ISBD for Manifestation: Single-Entity Cataloguing in a Multiple-Entity Bibliographic Universe

Gordon DUNSIRE
gordon@gordondunsire.com

Abstract

The paper describes issues that arise from a project to develop a metadata content standard for a single entity in a multiple-entity data environment. The ISBD for Manifestation project is an initial and partial implementation of an entity-relationship data model that identifies 10 distinct entities that are of interest in the bibliographic description of resources held in library and cultural heritage collections. The project focuses on one of the entities and aims to deliver a set of elements with associated guidance and stipulations that function in standalone applications while maintaining integration with a subsequent and full implementation of the model. The model is designed for Semantic Web technologies and linked open data, but partial implementation requires the use of relational data in local, closed applications. The paper discusses how the boundaries of distinct entities determine the operational data requirements of closed bibliographic universes within the open universe of all things, and describes several methods for incorporating descriptions of and references to instances of entities within and beyond the local universe. These methods include the specification of note elements that refer to external entities, of relationship and shortcut elements that cross entity boundaries, and of appellation elements that provide references across entity boundaries. The paper uses examples taken from the draft ISBD for Manifestation and the standards to which it is related.

Keywords: entity-relationship cataloguing, ISBD, Library Reference Model, Semantic Web

1. Introduction

ISBD: International Standard Bibliographic Description is a standard for determining the content of bibliographic metadata that are created and shared by national library and cultural heritage organizations (ISBD Review Group, 2011). ISBD for Manifestation (ISBDM) is the first phase of a project to develop ISBD as a content standard for the IFLA Library Reference Model (LRM) (Riva, Žumer & Le Bœuf, 2017). The current phase focuses on the Manifestation entity, while the second phase is intended to extend the standard to cover the other nine entities of the LRM. ISBD and the LRM are maintained and developed under the aegis of IFLA, the International Federation of Library Associations and Institutions.

The LRM Manifestation entity was selected for the first phase because the last edition of ISBD had consolidated the standard in conformance with the Work, Expression, Manifestation, and Item (Group 1) entities of Functional Requirements for Bibliographic Records (FRBR), a precursor of the LRM (IFLA Study Group on the Functional Requirements for Bibliographic Records, 2009). The four FRBR entities are equivalent to the LRM versions, and the Manifestation entity in both standards is essentially the same. A map between the consolidated ISBD elements and FRBR elements confirms that most of the ISBD is focused on the Manifestation entity (ISBD Review Group, 2004). The Manifestation entity can be seen therefore as a bridge between the original ISBD and the LRM.

An additional constraint on the project is to ensure compatibility with RDA: Resource Description and Access (RDA Steering Committee, 2024). RDA is an existing implementation of the full model that was developed immediately after the publication of the LRM, but it is not maintained or published by IFLA. RDA accommodates Manifestation as well as the other LRM entities.

At an early stage, the project took a decision to develop the standard so that it could be used irrespective of the second phase of the project. That is, ISBDM is planned as a standalone content standard for the Manifestation entity, and also as part of an integrated content standard for all LRM entities. This inevitably results in redundancy and incompleteness in the description of an information resource held in a library or other cultural heritage collection. Differentiation that is accommodated by the separate description of

entities in a multiple-entity application is accommodated in annotation and attribute elements of a single entity. The inverses of relationships from Manifestation to other entities are missing until the second phase is completed and the semantic structure of each entity is known. However, such overlaps and gaps may be treated as aspects of the Open World Assumption that is applied in the Semantic Web technologies for which the LRM is optimized, rather than undesirable effects of the two-phase development process.

An additional problem for ISBDM is that Manifestation is one of four LRM entities from the original FRBR model that must be combined to form a complete description of the contents and embodiment of a resource. ISBDM needs to accommodate sufficient description of the other entities to be useful in practice. At a minimum, this includes the provisions of the ISBD for describing characteristics of the Work and Expression entities. The coverage of the Item entity is mainly of interest for specific applications such as the control of circulation of items, the management of collections of items, and the bibliographic history of specific rare or significant items.

The standalone approach of the first phase presents an opportunity to examine some issues associated with "single-entity cataloguing" in the wider context of entity-based cataloguing. Entity-based cataloguing uses distinct descriptions of instances of entities and relates them to provide fullness of description, context, and retrievability. The challenge is to accommodate information about instances of related entities in the description of a single instance of a single entity. Such information provides context for the entity being described and places it with the universe of entities of interest.

It should be noted that ISBDM is undergoing review at the time of writing, and details of ISBDM elements may change. A draft presentation of the standard is available online at https://www.iflastandards.info/ISBDM/.

2. Entities, Relationships, and the Universe

The LRM is an entity-relationship model for describing the universe of discourse, the "bibliographic universe", including the products, agents, and physical milieu of recorded human culture. The model identifies entities or things of interest, a set of broad attributes for each entity that describe

its characteristics, and a set of broad relationships between the entities. The LRM entities include Work, Expression, Manifestation, and Item as distinct sets of attributes of a library or cultural heritage resource that are combined using special relationships to form a complete description of the contents and embodiment of the resource. The creators of the contents and embodiments are modelled as the Agent entity, which is sub-divided into the Person and Collective Agent entities. The physical milieu is described using the Place and Time-span entities. The Nomen entity covers the names, titles, and other labels assigned to instances of the other entities in order to support identification and navigation in information retrieval. The LRM also provides Res as a "universal" entity: it is a supertype of the other entities with attributes and relationships that are cascaded down and inherited by each of the other entities. This is an established technique and is similar, for example, to the utility of the Class entity in RDF Schema (W3C, 2014), a data modelling tool that provides mechanisms for describing groups of related resources and the relationships between these resources in the Semantic Web.

The LRM is therefore a multiple-entity model and furthermore requires more than one entity to provide an overall description of a resource held in a library, archive, or museum collection.

In addition to the special relationships that connect and integrate the separate entities within a resource description, the LRM defines a general relationship between any pair of entities: LRM-R1 "is associated with", with Res as its domain and range. The domain of an element is the entity that the element describes, and the range of a relationship element is the entity that is related. This allows the relationship to cascade down to every combination

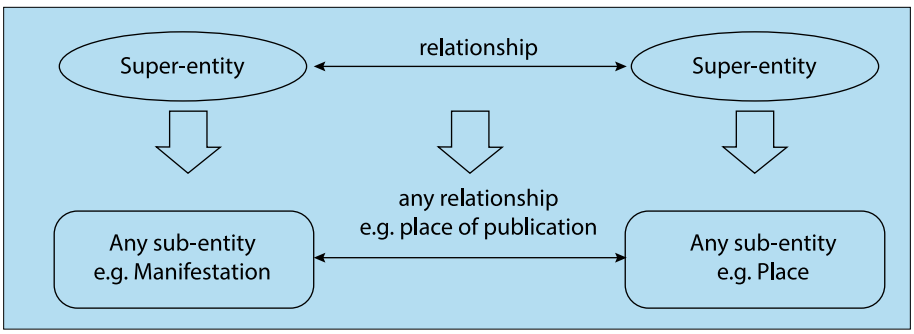

Figure 1. *Relationship matrix cascading from a broad super-entity relationship*

of two entities, including pairs of the same entity. The general relationship can be refined in an implementation of the model with, for example, broad relationships between Manifestation and Place or Manifestation and Manifestation.

Figure 1 shows that any specific relationship between any pair of sub-entities can be cascaded down from a broad relationship for the super-entity. In RDF terms, the specific relationship is a subproperty of the broad relationship. A complete set of intermediary broad relationships between pairs of sub-entities replicates the cascade mechanism at the level of specific entities and provides the basis for a discrete set of relationships organized in a semantic hierarchy. RDA refers to this as a "relationship matrix" (RDA Steering Committee, 2018).

In turn, these broad relationships can be refined with more specific relationships. All relationships in an implementation of the model are refinements of LRM-R1, including the special relationships that are required for an integrated resource description. For example, the special relationship LRM-R3i "embodies" that connects an instance of Manifestation and an instance of Expression in a single resource is a refinement of LRM-R1: LRM-R3i is an element subtype or subproperty of LRM-R1. It is also a refinement of the broad relationship between Manifestation and Expression that is implied by LRM-R1.

Although Table 4.6 of the LRM includes a relationship hierarchy, it is simplified by ignoring the element subtypes implied by LRM-R1. The first element at the "Second Level" is at the fourth level of a full semantic hierarchy:

LRM-R1 Res is associated with Res
> [Work is associated with Res]
> [Work is associated with Expression]
> LRM-R2 Work is realized through Expression

The second and third levels are obtained by subtyping the domain and range of the top level from Res to Work and Expression respectively. The bracketed elements in the hierarchy are not identified explicitly in the LRM. All relationship elements conform to this pattern if the appropriate entity subtypes are used.

An implementation of the LRM benefits if it provides a set of explicit broad relationship elements to organize more specific relationship elements in a semantic hierarchy and to support applications that require low granularity metadata that can be generated automatically from finer levels using semantic inferencing or entailment. For example, RDA refines and replaces Res with RDA Entity as the implementation's "super-entity", and all broad relationships are declared explicitly as distinct relationship elements. Every specific RDA relationship element is declared as an element subtype in a hierarchical chain that is headed by the general element "related RDA entity of RDA entity". RDA defines two entities, Corporate Body and Family, that refine the LRM's Collective Agent, bringing the number of RDA entities to 13 in total. There are therefore 169 distinct broad RDA relationship elements, the result of pairing each entity with every other entity and itself (13 times 13). Some of the broad RDA elements do not have any subtypes, for example "related place of timespan" has no refinements, but if necessary these can be defined

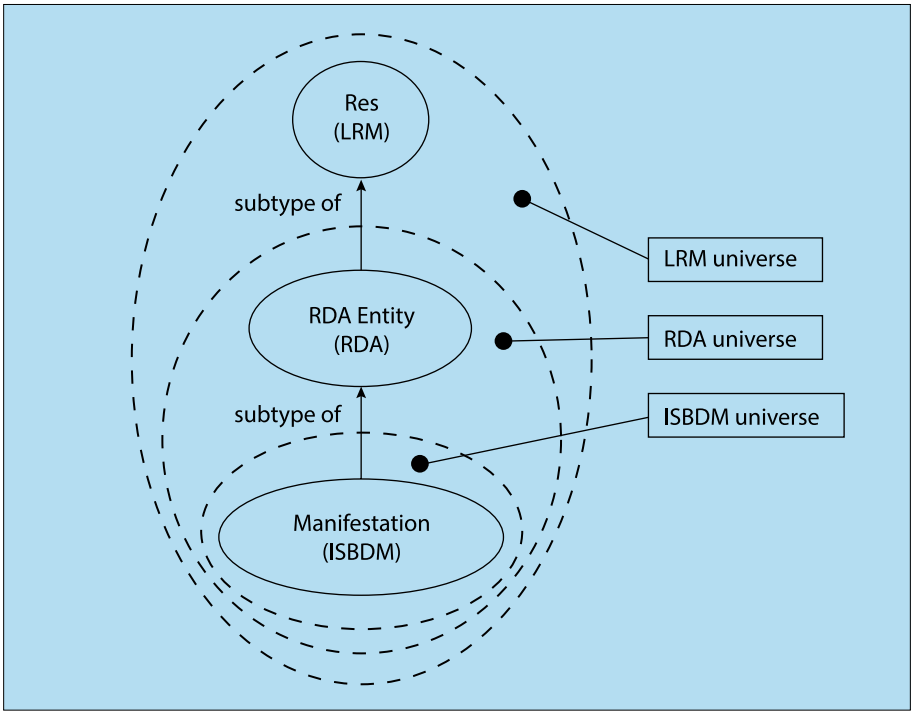

Figure 2. *Nested bibliographic universes*

in the future without affecting existing element hierarchies under other broad elements.

RDA constricts the LRM model universe by substituting Res with RDA Entity. This controls the scope of RDA applications and the interoperability of RDA metadata. If a new entity is added to the LRM or another implementation as a subtype of Res, it will not impact the RDA universe unless it is subsequently included in RDA as a subtype of RDA Entity. RDA Entity is a subtype of Res, as are all entities in the bibliographic universe; the RDA universe is contained within the LRM universe.

In the same way, ISBDM effectively constricts the bibliographic universe to Manifestation.

Figure 2 shows the nested bibliographic universes of the LRM, RDA, and ISBDM. In each universe, only the top "universal" entity and its subtypes can be described and related to other entities within and beyond the universe. The Manifestation entity has the same semantics in each universe and the ISBDM and RDA versions are equivalent, so the ISBDM Manifestation is a subtype of RDA Entity. RDA Entity is a refinement and therefore a subtype of Res. The chain of two subtype links reflects the hierarchical nesting of the universe boundaries indicated by dashed lines: ISBDM is contained entirely within the RDA and LRM universes and RDA is contained entirely within the LRM universe, like a set of Matryoshka dolls. The area between the universal entity and boundary is the totality of linked metadata that can be accommodated in that universe. An instance of an entity that is outside the universe can be referenced in a note or related heading, although it cannot be described as a distinct instance within the universe. This does not contradict the "anyone can say anything about any thing" (AAA) principle that is applicable to Semantic Web technologies, where instances of any entity are referenced by URIs in linked open data applications. A URI is opaque, with no intrinsic semantics, and must be de-referenced to obtain data about its referent. De-referencing an instance from a larger universe causes the "collapse" of a copy of its metadata into the smaller universe by processing it into a note or related heading.

The second phase of the ISBD project will inflate the ISBD universe to a magnitude that is similar to the current RDA universe, but it will still contain the distinct ISBDM universe created in the first phase. If the ISBD for other LRM entities is developed with the same standalone functionality as Manifes-

tation, each entity will have its own universe and innermost nested doll. The RDA entities can also be treated as inner universes by selecting appropriate RDA "recording methods" for each entity and its elements in an application profile. These are described in more detail in the context of ISBDM. Thus, with appropriate application profiles, Figure 2 can be adapted to each LRM, RDA, and future ISBD entity to form a set of "island" universes contained within the larger bibliographic universe of the LRM.

The overall magnitude of a semantic bibliographic universe is determined simply by the number of entities it contains. The size of each universe is determined by its universal entity supertype: Manifestation, RDA Entity, and Res in increasing magnitude. The second phase of the ISBD project must decide if an ISBD Entity supertype should be declared to provide the functionality of RDA Entity as a focus of general stipulations and guidance and as a top-level entity for relationship hierarchies and data processing for interoperability. Res is not suitable for these purposes because it is too general; it is similar to Thing, the broadest entity in the Semantic Web, because it covers anything of (bibliographic) interest. The AAA principle is, after all, a bibliographic concept: anyone can record anything about any thing.

3. Single-Entity Universes

The metadata that is accommodated by a bibliographic universe with one entity can only describe instances of that entity. Instances of other entities can be referenced in the metadata as related instances, but not described with any structure or refinement.

The domain of every attribute and relationship element must be the entity that is being described. For ISBDM, the domain of all elements is LRM-E4 Manifestation (or an ISBDM equivalent). In a pure single-entity universe, the range of every relationship element must be a related instance of the same entity. For LRM-E4 Manifestation, this restricts the hierarchy of specific relationships to the implied broad relationship element "Manifestation is associated with Manifestation".

In the case of ISBDM, the context of the second phase of the project suggested that the range should be extended to the other LRM entities, as broad

relationships that implied no detail beyond the content of Manifestation until subsequently refined. ISBDM has 10 broad relationship elements for the 10 LRM entities, each with a domain of Manifestation and a range of one of the entities, including Manifestation itself.

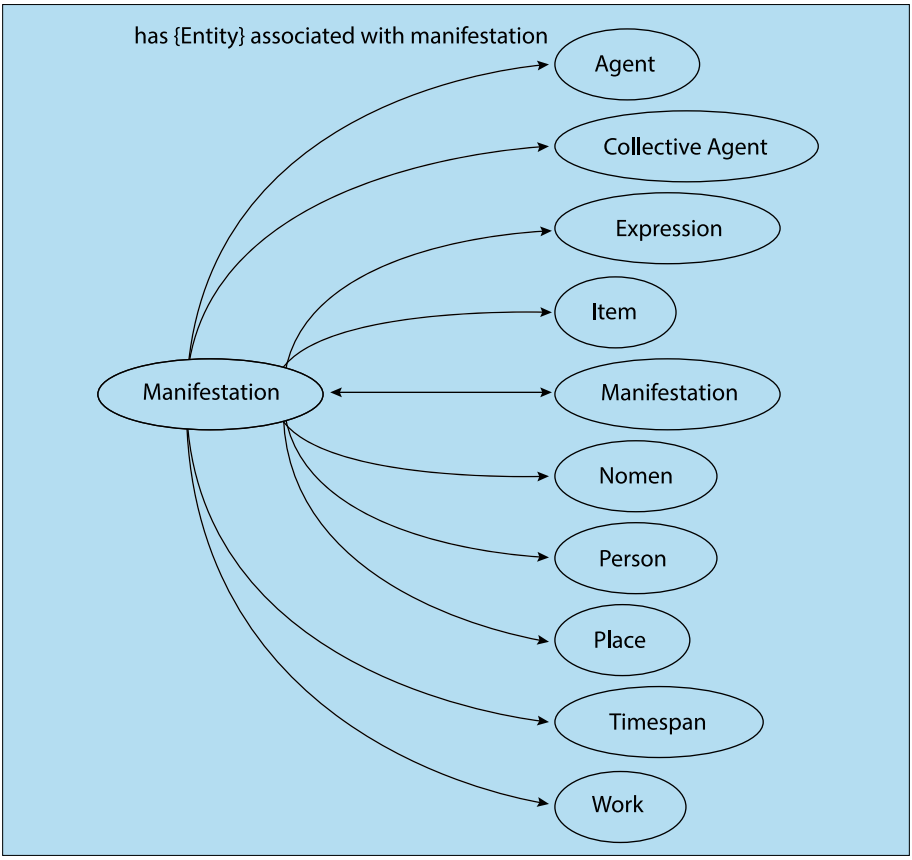

Figure 3. *Broad relationship elements in ISBDM*

Figure 3 shows the broad "association" relationship elements in ISBDM. Each element is distinct and labelled with the name of the related entity. The elements for Collective Agent and Person are subtypes of the element for Agent, to reflect the LRM entity hierarchy. The Manifestation to Manifestation element is symmetric; that is, it is its own inverse. Two instances of Manifestation are associated irrespective of which one is being described. In general, the broad relationship of the super-entity that generates relationship

matrix hierarchies must be symmetric.

The second phase may add 90 elements to give the total of 10x10=100 if the pairwise approach of RDA is followed in order to support interoperability and improve functionality. These additional elements will include those with a range of Manifestation and a domain of another LRM entity; that is, inverses of ISBDM broad relationships. For example, ISBDM "has person associated with manifestation" is the inverse of a second phase ISBD for Person "has manifestation associated with person".

This will cascade down to the specific elements in the broad relationship element hierarchy. For example, ISBDM "has publisher person" is the inverse of a future ISBD for Person "has published manifestation". The semantics of the broad relationship elements in ISBDM determine in part the semantic structures of its expansion within the LRM universe.

The only element in Figure 3 that is available in a Manifestation-only universe is the symmetric Manifestation to Manifestation association. Similarly, any entity that is the basis of a single-entity universe is the domain and range of the broad symmetric element that is the top-level of the relationship element hierarchy. Any refinement of that element must have a domain

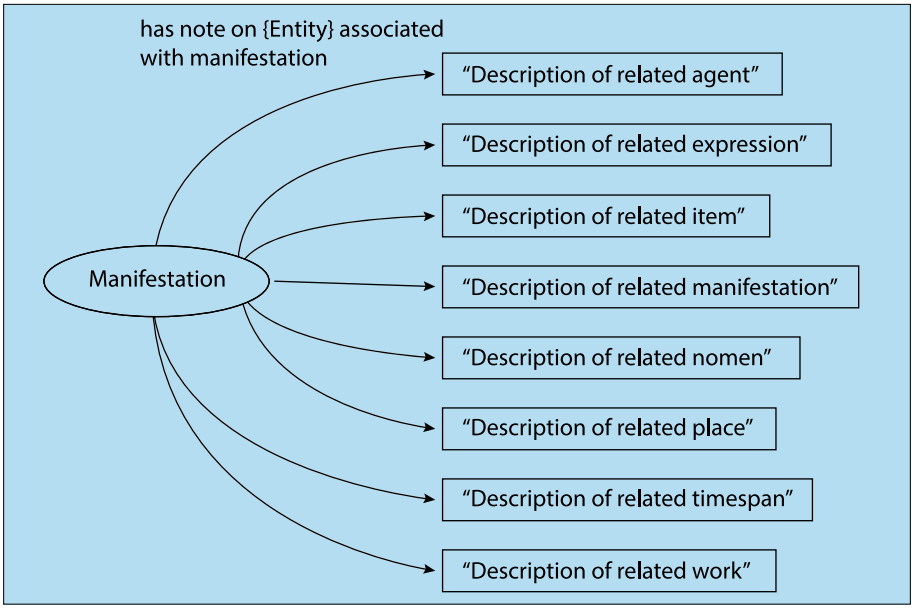

Figure 4. *Attributes for notes on related entities in ISBDM*

and range of the only entity in the universe. The separate description of an instance of another entity cannot be linked using a relationship element; it can only be embedded in the string value of an annotation element such as a note.

ISBDM provides a set of note elements as attributes to meet this requirement. These elements are refinements of the attribute LRM-E1-A2 "Note" of Res, cascaded to Manifestation.

Figure 4 shows the attribute elements used in ISBDM to describe instances of specific related entities. There is a distinct element for each entity (except the subtypes of Agent), including Manifestation itself. The description is an unstructured string that may describe one or more instances of the entity; the description may be partial and may not differentiate between different instances. This is equivalent to the "unstructured description" recording method in RDA. The Collective Agent and Person entities are included in the Agent supertype to reflect the lack of structure in values of the note. ISBDM guidance and stipulations clarify that the value of a note element is intended for display and keyword extraction only.

ISBDM also provides "has note on entity associated with manifestation" as a supertype of these elements:

"has note on entity associated with manifestation"
- > "has note on agent associated with manifestation"
- > "has note on expression associated with manifestation"
- > etc.

The supertype serves as the top level of attribute elements for notes on related entities, forming a separate hierarchy that distinguishes them from other kinds of note. It also serves as a bridge to the universe beyond the LRM, because there is no constraint on what type of entity can be described with this broad attribute. RDA accommodates such metadata in a general note element for each entity that can be used to record anything that is pertinent to the instance being described. RDA recommends using the general note element rather than element subtypes based on pre-LRM foundations because the unstructured value of the element is not suitable for semantic data processing.

The ISBDM approach provides considerable flexibility for a single-entity cataloguing application. It allows the cataloguer to describe the context or characteristics of a group of related entities that do not warrant the use of a controlled or structured value such as an access point.

3.1 Manifestation Statements

The LRM introduces an attribute of Manifestation that records how an instance of Manifestation describes itself. LRM-E4-A4 "Manifestation statement" stores a string value that is usually transcribed from a source of information found in the manifestation that is being described. Sources include title pages, credit screens, and other preliminaries to the embodied content, colophons, captions, and dust jackets and other wrappers. The attribute supports the principle of representation in IFLA's International Cataloguing Principles (IFLA Cataloguing Section and IFLA Meetings of Experts on an International Cataloguing Code, 2016). It is unique to the Manifestation entity because that is the only entity that embeds textual information about itself. A manifestation statement may cover any aspect of the manifestation, including its title, publication or production details, content, and agents responsible for the creation of the manifestation or the expressions and works that it embodies. However, those agents are also the creators of the statements and have their own purposes and motivations, so the information may be missing, incomplete, misleading, or fraudulent.

ISBDM implements the attribute as a distinct attribute element "has manifestation statement". It is refined as a set of element subtypes that reflect the specific kinds of information found in a statement, supporting the user task of identifying the manifestation:

"has manifestation statement"
- > "has manifestation statement of category"
- > "has manifestation statement of edition"
- > "has manifestation statement of extent"
- > etc.

The unreliability of information given in a manifestation statement means

that it cannot directly support other user tasks defined in the LRM, although it can be used as evidence of specific related entities such as agents, embodied works or expressions, and other manifestations. ISBDM clarifies that the metadata recorded in a manifestation statement is suitable only for display and uncontrolled keyword indexing.

The ISBDM refinement of LRM-E4-A4 is not the same as the treatment in RDA. This is a result of different factors that influenced the decisions. For example, RDA retains compatibility with a pre-LRM accommodation of the principle of representation based historically on ISBD while ISBDM takes into account the limitations of single-entity cataloguing. The ISBDM "has manifestation statement of category" does not have an equivalent attribute in RDA. In ISBDM, the statement supports the category attributes that implement and refine the LRM attributes LRM-E1-A1 "Category" of Res, cascaded down to Manifestation, and LRM-E4-A1 "Category of carrier", a separate Manifestation attribute. In particular, ISBDM also includes the element "has category of embodied content" to accommodate structured data about instances of Expression that are embodied by the manifestation that is being described. This attribute is a refinement of LRM-E1-A1 that is essentially disjoint with LRM-E4-A1; one covers carrier, and the other covers content. In RDA, the LRM attributes are implemented as "category of manifestation" without any further refinement.

The ISBDM "has manifestation statement of category" element accommodates statements about content as well as carrier. ISBDM does not consider these and other differences in the refinement of LRM-E4-A4 to be a significant issue for interoperability with RDA. The fuzzy semantics and variation across sources of statements within RDA and ISBDM absorb any distinction between ISBDM and RDA in the utility of the metadata for display and keyword indexing applications. ISBDM gives examples of the display of manifestation statement subtypes as a continuous description without any distinguishing labels, similar to ISBD and to the possible RDA metadata for the same instance of Manifestation.

Although self-description is only applicable to the Manifestation entity in the LRM bibliographic universe, similar methods of accommodating quoted descriptive data from a specified external source could be used for other entities.

4. Shortcuts

The ISBDM "has category of embodied content" element is a shortcut between the Manifestation entity and an attribute that is a refinement of LRM-E1-A1 "Category" of Res, cascaded down to Expression. The shortcut is equivalent to collapsing a chain of two elements: Manifestation "has expression embodied in manifestation" Expression and Expression "has category of content".

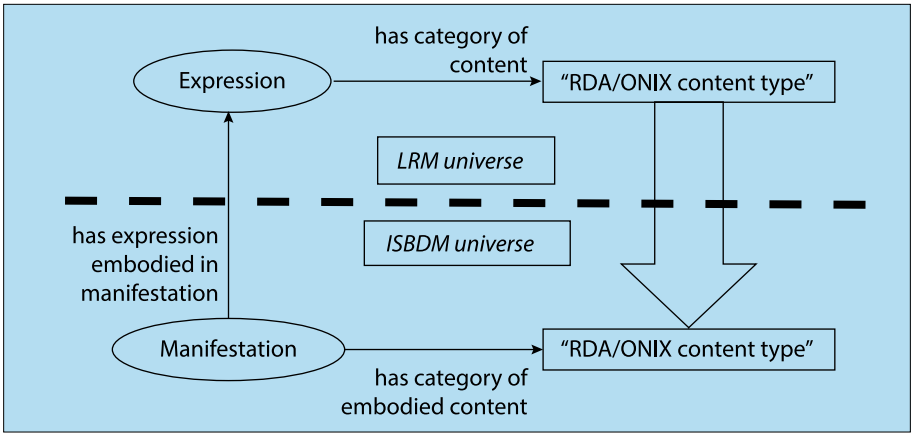

Figure 5. *Shortcut relationship that crosses the single-entity boundary*

Figure 5 shows how the shortcut crosses the ISBDM entity boundary and pulls in data from the broader LRM (or RDA) universe. The Expression attribute element "has category of content" will not be specified until the second phase of the project, but it will prescribe the use of the RDA/ONIX Framework for Resource Categorization to maintain consistency with ISBDM and interoperability with RDA (Joint Steering Committee for Revision of AACR, 2006). The shortcut allows the content categories to be used with the carrier categories in the description of an instance of Manifestation. This accommodates a fuller categorization of a resource in a single-entity bibliographic universe, and it completes the long-term goal of applying the Framework to ISBD in general.

The shortcut's collapse of the chain eliminates any distinguishing identification of the instance of Expression to which the category of content pertains. This includes the number of expressions with the same category in an aggregate manifestation; the shortcut states only that the manifestation carries a specific

type of content. The same approach can be taken when developing ISBD for the Expression entity: a shortcut element for "has category of content carrier", with values taken from the ISBDM Category of Carrier vocabulary, would be useful in an application that focuses on Expression by supporting the retrieval of resources that embody a specific expression in a required carrier, for example a still image on a sheet, in a volume, or in an online resource.

ISBDM specifies another shortcut as a special relationship element between Manifestation and Work in the same resource. The ISBDM element "has work embodied in manifestation" is equivalent to collapsing the chain Manifestation "has expression embodied in manifestation" Expression and Expression "realizes" Work. Again, the second relationship in the chain will be specified in the development of Expression, but it will be an implementation of the special relationship LRM-R2i "realizes". If ISBD for Expression is also developed for standalone functionality, a similar shortcut between Expression and Item that eliminates Manifestation will support applications that focus on the LRM user task "obtain" and the local availability of content irrespective of carrier.

This approach seems to resolve the issues raised about the original FRBR model, when considering "which entity (or class) is to be given primacy among bibliographic ones" (Taniguchi, 2017). Any one of the Work, Expres-

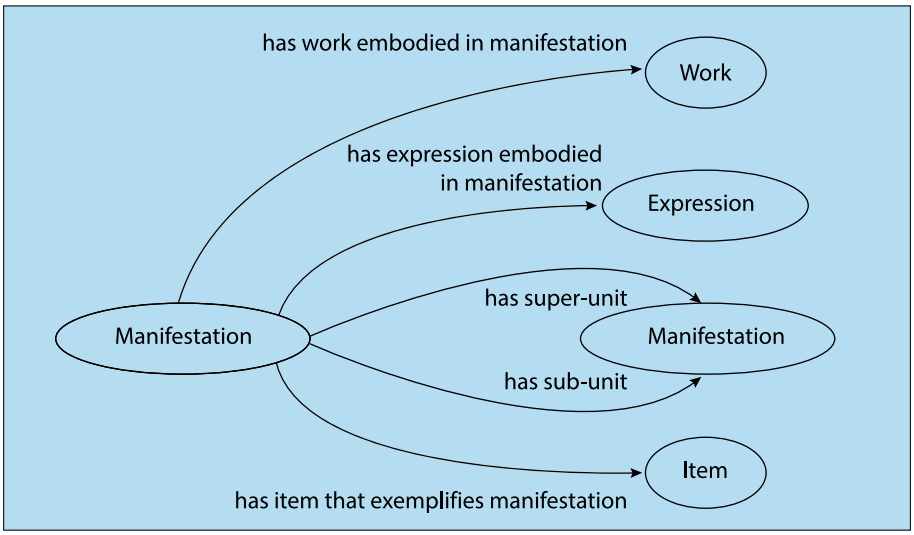

Figure 6. *Resource description focused on the Manifestation entity*

sion, Manifestation, or Item entities can be treated as primary, and any of the others can be ignored or eliminated.

Figure 6 shows the special relationships used to integrate the Work, Expression, Manifestation, and Item aspects of the description of a single resource with a focus on the Manifestation entity. ISBDM requires that a relationship to at least one instance of a work or expression is recorded to improve the retrievability of the manifestation that is being described, but that is the only constraint. The focus can be shifted to any other entity by declaring appropriate relationships based on the LRM and shortcuts.

5. Relating and Describing Instances

Entity-based cataloguing can be implemented with relational or object-oriented database technologies as well as the Semantic Web. The main distinction for entity-based cataloguing lies in how instances of entities are identified and linked: a URI with global uniqueness is used in the Semantic Web; a string identifier with local uniqueness is used in a relational or object database implementation. RDA treats these as two of four distinct "implementation scenarios". The other RDA scenarios cover the bibliographic and authority record approach of the current MARC formats, and the flat-file description that is used by the consolidated edition of ISBD. The single-entity techniques adopted by ISBDM accommodate the functionality of these other scenarios through data and display processing. The ISBDM stipulations for metadata creation are therefore confined to Semantic Web and relational database technologies.

ISBDM distinguishes between "linked open data" and "relational data" applications in its prescription of the value of a relationship element. For linked open data that use Semantic Web technologies, the preference order for choosing a value is URI, stringified URI or other identifier string, and authorized or other access point. For relational data, the order is authorized access point or identifier, and then other access point. In essence, ISBDM expects an application to connect an instance of a related entity by URI for linked data, or by authorized access point for relational data. In a single-entity bibliographic universe, the URI for an instance of another type of entity

cannot be de-referenced to obtain any human-readable data. Instead, it is better to implement all applications in a pure single-entity universe as relational data and use the human-readable authorized access point to identify a related entity.

ISBDM defines "has authorized access point of manifestation" as a refinement of LRM-R13 "has appellation" with domain Res and range Nomen. The LRM relationship is cascaded down to Manifestation as the domain, and then refined with a hierarchy of kinds of appellation that are used to reference instances of things:

"has appellation of manifestation"
- > "has access point of manifestation"
  - > "has authorized access point of manifestation"
  - > "has variant access point of manifestation"
- > "has identifier of manifestation"
- > "has title of manifestation"
  - > "has title proper of manifestation"
  - > "has variant title of manifestation"

The refinement of LRM-R13 is based on the function and processing of real-world labels for instances in information retrieval systems. The "has identifier of manifestation" element is further refined by subtypes of identifier that are specified in ISBD, such as "has fingerprint". RDA refines LRM-R13 in a similar fashion, although there are minor differences in the identifier subtypes.

ISBDM assumes that the other LRM entities will be treated in the same way, as in RDA, with the exception of Nomen which is essentially its own appellation. For example, ISBD for Expression is expected to provide the same appellation element hierarchy for the Expression entity, including "has authorized access point of expression", and should stipulate a preference for an authorized access point for manifestation to be the value of "has manifestation associated with expression", and therefore of all of its element subtypes, in a relational data application.

ISBDM provides suggestions for a set of string encoding schemes that construct authorized access points for most of the LRM entities; these are used for

examples in ISBDM itself, but this is not prescriptive and there is no expectation of global or international agreement on component string values, their order, or the punctuation that is added for clarification. ISBDM assumes that simple entity-based cataloguing will use only values from the entity that is being described to construct its authorized access point. An authorized access point includes descriptive metadata as the values of the component strings, as well as acting as a connection to the related entity. It has a secondary function as an entry in a browsable index that collocates referents to similar or related instances of the entity. An authorized access point for a related external entity in a pure single-entity universe is another mechanism that imports and localizes metadata from another universe, in this case a partial description of the related entity.

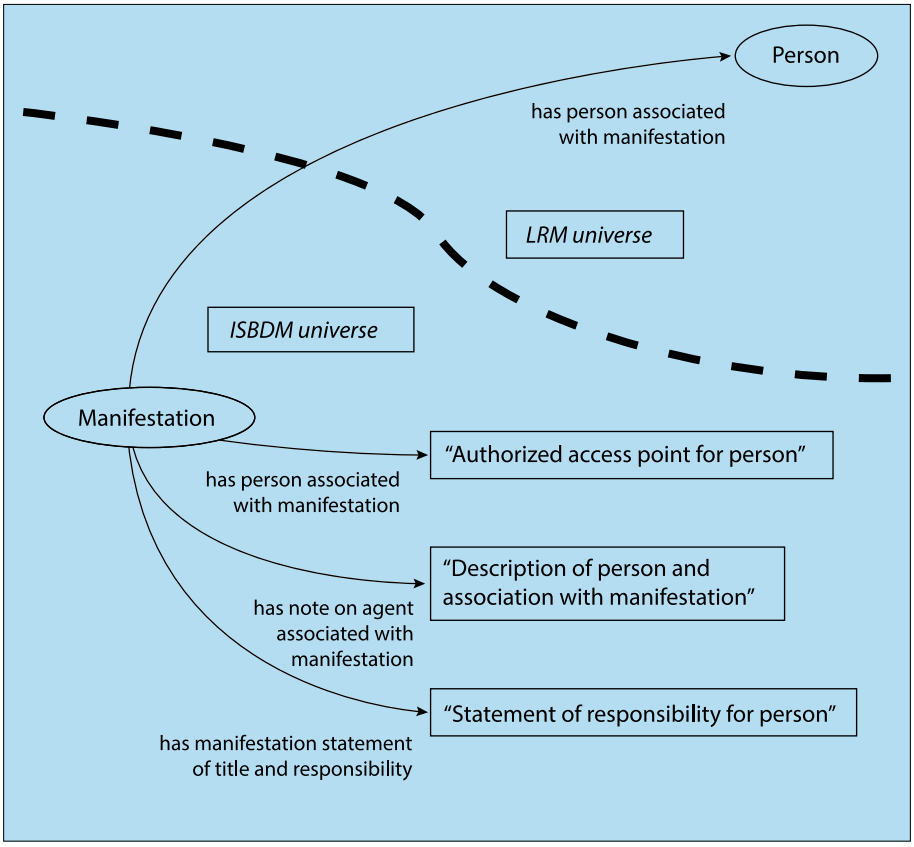

Figure 7. *Elements for related persons within and across the single-entity boundary in ISBDM*

In summary, the "global" partial description of an instance of a related entity beyond the universe boundary is provided by an authorized access point that contains the values of some elements of the instance, and the "local" partial description of one or more instances of a related entity is recorded with uncontrolled terminology as a note element. The attributes of unidentified instances of a related entity are provided through shortcut elements.

Figure 7 shows the ISBDM elements that can record descriptive data for an instance of a related person. The value of "has person associated with manifestation" is under authority control, but the values of the note and manifestation statement elements are uncontrolled and suitable only for general keyword indexing and display. Some structure and control may be applied to the value of a note element, but it is not possible for a manifes-

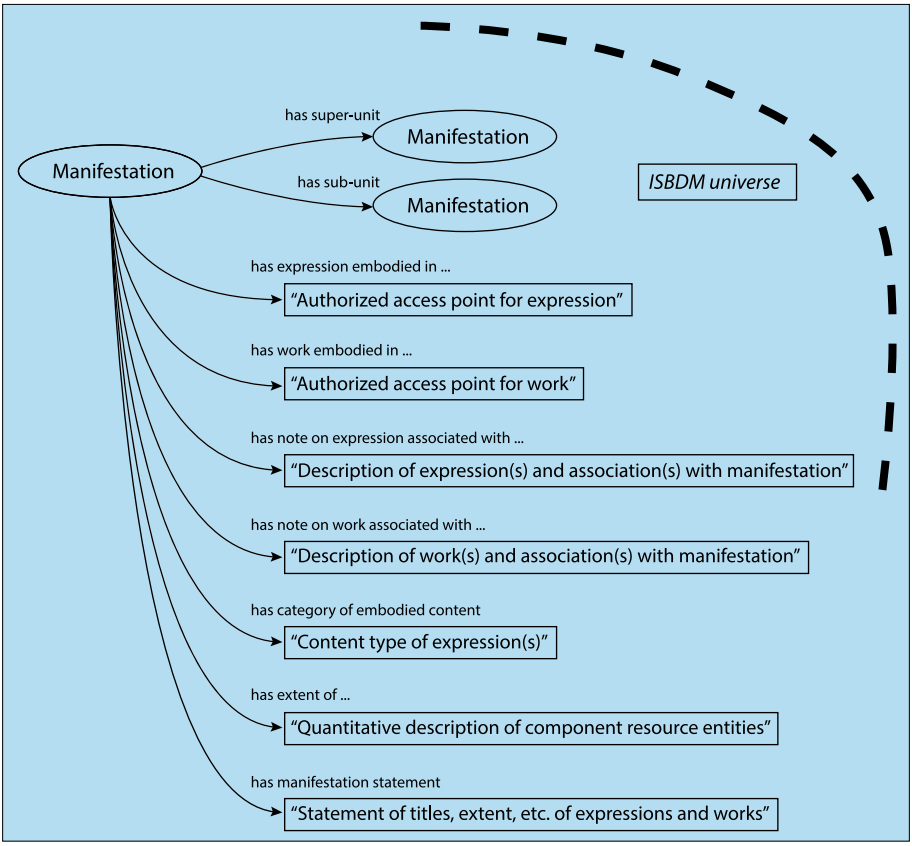

Figure 8. *Single-entity resource description in ISBDM*

tation statement.

Figure 8 shows the ISBDM elements that can record metadata for the library or cultural heritage resource that is being described. Items that exemplify the manifestation are excluded for clarity. Metadata for a super-unit or a sub-unit can also be recorded as an authorized access point, in a "has note on manifestation associated with manifestation" element, or in an appropriate manifestation statement element. Figure 8 combines single-entity cataloguing techniques from Figure 6 and Figure 7.

6. Conclusion

The use of a super-entity in a multiple-entity bibliographic universe encapsulates the universe and defines its boundary within the open universe.

The use of broad relationship elements as the root of specific hierarchies of relationships between entities in the local bibliographic universe encapsulates each entity and simplifies its integration with a new entity or a larger universe.

Partial metadata for an instance of an entity that lies outside of a local bibliographic universe is accommodated in a relationship element with a structured string value such as an authorized access point.

An unstructured description of one or more instances of an entity that lies outside of a local bibliographic universe is recorded in a note assigned to the external entity.

The description or identification of an instance of an intermediary entity that lies within or outside of a local bibliographic universe is avoided altogether with the use of a shortcut element.

A controlled terminology for the values of an entity that lies outside of a local bibliographic universe can be imported into the local universe with the use of a shortcut element.

These tools and techniques of a single-entity approach may be useful within implementations of a multiple-entity model. The redundancy that arises from duplicate and partial descriptive data in unstructured notes and structured access points improves the accommodation of legacy metadata and the utility of hybrid semantic and local relational data applications.

The result of resource description using these methods is not dissimilar to the bibliographic and authority record approach of the implementation scenario C of RDA that is effectively an extension of classic ISBD from pure description to access. The difference is that these approaches are embedded in the context of entity-based cataloguing in a multiple-entity bibliographic universe that supports the new paradigm of semantic metadata.

References

IFLA Cataloguing Section and IFLA Meetings of Experts on an International Cataloguing Code (2016). *Statement of International Cataloguing Principles (ICP) 2016*. IFLA. [accessed: 2024–01–31]. Available at: https://repository.ifla.org/handle/123456789/80

IFLA Study Group on the Functional Requirements for Bibliographic Records (2009). Functional requirements for bibliographic records: final report. As amended and corrected through 2009. IFLA. [accessed: 2024–01–31]. Available at: https://repository.ifla.org/handle/123456789/811

ISBD Review Group (2004). *Mapping ISBD elements to FRBR entity attributes and relationships.* IFLA. [accessed: 2024–01–31]. Available at: https://repository.ifla.org/handle/123456789/1901

ISBD Review Group (2011). *ISBD: International standard bibliographic description*. Consolidated ed. De Gruyter Saur. [accessed: 2024–01–31]. Available at: https://repository.ifla.org/handle/123456789/786

Joint Steering Committee for Revision of AACR (2006). RDA/ONIX framework for resource categorization. Version 1.0. RDA Copyright Holders. [accessed: 2024–01–31]. Available at: http://rda-rsc.org/archivedsite/docs/5chair10.pdf

RDA Steering Committee (2018). Outcomes of the October 2018 RSC Meeting. [accessed 2024-01-31]. Available at: http://www.rda-rsc.org/sites/all/files/RSC-Outcomes-2018.pdf

RDA Steering Committee (2024). *RDA Toolkit*. RDA Copyright Holders. [accessed: 2024–01–31]. Available at: https://access.rdatoolkit.org/

RIVA, P.; M. ŽUMER; P. Le BŒUF. (2017). *IFLA Library reference model: a conceptual model for bibliographic information.* IFLA. [accessed: 2024–01–31]. Available at: https://repository.ifla.org/handle/123456789/40

TANIGUCHI, S. (2017). What does giving primacy to a certain entity cause in a conceptual model for cataloging?: expression-entity dominant model revisited. *LRTS*, 61 (4): 212-225

W3C (2014). RDF Schema 1.1. W3C. [accessed: 2024–01–31]. Available at: https://www.w3.org/TR/rdf-schema/