When Conceptual Models Collide

Aggregates in IFLA's Library Reference Model

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ABSTRACT

IFLA's Library Reference Model defines manifestations as sets of carriers sharing relevant physical and intentional properties, and aggregates as manifestations that embody multiple expressions. Taken together, these accounts pose consistency problems for some manifestation-level properties, and for the constraint that an item exemplifies exactly one manifestation.

CCS CONCEPTS

• Digital libraries and archives • Document metadata • Computing standards, RFCs and guidelines

KEYWORDS

Bibliographic metadata; Conceptual models; Aggregates

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1 Introduction

Library users rely on bibliographic metadata to help them locate and access information resources of interest to them. Conceptual models, such as the International Federation of Library Associations and Institutions' (IFLA) Library Reference Model (LRM) and the Functional Requirements for Bibliographic Records (FRBR) that preceded it are intended to abstract and explicate the logical structure of bibliographic information. Since some information resources are composites like anthologies, journal volumes, and digital collections, the usefulness of reference models like LRM will depend in part on how well they account for articles' publication in journal issues and stories' inclusion in anthologies.

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2 IFLA's Library Reference Model

IFLA's Library Reference Model [4] clarifies the Work-Expression-Manifestation-Item (WEMI) model first deployed in FRBR [1]. Although FRBR is clear that works are abstract intellectual and artistic creations, and that only items are concrete physical objects, the Group 1 entities were defined primarily by their participation in realization, embodiment, and exemplification relationships [6]. That is to say, an expression is that which realizes a work, a manifestation is that which embodies an expression, and an item is that which exemplifies a manifestation. These latter three classes can therefore be understood as roles rather than types [3]. The other main constraint on the WEMI entities is the cardinality limitations on the relationships between the levels. We're told that a manifestation may embody multiple expressions, but that an expression may realize only one work and that an item may exemplify only one manifestation.

The LRM model offers a narrower, more precise interpretation of the earlier Group 1 definitions. A work is the intellectual or artistic content of a distinct creation, with content characterized as concepts that can be conveyed to an audience by the use of signs. An LRM expression is not just whatever 'realizes' a work, but more specifically an abstract combination of signs that convey conceptual content.

Under this interpretation, LRM expressions and manifestations are still roles, since realization and embodiment relationships are just as contingent as they were in FRBR. But LRM rules out certain interpretations that are consistent with the earlier definitions. For example, the Greek text of the Pastoral Epistles could be understood (per FRBR) to realize either first century works or second century works, depending on which were actually realized. This plurality does not violate the expression/work cardinality constraint, since FRBR expressions are realizations of works, not realizing texts. But LRM admits no such understanding of disputed authorship, since the text of an epistle is itself the expression. Dual aspect interpretations of texts in scholarly digital editions are similarly complicated by the LRM definitions [2].

While the LRM expression and item entities are understood (as in FRBR) with respect to the work realized, LRM's manifestation entity is defined from the other direction as a set of carriers sharing relevant physical and intentional properties. LRM expressions and items are defined from the top down, while LRM manifestations are defined from the bottom up as sets of items that stand in a physical and/or functional similarity relationship with one another.

This curious exception recalls the reductionist model of bibliographic entities proposed by Elaine Svenonius [5]. In that account physical copies, not works, are the starting point, and other entities—impressions, imprints, editions, texts, works, archives, and collections—are all reduced to sets of physical copies that belong together in virtue of a relevant similarity.

One problem with defining manifestations as sets is that attributes at the manifestation level, such as physical extent and type of material, are not properties of sets. However, LRM avoids this problem by defining the domain of those properties to the elements rather than the set itself. To say that a particular manifestation has, for example, a physical extent of one hundred pages or twenty centimeters is to count those among the physical properties common to the manifestation's items/elements.

More difficult problems arise in reconciling this set-theoretic account of manifestations with that entity's role in explaining aggregates such as anthologies or journal volumes. Some features of aggregates that are relevant to locatability, access, and ongoing stewardship are neither properties of manifestation sets, nor of their elements.

3 Aggregates as Manifestations

LRM's definition of an aggregate as "a manifestation embodying multiple expressions" is in contrast to approaches that model aggregation as a whole/part relationship. Whole/part relationships can be found in LRM, but they're reserved for combinations of entities that do not carry distinct works. For example, a novel may have a chapter as a proper part, but a short story is not, strictly speaking, a part of the anthology in which it is published. LRM interprets the anthology as an aggregating work representing editorial contributions of selection and arrangement, with its manifestation embodying the expressions of the selected stories. Manifestations of serial works can, under LRM, have issue-level manifestations as proper parts. We're told that "the manifestation constituting the complete serial as a whole is issued in a sequence of parts over time, in a whole/part relationship at the manifestation level" [4].

Consider, however, the manifestation set for an issue of a journal, with physical copies as its elements. An LRM manifestation at the volume or series level would have issue-level manifestations as its parts, but the series-level manifestation has to be a set of items, otherwise it would not be a manifestation. The manifestation for a volume (or entire journal) therefore cannot be a set of manifestation sets, but only a union of manifestation sets.

A series-level LRM manifestation embodies the expression of editorial work, and the set union account admits series-level preservation of properties relating to style and scope. But any physical or conceptual feature that is neither a property of the manifestation set itself nor common to every element of that set cannot be a candidate for manifestation-level attributes in a metadata record. Furthermore, subset relationships violate the cardinality constraint from item to manifestation, since any physical copy of a journal is simultaneously an element of the issue, volume, and series manifestation sets.

In practice metadata records document a variety of properties that are possessed neither by abstract sets, nor by every element of a series-level set union. Issues of a periodical stand in ordinal relationships, but those relationships are among the issues, not common to the issues, and a manifestation set itself does not possess an ordering relation among its elements. Although every copy of a specific journal issue may have the same thickness in millimeters, that extent property cannot be preserved at the series manifestation level because the value will not be the same for each element. LRM would therefore seem to offer no basis for recording administrative metadata on the amount of shelf space occupied by a journal.

Some of these problematic attributes could be recorded among signs that realize the aggregating editorial work: volume and issue numbers, the title of the journal, etc. That structure of signs would be understood to be embodied in the series-level manifestation. But on that interpretation attributes like extent or access conditions would be work-level attributes. Moreover, since LRM works come into existence simultaneously with their first expression, such properties would literally not exist if they were not recorded by a contributor (e.g., an editor) to the series-level work.

4 Conclusions

None of these objections prevent the creation and management of useful metadata records in systems based on LRM's conceptual model. They only raise questions of exactly what the model contributes to reliable standards for systems that document and catalog aggregate resources. Does overloading the embodies relationship for aggregation really solve more problems than it creates? The source of the problems appears to be locating this explanation at a class that is defined differently than the other Group 1 entities. LRM offers more precise conceptual definitions of works, expressions, and items, but a reductionist account of manifestations.

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