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*Martin Doerr, Chryssoula Bekiari*

## **FRBR<sub>00</sub>, A CONCEPTUAL MODEL FOR PERFORMING ARTS**

Martin Doerr, Chryssoula Bekiari  
Institute of Computer Science, Foundation for Research and Technology Hellas  
Heraklion, Crete  
Greece  
{martin, bekiari}@ics.forth.gr

Patrick Le Bœuf  
Bibliothèque nationale de France  
Paris  
France  
[patrick.le-boeuf@bnf.fr](mailto:patrick.le-boeuf@bnf.fr)

### **Abstract**

**There are increasing efforts to provide integrated access to archive, library and museum information. When it comes to creating information systems, the deep difference in the organizational cultures becomes apparent. Working groups from CIDOC-ICOM and IFLA have come together from 2003 to 2008 to analyze how museum and library conceptualization relates and have built a common conceptual model. It includes an innovative model of performing arts from a documentation perspective. This paper argues on the example of performing arts how the common model can be used to integrate information across institutions in a more effective way than by current approaches. The work on this model revealed an important generic form of creative activity, the “incorporation” of an expression of a work in the expression of a work of another form or kind.**

### **INTRODUCTION**

For a number of years, museums, archives and libraries have been increasingly mentioned together in political efforts to cross-correlate their knowledge and bring it closer to the public by the new communication means. These memory institutions, as they are sometimes called, play an important role in our societies to preserve their knowledge and to keep it accessible to those who need it. They are a product of our culture and take part in shaping what we regard as our cultural identity.

When it comes to designing and employing information systems, the deep difference in the organizational culture of libraries, archives and museums becomes apparent. Libraries have a long

tradition in sharing knowledge. They are extremely well organized, provide services which respond to user requests in large scale, and have achieved considerable national and world-wide standardization and interoperability. Most of the material they keep is accessible to the user, in a more or less direct way. The use of computer-based information systems is the rule.

Archives present a more secluded image. There are international standards for their documentation formats. They keep huge amounts of relatively uniform items originating in some common context. Various levels of description are in use; many collections are documented only at the highest level, and the content of the individual items they consist of has never been looked at, while some collections are described in detail. Access to the physical contents is typically granted to individual researchers.

Museums on the other side are a magnet for the public and even tourism. They present to the public objects in a way they select and they make us conscious about our cultural identity and other valuable knowledge. Access to the physical objects hidden in stage locations may be granted to individual researchers. Most objects are still documented on paper and not accessible to the public. In contrast to archives and libraries, many museums act as information centers for the scientific questions themselves, rather than about how to find information or the objects they keep.

The grand vision is to see all these data sets integrated so that users are effectively supported in searching for and analyzing data across all domains. So, why not use the experience of libraries to bring archives and museums on the same level? All of them keep some objects and their knowledge about them. This more than reasonable requirement is frequently oversimplified to the question: “Why should we use different information systems? Museum and library information should be the same!” Only a comprehensive analysis of the nature of the information that makes up the cultural heritage kept by those institutions can reveal how the information is effectively brought together.

Therefore working groups of CIDOC-ICOM and IFLA have collaborated over the past five years and developed a common understanding of how library and museum information relates to each other, and

developed common modular core ontology, the CIDOC CRM<sup>1</sup> and FRBR<sub>OO</sub><sup>2</sup>, to formally capture the underlying concepts necessary for integrated information systems. We present here the core ideas of this common understanding and illustrate the common model on the part developed last, the model of performing arts as a subject of documentation. Performing arts stand in itself outside of the core of library, museum and archive information, but relate to all of them in a complex way. To our surprise, this work revealed the importance of a basic mechanism of intellectual work overseen so far in this generality, the incorporation of one “Expression” in another.

## **THE HARMONIZATION PROJECT**

The CIDOC Conceptual Reference Model (CRM) has been developed since 1996 under the auspices of the International Committee on Documentation (CIDOC) of the International Council for Museums (ICOM) Documentation Standards Working Group. This is occurring with the initiative and support of ICS-FORTH, Heraklion, and the CRM was accepted as an ISO standard, namely ISO 21127, in 2006. It is a core ontology aiming to integrate cultural heritage information [2,6,9]. It already generalizes over most data structures used by highly diverse museum disciplines, archives, and site and monument records. Even the common library format MARC (‘MACHINE Readable Cataloguing’) can be adequately mapped to it. Its innovation is to centre descriptions not around the things, but around the events that connect people, material and immaterial things in space-time. Further, it explicitly describes the discourse on relations between identifiers and the identified, a powerful feature for the integration of information assets. Finally it bridges the role of typologies as classification systems with their nature as objects of the cultural-historical discourse.

Quite independently, the FRBR model (‘Functional Requirements for Bibliographic Records’) was 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. It was published in 1998. Its innovation is to cluster publications and other items around the notion of a common conceptual origin – the ‘Work’ - in order to support information retrieval. It distinguishes four levels of abstraction from ideational content to the physical thing in hand: The Work, Expression,

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<sup>1</sup> [http://cidoc.ics.forth.gr/official\\_release\\_cidoc.html](http://cidoc.ics.forth.gr/official_release_cidoc.html)

<sup>2</sup> [http://cidoc.ics.forth.gr/frbr\\_drafts.html](http://cidoc.ics.forth.gr/frbr_drafts.html)

Manifestation, Item. Its focus is domain-independent and can be regarded as the most advanced formulation of library conceptualization [3,8].

Initial contacts in 2000 between the two communities eventually led to the formation in 2003 of the International Working Group on FRBR/CIDOC CRM Harmonisation. It is headed by Martin Doerr from ICS-FORTH and Patrick Le Boeuf from BNF Paris, and brings together representatives from both communities. The common goals were to express the IFLA FRBR model with the concepts, ontological methodology and notation conventions provided by the CIDOC CRM, and to merge the two object-oriented models thus obtained. The work started with an investigation of the utility of such a model. Part of this was a more detailed analysis than currently has been published of how library and museum information relates to each other [10, 11, 12]. In 11 meetings over the past five years and much “homework”, the Working Group has finalized the complete draft of FRBR<sub>OO</sub>, i.e. the object-oriented version of FRBR, expressed as a specialization of the CIDOC CRM, in spring 2008 and submitted to IFLA for public review and approval.

In parallel, the CIDOC CRM itself has been adapted in several details to represent a true generalization of all concepts and relationships in FRBR<sub>OO</sub>, and adopted some generic concepts from FRBR<sub>OO</sub>. After approval by CIDOC, the respective amendments to the CIDOC CRM and other changes that were found to be useful in the years after ISO21127 entered the final approval phase by ISO will be submitted to ISO by the end of 2008.

## **THE RELATIONSHIPS OF LIBRARY AND MUSEUM INFORMATION**

The traditional and primary task of library catalogues is to *facilitate access* to the information contained in the literature kept by a library. This also applies to digital libraries and integrated electronic cataloguing services that are detached from keeping a physical object. Therefore metadata are created to support the finding of literature.

In remote times, a library catalogue was an inventory of the physical objects kept by a given library; with the advent of printing, however, and mass production of copies regarded as functionally equivalent, librarians’ efforts tended to concentrate on the description of the abstract characteristics of

*publications* rather than physical exemplars, as that level of description can be shared by two libraries that hold distinct copies of the same publication, while the characteristics of one physical exemplar are only relevant to the library which holds that exemplar. ISBDs (International Standard Bibliographic Descriptions) focus exclusively on that level and contain no prescription as to how the particular features of an individual exemplar should be documented. MARC formats were primarily developed to share information about publications. As a consequence, library catalogues are scarcely more than bibliographies to which call numbers are added, and the integration in a library's general catalogue of the description of special materials (annotated copies, grey literature, preparatory dummies, archival materials...) held by that library can prove at times extremely difficult. In particular, a unique object such as a mediaeval manuscript can be described in such catalogues only at the price of puzzling distinctions; manuscript annotations are not recorded the same way if they were made on a unique manuscript or on a printed copy of a publication. On the other hand, if information about the publication level *can* be shared by libraries, the role of cataloguing rules is also to ensure that two distinct librarians describing two copies of the same publication will produce (ideally) identical descriptions of that publication. The FRBR study [8] expresses the basic functions that a library catalogue should support as: *to find* (i.e., to retrieve information after a query on a given criterion), *to identify* (i.e., to make sure that the object you hold and the object described in the database are really identical under some aspect, e.g. both are copies of the same publication), *to select* (i.e., to know precisely under which aspects two similar objects described in the database actually differ from each other), and *to obtain* (i.e., to be enabled to actually access the object described in the database).

The traditional and primary task of museum *inventories* can be seen to document the cultural or scientific *relevance* of the objects kept by a museum, and implicitly to justify the reason for their preservation. In order to do so they classify objects, describe their physical characteristics and their history, i.e. the contexts of creation, use, finding, modification, change of ownership and custody. The kind of relevance may vary extremely between different objects. A T-shirt from a pop-star, the sword of a king, an archaeological potsherd, a piece of traditional pottery, a pinned bee, or a painting by Monet are kept for quite heterogeneous reasons. Some objects are unique in their aesthetic form. Some are unique witnesses of a culture, some only characteristic ones. Some are examples, prototypes or archetypes of categories of things or life forms. Some were just present at a remarkable event. Accordingly, documentation may look at quite different angles and have quite different formats.

Unique objects in the one or other sense dominate museums. Therefore the discourse about their identity focuses on tracing an object through its history and through the museum locations. For instance, museums register unique *marks and inscriptions* and *distinguishing features* in order to support identification [13]. Traditionally, access is more an in-house problem. The curator may decide which object to show in an exhibition, and to which researchers to grant access to the stored objects, which is justified with the fragility and value of many objects. Curators themselves regularly research their objects and write publication about them. With the possibility to create cheap digital surrogates of museum objects, traditional access policy becomes obsolete, and there are social and political demands to open up all museum information to the interested public.

The different primary focus of museums and libraries has still a bearing both on the opinion what a core documentation standard might be, and on the awareness of all the functions that might be better supported. But indeed, their functions overlap: Both may deal with a physical inventory of objects. Museums may deal with non-unique objects of specific types, such as automobile museums. Libraries may deal with unique objects, such as manuscripts. Many museums include a library. Increasingly, libraries are researching their objects and produce literature. Even though most library documentation is not primarily targeted at being historical records of what existed and has happened in the world, the implicit notions of context and explicit notions of identity are regarded increasingly as a source of historical knowledge. For all those functions, it is wise to learn from each other's concepts and to find common ways to deal with common tasks.

It is however equally important to understand the differences. For instance, an inventory of common books and one of valuable paintings will require some distinct treatment. But even if we exploit all commonalities and cater for all differences, we have not yet answered what the relationship between a typical museum object and a typical library item is, that would justify an integrated catalogue. The popular Dublin Core approach assumes that the relevant relationships could be represented by common attribute values. This will indeed allow for selecting paintings and books created by the same painter, or things of a particular category and books specialized to this particular category. Both cases are relatively irrelevant compared to the effort: how many authors create things kept in museums? Books about categories of things, such as biological objects, ethnological items, archaeological finds

etc., normally describe many categories or objects together. A respective retrieval of museum information would return huge quantities of things. A reasonable selection of museum objects would not correspond to a selection of the relevant literature *about* those things.

To our opinion, the dominant kinds of relationships are the following:

- Subject relation: Museum objects are referred to and published in literature. Literature describes the museum objects, their context and theories about and related to them. It describes the creators, discoverers or users of the objects. It compares objects.
- Reference relation: Frequently, museum documentation could refer to explicit citations in literature about an object, a related person or location, which is not apparent from the respective literary subject. This relation should probably not be regarded as symmetrical (i.e., a user could be allowed to go seamlessly from the description of a museum object to the description of books, CD-ROMs, DVDs etc. that refer to that object, while there is no point in allowing a user to go from the description of a book to the descriptions of all the objects referred to in that book).
- Event-mediated relations, such as things, people and literature used, produced or present at itineraries, discoveries, excavations, battles, conferences and performances.

We believe that a satisfactory integrated access structure to museum and library information should contain:

- Access by a homogeneous documentation of shared attributes, such as creator etc.
- Access to things and literature by *explicitly* documented related events or activities.
- Access to literature by characteristics of *referred* objects as documented *for* the objects.
- Access by explicit subject relationship between literature and things.

Particularly enlightening in this context is to understand performing arts from a point of view of memories they create and how they are documented: They attract much of our cultural attention, but since their very substance is volatile - temporary activities in space-time - they are not kept as such in memory institutions. However, performances may be based on texts or musical scores kept in libraries,

possibly adapted for the particular run, they may use equipment, costumes, organs kept in museums, witnesses may write about them, and recordings may be kept in libraries or museums. A play, the stage director, the actors, the recorders represent different streams of activities, interests and memories that meet in the performance. Their relations are *event-mediated*.

## **A MODEL OF PERFORMING ARTS**

The case of performing arts is particularly interesting in the context of an effort toward a unified conceptualization of information produced by libraries and museums (and archives), precisely because there is no widely accepted agreement on the type of institution that should be in charge of the cultural heritage produced in that domain. A look at the Web page of the SIBMAS (International Association of Libraries and Museums of the Performing Arts) entitled “National Collections” (<http://www.sibmas.org/English/Collections.html>) will show a variety of situations: there are national theatre *museums* in Portugal, Austria, Slovenia, Greece, etc.; national theatre *libraries* in Italy and France (in the latter it is actually a department of the National Library of France); a *documentation centre* for the theatre in Andalusia; and “theatre *institutes*” (whatever the term may cover) in the Netherlands and in Barcelona. National theatre museums, however, are the most frequent case; but all theatre museums include a library or documentation centre, and all theatrical libraries are likely to hold at least some objects that one would expect to find in a museum. Additionally, documentation about performing arts can be found in archives (for instance, there is a huge collection on theatrical censorship in the Archives nationales de France). Although the SIBMAS has a Cataloguing and Bibliographic Control Commission, there is virtually no standardization at the international level, and each institution follows the rules that apply to the category it belongs to: the Commission’s Web page (<http://www.sibmas.org/English/CBCC.html>) lists standards for archives, libraries, and museums, without prescribing any one of them in particular.

The essence of (live) performing arts resides in that they are the only cultural field in which the process through which the cultural “artifact” is *perceived* cannot be separated from that cultural artifact itself. When a poet writes a poem, when a painter produces a painting, there is a spatio-temporal process of production, which results in a distinct, physical carrier of the poet’s or painter’s creation; once that process is over, any individual can perceive that creation at any time, even long

after the creator's death. As long as a carrier of the creation exists, it is available for a distinct spatio-temporal process of perception: "I am looking *here* and *now* at a painting that was produced in May-June 1647;" the painter does not have to produce his painting afresh every time I want to look at it. In the case of performing arts, the process of perception necessarily covers in time and space the process of performance: if there is no performer involved in an activity of performance when I am willing and ready to perceive, I cannot perceive anything at all, because there is nothing to be perceived.

What is the "thing" I perceive when I attend a performance – beyond the mere process of performance? Performers must perform *something*. They can extemporize, without any preparation, without any premeditation, on the spot. More often than not, however, they know in advance what they will perform, and they have rehearsed in order to convey some cultural artifact through the process of performance. They may not know in advance and in detail *how* the performance will take place (indeed they *cannot* know – any accident may happen), but they have a clear idea of what they intend to do.

They may begin discussing and conceiving an overall ideation of the intellectual/emotional content they intend to convey to their audience, that may result in multiple realizations, or even being taken up and continued at another time and by others. We call such an ideation a "performance work."

These ideas may result in a concrete *performance plan*, i.e. the foreseen sequence of actions they will perform over time, including motion, speech, sound, optical presentations and equipment to use. To put it in very rough terms, the *performance work* is a "what," and the *performance plan* is a "how." The *performance* itself is just the event, which follows more or less the plan. Multiple runs may follow the same plan, being adapted in between or not.

FRBR<sub>00</sub> declares therefore three classes: F20 Performance Work, F25 Performance Plan, and F31 Performance, interrelated as follows:

- F20 Performance Work *R12 is realized in (realizes)* F25 Performance Plan,
- F31 Performance *R25 performed (was performed in)* F25 Performance Plan.

Now, in most cases, performances are based on some pre-existing material (the text of a play, a musical score, etc.), and may imply the creation of new material which is required for the performance

to take place (scenery, costumes, lighting effects, etc.). This particular relation is modeled in FRBR<sub>OO</sub> through the following property:

- F25 Performance Plan *R14 incorporates (is incorporated in)* F2 Expression.

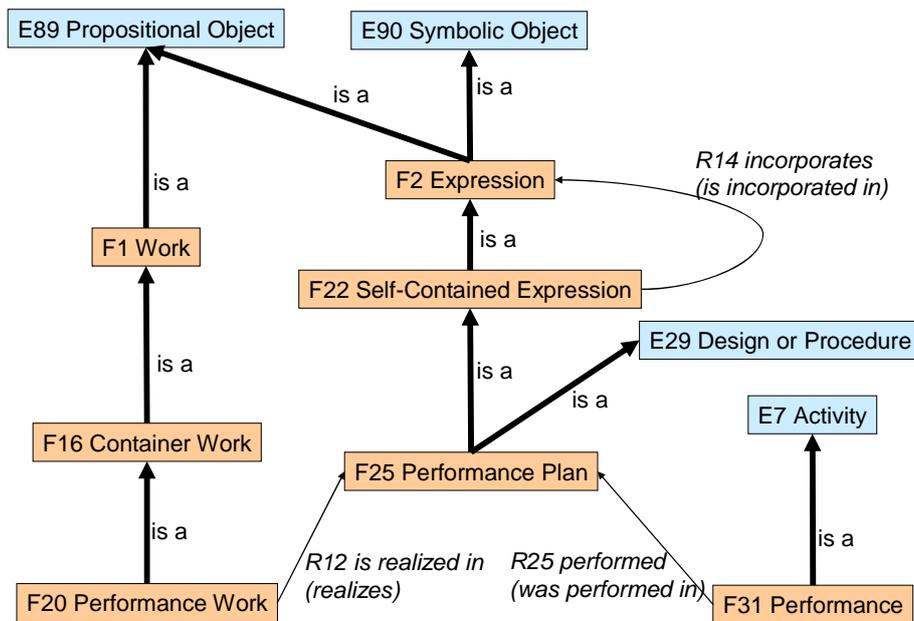
This property expresses the fact that the text of Shakespeare's *Hamlet* or the musical notation of Mozart's *Symphony No. 41* becomes a "part" of a given performance plan, while the conceptual aspects of both performance and pre-existing material remain independent. The stage director and the conductor elaborate on sets of signs that convey Shakespeare's work (possibly in a debatable translation) and Mozart's work (possibly in a poor edition with many notational mistakes), but Shakespeare's work and Mozart's work cannot be said to be "included" in the stage director's work and the conductor's work. The inclusion relationship holds only at the level of signs.

As a matter of fact, it was recognized, during the process of developing FRBR<sub>OO</sub>, that such a construct was in no way specific to performing arts. Quite a number of cultural activities imply the "incorporation" of sets of signs that initially served to realize a distinct creation. The R14 property was therefore eventually generalized at a higher level:

- F22 Self-Contained Expression *R14 incorporates (is incorporated in)* F2 Expression.

For instance, if the performance plan for a performance of Mozart's opera entitled "Don Giovanni" *R14 incorporates (is incorporated in)* Mozart's musical notation, it is also true, in turn, that Mozart's musical notation itself *R14 incorporates (is incorporated in)* Lorenzo Da Ponte's Italian text. By the way, the performance plan may actually incorporate Mozart's musical notation, and a German translation of the libretto. This construction can be extended to the notion of publication itself: a publisher determines the set of signs (including cover illustration, typeface, etc.) that will be conveyed by the publication, and that incorporates the authorial text: F24 Publication Expression *R14 incorporates (is incorporated in)* F2 Expression. Similarly, a collection of poems incorporates the individual poems in the collection. In a way, the intellectual contribution to the incorporated expressions can be seen as "adding value" of a different quality to it. We call a work which is mainly aiming at adding such value to expressions of other work a *container work*.

Figure 1 shows how the model for performing arts which is part of the FRBR<sub>00</sub> conceptualization relates to the CIDOC CRM.



**Figure 1:** The model of Performing Arts

Once F20 Performance Work, F25 Performance Plan, and F31 Performance were declared in FRBR<sub>00</sub>, they were available, through their respective positions in the class hierarchy, for any kind of discourse modeled in both FRBR<sub>00</sub> and CIDOC CRM, in particular for subject and reference relations. As already stated above, the very essence of performances cannot be curated in archives, libraries and museums, but theatrical collections consist of materials that are either elaborations about that essence, or witnesses of how it came into being. For instance, prompter books provide glimpses of performance plans; photographs document performances; two-dimensional models for costumes provide images incorporated in performance plans, along with the text of the play; press clippings make statements about performance works, etc. Figure 2 shows a real-life example from the National Library of France (BnF):

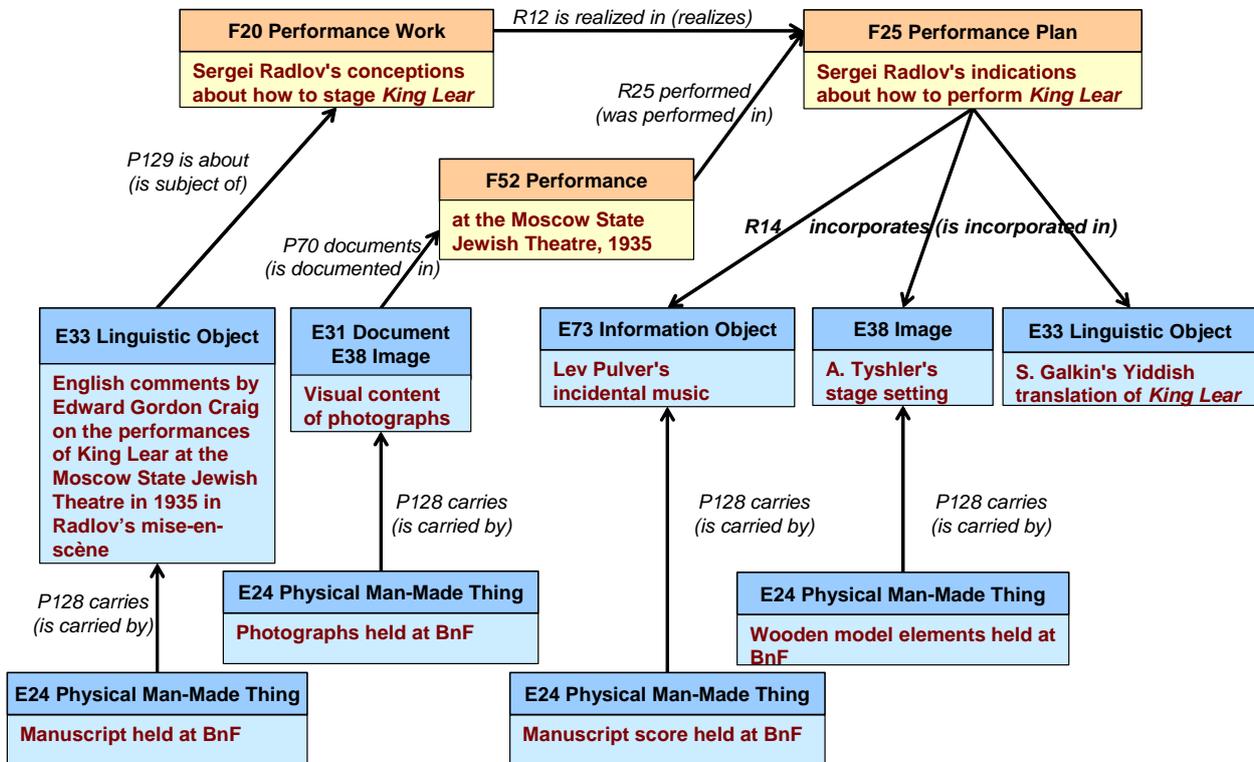


Figure 2: Example from BnF of performance-related things and documents.

Documentation on performing arts can also be more direct, through audio or audiovisual recordings. FRBR<sub>00</sub> models also the activity of recording an event and the outcomes of such an activity, in the following manner:

- F29 Recording Event R20 recorded (was recorded through) E5 Event
- F29 Recording Event R22 created a realization of (was realized through) F21 Recording Work
- F29 Recording Event R21 created (was created through) F26 Recording
- F21 Recording Work R13 is realized in (realizes) F26 Recording.

An instance of F26 Recording is just a set of signs (analogue or digital), which can be carried by either a unique instance of F4 Manifestation Singleton (e.g., a recording master tape), or multiple instances of F5 Item (e.g., all the CDs released in one publication event). Once again, the R14 property allows us to express the fact that a recording incorporates signs from pre-existing materials, e.g.: a recording

of John Gielgud reading *Hamlet* (F26 Recording) *R14 incorporates* aspects of John Gielgud's performance plan (F25 Performance Plan), which in turn *R14 incorporates* Shakespeare's text (F2 Expression and E33 Linguistic Object).

## CONCLUSIONS AND FUTURE WORK

The presented model of performing arts is a specialization of the CIDOC CRM and part of FRBR<sub>OO</sub>. Thereby it inherits all properties about the context of activities, such as the people and things present, and the properties and history of those things. From the rest of FRBR<sub>OO</sub>, it inherits all properties of the relationships between the entities of intellectual work. So, instances encoded in a data structure equivalent to this model are capable to describe in a coherent way how intellectual products, such as plays and musical scores, come together with people, leaving physical evidence of their plans, wearing costumes in performances, being recorded and the recordings becoming market products etc. So indeed, it provides a detailed model of how all this material about one or more performances, found distributed over archives, museums and libraries is related, based on the underlying common history.

In the sequence, information systems implementing such a model allow for researching the material across institutions not by an approximation via intuitively defined finding aids, but by an objectively verifiable, causal model, i.e., via the involved events. Data examples for demonstration have been successfully elaborated in RDF encoding in the framework of the European funded Project CASPAR on Digital Preservation. Surprisingly enough, this model is not infinitely complex, but rather small compared to typical business database applications. As has been shown with the CRM Core, the built-in abstraction layers allow for very handy but still powerful simplifications. A respective core model for FRBR<sub>OO</sub> is under development.

The model also avoids the pitfalls of oversimplifications as in some attempts to regard performances as kinds of Expressions in the sense of FRBR. Such an approach may be convenient from the perspective of a particular library information system implementation, but it creates serious contradictions with underlying reality – a performance is simply an event happening in space-time and not a persistent item - and fails completely to describe how all the things used or produced during a performance relate to it.

Finally, the rigorous ontological interpretation of FRBR and performing arts brought to the light a fundamental and important dimension of intellectual creative activity, which – to our knowledge – has been overseen so far, the adding value to an existing expression by incorporating it in a work of different form, analogous to but distinct from creative processes of derivation and continuation of an existing work. Future work of the FRBR/CIDOC CRM Harmonisation Group will try to create a very small core data structure from FRBR<sub>OO</sub> around these fundamental relationships between intellectual products, and seek ways to demonstrate its utility in practical large-scale applications.

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### **Links:**

IFLA: <http://www.ifla.org>

ICOM: <http://icom.museum>

Definition of the CIDOC CRM: <http://cidoc.ics.forth.gr>.

Definition of CRM Core: [http://cidoc.ics.forth.gr/working\\_editions\\_cidoc.html](http://cidoc.ics.forth.gr/working_editions_cidoc.html)

Definition of FRBR: <http://www.ifla.org/VII/s13/frbr/frbr.htm>

DELOS NoE deliverable 5.3.1: <http://delos-wp5.ukoln.ac.uk/project-outcomes/SI-in-DLs>