

**THE LOGICAL STRUCTURE OF THE  
ANGLO-AMERICAN CATALOGUING RULES – PART I**

**Drafted for  
The Joint Steering Committee for Revision of AACR**

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# THE LOGICAL STRUCTURE OF THE ANGLO-AMERICAN CATALOGUING RULES – PART I

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## OBJECTIVE

The principal objective of this study is to develop a formalized schema to reflect the internal logic of the *Anglo-American Cataloguing Rules*.

The schema is intended to serve as a tool to assist in the re-examination of the principles underlying the code and in setting directions for its future development.

The presentation of the analytic model is designed specifically to:

- assist in clarifying the concepts that are integral to the logical design of the code;
- highlight anomalies within the rules and inconsistencies in the application of basic principles;
- provide a clearly defined frame of reference to be used in determining how to develop and extend the code to reflect new media used as information carriers, new forms of publication, and new modes of dissemination and access.

## METHODOLOGY

The methodology used in this study is derived from techniques used in systems development projects to create entity-relationship models or object-oriented models. As analytic tools, entity-relationship and object-oriented models are used as the basis for identifying the key entities or objects about which an organization needs to keep data and clarifying the data-related business rules that apply within the organization prior to designing the layout of databases to support the organization's business activities.

The modeling technique as applied in this study focuses on the cataloguing process as the activity to be analyzed, and the code itself as the set of business rules that govern that activity. The model is not designed to reflect in the abstract the information universe or the universe of recorded knowledge. It is designed to represent in specific terms how that universe is reflected in the logic of the cataloguing code *per se*.

This first segment of the study has taken as its starting point a detailed analysis of the data elements in Part I of the code. Each data element in the descriptive record has been mapped either to an attribute of a particular entity or object or to a relationship between particular entities or objects. Because it is intended to serve as a schema mirroring the *internal* logic of the code, the model reflects only what is made explicit through the rules as currently set out in the code, and only what is recorded in the descriptive record as a result of applying those rules. Other entities or objects, other attributes, and other relationships that might be inferred from an analysis of phenomena *external* to the code itself have not been reflected in the model.

### ***Terminology / definitions***

As far as possible the terms used in the model to identify entities or objects, their attributes, and their relationships have been derived directly from the code itself.

The definitions for the terms used to identify entities, etc. have also been derived, to the extent possible, either from the glossary or from the wording of the rules themselves, in some cases in a modified form. Where definitions could not be derived from the code itself, they have been derived from other sources such as the *ALA glossary of library and information science*, the *Functional requirements for bibliographic records*, and technical dictionaries. In other instances definitions have been developed specifically for the purposes of the model.

Specifications as to what is included within the scope of a particular entity, attribute, or relationship, or excluded from it, have been derived, wherever possible, directly from the rules themselves.

### ***Entities / relationships***

The entities or objects defined in the model represent the key agents, processes, objects, and concepts around which the code operates; they are in effect the primary points of reference or coordinates for mapping the logic of the code.

Similarly the relationships defined in the model represent the key associations between entities or objects reflected in the code; they are in effect the logical connectors between the key entities or objects.

### ***Attributes / data elements***

The attributes associated with each entity or object in the model have been defined at a logical level, i.e., as characteristics of the entity or object as they would be defined with reference to the entity or object itself, not as specific data elements defined with reference to the bibliographic record. For example, "title" is defined as an attribute of the entity or object "document" in such a way as to encompass all the names by which the document may be identified.

Each logical attribute is in turn linked to the specific data elements that fall within its defined scope (e.g., "title" as a logical attribute is linked to the data elements "title proper," "parallel title," "variant title," "romanized title," and "key-title"). In many instances, however, the logical attribute is linked to only one data element.

If the rules permit the recording of a data element in more than one area of the description the reference to the rules for that data element will indicate those distinctions. For example, the references under the data element "parallel title" to the rules pertaining to that data element distinguish between those that give instructions for "recording" a parallel title in the title and statement of responsibility area and those that give instructions for "noting" a parallel title in the note area. In such cases the data element is treated as a single data element irrespective of its placement within the record.

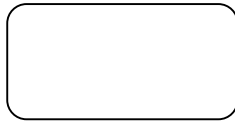
### **General rules / specific rules**

The data elements associated with each logical attribute are linked to the rules in the code that pertain to that data element.

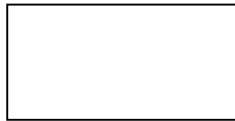
The rules relating to each data element are identified under two categories: general rules that are applicable across all classes of material and types of publication; and specific rules that apply only to specific classes of material and types of publication. Apparent anomalies in the rules have been noted in the detailed analysis that is provided for each data element.

### **Diagramming**

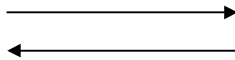
The conventions used for diagramming the logic of the code are as follows:



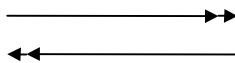
A rectangle with rounded corners represents a “bibliographic” entity (i.e., an abstract concept used in the code as a point of reference or as a structuring device for the rules).



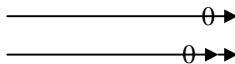
A rectangle with right-angled corners represents a “real world” entity (i.e., an agent, process, or object) the characteristics of which are reflected in the descriptive record.



A single-headed arrow on a line represents a relationship in which any given instance of the entity at the opposite end of the line may be associated with only one instance of the entity to which the arrow is pointing.



A double-headed arrow on a line represents a relationship in which any given instance of the entity at the opposite end of the line may be associated with one or more instances of the entity to which the arrows are pointing.



A zero on a line indicates that the relationship between any given instance of the entity at the opposite end of the line and the entity to which the arrow is pointing is optional (i.e., the relationship may not be operative in all instances).

## OVERVIEW OF THE MODEL

An overview of the model developed for this study is presented in a series of entity-relationship diagrams (Figures 1-10), accompanied by a summary explanation of the entities and relationships depicted in each of the diagrams. The first diagram (Figure 1) sets out the “bibliographic” entities that are used to give Part I of the code its structure (i.e., the abstract concepts used in Part I as points of reference or as structuring devices for the rules). In the subsequent diagrams (Figures 2-10) those “bibliographic” entities are then overlaid on the “real world” entities (i.e., the agents, processes, and objects) the characteristics of which are reflected in the descriptive record. Separate “bibliographic” overlays are presented for each of the various categories of items dealt with by the code (i.e., unpublished documents, publication masters, published documents, collections, document parts, and parts of the content of a document) and for the various types of multilevel description (for multipart documents, series, and collections).

### *The “bibliographic” entities (Figure 1)*

**Figure 1** depicts the “bibliographic” entities that are used to structure the rules, and the relationships between those entities: **ITEM**, **SERIES**, **SUBSERIES**, **CLASS OF MATERIALS**, **TYPE OF PUBLICATION**, and **CHIEF SOURCE OF INFORMATION**.

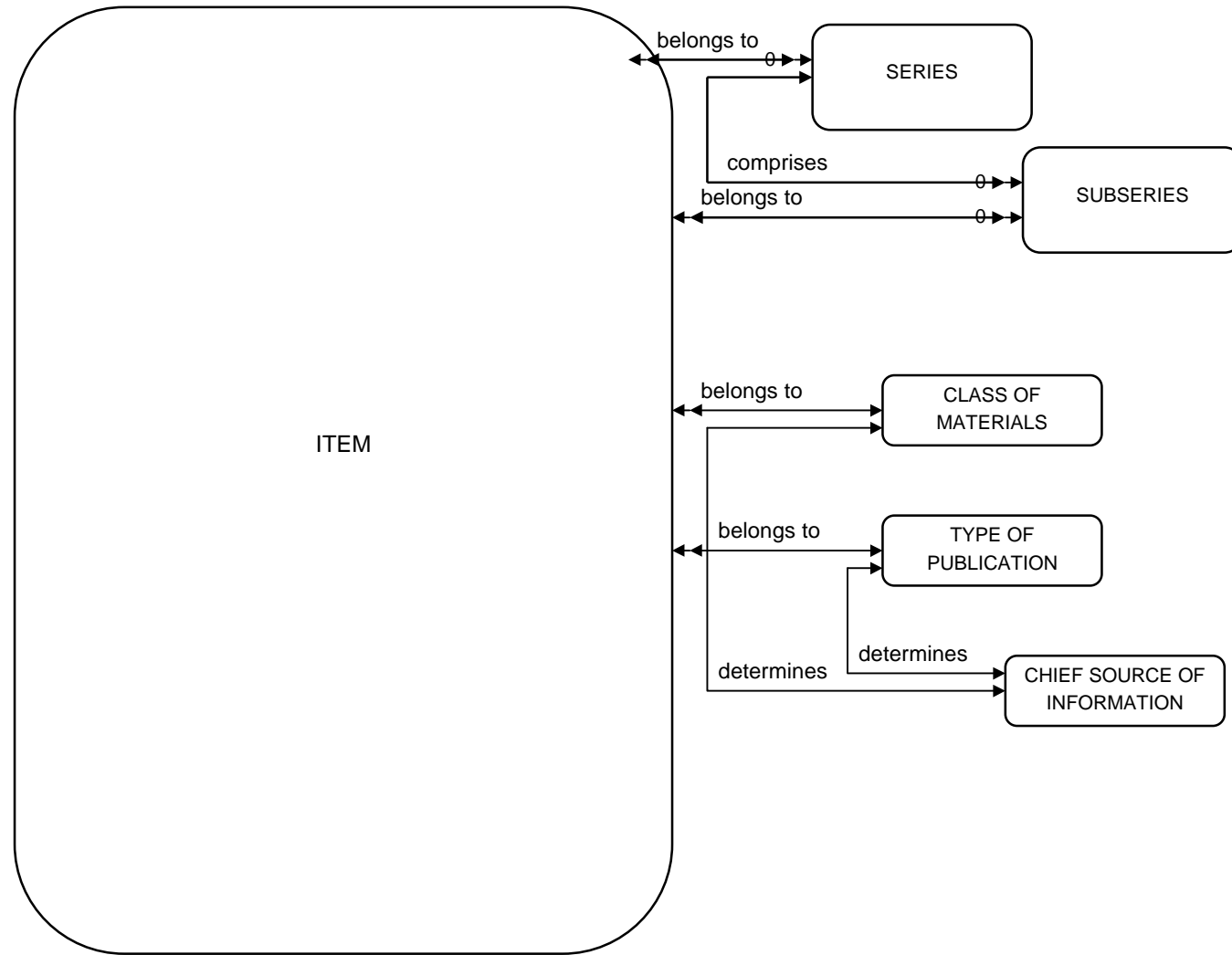
**ITEM** (as defined in the model) is a document or set of documents in any physical form, published, issued, or treated as an entity. **ITEM** is in effect a “cipher” entity, a bibliographic concept that serves within the logical structure of the rules themselves as a “handle” to facilitate reference to the “real world” entity that is the centre of focus for the bibliographic record (i.e., for the document, document part, collection, or part of the content of a document that forms the basis for the description). (For a detailed analysis of **ITEM** and its attributes see Tab 1.)

The **ITEM** may (or may not) “belong to” one or more **SERIES** and to one or more **SUBSERIES**.

**SERIES** (as defined in the model) is a group of separate items related to one another by the fact that each item bears, in addition to its own title proper, a collective title applying to the group as a whole. **SERIES** also functions in effect as a “cipher” entity, as a “place marker” of sorts to accommodate reference to an aggregate of items to which the item described in the record belongs. As a bibliographic entity, **SERIES** may equate to any one of a number of “real world” aggregates, depending on what type of “real world” object is treated as the item being described. If the item is a document, the series is normally a set of documents. If the item is a document part, the rules make provision for a document (i.e., the multipart document to which the document part belongs) to be tagged as the series. (For a detailed analysis of **SERIES** and its attributes see Tab 2.)

The **SERIES** may (or may not) comprise one or more **SUBSERIES**.

Figure 1: AACR's bibliographic constructs



**SUBSERIES** (as defined in the model) is a series within a series. **SUBSERIES** functions in the same way as series, as a “cipher” entity to accommodate reference to an intermediate level of aggregation. If the item described in the record is a document, the subseries is normally a set of documents, which in turn is a subset of a larger set of documents forming the series. If the item is a document part, the rules make provision for a subset of document parts to be tagged as the subseries. (For a detailed analysis of **SUBSERIES** and its attributes see Tab 3.)

**ITEM** also “belongs to” a **CLASS OF MATERIALS** and a **TYPE OF PUBLICATION**.

**CLASS OF MATERIALS** (as defined in the model) is the broad class or specific class of materials to which an item belongs. **CLASS OF MATERIALS** is a bibliographic entity that functions as a means of organizing the rules for description. Documents and document parts are assigned to a specific class of materials based normally on the form of the physical carrier of the document or document part. Specific classes are in turn grouped to form a broad class of materials, normally on the basis of common physical characteristics linking the specific classes in the group. (For a detailed analysis of **CLASS OF MATERIALS** and its attributes see Tab 4.)

**TYPE OF PUBLICATION** (as defined in the model) is the category to which a published item belongs with respect to its intended termination. **TYPE OF PUBLICATION** is a bibliographic entity, similar to class of materials, that functions as a means of organizing the rules for description. Documents are assigned to a type of publication based on whether the document is intended to be completed in a single or finite number of parts, or to continue indefinitely. (For a detailed analysis of **TYPE OF PUBLICATION** and its attributes see Tab 5.)

**CLASS OF MATERIALS** and **TYPE OF PUBLICATION** “determine” the **CHIEF SOURCE OF INFORMATION** for the item being described.

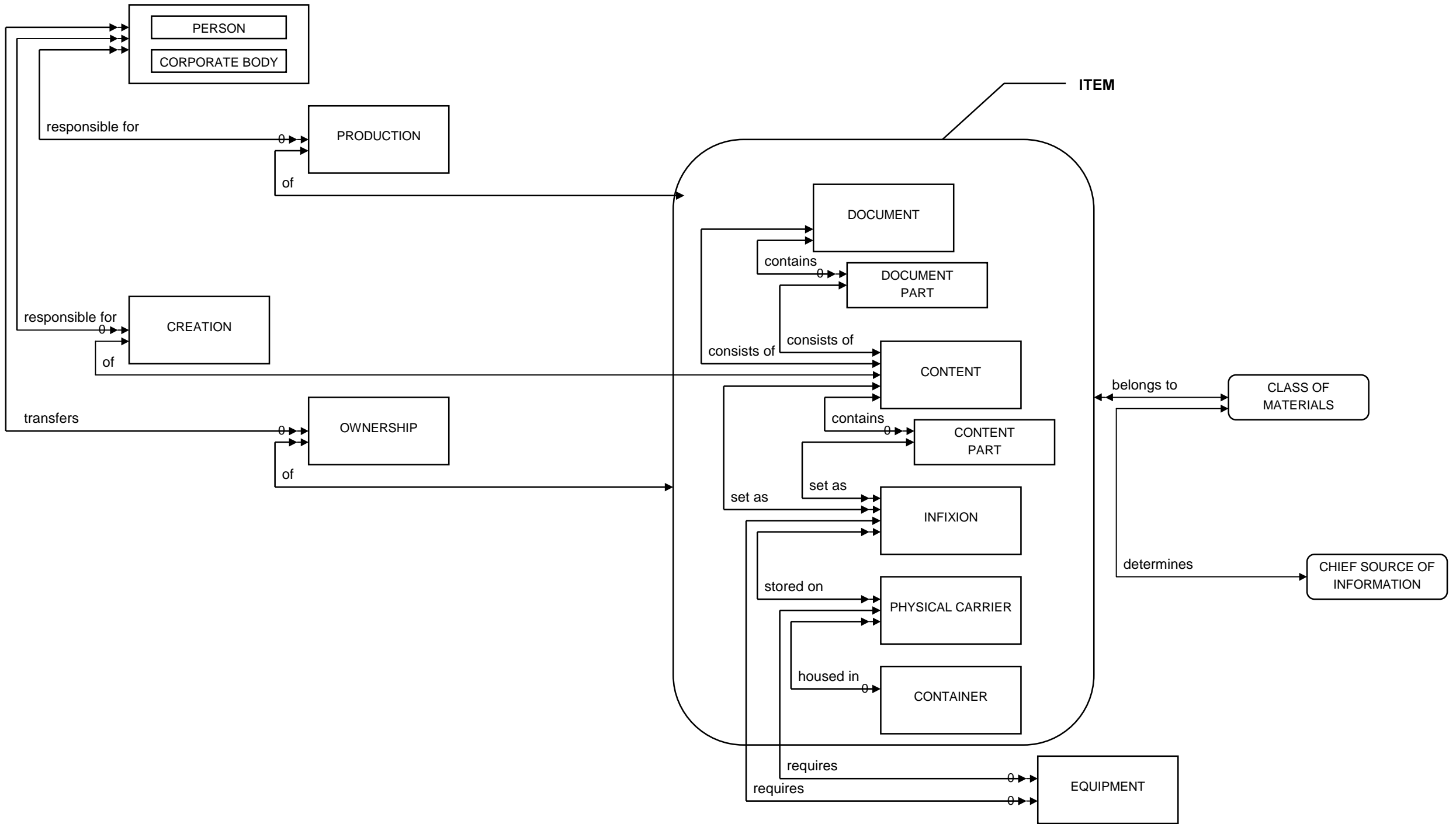
**CHIEF SOURCE OF INFORMATION** (as defined in the model) is the source of bibliographic data to be given preference as the source from which a bibliographic description—or portion thereof—is prepared. **CHIEF SOURCE OF INFORMATION** is a bibliographic entity that functions, again, as a “cipher” entity to accommodate reference to any one of a number of physical or structural elements associated with a document, document part, collection, or part of the content of a document, selected according to a set order of precedence as the primary source for the information used to describe the document, document part, etc. (For a detailed analysis of **CHIEF SOURCE OF INFORMATION** and its attributes see Tab 6.)

***Item = unpublished document (Figure 2)***

**Figure 2** depicts the “real world” entities that are reflected in the description of an unpublished document, and overlays on those entities the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured.



Figure 2: Item = Unpublished document



The central group of “real world” entities depicted in **Figure 2** represent the object that serves as the focus for the description, i.e., the **DOCUMENT**. Because the rules deal with the constituent elements of the document to a significant extent as objects in their own right, those constituent elements have been represented in the model as separate entities: **DOCUMENT PART**, **CONTENT**, **CONTENT PART**, **INFIXION**, **PHYSICAL CARRIER**, and **CONTAINER**. Together they constitute the bibliographic item.

**DOCUMENT** (as defined in the model) is an object that comprises intellectual and/or artistic content and is conceived, produced, and/or issued as an entity. The **DOCUMENT** entity has two primary sub-types: unpublished document, and published document. When the item described is an unpublished document, the document entity equates to the unpublished document sub-type of the entity. (For a detailed analysis of **DOCUMENT** and its attributes see Tab 7.)

The **DOCUMENT** may (or may not) “contain” one or more **DOCUMENT PART**.

**DOCUMENT PART** (as defined in the model) is a physically separate component of a document. When the item described is the document as a whole, the rules provide for the inclusion of data elements within the description that pertain specifically to one or more document parts (e.g., a note on accompanying material). (For a detailed analysis of **DOCUMENT PART** and its attributes see Tab 8.)

The **DOCUMENT** and **DOCUMENT PART** “consist of” **CONTENT**.

**CONTENT** (as defined in the model) is the intellectual or artistic substance contained in a document or document part. When the item described is the document as a whole, the rules provide for the inclusion of data elements within the description that pertain specifically to the content of the document and its document parts (e.g., a summary note). (For a detailed analysis of **CONTENT** and its attributes see Tab 9.)

**CONTENT** may (or may not) “contain” one or more **CONTENT PART**.

**CONTENT PART** (as defined in the model) is an individual component of the intellectual or artistic content of a document or document part. When the item described is the document as a whole, the rules provide for the inclusion of data elements within the description that pertain specifically to a content part (e.g., a list of contents). (For a detailed analysis of **CONTENT PART** and its attributes see Tab 10.)

**CONTENT** and **CONTENT PART** are “set as” one or more **INFIXION**.

**INFIXION** (as defined in the model) is the formatting of intellectual or artistic content. When the item described is the document as a whole, the rules provide for the inclusion of data elements within the description that pertain specifically to the infixion of the content of the document (e.g., a note on the aspect ratio of a film). (For a detailed analysis of **INFIXION** and its attributes see Tab 11.)

**INFIXION** is “stored on” one or more **PHYSICAL CARRIER**.

**PHYSICAL CARRIER** (as defined in the model) is a physical medium in which data, sound, images, etc. are stored. When the item described is the document as a whole, the rules

provide for the inclusion of data elements within the description that pertain specifically to the physical carrier for the document (e.g., the form of the carrier). (For a detailed analysis of **PHYSICAL CARRIER** and its attributes see Tab 12.)

**PHYSICAL CARRIER** may (or may not) be “housed in” a **CONTAINER**.

**CONTAINER** (as defined in the model) is any housing for a document, a group of documents, or part of a document that is physically separable from the material being housed. When the item described is the document as a whole, the rules provide for the inclusion of data elements within the description that pertain specifically to the container of the document and its document parts (e.g., the dimensions of the container). (For a detailed analysis of **CONTAINER** and its attributes see Tab 13.)

When the item described is an unpublished document, the rules also provide for including in the description data elements that pertain to a number of other “real world” entities that are external to the document and its constituent elements. Those external entities represent agents, processes, and other objects associated with the document and its content: **PERSON**, **CORPORATE BODY**, **PRODUCTION**, **CREATION**, **OWNERSHIP**, and **EQUIPMENT**.

**PERSON** (as defined in the model) is an individual; **CORPORATE BODY** (as defined in the model) is an organization or group of persons that is identified by a particular name and that acts, or may act, as an entity. When the item described is an unpublished document, the rules provide for the inclusion of data elements within the description that pertain specifically to persons and/or corporate bodies responsible for the production of the document, the creation of its content, or to those who have transferred ownership in the document. For the purposes of the model data elements reflecting attributes of a person or corporate body, or that person’s or corporate body’s relationship to the document or its content that are derived from sources other than the “labels” that appear prominently on the document are treated as data pertaining to the external entity **PERSON** or **CORPORATE BODY**, as distinct from being treated simply as attributes of the document itself. For example, a statement of responsibility appearing prominently in the document is treated as an attribute of the **DOCUMENT**, whereas a note attributing authorship of the content of the document to a person not named in a statement of responsibility is treated as a data element pertaining to **PERSON** as an external entity. (For a detailed analysis of **PERSON** and its attributes see Tab 14. For a detailed analysis of **CORPORATE BODY** and its attributes see Tab 15.)

**PERSON** and/or **CORPORATE BODY** may (or may not) be “responsible for” **PRODUCTION**.

**PRODUCTION** (as defined in the model) is the act of physically creating a document. When the item described is an unpublished document, the rules provide for the inclusion of data elements within the description that pertain specifically to the production of the document (e.g., the date of production of a manuscript). Such data elements, when derived from sources other than the “labels” that appear prominently on the document, are treated as data pertaining to the external entity **PRODUCTION**. (For a detailed analysis of **PRODUCTION** and its attributes see Tab 16.)

**PERSON** and/or **CORPORATE BODY** may be (or may not) “responsible for” **CREATION**.

**CREATION** (as defined in the model) is the act of originating intellectual or artistic content. When the item described is an unpublished document, the rules provide for the inclusion of data elements within the description that pertain specifically to the creation of the document (e.g., the date of original creation of the content of the document). Such data elements, when derived from sources other than the “labels” that appear prominently on the document are treated as data pertaining to the external entity **CREATION**. (For a detailed analysis of **CREATION** and its attributes see Tab 17.)

**PERSON** and/or **CORPORATE BODY** may (or may not) “transfer” **OWNERSHIP**.

**OWNERSHIP** (as defined in the model) is the legal title to an object of physical property. When the item described is an unpublished document, the rules provide for the inclusion of data elements within the description that pertain specifically to the ownership of the document (e.g., date of accession of a manuscript). Such data elements are treated as data pertaining to the external entity **OWNERSHIP**. (For a detailed analysis of **OWNERSHIP** and its attributes see Tab 18.)

**INFIXION** and/or **PHYSICAL CARRIER** may (or may not) “require” **EQUIPMENT**.

**EQUIPMENT** (as defined in the model) is a device used to play, project, operate, or use a document whose content cannot otherwise be accessed by the unaided senses. When the item described is an unpublished document, the rules provide for the inclusion of data elements within the description that pertain specifically to the equipment that is required for use of the document (e.g., the name of a particular type of reader required for a microform). Such data elements are treated as data pertaining to the external entity **EQUIPMENT**. (For a detailed analysis of **EQUIPMENT** and its attributes see Tab 19.)

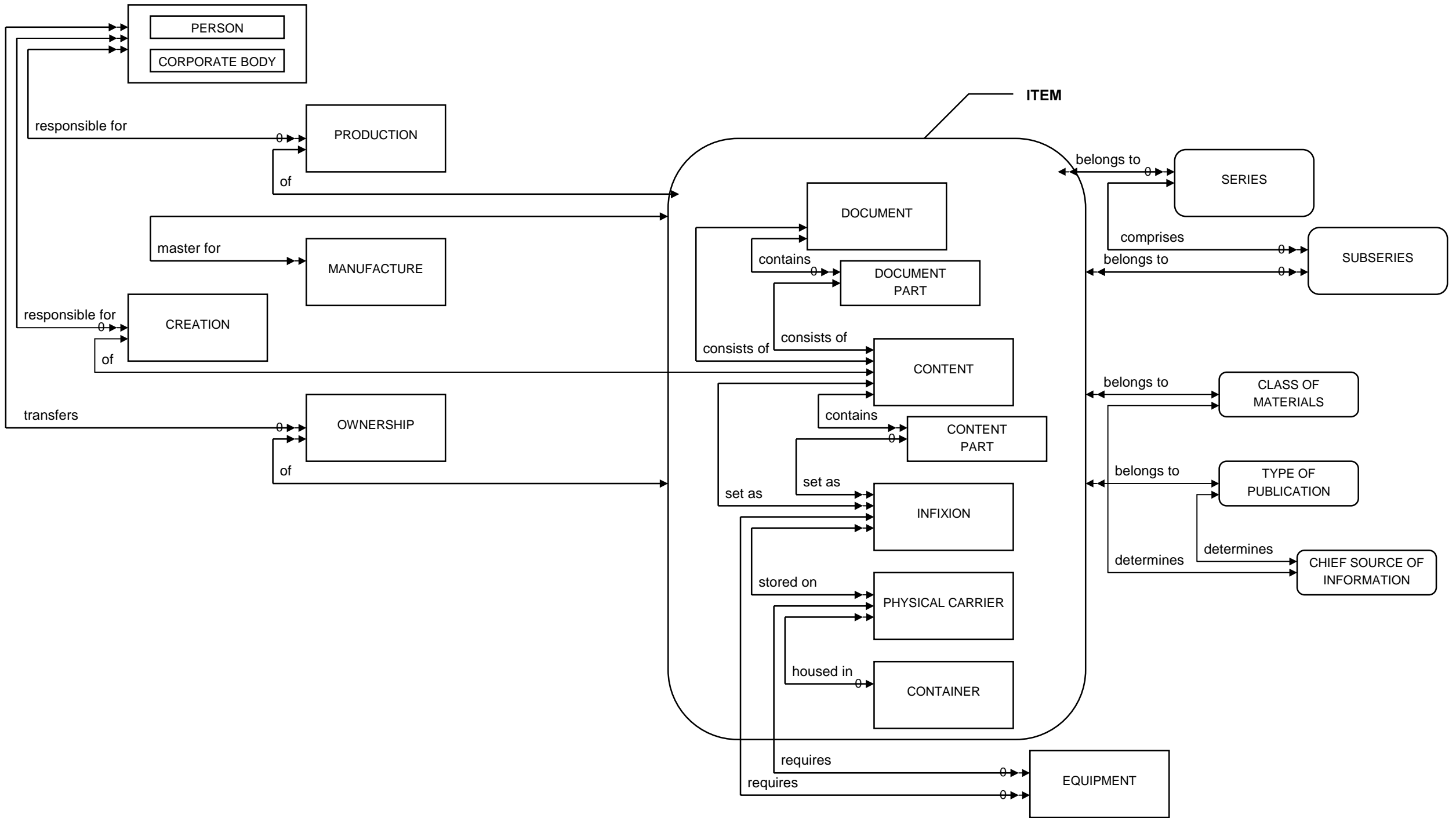
As an overlay to the “real world” objects reflected in the description of an unpublished document, **Figure 2** depicts the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured: **ITEM**, **CLASS OF MATERIALS**, and **CHIEF SOURCE OF INFORMATION**. Those entities and their relationships to one another are outlined above under the description provided for **Figure 1**.

***Item = publication master (Figure 3)***

**Figure 3** depicts the “real world” entities that are reflected in the description of a publication master, and overlays on those entities the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured.

The “real world” entities depicted in **Figure 3** are with only one exception the same as those depicted for an unpublished document in **Figure 2**. The one additional “real world” entity relevant to the description of a publication master is **MANUFACTURE**.

Figure 3: Item = Publication master



**MANUFACTURE** (as defined in the model) is the act of making copies of a document by means of a mechanical or electronic process. The external entity **MANUFACTURE** is implicit in the description of a publication master inasmuch as the presumed intent for the existence of the item is to serve as the master for the manufacturing process. (For a detailed analysis of **MANUFACTURE** and its attributes see Tab 20.)

As an overlay to the “real world” objects reflected in the description of a publication master, **Figure 3** depicts the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured: **ITEM**, **SERIES**, **SUBSERIES**, **CLASS OF MATERIALS**, **TYPE OF PUBLICATION** and **CHIEF SOURCE OF INFORMATION**. Those entities and their relationships to one another are outlined above under the description provided for **Figure 1**.

***Item = published document (Figure 4)***

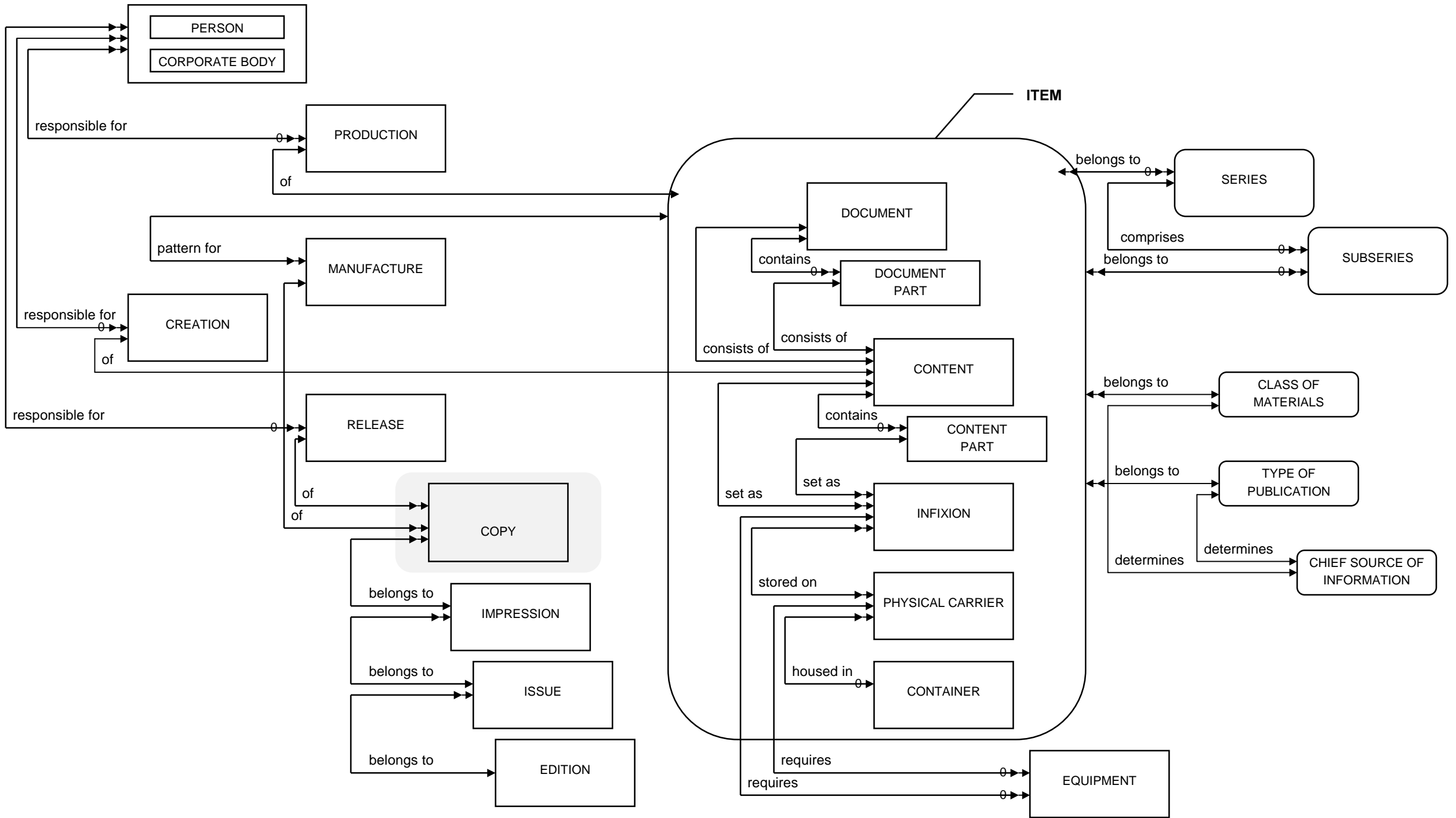
**Figure 4** depicts the “real world” entities that are reflected in the description of a published document, and overlays on those entities the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured.

The “real world” entities depicted in **Figure 4** correspond to a large extent to those depicted for an unpublished document in **Figure 2**. The central group of entities are again **DOCUMENT**, **DOCUMENT PART**, **CONTENT**, **CONTENT PART**, **INFIXION**, **PHYSICAL CARRIER** and **CONTAINER**. Also corresponding to the entities depicted in **Figure 2** are the entities external to the document and its constituent entities: **PERSON**, **CORPORATE BODY**, **PRODUCTION** and **CREATION**. **Figure 4**, however, depicts a number of additional “real world” entities relevant to the description of a published document: **MANUFACTURE**, **RELEASE**, **COPY**, **IMPRESSION**, **ISSUE**, and **EDITION**.

In the description of a published document the entity **DOCUMENT** and its constituent entities (**DOCUMENT PART**, **CONTENT**, **CONTENT PART**, **INFIXION**, **PHYSICAL CARRIER**, and **CONTAINER**) are defined in the same way as they are for an unpublished document. The attributes of the **DOCUMENT** entity itself, however, are those that pertain to the primary sub-type published document (as distinct from unpublished document). The model for a published document also differs from that for an unpublished document in that the entity **DOCUMENT** and its constituent entities are in effect abstract in nature. That is to say that the description of a published document is essentially a description of what are assumed to be the characteristics that are common to all copies of the document, based on the characteristics of the copy in hand. Hence the entity **COPY** is shadowed in **Figure 4** to indicate that it is effectively the source from which the characteristics of the **DOCUMENT**, in the abstract sense, are inferred.

**MANUFACTURE** (as noted above under the description for **Figure 3**) is the act of making copies of a document by means of a mechanical or electronic process. When the item described is a published document, the rules provide for the inclusion of data elements within the description that pertain specifically to the manufacturing process (e.g., the method of reproduction for a cartographic item). Such data elements are treated as data pertaining to the external entity **MANUFACTURE**. (For a detailed analysis of **MANUFACTURE** and its attributes see Tab 20.)

Figure 4: Item = Published document



**RELEASE** (as defined in the model) is the act of making copies of a document available to the public. When the item described is a published document, the rules provide for the inclusion of data elements within the description that pertain specifically to the release of the document (e.g., the country of original release of a motion picture). Such data elements, when derived from sources other than the “labels” that appear prominently on the document, are treated as data pertaining to the external entity **RELEASE**. (For a detailed analysis of **RELEASE** and its attributes see Tab 21.)

**MANUFACTURE** and **RELEASE** are linked to **COPY**.

**COPY** (as defined in the model) is a single specimen of a document. **COPY** functions in two ways within the model. A copy is normally the object from which the cataloguer derives the evidence necessary to describe the document as a document (i.e., to provide a description that is presumed to be applicable to all copies of the document). But a copy may also be reflected in the descriptive record through data elements that pertain specifically to that particular copy of the document, and are presumed not to apply to all copies of the document. The rules provide for the inclusion of data elements within the description that pertain to the particular copy in hand (e.g., a note on lacunae). Such data elements are treated as data pertaining to the entity **COPY**. (For a detailed analysis of **COPY** and its attributes see Tab 22.)

**COPY** “belongs to” **IMPRESSION**.

**IMPRESSION** (as defined in the model) encompasses all copies of an edition of a document manufactured at one time. When the item described is a published document, the rules provide for the inclusion of data elements within the description that pertain specifically to the impression of the document (e.g., a designation distinguishing the impression from other impressions of the same document). Such data elements, when derived from sources other than the “labels” that appear prominently on the document, are treated as data pertaining to the external entity **IMPRESSION**. (For a detailed analysis of **IMPRESSION** and its attributes see Tab 23.)

**IMPRESSION** “belongs to” **ISSUE**

**ISSUE** (as defined in the model) encompasses all copies of an edition forming a distinct group that are distinguished from other copies of that edition by minor but well-defined variations. When the item described is a published document, the rules provide for the inclusion of data elements within the description that pertain specifically to the issue of the document (e.g., a designation distinguishing the issue from other issues of the same document). Such data elements, when derived from sources other than the “labels” that appear prominently on the document, are treated as data pertaining to the external entity **ISSUE**. (For a detailed analysis of **ISSUE** and its attributes see Tab 24.)

**ISSUE** “belongs to” **EDITION**

**EDITION** (as defined in the model) encompasses all copies produced from essentially the same image or master copy and issued by the same entity. When the item described is a published document, the rules provide for the inclusion of data elements within the description that pertain specifically to the edition of the document (e.g., a designation distinguishing the edition from other editions of the same document). Such data



elements, when derived from sources other than the “labels” that appear prominently on the document, are treated as data pertaining to the external entity **EDITION**. (For a detailed analysis of **EDITION** and its attributes see Tab 25.)

As an overlay to the “real world” objects reflected in the description of a published document, **Figure 4** depicts the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured: **ITEM**, **SERIES**, **SUBSERIES**, **CLASS OF MATERIALS**, **TYPE OF PUBLICATION** and **CHIEF SOURCE OF INFORMATION**. Those entities and their relationships to one another are outlined above under the description provided for **Figure 1**.

***Item = collection (Figure 5)***

**Figure 5** depicts the “real world” entities that are reflected in the description of a collection, and overlays on those entities the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured.

The primary “real world” entity depicted in **Figure 5** represents the object that serves as the focus for the description, i.e., the **COLLECTION**.

**COLLECTION** (as defined in the model) is a collection of documents, normally formed by or around a person, family, corporate body, or subject, assembled by a library or by a previous owner. The rules provide for the description of a collection as a whole that includes data elements such as the title by which the collection is known and its extent. (For a detailed analysis of **COLLECTION** and its attributes see Tab 26.)

When the item described is a collection, the rules also provide for including in the description data elements that pertain to a number of other “real world” entities that are external to the collection: **PERSON**, **CORPORATE BODY**, and **OWNERSHIP**. Those entities and their relationships to one another are outlined above under the description provided for **Figure 2**.

As an overlay to the “real world” objects reflected in the description of a collection, **Figure 5** depicts the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured: **ITEM**, **CLASS OF MATERIALS**, and **CHIEF SOURCE OF INFORMATION**. Those entities and their relationships to one another are outlined above under the description provided for **Figure 1**.

***Item = document part (Figure 6)***

**Figure 6** depicts the “real world” entities that are reflected in the description of a document part, and overlays on those entities the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured.

Figure 5: Item = Collection

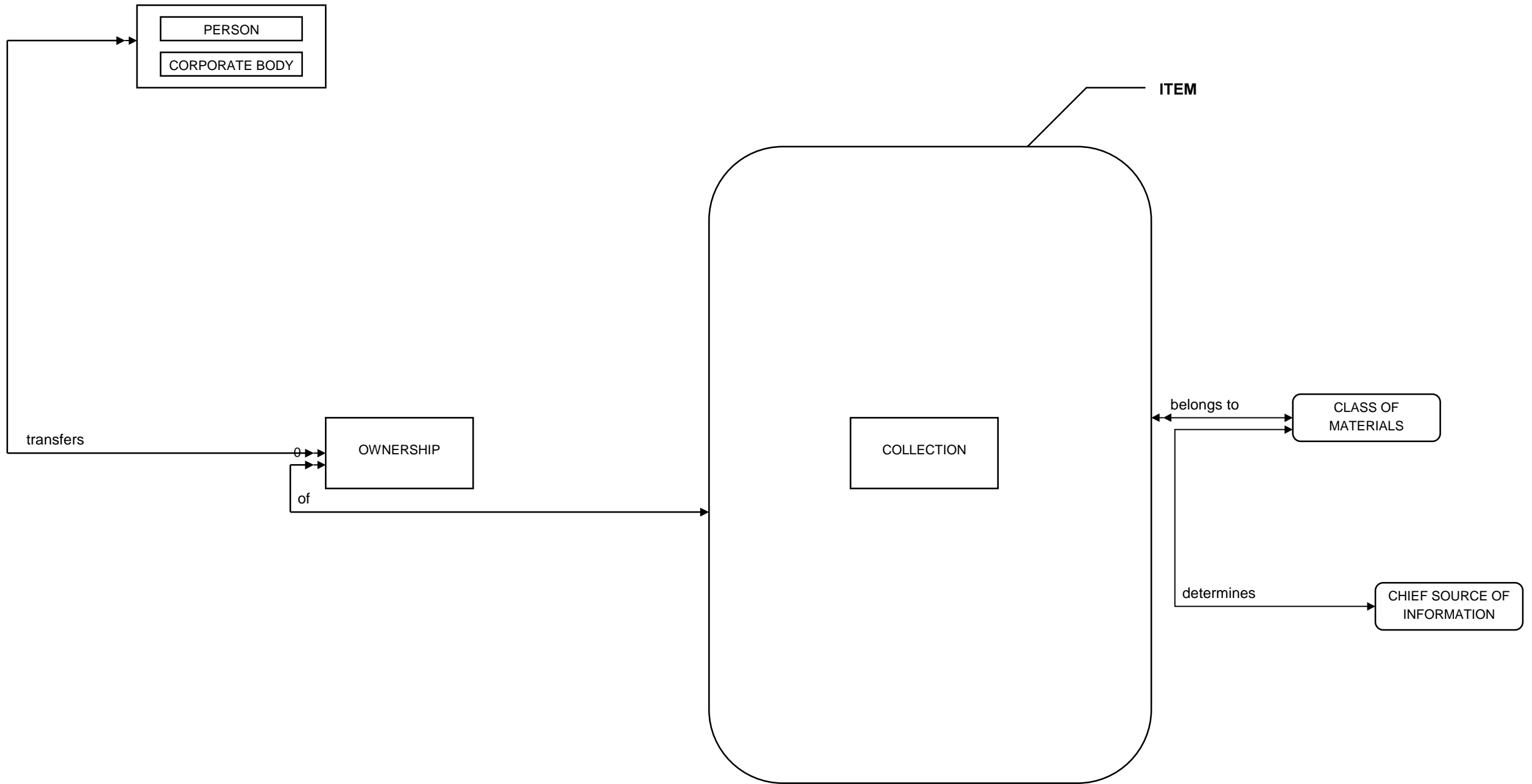
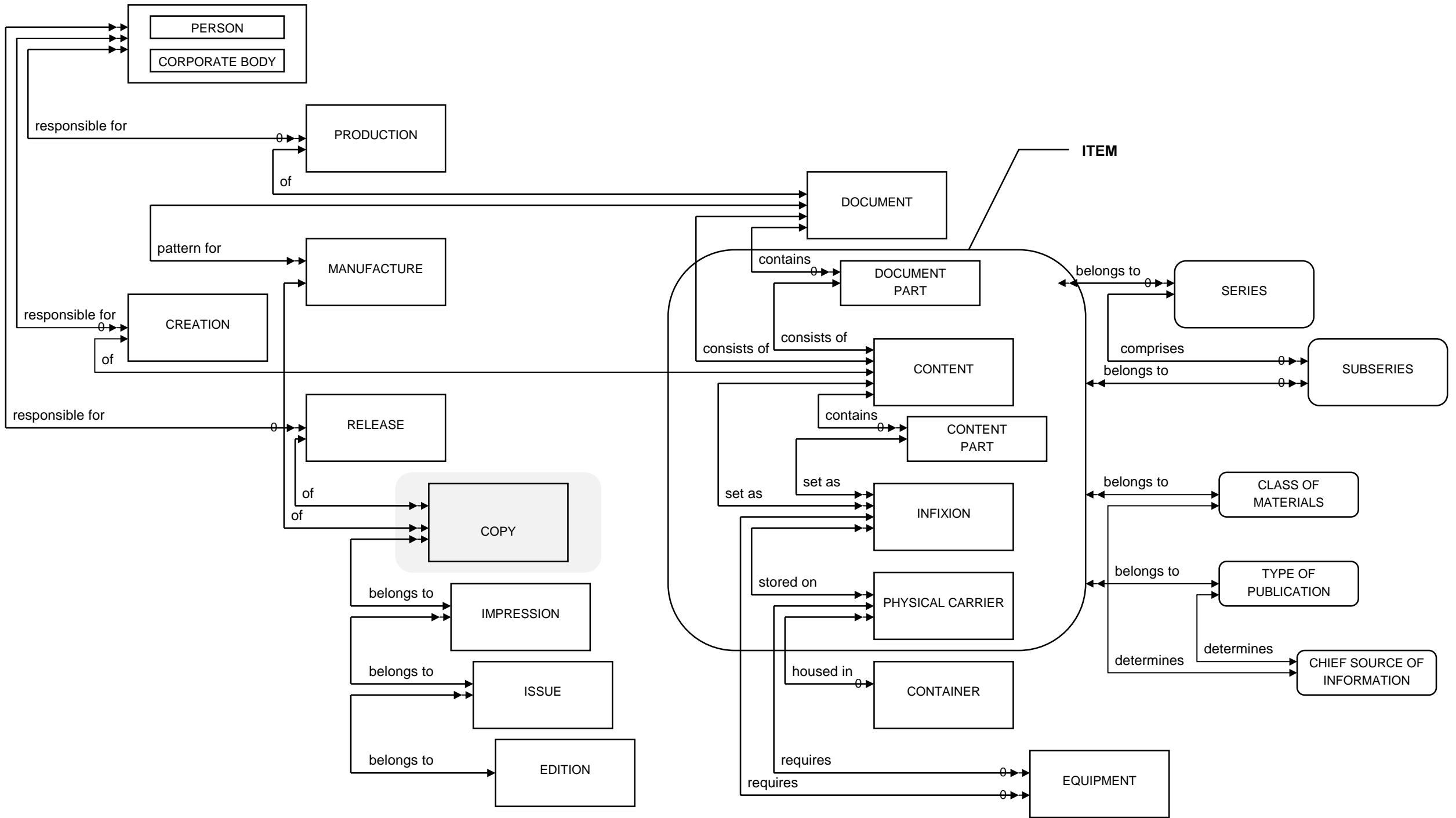


Figure 6: Item = Document part



The central group of “real world” entities depicted in **Figure 6** are those that serve as the focus for the description, i.e., the **DOCUMENT PART** itself and its constituent entities **CONTENT**, **CONTENT PART**, **INFIXION**, and **PHYSICAL CARRIER**. Those entities and their relationships to one another are outlined above under the description provided for **Figure 2**.

The other “real world” entities depicted in **Figure 6** as entities external to the **DOCUMENT PART** and its constituent entities may be reflected in the description to the extent that they relate specifically to the document part being described. For example, the description for the document part may include data elements pertaining to the production of the document part, or it may contain data elements pertaining to the equipment required to use the document part. Note that although **Figure 6** depicts the entity **CONTAINER** as external to the item there may be cases where the document part has its own container (as distinguished from the container for the document as a whole), and in those cases the entity **CONTAINER** would be considered to fall within the group of constituent entities making up the item described.

As an overlay to the “real world” objects reflected in the description of a document part, **Figure 6** depicts the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured: **ITEM**, **SERIES**, **SUBSERIES**, **CLASS OF MATERIALS**, **TYPE OF PUBLICATION** and **CHIEF SOURCE OF INFORMATION**. Those entities and their relationships to one another are outlined above under the description provided for **Figure 1**.

When the item described is a document part, the rules provide for recording data elements pertaining to the larger document to which the document part belongs as series data.

### ***Item = content part (Figure 7)***

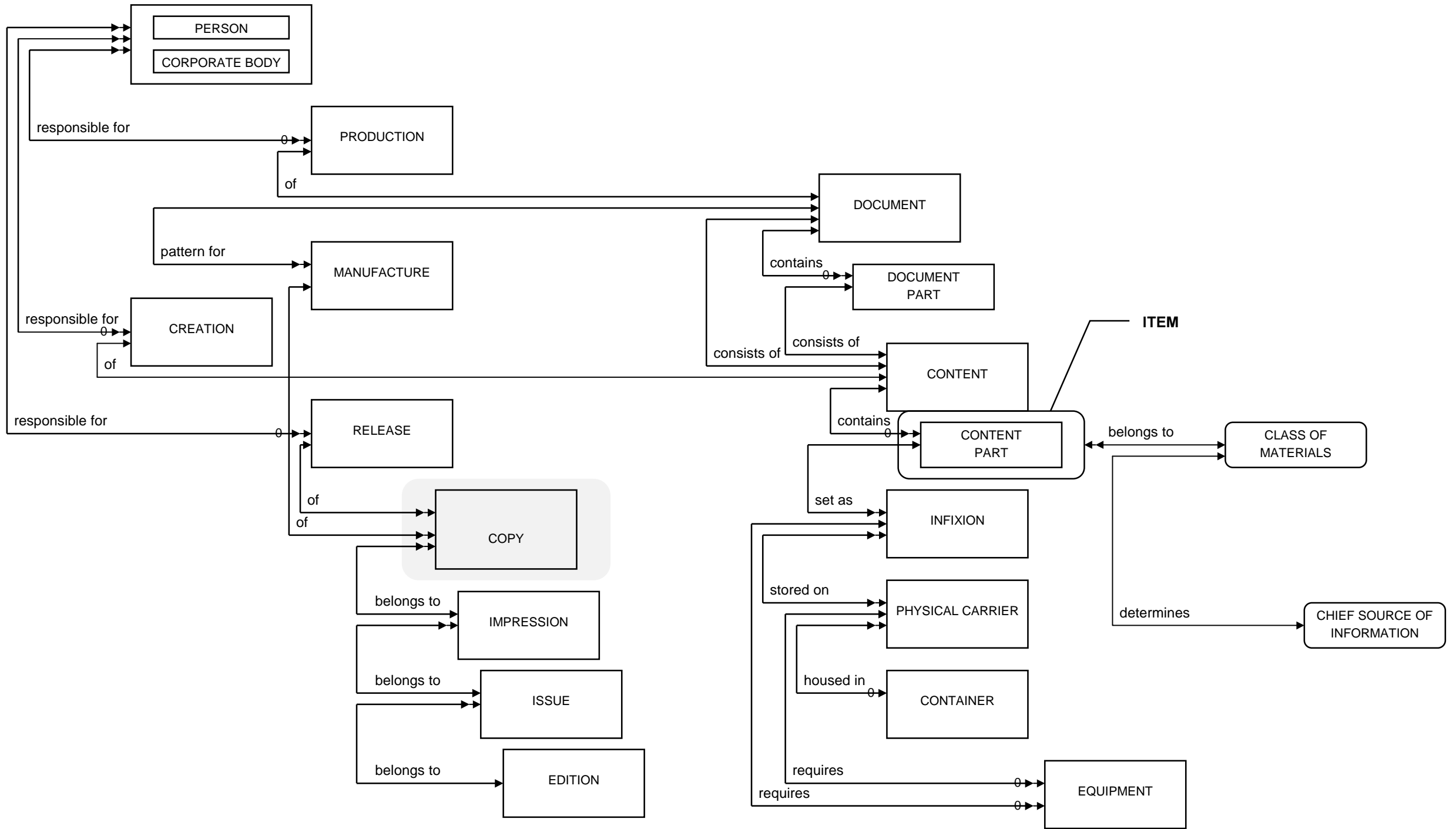
**Figure 7** depicts the “real world” entities that are reflected in the description of a content part, and overlays on those entities the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured.

The primary “real world” entity depicted in **Figure 7** is the entity that serves as the focus for the description, i.e., the **CONTENT PART** itself. **CONTENT PART** and its relationships to other entities are outlined above under the description provided for **Figure 2**.

The other “real world” entities depicted in **Figure 7** as entities external to the **CONTENT PART** may be reflected in the description to the extent that they relate specifically to the content part being described. For example, the description for the content part may include data elements pertaining to the person responsible for the creation of the content part.

As an overlay to the “real world” objects reflected in the description of a content part, **Figure 7** depicts the “bibliographic” entities that are brought into play as the data elements for the description are recorded and structured: **ITEM**, **CLASS OF MATERIALS**, and **CHIEF SOURCE OF INFORMATION**. Those entities and their relationships to one another are outlined above under the description provided for **Figure 1**.

Figure 7: Item = Content part



### ***Multilevel description (Figures 8, 9, 10)***

**Figures 8, 9, and 10** depict the overlay of “bibliographic” entities on the “real world” entities that are reflected in multilevel descriptions for multipart documents, series, and collections.

**Figure 8** depicts the overlay for a multilevel description of a multipart document. The “bibliographic” entity **ITEM** is overlaid in multiple levels.

In the first level of the description, the item described is the multipart document as a whole. The primary entities reflected in that level of the description are the **DOCUMENT** itself and its constituent entities **CONTENT**, **CONTENT PART**, **INFIXION**, **PHYSICAL CARRIER**, and **CONTAINER**.

The first level of the description may also include data elements pertaining to entities external to the document (e.g., data pertaining to a person or corporate body responsible for the production of the document).

In the second level of the description the item described is an individual document part. The primary entities reflected in that level of the description are the **DOCUMENT PART** itself and its constituent entities **CONTENT**, **CONTENT PART**, **INFIXION**, and **PHYSICAL CARRIER**.

The second level of the description may also include data elements pertaining to entities external to the document part to the extent that they relate specifically to the document part being described (e.g., data pertaining to the person responsible for the creation of the content of the document part).

Subsequent levels of description may be used to describe a document part within a document part.

**Figure 9** depicts the overlay for a multilevel description of a series. The “bibliographic” entity **ITEM** is again overlaid in multiple levels.

In the first level of the description, the item described is the series as a whole. The primary entity reflected in that level of the description is the **SERIES**.

In the second level of the description the item described is a subseries. The primary entity reflected in that level of the description is the **SUBSERIES**.

In the third level of the description the item described is an individual document within the series. The primary entities reflected in that level of the description are the **DOCUMENT** itself and its constituent entities **CONTENT**, **CONTENT PART**, **INFIXION**, **PHYSICAL CARRIER**, and **CONTAINER**.

The third level of the description may also include data elements pertaining to entities external to the document (e.g., data pertaining to a person or corporate body responsible for the production of the document).

**Figure 8: Multilevel description of a multipart document**

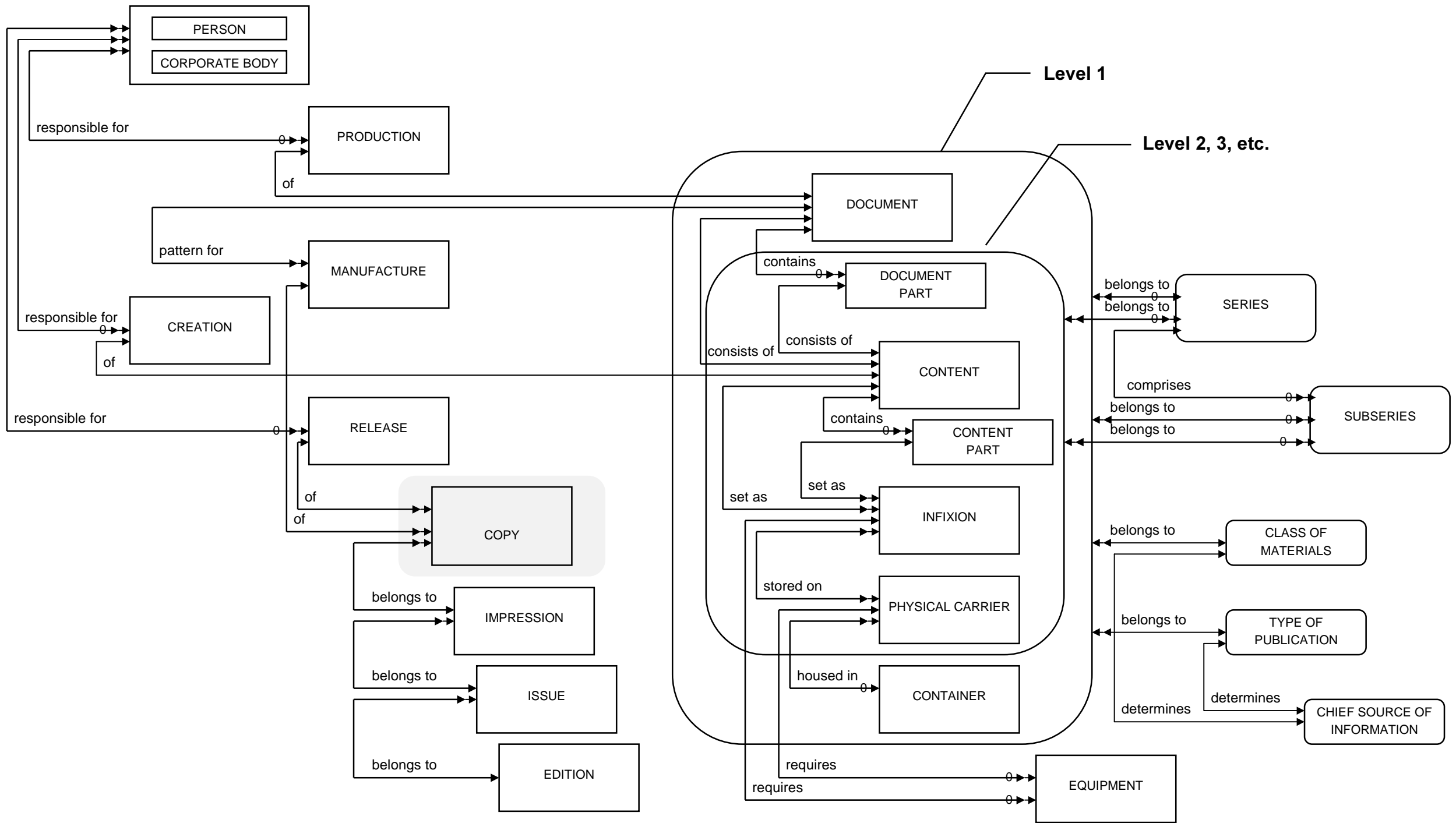
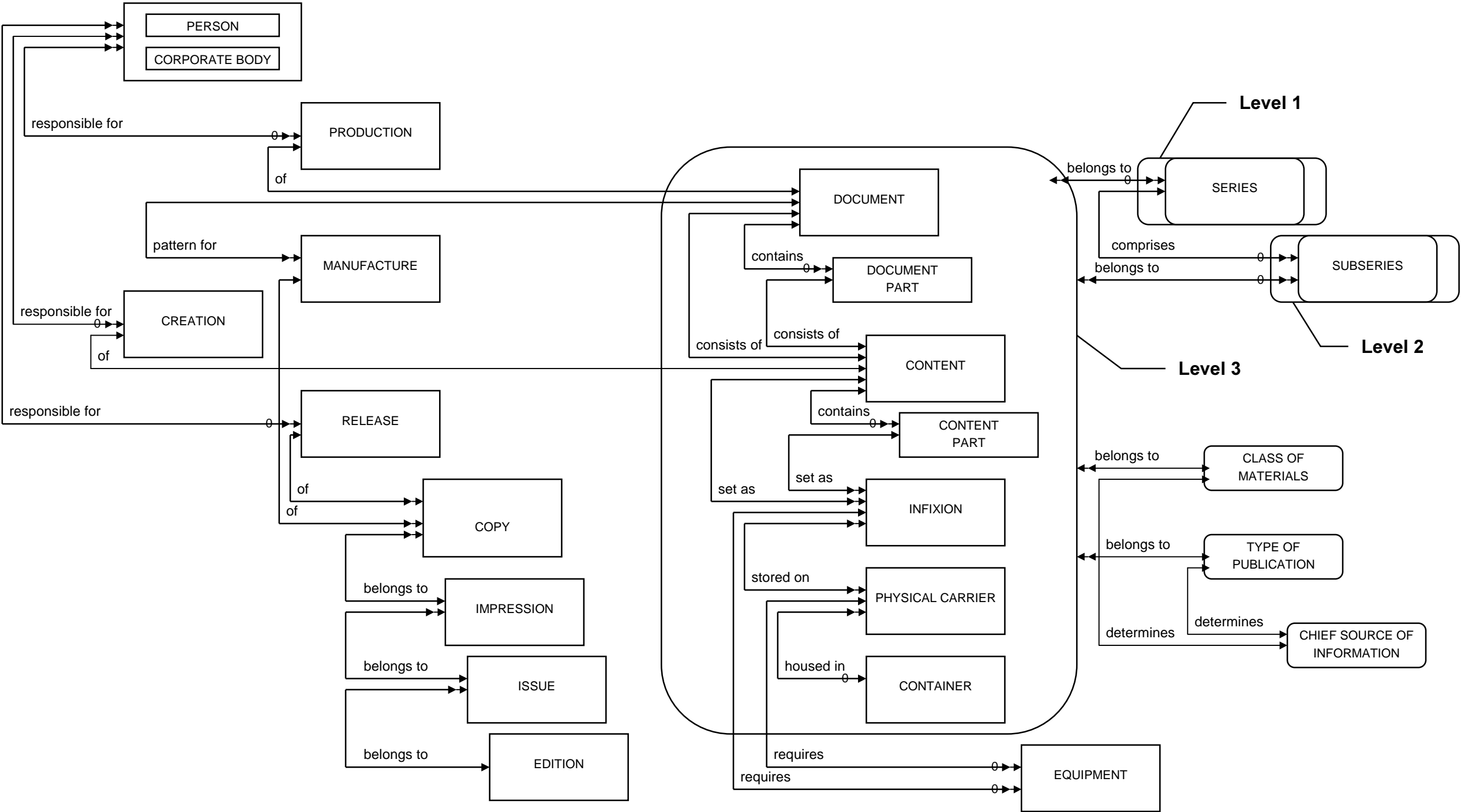


Figure 9: Multilevel description for a series





In the absence of a subseries, an individual document within the series is described in the second level of the description.

**Figure 10** depicts the overlay for a multilevel description of a collection. The “bibliographic” entity **ITEM** is again overlaid in multiple levels.

In the first level of the description, the item described is the collection as a whole. The primary entity reflected in that level of the description is the **COLLECTION**.

In the second level of the description the item described is an individual document within the collection. The primary entities reflected in that level of the description are the **DOCUMENT** itself and its constituent entities **CONTENT**, **CONTENT PART**, **INFIXION**, **PHYSICAL CARRIER**, and **CONTAINER**.

The second level of the description may also include data elements pertaining to entities external to the document (e.g., data pertaining to a person or corporate body responsible for the production of the document).

Subsequent levels of the description may be used to describe a document part.

### ***Relationships***

The rules provide for making explicit or implicit reference in the description to a number of the relationships that operate between both the “bibliographic” entities and the “real world” entities depicted in **Figures 1** through **10**.

Relationships between one item and another item that are reflected in the description include the following: “other edition,” “simultaneous publication,” “supplement,” “other format,” “reproduction,” “published version,” “published index/catalogue,” “issued with,” “continuation,” “merger,” split,” “absorption,” “index,” and “whole/part”. (For details on these **ITEM-to-ITEM** relationships and their associated data elements see Tab 27.)

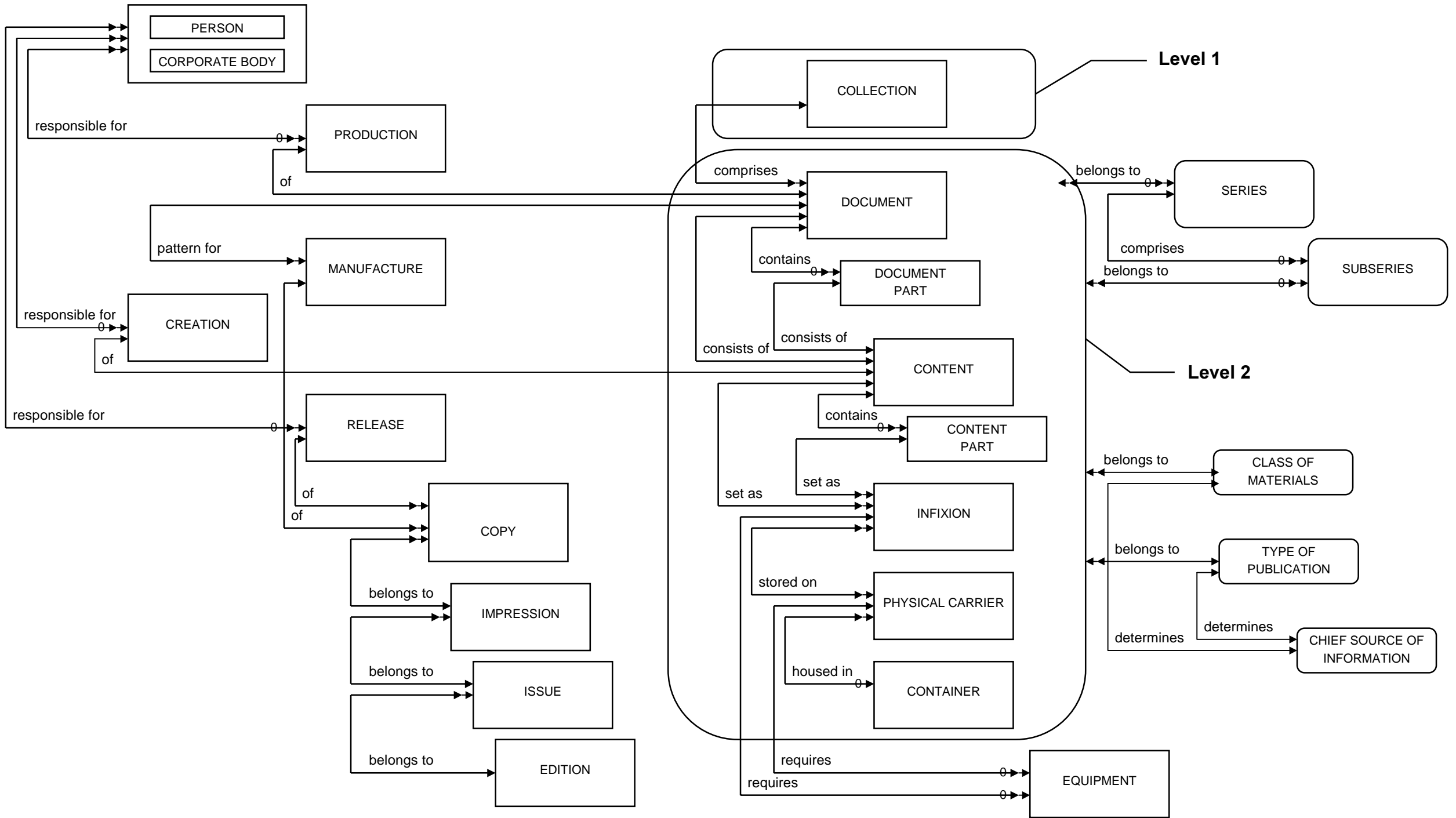
Relationships between a series and a subseries include the “whole/part” relationship. (For details on these **SERIES-to-SUBSERIES** relationships and their associated data elements see Tab 28.)

Relationships between a series and an item include the “whole/part” relationship. (For details on these **SERIES-to-ITEM** relationships and their associated data elements see Tab 29.)

Relationships between a subseries and an item include the “whole/part” relationship. (For details on these **SUBSERIES-to-ITEM** relationships and their associated data elements see Tab 30.)

Relationships between a document and a document part include the “whole/part” relationship. (For details on these **DOCUMENT-to-DOCUMENT PART** relationships and their associated data elements see Tab 31.)

Figure 10: Multilevel description for a collection of documents



Relationships between the content of an item and the content of another item or items include the following: “translation,” “adaptation,” and “sequel”. (For details on these **CONTENT-to-CONTENT** relationships and their associated data elements see Tab 32.)

Relationships between content and content part include the “whole/part” relationship. (For details on these **CONTENT-to-CONTENT PART** relationships and their associated data elements see Tab 33.)

Relationships between a person or corporate body and the production of a document include the “production responsibility” relationship. (For details on these **PERSON/CORPORATE BODY-to-PRODUCTION** relationships and their associated data elements see Tab 34.)

Relationships between a person or corporate body and the creation of the content of a document include the “creation responsibility” relationship. (For details on these **PERSON/CORPORATE BODY-to-CREATION** relationships and their associated data elements see Tab 35.)

Relationships between a person or corporate body and the ownership of an item include the “ownership transfer” relationship. (For details on these **PERSON/CORPORATE BODY-to-OWNERSHIP** relationships and their associated data elements see Tab 36.)

## **KEY ISSUES**

The model produced for this study provides a clearly defined frame of reference for re-examining the principles and assumptions underlying the internal logic of the code and for exploring options for modifying its logical structure. What follows is a re-framing of a number of key issues relating to the structure of the code and its future development with specific reference to the logical structure set out in the model. The issues addressed are centred primarily, but not exclusively, on the implications of extending the code to accommodate the introduction of new media, new forms of publishing, and new modes of disseminating information in a digital environment.

### **1. Does the concept of class of materials as currently reflected in the code serve as a viable basis for an extended structure accommodating new forms of digital materials?**

The method of procedure for applying the rules for description, as set out in rule 0.24, links the subset of rules to be applied in describing any given item to the class of materials to which the item belongs. The wording of rule 0.24 implies that the form of the physical carrier determines the class of materials to which the item belongs. However, a detailed examination of how each class of materials is defined indicates that while the form of the physical carrier is in many cases the principal criterion for determining the broad class of materials to which an item belongs, there are in fact other criteria at play in defining the scope of those classes.



The matrix presented in **Table 1**, shows that the form of the physical carrier actually serves as the defining criterion for only five of the broad classes: sound recordings, motion pictures, videorecordings, computer files, and microforms. Each of those classes encompasses a defined set of physical carriers (e.g., sound cassettes, sound discs, etc.; film and video cassettes, video discs, etc.) that are exclusive to that class and are in fact the basis for the definition of the class.

By contrast, the broad classes defined as cartographic materials, graphic materials, and three-dimensional artefacts and realia each centre on a group of materials that derives its definition not from the form of the physical carrier, but primarily from the intellectual or artistic content of the item. In fact there is a significant overlap between the carriers that fall within these three classes (e.g., slides, transparencies, photographs, etc. are common to both cartographic materials and graphic materials; models are common to both cartographic materials and three-dimensional artefacts). The defining criterion for each of these classes is actually the type of content contained in the item, not the form of the physical carrier.

Music, as a broad class of materials, is defined exclusively with reference to the intellectual form in which the content of the item is expressed; the class is restricted to materials whose content is expressed in the form of musical notation. The form of the physical carrier is not the defining criterion. Nor is the type of content contained in the item. Unlike cartographic materials, graphic materials, and three-dimensional artefacts and realia, music as a class does not encompass all materials containing a particular type of content. In this case musical content expressed in the form of musical notation is included, but musical content expressed in the form of recorded sound is not.

What this analysis serves to point up is that the concept of **CLASS OF MATERIALS** that provides the underlying structure for the rules in Part I is more complex than it might appear on the surface, and contrary to what might be inferred from the statement of the principle in rule 0.24, determining the class of materials to which an item belongs is not synonymous with determining the form of the physical carrier. In fact the class to which a particular item belongs may be determined on the basis of attributes that are associated with its intellectual or artistic content or with the particular intellectual form in which the content is expressed, as distinct from attributes that are associated with the physical carrier *per se*.

The complexity of the concept of **CLASS OF MATERIALS** as it is reflected in the code raises a number of significant questions that need to be taken into consideration as we review the rules for consistency and as we attempt to expand them to accommodate new media and new forms of intellectual and artistic expression.

In examining the entity **CLASS OF MATERIALS**, particularly in the context of extending the code to accommodate new media and new forms of intellectual and artistic expression, the following questions need to be addressed:

- are the classes that group materials on the basis of the form of the physical carrier—sound recordings, motion pictures, videorecordings, computer files, and microforms—conceived in sufficiently precise terms to enable an unequivocal determination as to the class to which a new form of physical carrier would belong (e.g., as digital technologies continue to evolve, will it be possible to make clear distinctions between a sound disc and a computer disc);

- are the rules set out for each class of materials sufficiently comprehensive to accommodate the various types of content and forms of intellectual expression that might be recorded on the physical carriers included in that class (e.g., do the rules for computer files adequately cover digital forms of text, musical notation, sound and video);
- if certain classes are defined on the basis of the form of the physical carrier and others are defined on the basis of the type of content or the intellectual form in which the content is expressed, how is a determination to be made as to which criterion takes precedence in classing new forms of material (e.g., will digitally encoded musical notation that can be “played back” in the form of sound be classed as music or as a sound recording);
- if an item falls within more than one class, how is an order of precedence for applying specific rules that differ for each of the relevant classes to be determined?

The model, by breaking out the entity **DOCUMENT** into its constituent elements, including **CONTENT**, **INFIXION**, and **PHYSICAL CARRIER**, provides a re-mapping of attributes associated with the entities that are central to the definition of the various classes of materials currently defined in the code. That re-mapping of attributes, and the linking of attributes to specific data elements and relevant rules for description, also serves to highlight the significance of both the content and the physical carrier of the document for the formulation of specific rules relating to individual data elements. The analysis reflected in the model provides the detailed frame of reference necessary to examine the possibility of “de-constructing” the **CLASS OF MATERIALS** concept as currently reflected in the code, and introducing a more flexible approach to structuring the rules that might accommodate in a more effective way new permutations of content and form emerging in a digital environment.

**Recommendation 1:** Use the model developed for this study to assess options for restructuring Part I of the code to facilitate the integration of rules for new forms of expression and new media. One option for consideration would be to use the ISBD(G) areas of description as the primary organizing element for the overall structure of Part I.

## **2. Does the physicality inherent in the concept of DOCUMENT constrain the logical development of the code to accommodate the cataloguing of electronic resources?**

The term “document,” though not defined in the glossary to AACR, is central to the internal logic of the code inasmuch as it is the key term in the definition of “item.”

The code implicitly assumes that a document (as a candidate “item in hand”) has a physical dimension. The method of procedure outlined in rule 0.24 dictates that the “physical form of the item in hand” is the starting point for description. The scope of each chapter in Part I is defined largely with reference to the physical form of the materials covered. The data elements in the physical description area of the record are treated as being applicable to all items within a given class of materials. Moreover, key concepts in Part I such as “multipart item,” “serial,” and “series” are all defined in relation to physically separable parts of a document.

The question to be addressed, therefore, is whether the concept underlying the entity defined as **DOCUMENT** can be extended to encompass entities such as networked electronic resources that effectively have no physical dimension.

In terms of the internal logic of the code, extending the concept of the document to include non-physical entities would have the following implications:

- the **DOCUMENT** entity would have to be defined in terms that are not necessarily linked to the notion of physicality;
- the attributes of the entity **DOCUMENT** would have to be reviewed and extended as necessary to include attributes unique to networked electronic resources;
- the definition of **DOCUMENT PART** would have to be reworked so that it is not necessarily linked to the notion of physical separability;
- the “stored on” relationship between **INFIXION** and **PHYSICAL CARRIER** would have to be treated as optional;
- the criteria for determining **CHIEF SOURCE OF INFORMATION** would have to be reviewed to ensure that they could be applied, as appropriate, to non-physical (i.e., intellectual) elements of a **DOCUMENT**.

“De-linking” the concept underlying the entity **DOCUMENT** from the notion of physicality is not a trivial matter. Effectively it would require a fundamental rethinking of the nature of object being described. Currently the logic of the code normally assumes that the entity being described is a physically discrete object. There are exceptions that provide for centering the record on an intellectual component of the physical object in which it is contained (see rules 1.1G2 and 13.5). Those provisions, however, are the exception, not the norm. To treat the document itself, as distinct from an intellectual component of the document, as a non-physical entity would require a rethinking of the conventional distinction that is made between the document as physical object and its content as intellectual substance that is currently embedded in the internal logic of the code. That in turn would require a thorough reworking of the operative principles linked to physical form that serve to structure the code (e.g., the method of procedure outlined in 0.24, the grouping of materials into classes, the treatment of reproductions, etc.).

Closely linked to the question of physicality of the document is the question of “boundaries” for an electronic document. If the document is not defined in physical terms, how are its boundaries determined? If a networked electronic resource is defined as a document in non-physical terms, how far do the boundaries of the document extend? Does all the “content” associated with the document through hypertext links constitute part of the document? Does the document extend to include “content” linked indirectly through the network of hypertext links that extend outward from each document linked to the primary document, through second, third, fourth layers of links, ad infinitum?

**Recommendation 2:** Use the model developed for this study as the basis for examining the feasibility of modifying the internal logic of the code to accommodate documents that are defined in non-physical terms. Consultation should be undertaken with experts in the area of electronic document architecture.

### 3. Is the division of the universe of objects described into two categories—published and unpublished—adequate to accommodate the description of digital objects disseminated on-line?

Throughout Part 1 of the code there are rules identified as being applicable specifically to “unpublished” materials. Implicitly the rules not so designated are applicable to “published” materials, and unless stated otherwise, are assumed to apply also to “unpublished” materials.

The distinction between “unpublished” and “published” materials is reflected in the model at several levels: through the sub-types defined for **DOCUMENT** and **DOCUMENT PART**; through the attributes that are unique to each of those sub-types; through the distinctions that are made between **PRODUCTION**, on the one hand, and **MANUFACTURE** and **RELEASE**, on the other; and through the attributes associated with those “process” entities.

Implicit in the concept of “publication,” as it is reflected in the code, is the notion of distribution to the public of copies of a document or document part. In that sense, the entities **RELEASE** and **COPY** are central to the concept of “publication.”

The question to be addressed, therefore, is whether the concepts underlying the entities defined as **RELEASE** and **COPY** can be extended to encompass the on-line or networked dissemination of digital objects, so as to include such dissemination notionally as a form of “publication,” or whether, as in copyright legislation, communication effected through electronic transmission needs to be treated as something other than “publication.”

In terms of the internal logic of the code, extending the concept of “publication” to include the electronic transmission of a digital object would have the following implications:

- the **DOCUMENT** entity would have to be defined in terms that would encompass digital objects that effectively lack a physical dimension (see the discussion of the “physicality” issue, above);
- the concept of **MANUFACTURE** would have to be reexamined to determine its applicability in a networked environment;
- the concept of **RELEASE** would have to be modified to extend the notion of “making copies available to the public” to modes of dissemination in which the “copies” made available are not necessarily physical in nature;
- the concept of **COPY** and the specifications for the scope of the entity would have to be reviewed with respect to the inclusion of on-line displays of a digital object, document source, printouts of screen displays, etc.;
- the attributes of the entity **COPY** would have to be reviewed and extended as necessary to include attributes unique to “copies” of digital objects;
- the concepts of **IMPRESSION**, **ISSUE**, and **EDITION** would have to be reworked to accommodate groupings of copies that are the product of on-line transmission;
- the concept of **TYPE OF PUBLICATION** would have to be reviewed to ensure that it adequately accommodates the range of “publication” possible through the on-line dissemination of a digital object (see the discussion of the “seriality” issue below).



The operative distinctions made in the code between “unpublished” and “published” documents are implicitly predicated on the notion of public distribution of physical copies of a document. Modifying the criteria for “publication” to include modes of dissemination that do not involve the making of physical copies of a document would require the development of alternative criteria for distinguishing between “unpublished” and “published” documents, where the making of physical copies does not apply. How would such alternative criteria be framed?

Extending the notion of “publication” to include on-line dissemination of a digital object also has implications for the implicit underlying assumption that the attributes of the published document as a document (in the abstract sense) can be reliably inferred from the attributes of the copy in hand. Under the conventional mode of distribution of physical copies manufactured from a “master” document, that assumption works reasonably well (allowing for irregularities in the manufacturing process and changes made to the copy subsequent to its manufacture). With on-line dissemination of digital objects, those same assumptions do not necessarily hold, largely because the transmission mode and the hardware and software used to access the object at the user’s end of the transmission introduce a range of variables that can affect both the content and form of display. The larger question, then, is how to describe the document as a document and how to distinguish between characteristics that presumably apply to all “copies” of the document and those that apply only to the “copy in hand.”

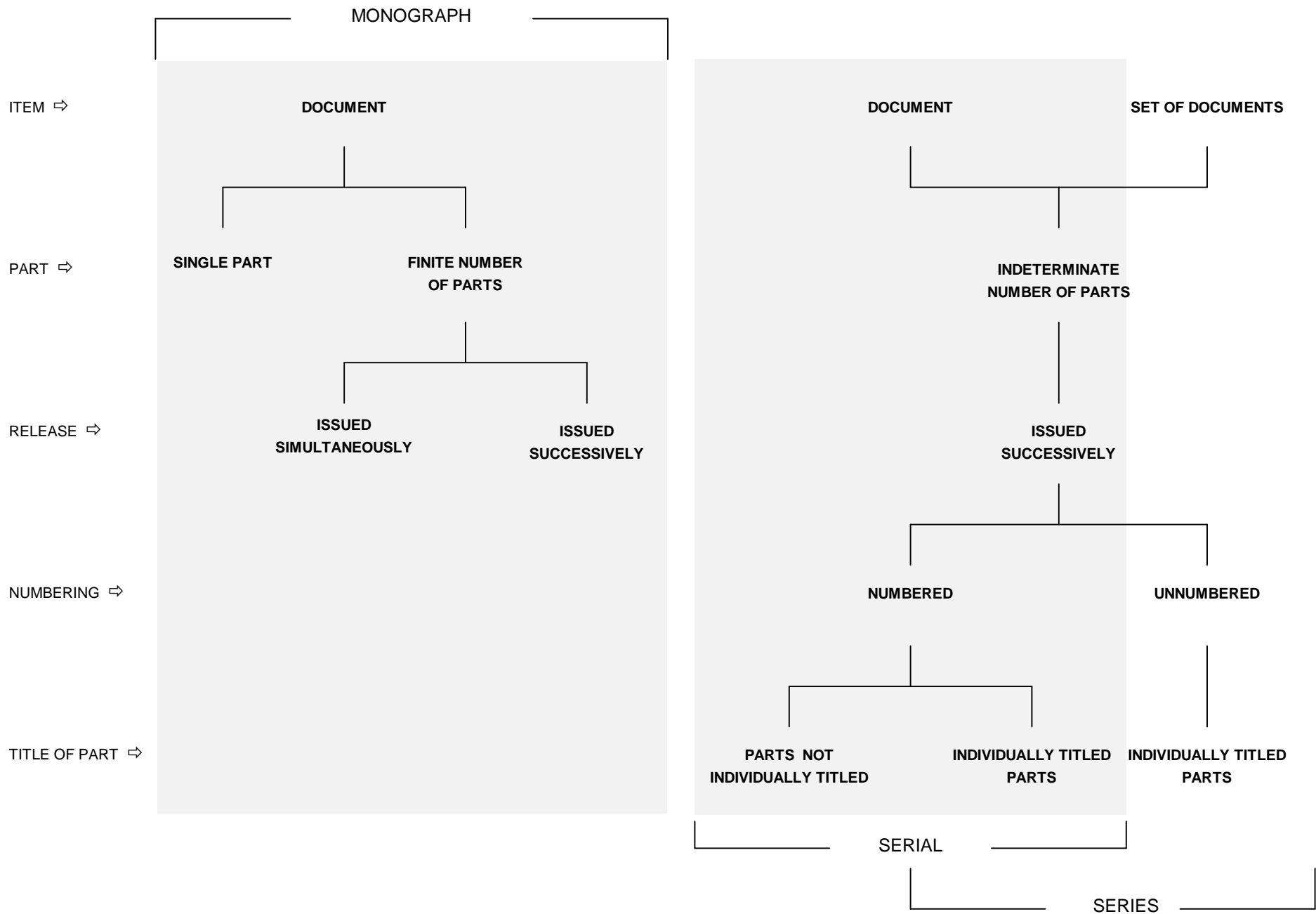
**Recommendation 3:** Using the model developed for this study as a frame of reference, examine the issues raised with respect to the notion of “publication” in a networked context in consultation with experts in the area of electronic documents.

#### **4. Can the notion of “seriality” as reflected in the code be extended to accommodate electronic forms of “publication” or dissemination of documents “intended to be continued indefinitely”?**

In the glossary definition there are three defining criteria for a “serial”: the publication must be issued in successive parts; the parts must bear numeric or chronological designations; and the publication must be intended to continue indefinitely. The criteria for categorizing a “serial” as a type of publication are presented in graphic form in **Figure 11**.

In terms of the internal logic of the code, “seriality,” as defined in the glossary, is reflected primarily through the entity **TYPE OF PUBLICATION**. If the item being described is a document conforming with the criteria in the definition, the item falls into the serials category as a type of publication. As a sub-type of the entity **DOCUMENT** a serial has uniquely associated with it the attributes numbering and frequency. As a serial the document also has specific criteria set for determining the chief source of information and for determining the “boundaries” for the set of document parts comprising the serial described in a single bibliographic record. The model also reflects a number of recursive **ITEM-to-ITEM** relationships that are defined specifically for serials.

Figure 11: Type of Publication



Extending the concept of “seriality” to accommodate electronic forms of dissemination of documents “intended to be continued indefinitely” would have the following implications:

- the concept of the **DOCUMENT** entity would have to be extended to encompass digital objects that effectively lack a physical dimension (see the discussion of the “physicality” issue, above);
- the concepts of **MANUFACTURE**, **RELEASE**, **COPY**, **IMPRESSION**, **ISSUE**, and **EDITION** would have to be reworked to accommodate the electronic transmission of a digital object within the notion of “publication” (see the discussion of the “publication” issue, above);
- the definition of serial as a **TYPE OF PUBLICATION** would have to be reviewed to determine whether the criterion relating to the issue of successive parts implies the distribution of separate “physical” parts, and if so, whether the criterion could be modified;
- examining the implications of treating a “serial” issued as a continuously updated database of articles, etc. not as a set of document parts but as a single document intended to be continued indefinitely;
- reworking the concept of **TYPE OF PUBLICATION** to reflect alternatives to the current binary division of the universe of publications into monographic and serial publications.

The operative distinctions made in the code between monographic publications and serial publications—although in part based on a difference in intent with respect to the completion or indefinite continuation of the publication—are also predicated on conventional modes of “continuing” a publication by means of issuing successive physical parts, irrespective of whether the parts are intended as parts of a finite multipart publication or as parts of a set that has no predetermined end. The use of digital technology in both the creation and the dissemination of documents introduces other options for “continuing” publications that do not entail the issuing of successive physical parts and as such demand a re-examination of the conventional paradigm. The question to be addressed is whether adjustment to the current binary categorization of publication type will be effective, whether a new multi-type categorization is needed, or whether the categorization of type of publication should be “de-constructed” and replaced with a more flexible approach to organizing rules dealing with the characteristics of “continuing” publications.

**Recommendation 4:** Continue the examination of the “seriality” issue initiated as a follow-up to the Conference on the Principles and Future Development of AACR, using the frame of reference set out in the model developed for this study as a tool to assist in the analysis of the issues.

## **5. What are the implications of applying the logic of the code to documents in which the intellectual or artistic content is not permanently “fixed” within a physical object?**

In conventional media the intellectual or artistic content is permanently fixed within the physical object, and the content is, for all intents and purposes, considered immutable. The rules in Part 1 of the code implicitly take that relationship as a given. To ensure uniformity of description the rules, for the most part, simply focus on the selection of sources of information, on criteria for determining precedence where information

pertaining to a given data element might appear in more than one form within the specified source of information, and on detailing the conventions to be followed in transcribing or recording a particular data element. Implicit in the rules is the assumption that both the source from which the data is derived and the form in which the information is represented in that source will be the same from one copy of a document to another. In fact the assumption is made that in general any difference detected in the formalized elements of the descriptions for two items is a signal that the items represent different documents.

The introduction of digital technologies has effectively undercut those *a priori* assumptions about the relationship between the physical form and the intellectual content of the objects catalogued that are implicit in the code. For digital objects the assumptions may not necessarily hold. The implications of this undercutting of *a priori* assumptions become particularly problematic when we deal with digitally encoded documents that are stored on a host computer and are accessible only on-line. The "item in hand" that the rules indicate is the starting point for the description becomes more of a "virtual" than a "physical" object, linked in some ways more with the dimension of time than with physical dimension. This attenuation of the physical object has several implications both for the code's logical constructs and for the way those constructs are reflected in the rules.

While the digital object may contain the kind of "product" information (e.g., title, statement of responsibility, publisher/distributor) that is associated with more traditional "physical forms," it cannot be assumed that the information will remain constant from one display of the object to the next. Nor can it be assumed that the intellectual or artistic content within the digital object will remain constant, or that a change in the content would be signaled by some parallel change in the "product" information. Furthermore, the technology available to the user at the desktop and the functional capabilities of the applications software used to display the digital object may mean that the copy of the digital object displayed on the user's screen will differ from the copy stored on the host computer. The differences may only affect incidentals such as character fonts, resolution of images, layout, etc., but they may also extend to characteristics that affect the intelligibility of the digital object. There is the potential, therefore, to change not only the physical form of the digital object but also its intellectual or artistic content each and every time the digital object is displayed.

In some ways the problems posed by digital objects are analogous to those associated with conventional materials whose form and/or content is subject to change over time (e.g., serials, loose-leaf updates, and multipart items issued at intervals). For those materials rules have been devised and conventions have been established to address the possibility that as segments of the publication are issued over time the "product" information contained on the chief source of information may change, the physical form may be altered, and the content may be extended or revised. In general the solution has been to record a snapshot of the publication at a given point in its history, to leave certain details open-ended, to record significant variations by means of notes, and to simply ignore others. Basically, however, none of those techniques permit multiple values for a single data element within the record. Either a new record is created (as in the case of successive entry for serials), or the data pertaining to the affected data element is revised (as in the case of changes in responsibility for a multipart monograph). Data that is displaced as a result of such changes is normally re-

incorporated into the description by means of edition and history notes (including notes linking successive entries for a serial), by notes explaining variations in physical details, or sometimes simply through a note such as “title varies slightly.” **Table 2** provides a structured synopsis of the rules in Part I that are designed to reflect change in the attributes of the item described.

It would be more difficult, however, to apply this snapshot technique to digital materials. Because the changes that occur in digital documents are not necessarily linked to the release of a new issue, a set of updates, or an additional part, there is less probability that the cataloguer would re-examine the digital object at the point in time when the change is made. Further, there is less likelihood of there being available to the cataloguer an archival record of the digital object’s content at each interval in the process of revision or extension as there is with conventional materials. Thus there is little guarantee that the snapshot descriptions compiled by different cataloguers would coincide. A cataloguer describing the digital object at any given point in time may have no means of reconstructing and recording the details that pertained to the digital object prior to that point. And there is little likelihood that subsequent changes will be reflected consistently from one record to another.

In terms of the internal logic of the code, the problem is not one that requires the definition of additional attributes, but rather one that requires allowance to be made for the possibility that a given instance of an entity or object type may have an attribute that is subject to change over time. The problem then is to determine how the multiple values for that attribute can be reflected in the data, and whether or not it is necessary to recognize a new instance of the entity or object each time the value for that attribute changes.

**Recommendation 5:** Review the conventions and rules for reflecting change in the attributes of the item described, as currently established, to determine their applicability to changes in the attributes of digital objects, and extend them as necessary to accommodate a broader range of variables.

**Table 2: Rules for reflecting change in the attributes of the item described**

	SINGLE-PART MONOGRAPH	MULTIPART MONOGRAPH	SERIAL/NUMBERED SERIES	UNNUMBERED SERIES
More than one chief source of information	1.0H1: Use first occurring chief source <i>Exception:</i> prefer source bearing later date of publication	1.0H2: Use chief source for the first part <i>Exception:</i> if there is no discernible first part, use unifying element	12.0B1: Use chief source for the first issue <i>Exception:</i> if first issue is not available, use the first available issue	[Unspecified]
Change in title proper	21.2B1: Describe as a separate edition	21.2B2: Use title proper of first part <i>Exception:</i> if later title predominates, change to the later title proper	21.2C1: Make a separate entry for each title	[Unspecified]
Change in responsibility	21.3A1: Describe as a separate edition	21.3A2: Enter under heading for first part <i>Exception:</i> if person or body named in later parts predominates, change the heading	21.3B1: Make a new entry if heading for corporate body under which serial is entered changes, or if person or corporate body under which serial is entered is no longer responsible	[Unspecified]
Change in place of publication, distribution, etc.	[Unspecified]	1.4D5: Describe in terms of the publisher named first in the first part <i>Exception:</i> add place associated with a publisher named in a later part under specified conditions	[Nonspecific reference to 1.4C]	[Unspecified]

	SINGLE-PART MONOGRAPH	MULTIPART MONOGRAPH	SERIAL/NUMBERED SERIES	UNNUMBERED SERIES
Change in name of publisher, distributor, etc.	[Unspecified]	1.4D5: Describe in terms of the publisher named first in the first part <i>Exception:</i> add name of publisher named in a later part under specified conditions	[Nonspecific reference to 1.4D]	[Unspecified]
Change in date of publication, distribution, etc.	[Unspecified]	1.4F8: Give earlier and later or earliest and latest dates separated by a hyphen, or earliest or earlier date only followed by hyphen and four spaces	12.4F1: Give date of first issue followed by a hyphen and four spaces, or dates of first issue and last issue separated by a hyphen	[Unspecified]
Change in extent of item	[Unspecified]	1.5B5: Precede specific material designation by three spaces when describing a multipart item that is not yet complete	12.5B1: Precede specific material designation by three spaces when describing a serial that is not yet complete	[Unspecified]
Change in dimensions	[Unspecified]	2.5D3, etc.: Give the dimensions of the smallest or smaller and the largest or larger unit separated by a hyphen	[Nonspecific reference to .5D in the chapter dealing with the type of material to which the serial belongs]	[Unspecified]
Addition of accompanying or supplementary material	[Unspecified]	1.5E1, 1.9B1: Record as accompany material, in a note, or use multilevel description	12.5E1: Give the name of the accompanying material preceded by three spaces if the serial is still in progress	[Unspecified]

	SINGLE-PART MONOGRAPH	MULTIPART MONOGRAPH	SERIAL/NUMBERED SERIES	UNNUMBERED SERIES
Change in title proper of series on item catalogued	1.6B2: Choose the title given in the first of the prescribed sources for the series area <i>Exception:</i> if the title does not appear in the first of the prescribed sources, choose the title given in the other prescribed sources in the order of preference for the sources	1.6B2: Choose the title given in the first of the prescribed sources for the series area <i>Exception:</i> if the title does not appear in the first of the prescribed sources, choose the title given in the other prescribed sources in the order of preference for the sources	[Nonspecific reference to 1.6]	[Unspecified]
Additional numbering within series	[Unspecified]	1.6G2: Give the first and last numbers if the numbering is continuous; otherwise give all the numbers	12.6B1: Do not give series numberings if each issue is separately numbered within the series	[Unspecified]
Changes in frequency	[Not applicable]	[Not applicable]	12.7B1: Make notes on changes in frequency	[Not applicable]
Changes in numbering, etc.	[Not applicable]	[Not applicable]	12.7B8: Make notes on peculiarities in the numbering, etc.	[Not applicable]
Variations in physical details	[Unspecified]	[Unspecified]	12.7B10: Make notes on variations in the physical details of issues of a serial	[Unspecified]