InterPARES 2 Project

International Research on Permanent Authentic Records in Electronic Systems

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Introduction

The life cycle conception of record creation, keeping, and preservation identifies stages where records change hands – moving from creator to preserver. During the creation stage, creators make or receive documents in the ordinary course of business. These become records when they are set aside. They are active or semi-active records during the record keeping stage, and when judged to be of enduring value to the creator itself and/or to society at large, pass a threshold and enter long-term preservation. Only those records deemed permanently valuable are kept. This seemingly straightforward and natural process of dealing with documents produced in the course of business is made complex by a number of social, legal, political, and cultural factors. Technology compounds this problem. InterPARES 1 found that rather than preserving electronic records, information systems had only the capacity to preserve the ability to reproduce them as copies of records. The challenge then is to find a way to preserve the presumption of authenticity of re-produced records. As a result of this research, archival science is left to have to make sense of the traditional understanding of the life cycle of records in a an increasingly complex variety of contexts that are dependent on information systems to create, keep, and preserve records. In order for these systems to function in accordance with juridical, archival, and social mandates, they must be able to identify and attest to the integrity of copies of digital records, throughout their life cycle. Archivists must be able to track actions taken on and with the records, and the public must be able to access authentic copies of these records. In the digital environment, we use metadata to track these actions. In this article, I will describe the set of metadata derived from a life cycle model of record creation, keeping, and preservation. This description builds on the Chain of Preservation Model developed by the Modeling Cross-domain of the InterPARES 2 research project.

In this article, the term 'record' will be used as shorthand for copy of record, which is a cumbersome phrase, but a key conceptual token of understanding the preservation of authentic records in electronic systems. Such a token comes from the nature of digital systems, which copy records in order to display, transmit, and store them. InterPARES 1 found that the preserver did not keep authentic records, but authentic copies. The authors of the Preservation Task Force report tell us that, "(e)mpirically, it is not possible to preserve an electronic record: it is only possible to preserve the ability to reproduce the record. That is because it is not possible to store an electronic record in the documentary form in which it is capable of serving as a record. There is inevitably a substantial difference between the digital representation of the record in storage and the form in which it is presented for use. It is always necessary to use some software to translate the stored digital bits into the documentary form of the record," (Preservation Task Force, 2005 p. 5). Documentary form is a problem in dynamic, interactive, and experiential systems, and this has led the InterPARES 2 researchers to the development of the concept of bounded variability (Duranti and Thibodeau, 2006).

Also, InterPARES 2 has challenged the definitions of the terms "electronic" and "digital," as it regards records. The former can apply to a number of analogue media that are only usable via electronic means. The InterPARES 2 Project distinguishes between electronic and digital records as such. An electronic record is "an analog[ue] or digital record that is carried by an electrical conductor and requires the use of equipment to be intelligible by a person," whereas a digital record is "a record whose content and form are encoded using discrete numeric values (such as the binary values 0 and 1) rather than a continuous spectrum of values (such as those generated by an analogue system)" (InterPARES 2 Terminology Database, 2007). This article deals exclusively with digital records, following the above definition. Therefore the term digital is not used to modify the term record in this chapter, because it would be redundant.

Background

Archival and recordkeeping metadata are a popular topic in the archival discourse. Recommendations in international standards, scholarly literature, and research projects abound. The popularity of this topic may be due, at least in some respects, to its controversial nature, because the rise of the concept of metadata has lead some to question the purpose and utility of archival description. MacNeil characterizes this distinction as a micro-macro distinction. "Metadata map administrative and documentary relationship among individual items within a particular electronic system during the life cycle of that system… Archival description maps administrative and documentary relationships across all the record systems both electronic and non-electronic, textual and non-textual, within and across a fonds over time," (MacNeil, 1995 p. 24). She also invokes a powerful metaphor for the narrative and synthetic dimension of archival description, casting it as a biography of a life or a view of the landscape from 10,000 feet. While metadata is a personal diary of each day or an atomized view of the field as it is being plowed. InterPARES 2 has taken a similar stance. The findings of the Description Cross-Domain speak to this. When answering the research question: *Can metadata associated with the creation and active use of records ever contribute to archival description, particularly in the capture and elucidation of certain kinds of context and fundamental identification and arrangement information relating to the records?* researchers found:

> One aspect of an integrated metadata creation and management regime that makes some in the archival community nervous is the notion, also raised by projects such as the Archivists' Workbench,[1] that certain types of metadata, created while the records to which they relate are active, could be captured or analysed automatically and used to partially automate, or even to replace archival description. As identified by InterPARES 1, records have many types of interacting contexts that need to be documented. Often with electronic records, because of their virtual nature and also their complexity, it can be more difficult to identify these contexts than it might be

[1] See San Diego Supercomputer Center, Archivists' Workbench Project Summary. Available: http://www.sdsc.edu/NARA/Publications/nhprc_summary.pdf

> with traditional records. However, often it is the case that the system within which the record has been created or maintained has in place metadata mechanisms, or could be designed to have them, that document some of the context in which archivists are interested (albeit that these are generally created contemporaneous with the record and lack the hindsight and birds-eye view of the archivist)…
>
> In the future, time and cost concerns as well as new technological capabilities are likely to necessitate that even archival description may be created, at least partially, by automated means, likely including harvesting and re-purposing metadata created by others prior to the records coming into archival custody. For this to be acceptable as an assistance or augmentation to archival description, however, a) the metadata harvested should supplement manual description or should capture some aspect that it is difficult or impossible to do manually; and b) archivists should assess what they do manually in traditional description and identify at the point of recordkeeping systems design what could be captured automatically out of the system. Neither of these activities, however, necessarily usurps the archivist's prerogative to supplement and synthesize the metadata gathered automatically in the process of creating a descriptive instrument. Moreover, because the metadata thus gathered is likely to be in digital form, the archivist would have the option of retaining it both in its original form, as evidence of the records and recordkeeping to which it relates, and to transform it into a form that is more useful for secondary use. (Gilliland, et al., 2008 pp. 44, 45).

The above passage draws a clear line between archival description and metadata – while providing us with insight into what value metadata have in tracking the life of a record from creation to preservation. And it is the boundaries of the record that concern us here. Whereas metadata are useful to archival description, as seen in the arguments above, they are essential to establishing the record *as a record* in a digital system. And it is this focus on the attributes of a record as it goes through the Life Cycle that shapes the remainder of this article.

InterPARES 1 Benchmark Requirements and the InterPARES 2 Chain of Preservation Model

InterPARES 1 determined the necessary requirements for establishing the "quiddity" of a record in an electronic system. These were labeled Benchmark Requirements (Authenticity Task Force, 2005), and established, on the basis of special diplomatics (Duranti, 1998), the attributes of a record needed in order to presume its authenticity in digital systems. These attributes attest to the creation of the record and how it was handled during the course of business. They reflect the *identity* and *integrity* of the record and manifest themselves as metadata in the analysis below.

The Chain of Preservation Model (COP) is one of two models generated by InterPARES 2.[2] It shows the Life Cycle of records creation, recordkeeping, and records preservation (Eastwood, Hoffman, and Preston, 2008), by delineating the processes and constraints in the life of a

[2] See: http://interpares.org/ip2/ip2_models.cfm

record. This model, coupled with the Benchmark Requirements, allowed us to identify where assertions about record attributes should be manifest, and where processes carried out on the record, or on an aggregation of records, occurred. The requirements and the model shaped our work, in demonstrating what metadata are required in the Life Cycle conception of records in digital systems.

Metadata and the Life Cycle Concept

The metaphor for understanding the life cycle of records is a geologic one, where strata of activities and documents accrete over time. Creating a record is a complex act, but once completed, then further activities can be carried out using it – like decisions on action or policies. For example, crafting an email may take five writing sessions, and each time the activity of writing together with its outcome is recorded and saved in the computer. This constitutes an element of the first layer of the record's life. As actions are taken on this record, as it changes hands, as it is consulted for decision-making purposes, and as it is sent to the preserver, new layers of actions and documents must be linked to it. In a digital system, this is done with metadata. Metadata testify to the activities and documents that form the strata of a record's life. First, metadata identify the record and its component parts. Then, they identify the integrity of the record, testifying to the actions taken on the record, and linking it to related documents and to a specific responsible person. As this record moves from creation through the keeping stage to preservation, more metadata are linked to it. Each metadata assertion has a particular function, but is universally used to provide evidence for the presumption of authenticity of the record. That is, metadata element from creation to preservation serves the purpose of identifying the record and making clear that its integrity remains intact as it changes hands and moves from one technological context to another. Thus, metadata in the life cycle conception are the result of tracking the record's identity and integrity through three stages: creation, keeping, and preservation, in order to reproduce an authentic copy of that record.

Life Cycle Model in InterPARES 2

The Life Cycle-based model in InterPARES 2 (i.e., the COP) comprises four major activities: Records Creation, Recordkeeping, Records Preservation, and Managing the Life Cycle Process. We did not investigate the metadata requirements for the Management activity – as it is subservient to the other activities. However, a complete model of metadata required for this model will account for Management of Metadata. Within the scope of our study, and this article, we examined three stages. This part of the life cycle model can be schematized as three rectangles, presented in Figure 1a.

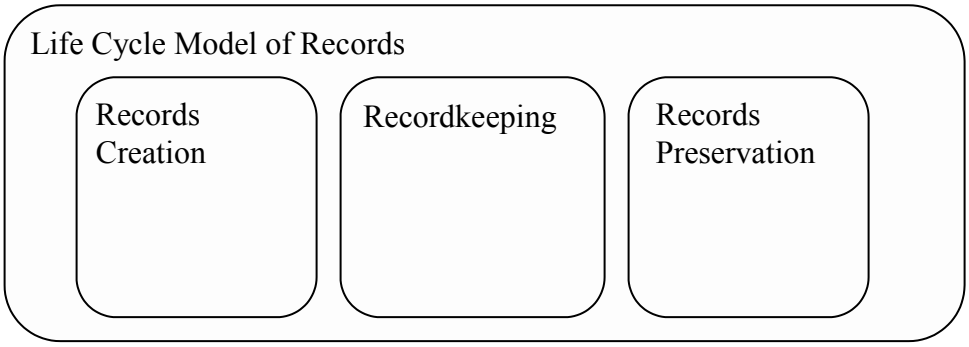

Figure 1a. Life Cycle Model of Records, including Records Creation, Recordkeeping, and Records Preservation

The first two stages, which establish the quiddity of the record – the recordness that must be preserved in the final stage of the Life Cycle – are the responsibility of the creator. We can see this in Figure 1b.

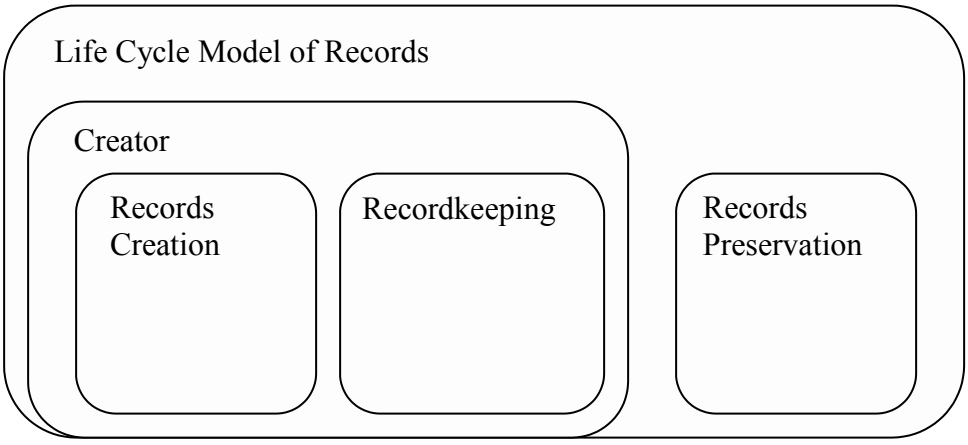

Figure 1b. Life Cycle Model of Records, where Records Creation and Recordkeeping are the responsibility of the Creator

The model can be further subdivided into processes that manifest within and across Creation, Keeping, and Preservation. For example, we can see where the Identity, Integrity, and Transmission metadata fit in the model in Figure 2. This allows us to see where the InterPARES 1 Benchmark Requirements (Authenticity Task Force, 2005) inform metadata in the life cycle.

Here we see Identity Metadata and Integrity Metadata, created at the beginning of the Life Cycle, but defining the record and its boundaries beyond Creation and Keeping. The Creator's responsibility for the record ends at the threshold of preservation, and it is at that point that the preserver uses assertions about the records' Identity and Integrity to describe them, thereby attesting to the presumption of their authenticity.

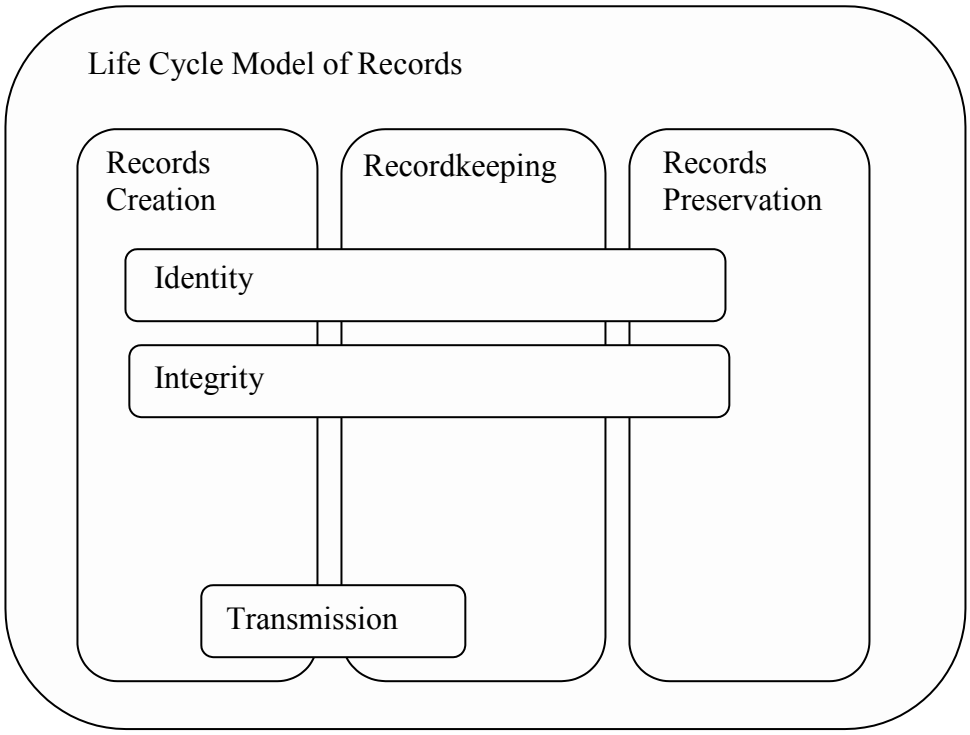

Figure 2. Life Cycle Model shown with Creation Metadata, including Identity, Integrity, and Transmission Metadata.

Figures 3 and 4 show the remaining categories of metadata developed in this investigation. Here we can see the geologic metaphor manifested in the increasing complexity and variety of metadata required for recordkeeping and records preservation.

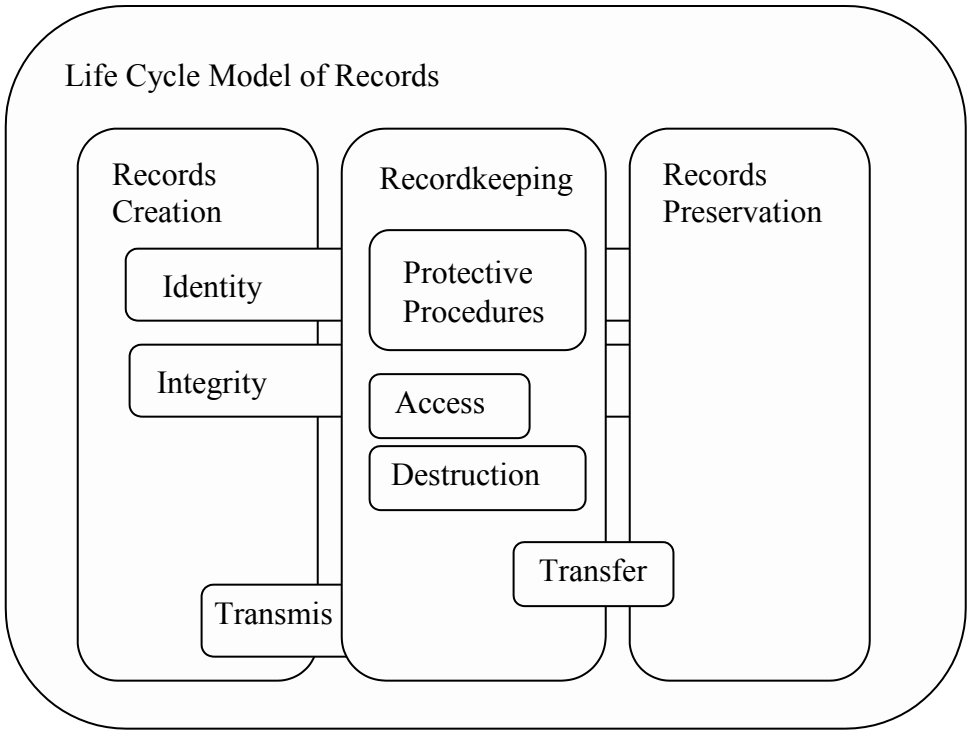

Figure 3. Record Creation and Recordkeeping Categories of Metadata in the Life Cycle

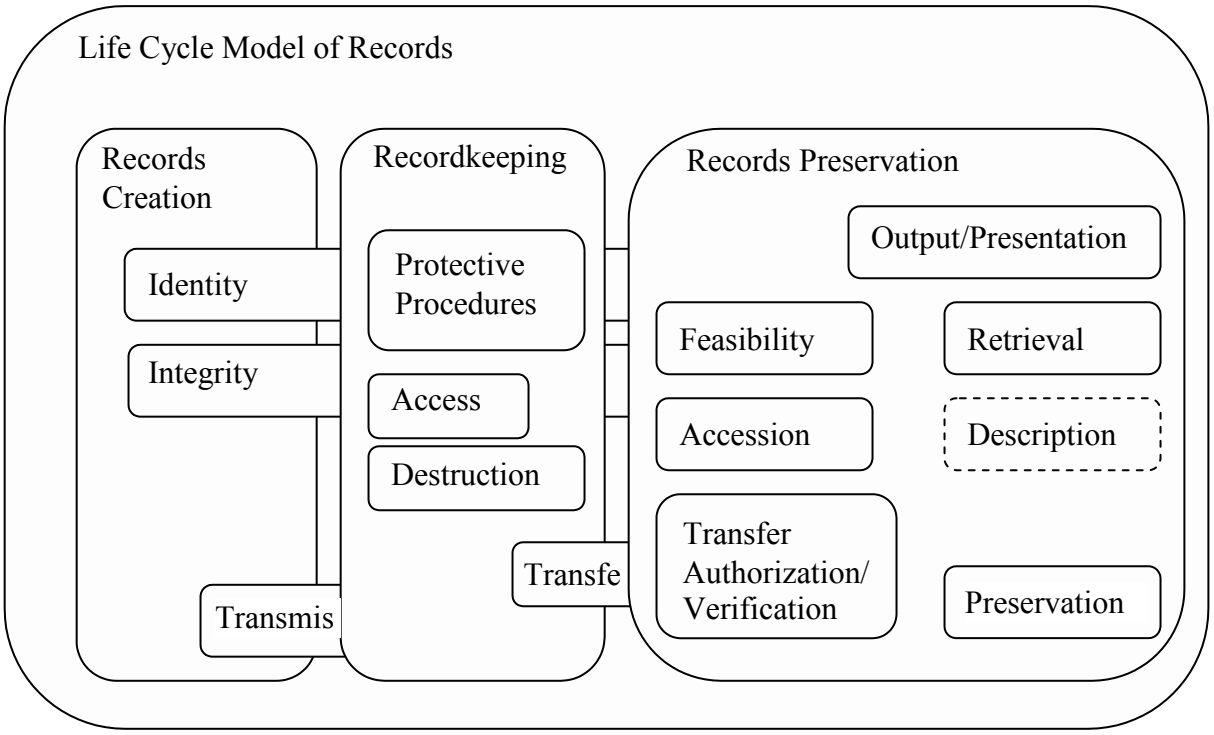

Figure 4. All the categories of metadata identified in the three stages of the Life Cycle Model

The balloons above circumscribe the categories of metadata, but they do not show the complex relationships between metadata, documentation, and controlled lists, like classification schemes, filing plans, preservation action taxonomies. I have simplified the model here for the purpose of presenting the statements we need to make, rather than focusing on the form or semantics of those statements. This holds for the whole metadata model presented here, except in the case of Description, which is a special case of a metadata category in this model. I have created a dashed balloon to illustrate this. In the case of description we make an assertion, following MacNeil, that we want "narrative" as the value of Archival Description, derived from metadata accreted during the record's life. We flesh out this, and the other categories below.

Anatomy of Metadata

In order to go into more detail about metadata derived from the Chain of Preservation Model, we must first describe the anatomy of a metadata assertion. What are metadata? And what are metadata made of? Once these questions are answered, we can then describe how metadata can be linked to the life cycle concept.

Metadata are derived from the conceptual analysis of resources and their attributes. They are assertions about a resource that are both human and machine-readable. An assertion in this context is a statement that contains a reference to the resource, a property of the resource, and

a value; and our resource may be of two types: a record or a group of records. Properties are what we want to say about records – what InterPARES calls the attributes of records--and value is the way we say it. For example, each record we deal with in this model has an Author. Author is an attribute of a record, which is represented as a property of the record. How we say there is an author – by typing in text, deriving it from the digital record or system, or linking to a specific name from an authorized list of Authors--is the value of that property. In another example, this time with a group of records, we can say when and by whom a group of records is transferred to the preserver.

We can take an example from Duranti's work. On page 155 of her book on Diplomatics, Duranti names an author of a document (1998). The Author is the Piscataway Indian Nation. That body is the Author of a letter, a type of record. In this case, Author is the property, the resource is the record (the letter), and the value is the Piscataway Indian Nation. The following table provides a visual interpretation of these metadata.

Conceptual	Statement		
		Attribute	
	Resource	Property	Value
Instance	A particular letter	Author	Piscataway Indian Nation
Example Metadata	piscat.pdf	<author>	<author> Piscataway Indian Nation </author>
Example Metadata as a Statement	piscat.pdf has an <author> named <author> Piscataway Indian Nation </author>		

Table 1. Layers and vocabulary of metadata

This article deals primarily with properties in archival metadata, while we will reserve a discussion of values for future work. In fact, many of the values for metadata in this model of records preservation are left to different juridical and archival contexts to establish. For example, no type of classification scheme or code is prescribed for the property Archival Bond, though such entity is part of the model's assumption about its value. In the next sections, I will go into detail, and name the different metadata derived from our investigation. I will start with Records Creation Metadata, the first type in the record's life cycle.

Records Creation Metadata

When a record is created in the ordinary course of business, the creator[3] provides it with

[3] The creator is defined as the physical or juridical person in whose fonds the record is kept, thus it may coincide with the author of an internal record or of the last draft of a record sent out, or with the recipient of an incoming record, or may be the body for which the author or the recipient work.

certain formal elements. These are studied in diplomatic analysis. Diplomatic analysis allows us to discern the identity of the record based on its formal elements that from which it derives the key attributes of the record. In fact, diplomatic analysis allows the preserver to differentiate records from other kinds of documents, and aids in deciding what to preserve and how (Duranti, 1998). Though there are some open questions about the role of diplomatic analysis in discovering authentic copies of records in digital systems, (MacNeil, 2002), it is clear that it can be used to determine the documentary form of a record before its creation.

The InterPARES 1 Project took the diplomatic understanding of traditional records and asked what attributes were required of digital records to presume their authenticity. This research developed the Benchmark Requirements for Electronic Records (Authenticity Task Force, 2005), which outline the metadata required at the point of record creation. Two major types of metadata are needed at the point of record creation according to the Benchmark Requirements: Identity Metadata and Integrity Metadata.

Identity Metadata

As per the Benchmark Requirements, the creator in the ordinary course of business should attach to each record the names of the Author, the Writer, and the Originator. In some cases, these will be the same person, though it is possible, and not uncommon, that they are not.[4] There should also be the name of an Addressee, the mention of an Action or Matter stating the business, the indication of any Attachments, and dates associated with the creation and transmission of the record. The latter are Chronological Date, Received Date, Archival Date, and Transmission Date. These dates are important because they chronicle the trajectory that a document must take if it is to be considered a record according to a rigorous diplomatic analysis. Finally, a record is qualified as such by its Archival Bond – its relationship with other records in the files of the creator, expressed by means of a classification code or file name. By declaring these record attributes with metadata, we can meet the Benchmark Requirements, and in so doing, assert the identity of the digital record. Once the record has been identified, we must work to ensure that its integrity is not compromised in the course of its life in an electronic system. This requires Integrity Metadata.

Integrity Metadata

The integrity of the record is protected by four assertions: the name of the Handling Office and the Office of Primary Responsibility, the Indication of any Annotation, and Indication of any Technical Modifications. These assertions describe what has been done to the record.

Integrity and Identity Metadata follow the record through its life cycle. Though the record will

[4] It is important to note that the concept of "persons" in this instance is defined by the Juridical, Archival, or Social context of record creation.

accrete more metadata, these new metadata may be cast aside at the threshold of preservation, after archival description has been carried out. However, Identity and Integrity Metadata will not be removed like other assertions. They constitute the quiddity of the record, and as a result, cannot be separated from it.

Transmission Metadata

The creation stage of the record's life cycle ends with the transfer of the record to a Records Keeping System. This requires Record Transmission metadata, and signals the end of the creation process. Figure 5 illustrates these metadata in relation to the other stages in the life cycle, and Figure 6 illustrates them in detail.

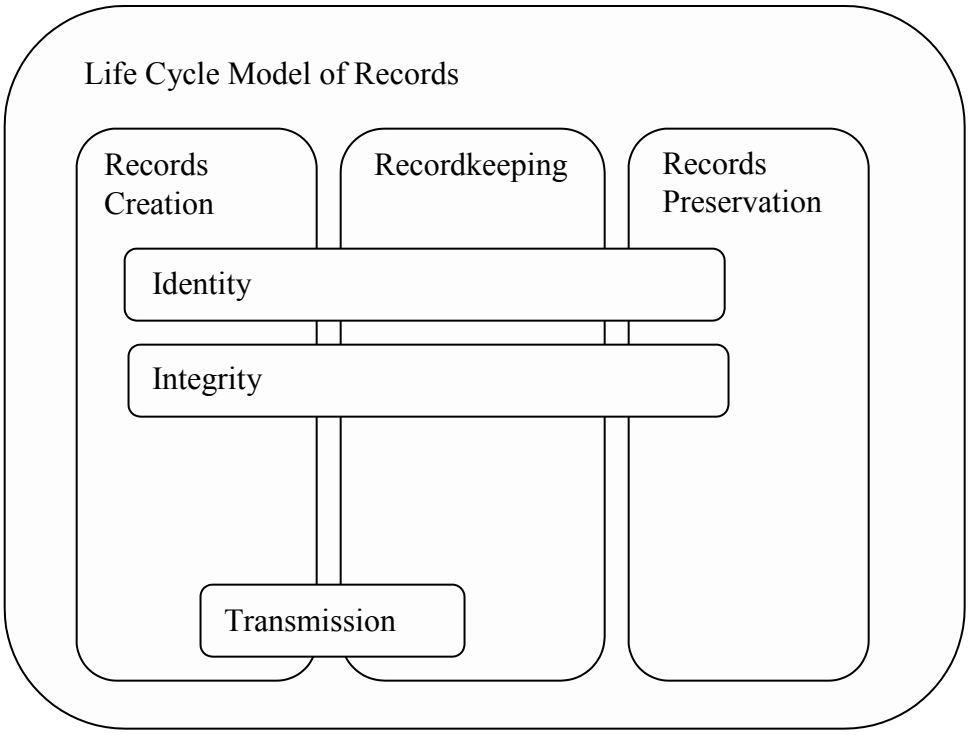

Figure 5. Creation Metadata in relation to other stages in the life cycle

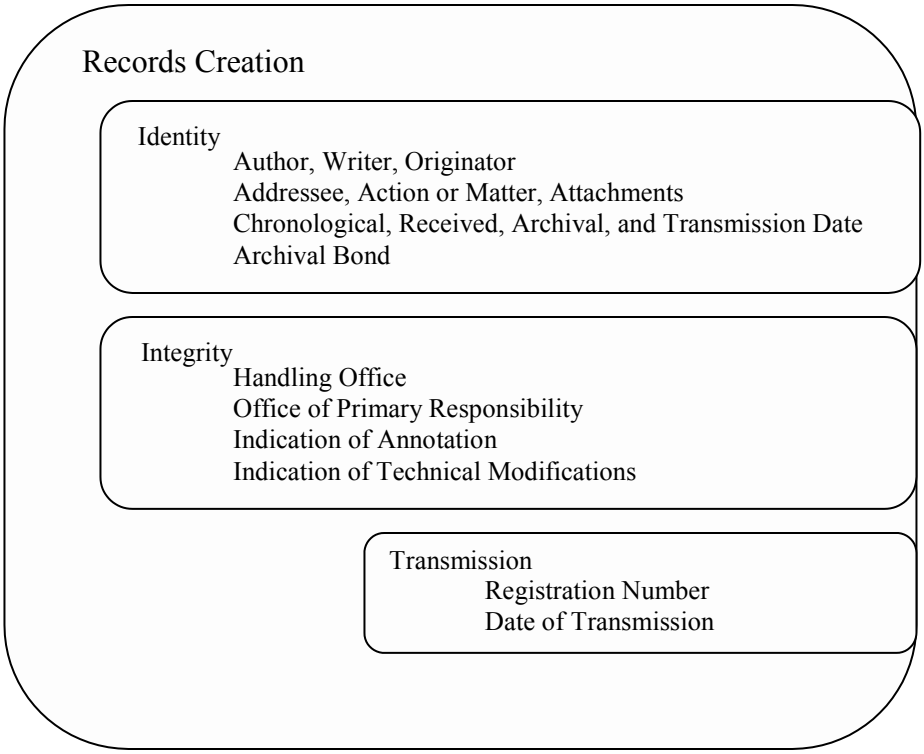

Figure 6. Detail of Creation Metadata in the Life Cycle

Recordkeeping Metadata

A record that is active or semi-active has entered the recordkeeping stage of the life cycle. In this stage we have four classes of metadata: Protective Procedures, Access, Destruction, and Transfer to Preservation Metadata. These metadata are assertions about the technological infrastructure of the Recordkeeping Systems (like types and frequency of backups), the use of the record (accessed or not), and the fate of the records destroyed or transferred to a Preservation System. Once transferred, the record has crossed the threshold of preservation, and is part of a set of records to be described in archival description. It is at this point that Preservation Metadata begin to be linked to the records.

Protective Procedures Metadata

Once a record has been placed in a recordkeeping system, it must be maintained, independently of technological context and against any risks to its integrity. This requires the recordkeeping system not only to backup records, but also to account for such action by indicating that a backup was made, who effected the backup, the date and time of backup, and the location of the backup copy.

Destruction Metadata

Destruction metadata signal what records were destroyed before crossing the threshold of preservation. The metadata in this category account for the act of destruction by naming the records destroyed, persons effecting the destruction, date and time of destruction, and a link to any documentation that discusses the context or content of the records destroyed, for example a retention schedule and disposition activity directive report.

Access Metadata

Because records in a recordkeeping system are active or semi-active, they are accessed in the ordinary course of business. Though they have been set aside, it is possible for creators to annotate them or append attachments to them. Thus, the metadata affiliated with accessing records from an Electronic Records Management System--the structure that enables the second stage of the life cycle, Recordkeeping--account for the request action itself and for the way it was handled. Key to this is the indication of the state of the record(s) at the time of the request. In the process of using active or semi-active records, it is important to document the form and components of the records so that the context and evidence of decision-making is recorded. Metadata that capture this information can then be used in relation to Integrity and Identity Metadata in Archival Description.

Transfer Metadata

At the end of their period of activity or semi-activity, a decision is made to destroy or transfer records to long-term preservation. It is at this point that the records move entirely under the control and responsibility of the preserver. This transfer from the Recordkeeping stage to the Preservation Stage is marked by metadata providing indication of records transferred, the name of the person effecting the transfer (from recordkeeping to preservation), and the date and time of the transfer. The transfer is then given a Transfer Number, and a link is established between that record and any other records in the aggregate. These metadata are written by the records manager, the person responsible for the management of active and semi-active records of a creator, and the preserver writes a sister set after the record or records have crossed the threshold of preservation.

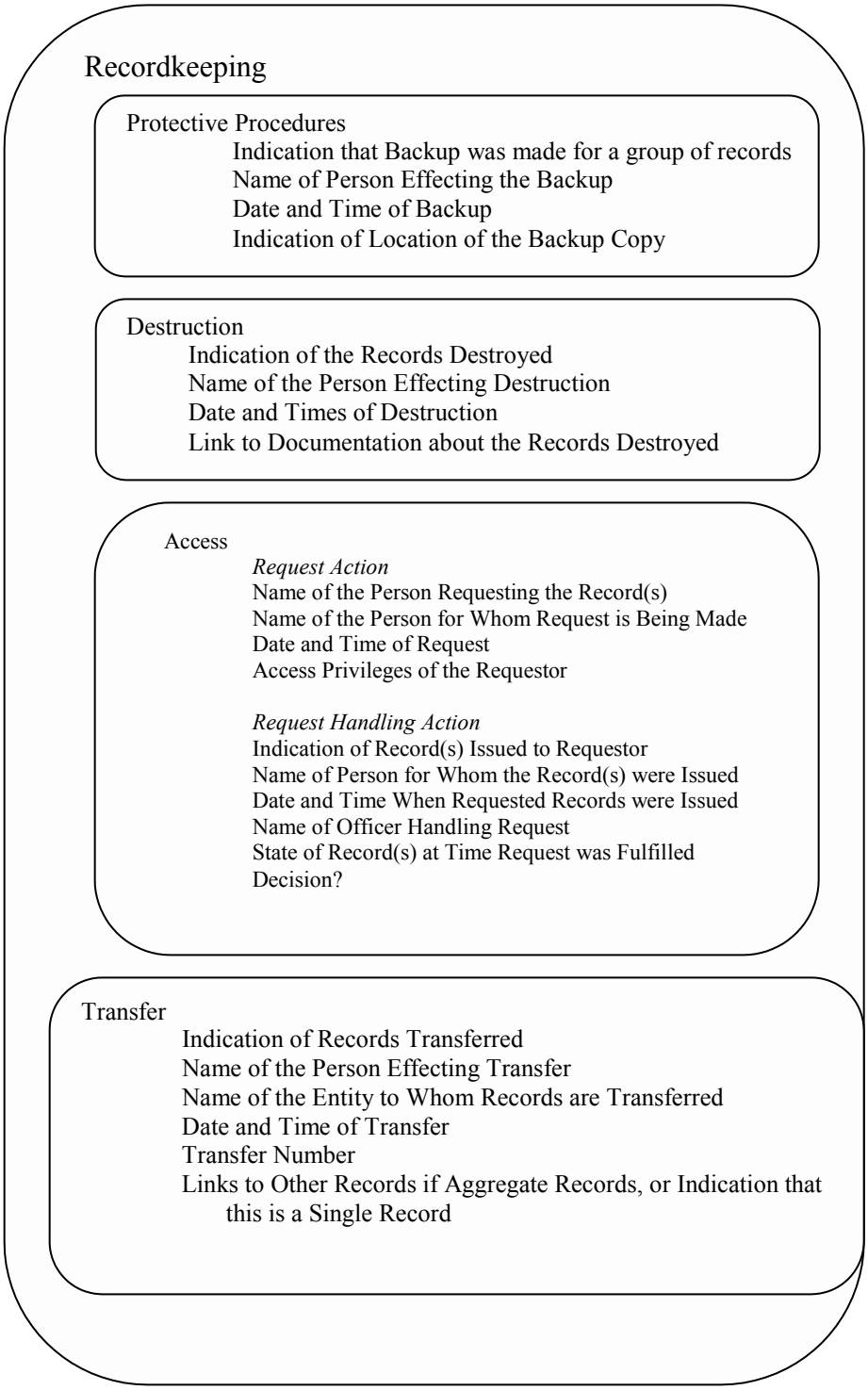

Figure 7. Recordkeeping Metadata detailed

Records Preservation Metadata

Once a record has crossed the threshold of preservation, the preserver assesses what sets of metadata should be kept as evidence of the record's life cycle, and what metadata can be discarded. At this point other decisions have to be made about the preservation of the record. It is also at this stage that retrieval metadata are considered. The classes of metadata, elicited from the Chain of Preservation Model, are Transfer Verification and Authentication Metadata, Feasibility of Preservation Confirmation, Record Accession Metadata, Preservation Action Metadata, Description Metadata, Retrieval, Presentation, and Package Output Metadata. As can be seen from this list, Preservation Metadata is diverse in nature, and some of it changes over time, while other sets of metadata are fixed at one point. For example, retrieval metadata will have to evolve as preservation metadata changes the presentation of record attributes, and also perhaps the Attachments and Annotations.

The figures for Preservation Metadata are more complex, and must be broken down and presented in separate categories. So the following Figures 8-15 are presented each with an explicit reference to their location in the Preservation Stage of the life cycle, though all of them are in one stage.

Transfer Metadata, Transfer Authorization Metadata, and Transfer Verification Metadata

These constitute another kind of record kept about records. These metadata assert that authorized Records Managers transferred a record or particular set of records to the Preserver, that the transfer was authorized, and verified.

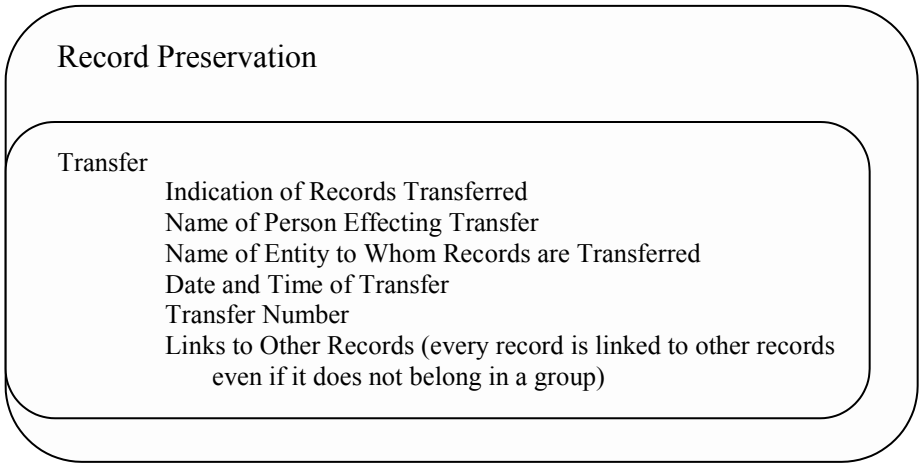

Figure 8. Transfer Metadata marking the transition of records from Recordkeeping Stage to Records Preservation Stage

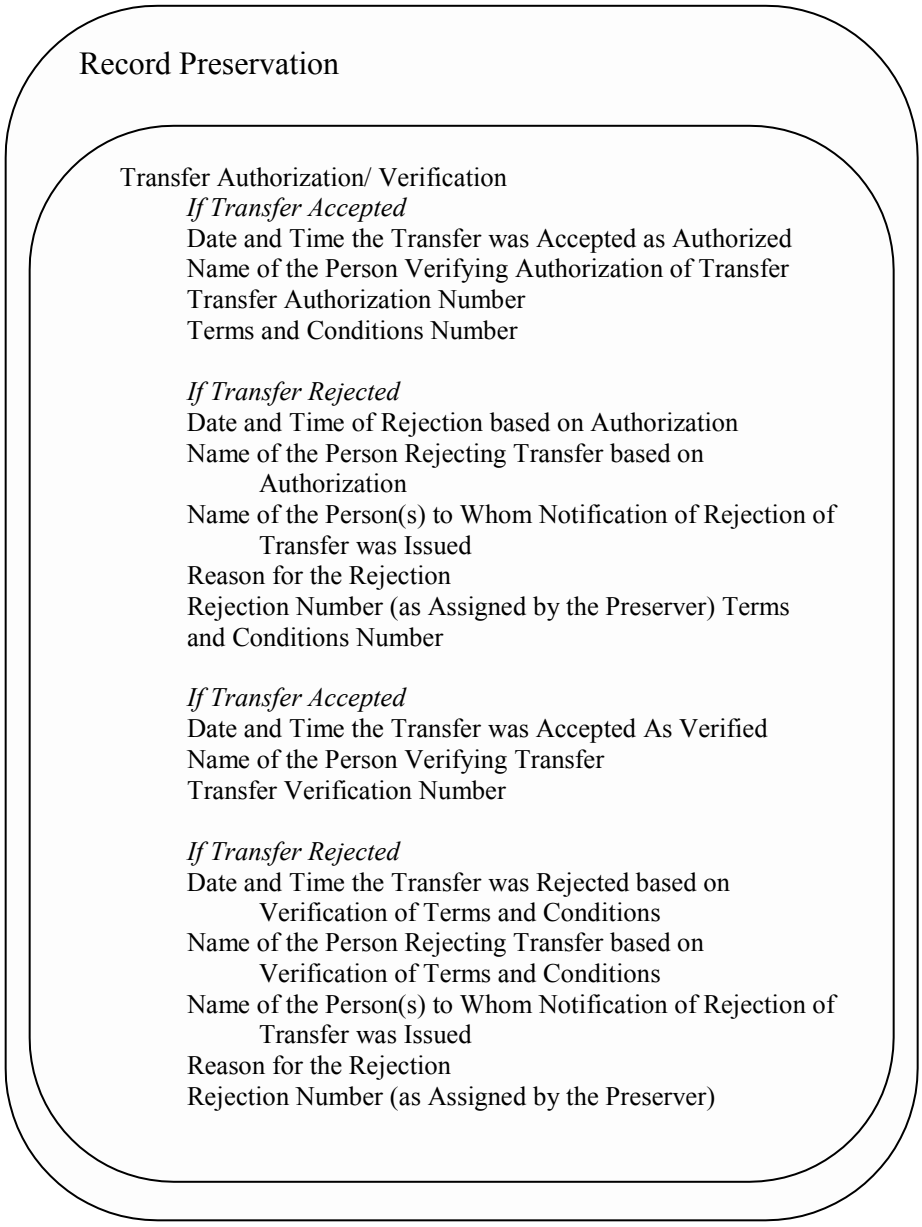

Figure 9. Authorization and Verification of Transfers Metadata

Feasibility of Preservation Confirmation Metadata

This class of metadata is a record of a decision made by the preserver. The preserver must declare whether the record can be preserved for the long-term. A positive decision would be recorded, and so would a negative one, together with the rejection of the records transfer. These decisions, especially decisions that preservation is not feasible, form an integral part of the evolution of the Preservation System.

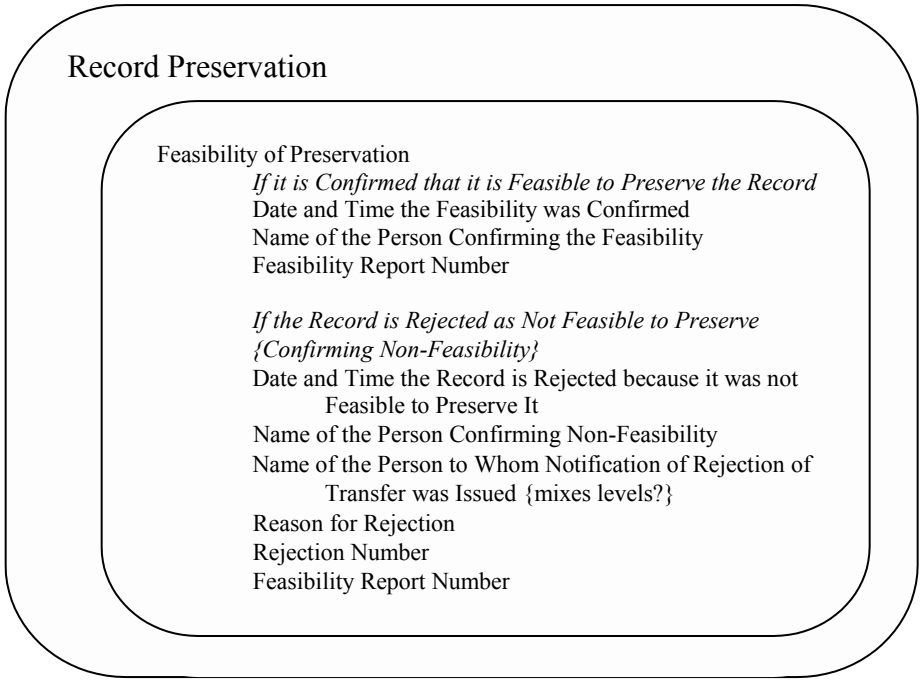

Figure 10. Feasibility Metadata and its two parts

Accession Metadata

Once feasibility of preservation has been confirmed, then the records are accessioned. At this point the preserver has claimed custody and responsibility for these records, and Accession metadata declare what has been taken in, by whom, and when.

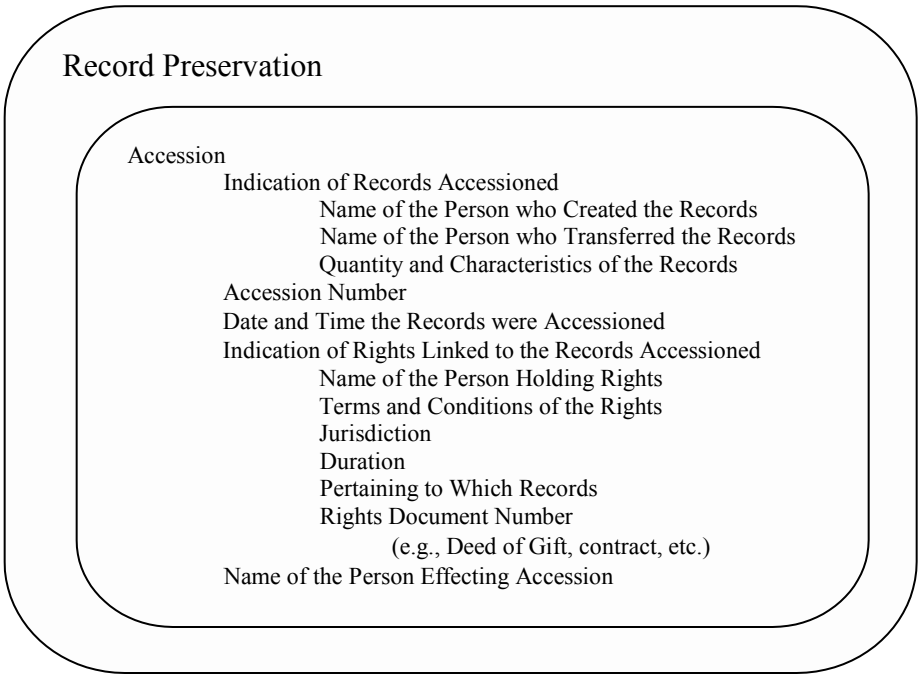

Figure 11 Accession Metadata

Description Metadata

Following MacNeil (1995), we find that the discrete pieces of metadata constitute the raw material of archival description, as outlined in the Canadian tradition, requiring the preserver to construct a narrative from the evidence of the record's life cycle. It is at this point, the point of creating a description of the records, that the preserver attests to the presumption of authenticity of each record. In order to do this, the preserver uses the Identity and Integrity Metadata outlined above, and all other metadata carried forward to the threshold of preservation. The preserver also uses Preservation, Appraisal and Transfer Metadata for the descriptive work. It is also at this point that some metadata are discarded. They are replaced, in function, by the narrative of the archival description, and the voice of the preserver in that narrative.

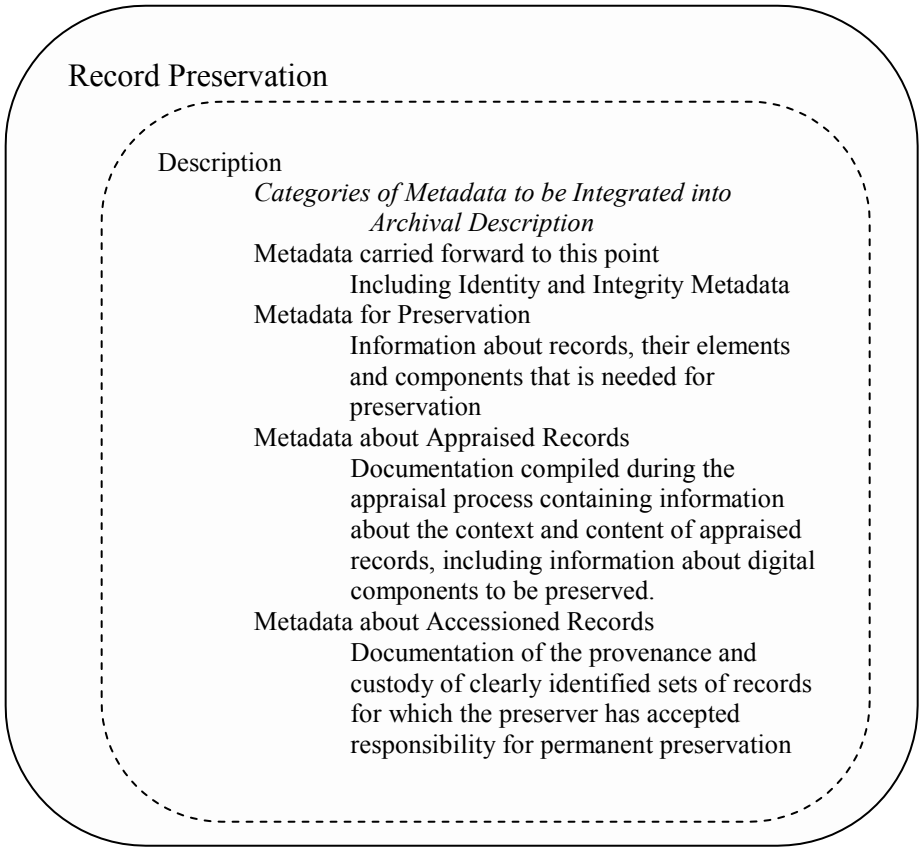

Figure 12. Categories of Metadata used in the life cycle model to generate a narrative archival description

Preservation Action Metadata

These metadata record the state of the records before and after they undergo any preservation action. State here is "information about records and their elements and components that is needed for preservation," (Eastwood, Hoffman, and Preston, 2008 p. 160). An assessment of the state of records requires documentation as well as metadata, and extends the Integrity

Metadata requirements into the Records Preservation stage of the life cycle. It also requires an explicit and detailed understanding of the way in which records will be preserved. Thus, emulation, migration, or conversion must be operationalized as processes in the system, and documented in this category of metadata. The basic components of this category are the state of the records prior to an update, an indication of the update processes, and then a declaration of the state of records after the update. As with other processes, the name of the person responsible, the date and time, and an identification number (as a mechanism used to associate and locate records accessioned at the same time), are required inclusions.

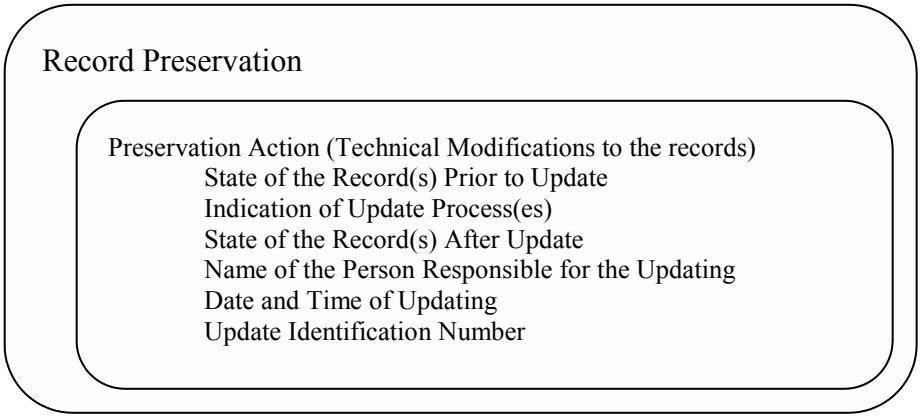

Figure 13. Preservation Action Metadata

Retrieval, Presentation, and Package Output Metadata

Once records have crossed the threshold of preservation, it is assumed that they are being kept for their long-term value. That value is dependent on a person's ability to retrieve and use the records. This requires metadata, but not metadata that attest to the presumption of authenticity. Rather, retrieval, presentation, and package output metadata should be added to the other metadata, and must extend them by incorporating indexing and display configurations. Retrieval metadata use Description metadata, the Archival Description Narrative, and Indexing, while Presentation and Package Output Metadata are recordkeeping assertions that log the time and indicate which records were presented and packaged for output.

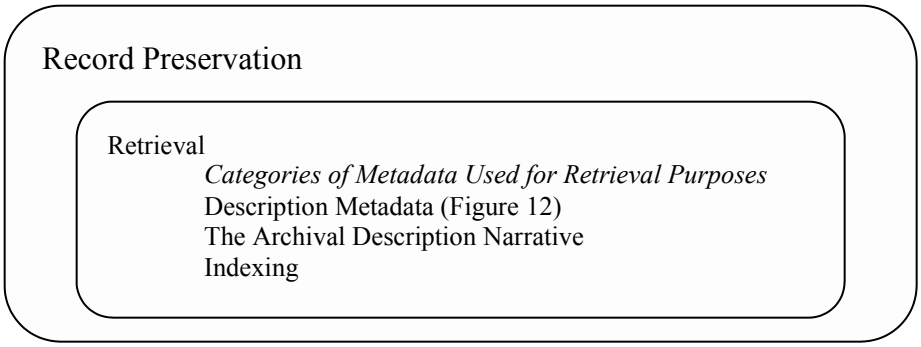

Figure 14. Categories of Metadata used for Retrieval during the Preservation Stage

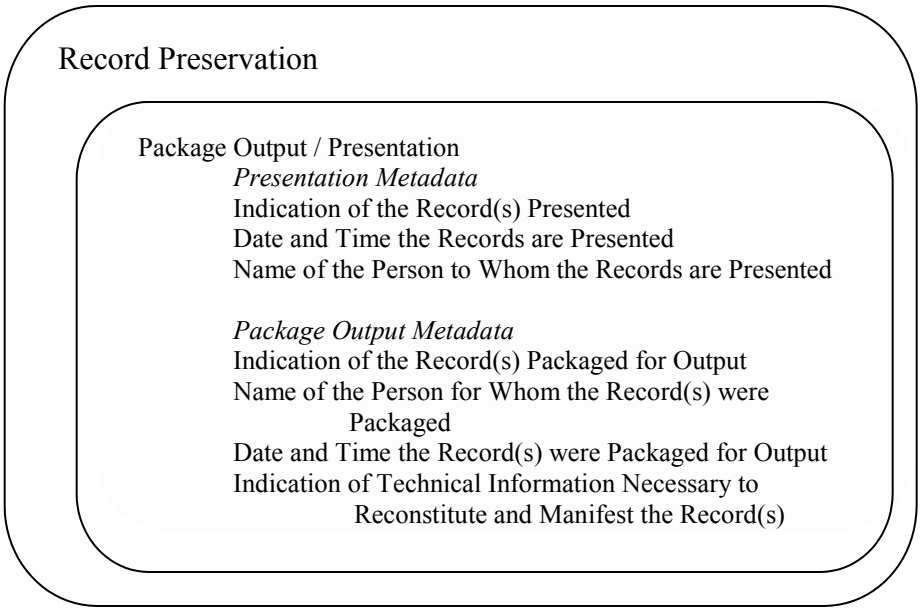

Figure 15. Package Output and Presentation Metadata

Next steps in developing this metadata specification

The next steps in the process of developing this metadata specification are diverse. First, we must understand how this conceptual model, together with its metadata assertions, relates to other conceptual models and metadata schemas. This will require a rigorous conceptual analysis, and a look at what systems have done to instantiate metadata to serve the conceptual model. Second, we must clarify our methodology for making these metadata assertions. This means that our next step in refining this metadata specification is to go back to the anatomy of metadata mentioned above, and look at what is being said (property), about what (resource), and in what way (value), so that we can be clear and precise in our model, and as a consequence, clear and precise in system specification.

Policies for Preservation and Metadata

The InterPARES 2 Policy Cross-domain, as part of its mandate, created a Framework of Principles for Policy Development for Preservers. The assertions made here about archival metadata are echoed in those principles (Duranti, Suderman, and Todd, 2008). For example, the Policy Cross-domain asserts that "[a]uthentic copies should be made for preservation purposes only from the creator's records; that is, from digital entities that have a stable content and a fixed documentary form." (Duranti, Suderman, and Todd, 2008 p. 16). This speaks of the quiddity of the record, and by extension the importance and complexity of its integrity metadata, as conceived in the course of business by the creator, and as preserved later on in the archives.

In another assertion, the Policy Cross-domain Framework restates the role of archival description as a work of collective authentication of an aggregation of records, as distinct from metadata, which produce many atomistic tracings, charting the maneuvers a record takes in a system. It reads: "[a]rchival description of a fonds emerges from a comprehensive analysis of the various relationships interwoven in the course of records' formation and accumulation, and therefore is the most reliable means of establishing the continued authenticity of a body of interrelated records. While the authenticity of individual records can be in part established through their metadata, the authenticity of aggregations of records, i.e., file, series, or fonds, can only be proved through archival description," (Duranti, Suderman, and Todd, 2008 p. 20). The framework attestation continues: "[archival description] is also different both from the identity and integrity metadata attached to individual records, which are part of the record itself and are reproduced time after time with it, and from the additional metadata attached to records aggregations (e.g., file, series) within the recordkeeping system to identify them and document their technological transformations," (Duranti, Suderman, and Todd, 2008 p. 21). Thus, the Life Cycle concept, when addressing the question of metadata and description, finds that these two tools are separated by the same geologic metaphor that shapes the concept of records. Metadata, evinced during the records creation and recordkeeping processes, are strata used in development of the overall narrative presented in archival description, which appears beyond the threshold of preservation.

Closing

The world of archival metadata is fractured. There are many interpretations of preservation, and there are many interpretations of archival metadata. This article intends to contribute to that cacophonous discourse, but in what I hope is a useful way. By employing a consistent, and theoretically sound conceptual model, as manifest in the Chain of Preservation Model of InterPARES 2, I have made a clear assertion, through the discussion of metadata, that these are the required statements that need to be made in order to manage records through their life cycle, while maintaining their identity and integrity, and therefore, the presumption of their authenticity.

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