *R30 produced* The New York Public Library holding identified by call number 'JMD 04-1060' (E84)

R31 is reproduction of (has reproduction)

Domain: E84 Information Carrier
Range: E84 Information Carrier
Superproperty of:
Subproperty of: E70 Thing. P130 shows features of (features are also found on): E70 Thing
Quantification: (0:1,0:n)

Scope note: This property associates an instance of E84 Information Carrier which is a reproduction of another instance of E84 Information Carrier with the latter. It is considered that a reproduction of multiple originals resulting in a single product requires a merging of those objects prior to the reproduction. Therefore an Information Carrier is regarded to be a reproduction of one and only one original. This property is a shortcut of the more fully developed path from E84 Information Carrier through *R30 produced (was produced by)*, F33 Reproduction Event *R29 reproduced (was reproduced by)* to E84 Information Carrier.

Examples: The New York Public Library holding identified by call number 'JMD 04-1060' (E84) *R31 is reproduction of* One of the original exemplars of Eran Guter's dissertation (E84)

CLP2 should have type (should be type of)

Domain: F3 Manifestation Product Type
Range: E55 Type
Superproperty of:
Subproperty of:
Quantification: (0:n,0:n)

Scope note: This property associates a publication, i.e. an instance of F3 Manifestation Product Type, with an instance of E55 Type, which all exemplars of that publication should belong to, as long as they are recognised as exemplars of that publication. Typically, this property is observed on one exemplar of a publication, and extrapolated to all other exemplars of the same publication. This logical inference is an induction along the path that can be modelled as: F3 Manifestation Product Type *R7B has example* F5 Item *P41B was classified by* E17 Type Assignment *P42 assigned* E55 Type.

It can happen that a given exemplar, or subset of exemplars, originally produced, or intended to be produced, with that characteristic, accidentally lacks it. This fact should be recorded as a property of F5 Item, and not of F3 Manifestation Product Type.

Examples: 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) *CLP2 should have type* sound recording (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) *CLP2 should have type* kind of sound: monaural (E55)

CLP43 should have dimension (should be dimension of)

Domain: F3 Manifestation Product Type
Range: E54 Dimension
Superproperty of:
Subproperty of:
Quantification: (1:n,1:1)

Scope note: This property associates a publication, i.e. an instance of F3 Manifestation Product Type, with an instance of E54 Dimension, which all exemplars of that publication should have, as long as they are recognised as exemplars of that publication. Typically, this property is observed on one exemplar of a publication, and extrapolated to all other exemplars of the same publication. This logical inference is an induction along the path that can be modelled as: F3 Manifestation Product Type *R7B has example* F5 Item *P39B was measured by* E16 Measurement *P40 observed dimension* E54 Dimension.

It can happen that a given exemplar, or subset of exemplars, originally produced, or intended to be produced, with that characteristic, accidentally lacks it. This fact should be recorded as a property of F5 Item, and not of F3 Manifestation Product Type.

Examples: The publication entitled 'Functional Requirements for Bibliographic Records: final report', published by K. G. Saur in 1998, identified by ISBN '3-598-11382-X' (F3) *CLP43 should have dimension* height of the individual copy of 'Functional Requirements for Bibliographic Records: final report' that I have at hand and that I observed while describing it (E54) *P3 has note* "24 cm" (E62) [or, alternatively: *P90 has value* "24" (E60) and *P91 has unit* "cm" (E58)]

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) *CLP43 should have dimension* length and height of the exemplar held and catalogued by the Library of Congress (E54) *P3 has note* "46 x 29 cm" (E62)

CLP45 should consist of (should be incorporated in)

Domain:	F3 Manifestation Product Type
Range:	E57 Material
Superproperty of:	
Subproperty of:	
Quantification:	(0:n,0:n)

Scope note: This property associates a publication, i.e. an instance of F3 Manifestation Product Type, with an instance of E57 Material, which all exemplars of that publication should consist of, as long as they are recognised as exemplars of that publication. Typically, this property is observed on one exemplar of a publication, and extrapolated to all other exemplars of the same publication. This logical inference is an induction along the path that can be modelled as: F3 Manifestation Product Type *R7B has example* F5 Item *P41B was classified by* E17 Type Assignment *P42 assigned* E57 Material.

It can happen that a given exemplar, or subset of exemplars, originally produced, or intended to be produced, with that characteristic, accidentally lacks it. This fact should be recorded as a property of F5 Item, and not of F3 Manifestation Product Type.

Examples: 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) *CLP45 should consist of* Cardboard (E57)

CLP46 should be composed of (may form part of)

Domain:	F3 Manifestation Product Type
Range:	F3 Manifestation Product Type
Superproperty of:	
Subproperty of:	
Quantification:	(0:n,0:n)

Scope note: This property associates an instance of F3 Manifestation Product Type which prescribes that all its Items will contain as parts an Item of another instance of F3 Manifestation Product Type with that instance of F3 Manifestation Product Type.

Examples: The publication product identified by ISBN '0618260587' and consisting of a 3-volume edition of J.R.R. Tolkien's 'The Lord of the rings' (F3) *CLP46 should be composed of* The publication product identified by ISBN '0618260595' and consisting of an edition of J.R.R Tolkien's 'The two towers' (F3)

The publication product 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) *CLP46 should be composed of* The publication product consisting of printed programme notes and libretto with French and English translations (F3)

CLP57 should have number of parts

Domain:	F3 Manifestation Product Type
Range:	E60 Number
Superproperty of:	
Subproperty of:	
Quantification:	(1:1,0:n)

Scope note: This property associates a publication, i.e. an instance of F3 Manifestation Product Type, with an instance of E60 Number, which denotes the number of physical units all exemplars of that publication should consist of, as long as they are recognised as complete exemplars of that publication. Typically, this property is observed on one exemplar of a publication, and extrapolated to all other exemplars of the same publication. This logical inference is an induction along the path that can be modelled as: F3 Manifestation Product Type *R7B has example* F5 Item *P57has number of parts* E60 Number.

It can happen that a given exemplar, or subset of exemplars, originally produced, or intended to

be produced, with that characteristic, accidentally lacks it. This fact should be recorded as a property of F5 Item, and not of F3 Manifestation Product Type.

Examples: 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) *CLP57 should have number of parts* 76 (E60) [Number of physical units of the exemplar held by the Library of Congress, as observed by a cataloguer from the Library of Congress when he/she catalogued that particular exemplar and recorded the statement: '1 jigsaw puzzle (ca. 76 pieces)']

The publication entitled 'History of costume: in slides, notes, and commentaries' by Jeanne Button, Patricia Quinn Stuart, and Stephen Sbarge, released by Slide Presentations (New York) ca. 1975 (F3) *CLP57 should have number of parts* 1,491 (E60) [Number of physical units of the exemplar held by the Gelman Library of the George Washington University, as observed by a cataloguer from the Gelman Library of the George Washington University when he/she catalogued that particular exemplar and recorded the statement: '1,491 slides in 14 slide trays + 6 ring binders in cases (30 x 29 cm.)']

CLP104 subject to (applies to)

Domain: F3 Manifestation Product Type
Range: E30 Right
Superproperty of:
Subproperty of:
Quantification: (0:n,1:1)

Scope note: This property associates a publication, i.e. an instance of F3 Manifestation Product Type, with an instance of E30 Right, which applies to all exemplars of that publication, as long as they are recognised as exemplars of that publication.

The rights covered by this property may include: acquisition or access authorisation; terms of availability; access restrictions on the Manifestation Product Type; etc.

Examples: The publication entitled 'Recent poems' by the author named 'Stephen Spender', released by the publisher named 'Anvil Press Poetry' in 1978 and identified by ISBN '0856460516' (F3) *CLP104 subject to* Availability restricted to Anvil Press Poetry subscribers (E30) [*P3 has note* "This edition […] is available only to Anvil Press Poetry subscribers" (E62)]

CLP105 right held by (right on)

Domain: F3 Manifestation Product Type
Range: E39 Actor
Superproperty of:
Subproperty of:
Quantification: (0:n,0:n)

Scope note: This property associates a publication, i.e. an instance of F3 Manifestation Product Type, with an instance of E39 Actor, who holds an instance of E30 Right on all exemplars of that publication, as long as they are recognised as exemplars of that publication.

Examples: The publication entitled 'Recent poems' by the author named 'Stephen Spender', released by the publisher named 'Anvil Press Poetry' in 1978 and identified by ISBN '0856460516' (F3) *CLP105 right held by* Anvil Press Poetry (F11)

CLR6 should carry (should be carried by)

Domain: F3 Manifestation Product Type
Range: F24 Publication Expression
Superproperty of:
Subproperty of:
Quantification: (1:1,0:1)

Scope note: This property associates a publication, i.e. an instance of F3 Manifestation Product Type, with an instance of F24 Publication Expression, which all exemplars of that publication should carry,

as long as they are recognised as complete exemplars of that publication. Typically, this property is observed on one exemplar of a publication, and extrapolated to all other exemplars of the same publication. This logical inference is an induction along the path that can be modelled as: F3 Manifestation Product Type *R7B has example* F5 Item *R6 carries* F24 Publication Expression.

It can happen that a given exemplar, or a subset of exemplars, originally produced, or intended to be produced with that characteristic, accidentally lacks part of the publication expression. This fact should be recorded as a property of F5 Item, and not of F3 Manifestation Product Type.

Examples: The publication, dated 1972, entitled 'The complete poems of Stephen Crane, edited with an introduction by Joseph Katz' (ISBN '0-8014-9130-4') (F3) *CLP128 should carry* The overall content of the book identified by ISBN '0-8014-9130-4', i.e.: the text of Stephen Crane's complete poems as edited by Joseph Katz, the numbering system introduced by Joseph Katz in order to identify each individual poem by Stephen Crane, page numbers, the text of Joseph Katz's dedication, preface, acknowledgements, and introduction, the table of contents, the index of first lines, the statements found on title page, back of title page (including CIP bibliographic record), cover front, back front, and spine, and the layout of the publication, and the occasional statement '[NO STANZA BREAK]' (F24)

3   FRBR_{ER} to FRBR_{OO} mappings

3.1 Introduction

This chapter defines the mapping between the FRBR$_{ER}$ model (**Functional Requirements for Bibliographic Records   http://www.ifla.org/files/cataloguing/frbr/frbr_2008.pdf**)   and   FRBR$_{OO}$ (FRBR   object-oriented definition and mapping of the FRBR$_{ER}$). The mapping includes a listing of the entities, relationships and attributes defined in FRBR$_{ER}$ and shows how the same information can be expressed using FRBR$_{OO}$. These mappings can be seen on one hand as an intellectual definition of the relationship between both models. On the other hand, they are in a format that could be turned more or less mechanically into an algorithm to automatically transform data structured following the one form into data in the other form, i.e. they can be used to implement an automatic data translation.

The FRBR$_{OO}$ model includes a more elaborated set of classes and for this reason there are several FRBR$_{OO}$ classes listed for some of the FRBR$_{ER}$ entities.

FRBR$_{OO}$ is defined as an extension to the CIDOC CRM model which regards any information element as a property (or relationship) between two classes. For this reason each FRBR attribute or relationship is defined using a path of subsequent properties of FRBR$_{OO}$ that includes the domain, the property name and the range of each property in the path.

The attributes in FRBR$_{ER}$ have been defined at a logical level and express the characteristics of an entity as they might be viewed and composed by a user when creating an information system. In contrast to that, FRBR$_{OO}$ tries to model the things and processes of the reality that librarians deal with and that FRBR$_{ER}$ entities refer to explicitly or implicitly. Therefore corresponding paths expressed using FRBR$_{OO}$ are in many cases complex paths that include the intermediate classes and properties that are needed to make explicit the implicit meaning and structure of the FRBR attributes. Using the same method of mapping, FRBR$_{OO}$ can also be used to describe the meaning of data structures and models other than FRBR and so give an account of the degree to which such data structures or models represent library concepts.

Some FRBR$_{ER}$ attributes and relationships will correspond to more than one path in FRBR$_{OO}$ depending on the interpretation and use of an attribute or a relationship. This is particularly evident when inspecting manifestation attributes where attributes can be mapped to one path if they are used for uncontrolled text entries and a different path if they are used for codes or terms from a controlled set of values.

3.2 Explanation of types used in the mapping

FRBR$_{OO}$ is a core ontology in the sense of the CIDOC CRM, i.e., it specifies only the concepts necessary to describe the basic relationships between things in the selected domain of discourse. The same holds for the FRBR$_{ER}$ model. Therefore, FRBR$_{OO}$ adopts the CRM model's use of external types, i.e. terms that appear as data, declared as instances of the class E55 Type, to declare specialisations of concepts or relationships that are considered not to contribute to basic structure of the core ontology.

Some of the FRBR$_{ER}$ attributes and relationships are considered to be too specific in this sense and for this reason are expressed in the mapping using paths that include instantiation of E55 Type in different ways. The following summary lists the different ways external types are used in the mapping. The listing of types is not exhaustive but is included as examples for the types (terms) that are needed here and there to express all the semantics of bibliographic data elements in FRBR$_{OO}$. Quotations indicate type values (instances of E55 Type) whereas type names without quotations identify whole type vocabularies.

FRBR$_{ER}$ attributes mapped to FRBR$_{OO}$ using *P3 has note* in combination with *P3.1 has type*.
This solution is used to map data elements that are uncontrolled text entries. They are all mapped to the property *P3 has note* for the respective class. In the sequence, *P3.1 has type* is used to differentiate between different special meanings of the *P3 has note* property and to express the particular meaning of the note, such as:
- P3.1 has type: E55 Type = {"Capture mode", "Collation", "Colour", "Extent of the carrier", "File characteristics", "Foliation", "Generation", "Groove width", "Kind of cutting", "Kind of sound", "Physical medium", "Playing speed", "Presentation format", "Reduction ratio", "Reproduction characteristics",

"Scheduled treatment", "Series statement", "System requirements", "Tape configuration", "Technique", "Type size", "Typeface",…}

FRBR$_{ER}$ attributes mapped to FRBR$_{OO}$ using *P2 has type.*
This solution is used for data elements that are coded values or terms from a controlled vocabulary and express categorical characteristics of an entity. In the sequence, the use of the respective terminology to instantiate E55 Type should be restricted to specific vocabularies as indicated in the following list:
- E55 Type = *superclass of* (Capture mode, Colour, File characteristics, Foliation, Form of carrier, Generation, Groove width, Kind of cutting, Kind of sound, Playing speed, Presentation format, Reduction Ratio, Reproduction characteristics, System requirements, Tape configuration, Type size, Typeface,…)

FRBR$_{ER}$ attributes mapped to FRBR$_{OO}$ using *P148 has component (is component of)of E33 Linguistic Object P2 has type.*
This solution is used for data elements that are transcribing information appearing in the content of a bibliographic object, typically the title page. The property *P2 has type E55 Type* is used to define the category for this information, such as:
- E55 Type = {"Edition/Issue designation", "Series statement", "Statement of responsibility"}

FRBR$_{ER}$ relationships mapped to FRBR$_{OO}$ using *R2 is derivative of* in combination with *R2.1 has type.*
This solution is used to parametrise the specialisations of the more generic FRBR$_{OO}$ property *R2 is derivative of* by the corresponding FRBR$_{ER}$ subproperties:
- R2.1 has type E55 Type = {"Abridgement", "Adaptation", "Arrangement", "Imitation", "Revision", "Summary", "Transformation", "Translation"}

3.3 List of Mappings

FRBR$_{ER}$ Section numbers	Unit of Information	Condition	
3.2.1	Work		F1 Work
3.2.1	Work		F15 Complex Work
3.2.1	Work		F14 Individual Work
3.2.1	Work		F17 Aggregation Work
3.2.1	Work		F19 Publication Work
3.2.1	Work		F18 Serial Work
3.2.1	Work		F16 Container Work
3.2.1	Work		F20 Performance Work
3.2.1	Work		F21 Recording work
4.2.1	Work: Title of the work		F1 Work P102 has title E35 Title
4.2.2	Work: Form of work		F1 Work P2 has type E55 Type E55 Type {Form}
4.2.3	Work: Date of the work		F1 Work R16B was initiated by F27 Work Conception P4 has timespan E52 Timespan P78 is identified by E50 Date
4.2.4	Work: Other distinguishing characteristics		F1 Work P1 is identified by F13 Identifier R8 consists of F12 Name
4.2.5	Work: Intended termination	if no intended termination it is an instance of F18 Serial Work	F18 Serial Work
4.2.5	Work: Intended termination	if it has an intended termination it is an instance of F14 Individual Work	F14 Individual Work

FRBR_ER Section numbers	Unit of Information	Condition	
4.2.6	Work: Intended audience		F1 Work P103 was intended for E55 Type
4.2.7	Work: Context for the work		F1 Work R16B was initiated by F27 Work Conception P15 was influenced by E1 CRM Entity
4.2.8	Work: Medium of performance (Musical work)		F1 Work P2 has type E55 Type {Medium}
4.2.9	Work: Numeric designation (Musical work)		F1 Work P1 is identified by F13 Identifier R8 consists of F12 Name
4.2.10	Work: Key (Musical work)	used as part of an identifier	F1 Work P1 is identified by F13 Identifier R8 consists of F12 Name
4.2.10	Work: Key (Musical work)		F1 Work P2 has type E55 Type {Key}
4.2.11	Work: Coordinates (Cartographic work)		F1 Work P129 is about E27 Site P59B is located in or within E53 Place P87 is identified by E47 Spatial Coordinates
4.2.12	Work: Equinox (Cartographic work)		F1 Work P129 is about E27 Site P59B is located in or within E53 Place P87 is identified by E47 Spatial Coordinates
5.2.1	Work: is realized through (Expression)		F1Work R3 is realised in F22 Self-contained Expression
5.2.2	Work: is created by (Person, Corporate body)		F1 Work R16B was initiated by F27 Work Conception P14 carried out by {P14.1 in the role of: E55 Type = "Creator"} E39 Actor
5.2.3	Work: has as subject (all other entities)		F1 Work P129 is about E1 CRM Entity
5.2.3	Work: is subject of (Work)		F1 Work P129B is subject of F1 Work
5.3.1	Work: has a successor (Work)		F1 Work R1B has successor F1 Work
5.3.1	Work: is a successor to (Work)		F1 Work R1 is logical successor of F1 Work
5.3.1	Work: has a supplement (Work)		F2 Expression R5 has component F2 Expression
5.3.1 5.3.2	Work: supplements (Work, Expression)		F2 Expression R5B is component of F2 Expression
5.3.1	Work: has a complement (Work)		F2 Expression R5 has component of F2 Expression
5.3.1	Work: complements (Work)		F2 Expression R5B is component of F2 Expression
5.3.1	Work: is a summary of (Work)		F1 Work R2 is derivative of {R2.1 has type E55 Type = "Summary"} F1 Work
5.3.1	Work: has a summary (Work)		F1 Work R2B has derivative {R2.1 has type E55 Type = "Summary"} F1 Work
5.3.1	Work: is an adaptation of (Work, Expression)		F1 Work R2 is derivative of {R2.1 has type E55 Type = "Adaptation"} F1 Work
5.3.1	Work: has adaptation (Work)		F1 Work R2B has derivative {R2.1 has type E55 Type = "Adaptation"} F1 Work
5.3.1	Work: is a transformation of (Work, Expression)		F1 Work R2 is derivative of {R2.1 has type E55 Type = "Transformation"} F1 Work
5.3.1	Work: has a transformation (Work)		F1 Work R2B has derivative {R2.1 has type E55 Type = "Transformation"} F1 Work
5.3.1	Work: is an imitation of (Work, Expression)		F1 Work R2 is derivative of {R2.1 has type E55 Type = "Imitation"} F1 Work
5.3.1	Work: has an imitation (Work)		F1 Work R2B has derivative {R2.1 has type E55 Type = "Imitation"} F1 Work
5.3.1.1	Work: has part (Work)		F15 Complex Work R10 has member F1 Work
5.3.1.1	Work: is part of (Work)		F1 Work R10B is member of F15 Complex Work
3.2.2	Expression		F2 Expression
3.2.2	Expression		F22 Self-Contained Expression

FRBR_ER Section numbers	Unit of Information	Condition	
3.2.2	Expression		F24 Publication Expression
3.2.2	Expression		F23 Expression Fragment
3.2.2	Expression		F26 Recording
3.2.2	Expression		F25 Performance Plan
4.3.1	Expression: Title of the expression		F2 Expression P102 has title E35 Title
4.3.2	Expression: Form of the expression		F2 Expression P2 has type E55 Type {Form}
4.3.3	Expression: Date of the expression		F2 Expression R17B was created by F28 Expression Creation P4 has timespan E52 Timespan P78 is identified by E50 Date
4.3.4	Expression: Language of the expression		F2 Expression (instantiated as E33 Linguistic Object) P72 has language E56 Language
4.3.5	Expression: Other distinguishing characteristics		F2 Expression P1 is identified by F13 Identifier R8 consists of F12 Name
4.3.6	Expression: Extensibility of expression		F22 Self-Contained Expression R3B realises F1 Work R10B is member of F18 Serial Work P3 has note {P3.1 has type E55 Type = "Extensibility"} E62 String
4.3.7	Expression: Revisability of expression		F22 Self-Contained Expression R3B realises F1 Work R10B is member of F18 Serial Work P3 has note {P3.1 has type E55 Type = "Revisability"} E62 String
4.3.8	Expression: Extent of the expression		F2 Expression P43 has dimension E54 Dimension
4.3.9	Expression: Summarization of content		F24 Expression P148 has component F2 Expression {P2 has type E55 Type = "Summary"}
4.3.10	Expression: Context for the expression		F2 Expression R17B was created by F28 Expression Creation
4.3.11	Expression: Critical response to the expression		F2 Expression P129B is subject of F1 Work R3 is realised in F22 Self-contained Expression
4.3.12	Expression: Use restrictions on the expression		F2 Expression P104 is subject to E30 Right
4.3.13	Expression: Sequencing pattern (Serial)		F22 Self-Contained Expression R3B realises F18 Serial work P3 has note {P3.1 has type E55 Type = "Sequencing pattern"} E62 String
4.3.13	Expression: Sequencing pattern (Serial)		F22 Self-Contained Expression R3B realises F18 Serial work R11 has issuing rules E29 Design or Procedure
4.3.14	Expression: Expected regularity of issue (Serial)		F22 Self-Contained Expression R3B realises F18 Serial work P3 has note {P3.1 has type E55 Type = "Expected regularity"} E62 String
4.3.14	Expression: Expected regularity of issue (Serial)		F22 Self-Contained Expression R3B realises F18 Serial Work R11 has issuing rules E29 Design or Procedure
4.3.15	Expression: Expected frequency of issue (Serial)		F22 Self-Contained Expression R3B realises F18 Serial work P3 has note {P3.1 has type E55 Type = "Expected frequency"} E62 String
4.3.15	Expression: Expected frequency of issue (Serial)		F22 Self-Contained Expression R3B realises F18 Serial Work R11 has issuing rules E29 Design or Procedure
4.3.16	Expression: Type of score (Musical notation)		F2 Expression P2 has type E55 Type {Type of score}
4.3.17	Expression: Medium of performance (Musical notation or recorded sound)		F2 Expression P2 has type E55 Type {Medium of performance}

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4.3.18	Expression: Scale (Cartographic image/object)		F2 Expression P138 represents {P138.1 has type E55 Type = "Scale"} E1 CRM Entity
4.3.19	Expression: Projection (Cartographic image/object)		F2 Expression P138 represents {P138.1 has type E55 Type = "Projection"} E1 CRM Entity
4.3.20	Expression: Presentation technique (Cartographic image/Object)		F2 Expression P2 has type E55 Type {Technique}
4.3.21	Expression: Representation of relief (Cartographic image/object)		F2 Expression P2 has type E55Type {Technique}
4.3.22	Expression: Geodetic, grid, and vertical measurement (Cartographic image/object)		F2 Expression P2 has type E55 Type {Different types of Geodetic, grid, and vertical measurement}
4.3.23	Expression: Recording technique (Remote sensing image)		F2 Expression P2 has type E55 Type {Recording technique}
4.3.24	Expression: Special characteristics (Remote sensing image)		F2 Expression P3 has note {P3.1 has type E55 Type = "Special characteristics"} E62 String
4.3.25	Expression: Technique (Graphic of projected image)		F2 Expression P2 has type E55 Type {Technique}
5.2.1	Expression: is a realization of		F22 Self-contained Expression R3B realises F1 Work
5.2.1	Expression: is embodied in		F2 Expression R4 carriers provided by F3 Manifestation Product Type
5.2.1	Expression: is embodied in		F24 Publication Expression CLR6B should be carried by F3 Manifestation Product Type
5.2.1	Expression: is embodied in		F2 Expression P128R is carried by F4 Manifestation Singleton
5.2.1	Expression: is embodied in		F2 Expression R17B was created by F28 Expression Creation R18 created F4 Manifestation Singleton
5.2.1	Expression: is realized by		F2 Expression R17B was created by F28 Expression Creation P14 carried out by {P14.1 in the role of E55 Type = e.g. "Translator"} E39 Actor
5.2.3	Expression: is subject of		F2 Expression P129B is subject of F1 Work
5.3.2	Expression: has an abridgement		F22 Self-Contained Expression R9B realises F14 Individual Work R2B has derivative {R2.1 has type E55 Type = "Abridgement"} F1 Work
5.3.2	Expression: is an abridgement of		F22 Self-Contained Expression R9B realises F14 Individual Work R2 is derivative of {R2.1 has type E55 Type = "Abridgement"} F1 Work
5.3.2	Expression: has a revision		F22 Self-Contained Expression R9B realises F14 Individual Work R2B has derivative {R2.1 has type E55 Type = "Revision"} F1 Work
5.3.2	Expression: is a revision of		F22 Self-Contained Expression R9B realises F14 Individual Work R2 is derivative of {R2.1 has type E55 Type = "Revision"} F1 Work
5.3.2	Expression: has a translation		F22 Self-Contained Expression R9B realises F14 Individual Work R2B has derivative {R2.1 has type E55 Type = "Translation"} F1 Work
5.3.2	Expression: is a translation of		F22 Self-Contained Expression R9B realises F14 Individual Work R2 is derivative of {R2.1 has type E55 Type = "Translation"} F1 Work
5.3.2	Expression: has an arrangement		F22 Self-Contained Expression R9B realises F14 Individual Work R2B has derivative {R2.1 has type E55 Type = "Arrangement"} F1 Work

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5.3.2	Expression: is an arrangement of		F22 Self-Contained Expression R9B realises F14 Individual Work R2 is derivative of {R2.1 has type E55 Type = "Arrangement"} F1 Work
5.3.2	Expression: has a successor		F22 Self-Contained Expression R9B realises F14 Individual Work R1B has successor F1 Work
5.3.2	Expression: is a successor to		F22 Self-Contained Expression R9B realises F14 Individual Work R1 is logical successor of F1 Work
5.3.2	Expression: has a supplement		F22 Self-Contained Expression R9B realises F14 Individual Work R10B is member of F15 Complex Work R10 has member F1 Work
5.3.2	Expression: supplements		F22 Self-Contained Expression R9 B realises F14 Individual Work R10B is member of F15 Complex Work R10 has member F1 Work
5.3.2	Expression: has a complement		F22 Self-Contained Expression R9B realises F14 Individual Work R10B is member of F15 Complex Work R10 has member F1 Work
5.3.2	Expression: complements		F22 Self-Contained Expression R9B realises F14 Individual Work R10B is member of F15 Complex Work R10 has member F1 Work
5.3.2	Expression: has a summary		F22 Self-Contained Expression R9B realises F14 Individual Work R2B has derivative {R2.1 has type E55 Type = "Summary"} F1 Work
5.3.2	Expression: is a summary of		F22 Self-Contained Expression R9B realises F14 Individual Work R2 is derivative of {R2.1 has type E55 Type = "Summary"} F1 Work
5.3.2	Expression: has an adaptation		F22 Self-Contained Expression R9B realises F14 Individual Work R2B has derivative {R2.1 has type E55 Type = "Adaptation"} F1 Work
5.3.2	Expression: is an adaptation of		F22 Self-Contained Expression R9B realises F14 Individual Work R2 is derivative of {R2.1 has type E55 Type = "Adaptation"} F1 Work
5.3.2	Expression: has a transformation		F22 Self-Contained Expression R9B realises F14 Individual Work R B has derivative {R2.1 has type E55 Type = "Transformation"} F1 Work
5.3.2	Expression: is a transformation of		F22 Self-Contained Expression R9B realises F14 Individual Work R2 is derivative of {R2.1 has type E55 Type = "Transformation"} F1 Work
5.3.2	Expression: has an imitation		F22 Self-Contained Expression R9B realises F14 Individual Work R2B has derivative {R2.1 has type E55 Type = "Imitation"} F1 Work
5.3.2	Expression: is an imitation of		F22 Self-Contained Expression R9B realises F14 Individual Work R2 is derivative of {R2.1 has type: E55 Type = "Imitation"} F1 Work
5.3.2.1	Expression: has part		F2 Expression R15 has fragment F23 Expression Fragment
5.3.2.1	Expression: has part		F2 Expression R5 has component F22 Self-Contained Expression
5.3.2.1	Expression: is part of		F23 Expression Fragment R15B is fragment of F2 Expression
5.3.2.1	Expression: is part of		F22 Self-Contained Expression R5B is component of F2 Expression
3.2.3	Manifestation	If it is a published item, or something that is produced as multiple copies	F3 Manifestation Product Type
3.2.3	Manifestation	If it is a manuscript or other unique manifestations	F4 Manifestation Singleton

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4.4.1	Manifestation: Title of the manifestation		F3 Manifestation Product Type P102 has title E35 Title
4.4.1	Manifestation: Title of the manifestation		F4 Manifestation Singleton P102 has title E35 Title
4.4.2	Manifestation: Statement of responsibility		F3 Manifestation Product Type CLR6 should carry F24 Publication Expression P148 has component E33 Linguistic Object P2 has type E55 Type {"Statement of responsibility"}
4.4.2	Manifestation: Statement of responsibility		F4 Manifestation Singleton P128 carries F2 Expression P148 has component E33 Linguistic Object P2 has type E55 Type {"Statement of responsibility"}
4.4.3	Manifestation: Edition/Issue designation		F3 Manifestation Product Type CLR6 should carry F24 Publication Expression P148 has component E33 Linguistic Object P2 has type E55 Type {"Edition/Issue designation"}
4.4.3	Manifestation: Edition/Issue designation		F4 Manifestation Singleton P128 carries F2 Expression P148 has component E33 Linguistic Object P2 has type E55 Type {"Edition/Issue designation"}
4.4.4	Manifestation: Place of publication/distribution	Publishing:	F3 Manifestation Product Type CLR6 should carry F24 Publication Expression P94 was created by F30 Publication Event P14 carried out by E39 Actor P74 has current or former residence E53 Place P87 is identified by E44 Place Appellation
4.4.4	Manifestation: Place of publication/distribution	Publishing:	F3 Manifestation Product Type CLR6 should carry F24 Publication Expression P148 has component E33 Linguistic Object P2 has type E55 Type {Place of publication/distribution}
4.4.4	Manifestation: Place of publication/distribution	Publishing:	F4 Manifestation Singleton R18B was created by F28 Expression Creation P14 carried out by E39 Actor P74 has current or former residence E53 Place P87 is identified by E44 Place Appellation
4.4.4	Manifestation: Place of publication/distribution	Distribution:	P104 is subject to E30 right {P2 has type E55 Type = "Distribution right"} P75 is possessed by E39 Actor P74 has current or former residence E53 Place P87 is identified by E44 Place Appellation
4.4.5	Manifestation: Publisher/distributor	Publishing:	F3 Manifestation Product Type CLR6 should carry F24 Publication Expression P94 was created by F30 Publication Event P14 carried out by E39 Actor P131 is identified by E82 Actor Appellation
4.4.5	Manifestation: Publisher/distributor	Publishing:	F3 Manifestation Product Type CLR6 should carry F24 Publication Expression P148 has component E33 Linguistic Object P2 has type E55 Type {Place of publication/distribution}
4.4.6	Manifestation: Date of publication/distribution		F3 Manifestation Product Type CLR6 should carry F24 Publication Expression P148 has component E33 Linguistic Object P2 has type E55 Type {Date of publication/distribution}
4.4.6	Manifestation: Date of publication/distribution		F3 Manifestation Product Type CLR6 should carry F24 Publication Expression P94 was created by F30 Publication Event P4 has time-span E52 Time-Span P78 is identified by E49 Time Appellation
4.4.6	Manifestation: Date of publication/distribution		F3 Manifestation Product Type CLR6 should carry F24 Publication Expression P94 was created by E65 Creation Event P4 has time-span E52 Time-Span P82 at some time within E61 Time Primitive

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4.4.6	Manifestation: Date of publication/distribution		F4 Manifestation-Singleton R18 was created by F28 Expression Creation P4 has time-span E52 Time-Span P82 at some time within E61 Time Primitive
4.4.7	Manifestation: Fabricator/manufacturer		F3 Manifestation Product Type CLP108 should have been produced by F32 Carrier Production Event P14 carried out by E39 Actor P131 is identified by E82 Actor Appellation
4.4.7	Manifestation: Fabricator/manufacturer		F4 Manifestation-Singleton R18 was created F28 Expression Creation P14 carried out by E39 Actor P131 is identified by E82 Actor Appellation
4.4.8	Manifestation: Series statement		F3 Manifestation Product Type CLR6 should carry F24 Publication Expression P148 has component E33 Linguistic Object P2 has type E55 Type {"Series statement"}
4.4.8	Manifestation: Series statement		F4 Manifestation-Singleton P148 has component E33 Linguistic Object P2 has type E55 Type {"Series statement"}
4.4.9	Manifestation: Form of carrier		F3 Manifestation Product Type CLP2 should have type E55 Type {Form of carrier}
4.4.9	Manifestation: Form of carrier		F4 Manifestation Singleton P2 has type E55 Type {Form of carrier}
4.4.10	Manifestation: Extent of the carrier		F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Extent of the carrier"} E62 String
4.4.10	Manifestation: Extent of the carrier		F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Extent of the carrier"} E62 String
4.4.10	Manifestation: Extent of the carrier		F3 Manifestation Product Type CLP57 should have number of parts E60 Number
4.4.10	Manifestation: Extent of the carrier		F4 Manifestation Singleton P57 has number of parts E60 Number
4.4.11	Manifestation: Physical medium		F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Physical medium"} E62 String
4.4.11	Manifestation: Physical medium		F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Physical medium"} E62 String
4.4.11	Manifestation: Physical medium		F3 Manifestation Product Type CLP45 should consist of E57 Material
4.4.11	Manifestation: Physical medium		F4 Manifestation Singleton P45 consists of E57 Material
4.4.12	Manifestation: Capture mode		F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Capture mode"} E62 String
4.4.12	Manifestation: Capture mode		F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Capture mode"} E62 String
4.4.12	Manifestation: Capture mode		F3 Manifestation Product Type CLP2 should have type E55 Type {Capture mode}
4.4.12	Manifestation: Capture mode		F4 Manifestation Singleton P2 has type E55 Type {Capture mode}
4.4.13	Manifestation: Dimensions of the carrier		F3 Manifestation Product Type CLP43 should have dimension E54 Dimension
4.4.13	Manifestation: Dimensions of the carrier		F4 Manifestation Singleton P43 has dimension E54 Dimension
4.4.14	Manifestation: Manifestation identifier		F3 Manifestation Product Type P1 is identified by F13 Identifier
4.4.14	Manifestation: Manifestation identifier		F4 Manifestation Singleton P1 is identified by E42 Identifier
4.4.15	Manifestation: Source for acquisition/access authorization		F3 Manifestation Product Type CLP104 is subject to E30 Right

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4.4.15	Manifestation: Source for acquisition/access authorization		F3 Manifestation Product Type CLP105 right held by E39 Actor P131 is identified by E82 Actor Appellation
4.4.15	Manifestation: Source for acquisition/access authorization		F4 Manifestation Singleton P104 is subject to E30 Right
4.4.15	Manifestation: Source for acquisition/access authorization		F4 Manifestation Singleton P105 right held by E39 Actor P131 is identified by E82 Actor Appellation
4.4.15	Manifestation: Source for acquisition/access authorization		F4 Manifestation Singleton P49 has former or current keeper E39 Actor P131 is identified by E82 Actor Appellation
4.4.15	Manifestation: Source for acquisition/access authorization		F4 Manifestation Singleton P51 has former or current owner E39 Actor P131 is identified by E82 Actor Appellation
	Manifestation: Terms of availability		F3 Manifestation Product Type CLP104 is subject to E30 Right
4.4.16	Manifestation: Terms of availability		F4 Manifestation Singleton P104 is subject to E30 Right
4.4.17	Manifestation: Access restrictions on the manifestation		F3 Manifestation Product Type CLP104 is subject to E30 Right
4.4.17	Manifestation: Access restrictions on the manifestation		F4 Manifestation Singleton P104 is subject to E30 Right
4.4.18	Manifestation: Typeface (Printed book)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Typeface"} E62 String
4.4.18	Manifestation: Typeface (Printed book)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Typeface}
4.4.18	Manifestation: Typeface (Printed book)	descriptive form	F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Typeface"} E62 String
4.4.18	Manifestation: Typeface (Printed book)	coded form	F4 Manifestation Singleton P2 has type E55 Type {Typeface}
4.4.18	Manifestation: Type size (Printed book)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Type size"} E62 String
4.4.18	Manifestation: Type size (Printed book)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Type size}
4.4.18	Manifestation: Type size (Printed book)	descriptive form	F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Type size"} E62 String
4.4.18	Manifestation: Type size (Printed book)	coded form	F4 Manifestation Singleton P2 has type E55 Type {Type size}
4.4.20	Manifestation: Foliation (Hand-printed book)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Foliation"} E62 String
4.4.20	Manifestation: Foliation (Hand-printed book)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Foliation}
4.4.20	Manifestation: Foliation (Hand-printed book)	descriptive form	F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Foliation"} E62 String
4.4.20	Manifestation: Foliation (Hand-printed book)	coded form	F4 Manifestation Singleton P2 has type E55 Type {Foliation}
4.4.21	Manifestation: Collation (Hand-printed book)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Collation"} E62 String
4.4.21	Manifestation: Collation (Hand-printed book)	descriptive form	F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Collation"} E62 String
4.4.22	Manifestation: Publication status (Serial)	coded form	F18 Serial Work P2 has type E55 Type {Publication status}
4.4.22	Manifestation: Publication status (Serial)	descriptive form	F18 Serial Work P2 has note {P3.1 has type E55 Type = "Publication status"} E62 String
4.4.23	Manifestation: Numbering (Serial)		F3 Manifestation Product Type P1 is identified by F13 Identifier R8 consists of F12 Name
4.4.24	Manifestation: Playing speed (Sound recording)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Playing speed"} E62 String

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4.4.24	Manifestation: Playing speed (Sound recording)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Playing speed}
4.4.24	Manifestation: Playing speed (Sound recording)	descriptive form	F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Playing speed"} E62 String
4.4.24	Manifestation: Playing speed (Sound recording)	coded form	F4 Manifestation Singleton P2 has type E55 Type {Playing speed}
4.4.25	Manifestation: Groove width (Sound recording)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Groove width"} E62 String
4.4.25	Manifestation: Groove width (Sound recording)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Groove width}
4.4.25	Manifestation: Groove width (Sound recording)	descriptive form	F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Groove width"} E62 String
4.4.25	Manifestation: Groove width (Sound recording)	coded form	F4 Manifestation Singleton P2 has type E55 Type {Groove width}
4.4.26	Manifestation: Kind of cutting (Sound recording)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Kind of cutting"} E62 String
4.4.26	Manifestation: Kind of cutting (Sound recording)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Kind of cutting}
4.4.26	Manifestation: Kind of cutting (Sound recording)	descriptive form	F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Kind of cutting"} E62 String
4.4.26	Manifestation: Kind of cutting (Sound recording)	coded form	F4 Manifestation Singleton P2 has type E55 Type {Kind of cutting}
4.4.27	Manifestation: Tape configuration (Sound recording)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Tape configuration"} E62 String
4.4.27	Manifestation: Tape configuration (Sound recording)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Tape configuration}
4.4.27	Manifestation: Tape configuration (Sound recording)	descriptive form	F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Tape configuration"} E62 String
4.4.27	Manifestation: Tape configuration (Sound recording)	coded form	F4 Manifestation Singleton P2 has type E55 Type {Tape configuration}
4.4.28	Manifestation: Kind of sound (Sound recording)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Kind of sound"} E62 String
4.4.28	Manifestation: Kind of sound (Sound recording)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Kind of sound}
4.4.28	Manifestation: Kind of sound (Sound recording)	descriptive form	F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Kind of sound"} E62 String
4.4.28	Manifestation: Kind of sound (Sound recording)	coded form	F4 Manifestation Singleton P2 has type E55 Type {Kind of sound}
4.4.29	Manifestation: Special reproduction characteristics (Sound recording)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Reproduction characteristics"} E62 String
4.4.29	Manifestation: Special reproduction characteristics (Sound recording)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Reproduction characteristics}
4.4.29	Manifestation: Special reproduction characteristics (Sound recording)	descriptive form	F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Reproduction characteristics"} E62 String
4.4.29	Manifestation: Special reproduction characteristics (Sound recording)	coded form	F4 Manifestation Singleton P2 has type E55 Type {Reproduction characteristics}

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4.4.30	Manifestation: Colour (Image)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Colour"} E62 String
4.4.30	Manifestation: Colour (Image)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Colour}
4.4.30	Manifestation: Colour (Image)	descriptive form	F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Colour"} E62 String
4.4.30	Manifestation: Colour (Image)	coded form	F4 Manifestation Singleton P2 has type E55 Type {Colour}
4.4.31	Manifestation: Reduction ratio (Microform)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Reduction ratio"} E62 String
4.4.31	Manifestation: Reduction ratio (Microform)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Reduction Ratio}
4.4.32	Manifestation: Polarity (Microform or visual projection)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Tape configuration"} E62 String
4.4.32	Manifestation: Polarity (Microform or visual projection)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Tape configuration}
4.4.33	Manifestation: Generation (Microform or visual projection)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = Generation} E62 String
4.4.33	Manifestation: Generation (Microform or visual projection)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Generation}
4.4.34	Manifestation: Presentation format (Visual projection)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "Presentation format"} E62 String
4.4.34	Manifestation: Presentation format (Visual projection)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {Presentation format}
4.4.35	Manifestation: System requirements (Electronic resource)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "System requirements"} E62 String
4.4.35	Manifestation: System requirements (Electronic resource)	coded form	F3 Manifestation Product Type CLP2 should have type E55 Type {System requirements}
4.4.36	Manifestation: File characteristics (Electronic resource)	descriptive form	F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "File characteristics"} E62 String
4.4.36	Manifestation: File characteristics (Electronic resource)		F3 Manifestation Product Type CLP2 should have type E55 Type {File characteristics}
4.4.37	Manifestation: Mode of access (Remote access electronic resource)		F3 Manifestation Product P3 has note {P3.1 has type E55 Type = "Mode of access"} E62 String
4.4.38	Manifestation: Access address (Remote access electronic resource)		F3 Manifestation Product P3 has note {P3.1 has type E55 Type = "Access address"} E62 String
5.2.1	Manifestation: is the embodiment of		F3 Manifestation Product Type R4 comprises carriers of F2 Expression
5.2.1	Manifestation: is the embodiment of		F3 Manifestation Product Type CLR6 should carry F24 Publication Expression
5.2.1	Manifestation: is the embodiment of		F4 Manifestation Singleton R18B was created by F28 Expression Creation R17 created F2 Expression
5.2.1	Manifestation: is the embodiment of		F2 Expression P128R is carried by F4 Manifestation Singleton
5.2.1	Manifestation: is exemplified by		F3 Manifestation Product Type R7B has example F5 Item

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5.3.5	Manifestation: is produced by		F3 Manifestation Product Type R26B was produced by F32 Carrier Production Event P14 carried out by E39 Actor P131 is identified by E82 Actor Appellation
5.2.2	Manifestation: is produced by		F4 Manifestation Singleton R18 was created by F28 Expression Creation P14 carried out by E39 Actor P131 is identified by E82 Actor Appellation
5.2.3	Manifestation: is subject of		F3 Manifestation Product Type P129B is subject of F1 Work
5.2.3	Manifestation: is subject of		F4 Manifestation Singleton P129B is subject of F1 Work
5.3.4.1	Manifestation: has part		F4 Manifestation Singleton P46 is composed of F4 Manifestation Singleton
5.3.4.1	Manifestation: has part		F3 Manifestation Product Type CLP46B may form part of F3 Manifestation Product Type
5.3.4.1	Manifestation: is part of		F4 Manifestation Singleton P46B forms part of F4 Manifestation Singleton
5.3.4.1	Manifestation: is part of		F3 Manifestation Product Type CLP46B may form part of F3 Manifestation Product Type
5.3.4	Manifestation: has a reproduction		F3 Manifestation Product Type P125 was type of object used in F33 Reproduction Event R29 reproduced E84 Information Carrier
5.3.4	Manifestation: is a reproduction of		F3 Manifestation Product Type R7B has example F5 Item R29B was reproduced by F33 Reproduction Event P125 used object of type F3 Manifestation Product Type
5.3.4	Manifestation: has an alternate		F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "has an alternate"} E62 String
5.3.4	Manifestation: is an alternate to		F3 Manifestation Product Type P3 has note {P3.1 has type E55 Type = "is an alternate to"} E62 String
3.2.4	Item		F4 Manifestation Singleton
3.2.4	Item		F5 Item
4.5.1	Item: Item identifier		F4 Manifestation Singleton P1 is identified by E42 Identifier
4.5.1	Item: Item identifier		F5 Item P1 is identified by E42 Identifier
4.5.2	Item: Fingerprint		F4 Manifestation Singleton P1 is identified by E41 Appellation
4.5.2	Item: Fingerprint		F5 Item P1 is identified by E41 Appellation
4.5.3	Item: Provenance of the item		F4 Manifestation Singleton P49 has former or current keeper E39 Actor
4.5.3	Item: Provenance of the item		F4 Manifestation Singleton P51 has former or current owner E39 Actor
4.5.3	Item: Provenance of the item		F5 Item P49 has former or current keeper E39 Actor
4.5.3	Item: Provenance of the item		F5 Item P51 has former or current owner E39 Actor
4.5.4	Item: Marks/inscriptions		F4 Manifestation Singleton P65 shows visual item E37 Mark
4.5.4	Item: Marks/inscriptions		F5 Item P65 shows visual item E37 Mark
4.5.5	Item: Exhibition history		F4 Manifestation Singleton P12B was present at E7 Activity
4.5.5	Item: Exhibition history		F5 Item P12B was present at E7 Activity
4.5.6	Item: Condition of the item		F4 Manifestation Singleton P44 has condition state E3 Condition State
4.5.6	Item: Condition of the item		F5 Item P44 has condition state E3 Condition State

FRBR_{ER} Section numbers	Unit of Information	Condition	
4.5.7	Item: Treatment history		F4 Manifestation Singleton P31B was modified by E11 Modification Event
4.5.7	Item: Treatment history		F5 Item P31B was modified by E11 Modification Event
4.5.8	Item: Scheduled treatment		F4 Manifestation Singleton P3 has note {P3.1 has type E55 Type = "Scheduled treatment"} E62 String
4.5.8	Item: Scheduled treatment		F5 Item P3 has note {P3.1 has type E55 Type = "Scheduled treatment"} E62 String
4.5.9	Item: Access restrictions on the item		F4 Manifestation Singleton P104 is subject to E30 Right
4.5.9	Item: Access restrictions on the item		F5 Item P104 is subject to E30 Right
5.2.1	Item: exemplifies		F5 Item R7 is example of F3 Manifestation Product Type
5.2.3	Item: is subject of		F5 Item P129B is subject of F1 Work
5.2.2	Item: is owned by		P5 Item P51 has former or current owner E39 Actor
5.2.2	Item: is owned by		P5 Item P50 has current keeper E39 Actor
5.3.6.1	Item: has part		F5 Item P46 is composed of F5 Item
5.3.6.1	Item: has part		F4 Manifestation Singleton P46B is composed of F4 Manifestation Singleton
5.3.6.1	Item: is part of		F5 Item P46B forms part of F5 Item
5.3.6.1	Item: is part of		F4 Manifestation Singleton P46B forms part of F4 Manifestation Singleton
5.3.6	has reconfiguration		F5 Item P46 is composed of F5 Item R7 has type F4 Manifestation Product Type
5.3.6	is a reconfiguration of		F5 Item P46B forms part of F5 Item R7 has type F4 Manifestation Product Type
5.3.6	has reproduction		F5 Item R7 has type F3 Manifestation Product Type P125B was type of object used in F33 Reproduction Event R29 has produced E84 Information Carrier
5.3.6	is a reproduction of (Manifestation, Item)		F5 Item R29B was reproduced by F33 Reproduction Event P125 used object of type F3 Manifestation Product Type R7 is type of F5 Item
3.2.5	Person		E21 Person
4.6.1	Person: Name of person		E21 Person P131 is identified by E82 Actor Appellation
4.6.2	Person: Dates of person	Date of birth	E21 Person P98 was born E67 birth P4 has timespan E52 Timespan P78 is identified by E50 Date
4.6.2	Person: Dates of person	Date of death	E21 Person P100 died in E69 Death P4 has timespan E52 Timespan P78 is identified by E50 Date
4.6.2	Person: Dates of person	was active in period	E21 Person P14B performed E7 Activity P4 has timespan E52 Timespan P78 is identified by E50 Date
4.6.2	Person: Dates of person	part of identifier	
4.6.3	Person: Title of person		E21 Person P2 has type E55 Type {Title}
4.6.3	Person: Title of person		E21 Person P1 is identified by F12 Name R8 consists of F12 Name
4.6.4	Person: Other designation associated with the person		E21 Person P1 is identified by F12 Name R8 consists of F12 Name
5.2.2	Person: has created		E21 Person P14 performed F27 Work Conception R16 initiated F1 Work
5.2.2	Person: has realized		E21 Person P14B performed F28 Expression Creation R17 created F2 Expression

FRBR_ER Section numbers	Unit of Information	Condition	
5.2.2	Person: has produced		E21 Person P14B performed F32 Carrier Production Event R26 produced things of type F3 Manifestation Product Type
5.2.2	Person: has produced		E21 Person P14B performed F28 Expression Creation R18 created F4 Manifestation Singleton
5.2.2	Person: is owner of		E21 Person P51B is former or current owner of F5 Item
5.2.2	Person: is owner of		E21 Person P51B is former or current owner of F4 Manifestation Singleton
4.6.1	Person: is subject of		E21 Person P129B is subject of F1 Work
3.2.6	Corporate Body		E74 Group
4.7.1	Corporate Body: Name of the corporate body		E74 Group P131 is identified by E82 Actor Appellation
4.7.2	Corporate Body: Number associated with the corporate body		P3 has note {P3.1 has type E55 Type = "Associated number"} E62 String
4.7.3	Corporate Body: Place associated with the corporate body	Place associated with an activity / event	E74 Group P14B performed E7 Activity P7 took place at E53 Place P87 is identified by E44 Place Appellation
4.7.3	Corporate Body: Place associated with the corporate body	Location with which the corporate body is otherwise associated	E74 Group P74 has current or former residence E53 Place P87 is identified by E44 Place Appellation
4.7.4	Corporate Body: Date associated with the corporate body	Formation of a group,	E74 Group P95B was formed by E66 Formation P4 has timespan E52 Timespan P78 is identified by E50 Date
4.7.4	Corporate Body: Date associated with the corporate body	Timespan of the event (conference)	E74 Group P14B performed E7 Activity P4 has timespan E52 Timespan P78 is identified by E50 Date
4.7.5	Corporate Body: Other designation associated with the corporate body		name parts
5.2.2	Corporate Body: has created		E74 Group P14B performed F27 Work Conception R16 initiated F1 Work
5.2.2	Corporate Body: has realized		E74 Group P14B performed F28 Expression Creation R17 created F2 Expression
5.2.2	Corporate Body: has produced		E74 Group P14B performed F32 Carrier Production Event R26 produced things of type F3 Manifestation Product Type
5.2.2	Corporate Body: has produced		E74 Group P14B performed F28 Expression Creation R18 created F4 Manifestation Singleton
5.2.2	Corporate Body: is owner of		E74 Group P51B is former or current owner of F5 Item
5.2.2	Corporate Body: is owner of		E74 Group P51B is former or current owner of F4 manifestation Singleton
5.2.3	Corporate Body: is subject of		E74 Group P129B is subject of F1 Work
3.2.7	Concept		F6 Concept
4.8.1	Concept: Term for the concept		F6 Concept P1 is identified by E41 Appellation
5.2.3	Concept: is subject of		F6 Concept P129B is subject of F1 Work
3.2.8	Object		E18 Physical Thing
4.9.1	Object: Term for the object		E18 Physical Thing P1 is identified by E41 Appellation
5.2.3	Object: is subject of		E18 Physical Thing P129B is subject of F1 Work
3.2.9	Event		E4 Period

FRBR_{ER} Section numbers	Unit of Information	Condition	
4.10.1	Event: Term for the event		E4 Period P1 is identified by E41 Appellation
5.2.3	Event: is subject of		E4 Period P129B is subject of F1 Work
3.2.10	Place		E53 Place
4.11.1	Place: Term for the place		E53 Place P87 is identified by E44 Place Appellation
5.2.3	Place: is subject of		E53 Place P129B is subject of F1 Work

4 Referred CIDOC CRM Classes and Properties

Since FRBR$_{OO}$ refers to and reuses, wherever appropriate, large parts of ISO21127, the CIDOC Conceptual Reference Model, this section provides a comprehensive list of all constructs used from ISO21127, together with their definitions following version 5.0.4 maintained by CIDOC. Use in this context includes: reference as immediate superclass, superproperty or element of a path expression in a mapping statement.

Some of these constructs appear only in the mapping in section 5 (above) and not in section 4, because they are generic in nature. For instance, we regarded it as better not to overload the description of FRBR$_{OO}$ with generic notions such as carrying out activities or using things.

4.1 List of Referred CIDOC CRM Classes:

In this section we present the classes of the CIDOC CRM Conceptual Reference Model version 5.0.4 referred to by FRBR$_{OO}$ as a list. The classes that appear indirectly in the FRBR$_{OO}$ 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.

E1	CRM Entity
E3	Condition State
E4	**Period**
E5	Event
E7	**Activity**
E11	Modification
E12	**Production**
E18	**Physical Thing**
E21	**Person**
E24	**Physical Man-Made Thing**
E27	Site
E28	**Conceptual Object**
E29	**Design or Procedure**
E30	**Right**
E33	Linguistic Object
E35	Title
E37	Mark
E39	**Actor**
E41	**Appellation**
E42	**Identifier**
E44	Place Appellation
E47	Spatial Coordinates
E49	Time Appellation
E50	Date
E52	Time-Span
E53	**Place**
E54	**Dimension**
E55	**Type**
E56	Language
E57	**Material**
E60	**Number**
E61	Time Primitive
E62	String
E65	**Creation**
E66	Formation
E67	Birth
E70	**Thing**

E69	Death
E72	**Legal Object**
E73	**Information Object**
E74	**Group**
E82	Actor Appellation
E84	**Information Carrier**
E89	**Propositional Object**
E90	**Symbolic Object**

4.2 List of Referred CIDOC CRM Properties:

In this section we present the properties of the CIDOC CRM 5.0.4 referred to by FRBR$_{OO}$ as a list. The properties that appear indirectly in the FRBR$_{OO}$ Model, i.e. as superproperties of properties defined in the model, are marked in bold.

Property id	Property Name	Entity – Domain	Entity - Range
P1	is identified by (identifies)	E1 CRM Entity	E41 Appellation
P2	**has type (is type of)**	**E1 CRM Entity**	**E55 Type**
P3	has note	E1 CRM Entity	E62 String
P4	has time-span (is time-span of)	E2 Temporal Entity	E52 Time-Span
P7	took place at (witnessed)	E4 Period	E53 Place
P9	**P9 consists of (forms part of)**	**E4 Period**	**E4 Period**
P12	occurred in the presence of (was present at)	E5 Event	E77 Persistent Item
P14	carried out by (performed)	E7 Activity	E39 Actor
P15	was influenced by (influenced)	E7 Activity	E1 CRM Entity
P16	**used specific object (was used for)**	**E7 Activity**	**E70 Thing**
P31	has modified (was modified by)	E11 Modification	E24 Physical Man-Made Thing
P33	**used specific technique (was used by)**	**E7 Activity**	**E29 Design or Procedure**
P43	has dimension (is dimension of)	E70 Thing	E54 Dimension
P44	has condition (condition of)	E18 Physical Thing	E3 Condition State
P45	consists of (is incorporated in)	E18 Physical Thing	E57 Material
P46	is composed of (forms part of)	E18 Physical Thing	E18 Physical Thing
P49	has former or current keeper (is former or current keeper of)	E18 Physical Thing	E39 Actor
P50	has current keeper (is current keeper of)	E18 Physical Thing	E39 Actor
P51	has former or current owner (is former or current owner of)	E18 Physical Thing	E39 Actor
P57	has number of parts	E19 Physical Object	E60 Number
P59	has section (is located on or within)	E18 Physical Thing	E53 Place
P65	shows visual item (is shown by)	E24 Physical Man-Made Thing	E36 Visual Item
P72	has language (is language of)	E33 Linguistic Object	E56 Language
P74	has current or former residence (is current or former residence of)	E39 Actor	E53 Place
P75	possesses (is possessed by)	E39 Actor	E30 Right
P78	is identified by (identifies)	E52 Time-Span	E49 Time Appellation
P82	at some time within	E52 Time-Span	E61 Time Primitive
P87	is identified by (identifies)	E53 Place	E44 Place Appellation
P94	**has created (was created by)**	**E65 Creation**	**E28 Conceptual Object**
P95	has formed (was formed by)	E66 Formation	E74 Group
P98	brought into life (was born)	E67 Birth	E21 Person
P100	was death of (died in)	E69 Death	E21 Person
P102	has title (is title of)	E71 Man-Made Thing	E35 Title
P103	was intended for (was intention of)	E71 Man-Made Thing	E55 Type
P104	is subject to (applies to)	E72 Legal Object	E30 Right
P105	right held by (has right on)	E72 Legal Object	E39 Actor
P106	**is composed of (forms part of)**	**E90 Symbolic Object**	**E90 Symbolic Object**

P108	**has produced (was produced by):**	**E12 Production**	**E24 Physical Man-Made Thing**
P125	used object of type (was type of object used in)	E7 Activity	E55 Type
P128	**carries (is carried by)**	**E24 Physical Man-Made Thing**	**E90 Symbolic Object**
P129	is about (is subject of)	E89 Propositional Object	E1 CRM Entity
P130	**shows features of (features are also found on)**	**E70 Thing**	**E70 Thing**
P131	is identified by (identifies)	E39 Actor	E82 Actor Appellation
P138	represents (has representation)	E36 Visual Item	E1 CRM Entity
P148	**has component (is component of)**	**E89 Propositional Object**	**E89 Propositional Object**

4.3 Referred CIDOC CRM Classes

This section contains the complete definitions of the classes of the CIDOC CRM Conceptual Reference Model version 5.0.4 referred to by FRBR$_{OO}$. The properties within these class definitions which are referred to FRBR$_{OO}$ are presented in bold face. Otherwise, we apply the same format conventions as in section 2.6.

E1 CRM Entity

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

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

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

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

Examples:
- the earthquake in Lisbon 1755 (E5)

Properties:

P1 is identified by (identifies): E41 Appellation
P2 has type (is type of): E55 Type
P3 has note: E62 String
        (P3.1 has type: E55 Type)
P48 has preferred identifier (is preferred identifier of): E42 Identifier
P137 exemplifies (is exemplified by): E55 Type

E3 Condition State

Subclass of: E2 Temporal Entity

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

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

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

Examples:
- the "Amber Room" in Tsarskoje Selo being completely reconstructed from summer 2003 until now
- the Peterhof Palace near Saint Petersburg being in ruins from 1944 – 1946
- the state of my turkey in the oven at 14:30 on 25 December, 2002 (*P2 has type: E55 Type* "still not cooked")

Properties:

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

E4 Period

Subclass of: E2 Temporal Entity

Superclass of: E5 Event

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

It is the social or physical coherence of these phenomena that identify an E4 Period and not the associated spatio-temporal bounds. These bounds are a mere approximation of the actual process of growth, spread and retreat. Consequently, different periods can overlap and coexist in time and space, such as when a nomadic culture exists in the same area as a sedentary culture.

Typically this class is used to describe prehistoric or historic periods such as the "Neolithic Period", the "Ming Dynasty" or the "McCarthy Era". There are however no assumptions about the scale of the associated phenomena. In particular all events are seen as synthetic processes consisting of coherent phenomena. Therefore E4 Period is a superclass of E5 Event. For example, a modern clinical E67 Birth can be seen as both an atomic E5 Event and as an E4 Period that consists of multiple activities performed by multiple instances of E39 Actor.

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

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

Examples:

- Jurassic
- European Bronze Age
- Italian Renaissance
- Thirty Years War
- Sturm und Drang
- Cubism

Properties:

P7 took place at (witnessed): E53 Place

P8 took place on or within (witnessed): E19 Physical Object

P9 consists of (forms part of): E4 Period

P10 falls within (contains): E4 Period

P132 overlaps with: E4 Period

P133 is separated from: E4 Period

E5 Event

Subclass of: E4 Period

Superclass of: E7 Activity

                  E63 Beginning of Existence

                  E64 End of Existence

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

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

Examples:

- the birth of Cleopatra (E67)
- the destruction of Herculaneum by volcanic eruption in 79 AD (E6)
- World War II (E7)
- the Battle of Stalingrad (E7)
- the Yalta Conference (E7)
- my birthday celebration 28-6-1995 (E7)
- the falling of a tile from my roof last Sunday
- the CIDOC Conference 2003 (E7)

Properties:

P11 had participant (participated in): E39 Actor

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

E7 Activity

Subclass of: E5 Event

Superclass of: E8 Acquisition

E9 Move

E10 Transfer of Custody

E11 Modification

E13 Attribute Assignment

E65 Creation

E66 Formation

E85 Joining

E86 Leaving

E87 Curation Activity

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

This notion includes complex, composite and long-lasting actions such as the building of a settlement or a war, as well as simple, short-lived actions such as the opening of a door.

Examples:

- the Battle of Stalingrad
- the Yalta Conference
- my birthday celebration 28-6-1995
- the writing of "Faust" by Goethe (E65)
- the formation of the Bauhaus 1919 (E66)
- calling the place identified by TGN '7017998' 'Quyunjig' by the people of Iraq

Properties:

P14 carried out by (performed): E39 Actor

(P14.1 in the role of: E55 Type)

P15 was influenced by (influenced): E1 CRM Entity

**P16 used specific object (was used for): E70 Thing
      (P16.1 mode of use: E55 Type)**

P17 was motivated by (motivated): E1 CRM Entity

P19 was intended use of (was made for): E71 Man-Made Thing
      (P19.1 mode of use: E55 Type)

P20 had specific purpose (was purpose of): E5 Event

P21 had general purpose (was purpose of): E55 Type

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

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

P125 used object of type (was type of object used in): E55 Type

P134 continued (was continued by): E7 Activity

E11 Modification

Subclass of: E7 Activity

Superclass of: E12 Production

                E79 Part Addition

                E80 Part Removal

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

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

                Since the distinction between modification and production is not always clear, modification is regarded as the more generally applicable concept. This implies that some items may be consumed or destroyed in a Modification, and that others may be produced as a result of it. An event should also be documented using E81 Transformation if it results in the destruction of one or more objects and the simultaneous production of others using parts or material from the originals. In this case, the new items have separate identities.

                If the instance of the E29 Design or Procedure utilised for the modification prescribes the use of specific materials, they should be documented using properties of the design or procedure, rather than via *P126 employed (was employed in): E57 Material*.

Examples:

- the construction of the SS Great Britain (E12)

- the impregnation of the Vasa warship in Stockholm for preservation after 1956

- the transformation of the Enola Gay into a museum exhibit by the National Air and Space Museum in Washington DC between 1993 and 1995 (E12, E81)

- the last renewal of the gold coating of the Toshogu shrine in Nikko, Japan

Properties:

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

      P126 employed (was employed in): E57 Material

E12 Production

Subclass of: E11 Modification

                E63 Beginning of Existence

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

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

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

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

Examples:

- the construction of the SS Great Britain
- the first casting of the Little Mermaid from the harbour of Copenhagen
- Rembrandt's creating of the seventh state of his etching "Woman sitting half dressed beside a stove", 1658, identified by Bartsch Number 197 (E12,E65,E81)

Properties:

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

E18 Physical Thing

Subclass of: E72 Legal Object

Superclass of: E19 Physical Object

E24 Physical Man-Made Thing

E26 Physical Feature

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

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

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

Examples:

- the Cullinan Diamond (E19)

- the cave "Ideon Andron" in Crete (E26)

- the Mona Lisa (E22)

Properties:

P44 has condition (condition of): E3 Condition State

P45 consists of (is incorporated in): E57 Material

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

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

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

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

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

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

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

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

E21 Person

Subclass of: E20 Biological Object

E39 Actor

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

Legendary figures that may have existed, such as Ulysses and King Arthur, fall into this class if the documentation refers to them as historical figures. In cases where doubt exists as to whether several persons are in fact identical, multiple instances can be created and linked to indicate their relationship. The CRM does not propose a specific form to support reasoning about possible identity.

Examples:

- Tut-Ankh-Amun
- Nelson Mandela

E24 Physical Man-Made Thing

Subclass of: E18 Physical Thing

E71 Man-Made Thing

Superclass of: E22 Man-Made Object

E25 Man-Made Feature

E78 Collection

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

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

Examples:

- the Forth Railway Bridge (E22)
- the Channel Tunnel (E25)
- the Historical Collection of the Museum Benaki in Athens (E78)

Properties:

P62 depicts (is depicted by): E1 CRM Entity
    (P62.1 mode of depiction: E55 Type)

P65 shows visual item (is shown by): E36 Visual Item

P128 carries (is carried by): E90 Symbolic Object

E27 Site

Subclass of: E26 Physical Feature

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

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

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

Examples:

- the Amazon river basin
- Knossos
- the Apollo 11 landing site
- Heathrow Airport
- the submerged harbour of the Minoan settlement of Gournia, Crete

E28 Conceptual Object

Subclass of: E71 Man-Made Thing

Superclass of: E55 Type

                 E89 Propositional Object

                 E90 Symbolic Object

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

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

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

Examples:

- Beethoven's 'Ode an die Freude' (Ode to Joy), (E73)
- the definition of "ontology" in the Oxford English Dictionary
- the knowledge about the victory at Marathon carried by the famous runner

Properties:
        P149 is identified by (identifies): E75 Conceptual Object Appellation

E29 Design or Procedure

Subclass of: E73 Information Object

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

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

                 Designs or procedures can be seen as one of the following:
                 1. A schema for the activities it describes
                 2. A schema of the products that result from their application.
                 3. An independent intellectual product that may have never been applied, such as Leonardo da Vinci's famous plans for flying machines.

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

Examples:

- the ISO standardisation procedure
- the musical notation for Beethoven's "Ode to Joy"
- the architectural drawings for the Kölner Dom in Cologne, Germany
- The drawing on the folio 860 of the Codex Atlanticus from Leonardo da Vinci, 1486-1490,

kept in the Biblioteca Ambrosiana in Milan

Properties:

> P68 foresees use of (use foreseen by): E57 Material
>
> P69 is associated with: E29 Design or Procedure
>
> > (P69.1 has type: E55 Type)

E30 Right

Subclass of: E89 Propositional Object

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

These include reproduction and property rights.

Examples:

- copyright held by ISO on ISO/CD 21127
- ownership of the "Mona Lisa" by the Louvre

E33 Linguistic Object

Subclass of: E73 Information Object

Superclass of: E34 Inscription

E35 Title

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

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

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

Examples:

- the text of the Ellesmere Chaucer manuscript
- the lyrics of the song "Blue Suede Shoes"
- the text of the Jabberwocky by Lewis Carroll
- the text of "Doktoro Jekyll kaj Sinjoro Hyde" (an Esperanto translation of Dr Jekyll and Mr Hyde)

Properties:

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

E35 Title

Subclass of: E33 Linguistic Object

E41 Appellation

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

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

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

Examples:

- "The Merchant of Venice"
- "Mona Lisa"
- "La Pie or The Magpie"
- "Lucy in the Sky with Diamonds"

E37 Mark

Subclass of: E36 Visual Item

Superclass of: E34 Inscription

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

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

Examples:

- Minoan double axe mark

- ©

- ☺

E39 Actor

Subclass of: E77 Persistent Item

Superclass of: E21 Person

E74 Group

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

The CRM does not attempt to model the inadvertent actions of such actors. Individual people should be documented as instances of E21 Person, whereas groups should be documented as instances of either E74 Group or its subclass E40 Legal Body.

Examples:

- London and Continental Railways (E40)

- the Governor of the Bank of England in 1975 (E21)

- Sir Ian McKellan (E21)

Properties:

P74 has current or former residence (is current or former residence of): E53 Place

P75 possesses (is possessed by): E30 Right

P76 has contact point (provides access to): E51 Contact Point

P131 is identified by (identifies): E82 Actor Appellation

E41 Appellation

Subclass of: E90 Symbolic Object

Superclass of: E35 Title

E42 Identifier

E44 Place Appellation

E49 Time Appellation

E51 Contact Point

E75 Conceptual Object Appellation

E82 Actor Appellation

Scope note: This class comprises all sequences of signs of any nature, either meaningful or not, that are used or can be used to refer to and identify a specific instance of some class within a certain context.

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

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

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

Examples:

- "Martin"

- "the Forth Bridge"

- "the Merchant of Venice" (E35)

- "*Spigelia marilandica* (L.) L." [not the species, just the *name*]

- "information science" [not the science itself, but the name through which we refer to it in an English-speaking context]

Properties:

P139 has alternative form: E41 Appellation
   P139.1 has type: E55 Type

E42 Identifier

Subclass of: E41 Appellation

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

Examples:

- "MM.GE.195"

- "13.45.1976"

- "OXCMS: 1997.4.1"

- ISSN "0041-5278"

- ISRC "FIFIN8900116"

- Shelf mark "Res 8 P 10"

- "Guillaume de Machaut (1300?-1377)" [a controlled personal name heading that follows the French rules]

E44 Place Appellation

Subclass of: E41 Appellation

Superclass of	E45 Address
	E46 Section Definition
	E47 Spatial Coordinates
	E48 Place Name

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

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

Examples:

- "Vienna"
- "CH-1211, Genève"
- "Aquae Sulis Minerva"
- "Bath"
- "Cambridge"
- "the Other Place"
- "the City"

E47 Spatial Coordinates

Subclass of: E44 Place Appellation

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

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

Examples:

- "6°5'29"N 45°12'13"W"
- "Black queen's bishop 4" [chess coordinate]

E49 Time Appellation

Subclass of: E41 Appellation

Superclass of E50 Date

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

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

Examples:

- "Meiji" [Japanese term for a specific time-span]
- "1st half of the XX century"
- "Quaternary"
- "1215 Hegira" [a date in the Islamic calendar]
- "Last century"

E50 Date

Subclass of: E49 Time Appellation

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

                 Dates may vary in their degree of precision.

Examples:

- "1900"
- "4-4-1959"
- "19-MAR-1922"
- "19640604"

E52 Time-Span

Subclass of: E1 CRM Entity

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

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

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

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

Examples:

- 1961

- From 12-17-1993 to 12-8-1996

- 14h30 – 16h22 4th July 1945

- 9.30 am 1.1.1999 to 2.00 pm 1.1.1999

- duration of the Ming Dynasty

Properties:

P78 is identified by (identifies): E49 Time Appellation

P79 beginning is qualified by: E62 String

P80 end is qualified by: E62 String

P81 ongoing throughout: E61 Time Primitive

P82 at some time within: E61 Time Primitive

P83 had at least duration (was minimum duration of): E54 Dimension

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

P86 falls within (contains): E52 Time-Span

E53 Place

Subclass of: E1 CRM Entity

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

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

It is sometimes argued that instances of E53 Place are best identified by global coordinates or absolute reference systems. However, relative references are often more relevant in the context of cultural documentation and tend to be more precise. In particular, we are often interested in position in relation to large, mobile objects, such as ships. For example, the Place at which Nelson died is known with reference to a large mobile object – H.M.S Victory. A resolution of this Place in terms of absolute coordinates would require knowledge of the movements of the vessel and the precise time of death, either of which may be revised, and the result would lack historical and cultural relevance.

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

Examples:

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

Properties:

P87 is identified by (identifies): E44 Place Appellation

P88 consists of (forms part of): E53 Place

P89 falls within (contains): E53 Place

P121 overlaps with: E53 Place

P122 borders with: E53 Place

E54 Dimension

Subclass of: E1 CRM Entity

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

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

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

Examples:

- currency: £26.00
- length: 3.9-4.1 cm
- diameter 26 mm
- weight 150 lbs
- density: 0.85 gm/cc

- luminescence: 56 ISO lumens
- tin content: 0.46 %
- taille au garot: 5 hands
- calibrated C14 date: 2460-2720 years, etc

Properties:

P90 has value: E60 Number

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

E55 Type

Subclass of: E28 Conceptual Object

Superclass of: E56 Language

E57 Material

E58 Measurement Unit

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

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

Examples:

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

Properties:

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

E56 Language

Subclass of: E55 Type

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

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

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

Examples:

- el [Greek]
- en [English]
- eo [Esperanto]
- es [Spanish]
- fr [French]

E57 Material

Subclass of: E55 Type

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

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

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

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

Examples:

- brick
- gold
- aluminium
- polycarbonate
- resin

E60 Number

Subclass of: E59 Primitive Value

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

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

Examples:

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

E61 Time Primitive

Subclass of: E59 Primitive Value

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

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

Examples:

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

E62 String

Subclass of: E59 Primitive Value

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

E62 String is not further elaborated upon within the model

Examples:

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

E65 Creation

Subclass of: E7 Activity

E63 Beginning of Existence

Superclass of: E83 Type Creation

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

Examples:

- the framing of the U.S. Constitution
- the drafting of U.N. resolution 1441

Properties:

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

E66 Formation

Subclass of: E7 Activity

E63 Beginning of Existence

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

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

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

Examples:

- the formation of the CIDOC CRM Special Interest Group
- the formation of the Soviet Union
- the conspiring of the murderers of Caesar

Properties:

P95 has formed (was formed by): E74 Group

E67 Birth

Subclass of: E63 Beginning of Existence

Scope note: This class comprises the birth of a human beings.

E67 Birth is a biological event focussing on the context of people coming into life.

(E63 Beginning of Existence comprises the coming into life of any living beings).

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

Examples:

- the birth of Alexander the Great

Properties:

P96 by mother (gave birth): E21 Person

P97 from father (was father for): E21 Person

P98 brought into life (was born): E21 Person

E69 Death

Subclass of: E64 End of Existence

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

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

Examples:

- the murder of Julius Caesar (E69, E7)
- the death of Senator Paul Wellstone

Properties:

P100 was death of (died in): E21 Person

E70 Thing

Subclass of: E77 Persistent Item

Superclass of: E71 Man-Made Thing

E72 Legal Object

Scope note: This general class comprises usable discrete, identifiable, instances of E77 Persistent Item that are documented as single units.

They can be either intellectual products or physical things, and are characterized by relative stability. They may for instance either have a solid physical form, an electronic encoding, or they may be logical concept or structure.

Examples:

- my photograph collection (E78)
- the bottle of milk in my refrigerator (E22)
- the plan of the Strassburger Muenster (E29)
- the thing on the top of Otto Hahn's desk (E19)
- the form of the no-smoking sign (E36)
- the cave of Dirou, Mani, Greece (E27)

Properties:

P43 has dimension (is dimension of): E54 Dimension

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

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

E72 Legal Object

Subclass of: E70 Thing

Superclass of: E18 Physical Thing

E90 Symbolic Object

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

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

Examples:

- the Cullinan diamond (E19)
- definition of the CIDOC Conceptual Reference Model Version 2.1 (E73)

Properties:

P104 is subject to (applies to): E30 Right

P105 right held by (has right on): E39 Actor

E73 Information Object

Subclass of: E89 Propositional Object

E90 Symbolic Object

Superclass of: E29 Design or Procedure

E31 Document

E33 Linguistic Object

E36 Visual Item

Scope note: This class comprises identifiable immaterial items, such as a poems, jokes, data sets, images, texts, multimedia objects, procedural prescriptions, computer program code, algorithm or mathematical formulae, that have an objectively recognizable structure and are documented as single units.

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

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

Examples:

- image BM000038850.JPG from the Clayton Herbarium in London
- E. A. Poe's "The Raven"
- the movie "The Seven Samurai" by Akira Kurosawa
- the Maxwell Equations

Properties:

E74 Group

Subclass of: E39 Actor

Superclass of: E40 Legal Body

Scope note: This class comprises any gatherings or organizations of two or more people that act collectively or in a similar way due to any form of unifying relationship. In the wider sense this class also comprises official positions which used to be regarded in certain contexts as one actor, independent of the current holder of the office, such as the president of a country.

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

Examples:

- the impressionists
- the Navajo
- the Greeks
- the peace protestors in New York City on February 15 2003
- Exxon-Mobil
- King Solomon and his wives
- The President of the Swiss Confederation

Properties:

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

(P107.1 *kind of member*: E55 Type)

E82 Actor Appellation

Subclass of: E41 Appellation

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

An E39 Actor will typically have more than one E82 Actor Appellation, and instances of E82 Actor Appellation in turn may have alternative representations. The distinction between corporate and personal names, which is particularly important in library applications, should be made by explicitly linking the E82 Actor Appellation to an instance of either E21 Person or E74 Group/E40 Legal Body. If this is not possible, the distinction can be made through the use of the *P2 has type* mechanism.

Examples:

- "John Doe"
- "Doe, J"
- "the U.S. Social Security Number 246-14-2304"
- "the Artist Formerly Known as Prince"
- "the Master of the Flemish Madonna"
- "Raphael's Workshop"
- "the Brontë Sisters"
- "ICOM"
- "International Council of Museums"

E84 Information Carrier

Subclass of: E22 Man-Made Object

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

This allows a relationship to be asserted between an E19 Physical Object and its immaterial information contents. An E84 Information Carrier may or may not contain information, e.g., a diskette. Note that any E18 Physical Thing may carry information, such as an E34 Inscription. However, unless it was specifically designed for this purpose, it is not an Information Carrier. Therefore the property *P128 carries (is carried by)* applies to E18 Physical Thing in general.

Examples:

- the Rosetta Stone

- my paperback copy of Crime & Punishment
- the computer disk at ICS-FORTH that stores the canonical Definition of the CIDOC CRM

Properties:

E89 Propositional Object

Subclass of: E28 Conceptual Object

Superclass of: E73 Information Object

E30 Right

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

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

Examples:

- Maxwell's Equations
- The ideational contents of Aristotle's book entitled 'Metaphysics' as rendered in the Greek texts translated in … Oxford edition…
- The underlying prototype of any "no-smoking" sign (E36)
- The common ideas of the plots of the movie "The Seven Samurai" by Akira Kurosawa and the movie "The Magnificent Seven" by John Sturges
- The image content of the photo of the Allied Leaders at Yalta 1945 (E38)

Properties:

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

P67 refers to (is referred to by): E1 CRM Entity
(P67.1 has type: E55 Type)

P129 is about (is subject of): E1 CRM Entity

E90 Symbolic Object

Subclass of: E28 Conceptual Object

E72 Legal Object

Superclass of: E73 Information Object

E41 Appellation

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

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

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

Examples:

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

Properties:

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

4.4 Referred CIDOC CRM Properties

This section contains the complete definitions of the properties of the CIDOC CRM Conceptual Reference Model version 5.0.4 referred to by FRBR$_{OO}$. We apply the same format conventions as in section 2.7.

P1 is identified by (identifies)

Domain:	E1 CRM Entity
Range:	E41 Appellation

Superproperty of:E1 CRM Entity. P48 has preferred identifier (is preferred identifier of): E42 Identifier

E52 Time-Span. P78 is identified by (identifies): E49 Time Appellation

E53 Place. P87 is identified by (identifies): E44 Place Appellation

E71 Man-Made Thing. P102 has title (is title of): E35 Title

E39 Actor. P131 is identified by (identifies): E82 Actor Appellation

E28 Conceptual Object.P149 is identified by (identifies): E75 Conceptual Object Appellation

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

Scope note: This property describes the naming or identification of any real world item by a name or any other identifier.

This property is intended for identifiers in general use, which form part of the world the model intends to describe, and not merely for internal database identifiers which are specific to a technical system, unless these latter also have a more general use outside the technical context. This property includes in particular identification by mathematical expressions such as coordinate systems used for the identification of instances of E53 Place. The property does not reveal anything about when, where and by whom this identifier was used. A more detailed representation can be made using the fully developed (i.e. indirect) path through E15 Identifier Assignment.

Examples:

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

P2 has type (is type of)

Domain:	E1 CRM Entity
Range:	E55 Type

Superproperty of. E1 CRM Entity.P137 exemplifies (is exemplified by):E55 Type

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

Scope note: This property allows sub typing of CRM entities - a form of specialisation – through the use of a terminological hierarchy, or thesaurus.

The CRM is intended to focus on the high-level entities and relationships needed to describe data structures. Consequently, it does not specialise entities any further than is required for this immediate purpose. However, entities in the isA hierarchy of the CRM may by specialised into any number of sub entities, which can be defined in the E55 Type hierarchy. E51 Contact Point, for example, may be specialised into "e-mail address", "telephone number", "post office box", "URL" etc. none of which figures explicitly in the CRM hierarchy. Sub typing obviously requires consistency between the meaning of the terms assigned and the more general intent of the CRM entity in question.

Examples:

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

P3 has note

Domain: E1 CRM Entity

Range: E62 String

Superproperty of: E52 Time-Span. P79 beginning is qualified by: E62 String

       E52 Time-Span. P80 end is qualified by: E62 String

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

Scope note: This property is a container for all informal descriptions about an object that have not been expressed in terms of CRM constructs.

       In particular it captures the characterisation of the item itself, its internal structures, appearance etc.

       Like property *P2 has type (is type of)*, this property is a consequence of the restricted focus of the CRM. The aim is not to capture, in a structured form, everything that can be said about an item; indeed, the CRM formalism is not regarded as sufficient to express everything that can be said. Good practice requires use of distinct note fields for different aspects of a characterisation. The *P3.1 has type* property of *P3 has note* allows differentiation of specific notes, e.g. "construction", "decoration" etc.

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

Examples:

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

Properties: **P3.1 has type: E55 Type**

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

Domain: E2 Temporal Entity

Range: E52 Time-Span

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

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

       The related E52 Time-Span is understood as the real Time-Span during which the phenomena were active, which make up the temporal entity instance. It does not convey any other meaning than a positioning on the "time-line" of chronology. The Time-Span in turn is approximated by a set of dates (E61 Time Primitive). A temporal entity can have in reality only one Time-Span, but there may exist alternative opinions about it, which we would express by assigning multiple Time-Spans. Related temporal entities may share a Time-Span. Time-Spans may have completely unknown dates but other descriptions by which we can infer knowledge.

Examples:

-   the Yalta Conference (E7) *has time-span* Yalta Conference time-span (E52)

P7 took place at (witnessed)

Domain: E4 Period

Range: E53 Place

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

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

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

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

       The related E53 Place should be seen as an approximation of the geographical area within which the phenomena that characterise the period in question occurred. *P7 took place at (witnessed)* does not convey any meaning other than spatial positioning (generally on the surface of the earth). For example, the period "Révolution française" can be said to have taken place in

"France", the "Victorian" period, may be said to have taken place in "Britain" and its colonies, as well as other parts of Europe and north America.

A period can take place at multiple locations.

Examples:

- the period "Révolution française" (E4) *took place at* France (E53)

P9 consists of (forms part of)

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

Scope note: This property describes the decomposition of an instance of E4 Period into discrete, subsidiary periods.

The sub-periods into which the period is decomposed form a logical whole - although the entire picture may not be completely known - and the sub-periods are constitutive of the general period.

Examples:

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

P12 occurred in the presence of (was present at)

Domain: E5 Event

Range: E77 Persistent Item

Superproperty of: E5 Event. P11 had participant (participated in): E39 Actor

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

E9 Move. P25 moved (moved by): E19 Physical Object

E11 Modification. P31 has modified (was modified by): E24 Physical Man-Made Thing

E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item

E64 End of Existence. P93 took out of existence (was taken out of existence by): E77 Persistent Item

E79 Part Addition.P111 added (was added by): E18 Physical Thing

E80 Part Removal.P113 removed (was removed by): E18 Physical Thing

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

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

It connects the history of a thing with the E53 Place and E50 Date of an event. For example, an object may be the desk, now in a museum on which a treaty was signed. The presence of an immaterial thing implies the presence of at least one of its carriers.

Examples:

- Deckchair 42 (E19) *was present at* The sinking of the Titanic (E5)

P14 carried out by (performed)

Domain: E7 Activity

Range: E39 Actor

Subproperty of: E5 Event. P11 had participant (participated in): E39 Actor

Superproperty of: E8 Acquisition. P22 transferred title to (acquired title through): E39 Actor

E8 Acquisition. P23 transferred title from (surrendered title through): E39 Actor

E10 Transfer of Custody. P28 custody surrendered by (surrendered custody through): E39 Actor

E10 Transfer of Custody. P29 custody received by (received custody through): E39 Actor

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

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

It implies causal or legal responsibility. The *P14.1 in the role of* property of the property allows the nature of an Actor's participation to be specified.

Examples:

- the painting of the Sistine Chapel (E7) *carried out by* Michaelangelo Buonaroti (E21) *in the role of* master craftsman (E55)

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

P15 was influenced by (influenced)

Domain: E7 Activity

Range: E1 CRM Entity

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

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

E7 Activity. P134 continued (was continued by): E7 Activity

E83 Type Creation. P136 was based on (supported type creation): E1 CRM Entity

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

Scope note: This is a high level property, which captures the relationship between an E7 Activity and anything that may have had some bearing upon it.

The property has more specific sub properties.

Examples:

- the designing of the Sydney Harbour Bridge (E7) *was influenced by* the Tyne bridge (E22)

P16 used specific object (was used for)

Domain: E7 Activity

Range: E70 Thing

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

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

Superproperty of: E7 Activity.P33 used specific technique (was used by):E29 Design or Procedure

E15 Identifier Assignment.P142 used constituent (was used in):E41 Appellation

E79 Part Addition. P111 added (was added by):E18 Physical Thing

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

Scope note: This property describes the use of material or immaterial things in a way essential to the performance or the outcome of an E7 Activity.

This property typically applies to tools, instruments, moulds, raw materials and items embedded in a product. It implies that the presence of the object in question was a necessary condition for the action. For example, the activity of writing this text required the use of a computer. An immaterial thing can be used if at least one of its carriers is present. For example, the software tools on a computer.

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

Examples:

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

Properties: P16.1 mode of use: <u>E55</u> Type

P31 has modified (was modified by)

Domain: E11 Modification

Range: E24 Physical Man-Made Thing

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

Superproperty of:E12 Production. P108 has produced (was produced by): E24 Physical Man-Made Thing

E79 Part Addition. P110 augmented (was augmented by): E24 Physical Man-Made Thing

E80 Part Removal. P112 diminished (was diminished by): E24 Physical Man-Made Thing

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

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

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

Examples:

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

P33 used specific technique (was used by)

Domain: E7 Activity

Range: E29 Design or Procedure

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

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

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

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

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

Examples:

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

P43 has dimension (is dimension of)

Domain: E70 Thing

Range: E54 Dimension

Quantification: one to many, dependent (0,n:1.1)

Scope note: This property records a E54 Dimension of some E70 Thing.

It is a shortcut of the more fully developed path from E70 Thing through *P39 measured (was measured by)*, E16 Measurement *P40 observed dimension (was observed in)* to E54 Dimension.

It offers no information about how and when an E54 Dimension was established, nor by whom.

An instance of E54 Dimension is specific to an instance of E70 Thing.

Examples:

- silver cup 232 (E22) *has dimension* height of silver cup 232 (E54) *has unit* mm (E58), *has value* 224 (E60)

P44 has condition (is condition of)

Domain: E18 Physical Thing

Range: E3 Condition State

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

Scope note: This property records an E3 Condition State for some E18 Physical Thing.

It is a shortcut of the more fully developed path from E18 Physical Thing through *P34 concerned (was assessed by)*, E14 Condition Assessment *P35 has identified (identified by)* to E3 Condition State. It offers no information about how and when the E3 Condition State was established, nor by whom.

An instance of Condition State is specific to an instance of Physical Thing.

Examples:

- silver cup 232 (E22) *has condition* oxidation traces were present in 1997 (E3) *has type* oxidation traces (E55)

P45 consists of (is incorporated in)

Domain: E18 Physical Thing

Range: E57 Material

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

Scope note: This property identifies the instances of E57 Materials of which an instance of E18 Physical Thing is composed.

All physical things consist of physical materials. *P45 consists of (is incorporated in)* allows the different Materials to be recorded. *P45 consists of (is incorporated in)* refers here to observed Material as opposed to the consumed raw material.

A Material, such as a theoretical alloy, may not have any physical instances.

Examples:

- silver cup 232 (E22) *consists of* silver (E57)

P46 is composed of (forms part of)

Domain: E18 Physical Thing

Range: E18 Physical Thing

Superproperty of:E19 Physical Object. P56 bears feature (is found on): E26 Physical Feature

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

Scope note: This property allows instances of E18 Physical Thing to be analysed into component elements.

Component elements, since they are themselves instances of E18 Physical Thing, may be further analysed into sub-components, thereby creating a hierarchy of part decomposition. An instance of E18 Physical Thing may be shared between multiple wholes, for example two buildings may share a common wall.

This property is intended to describe specific components that are individually documented, rather than general aspects. Overall descriptions of the structure of an instance of E18 Physical Thing are captured by the *P3 has note* property.

The instances of E57 Materials of which an item of E18 Physical Thing is composed should be documented using *P45 consists of (is incorporated in)*.

Examples:

- the Royal carriage (E22) *forms part of* the Royal train (E22)
- the "Hog's Back" (E24) *forms part of* the "Fosseway" (E24

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

Domain: E18 Physical Thing

Range: E39 Actor

Superproperty of:E18 Physical Thing. P50 has current keeper (is current keeper of): E39 Actor

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

Scope note: This property identifies the E39 Actor or Actors who have or have had custody of an instance of E18 Physical Thing at some time.

The distinction with *P50 has current keeper (is current keeper of)* is that *P49 has former or current keeper (is former or current keeper of)* leaves open the question as to whether the specified keepers are current.

P49 has former or current keeper (is former or current keeper of) is a shortcut for the more detailed path from E18 Physical Thing through *P30 transferred custody of (custody transferred through)*, E10 Transfer of Custody, *P28 custody surrendered by (surrendered custody through)* or *P29 custody received by (received custody through)* to E39 Actor.

Examples:

- paintings from The Iveagh Bequest (E18) *has former or current keeper* Secure Deliveries Inc. (E40)

P50 has current keeper (is current keeper of)

Domain: E18 Physical Thing

Range: E39 Actor

Subproperty of: E18 Physical Thing. P49 has former or current keeper (is former or current keeper of): E39 Actor

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

Scope note: This property identifies the E39 Actor or Actors who had custody of an instance of E18 Physical Thing at the time this property was recorded.

P50 has current keeper (is current keeper of) is a shortcut for the more detailed path from E18 Physical Thing through *P30 transferred custody of (custody transferred through)*, E10 Transfer of Custody, *P29 custody received by (received custody through)* to E39 Actor.

Examples:

- paintings from The Iveagh Bequest (E18) *has current keeper* The National Gallery (E40)

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

Domain: E18 Physical Thing

Range: E39 Actor

Superproperty of:E18 Physical Thing. P52 has current owner (is current owner of): E39 Actor

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

Scope note: This property identifies the E39 Actor that is or has been the legal owner (i.e. title holder) of an instance of E18 Physical Thing at some time.

The distinction with *P52 has current owner (is current owner of)* is that *P51 has former or current owner (is former or current owner of)* does not indicate whether the specified owners

are current. *P51 has former or current owner (is former or current owner of)* is a shortcut for the more detailed path from E18 Physical Thing through *P24 transferred title of (changed ownership through)*, E8 Acquisition, *P23 transferred title from (surrendered title through)*, or *P22 transferred title to (acquired title through)* to E39 Actor.

Examples:

- paintings from the Iveagh Bequest (E18) *has former or current owner* Lord Iveagh (E21)

P57 has number of parts

Domain: E19 Physical Object

Range: E60 Number

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

Scope note: This property documents the E60 Number of parts of which an instance of E19 Physical Object is composed.

This may be used as a method of checking inventory counts with regard to aggregate or collective objects. What constitutes a part or component depends on the context and requirements of the documentation. Normally, the parts documented in this way would not be considered as worthy of individual attention.

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

Examples:

- chess set 233 (E22) *has number of parts* 33 (E60)

P59 has section (is located on or within)

Domain: E18 Physical Thing

Range: E53 Place

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

Scope note: This property links an area to the instance of E18 Physical Thing upon which it is found.

It is typically used when a named E46 Section Definition is not appropriate.

E18 Physical Thing may be subdivided into arbitrary regions.

P59 has section (is located on or within) is a shortcut. If the E53 Place is identified by a Section Definition, a more detailed representation can make use of the fully developed (i.e. indirect) path from E18 Physical Thing through *P58 has section definition (defines section)*, E46 Section Definition, *P87 is identified by (identifies)* to E53 Place. A Place can only be located on or within one Physical Object.

Examples:

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

P65 shows visual item (is shown by)

Domain: E24 Physical Man-Made Thing

Range: E36 Visual Item

Subproperty of: E24 Physical Man-Made Thing. P128 carries (is carried by): E90 Symbolic Object

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

Scope note: This property documents an E36 Visual Item shown by an instance of E24 Physical Man-Made Thing.

This property is similar to *P62 depicts (is depicted by)* in that it associates an item of E24 Physical Man-Made Thing with a visual representation. However, *P65 shows visual item (is*

shown by) differs from the *P62 depicts (is depicted by)* property in that it makes no claims about what the E36 Visual Item is deemed to represent. E36 Visual Item identifies a recognisable image or visual symbol, regardless of what this image may or may not represent.

For example, all recent British coins bear a portrait of Queen Elizabeth II, a fact that is correctly documented using *P62 depicts (is depicted by).* Different portraits have been used at different periods, however. *P65 shows visual item (is shown by)* can be used to refer to a particular portrait.

P65 shows visual item (is shown by) may also be used for Visual Items such as signs, marks and symbols, for example the 'Maltese Cross' or the 'copyright symbol' that have no particular representational content.

This property is part of the fully developed path from E24 Physical Man-Made Thing through *P65 shows visual item (is shown by)*, E36 Visual Item, *P138 represents (has representation)* to E1 CRM Entity which is shortcut by, *P62 depicts (is depicted by).*

Examples:

- My T-Shirt (E22) *shows visual item* Mona Lisa (E38)

P72 has language (is language of)

Domain: E33 Linguistic Object

Range: E56 Language

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

Scope note: This property describes the E56 Language of an E33 Linguistic Object.

Linguistic Objects are composed in one or more human Languages. This property allows these languages to be documented.

Examples:

- the American Declaration of Independence (E33*) has language* 18th Century English (E56)

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

Domain: E39 Actor

Range: E53 Place

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

Scope note: This property describes the current or former E53 Place of residence of an E39 Actor.

The residence may be either the Place where the Actor resides, or a legally registered address of any kind.

Examples:

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

P75 possesses (is possessed by)

Domain: E39 Actor

Range: E30 Right

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

Scope note: This property identifies former or current instances of E30 Rights held by an E39 Actor.

Examples:

- Michael Jackson (E21) *possesses* Intellectual property rights on the Beatles' back catalogue (E30)

P78 is identified by (identifies)

Domain: E52 Time-Span

Range: E49 Time Appellation

Subproperty of: E1 CRM Entity. P1 is identified by (identifies): E41 Appellation

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

Scope note: This property identifies an E52 Time-Span using an E49 Time Appellation.

Examples:

- the time span 1926 to 1988 (E52) *is identified by* Showa (Japanese time appellation) (E49)

P82 at some time within

Domain: E52 Time-Span

Range: E61 Time Primitive

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

Scope note: This property describes the maximum period of time within which an E52 Time-Span falls.

               Since Time-Spans may not have precisely known temporal extents, the CRM supports statements about the minimum and maximum temporal extents of Time-Spans. This property allows a Time-Span's maximum temporal extent (i.e. it's outer boundary) to be assigned an E61 Time Primitive value. Time Primitives are treated by the CRM as application or system specific date intervals, and are not further analysed.

Examples:

- the time-span of the development of the CIDOC CRM (E52) *at some time within* 1992-infinity (E61)

P87 is identified by (identifies)

Domain: E53 Place

Range: E44 Place Appellation

Subproperty of: E1 CRM Entity. P1 is identified by (identifies): E41 Appellation

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

Scope note: This property identifies an E53 Place using an E44 Place Appellation.

               Examples of Place Appellations used to identify Places include instances of E48 Place Name, addresses, E47 Spatial Coordinates etc.

Examples:

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

P94 has created (was created by)

Domain: E65 Creation

Range: E28 Conceptual Object

Subproperty of: E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item

Superproperty of: E83 Type Creation. P135 created type (was created by): E55 Type

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

Scope note: This property allows a conceptual E65 Creation to be linked to the E28 Conceptual Object created by it.

               It represents the act of conceiving the intellectual content of the E28 Conceptual Object. It does not represent the act of creating the first physical carrier of the E28 Conceptual Object. As an

example, this is the composition of a poem, not its commitment to paper.

Examples:

- the composition of "The Four Friends" by A. A. Milne (E65) *has created* "The Four Friends" by A. A. Milne (E28)

P95 has formed (was formed by)

Domain: E66 Formation

Range: E74 Group

Subproperty of: E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item

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

Scope note: This property links the founding or E66 Formation for an E74 Group with the Group itself.

Examples:

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

P98 brought into life (was born)

Domain: E67 Birth

Range: E21 Person

Subproperty of: E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item

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

Scope note: This property links an E67 Birth event to an E21 Person in the role of offspring.

Twins, triplets etc. are brought into life by the same Birth event. This is not intended for use with general Natural History material, only people. There is no explicit method for modelling conception and gestation except by using extensions.

Examples:

- the Birth of Queen Elizabeth II (E67) *brought into life* Queen Elizabeth II (E21)

P100 was death of (died in)

Domain: E69 Death

Range: E21 Person

Subproperty of: E64 End of Existence. P93 took out of existence (was taken out of existence by): E77 Persistent Item

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

Scope note: This property links an E69 Death event to the E21 Person that died.

A Death event may involve multiple people, for example in the case of a battle or disaster.

This is not intended for use with general Natural History material, only people.

Examples:

- Mozart's death (E69) *was death of* Mozart (E21)

P102 has title (is title of)

Domain: E71 Man-Made Thing

Range: E35 Title

Subproperty of: E1 CRM Entity. P1 is identified by (identifies): E41 Appellation

Quantification:	many to many (0,n:0,n)
Scope note:	This property describes the E35 Title applied to an instance of E71 Man-Made Thing. The E55 Type of Title is assigned in a sub property.

The *P102.1 has type* property of the *P102 has title (is title of)* property enables the relationship between the Title and the thing to be further clarified, for example, if the Title was a given Title, a supplied Title etc.

It allows any man-made material or immaterial thing to be given a Title. It is possible to imagine a Title being created without a specific object in mind.

Examples:	

- the first book of the Old Testament (E33) *has title* "Genesis" (E35)

    has type translated (E55)

Properties:	**P102.1 has type: E55 Type**

P103 was intended for (was intention of)

Domain:	E71 Man-Made Thing
Range:	E55 Type
Quantification:	many to many (0,n:0,n)
Scope note:	This property links an instance of E71 Man-Made Thing to an E55 Type of usage.

It creates a property between specific man-made things, both physical and immaterial, to Types of intended methods and techniques of use. Note: A link between specific man-made things and a specific use activity should be expressed using *P19 was intended use of (was made for)*.

Examples:	

- this plate (E22) *was intended for* being destroyed at wedding reception (E55)

P104 is subject to (applies to)

Domain:	E72 Legal Object
Range:	E30 Right
Quantification:	many to many (0,n:0,n)
Scope note:	This property links a particular E72 Legal Object to the instances of E30 Right to which it is subject.

The Right is held by an E39 Actor as described by *P75 possesses (is possessed by)*.

Examples:	

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

P105 right held by (has right on)

Domain:	E72 Legal Object
Range:	E39 Actor

Superproperty of: E18 Physical Thing .P52 has current owner (is current owner of):E39 Actor

Quantification:	many to many (0,n:0,n)
Scope note:	This property identifies the E39 Actor who holds the instances of E30 Right to an E72 Legal Object.

It is a superproperty of *P52 has current owner (is current owner of)* because ownership is a right that is held on the owned object.

P105 right held by (has right on) is a shortcut of the fully developed path from E72 Legal Object through *P104 is subject to (applies to)*, E30 Right, *P75 possesses (is possessed by)* to

E39 Actor.

Examples:

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

P106 is composed of (forms part of)

Domain: E90 Symbolic Object

Range: E90 Symbolic Object

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

Scope note: This property associates an instance of E90 Symbolic Object with a part of it that is by itself an instance of E90 Symbolic Object, such as fragments of texts or clippings from an image.

Examples:

- This Scope note *P106* (E33) *is composed of* fragments of texts (E33)

- 'recognizable' *P106* (E90) *is composed of* 'ecognizabl' (E90)

P108 produced (was produced by)

Domain: E12 Production

Range: E24 Physical Man-Made Thing

Subproperty of: E11 Modification. P31 has modified (was modified by): E24 Physical Man-Made Thing

E63 Beginning of Existence. P92 brought into existence (was brought into existence by): E77 Persistent Item

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

Scope note: This property identifies the E24 Physical Man-Made Thing that came into existence as a result of an E12 Production.

The identity of an instance of E24 Physical Man-Made Thing is not defined by its matter, but by its existence as a subject of documentation. An E12 Production can result in the creation of multiple instances of E24 Physical Man-Made Thing.

Examples:

- The building of Rome (E12) *has produced* The Colosseum (E22)

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

Domain: E7 Activity

Range: E55 Type

Subproperty of:

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

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

Scope note: This property defines the kind of objects used in an E7 Activity, when the specific instance is either unknown or not of interest, such as use of "a hammer".

Examples:

- at the Battle of Agincourt (E7), the English archers *used object of type* long bow (E55)

P128 carries (is carried by)

Domain: E24 Physical Man-Made Thing

Range: E90 Symbolic Object

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

Superproperty of: E24 Physical Man-Made Thing. P65 shows visual item (is shown by): E36 Visual Item

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

Scope note: This property identifies an E73 Information Object carried by an instance of E24 Physical Man-Made Thing.

In general this would be an E84 Information Carrier P65 shows visual item (is shown by) is a specialisation of P128 carries (is carried by) which should be used for carrying visual items.

Examples:

Matthew's paperback copy of Reach for the Sky (E84) carries the text of Reach for the Sky (E73)

P129 is about (is subject of)

Domain: E89 Propositional Object

Range: E1 CRM Entity

Subproperty: E89 Propositional Object. P67 refers to (is referred to by): E1 CRM Entity

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

Scope note: This property documents that an E89 Propositional Object has as subject an instance of E1 CRM Entity.

This differs from P67 refers to (is referred to by), which refers to an E1 CRM Entity, in that it describes the primary subject or subjects of an E89 Propositional Object.

Examples:

- The text entitled 'Reach for the sky' (E33) is about Douglas Bader (E21)

P130 shows features of (features are also found on)

Domain: E70 Thing

Range: E70 Thing

Superproperty of: E33 Linguistic Object. P73 has translation (is translation of): E33 Linguistic Object

E24 Physical Man-Made Thing .P128 carries (is carried by). E90 Symbolic Object

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

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

Examples:

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

Properties: P130.1 kind of similarity: E55 Type

P131 is identified by (identifies)

Domain: E39 Actor

Range: E82 Actor Appellation

Subproperty: E1 CRM Entity. P1 is identified by (identifies): E41 Appellation

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

Scope note: This property identifies a name used specifically to identify an E39 Actor.

This property is a specialisation of *P1 is identified by (identifies)* is identified by.

Examples:

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

P138 represents (has representation)

Domain:	E36 Visual Item
Range:	E1 CRM Entity
Subproperty:	E89 Propositional Object. P67 refers to (is referred to by): E1 CRM Entity
Quantification:	many to many (0,n:0,n)
Scope note:	This property establishes the relationship between an E36 Visual Item and the entity that it visually represents.

Any entity may be represented visually. This property is part of the fully developed path from E24 Physical Man-Made Thing through *P65 shows visual item (is shown by)*, E36 Visual Item, *P138 represents (has representation)* to E1 CRM Entity, which is shortcut by *P62depicts (is depicted by)*. P138.1 mode of representation allows the nature of the representation to be refined.

Examples:

▪ the design on the reverse of a Swiss coin (E36) *represents* Helvetia (E28) *mode of representation* Profile (E55)

Properties: P138.1 mode of representation: E55 Type

P148 has component (is component of)

Domain:	E89 Propositional Object
Range:	E89 Propositional Object
Superproperty of:	
Quantification:	(0:n,0:n)
Scope note:	This property associates an instance of E89 Propositional Object with a structural part of it that is by itself an instance of E89 Propositional Object.

Examples:

▪ Dante's "Divine Comedy" (E89) *has component* Dante's "Hell" (E89)

5   Appendix: Modelling of Identifier Creation

This section describes an extension of the object-oriented model that gives an account of identifier creation processes in cataloguing practice. It goes beyond FRBR, but the authors found it particularly useful to reflect cataloguing practice and the bibliographic notion of identity within the context of the FRBR concepts. A generic version of it is going to be proposed as an amendment to ISO21127.

5.1 Introduction

During the cataloguing process, one important phase is the creation of what are termed controlled access points (also known as headings). Controlled access points enable a given instance of a given bibliographic entity to be consistently referred to in a given bibliographic database. Controlled access points are, in general, composed of parts, which are appellations in their own right. They are created to identify persons, corporate bodies, geographic areas, works, etc.

Specific sections of cataloguing rules (usually in the section entitled "Form of headings") specify the steps that have to be followed when creating a controlled access point and how to ensure its uniqueness. The steps include the choice of the preferred form of the name, the choice of qualifiers, their form, punctuation and order. During an F40 Identifier Assignment the cataloguer composes the identifier and makes informed decisions during the process.

Examples:
- o   Combining the (disambiguated) author name and work title to create a uniform heading:
  'Poe, Edgar Allan, 1809-1849. Murders in the rue Morgue'
- o   The identifier of a corporate body including names of higher bodies:
  'University of Washington. Libraries. Manuscripts Section'
- o   Author-title identifiers disambiguated by adding the musical form:
  'Bach, Johann Sebastian, 1685-1750. Wachet auf, ruft uns die Stimme (Cantata)'
  'Bach, Johann Sebastian, 1685-1750. Wachet auf, ruft uns die Stimme (Chorale prelude)'
- o   A personal name including the title of nobility
  'John, of Gaunt, Duke of Lancaster, 1340-1399'

5.2 Description of the model

In the following sections, the Identifier Creation Model is formally defined as an extension of the main FRBR$_{OO}$ Model, following the same conventions as in section 4.

5.3 Analysis of Procedures of the Cataloguing Process

Cataloguing is a complex, tricky activity, that involves much knowledge and concatenations of mental processes of which cataloguers themselves are often unaware but which comprise their own expertise. The work that was being done on FRBR was also a good opportunity to explicate some of these mental processes, and to show how cataloguers do what they do.

For instance, one of the most complex processes involved in cataloguing, the creation of controlled access points, consists in selecting and assembling existing appellations so as to make the resulting construct as specific, accurate, and "unique" as possible, so as to disambiguate the way a given instance of a given bibliographic entity is consistently referred to in a given bibliographic database. In order to model that complex process, the Working Group declared two distinct classes (one of which was borrowed from the CIDOC CRM): F12 Name (= CIDOC CRM E41 Appellation), and F13 Identifier. F13 Identifier corresponds to standardised strings such as uniform titles, as well as the notion of numeric identifiers such as international standard numbers defined in ISO standards (such as ISBN, ISSN, ISRC, etc.), and is declared as a subclass of F12 Name, which makes it possible to assemble two constructed identifiers in order to create a new, distinct identifier (as is the case, for instance, when one creates an author-title heading in order to refer to a work through the controlled form of its creator's name, the dates that identify the time-span during which the creator was alive or active, and a selected form of the work's title). Any qualifier used in cataloguing practice to disambiguate headings is regarded as the name (or appellation) of something, thanks to the mechanisms defined in CIDOC CRM: dates are the appellation of a given time-span (E52 in CIDOC CRM), the title of a person is the appellation of a type (E55 in CIDOC CRM), a qualifier such as '(Coventry)' as in the example is provided in the *FRBR Final Report* is the name of a place (E53 in CIDOC

CRM), a qualifier such as '(Motion picture)' as required in AACR in uniform titles for cinematic works is the appellation of a type (E55) of work, etc. This activity can be represented as:
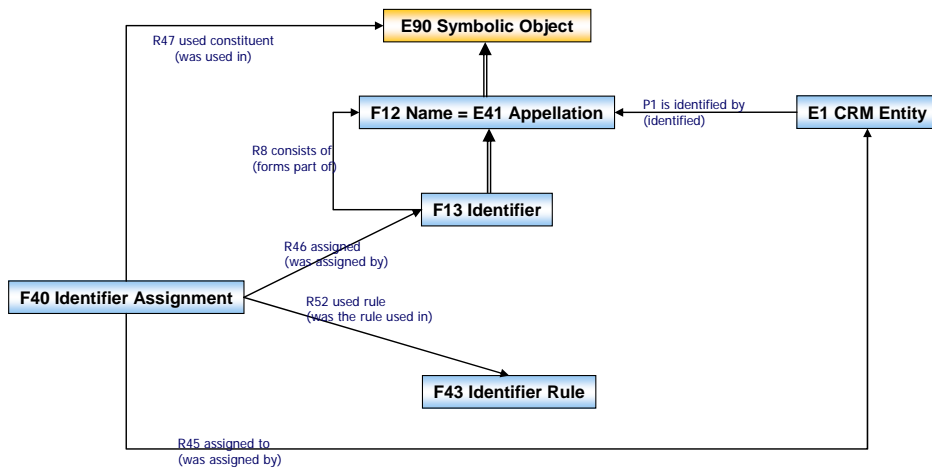
Identifier Construction

Figure 11

The model described in Figure 11 is relevant beyond library practice. It allows for the implementation of the reasoning processes involved in analysing the information encoded in the parts of an identifier. Therefore the CIDOC CRM is going to incorporate this model in a future version.

The process of creating controlled access points that are as specific, accurate, and "unique" as possible is particularly interesting when applied to instances of Work and Expression, concepts newly introduced to CRM by FRBR, as they lack a material nature. Figure 12 shows how the instance of an F2 Expression common to some instances of F3 Manifestation Product Type or F4 Manifestation Singleton would be identified with the one manifestation of a particular expression that has been selected to be "representative" for this expression. This model does not correspond to any explicit library information. Rather, it describes an implicit process behind the appellation creation process: The **very fact** of composing an identifier for an instance of F2 Expression using the identifier of one particular manifestation makes the latter "representative" for the corresponding expression. Note that the "representative" manifestation is not necessarily the historically first or earliest one. It might be the most popular one, or the first one detected. It might be a fragment of a whole detected later. As this introduces a kind of arbitrariness, the authors found this model interesting when discussing the respective practices. Similarly, an instance of F1 Work **can only be** identified if a corresponding instance of F2 Expression is selected as "representative".

How to identify Work?

E39 Actor

E13 Attribute Assignment

F3 Manifestation Product Type

F4 Manifestation-Singleton

R53 assigned
(was assigned by)

F41 Representative Manifestation Assignment

R49 assigned
(was assigned by)

R4 comprises carriers of
(carriers provided by)

R41 has representative
manifestation product type
(is representative
manifestation product
type for)

R42 has representative manifestation-singleton
(is representative manifestation singleton for)*

R43 carried out by
(performed)

F44 Bibliographic Agency

R48 assigned to
(was assigned by)

F2 Expression

R15 has fragment
(is fragment of)

R44 carried out by
(performed)

R51 assigned
(was assigned by)

F22 Self-Contained Expression

F23 Expression Fragment

F42 Representative Expression Assignment

R40 has representative
expression (is representative
expression of)

R50 assign to
(was assigned by)

F15 Complex Work

R3 is realised in
(realises)

F1 Work

*R42 has representative manifestation-singleton
(is representative manifestation singleton for) is
a sub property of P128 carries (is carried by)

Figure 12

5.3.1 Class Hierarchy of the FRBR$_{OO}$ Identifier Creation Model aligned with CIDOC CRM

E1	CRM Entity							
E2	-	Temporal Entity						
E3	-	-	Condition State					
E4	-	-	Period =F8 Event					
E5	-	-	-	Event				
E7	-	-	-	-	Activity			
E13	-	-	-	-		Attribute Assignment		
E15	-	-	-	-		-	Identifier Assignment = **F40** Identifier Assignment	
F41							Representative Manifestation Assignment	
F42							Representative Expression Assignment	
E77	-	Persistent Item						
E70	-	-	Thing					
E72	-	-	-	Legal Object				
F3					Manifestation Product Type			
E18	-	-	-	-	Physical Thing			
E24	-	-	-	-		Physical Man-Made Thing		
F4						Manifestation Singleton		
E73	-	-	-	-	Information Object			
E29	-	-	-	-		Design or Procedure		
F43							Identifier Rule	
E71	-	-	-	Man-Made Thing				
E24	-	-	-	-	*Physical Man-Made Thing*			
F4						Manifestation Singleton		
E28	-	-	-	-	Conceptual Object			
E73	-	-	-	-		*Information Object*		
E29	-	-	-	-		-	*Design or Procedure*	
F43								Identifier Rule
E39	-	-	Actor					
E74	-	-	-	Group=F11 Corporate Body				
F44			-		Bibliographic Agency			

5.3.2 FRBR_{OO} Identifier Creation Model Class declaration

The classes of the FRBR_{OO} Identifier Creation Model are comprehensively declared in this section using the same format as in section 2.5.

The declarations for the classes F1, F2 and F4 are repeated here briefly without their scope notes and examples, in order to show the declaration of their additional properties R40, R41 and R42 in the complete class context. The additional property declarations as well as subclasses / superclasses are highlighted in bold, whereas the properties, superclasses and subclasses from the main model are referred to only in grey color.

F1 Work

Subclass of:	E89 Propositional Object
Superclass of:	F14 Individual Work
	F15 Complex Work
	F16 Container Work
	F21 Recording Work

Properties**:**

        R1 is logical successor of (has successor): F1 Work

        R2 is derivative of (has derivative): F1 Work

        R3 is realised in (realises): F22 Self-Contained Expression

        R40 has representative expression (is representative expression for): F22 Self-contained Expression

F2 Expression

Subclass of:	E73 Information Object
Superclass of:	F22 Self-Contained Expression`
	F23 Expression Fragment
	F43 Identifier Rule

Properties**:**

        R4 carriers provided by (comprises carriers of): F3 Manifestation Product Type

        R5 has component (is component of): F22 Self-Contained Expression

        R41 has representative manifestation product type (is representative manifestation product type for): F3 Manifestation Product Type

F4 Manifestation Singleton

Subclass of:	E24 Physical Man-Made Thing
Properties:	**R42 is representative manifestation singleton for (has representative manifestation singleton): F2 Expression**

F40 Identifier Assignment

Equal to:	E15 Identifier Assignment
Scope note:	This class comprises activities that result in the allocation of an identifier to any E1 CRM Entity. An F40 Identifier Assignment may include the creation of the identifier from multiple constituents. The syntax of the identifier and the kinds of constituents to be used in constructing it may be declared in a rule. The construction of controlled access points for the names of persons, families and corporate bodies following specific cataloguing rules is a typical library application. F40 Identifier Assignment also includes the assignment of uniform titles as controlled access points for works or expressions

Examples: Assigning the name heading 'William, Prince, Duke of Cambridge, 1982-' as a controlled access point for a personal name using the *Anglo-American Cataloguing Rules*, 2nd edition

Assigning the name heading 'Library and Archives Canada' as an authorised controlled access point for a corporate body name using the *Anglo-American Cataloguing Rules*, 2nd edition

Assigning the name heading 'Bibliothèque et Archives Canada' as an authorised controlled access point for a corporate body name using the *Règles de catalogage anglo-américaines*, 2e édition

Assigning the author-title heading 'Goethe, Johann Wolfgang von, 1749-1832. Faust. 1. Theil.' as a uniform title for a work

Assigning the title heading 'Bible. English. American Standard' as a uniform title for an expression

Properties:

R45 assigned to (was assigned by): E1 CRM Entity

R46 assigned (was assigned by): F13 Identifier

R47 used constituent (was used in): E90 Symbolic Object

R52 used rule (was the rule used in): F43 Identifier Rule

F41 Representative Manifestation Assignment

Subclass of: E13 Attribute Assignment

Scope note: This class comprises activities through which an Agency declares (implicitly or explicitly) that a given instance of F3 Manifestation Product Type or F4 Manifestation Singleton is representative for a given F2 Expression, i.e., that some features found on that instance of F3 Manifestation Product Type or F4 Manifestation Singleton (most prominently, information about the title) can be inferred to also apply to that instance of F2 Expression, no matter within which manifestation it is embodied.

The reasoning behind is that the Work title is known through the title of an Expression that is deemed representative of the Work, and the title of the representative Expression is known through the title proper of a Manifestation that is deemed representative of the Expression representative of the Work.

Examples: By using the title proper 'Mrs Dalloway' found on the first edition of a novel by Virginia Woolf as the basis for a uniform title for that novel, rather than the title proper 'The hours' found on the manuscripts held by the British Library, an Agency implicitly states that the printed edition (instance of F3 Manifestation Product Type) is representative for the instance of F2 Expression that is representative for the F1 Work, whereas the hand-written instances of F4 Manifestation Singleton are not

By not using the title proper 'The tragicall historie of HAMLET Prince of Denmarke' found on an instance of F3 Manifestation Product Type as the basis for a uniform title heading for a work by Shakespeare, an Agency explicitly states that that instance of F3 Manifestation Product Type is not representative (at least, as far as title information is concerned) for an F2 Expression of Shakespeare's F1 Work 'Hamlet'

Selecting the manuscript identified by shelfmark 'MS-8282' within the collections of the National Library of France, Department for Music, as representative for the musical text of Stanislas Champein's opera 'Vichnou' [explanation: the BnF's Department for Music holds 3 manuscript scores (identified by shelfmarks 'MS-8282', 'MS-13778', and 'MS-17321') for this opera; the title inscribed on MS-8282 is 'Vichnou', while MS-13778 and MS-17321 are entitled 'Vistnou'; the authorised form chosen by cataloguers and reference tools such as the Grove Dictionary for Opera is 'Vichnou', while 'Vistnou' is recorded in the BnF's authority file only as a cross reference]

Properties:

R43 carried out by (performed): F44 Bibliographic Agency

R48 assigned to (was assigned by): F2 Expression

R49 assigned (was assigned by): F3 Manifestation Product Type

R53 assigned (was assigned by): F4 Manifestation Singleton

F42 Representative Expression Assignment

Subclass of: E13 Attribute Assignment

Scope note: This class comprises activities through which an Agency declares (implicitly or explicitly) that a given instance of F2 Expression is representative for a given F15 Complex Work, i.e., that some attributes of that instance of F2 Expression (most prominently, information about the title) can be inferred to also apply to that instance of F15 Complex Work, no matter in which particular expression it is realised.

    The reasoning behind this is that the Work title is known through the title of an Expression that is deemed representative of the Work, and the title of the representative Expression is known through the title of a Manifestation that is deemed representative of the Expression that is representative of the Work.

    For instance, by using the qualified uniform title 'Poe, Edgar Allan, 1809-1849. Murders in the rue Morgue (French)' for the French rendition of Poe's 'Murders in the rue Morgue' by Baudelaire, an Agency implicitly states that the French text does not constitute a representative F2 Expression for Poe's F1 Work, however the original English text does constitute a representative F2 Expression for Poe's F1 Work.

Examples: Choosing the English text entitled 'Murders in the rue Morgue', with that particular formulation of its title, as representative for the complex work Edgar Allan Poe's 'Murders in the rue Morgue'

Properties**:**

    R44 carried out by (performed): F44 Bibliographic Agency

    R50 assigned to (was assigned by): F15 Complex Work

    R51 assigned (was assigned by): F2 Expression

F43 Identifier Rule

Subclass of: E29 Design or Procedure,

    F2 Expression

Scope note: This class comprises sets of instructions relating to the formulation of a unique identifier

Examples: AACR2R 25.25-25.35F1

    RAK-Musik (Revidierte Ausgabe 2003), Chapter 6

    AFNOR Z 44-079

Properties**:**

F44 Bibliographic Agency

Subclass of: E40 Legal Body

Scope note: This class comprises agents who create the bibliographic description of publications and perform the authority control associated with such descriptions, for the description of copies of such publications actually held by libraries, and for the description of unique documents (manuscripts, objects…) held by libraries.

    The activity of creating such descriptions implies that one has to make decisions (as to the uniform title for a work, as to whether an arrangement still belongs to the same work or is definitely a new work, etc.). Since such decisions always are debatable and different agencies can make different decisions about the same real-world entities, it is important to document which agency made which decision.

Examples: The National Library of France, identified in bibliographic and authority records by the code

'FRBNF' at the beginning of INTERMARC field 001

Properties:

5.3.3 Property Hierarchy of FRBROO Identifier Creation Model

Property id		Property Name	Entity – Domain	Entity – Range
P130		shows features of (features are also found on):	E70 Thing.	E70 Thing
-	R40	has representative expression (is representative expression for)	F1 Work	F2 Expression
R4		carriers provided by (comprises carriers of)	F2 Expression	F3 Manifestation Product Type
-	R41	has representative manifestation product type (is representative manifestation product type for)	F2 Expression	F3 Manifestation Product Type
P14		carried out by (performed)	E7 Activity	E39 Actor
-	R43	carried out by (performed)	F41 Representative Manifestation Assignment	F44 Bibliographic Agency
-	R44	carried out by (performed)	F42 Representative Expression Assignment	F44 Bibliographic Agency
P16		used specific object (was used for)	E7 Activity	E70 Thing
-	R47	used constituent (was used in)	F40 Identifier Assignment	E90 Symbolic Object
P33		used specific technique (was used by)	E7 Activity	E29 Design or Procedure
-	R52	used rule (was the rule used in)	F40 Identifier Assignment	F43 Identifier Rule
P37 = R46	-	assigned (was assigned by)	E15 Identifier Assignment =F40 Identifier Assignement	E42 Identifier =F13 Identifier
P128		carries (is carried by)	E24 Physical Man-Made Thing	E73 Information Object
-	R42	is representative manifestation singleton for (has representative manifestation singleton)	F4 Manifestation Singleton	F2 Expression
P140		assigned attribute to (was attributed by)	E13 Attribute Assignment	E1 CRM Entity
-	R45	assigned to (was assigned by)	F40 Identifier Assignment	E1 CRM Entity
-	R48	assigned to (was assigned by)	F41 Representative Manifestation Assignment	F2 Expression
-	R50	assigned to (was assigned by)	F42 Representative Expression Assignment	F15 Complex Work
P141		assigned (was assigned by)	E13 Attribute Assignement	E1 CRM Entity
-	R49	assigned (was assigned by)	F41 Representative Manifestation Assignment	F3 Manifestation Product Type
-	R51	assigned (was assigned by)	F42 Representative Expression Assignment	F2 Expression
-	R53	assigned (was assigned by)	F41 Representative Manifestation Assignment	F4 Manifestation Singleton

5.3.4 FRBR_{OO} Identifier Creation Model Property declaration

The properties of the FRBR_{OO} Identifier Creation Model are comprehensively declared in this section using the same format as in section 2.7.

R40 has representative expression (is representative expression for)

Domain:	F1 Work
Range:	F2 Expression
Superproperty of:	
Subproperty of:	E70 Thing. P130 shows features of (features are also found on): E70 Thing
Quantification:	(0:n,0:n)

Scope note: This property identifies an instance of F2 Expression that has been chosen as the most characteristic expression of the instance of F1 Work of which it is an expression.

Typically, any expression that is not regarded as "representative" for the work it expresses, would require a uniform title, with qualifiers specifying the differences between that expression and a representative expression, although this may not always be done in practice. The title of a Work may not be one taken from a representative expression.

A given work can have more than one representative expression, provided the differences between these expressions are not deemed "substantial." If the anticipated needs of users are not considered to call for bibliographic distinctions between variant expressions of a work, then even expressions that differ significantly from each other can be regarded as equally representative for the work. (See *FRBR: Final Report,* p. 19-20).

A given expression can be deemed representative for a work with regard to some of its aspects (e.g., the text contained in an edition the title proper of which reads 'The tragicall historie of HAMLET Prince of Denmarke', and the language of that text), and not representative for it with regard to some other aspects (e.g., the title proper 'The tragicall historie of HAMLET Prince of Denmarke' itself, which, being different from the title that is regarded as "representative" for Shakespeare's work, will require the use of a uniform title).

R40 has representative expression is a shortcut of the more developed path F1 Work *R50B was assigned by* F42 Representative Expression Assignment *R51 assigned* F2 Expression.

Examples: Walt Whitman's textual work titled 'Leaves of Grass' (F15) *R40 has representative expression* the linguistic, English content of the 1892 edition, known as the deathbed edition, of Walt Whitman's textual work titled 'Leaves of Grass' (F2)

Beethoven's 5th symphony (F15) *R40 has representative expression* the notational content of the 1809 edition of Beethoven's 5th symphony (F2)

Beethoven's 5th symphony (F15) *R40 has representative expression* the sonic content of the recorded performance of Beethoven's 5th symphony by the Berliner Philharmoniker conducted by Herbert von Karajan in Berlin in November 1982 (F2)

The series titled 'Nancy Drew Mysteries' (F18) *R40 has representative expression* The overall content provided by publisher named 'Armada' in one volume belonging to that series, including, among other elements, the series title page, which states that the title of the series reads 'Nancy Drew Mysteries' (F24)

The periodical titled 'The New Courier', released by UNESCO, and described by the National Library of France in a bibliographic record that contains the following statement: "Notice réd. d'après le n° d'octobre 2002" (i.e., "description based on the issue dated October 2002") (F18) *R40 has representative expression* The overall content of the October 2002 issue of UNESCO's periodical titled 'The New Courier' (F24)

R41 has representative manifestation product type (is representative manifestation product type for)

Domain:	F2 Expression

Range: F3 Manifestation Product Type

Superproperty of:

Subproperty of: F2 Expression.R4 carriers provided by (comprises carriers of):F3 Manifestation Product Type

Quantification: (0:n,0:n)

Scope note: This property identifies an instance of F3 Manifestation Product Type that has been chosen as the most characteristic Manifestation Product Type of the instance of F2 Expression of which it is a manifestation.

Identifying an instance of F3 Manifestation Product Type that is representative for an instance of F2 Expression makes it possible in turn to identify an instance of F2 Expression that is representative for an instance of F1 Work, and to decide what should be regarded as the title of the work.

The title of an Expression may not be one taken from a representative Manifestation Product Type or Manifestation Singleton.

A given expression can have more than one Representative Manifestation Product Type.

R41 has representative manifestation product type is a shortcut of the more developed path F2 Expression *R48B was assigned by* F41 Representative Manifestation Assignment *R49 assigned* F3 Manifestation Product Type.

Examples: The original, English text of Virginia Woolf's textual work entitled 'Mrs Dalloway' (F22) *R41 has representative manifestation product type* the first edition, dated 1925, of Virginia Woolf's textual work entitled 'Mrs Dalloway' (F3)

R42 is representative manifestation singleton for (has representative manifestation singleton)

Domain: F4 Manifestation Singleton

Range: F2 Expression

Superproperty of:

Subproperty of: E24 Physical Man-Made Thing.P128 carries (is carried by):E73 Information Object

Quantification: (0:n,0:n)

Scope note: This property identifies an instance of Manifestation Singleton that has been declared as the unique representative for an instance of F2 Expression by some bibliographic agency.

This property identifies an instance of F4 Manifestation Singleton that has been chosen as the most characteristic Manifestation Singleton of the instance of F2 Expression of which it is a manifestation.

Identifying an instance of F4 Manifestation Singleton that is representative for an instance of F2 Expression makes it possible in turn to identify an instance of F2 Expression that is representative for an instance of F1 Work, and to decide what should be regarded as the title of the work.

The title of an Expression may not be one taken from a representative Manifestation Product Type or Manifestation Singleton.

A given expression can have more than one representative Manifestation Singleton.

It is a shortcut for the more developed path: F2 Expression *R48B was assigned by* F41 Representative Manifestation Assignment *R53 assigned* F4 Manifestation Singleton.

Examples: The musical text of Stanislas Champein's opera 'Vichnou' (F22) *R42 has representative manifestation singleton* The manuscript identified by shelfmark 'MS-8282' within the collections of the National Library of France, Department for Music (F4) [explanation: the BnF's Department for Music holds 3 manuscript scores (identified by shelfmarks 'MS-8282', 'MS-13778', and 'MS-17321') for this opera; the title inscribed on MS-8282 is 'Vichnou', while

MS-13778 and MS-17321 are titled 'Vistnou'; the authorised form chosen by cataloguers and reference tools such as the Grove Dictionary for Opera is 'Vichnou', while 'Vistnou' is recorded in the BnF's authority file only as a cross reference]

R43 carried out by (performed)

Domain: F41 Representative Manifestation Assignment

Range: F44 Bibliographic Agency

Superproperty of:

Subproperty of: E7 Activity.P14 carried out by (performed):E39 Actor

Quantification: (1:1,0:n)

Scope note: This property associates a bibliographic agency (represented by one or more of its cataloguers) and the assigning of which Manifestation (i.e., which instance of F3 Manifestation Product Type or F4 Manifestation Singleton) is representative for a given expression.

In cataloguing practice, such a relationship is usually just implicit. However, it can become explicit, for example when a bibliographic agency creates an authority record for a given work and fills the "Source" field with information about the publication that contains the expression that was used by the bibliographic agency to establish the uniform title for the work realised in that expression.

Examples: Assigning the manuscript identified by shelfmark 'MS-8282' within the collections of the National Library of France, Department for Music, as representative for the musical text of Stanislas Champein's opera 'Vichnou' (F41) *R43 carried out by* The National Library of France, identified by code 'FRBNF' at the beginning of field 001 in the INTERMARC authority record for the author/title heading for Stanislas Champein's opera 'Vichnou' (F44)

The assignment of the book that was published at some time between 1991 and 2004 and the title proper of which reads 'The astādhyāyī of Pānini with translation and explanatory notes' as being a representative instance of F3 Manifestation Product Type for texts that constitute bilingual editions in Sanskrit and English of Pānini's 'Astādhyāyī' (F41) *R43 carried out by* The bibliographic agency identified, in field 040 of a MARC21 authority record for the author/title heading 'Pānini. Astādhyāyī. English & Sanskrit', by the code 'DLC' (i.e., the Library of Congress) (F44)

R44 carried out by (performed)

Domain: F42 Representative Expression Assignment

Range: F44 Bibliographic Agency

Superproperty of:

Subproperty of: E7 Activity.P14 carried out by (performed):E39 Actor

Quantification: (1:1,0:n)

Scope note: This property associates a bibliographic agency (represented by one or more of its cataloguers) and the assigning of which expression is representative for a given Work.

In cataloguing practice, such a relationship is usually just implicit. However, it can become explicit, for example when a bibliographic agency creates an authority record for a given work and fills the "Source" field with information about the publication that contains the expression that was used by the bibliographic agency to establish the uniform title for the work realised in that expression.

Examples: Assigning the musical text contained in the manuscript identified by shelfmark 'MS-8282' within the collections of the National Library of France, Department for Music, as representative for Stanislas Champein's opera 'Vichnou' (F41) *R44 carried out by* The National Library of France, identified by code 'FRBNF' at the beginning of field 001 in the INTERMARC authority record for the author/title heading for Stanislas Champein's opera 'Vichnou' (F44)

The assignment of the Sanskrit text contained in the book that was published in 1973 under the title 'Pāṇinīyaṃ Sabdānuśāsanam' as being a representative instance of F2 Expression for the

textual work of Pānini titled 'Astādhyāyī' (F42) *R44 carried out by* The bibliographic agency identified, in field 040 of a MARC21 authority record for the author/title heading 'Pānini. Astādhyāyī', by the code 'DLC' (i.e., the Library of Congress) (F44)

R45 assigned to (was assigned by)

Domain:	F40 Identifier Assignment
Range:	E1 CRM Entity
Superproperty of:	
Subproperty of:	E13 Attribute Assignment.P140 assigned attribute to (was attributed by): E1 CRM Entity
Quantification:	(1:1,0:n)
Scope note:	This property identifies the entity to which an actor, such as a bibliographic agency, assigned an instance of F13 Identifier.
Examples:	Assigning the uniform title 'The Adoration of the Shepherds (Coventry)' (F40) *R45 assigned to* The anonymous textual work otherwise simply known as 'The Adoration of the Shepherds' (F15) [assignment of an Identifier to a Work]
	Assigning the uniform title 'Rite of spring (Choreographic Work: Bausch)' (F40) *R45 assigned to* Pina Bausch's choreographic work initially simply titled 'Rite of spring' (F15) [assignment of an Identifier to a Work]
	Assigning the uniform title 'King Kong (1933)' (F40) *R45 assigned to* The motion picture directed in 1933 by Merian C. Cooper and Ernest B. Schoedsack and simply titled 'King Kong' (F15) [assignment of an Identifier to a Work]
	Assigning the personal name heading 'Guillaume, de Machaut, ca. 1300-1377' (F40) *R45 assigned to* Guillaume de Machaut (F10) [assignment of an Identifier to a Person]
	Assigning the corporate name heading 'Univerza v Ljubljani. Oddelek za bibliotekarstvo' (F40) *R45 assigned to* The Department for library science of the University of Ljubljana (F11) [assignment of an Identifier to a Corporate Body]

R46 assigned (was assigned by)

Domain:	F40 Identifier Assignement
Range:	F13 Identifier
Equal to:	E15 Identifier Assignement:P37 assigned (was assigned by): E42 Identifier
Quantification:	(1:1,0:n)
Scope note:	This property associates the instance of F13 Identifier assigned to an instance of E1 CRM Entity and the event of assigning it.
Examples:	Assigning a uniform title to the anonymous textual work known as 'The Adoration of the Shepherds', a title shared by another, distinct anonymous textual work (F40) *R46 assigned* Uniform title 'The Adoration of the Shepherds (Coventry)' (F13)
	Assigning a uniform title to Pina Bausch's choreographic work initially simply entitled 'Rite of spring' (F40) *R46 assigned* Uniform title 'Rite of spring (Choreographic Work: Bausch)' (F13)
	Assigning a uniform title to the motion picture directed in 1933 by Merian C. Cooper and Ernest B. Schoedsack and entitled 'King Kong' (F40) *R46 assigned* Uniform title 'King Kong (1933)' (F13)
	Assigning a personal name heading to Guillaume de Machaut (F40) *R46 assigned* 'Guillaume, de Machaut, ca. 1300-1377' (F13)
	Assigning a corporate name heading to The Department for library science of the University of Ljubljana (F40) *R46 assigned* 'Univerza v Ljubljani. Oddelek za bibliotekarstvo' (F13)
	Assigning a subject heading (in an authority record) to the concept of knowledge representation (F40) *R46 assigned* 'Conceptual structures (Information theory)' (F13)
	Assigning a subject heading (in a bibliographic record) to the concept of the appreciation of

Victor Hugo's works in Germany between 1870 and 1914 (F40) *R46 assigned* 'Hugo, Victor, 1802-1885 – Appreciation – Germany – 1870-1914' (F13)

R47 used constituent (was used in)

Domain: F40 Identifier Assignment

Range: E90 Symbolic Object

Superproperty of:

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

Quantification: (0:n,0:n)

Scope note: This property associates the event of assigning an instance of F13 Identifier to an entity with the elements that an actor used to compose that identifier.

Examples: Assigning a uniform title to the anonymous textual work known as 'The Adoration of the Shepherds', a title shared by another, distinct anonymous textual work (F40) *R47 used constituent* 'Coventry' (E48 Place Name – i.e., the name of an F9 Place)

                Assigning a uniform title to Pina Bausch's choreographic work initially simply entitled 'Rite of spring' (F40) *R47 used constituent* '(Choreographic Work: Bausch)' (F12), which in turn is composed of 'Choreographic Work' (F12 Name for an E55 Type), and 'Bausch' (F12 Name for an F10 Person)

                Assigning a uniform title to the motion picture directed in 1933 by Merian C. Cooper and Ernest B. Schoedsack and entitled 'King Kong' (F40) *R47 used constituent* '1933' (E50 Date, subclass of E41 Appellation)

                Assigning the personal name heading 'Guillaume, de Machaut, ca. 1300-1377' to Guillaume de Machaut (F40) *R47 used constituent* 'Guillaume, de Machaut' (F12 Name for an F10 Person), and 'ca. 1300-1377' (E49 Time Apellation for an E52 Time-Span [P79 beginning is qualified by E62 String "ca."])

                Assigning the corporate name heading 'Univerza v Ljubljani. Oddelek za bibliotekarstvo' to The Department for library science of the University of Ljubljana (F40) *R47 used constituent* 'Univerza v Ljubljani' (F13 Identifier for an F11 Corporate Body), and 'Oddelek za bibliotekarstvo' (F13 Identifier for an F11 Corporate Body)

R48 assigned to (was assigned by)

Domain: F41 Representative Manifestation Assignment

Range: F2 Expression

Superproperty of:

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

Quantification: (1:1,0:n)

Scope note: This property associates the event of assigning a representative instance of F3 Manifestation Product Type or F4 Manifestation Singleton with the expression to which it was assigned.

Examples: Assigning the manuscript held by the National Library of France and identified by shelf mark 'MS-8282' as a representative Manifestation Singleton (F36) *R48 assigned to* The musical text of Stanislas Champein's opera 'Vichnou' (F22)

R49 assigned (was assigned by)

Domain: F41 Representative Manifestation Assignment

Range: F3 Manifestation Product Type

Superproperty of:

Subproperty of: E13 Attribute Assignement.P141 assigned (was assigned by): E1 CRM Entity

Quantification: (0:n,0:n)

Scope note:	This property associates the event of assigning a representative instance of F3 Manifestation Product Type with the F3 Manifestation Product Type which has been assigned.
Examples:	Assigning a representative manifestation for the English text of Virginia Woolf's novel entitled 'The hours' on the original manuscript and 'Mrs Dalloway' on the first printed edition (F41) *R49 assigned* The first printed edition, entitled 'Mrs Dalloway' (F3)

R50 assigned to (was assigned by)

Domain:	F42 Representative Expression Assignment
Range:	F15 Complex Work
Superproperty of:	
Subproperty of:	E13 Attribute Assignment.P140 assigned attribute to (was attributed by): E1 CRM Entity
Quantification:	(1:1,0:n)
Scope note:	This property associates the event of assigning a representative instance of F2 Expression with the instance of F15 Complex Work to which it was assigned.
Examples:	Assigning the English text entitled 'Murders in the rue Morgue', with that particular formulation of its title, as a representative expression (F42) *R50 assigned to* Edgar Allan Poe's textual work known, accordingly, as 'Murders in the rue Morgue' (F15)
	Assigning the Sanskrit text entitled 'Astādhyāyī', with that particular formulation of its title, as a representative expression (F42) *R50 assigned to* Pānini's textual work known, accordingly, as 'Astādhyāyī' (F15)

R51 assigned (was assigned by)

Domain:	F42 Representative Expression Assignment
Range:	F2 Expression
Superproperty of:	
Subproperty of:	E13 Attribute Assignement.P141 assigned (was assigned by): E1 CRM Entity
Quantification:	(1:n,0:n)
Scope note:	This property associates the event of assigning a representative instance of F2 Expression with the F2 Expression which has been assigned.
Examples:	Assigning a representative expression to Edgar Allan Poe's textual work known as 'Murders in the rue Morgue' in English or 'Double meurtre dans la rue Morgue' in French (F42) *R51 assigned* The English text entitled, in English, 'Murders in the rue Morgue', with that particular formulation of its title (F22)
	Assigning a representative, although fragmentary, expression to Sappho's ode referred to as Sappho's Poem #2 (F42) *R51 assigned* The ancient Greek text of four stanzas quoted in the treatise entitled 'On the sublime' attributed to an unidentified author referred to as 'Pseudo-Longinus' (F23)

R52 used rule (was the rule used in)

Domain:	F40 Identifier Assignment
Range:	F43 Identifier Rule
Superproperty of:	
Subproperty of:	E7 Activity.P33 used specific technique:E29 Design or Procedure
Quantification:	(0:n,0:n)
Scope note:	This property associates the event of assigning an instance of F13 Identifier with the instructions followed by an actor, such as a Bibliographic Agency, in creating that identifier.
Examples:	Assigning the uniform title 'Bach, Johann Sebastian, 1685-1750. Concertos, violins (2), string orchestra, BWV 1043, D minor' to Johann Sebastian Bach's Double Concerto in D minor, BWV

1043 (F40) *R52 used rule* AACR2R 25.25-25.35F1 (F43)

Assigning the uniform title 'Bach, Johann Sebastian [Konzerte, Vl 1 2 Orch BWV 1043]' to Johann Sebastian Bach's Double Concerto in D minor, BWV 1043 (F40) *R52 used rule* RAK-Musik (Revidierte Ausgabe 2003), Chapter 6 (F43)

Assigning the uniform title 'Bach, Johann Sebastian (1685-1750). – [Concertos. Violons (2), orchestre à cordes. BWV 1043. Ré mineur]' to Johann Sebastian Bach's Double Concerto in D minor, BWV 1043 (F40) *R52 used rule* AFNOR Z 44-079 (F43)

Assigning the personal name heading 'Guillaume de Machaut (1300?-1377)' (F40) *R52 used rule* AFNOR Z 44-061 (F43)

Assigning the personal name heading 'Guillaume, de Machaut, ca. 1300-1377' (F40) *R52 used rule* AACR2R 22 (F43)

R53 assigned (was assigned by)

Domain: F41 Representative Manifestation Assignment

Range: F4 Manifestation Singleton

Superproperty of:

Subproperty of: E13 Attribute Assignement.P141 assigned (was assigned by): E1 CRM Entity

Quantification: (0:n,0:n)

Scope note: This property associates the event of assigning a representative instance of F4 Manifestation Singleton with the F4 Manifestation Singleton which has been assigned.

Examples: Assigning a representative manifestation to the musical text of Stanislas Champein's opera 'Vichnou' (F41) *R53 assigned* The manuscript identified by shelfmark 'MS-8282' within the collections of the National Library of France, Department for Music [explanation: the BnF's Department for Music holds 3 manuscript scores (identified by shelfmarks 'MS-8282', 'MS-13778', and 'MS-17321') for this opera; the title inscribed on MS-8282 is 'Vichnou', while MS-13778 and MS-17321 are entitled 'Vistnou'; the authorised form chosen by cataloguers and reference tools such as the Grove Dictionary for Opera is 'Vichnou', while 'Vistnou' is recorded in the BnF's authority file only as a cross reference]

5.4 Referred CIDOC CRM Classes and Properties:

This section provides a comprehensive list of all constructs used by the FRBR$_{OO}$ Identifier Creation Model from version 5.0.1 of the CIDOC CRM. This use implies reference as an immediate superclass or superproperty.

5.4.1 Referred CIDOC CRM Classes

This section contains the complete definitions of the classes of the CIDOC CRM Conceptual Reference Model version 5.0.1 referred to by the FRBR$_{OO}$ Identifier Creation Model. The properties within these class definitions which are referred to by the FRBR$_{OO}$ Identifier Creation Model are presented in bold. Otherwise, we apply the same format conventions as in section 2.6.

E13 Attribute Assignment

Subclass of:	E7 Activity
Superclass of:	E14 Condition Assessment
	E15 Identifier Assignment
	E16 Measurement
	E17 Type Assignment
Scope note:	This class comprises the actions of making assertions about properties of an object or any relation between two items or concepts.
	This class allows the documentation of how the respective assignment came about, and whose opinion it was. All the attributes or properties assigned in such an action can also be seen as directly attached to the respective item or concept, possibly as a collection of contradictory values. All cases of properties in this model that are also described indirectly through an action are characterised as "short cuts" of this action. This redundant modelling of two alternative views is preferred because many implementations may have good reasons to model either the action or the short cut, and the relation between both alternatives can be captured by simple rules.
	In particular, the class describes the actions of people making propositions and statements during certain museum procedures, e.g. the person and date when a condition statement was made, an identifier was assigned, the museum object was measured, etc. Which kinds of such assignments and statements need to be documented explicitly in structures of a schema rather than free text, depends on if this information should be accessible by structured queries.
Examples:	
	▪ the assessment of the current ownership of Martin Doerr's silver cup in February 1997
Properties:	
	P140 assigned attribute to (was attributed by): E1 CRM Entity
	P141 assigned (was assigned by): E1 CRM Entity

E15 Identifier Assignment

Subclass of:	E13 Attribute Assignment
Scope note:	This class comprises activities that result in the allocation of an identifier to an instance of E1 CRM Entity. An E15 Identifier Assignment may include the creation of the identifier from multiple constituents, which themselves may be instances of E41 Appellation. The syntax and kinds of constituents to be used may be declared in a rule constituting an instance of E29 Design or Procedure.
	Examples of such identifiers include Find Numbers, Inventory Numbers, uniform titles in the sense of librarianship and Digital Object Identifiers (DOI). Documenting the act of identifier assignment and deassignment is especially useful when objects change custody or the identification system of an organization is changed. In order to keep track of the identity of things in such cases, it is important to document by whom, when and for what purpose an identifier is assigned to an item.

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

Examples:

- Replacement of the inventory number TA959a by GE34604 for a 17th century lament cloth at the Museum Benaki, Athens
- Assigning the author-uniform title heading "Goethe, Johann Wolfgang von, 1749-1832. Faust. 1. Theil." for a work (E28)

- On June 1, 2001 assigning the personal name heading "Guillaume, de Machaut, ca. 1300-1377" (E42,E82) to Guillaume de Machaut (E21)

Properties:

P37 assigned (was assigned by): E42 Identifier
P38 deassigned (was deassigned by): E42 Identifier
P142 used constituent (was used in): E41 Appellation

E24 Physical Man-Made Thing
(see the description on section 4.3)

E28 Conceptual Object
(see the description on section 4.3)

E29 Design or Procedure
(see the description on section 4.3)

E73 Information Object
(see the description on section 4.3)

E90 Symbolic Object
(see the description on section 4.3)

5.4.2 Referred CIDOC CRM Properties

This section contains the complete definitions of the properties of the CIDOC CRM Conceptual Reference Model version 5.0.1 referred to by the FRBR$_{OO}$ Identifier Creation Model. We apply the same format conventions as in section 2.7.

P14 carried out by (performed)
(see the description on section 4.4)

P16 used specific object (was used for)
(see the description on section 4.4)

P33 used specific technique (was used by)
(see the description on section 4.4)

P37 assigned (was assigned by)

Domain:	E15 Identifier Assignement
Range:	E42 Identifier
Subproperty of:	E13 Attribute Assignment. P141 assigned (was assigned by): E1 CRM Entity
Quantification:	many to many (0,n:0,n)
Scope note:	This property records the identifier that was assigned to an item in an Identifier Assignment activity.
	The same identifier may be assigned on more than one occasion.
	An Identifier might be created prior to an assignment.
Examples:	

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

P128 carries (is carried by)
(see the description on section 4.4)

P130 shows features of (features are also found on)
(see the description on section 4.4)

P140 assigned attribute to (was attributed by)

Domain:	E13 Attribute Assignment
Range:	E1 CRM Entity
Superproperty of:	E14 Condition Assessment. P34 concerned (was assessed by): E18 Physical Thing
	E16 Measurement. P39 measured (was measured by): E70 Thing
	E17 Type Assignment. P41 classified (was classified by): E1 CRM Entity
Quantification:	many to many (0,n:0,n)
Scope note:	This property indicates the item to which an attribute or relation is assigned.
Examples:	

- February 1997 Current Ownership Assessment of Martin Doerr's silver cup (E13) *assigned attribute to* Martin Doerr's silver cup (E19)
- 01 June 1997 Identifier Assignment of the silver cup donated by Martin Doerr (E15) *assigned attribute to* silver cup 232 (E19)

P141 assigned (was assigned by)

Domain:	E13 Attribute Assignment
Range:	E1 CRM Entity

Superproperty of: E14 Condition Assessment. P35 has identified (identified by): E3 Condition State

E15 Identifier Assignment. P37 assigned (was assigned by): E42 Identifier

E15 Identifier Assignment. P38 deassigned (was deassigned by): E42 Identifier

E16 Measurement. P40 observed dimension (was observed in): E54 Dimension

E17 Type Assignment. P42 assigned (was assigned by): E55 Type

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

Scope note: This property indicates the attribute that was assigned or the item that was related to the item denoted by a property P140 assigned attribute to in an Attribute assignment action.

Examples:

- February 1997 Current Ownership Assessment of Martin Doerr's silver cup (E13) *assigned* Martin Doerr (E21)
- 01 June 1997 Identifier Assignment of the silver cup donated by Martin Doerr (E15) *assigned* object identifier 232

P148 has component (is component of)
(see the description on section 4.4)

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7 Amendments

7.1 Amendments to version 1.0.1

In the 21th Joined meeting of the CIDOC CRM SIG and ISO/TC46/SC4/WG9 and 15th FRBR - CIDOC CRM Harmonization meeting, 27th – 30th of January 2010, National Gallery, Helsinki, the following has been decided:

F2 Expression

The forth example has been changed for better understanding

FROM

  Christian Morgenstern's 'Fisches Nachtgesang' [a poem consisting simply of "-" and "˘" signs, arranged in a determined combination] (F22)

TO

  The signs which make up Christian Morgenstern's 'Fisches Nachtgesang'Christian Morgenstern's 'Fisches Nachtgesang' [a poem consisting simply of "-" and "˘" signs, arranged in a determined combination] (F22)

F10 Person

The following examples have been added to F10.

Examples: Margaret Atwood

     Hans Christian Andersen

     Queen Victoria

F21 Recording Work

There was a problem with F21 declared as a subclass of F16 Container Work because individual instances of F21 may or may not be related to expressions of other works. The SIG decided that F21 isn't subclass of F16. F21 is subclass of F1. In the case where the recorded perdurant expresses some Work, the respective instance of F21 is also an F16 Container Work.

 The following updates have been made:
  a. Figure 6, 7, 10 has been updated
  b. Page 9: the second bullet has been changed from
     - Works that consist in establishing all the features of recordings of sounds and/or images (either natural or involving human activity). This is modelled as: F21 Recording Work *is a* F16 Container Work, F21 Recording Work *R13 is realised in (realises)* F26 Recording, and F26 Recording *is a* F22 Self-Contained Expression.
     To:
     - Works that consist in establishing all the features of recordings of sounds and/or images (either natural or involving human activity). This is modelled as: F21 Recording Work *is a* F1 Work, F21 Recording Work *R13 is realised in (realises)* F26 Recording, and F26 Recording *is a* F22 Self-Contained Expression.
  c. Page 27: 2.5.1, the table was updated
  d. Page 29:2.5.2, the table was updated
  e. Page 36: F1 Work, the superclass of part has been updated
  f. Page 46,47: F21 Recording Work, the subclass of part has been updated. The scope note has been updated from :
     This class comprises works that conceptualise the capturing of features of perdurants. The characteristics of the manifestation of a recording work are those of the product of the capture process. The characteristics of any other works recorded are distinct from those of the recording work itself.
     To:
     This class comprises works that conceptualise the capturing of features of perdurants. The

characteristics of the manifestation of a recording work are those of the product of the capture process. The characteristics of any other works recorded are distinct from those of the recording work itself. In the case where the recorded perdurant expresses some Work, the respective instance of F21 is also an F16 Container Work

F23 Expression Fragment

The following examples (third and the fourth example) have been deleted because they are controversial.

The notes G-G-G-Eflat (opening of the 1st movement of Ludwig van Beethoven's 5th symphony) performed by an orchestra, recorded, and broadcast by the BBC during World War II (the rhythm of this musical fragment corresponds to the Morse code for the initial V for Victory)

The graphic content of a digitised enlarged detail of Mona Lisa's left eye

F24 Publication Expression

The scope note of this entity has been reworded for better understanding

FROM

Scope note: This class comprises the complete layout and content provided by a publisher (in the broadest sense of the term) in a given publication and not just what was added by the publisher to the authors' expressions. It comprises the expressions of the authors' Works that constitute the raison d'être for the publication. Frequently, it also comprises illustrations selected by the publisher from different artists.

TO

Scope note: "This class comprises complete sets of signs present in publications, reflecting publishers' final decisions as to both content and layout of the publications."

F29 Recording Event

In the scope note of F26 Recording was not clear if the actual recordings are not just the result of instances of F29 Recording Event, but also of the whole process of post-production. Or is the notion of post-production implicitly included in the notion of F29 Recording Event? The SIG decided to add a sentence in the scope note of F29. The scope note of F29 Recording Event has been changed from :

This class comprises activities that intend to convey (and preserve) the content of events in a recording, such as a live recording of a performance, a documentary, or other capture of a perdurant. Such activities may follow the directions of a recording plan.

To:

This class comprises activities that intend to convey (and preserve) the content of events in a recording, such as a live recording of a performance, a documentary, or other capture of a perdurant. Such activities may follow the directions of a recording plan. They may include postproduction

R1 is logical successor of (has successor)

The example 1 is actually inaccurate, as the action of "H.—the story of Heathcliff" does not take place after the end of "Wuthering Heights", but right in the middle of it. The SIG decided to accept the proposal of PLB for replacing this example with the following.

FROM

The novel entitled 'H.--: the story of Heathcliff's journey back to Wuthering Heights', authored by the person named 'Lin Haire-Sargeant' (F1) *R1 is logical successor of* The novel entitled 'Wuthering Heights', authored by the person named 'Emily Brontë' (F1)

TO

Albrecht Dürer's woodcut from 'The Large Woodcut Passion' entitled 'The Agony in the Garden' (F1,

conceived ca 1496-98) *R1 is logical successor of* Albrecht Dürer's woodcut from 'The Large Woodcut Passion' entitled 'The Last Supper' (F1, dated 1510)

R4 carriers provided by (comprises carriers of)

This property is declared incorrectly as a subproperty of *R41 has representative manifestation product type (is representative manifestation product type for)*. It is superproperty of R41. Also the path of which R4 is a shortcut has been declared inversed and the corresponding superproperty of CRM has added. The following changes have been made.

FROM

Domain:	F2 Expression
Range:	F3 Manifestation Product Type
Superproperty of:	
Subproperty of:	F2 Expression.R41 has representative manifestation product type (is representative manifestation product type for): F3 Manifestation Product Type
Quantification:	(1:n,0,n)

Scope note: This property associates a publication, i.e. an instance of F3 Manifestation Product Type, with an instance of F2 Expression, which all exemplars of that publication should carry, as long as they are recognised as complete exemplars of that publication. Typically, this property is observed on one exemplar of a publication, and extrapolated to all other exemplars of the same publication. This property is a shortcut of: F3 Manifestation Product Type *CLR6 should carry* F24 Publication Expression *R14 incorporates* F2 Expression

TO:

Domain:	F2 Expression
Range:	F3 Manifestation Product Type
Superproperty of:	F2 Expression.R41 has representative manifestation product type (is representative manifestation product type for): F3 Manifestation Product Type
Subproperty of:	E73 Information Object.P128B is carried by: E24 Physical Man-Made Thing.P2 has type:E55 Type
Quantification:	(1:n,0,n)

Scope note: This property associates a publication, i.e. an instance of F3 Manifestation Product Type, with an instance of F2 Expression, which all exemplars of that publication should carry, as long as they are recognised as complete exemplars of that publication. Typically, this property is observed on one exemplar of a publication, and extrapolated to all other exemplars of the same publication. This property is a shortcut of: F2 Expression *R14B is incorporated in* F24 Publication Expression *CLR6B should be carried by* F3 Manifestation Product Type.

R8 consists of (forms part of)

The CRM property added to the superproperty list of R8. The change is.

FROM

Domain:	F13 Identifier
Range:	F12 Name
Superproperty of:	
Subproperty of:	

TO

Domain:	F13 Identifier
Range:	F12 Name
Superproperty of:	
Subproperty of:	E90 Symbolic Object.P106 is composed of (forms part of): E90 Symbolic Object

R10 has member (is member of)

The CRM property added to the superproperty list of R10. The change is.

FROM
      Domain: F15 Complex Work
      Range: F1 Work
      Superproperty of:
      Subproperty of:
      Quantification: (2:n,0:n)
TO
      Domain: F15 Complex Work
      Range: F1 Work
      Superproperty of:
      Subproperty of: E89 Propositional Object.P148 has component (is component of): E89 Propositional Object
      Quantification: (2:n,0:n)

R11 has issuing rule (is issuing rule of)

The CRM property added to the superproperty list of R11. The change is.
FROM
      Domain: F18 Serial Work
      Range: E29 Design or Procedure
      Superproperty of:
      Subproperty of:

TO
      Domain: F18 Serial Work
      Range: E29 Design or Procedure
      Superproperty of:
      Subproperty of: E70 Thing.P16B was used for:E7 Activity. P33 used specific technique: E29 Design or Procedure

R20 recorded (was recorded through)

The CRM superproperty has been added.

Subproperty of: E7 Activity.P15 was influenced by (influenced) E5 Event.P9B forms part of: E5 Event.P9 consists of: E5 Event

R26 produced things of type (was produced by)

The CRM superproperty has been added.

Subproperty of: E12 Production.P108 produced: E24 Physical Man-MadeThing. P2 has type: E55 Type

R41 has representative manifestation product type (is representative manifestation product type for)

The superproperty / subproperty part has been updated, following the changes to R4.

FROM

      Domain: F2 Expression

      Range: F3 Manifestation Product Type

      Superproperty of:F2 Expression.R4 carriers provided by (comprises carriers of):F3 Manifestation Product Type

Subproperty of:

TO

Domain: F2 Expression

Range: F3 Manifestation Product Type

Superproperty of:

Subproperty of: F2 Expression.R4 carriers provided by (comprises carriers of):F3 Manifestation Product Type

Proofreading

Page 9: The list of the meetings was updated.
p. 30: F17 Aggregation Work was not in the right place in the class hierarchy, it had to swap lines with F21 Recording Work.
Page 36: property "R2.1 has type: E55 Type" of R2 property has been added.
p. 38: a portion of text that was repeated twice is deleted.
p. 49: the inverted commas around the text of the scope note of F24 Publication Expression are removed
Page 57: R7, the label of the inverse property in the example has been deleted because we do not repeat the label for the reverse property in examples

General Notice 1.Updates to the following CRM reffered Entities and properties has been made. These are

Page no.	Entity / Property code	Page no.	Entity / Property code
89	E1	111	P4
91	E4	112	P14
93	E12	114	P44
96	E29	117	P65
97	E35	124	P148
98	E41		
99	E44		
99	E47		
100	E49		
100	E50		
102	E55		
105	E70		
107	E82		

7.2 Amendments to version 1.0.2

F40 Identifier Assignment

In the 17th FRBR-CIDOC CRM meeting joined with the 23rd meeting of the CIDOC CRM SIG and ISO/TC46/SC4/WG9, it is decided to change the scope note of F40 for being compatible with Controlled Access Points from FRAD. So the scope note has been changed from:

Scope note: This class comprises activities that result in the allocation of an identifier to any Entity. An Identifier Assignment may include the creation of the identifier from multiple constituents. The syntax and kinds of constituents to be used may be declared in a rule. It also includes the assignment of uniform titles.

Examples: Assigning the author-title heading 'Goethe, Johann Wolfgang von, 1749-1832. Faust. 1. Theil.' as a uniform title for a work

Assigning the title heading 'Bible. English. American Standard' as a uniform title for an expression

To:

Scope note: This class comprises activities that result in the allocation of an identifier to any E1 CRM Entity. An F40 Identifier Assignment may include the creation of the identifier from multiple constituents. The syntax of the identifier and the kinds of constituents to be used in constructing

it may be declared in a rule. The construction of controlled access points for the names of persons, families and corporate bodies following specific cataloguing rules is a typical library application. F40 Identifier Assignment also includes the assignment of uniform titles as controlled access points for works or expressions

Examples: Assigning the name heading 'William, Prince, Duke of Cambridge, 1982-' as a controlled access point for a personal name using the *Anglo-American Cataloguing Rules*, 2nd edition

Assigning the name heading 'Library and Archives Canada' as an authorised controlled access point for a corporate body name using the *Anglo-American Cataloguing Rules*, 2nd edition

Assigning the name heading 'Bibliothèque et Archives Canada' as an authorised controlled access point for a corporate body name using the *Règles de catalogage anglo-américaines*, 2e édition

Assigning the author-title heading 'Goethe, Johann Wolfgang von, 1749-1832. Faust. 1. Theil.' as a uniform title for a work

Assigning the title heading 'Bible. English. American Standard' as a uniform title for an expression

F43 Identifier Rule

In the 18th FRBR - CIDOC CRM Harmonization meeting joined with the 24th meeting of the CIDOC CRM SIG and ISO/TC46/SC4/WG9, it is decided that F43 Design or Procedure is a subclass of F2 Expression. This was one of the outcomes of the discussion about FRAD Rules. This decision produced the following changes in the document:

       Page 129: The F43 Identifier Rule has been added to the superproperty section of F2
       Page 131: The F2 is declared to Subproperty section of F43 Identifier Rule
       in the table of FRBROO Property Hierarchy aligned with (part of) CIDOC CRM Property Hierarchy

R14 incorporates (is incorporated in)

In the 18th FRBR - CIDOC CRM Harmonization meeting joined with the 24th meeting of the CIDOC CRM SIG and ISO/TC46/SC4/WG9, it is decided that R14 is also subproperty of *P106 is composed of (forms part of)*. This decision produced the following changes in the document:

       Page 59: The P106 has been added to the Subproperty section of the definition of R14
       Page 34: The R14 is declared to Subproperty of P106 in the table of FRBROO Property Hierarchy
       aligned with (part of) CIDOC CRM Property Hierarchy
This is related to the **issue 192**

R15 has fragment (is fragment of)

In the 18th FRBR - CIDOC CRM Harmonization meeting joined with the 24th meeting of the CIDOC CRM SIG and ISO/TC46/SC4/WG9, it is decided that R15 is not subproperty of *P148 has component (is component of)*.

R40 has representative expression (is representative expression for)

For consistency purposes the frbr-crm group decided by email to make the following updates to the range, subproperty and scope note of R40.

From:
       Domain: F1 Work
       Range: F22 Self-contained Expression
       Superproperty of:
       Subproperty of: F1 Work.R3 is realised in (realises): F22 Self-contained Expression
       Quantification: (0:n,0:n)
       Scope note: This property identifies an instance of F2 Expression that has been chosen as the most characteristic expression of the instance of F15 Complex Work of which it is an expression.
       Typically, any expression that is not regarded as "representative" for the work it expresses, would require a uniform title, with qualifiers specifying the differences between that expression and a representative expression, although this may not always be done in practice. The title of a Work may not be one taken from a representative expression.
       A given work can have more than one representative expression, provided the differences between these expressions are not deemed "substantial." If the anticipated needs of users are not considered to call for bibliographic distinctions between variant expressions of a work, then even expressions that differ

significantly from each other can be regarded as equally representative for the work. (See FRBR: Final Report, p. 19-20).

A given expression can be deemed representative for a work with regard to some of its aspects (e.g., the text contained in an edition the title proper of which reads ˝The tragicall historie of HAMLET Prince of DenmarkeˊA, and the language of that text), and not representative for it with regard to some other aspects (e.g., the title proper ˝The tragicall historie of HAMLET Prince of DenmarkeˊA itself, which, being different from the title that is regarded as "representative" for ShakespeareˊAs work, will require the use of a uniform title).

R40 has representative expression is a shortcut of the more developed path F1 Work R50B was assigned by F42 Representative Expression Assignment R51 assigned F2 Expression. "

To:

Domain: F1 Work
Range:F2 Expression
Superproperty of:
Subproperty of: E70 Thing. P130 shows features of (features are also found on): E70 Thing
Quantification: (0:n,0:n)

Scope note: This property identifies an instance of F2 Expression that has been chosen as the most characteristic expression of the instance of F1 Work of which it is an expression.

Typically, any expression that is not regarded as "representative" for the work it expresses, would require a uniform title, with qualifiers specifying the differences between that expression and a representative expression, although this may not always be done in practice. The title of a Work may not be one taken from a representative expression.

A given work can have more than one representative expression, provided the differences between these expressions are not deemed "substantial." If the anticipated needs of users are not considered to call for bibliographic distinctions between variant expressions of a work, then even expressions that differ significantly from each other can be regarded as equally representative for the work. (See FRBR: Final Report, p. 19-20).

A given expression can be deemed representative for a work with regard to some of its aspects (e.g., the text contained in an edition the title proper of which reads ˝The tragicall historie of HAMLET Prince of DenmarkeˊA, and the language of that text), and not representative for it with regard to some other aspects (e.g., the title proper ˝The tragicall historie of HAMLET Prince of DenmarkeˊA itself, which, being different from the title that is regarded as "representative" for ShakespeareˊAs work, will require the use of a uniform title).

R40 has representative expression is a shortcut of the more developed path F1 Work R50B was assigned by F42 Representative Expression Assignment R51 assigned F2 Expression.

This change produced the following updates:

R47 used constituent (was used in)

In the 18th FRBR-CIDOC CRM meeting joined with the 24rd meeting of the CIDOC CRM SIG and ISO/TC46/SC4/WG9, it is decided to change the range of R47 in order to cover situations where "whole and part" are applied in subject Authority Systems and the forms of names are not only represented in natural language but also are represented in artificial languages as codes, formulas, graphs etc as it is stated in FRSAD.

Thus the range of R47 was changed from F12 Name to E90 Symbolic Object. This change produces the following updates:

Proofreading

Page 32, 35 : In the line of R15, the domain and the range of the property has been corrected by interchanging them. This produced the following changes:

Page 19: In item b, the domain and the range of the property R15 has been corrected

Page 48: the declared property R15 in the definition of F23 has been deleted

Page 38: the R15 has been added to the properties of F2

Page 60: The domain and the range of the property R15 has been interchanged. In the section of the examples the direction of the property is corrected.

Page 127: Figure 12 has been updated

Page 34: The Property Hierarchy aligned with (part of) CIDOC CRM Property Hierarchy updated

Page 38: The underline has been removed from the text "The signs which make up" in the fourth example of F2

Page 42: the text "that was used to create a bibliographic record for that publication" from the second example of F9 has been dropped.

Page 126: The notation of R52 property has been corrected

Page 128: The class hierarchy of the FRBRoo Identifier Creation Model Aligned with CIDOC CRM has been updated. The entries of F42, F43 have been corrected

Page 133: Minor corrections to the property hierarchy table

Page 144: Updates to the referred CIDOC CRM Entities