

# Transforming FRBR into FRBR<sub>00</sub>

*Ciclo "Biblioteche, libri, documenti: dall'informazione alla conoscenza"  
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The FRBR model (Functional Requirements for Bibliographic Records)<sup>1</sup> has become a familiar element in cataloguers' landscape. The original intention was to provide a formal analysis of the structure and objectives of library catalogues such as they stand, and as a consequence it was developed on the basis of extant normative documents such as ISBDs, GARE, and GSARE.<sup>2</sup> Actually, the library catalogues it best describes are 19<sup>th</sup>-century printed catalogues, such as Charles A. Cutter's *Catalogue of the Library of the Boston Athenæum* (1874-82), rather than the computerized catalogues of the second half of the 20<sup>th</sup> century. Soon after its publication however, it was understood as an innovative vision of bibliographic information that paved the way for radically restructured catalogues in the 21<sup>st</sup> century. FRBR provided the conceptual and terminological basis for the new *International Cataloguing Principles*<sup>3</sup> that replaced the Paris Principles, for the new cataloguing code RDA (*Resource Description and Access*)<sup>4</sup> that supersedes the *Anglo-American Cataloguing Rules*, and for the new Italian cataloguing rules REICAT (*Regole italiane di catalogazione*)<sup>5</sup> that were substituted for RICA. FRBR only covers the information conveyed by bibliographic records (including headings) and holdings records, but IFLA's modelling effort continued with the development of two further models: FRAD (*Functional Requirements for Authority Data*)<sup>6</sup> for the information contained in authority records, and FRASAD (*Functional Requirements for Subject Authority Data*)<sup>7</sup> for subject relationships. Now that all three models have been published, the next

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<sup>1</sup> IFLA Study Group on the functional requirements for bibliographic records. *Functional requirements for bibliographic records: final report*. Munich, Germany: K. G. Saur, 1998. Also available online: <<http://www.ifla.org/en/publications/functional-requirements-for-bibliographic-records>>.

<sup>2</sup> *Functional requirements for bibliographic records...*, p. 4: 'The principal sources used in the analysis included the *International Standard Bibliographic Descriptions* (ISBDs), the *Guidelines for Authority and Reference Entries* (GARE), the *Guidelines for Subject Authority and Reference Entries* (GSARE), and the *UNIMARC Manual*.'

<sup>3</sup> IFLA. *Statement of international cataloguing principles*. 2009. Available online: <[http://www.ifla.org/files/assets/cataloguing/icp/icp\\_2009-en.pdf](http://www.ifla.org/files/assets/cataloguing/icp/icp_2009-en.pdf)>.

<sup>4</sup> Joint Steering Committee for Development of RDA. *Resource description & access: RDA*. Chicago: American Library Association, 2010-. Also available online: <<http://www.rdatoolkit.org/>>.

<sup>5</sup> *Regole italiane di catalogazione: REICAT*. Roma: Istituto centrale per il catalogo unico delle biblioteche italiane, 2009. Also available online: <[http://www.iccu.sbn.it/upload/documenti/REICA\\_bozza\\_complessiva\\_genn2009.pdf](http://www.iccu.sbn.it/upload/documenti/REICA_bozza_complessiva_genn2009.pdf)>.

<sup>6</sup> IFLA Working Group on Functional Requirements and Numbering of Authority Records (FRANAR). *Functional requirements for authority data: a conceptual model*. Munich, Germany: K. G. Saur, 2009.

<sup>7</sup> IFLA Working Group on the Functional Requirements for Subject Authority Records (FRSAR). *Functional Requirements for Subject Authority Data (FRSAD): A Conceptual Model*. Berlin: De Gruyter Saur, 2011. Also available online: <<http://www.ifla.org/files/classification-and-indexing/functional-requirements-for-subject-authority-data/frsad-final-report.pdf>>.

task on IFLA's agenda is to merge them into a single conceptual model covering the entire scope of the information contained in a library catalogue.<sup>8</sup>

The 'FR family' of models, as FRBR, FRAD and FRSAD are nicknamed, was developed in the entity-relationship (ER) formalism that has been in use in database design since the 1970s. The museum community, represented by ICOM CIDOC (International Council of Museums, Comité international pour la Documentation) chose a different formalism, the object-oriented (OO) formalism, for their own conceptual model, the CIDOC CRM (Conceptual Reference Model).<sup>9</sup> In the early 2000s, it was deemed interesting to strive to harmonize the bibliographic model and the museum information model so that a common model could account for the data produced by libraries and museums. The International Working Group on FRBR and CIDOC CRM Harmonization was formed to that end in 2003. It is affiliated to both the IFLA FRBR Review Group and the CIDOC CRM SIG (Special Interest Group). It 'translated' the definition of the FRBR model from its original entity-relationship formalism to the object-oriented formalism of CIDOC CRM; hence the acronyms FRBR<sub>ER</sub> and FRBR<sub>OO</sub>. The object-oriented formalism is closer to the RDF structure<sup>10</sup> than the entity-relationship paradigm, which is a considerable advantage in a context where the transformation of cultural heritage institutions' legacy data and currently produced data into Linked Open Data is a crucial matter. FRBR<sub>OO</sub> version 1.0 was released in June 2009; it only contained the 'translation' of FRBR and did not include the conceptualization expressed in FRAD and FRSAD; a draft version 2.0 of FRBR<sub>OO</sub> was released in November 2012 and consists of the reformulation of the entire 'FR family.' The present lecture is devoted to the transformation of FRBR, FRAD and FRSAD into FRBR<sub>OO</sub> 2.0, the differences between the original definitions of the 'FRBR family' and the resulting object-oriented model, and the projects that rely on that reformulation.

## Quick Reminder on the Original Models that Make Up the 'FR Family'

FRBR declares three groups of entities. Group 1 consists of four entities corresponding to the four levels of bibliographic analysis: Work, Expression, Manifestation, and Item. An Item is a physical thing held by a library; a Manifestation is a set of characteristics shared by a number of Items (there can be just one of them) produced under the same circumstances and carrying the same content; an Expression is a coherent collection of signs contained in one or more than one Manifestation; and a Work is a conceptual structure conveyed by one or more than one Expression.<sup>11</sup> Group 2 consists of two entities corresponding to agents who performed any kind of activity on any entity from Group 1: Person, and Corporate Body (the FRAD model later added a third one: Family). Group 3 consists of four entities that, in addition to all of the entities already declared in either Group 1 or Group 2, can constitute the subject of a Work: Concept, Object, Place, and Event. FRBR also declares a list of

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<sup>8</sup> Pat Riva, 'FRBR Review Group initiatives and the world of linked data.' *JLIS.it*. 4(1), 2013, 105-17.

<sup>9</sup> Documentation relating to the CIDOC CRM can be found online at: <<http://www.cidoc-crm.org/>>. The CIDOC CRM was also issued in 2006 as an ISO standard: *ISO 21127:2006 Information and documentation -- A reference ontology for the interchange of cultural heritage information*. Geneva, Switzerland: ISO, 2006.

<sup>10</sup> *Resource Description Framework*, a standard developed by W3C, the World Wide Web Consortium, for representing information about resources on the World Wide Web, and an essential element for the development of the Semantic Web and Linked Data. Documentation relating to RDF can be found online at: <<http://www.w3.org/standards/techs/rdf>>.

<sup>11</sup> Usually, the definitions are given from 'top' to 'bottom,' i.e., from Work to Item, but it is far more practical to proceed the other way round, from Item to Work.

attributes (i.e., data elements stored in library catalogues) for all of these entities (title of the Work, language of the Expression, date of the Manifestation, identifier of the Item, etc.), and a list of relationships between and among them (a Work is realized through an Expression, a Work is created by a Person, a Work is about a Concept, a Work is an adaptation of a Work, etc.).

In the FRAD model, all three groups of entities declared in the FRBR model are gathered in a single group, labelled 'Bibliographic Entities.' A second group consists of two entities corresponding to the devices through which we refer to Bibliographic Entities outside library catalogues: Name, and Identifier. Within library catalogues, we refer to Bibliographic Entities through a third type of appellation: Controlled Access Point, and Names and Identifiers serve as the basis for Controlled Access Points. FRAD declares two further entities: Agency, and Rules. Controlled Access Point, Agency and Rules are interrelated through relationships that define a triangle: Agencies create and modify Controlled Access Points, and apply Rules in so doing; as a consequence, Controlled Access Points are governed by Rules. FRAD also declares attributes for each entity (script of the Name, source of the Controlled Access Point, identifier of the Agency, etc.), and relationships between and among the entities (a Person is a member of a Corporate Body, a Corporate Body is split into other Corporate Bodies, a Name is an alternative linguistic form of another Name, a controlled Access Point is a parallel language form of another Controlled Access Point, etc.).

FRSAD declares only three entities: Work, Thema, and Nomen. The Thema entity corresponds to the 'Bibliographic Entities' group declared in FRAD (i.e., the sum of all the entities declared in FRBR, including Work). The Nomen entity corresponds to any kind of appellation, either within library catalogues or outside them (i.e., it covers the three FRAD entities Name, Identifier, and Controlled Access Point). FRSAD also declares attributes for each of these entities (type of the Thema, scheme of the Nomen, time of validity of the Nomen, etc.), and relationships between and among them (a Work is about a Thema, a Nomen is an appellation of a Thema, a Thema is broader than another Thema, a Nomen is equivalent to another Nomen, a Nomen consists of another Nomen, etc.).

## A Brief Presentation of CIDOC CRM

In order to understand the structure of FRBR<sub>00</sub>, it is necessary to have some basic knowledge about CIDOC CRM. Central to the conceptualization expressed in CIDOC CRM is the notion of event (or E5 Event in CIDOC CRM parlance).<sup>12</sup> Events can involve the participation of a human being or an institution (E21 Person or E40 Legal Body, both of which are gathered under the common umbrella E39 Actor), which we identify through their names (E82 Actor Appellation). Events can affect the physical products of human toil (E24 Physical Man-Made Thing) or the conceptual products of human

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<sup>12</sup> Each class in CIDOC CRM is identified by a code (consisting of an 'E' for 'Entity' and a number) and a textual label. Textual labels can be translated into other languages while codes must remain unchanged in any linguistic version of the CIDOC CRM documentation. Similarly, properties (i.e., relationships between classes) are identified by a code consisting of a 'P' for 'Property' and a number, and a textual label. When, in this article and more generally in literature about CIDOC CRM and FRBR<sub>00</sub>, the number is followed by an 'i', this 'i' means 'inverted', and indicates that the property is envisioned from the point of view of its range, instead of its domain. For instance, *P72 has language* symbolizes the property that goes from E33 Linguistic Object to E56 Language, and *P72i is language of* symbolizes the same property, envisioned from E56 Language to E33 Linguistic Object. (In all versions of CIDOC CRM prior to 2012, this notion was expressed through the use of a 'B,' for 'backwards,' instead of an 'i.')

mind (E28 Conceptual Object), or both types of products simultaneously, e.g. when a painter produces a new painting – seen as a physical object – and creates a new artistic image in the same process; and we often find it more convenient to devise names (or, to put it in CIDOC CRM terms, specific instances of E41 Appellation) in order to refer to physical and conceptual things. Events are localized in time and space, and we use dates (E50 Date) to refer to the moment of their occurrence (E52 Time-Span), and place names (E48 Place Name) to refer to the place (E53 Place) in which they occur. And we usually classify all of the above, i.e., we define categories (E55 Type) by which we qualify events, people, legal bodies, physical products, intellectual creations, places, appellations, etc. The notion of E5 Event is specialized into E63 Beginning of Existence, E64 End of Existence, and E7 Activity (which distinguishes itself from E5 Event in that it is always intentional).

## Events Associated with Dates Found in Bibliographic Data

The notion of event, which is central to CIDOC CRM, was not absent altogether from the FRBR model, but it was limited, such as the *FRBR Final Report* was originally written, to events referred to in subject headings. Much more important is the notion of activity, which corresponds to most of the dates that are declared as attributes of various entities in the FR family. As a matter of fact, every time a model of the FR family declares a date attribute, FRBR<sub>00</sub> declares a corresponding activity that makes it possible to connect that date with both a thing (either physical or conceptual) and an agent.

The first date that occurs to one's mind when one thinks of bibliographic information is the date of publication. Publishing is an activity, and it seemed therefore quite natural to declare a specific subclass of E7 Activity: F30 Publication Event. But what does such an activity cover? Is it the physical production of all the items of a given publication? Any cataloguer knows that the title-page of a book can say: '2011' while another part of the book conveys the information that the items were actually printed in 2012. In the case of reprint runs, the gap between the date of publication and the date when the physical production took place can be even more significant. Therefore, a conceptual model has to distinguish between the activity of publishing and the activity of producing the physical exemplars of a publication. Although the *FRBR Final Report* does not declare a date attribute for the Item entity, a distinct subclass of E7 Activity, F32 Carrier Production Event, was introduced in FRBR<sub>00</sub>. As a consequence, FRBR<sub>00</sub> makes it possible to account for the possible discrepancy between the date when an item was printed (or, more generally speaking, manufactured), and the date stated on the title-page (or its equivalent) of the publication, which can be useful in the case of reprint runs. But what, then, does the activity of publishing, or 'F30 Publication Event' as FRBR<sub>00</sub> puts it, consist of? The FRBR<sub>00</sub> working group understands it as the activity through which the content of a publication is finalized in all its details, including layout, cover, liminal pages, paratext, and even page numbers. It comes to determining the complete set of signs that will be carried by each individual exemplar of the publication, and that conveys the complete concept of the publication such as the publisher envisioned it. A 'complete set of signs' that conveys a 'complete concept' can rightly be said to be a particular case of Expression. An important novelty introduced in FRBR<sub>00</sub> is that the model acknowledges the existence of the publisher's Work and Expression as distinct from the authorial Work and Expression. Two specific classes are therefore declared in FRBR<sub>00</sub>: F19 Publication Work (the concepts that inform publications), and F24 Publication Expression (the sets of signs that make up the overall content of publications). The relationship between publisher's

Expression and authorial Expression is one of incorporation: an instance of F24 Publication Expression *R14 incorporates* an instance of F2 Expression. In that context, F30 Publication Event is regarded as a specific case of the activity that consists of creating an Expression, i.e., F28 Expression Creation.

F28 Expression Creation is therefore the activity through which someone adds a new Expression to the sum of all the Expressions that exist in the world. But is it sufficient to devise an Expression in one's mind for that Expression to be said to 'exist in the world?' From a philosophical point of view, that would be arguable; but within the particular context of documentation, an Expression that does not have at least one physical carrier cannot be said to 'exist,' since there is no reliable physical document to which memory institutions could refer as a means to check the identity of that Expression. F28 Expression Creation therefore displays a surprising characteristic: it is declared in FRBR<sub>00</sub> as a subclass of E65 Creation, the CIDOC CRM class that corresponds to the activity through which ideas are devised within the human mind, which seems logical enough, but also as a subclass of E12 Production, the CIDOC CRM class that corresponds to the activity through which artefacts are made, which may seem rather unexpected. This means that no Expression can be created unless a physical carrier for that Expression is simultaneously produced: the text I am devising in my mind only begins to exist, according to the FRBR<sub>00</sub> conceptualization, from the moment I write it on a sheet of paper or type it on a computer keyboard. The dates associated with an instance of F28 Expression Creation are, therefore, the dates that indicate the boundaries of the period of time during which the earliest physical carrier of an Expression is made, rather than the dates that indicate the boundaries of the period of time during which the author of this Expression has been devising it prior to committing it to a physical carrier.

So far, we have seen three distinct activities, corresponding to three dates that are relevant for bibliographic information: F32 Carrier Production Event, which corresponds to the date associated with the physical exemplars of a publication (although there is no date attribute declared for the Item entity in the original FRBR model); F30 Publication Event, which corresponds to the date of publication, defined as the date the complete content and layout characteristics of a publication are definitely established (this matches the date attribute declared in the original FRBR model for the Manifestation entity); and F28 Expression Creation, which corresponds to the date associated with an Expression, defined as the date a set of signs that makes up an Expression was first committed to a physical carrier (this matches the date attribute declared in the original FRBR model for the Expression entity). In the original FRBR model, we find yet another date attribute, which is declared for the Work entity. This date attribute poses much trickier problems: what is the nature of the activity implicitly referred to through it? The definition provided in the *FRBR Final Report* (4.2.3) simply says: 'The date of the *work* is the date (normally the year) the *work* was originally created,' without elaborating on what is actually meant by 'originally created.' It could be argued that this is the process through which the earliest known physical carrier was produced; but then the same class, F28 Expression Creation, would serve to account for the date attribute declared in the original FRBR model for the Expression entity, and the date attribute declared in the original FRBR model for the Work entity, leaving no possibility to differentiate between these two aspects. It was therefore decided to have a separate class, F27 Work Conception, that corresponds to the activity through which the initial idea for a new Work pops in someone's mind.

This decision proved controversial and misunderstood, as bibliographic data usually provides no information as to when precisely the idea for a new Work popped in someone’s mind, for the simple reason that, in a huge majority of cases, such information is unknown – and FRBR<sub>00</sub> was criticized for that. Perhaps a more relevant argument against F27 Work Conception would be that the idea for a new Work does not necessarily pop in the mind of the person who actually realizes the Work, e.g., a report drafted by an individual on behalf of a corporate body that commissioned it. However, the F27 Work Conception class does not only serve to define the notion of ‘date of the Work,’ it also serves, more importantly, to record the relationship between an author and a Work by that author in any of its Expressions, including Expressions for which the author only has an indirect responsibility. For instance, if you consider Raymond Queneau’s *Exercices de style* translated into Italian by Umberto Eco as *Esercizi di stile*, you have, on the one hand: F27 Work Conception *P14 carried out by (performed)* E21 Person {Raymond Queneau} *P14.1 in the role of* E55 Type {author}, and, on the other hand: F28 Expression Creation *P14 carried out by (performed)* E21 Person {Umberto Eco} *P14.1 in the role of* E55 Type {translator}. *P14 carried out by (performed)* is a CIDOC CRM property that relates an activity to the agents who played an active part in that activity; the property of that property, *P14.1 in the role of*, makes it possible to characterize the specific type of action carried out by those agents, in a manner similar to relator codes in MARC formats.

Some particular cases led to the declaration of further activities in FRBR<sub>00</sub>: F29 Recording Event, F31 Performance, and F33 Reproduction Event. F29 Recording Event is defined as covering activities through which recordings are made, and is associated with a date of recording; recordings themselves are regarded as a particular type of Expression. F31 Performance covers activities consisting of behaving in a particular way in the (unmediated or mediated) presence of an audience, and is associated with dates of performance. F33 Reproduction Event covers activities consisting of making microforms or digitisations or other types of reproduction of physical things, and is associated with dates of microfilming, digitisation, etc.

## Events Associated with Dates Found in Authority Data

The entities that comprise Group 2 of entities in the original FRBR model revised through FRAD, i.e.: Person, Family, and Corporate Body, also have date attributes which once again are an indication that some implicit events or activities form part of the conceptualization underlying library catalogues.

The date attribute declared for the Person entity is defined in FRAD (4.1) as including dates of birth and death of an individual, and dates of activity of an individual. The notions of birth and death of human beings were already present in CIDOC CRM and there was no need to redefine them in FRBR<sub>00</sub>. It is extremely important to keep in mind that, as FRBR<sub>00</sub> is defined as an extension of CIDOC CRM, any class or property declared in CIDOC CRM can be reused in any project involving an implementation of FRBR<sub>00</sub>, whenever deemed helpful. Dates of birth and death recorded in library catalogues as part of authority data for a person can therefore be modelled as associated with instances of the two CIDOC CRM classes E67 Birth and E69 Death. When it comes to dates of activity, however, it proved necessary to declare a specific class in FRBR<sub>00</sub>, F51 Pursuit. F51 Pursuit is declared as a subclass of the very general CIDOC CRM class named E7 Activity, and matches the notion that a



person (or family, or corporate body, for that matter) had a creative output of some kind in some specific field over a given period of time referred to through dates of activity.

The date attribute declared by FRAD (4.2) for the Family entity is not defined at all, but it is presumably analogous to the notion of dates of activity of an individual, and can therefore be associated with the FRBR<sub>00</sub> class named F51 Pursuit.

The date attribute declared for the Corporate Body entity in FRAD (4.3) is defined as including the dates of the event represented by the corporate body (for meetings, conferences, etc.), the date of establishment of the corporate body, and more generally speaking the dates of existence of the corporate body. The CIDOC CRM model declares two specific classes, E66 Formation and E68 Dissolution, that mark the beginning of existence and end of existence of any type of group. The date attribute of the Corporate Body entity can therefore be associated with these two CIDOC CRM classes, in addition to the more generic E7 Activity class that can serve to cover meetings, conferences, and other types of activities traditionally dealt with in cataloguing practice as ‘corporate bodies’ (although there is much to be said about that odd practice).

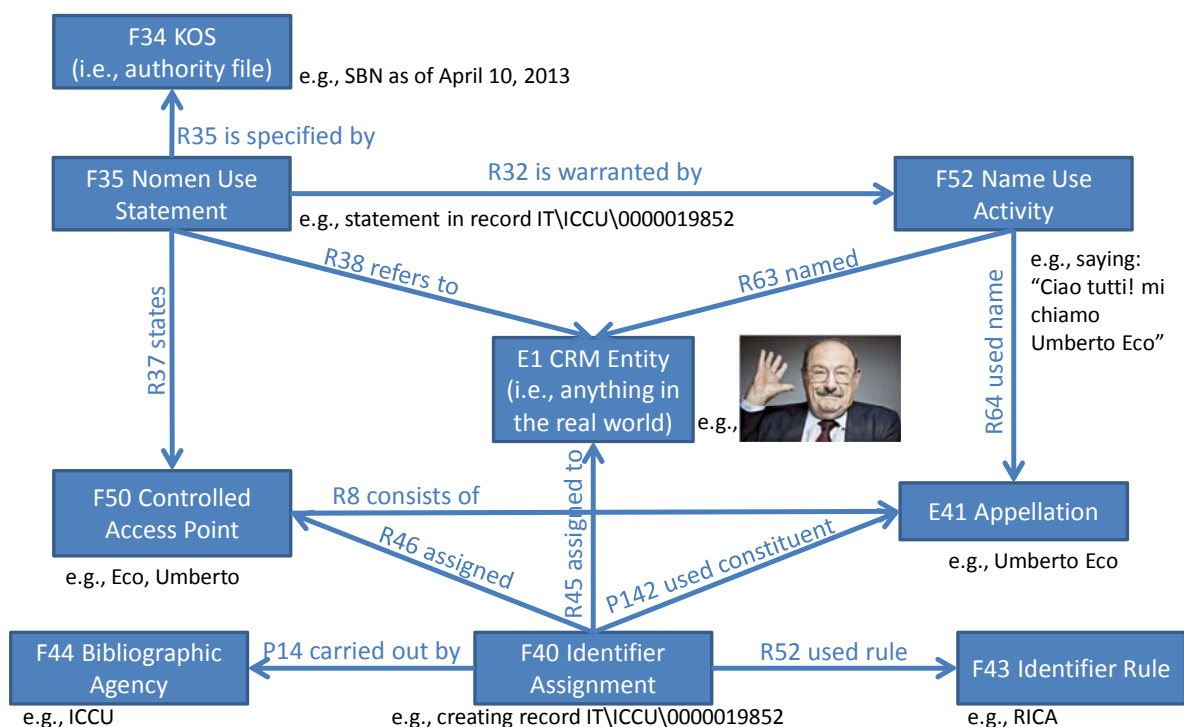
The FRAD model declares an additional date attribute for the Name entity, ‘dates of usage’ (4.12). Such dates are associated with the FRBR<sub>00</sub> class named F52 Name Use Activity, which covers both the notion that a given ethno-linguistic group uses a given term to refer to a given concept, and the notion that individuals use names (either the proper legal name that was given to them at their birth or that they acquired during their life, or any pseudonym chosen by them in the specific context of creative activities) to refer to themselves.

## Authority Work in FRBR<sub>00</sub>

Authority work is an important aspect of cataloguing practice. The FRAD and FRSAD models, which conceptualize it, were incorporated in version 2.0 of FRBR<sub>00</sub> as follows.

Let us consider something – anything – that exists in the real world; e.g., a well-known Italian writer and semiotician. The fact that everyone – including that writer himself – refers to him as ‘Umberto Eco’ is an instance of the F52 Name Use Activity class: it is an activity that relates an appellation (‘Umberto Eco’) to a real world entity (a person). The individual components of that appellation such as it is to be found in the natural language are reused, in a different order and combined with elements of punctuation to which a specific meaning is conventionally assigned, in a controlled access point (‘Eco, Umberto’). That controlled access point is stored, in a specific format the semantic value of which is precisely documented, in an authority record (numbered IT\ICCU\0000019852), which in turn has a specific status within an authority file, a knowledge organization system (namely, the SBN catalogue such as I consulted it on April 10, 2013). The activity through which this controlled access point was created was performed by a given bibliographic agency (named ICCU), and followed a given bibliographic rule (named RICA). The figure below shows all these relationships, together with the specific class names used in FRBR<sub>00</sub>. (For the sake of simplification, some details were omitted, and the labels of some properties were slightly altered; this figure should be understood as pursuing pedagogical purposes only, and is unfit for actual implementation.)

## Authority work in FRBR<sub>00</sub> (simplified view)



When it comes to determining the preferred title for a Work, bibliographic agencies can rely on external reference sources, or select one of the Expressions of the Work in one of its Manifestations, and record the title such as found on one of the Items of that Manifestation. Normally, bibliographic agencies do not select translations to fulfil that purpose, but strive to determine which of the extant Expressions is closest to the author's 'intentions' (as far as such a thing can be guessed), and will therefore give pre-eminence to one of the 'original' Expressions. Similarly, if the same Expression was published several times under several distinct titles, bibliographic agencies will select the Manifestation that is deemed to best preserve the spirit of the 'original' Expression. This process is modelled in FRBR<sub>00</sub> through two specific classes, F42 Representative Expression Assignment (the choice, implicit or documented in the authority record, of one Expression of the Work) and F41 Representative Manifestation Assignment (the choice, implicit or documented in the authority record, of one Manifestation that embodies the Expression selected through an instance of F42 Representative Expression Assignment).

### Different Types of Works, Expressions, Manifestations

The original version of the FRBR model recognised a single Work entity, which served to cover any kind of 'distinct intellectual or artistic creation.'<sup>13</sup> While FRBR<sub>00</sub> retains a very broad and generic

<sup>13</sup> IFLA Study Group on the functional requirements for bibliographic records. *Functional requirements for bibliographic records...*, p. 17.



class named F1 Work, some refinements were introduced under that notion, by declaring several subclasses of F1 Work.

Two of these subclasses form a pair: F14 Individual Work and F15 Complex Work. An individual work is the sum of concepts that is uniquely and completely expressed in a given Expression, while a complex work is a constellation of works that are deemed sufficiently related to each other, in a given cultural environment, to be reputed to form a single entity or 'family.'<sup>14</sup> For instance, the French text of Raymond Queneau's *Exercices de style* conveys a given sum of concepts, a given instance of F14 Individual Work; in his Italian translation, Umberto Eco had to make different choices, to drop some of the 'styles' selected by Queneau and to create new ones, of which Queneau might never have thought: this is a distinct sum of concepts, a distinct instance of F14 Individual Work. But *Esercizi di stile* does not present itself as a 'derivation' of Queneau's Work, it presents itself simply as a 'translation.' These two distinct instances of F14 Individual Work can therefore be gathered as members of the same 'family,' two members of one instance of F15 Complex Work.

A third subclass of F1 Work is F21 Recording Work. It covers Works the essence of which consists of capturing something of an event, e.g. by filming it or recording the sound it produced. The decisions made by a sound engineer who intends to record whale vocalizations constitute a sum of concepts that can be rightly regarded as a Work, in the absence of any pre-existing human Work a performance of which is being recorded. But even if there is a pre-existing human Work it is useful to conceptualize the decisions relating to recording as a particular type of Work. For instance, imagine that the same performance of the same opera is being recorded simultaneously by two sound engineers with different recording devices that they decided to locate in different places within the venue in which the performance occurs: these different decisions constitute distinct sums of concepts and, therefore, two distinct instances of F21 Recording Work. The two resulting instances of F26 Recording are not equivalent, even though they are recordings of the same performance.

The fourth subclass of F1 Work declared in FRBR<sub>00</sub> is F16 Container Work, a notion that covers Works the essence of which consists of adding value to Expressions of other Works through various processes, e.g. by juxtaposing them, as in an anthology (this notion is specialized as F17 Aggregation Work), or by editing them and providing them with an appropriate layout, as publishers do with the texts they publish (this notion is specialised as F19 Publication Work), or by performing them (this notion is specialised as F20 Performance Work).

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<sup>14</sup> I am using the term 'family' within inverted commas as an explicit reference to Patrick Wilson's definition of 'a Work' as 'a family of texts.' Patrick Wilson. *Two kinds of power: an essay in bibliographic control*. Berkeley: University of California Press, 1968 (reprint 1978), 9.

Serials are modelled in FRBR<sub>oo</sub> as instances of F18 Serial Work, a class that is declared as a subclass of both F15 Complex Work (since serials, by definition, are made of distinct parts that appear over time – the issues –, each of which is per se an instance of F19 Publication Work) and F19 Publication Work (since serials are always published and imply a notion of layout and editorial activities).

Similarly, while FRBR<sub>oo</sub> has a generic class named F2 Expression that matches the Expression entity defined in the original FRBR model as ‘the specific intellectual or artistic form that a *work* takes each time it is “realized,”’<sup>15</sup> it also introduces refinements to that notion by declaring several subclasses of the F2 Expression class.

FRBR<sub>oo</sub> distinguishes between complete Expressions, which realize the entirety of a given Work, and fragments of Expressions which do not allow us to have access to the complete sum of concepts the realized Work consists of. These two notions are represented by the two classes F22 Self-Contained Expression and F23 Expression Fragment. F22 Self-Contained Expression is in turn the super-class of three specific types of Expressions: F24 Publication Expression (the complete set of signs that is to be found on a given publication, i.e., both the signs that realize the authorial Work and the signs that correspond to the publisher’s decisions, including cover art and all the statements that are printed on the cover and the liminary pages), F25 Performance Plan (the complete set of signs that reflect the instructions performers are to follow during a performance, i.e., both the signs that realize the authorial Work – e.g., a musical composition or a play – and the signs that reflect the particular features that the performance should display in terms of interpretation – e.g., the choices of tempo and phrasing, or the staging directions that characterize a given *mise-en-scène*), and F26 Recording (the complete set of signs that constitute a representation of sound and/or image on either a digital or analogue carrier).

Additionally, F2 Expression has two further subclasses that were already mentioned above in the section devoted to how authority work is modelled in FRBR<sub>oo</sub>: F34 KOS and F35 Nomen Use Statement.

‘Is this a Work, or an Expression?’ is a frequent question in discussions on FRBR. The definitions provided in the original FRBR model are somewhat circular: a Work is accessed and recognized through its Expressions, an Expression is identified through the Work it realizes. The definitions provided by FRBR<sub>oo</sub> stipulate that ‘the substance of Work is concepts’ and ‘the substance of Expression is signs.’ However, that clear articulation between the two classes does not necessarily solve all problems, and the ‘concept/sign dichotomy’ is not always discernable or relevant. FRBR<sub>oo</sub> displays two characteristics that make it more flexible than the original FRBR model, in which the distinction between Work and Expression is sometimes felt as too constraining (notably in the context of Linked Data):

- The distinction between F14 Individual Work and F15 Complex Work, and the fact that any instance of F22 Self-Contained Expression is automatically connected with an

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<sup>15</sup> IFLA Study Group on the functional requirements for bibliographic records. *Functional requirements for bibliographic records...*, p. 19.

- instance of F14 Individual Work, make it possible to imagine that two distinct institutions could share their data even though they regard the same ‘thing’ respectively as a FRBR Work and a FRBR Expression;
- FRBR<sub>00</sub> is an extension of CIDOC CRM, which implies that, whenever the distinctions that were made in the original FRBR model are no longer deemed relevant, it is possible to give them up and reuse directly classes from CIDOC CRM. For instance, the Work/Expression distinction may be rightly deemed irrelevant for drawings or paintings; in a ‘FRBRized’ catalogue such as we tend to understand that notion today, and in the RDA cataloguing code, we are constrained to recognize that distinction even for drawings and paintings; in a system implementing FRBR<sub>00</sub>, it would be possible to use the CIDOC CRM class named E38 Image to refer to the immaterial content of a drawing or painting, without bothering whether it is a ‘Work’ or an ‘Expression.’

Perhaps the most important modification made by FRBR<sub>00</sub> in the original FRBR conceptualization is the abandonment of the Manifestation entity as such. The Manifestation notion such as it is defined in the original FRBR model covers both unique embodiments of Expressions, and ones that are available in multiple exemplars, i.e., both manuscripts and publications. A manuscript is a physical object, while a publication remains an abstract notion. In FRBR<sub>00</sub>, it was deemed preferable to separate these two notions, and to declare two distinct classes: F3 Manifestation Product Type (which covers the notion of publication), and F4 Manifestation Singleton (which covers unique physical carriers of Expressions, such as manuscripts). The same instance of F24 Publication Expression can be available through two distinct instances of F3 Manifestation Product Type: e.g., a hardcover and a paperback editions convey the same content in the same layout, while they represent two distinct ‘types’ exemplified by individual Items.

## What is the Use of FRBR<sub>00</sub>?

There is no point in developing ontologies if they are not used in practical implementations or reused as the basis for extensions in more specific projects. The University of Erlangen has developed an OWL-DL rendition of FRBR<sub>00</sub>, called Erlangen FRBR<sub>00</sub> or EFRBR<sub>00</sub> and available online for anyone who wishes to experiment with FRBR<sub>00</sub>.<sup>16</sup> So far, only version 1.0 of FRBR<sub>00</sub> was expressed in the OWL-DL language; as a consequence, the conceptualization of the content of authority data is not available yet under that form.

The European project for the preservation of cultural digital data named CASPAR (Cultural, artistic and scientific knowledge for preservation, access and retrieval) makes use of the CIDOC CRM and FRBR<sub>00</sub> conceptualization.<sup>17</sup>

In Poland, the Poznań Supercomputing and Networking Centre has built a semantic database that aggregates metadata sets from digital collections provided by Polish libraries, museums, and

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<sup>16</sup> Judith Merges, Martin Scholz, Guenther Goerz, ‘Erlangen implementation of FRBR<sub>00</sub>.’ CIDOC Conference, June 2012. <<http://www.cidoc2012.fi/en/File/1612/merges.pdf>>. The OWL-DL rendition of FRBR<sub>00</sub> is available from <<http://erlangen-crm.org/efrbroo>>.

<sup>17</sup> Kia Ng. ‘Digital preservation of interactive multimedia performances.’ *ERCIM News*, 2010, 80, p. 32-33. Available on line: <<http://ercim-news.ercim.eu/images/stories/EN80/EN80-web.pdf>>.

archives.<sup>18</sup> The need to integrate within the same system descriptions of publications and museum objects led the project team to turn to FRBR<sub>00</sub> and CIDOC CRM. Unsurprisingly, they experienced some difficulty in the automatic translation of existing digital library metadata records into FRBR<sub>00</sub>.

In the field of digital humanities, FRBR<sub>00</sub> provided the basis for HuCit, an ontology for classical citations developed by Matteo Romanello and Michele Pasin at King's College, London.<sup>19</sup>

A team of Japanese researchers at the University of Tsukuba developed an extension of FRBR<sub>00</sub> for the purpose of conceptualizing digital mangas.<sup>20</sup>

At the University of Bologna, there is a project to apply the FRBR<sub>00</sub> model to *Repertorio della poesia italiana in musica 1500-1700* (RePIM), a digital archive comprising analytical descriptions of texts set to music and digitized editions of those texts.<sup>21</sup>

The International ISSN Centre and the National Library of France developed PRESS<sub>00</sub>, an ontology for bibliographic information on serials, as an extension of FRBR<sub>00</sub>.<sup>22</sup> The International ISSN Centre's objective is to use this extension of FRBR<sub>00</sub> to develop a format to integrate heterogeneous records for serials.

Other projects, which have not been publicly documented yet, could be mentioned, such as the experimentations made by the Bibliographic Agency for French Universities (ABES, Agence bibliographique de l'enseignement supérieur), the Europeana digital library (EFAP-TF, EDM-FRBR<sub>00</sub> Application Profile Task Force), or the Publications Office of the European Union.

## Are We Entering the 'Post-FRBRistic' Age?

It is no longer possible to claim that FRBR is 'new.' FRBR is 15 years old now, and in our 'dromosphere,' as Paul Virilio labels our world in which speed, technology, and power interconnect, any technical concept that is 15 years old tends to be regarded as outmoded and discardable – especially if they are deemed 'complex' and require some effort before they are fully understood and mastered. As a matter of fact, FRBR never was 'new,' since the conceptualization it expressed in

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<sup>18</sup> Cezary Mazurek, Krzysztof Sielski, Justyna Walkowska, Marcin Werla. 'From MARC21 and Dublin Core, through CIDOC CRM: first tenuous steps towards representing library data in FRBR<sub>00</sub>.' CIDOC Conference, June 2012. <<http://www.cidoc2012.fi/en/File/1611/mazurek.pdf>>.

<sup>19</sup> Matteo Romanello, Michele Pasin. 'An Ontological view of canonic citations' [abstract only]. Digital Humanities 2011, <<http://dh2011abstracts.stanford.edu/xtf/view?docId=tei/ab-143.xml>>. The slides are available from <<http://www.michelepasin.org/software/hucit/>>. For a glimpse of the ontology itself, see <<http://demos.michelepasin.org/ontoview/?uri=http://www.purl.com/net/hucit>>.

<sup>20</sup> Waeyoung Son, Mitsuharu Nagamori, Shigeo Sugimoto. 'A study of manga ontology based on object-oriented FRBR.' *Digital Libraries*, 2010, 38, pp. 3-13. In Japanese, with English abstract: <<http://www.tulips.tsukuba.ac.jp/limedio/dlam/M10/M1031725/2.pdf>>.

<sup>21</sup> Ilaria Bartolini, Cecilia Luzzi, Marco Patella, Angelo Pompilio, Cesarino Ruini. 'MIMESIS, a semantic-based approach for a digital library of poetry in music: application to the Repertorio della poesia italiana in musica 1500-1700 (RePIM) repository.' *Proceedings ECLAP 2012*, ed. Paolo Nesi, Raffaella Santucci. Firenze University Press, 2012, p. 46-51. Also available on line: <<http://www.fupress.com/Archivio/pdf%5C5185.pdf>>.

<sup>22</sup> PRESS<sub>00</sub>, extension of CIDOC CRM and FRBR<sub>00</sub> for the modelling of bibliographic information pertaining to periodicals: version 0.1, ed. Patrick Le Boeuf. <[https://listes.services.cnrs.fr/wws/d\\_read/ontologie-patrimoine/PRESSoo\\_01.pdf](https://listes.services.cnrs.fr/wws/d_read/ontologie-patrimoine/PRESSoo_01.pdf)>.

'new' terms already was discernable in 19<sup>th</sup> century catalogues – indeed, it could be argued that the FRBR conceptualization is as old as literature itself, or at least that it has always existed since humankind has begun to produce translations of texts from one language into other languages (in a way, FRBR can be said to be mainly about translations and their physical carriers). The FRBR conceptualization had taken the power even before the FRBR model was formally developed and RDA established it in a position of power.

Today, this position of power is being attacked. A number of voices express doubts about the FRBR conceptualization, sometimes even their sheer rejection of it. On 21 July 2010, James Weinheimer posted on the Autocat discussion list a message in which he wrote: 'How do we get the power of the catalogue (...) onto the web in a way that is useful to people who are essentially untrained? The current ways do not work and FRBR/RDA do not help.'<sup>23</sup> On 25 November 2012, Allen Mullen posted on that same discussion list a message in which he insinuated that 'library staff and patrons' cannot 'make sense of (and use of)' the 'convoluted WEMI structure' [i.e., the Work, Expression, Manifestation, and Item entities] unless they go to 're-education camps.'<sup>24</sup> On 17 December 2012, Karen Coyle posted on the FRBR Review Group's discussion list a message in which she said bluntly that 'the reason that we keep discussing WEMI is that it doesn't work.'<sup>25</sup> This 'anti-FRBR' (and largely 'anti-RDA') trend culminated with the publication of the Bibframe model.<sup>26</sup>

The Bibframe model was developed by the private company named Zepheira on behalf of the Library of Congress. It was introduced as

more than a mere replacement for the library community's current model/format, MARC. It is the foundation for the future of bibliographic description that happens on, in, and as part of the web and the networked world we live in.<sup>27</sup>

The imperialistic objectives pursued by the Library of Congress are quite obvious from this quotation, but this may not be the most alarming aspect of this astoundingly undemocratic coup. More concerning is the fact that the Bibframe model abandoned the objectives for which it was supposed to be developed. The Bibliographic Framework initiative was originally presented as aiming at the development of a format allowing libraries to implement the RDA rules:

Our 26 test partners (...) noted that, were the limitations of the MARC standard lifted, the full capabilities of RDA would be more useful to the library community. Many of the libraries taking part in the test indicated that they had little confidence RDA changes would yield significant benefits without a change to the underlying MARC carrier. (...) With these strong statements from two expert groups, the Library of Congress is committed to developing (...) a new bibliographic framework.<sup>28</sup>

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<sup>23</sup> <[http://blog.jweinheimer.net/2010\\_07\\_01\\_archive.html](http://blog.jweinheimer.net/2010_07_01_archive.html)>.

<sup>24</sup> <<http://comments.gmane.org/gmane.education.libraries.autocat/50301>>.

<sup>25</sup> Access to the archive of the FRBR Review Group's discussion list is restricted to subscribers.

<sup>26</sup> Library of Congress. *Bibliographic Framework as a Web of Data: Linked Data model and supporting services*. Washington, DC: Library of Congress, November 21, 2012. <<http://www.loc.gov/marc/transition/pdf/marcl-d-report-11-21-2012.pdf>>.

<sup>27</sup> *Bibliographic Framework...*, 3.

<sup>28</sup> Deanna Marcum. *A Bibliographic Framework for the digital age*, October 31, 2011. <<http://www.loc.gov/marc/transition/news/framework-103111.html>>.

Now, the irony is that the Bibframe model published just one year after that encouraging declaration seems to be totally incompatible with RDA, and therefore with FRBR. Or, to put it more accurately, with the original, entity-relationship definition of FRBR. The irony of the irony is that Bibframe and FRBR<sub>00</sub> seem to be reasonably compatible. The Bibframe model declares, among others, a Work class, an Instance class (the name of which is certainly most infelicitous, in terms of modelling), and an Annotation class. The Work class does not correspond to the notion of authorial Work such as FRBR understands it (Bibframe ignores the notion of authorial Work altogether, and seems to be exclusively interested in publishers' outputs), but seems to cover a notion rather close to the F24 Publication Expression of FRBR<sub>00</sub>, while the Instance class seems to match the FRBR<sub>00</sub> notion of F3 Manifestation Product Type. The Annotation class corresponds roughly (although not exclusively) to both the FRBR Item entity and the FRBR<sub>00</sub> F5 Item class.

The Library of Congress has power, has technology, and has speed, and the outcome of the battles to come in the 'bibliographic dromosphere' makes therefore little doubt, alas, no matter how arbitrary and debatable and ill-conceived the Bibframe model is. The 'anti-FRBR/anti-RDA' clique is largely ignorant of FRBR<sub>00</sub>; however, FRBR<sub>00</sub> does not have the same finality as FRBR, and may still have a role to play in a 'post-FRBRistic,' Bibframe-embracing age. FRBR<sub>00</sub> was not designed to be made visible to end-users – it is too ugly; FRBR<sub>00</sub> was not even designed to be made visible to cataloguers – it is too 'complicated.' In contrast to FRBR, FRBR<sub>00</sub> could scarcely be used as the basis for a new cataloguing code; the role that FRBR<sub>00</sub> is likely to play in a Linked Data environment is rather as a means to harmonize heterogeneous information resources. FRBR<sub>00</sub> will serve to *interpret* and *interconnect* extant data (even Bibframe data, despite the incredible and unprecedented semantic impoverishment that Bibframe implies) rather than to create new data from scratch.

## By Way of Conclusion

Neither FRBR nor FRBR<sub>00</sub> must needs be made visible to end-users. FRBR can be hidden from them, FRBR<sub>00</sub> definitely should be. FRBR has long been (mis)understood, by both its advocates and detractors, as mainly a display tool. FRBR<sub>00</sub> has nothing to do with display; FRBR<sub>00</sub> is about the internal structure of information. The most important thing to remember about both FRBR and FRBR<sub>00</sub> is not: 'This is a Work, and that is an Expression,' but: 'This is related to that in such a way, and this interrelation makes sense as an elemental part of our culture.' FRBR<sub>00</sub> is neither a format nor a set of cataloguing rules; FRBR<sub>00</sub> is a tool aiming at extracting the meaning from library catalogues. Predictably, there will be more usages for FRBR<sub>00</sub> outside libraries than within them, as the above list of current projects already suggests. FRBR<sub>00</sub> can be used by external applications that rely on the aggregation of various information sources; FRBR<sub>00</sub> can be used to link library data to other types of data, in completely different environments.

The future of FRBR<sub>00</sub> may well not lie in libraries...