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DCC | Digital Curation Manual

Instalment on
"Archival Metadata"

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About the DCC

The JISC-funded Digital Curation Centre (DCC) provides a focus on research into digital curation expertise and best practice for the storage, management and preservation of digital information to enable its use and re-use over time. The project represents a collaboration between the University of Edinburgh, the University of Glasgow through HATII, UKOLN at the University of Bath, and the Council of the Central Laboratory of the Research Councils (CCLRC). The DCC relies heavily on active participation and feedback from all stakeholder communities. For more information, please visit www.dcc.ac.uk. The DCC is not itself a data repository, nor does it attempt to impose policies and practices of one branch of scholarship upon another. Rather, based on insight from a vibrant research programme that addresses wider issues of data curation and long-term preservation, it will develop and offer programmes of outreach and practical services to assist those who face digital curation challenges. It also seeks to complement and contribute towards the efforts of related organisations, rather than duplicate services.

DCC - Digital Curation Manual

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Preface

The Digital Curation Centre (DCC) develops and shares expertise in digital curation and makes accessible best practices in the creation, management, and preservation of digital information to enable its use and re-use over time. Among its key objectives is the development and maintenance of a world-class digital curation manual. The *DCC Digital Curation Manual* is a community-driven resource—from the selection of topics for inclusion through to peer review. The Manual is accessible from the DCC web site (http://www.dcc.ac.uk/resource/curation-manual).

Each of the sections of the *DCC Digital Curation Manual* has been designed for use in conjunction with *DCC Briefing Papers*. The briefing papers offer a high-level introduction to a specific topic; they are intended for use by senior managers. The *DCC Digital Curation Manual* instalments provide detailed and practical information aimed at digital curation practitioners. They are designed to assist data creators, curators and re-users to better understand and address the challenges they face and to fulfil the roles they play in creating, managing, and preserving digital information over time. Each instalment will place the topic on which it is focused in the context of digital curation by providing an introduction to the subject, case studies, and guidelines for best practice(s). A full list of areas that the curation manual aims to cover can be found at the DCC web site (http://www.dcc.ac.uk/resource/curation-manual/chapters). To ensure that this manual reflects new developments, discoveries, and emerging practices authors will have a chance to update their contributions annually. Initially, we anticipate that the manual will be composed of forty instalments, but as new topics emerge and older topics require more detailed coverage more might be added to the work.

To ensure that the Manual is of the highest quality, the DCC has assembled a peer review panel including a wide range of international experts in the field of digital curation to review each of its instalments and to identify newer areas that should be covered. The current membership of the Peer Review Panel is provided at the beginning of this document.

The DCC actively seeks suggestions for new topics and suggestions or feedback on completed Curation Manual instalments. Both may be sent to the editors of the *DCC Digital Curation Manual* at curation.manual@dcc.ac.uk.

Seamus Ross & Michael Day.
18 April 2005

Biographies

Marlene van Ballegooie is the Digital Collections Librarian at the University of Toronto Library. She received her MISt degree at the Faculty of Information Studies, University of Toronto. She has served as a member of the Canadian Committee on Archival Description and the Canadian-US Task Force on Archival Description (CUSTARD). She is also co-author of *RAD Revealed: A Basic Primer to the Rules for Archival Description*. Marlene has written several articles and presented at conferences on the topics of metadata and digital collections. Her primary research interests include: archival description, digital preservation, and user interface design.

Wendy Duff is an associate professor at the University of Toronto, Faculty of Information Studies. She received her PhD from the University of Pittsburgh. While doing her doctoral work she was the project co-ordinator for the University of Pittsburgh Electronic Recordkeeping Project. She has served as a member of the ICA Adhoc Commission on Descriptive Standards, the Canadian-US Task Force on Archival Description (CUSTARD) Steering Committee, the Encoded Archival Description Working Group, the Encoded Archival Context Working Group, the Working Group on Subject Indexing and The Planning Committee on Descriptive Standards. She was chair of the Canadian Committee on Archival Description. Her primary research interests are user studies, archival description, and electronic records. Her current research focuses on the development of generic user evaluation tools and the information seeking behaviour of archival users.

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Introduction

Archivists and records managers have always been metadata experts. Archivists create finding aids, file lists, inventories, registers, catalog records, calendars of correspondence, published repository guides, and file plans. Records managers also capture metadata about their organization's records in their records systems and related tools. All of these products of description contain recordkeeping metadata – descriptive information about the content, context and form of records. This type of metadata has long been used by researchers to identify, locate and interpret records. Although archivists and record managers have always been in the business of metadata, only recently have they begun to work together to develop standards and tools that ensure the appropriate metadata is captured and maintained across time and domain.

The initial work to standardize archival description began in the 1980s in the United States. The first set of American standards built upon standards developed by the library community. In the 1980s and 1990s archivists in many other countries, such as Canada and Great Britain, also developed standards for describing archival holdings. In 1994, the International Council of Archives published the first international standard for archival description. These standards acknowledged that information from record management systems could be incorporated into archival descriptions, but no records managers were involved in their development.

Parallel to the standardization of archival metadata was the development of metadata sets for the management of current records.[1] In the 1990s, the proliferation of electronic records and the move toward e-government highlighted the need for metadata standards that could ensure the capture and preservation of reliable and authentic records. The first efforts to standardize records management metadata sets dealt predominantly with metadata captured in electronic records management systems. Unlike archivists who were concerned with describing the holdings of their archival institutions, records managers were working on standards that would automatically generate metadata or extract metadata from business application systems. As it will be evidenced in this chapter, the most recent research and projects aim to develop standards and tools that unite record management and archival metadata. This work, which is most advanced in Australia, aims to develop a recordkeeping metadata standard that "enables the creation, management, and use of records through time and within and across domains."[2]

Archival Description: Purpose, Principles and Practices

The General International Standard Archival Description (1999) defines archival description as "the creation of an accurate representation of a unit of description and its component parts, if any, by capturing, analyzing, organizing and recording information that serves to identify, manage, locate and explain archival materials and the context and records systems which produced it."[3] In the process of archival description, an archivist formulates information about groupings of documents or records by analyzing the whole corpus of material and then organizing the information into sets of descriptions "along a continuum from the largest and most general to

[1] For a discussion of the differences between archival metadata and electronic records metadata, see David Bearman and Wendy Duff, "Grounding Archival Description in the Functional Requirements for Evidence," *Archivaria,* 41 (Spring 1996): 275-303.

[2] David A. Wallace, "Archiving Metadata Forum: Report from the Recordkeeping Metadata Working Meeting, June 2000," *Archival Science* 1, no. 3 (2001): 255.

[3] International Council of Archives. *ISAD(G): General International Standard Archival Description* (Ottawa: ICA, 2000), 10.

the smallest and most specific".[4] The descriptions of archival material often includes: a) information about the origin or provenance of the documents, e.g. who created accumulated and/or used them; b) their documentary form, e.g. diaries; c) their filing structure, e.g. chronological; d) their relationships with other records; and e) the ways they can be used, e.g. restrictions on the use or reproduction of the records.[5] Archivists believe that researchers need to comprehend the entire group of records and "its context before being able to retrieve a particular file or group of files."[6] By providing information on the context, content and structure of the records, archivists can assist users in locating records or groups of records that are suitable for their research needs.

The purpose of archival description goes beyond providing access to records. Archival materials exist only because they played a role in the completion of some practical activity or function. They possess the qualities of naturalness, uniqueness, inter-relatedness, authenticity and impartiality.[7] Archival descriptions provide information about the context of creation and use by describing the actions and events from which the documents emanated. Archival description ensures that "documents can be seen in the context in which they were created and associated with the actions which brought them into being so that they can be used as evidence of those actions."[8] Descriptive information, whether in traditional archival instruments or in the form of recordkeeping metadata, reveals information about the records and the processes visited upon them on which users can, if they wish, base their assumptions about the authenticity of the material. Archival description also serves to protect the integrity of the collective by preserving and describing each group of documents as an "unbreakable" or "infrangible" whole.[9]

While archival principles and practices vary from nation to nation, most archival traditions are based on the principle of *respect des fonds*. This principle states that "the records of a person, family or corporate body must be kept together in their original order, if it exists or has been maintained, and not be mixed or combined with the records of another individual or corporate body."[10] This principle encompasses two sub-principles: provenance and original order. In archival terminology, "provenance" refers to the external context of the records, that is the individual, family, or corporate or administrative body whose activities resulted in the production of the archival materials. The principle of provenance requires that the records created and accumulated by a single creator are never compiled or mixed with those of another. The principle of original order refers to the internal structure of the records. According to this principle, all efforts should be made to maintain records in the order in which they were accumulated and used by their creator. The records creator maintained items together because they related to one another or were used together. For this reason, archival materials need to exist within the context in which they were created in order for users to understand their true meaning. By analyzing and documenting both the provenance of the records and their original order,

[4] Frederic Miller, *Arranging and Describing Archives and Manuscripts* (Chicago, Society of American Archivists, 1990), 28.
[5] Ibid., 7.
[6] Ibid., 29.
[7] Ibid., 200-201.
[8] Heather MacNeil, "The Context Is All: Describing a Fonds and Its Parts in Accordance with the Rules for Archival Description," in *The Archival Fonds: From Theory to Practice*, ed. Terry Eastwood (Ottawa: Bureau of Canadian Archivists, 1992), 198.
[9] Michel Duchein, "Theortical Principles and Practical Problems of Respect des Fonds in Archival Science," *Archivaria* 16 (Summer 1983): 64-82.
[10] Bureau of Canadian Archivists, Planning Committee on Descriptive Standards, *Rules for Archival Description*, (Ottawa: Bureau of Canadian Archivists, 1990), Glossary D-6.

archivists are able to produce metadata that is essential to understanding the context and content of the records and preserve their impartiality and authenticity.

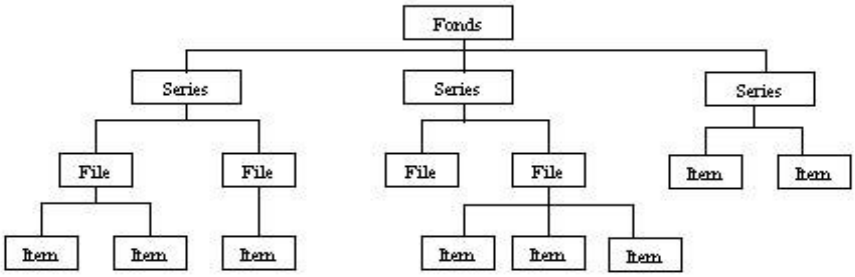
A distinctive feature of archival description is the concept of multi-level description. Since archival description is a reflection of its arrangement, the way that a record creator organized their records will determine how the records are described.[11] Hugo Stibbe illustrates the relationship between archival arrangement and description:

> [A]ll archival description is fundamentally [a] description of collectivities and…these collectivities may be organized in sub-collectivities which may be further subdivided…each collectivity or unit of arrangement becomes [potentially] a unit of description. Thus, there may be many "units of description" in a collectivity of archival material. These units of description, being divisions and subdivisions of the whole collectivity [and] naturally have a hierarchical structure, and group themselves into hierarchical levels that have as a common characteristic, the structure of a tree.[12]

[11] Kent Howarth, "Archival Description: Content and Context in Search of Structure," in *Encoded Archival Description on the Internet*, eds. Daniel V. Pitti and Wendy M. Duff (Binghamton, NY : Haworth Information Press, 2001), 14.

[12] Ibid.

The multilevel concept can further be demonstrated in a schematic illustration:



Just as archival records are arranged in a hierarchy of aggregate groupings, with the fonds being the highest level, the series and file the next levels down, and the item at the bottom of the hierarchy, archival descriptions are also multilevel in nature. Archival description begins by describing the fonds as a whole, and proceeds to document the various parts that constitute the fonds (e.g. series, files, items) in a hierarchical manner.[13] Most standards for the content and/or format of archival description include multilevel rules that require archivists to describe material from the general to the specific and to link separate units of description in a hierarchy.[14]

The use of multilevel description seems divided along nationalistic lines. For example, Canadian archivists have stressed the importance of representing the hierarchical structure of the material because they believe "the concepts of provenance and original order demand that these hierarchical linkages be maintained in order to show how the context of the material being described relates to the whole".[15] Other archivists, such as the Australians, have challenged the notion that the fonds level must be the highest level of description, that archival description must proceed from the general to the specific, and that the integrity of the archival unit is dependent upon hierarchical linkages.[16] In recent years, electronic recordkeeping systems and the dynamic nature of modern organizations have caused some North American archivists to question the importance and practicality of describing material at the fonds level.[17]

Background Developments to Date

Until recently, the majority of metadata standards development work within the archival community has been related to the description of archival records. These efforts have resulted in the creation of several data structure and data content standards for archival description. Data structure standards, such as MARC and Encoded Archival Description, specify the metadata elements that are required for an archival description. Each element in the metadata set serves as a placeholder in which the archivist can record data. Data content standards, on the other hand, provide the rules for how to enter data into each of the elements of the data structure. Standardization of both the structure and content is important because it allows for the exchange of data and supports usability.

Beginning in the early 1980s, efforts towards standardizing metadata were focused on the production of data content and data structure standards. These efforts were largely driven by the move towards automation and the desire to share and exchange archival metadata. Furthermore, these efforts were focused on the products of description that could be created at the end of a record's life cycle. More recently, with the proliferation of electronic records, work in the area of archival metadata has shifted to the beginning of the records life cycle, formerly the realm of records managers. In this new era dominated by electronic records, archivists and records managers are quickly realizing that electronic records may not survive without identification and intervention early in the record's life cycle.

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[13] A repository may choose to describe the hierarchy down to the item level or they may terminate the description at a higher level.

[14] Some of these standards include: ISAD(G), RAD and EAD.

[15] Hugo Stibbe, "Implementing the Concept of the Fonds: Primary Access Point, Multilevel Description and Authority Control," *Archivaria* 34 (1992): 115.

[16] Chris Hurley, "Data Systems, Management and Standardisation," *Archives and Manuscripts* 22 (Nov. 1994): 338-359.

[17] *See* Frederic Miller, *Arranging and Describing Archives and Manuscripts* (Chicago, Society of American Archivists, 1990) ; David Bearman, "Multi-level Description," *Archives and Museum Informatics* 8, no.1 (1994): 80-83.

While in some communities, such as the library community, metadata standards have been met with international agreement, in the archival community standards have largely been developed along nationalistic lines. Included below are accounts of the development of several of the most important archival metadata initiatives in recent years.

Rules for Archival Description (RAD)
In the early 1980s, Canada's archival community established a Working Group on Archival Descriptive Standards to study the state of archival description in Canada. In 1985, the Group published its report which made a set of recommendations and laid out a framework for the development of descriptive standards that dealt with all types of archival material and access points. Based on the recommendations of the working group, the Bureau of Canadian Archivists (BCA) established the Planning Committee to coordinate the development of archival descriptive standards.

The comprehensive data content standard: *Rules for Archival Description (RAD)* was completed in both English and French in 1996. *RAD's* structure is based on the *AACR2* standard for bibliographic description. *RAD* is divided into two parts, each having a unique function in the creation of an archival description. Part 1 of the standard is concerned primarily with the description of archival materials. The first chapter covers the basic principles and rules for archival description, and subsequent chapters focus on the various types of media ranging from textual materials to special media such as graphic materials and sound recordings. Part Two of *RAD* contains rules for the creation of non-subject access points and the formation of headings. The development of *RAD* took 7 years with individual media chapters being drafted by various working groups consisting of media experts. As each chapter was completed, it was circulated to the archival community for comment. Within the standard, a strong emphasis was placed upon providing guidance for creating multilevel descriptions to reflect the multilevel arrangement of an archival fonds.

To aid in the implementation of the standard, the members of the Planning Committee also gave workshops across the country and the Canadian Committee on Archives provided grants for describing material according to *RAD*. Furthermore, with the publication of *RAD*, a maintenance committee, the Canadian Committee on Archival Description (CCAD), was established to revise the rules on an annual basis and to deal with other matters related to descriptive standards. In recent years, the Committee has created new chapters on philatelic materials and objects, and has made all the rules and revisions freely available via the Web.[18]

APPM and MARC AMC
Archivists in the United States took a very different route in their efforts to standardize archival description.[19] In the United States, it was automation that led to the development of archival descriptive standards. In 1977, the Society of American Archivists (SAA) assigned to the National Information Systems Task Force (NISTF), the task of examining systems for exchanging information about archival material. The group decided that archivists required a data structure standard to exchange information, and they set about developing a list of metadata elements. Subsequently, the list was used to identify the MARC fields required to carry

[18] Canadian Committee on Archival Description, *Rules for Archival Description*, http://cdncouncilarchives.ca/archdesrules.html (Accessed January 7, 2006).
[19] For an elaboration of the different approaches taken by Canada and the United States to develop descriptive Standards, see Wendy M. Duff and Kent M. Haworth, "The Reclamation of Archival Description: The Canadian Perspective," *Archivaria* 31 (Winter 1990-91): 26-35.

descriptive information about archives which eventually led to the development of the "Machine Readable Catalog for Archives and Manuscript Control" (MARC-AMC) format.[20] In 1983, the Library of Congress, the Society of American Archivists and the cataloging standards committee of the American Library Association endorsed MARC AMC.[21]

Although MARC AMC provided a data structure standard with which archivists could share their descriptions of archival collections, they still required a data content standard that reflected archival practice. To alleviate this inadequacy, Library of Congress staff developed three different manuals for describing archival textual records, graphic material and moving images that built upon the library description standard, AACR2.[22] *Archives, Personal Papers, and Manuscripts* (APPM), the manual on textual records, had the greatest impact because it dealt with the descriptions of aggregates as well as items. Written by Steven Hensen, *APPM* was published in 1983 and quickly became the recognized standard for archival description in the United States. APPM was updated and revised in 1989 and, in the same year, the Society of American Archivists endorsed the manual as the standard for archival description.[23]

With MARC AMC and APPM, the American archival community started to create and exchange cataloguing records that described their archival material in standardized formats. Although MARC AMC allowed archives to contribute to national union catalogues, such as RLIN, its major shortcoming was that it was unable to represent multilevel descriptions. Since the MARC standard only allows for one level of description, it was not a substitute for the more detailed finding aids that were produced by archivists. It would not be until the mid-1990s that Encoded Archival Description would come on the scene as the preferred data structure standard for archival finding aids.

Manual of Archival Description

British efforts to standardize archival description also began in the mid-1980s with the Archival Description Project based at the University of Liverpool. The project culminated with the publication of Michael Cook and Margaret Procter's *Manual of Archival Description* (MAD). Unlike the standardization efforts in Canada and the United States, the British effort was not focused on the production of bibliographic descriptions that can be exchanged and displayed in online systems. Instead, the primary aim of *MAD* was to guide archivists in the production of finding aids and finding aid systems within a repository. Furthermore, unlike the efforts in North America, the British project rejected the use of the *Anglo-American Cataloguing Rules* (*AACR2*), or any of its derivatives, as a basis for the production of the descriptive standard.

The *MAD* standard covers both the content and form of finding aids. It also provides guidance for creating multilevel descriptions. Additionally, there are chapters covering special formats such as: title deeds, letters and correspondence,

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[20]Steven L. Hensen, "Squaring the Circle: the Reformation of Archival Description in AACR2," *Library Trends*, 36, no. 3 (Winter 1988): 539-551 ; Sharon Gibbs Thibodeau, "Archival Descriptive Standards in the United States," *Toward International Descriptive Standards for Archives* (Paris: K.G. Sauer, 1993): 91-94.

[21] Duff and Haworth, "The Reclamation of Archival Description," 464.

[22]Steven L. Hensen, *Archives, Personal Papers and Manuscripts, A Cataloging Manual for Archival Repositories, Historical Societies and Manuscript Libraries*, 2nd ed. (Chicago: 1989) ; Elizabeth Betz, *Graphic Materials: Rules for Describing Original Items and Historical Collections* (Washington, D.C., 1982) ; and Wendy White-Hensen, *Archival Moving Image Materials: a Cataloging Manual* (Washington, D.C.), [1984]).

[23] Duff and Haworth, "The Reclamation of Archival Description," 465.

photographs, cartographic material, architectural drawings and plans, film, video and sound archives, as well as electronic records. With recognition that the *ISAD(G)* standard, described in greater detail below, has been widely adopted by the British archival community, the most recent edition of the *Manual for Archival Description* has assimilated much of the structure and terminology of *ISAD(G)* into its rules.[24]

NCA Rules

While the *Manual for Archival Description* is focused primarily on the preparation of archival finding aids, the UK's National Council on Archives developed the *Rules for the Construction of Personal, Place and Corporate Names* for the creation of access points. Prepared by the NCA IT Committee and three working parties, the standard, commonly referred to as the "NCA Rules", were developed between 1990 and 1997 to assist cataloguers of archival material in forming names for persons, corporate bodies and place names. According to Dick Sargent, Chair of the National Council on Archives IT Committee, the NCA Rules are "designed for the consistent construction of proper names in the description, cataloguing and indexing of British Archives"[25] and are intended to be used in conjunction with archival descriptive standards such as *MAD3*.[26] Since many archivists work within library environments, the NCA Rules were heavily based on AACR2.[27] The development of the NCA Rules were largely driven by the desire to exchange data between repositories and to allow for the retrieval of name authority data by users via networks such as the internet. The NCA rules are being used in a number of networks including the Archives Hub[28] and the Archives Network Wales.[29]

ISAD(G) and ISAAR(CPF)

While descriptive standards projects were advancing in Canada, Great Britain, and the United States, initiatives were also moving forward at the international level. The International Council on Archives (ICA) established an Ad Hoc Commission on Descriptive Standards in 1990 and over the course of the next six years the Commission produced a "Statement of Principles Regarding Archival Description" (1992), the *ISAD(G): General International Standard Archival Description* (1994), and *ISAAR(CPF): International Standard Archival Authority Record for Corporate Bodies, Persons, and Families* (1996).[30]

ISAD(G) was developed by a group of archivists with an interest in exchanging and sharing data about their archival holdings. Originally issued in 1994 and revised in 1999, *ISAD(G)* has become one of the key standards for the description of archival records. *ISAD(G)* claims that metadata created in compliance with the standard will:

- Ensure the creation of consistent, appropriate, and self explanatory descriptions;
- Facilitate the retrieval and exchange of information about archival material;
- Enable the sharing of authority data; and

[24] Margaret Procter and Michael Cook, *Manual of Archival Description*, 3rd ed. (Brookfield, Vt. : Gower, 2000), xiii.

[25] National Council on Archives, *Rules for the Construction of Personal, Place and Corporate Names* ([London] : National Council on Archives, 1997), iii.

[26] In the 3rd edition of the *Manual for Archival Description*, the authors note that the NCA Rules "should be used in conjunction with MAD3 when access points using proper names are being set up."

[27] National Council on Archives, *Rules for the Construction of Personal, Place and Corporate Names*, 5.

[28] Available at http://www.archiveshub.ac.uk/

[29] Available at http://www.archivesnetworkwales.info/

[30] *ISAD(G): General International Standard Archival Description* (Ottawa: ICA, 2000) and *ISAAR(CPF): International Standard Archival Authority Record for Corporate Bodies, Persons and Families* (Ottawa: ICA, 2004). Also, Hugo L.P. Stibbe, "Archival Descriptive Standards and the Archival Community: A Retrospective, 1996," *Archivaria* 41 (Spring 1996): 268-272 provides a detailed account of the genesis of these international standards.

- Make possible the integration of descriptions from different locations into a unified information system.[31]

ISAD(G) is firmly based on accepted theoretical principles such as 'respect des fonds'.

Although the principles state that description activities take place throughout the life cycle of records, the standard was developed primarily to create descriptions at the end of the life cycle.

ISAD(G) establishes twenty-six data elements within seven information areas (Identity Statement, Context, Content and Structure, Conditions of Access and Use, Allied Materials, Notes and Description Control), and specifies only six data elements as essential for international exchange of descriptive information: a reference code, title, creator, dates of creation/accumulation, extent, and level of description. As an international standard, *ISAD(G)* provides for a high degree of flexibility and "widespread applicability" within a general set of rules for archival description.

Recognizing that the description of the creators of archival material is as important as the description of the archival material itself, the Ad Hoc Commission continued its work and developed *ISAAR(CPF)* as a standardized framework for information about creators of records within the structure of an authority control record. While the *ISAD(G)* standard introduced access points as an integral component of archival description, this was an unfamiliar concept to most archivists outside North America. The development of the *ISAAR(CPF)* standard not only educated archivists on the importance of access points for the efficient and effective retrieval and exchange of descriptive information, it also promoted the capture and maintenance of separate contextual information and the linking of this data to descriptive records.

As noted in the standard's statement of scope and purpose, *ISAAR(CPF)* "provides guidance for preparing archival authority records which provide descriptions of entities (corporate bodies, persons and families) associated with the creation and maintenance of archives."[32] The standard further states that these archival authority records are used:

- To describe a corporate body, person, or family as units within an archival descriptive system; and/or
- To control the creation and use of access points in archival descriptions;
- To document relationships between different records creators and between those entities and the records created by them and/or other resources about or by them.[33]

In essence, the standard provides archivists with the information needed to set up an authority control system.

The second edition of *ISAAR(CPF)*, published in 2004, contains four information areas, an Identity Area, a Description Area, a Relationships Area and a Control Area. While all elements contained in the rules are available for use in the creation of authority records, only four elements – the type of entity, the authorized form(s) of name, the dates of existence, and the authority record identifier – are required. The standard also provides guidelines for linking authority records to the archival descriptions created by those entities. The *ISAAR(CPF)* standard is intended to be used in conjunction with *ISAD(G)* and other national standards or conventions for archival description.

[31] International Council on Archives, *ISAD(G)*, 7.

[32] International Council on Archives, *ISAAR(CPF)*, 7.

[33] Ibid.

Encoded Archival Description

In the mid-1990s, American archivists decided to develop a new data structure standard – one that would facilitate access to finding aids via the Internet. In October 1995, the UCLA Berkeley Library began an investigation of the feasibility of creating a platform-independent, machine readable encoding standard for archival finding aids, known as the Berkeley Finding Aid Project.[34] Daniel Pitti, principal investigator for the project, identified the following functional requirements necessary to make archival finding aids available to network users:[35]

- presentation of extensive and inter-related descriptive information;
- preservation of hierarchical relationships existing between levels of description;
- representation of descriptive information inherited between one level of description from another;
- navigation with a hierarchical information architecture;
- perform element-specific indexing and retrieval.

After studying a number of encoding formats, SGML was selected as the technique most capable of meeting the functional requirements[36] and an alpha version of a DTD was developed. The assumption was made, based on the analysis of numerous examples, that archival finding aids, particularly inventories and accession registers, "share similar parts and structure."[37]

At this point the Berkeley Finding Aid project broadened its membership and the new team focused on articulating the following set of principles:

- Finding aids, and the DTD that contains them, are not objects of study but rather tools leading to such objects;
- EAD content designation identifies essential elements with findings rather than the intellectual content for them, providing for a minimum of required elements but permitting more detailed levels of description;
- EAD is based on a platform-independent standard in order to facilitate interchange and portability and accordingly will endure changing hardware and software platforms.[38]

These principles, known as the "Ann Arbor Accords", set the foundation for further work on the EAD standard. In 1997, the group developed a Beta Test Version of the DTD, which they heralded as having "the potential to revolutionize the world of finding aids by providing a single standardized encoding through which archival descriptions can be exchanged and used [and by

[34] The Berkeley initiative followed on the heels of a planning conference sponsored by the University of California EAD implementation team. The goal of the conference was "To explore the possibilities of cooperative implementation of Encoded Archival Description (EAD) by the University of California Archives and special collections units and other interested California research libraries."

[35] "EAD Progress Reports," http://sunsite.berkeley.edu/FindingAids/EAD/history.html (Accessed January 10, 2006).

[36] The EAD Guidelines define SGML as "An ISO standard (ISO 8879), first used by the publishing industry, for defining, specifying, and creating digital documents that can be delivered, displayed, linked, and manipulated in a system-independent manner." *EAD Application Guidelines for Version 1.0* http://www.loc.gov/ead/ag/agappf.html (Accessed January 10, 2006).

[37] "EAD Progress Reports," http://sunsite.berkeley.edu/FindingAids/EAD/history.html (Accessed January 10, 2006).

[38] A detailed account of the development of the EAD can be found at: http://sunsite.berkeley.edu/FindingAids/EAD/history.html (Accessed January 10, 2006).
A more detailed account of the Principles and Criteria can be found at: http://sunsite.berkeley.edu/FindingAids/EAD/accords.html (Accessed January 10, 2006).

simplifying] the process of creating machine-readable finding aids in the future as the use of SGML tools becomes more widespread and better understood."[39]

EAD is based on the notion that archives are hierarchical in nature. Within the standard, a wide variety of descriptive elements are available to describe the whole collection or fonds. Following the fonds level description, the same elements are available to describe the lower levels of description. EAD descriptions are based on the notion of inheritance; information that is relevant to the higher level is not repeated at lower levels. At each level of description, only the information that is relevant to that level of description is given. The EAD standard defines the semantics of a finding aid; it does not prescribe how data content should be recorded within each element.

In addition to providing the ability to describe archives hierarchically, the EAD standard also supports both internal and external linking. Links can be made to sections within the encoded document, as well as to other external files. With this capability, archivists can link to related finding aids or to digital representations of archival documents that are described within the encoded finding aid. Thus, the EAD standard enables archivists to provide direct access to digital representations of materials such as correspondence, maps, audio-visual material, photographs and so much more.

EAD was originally based on SGML, however, with the release of version 1.0 in 1998, it became XML compliant. In 2002, the EAD 2002 version of the standard was released. This version incorporated changes needed to maintain compatibility with ISAD (G) and to address concerns that were identified when non-North American archivists, particularly German and French archivists, tested the applicability of EAD to their descriptive practices.

The EAD standard is jointly administered and maintained by the United States Library of Congress (LC) and the Society of American Archivists (SAA). The SAA is responsible primarily for the intellectual oversight of the standard, while the LC is responsible for the standard's physical maintenance.[40] Although the administration of the standard is based primarily in the United States, members of the EAD Working Group come from around the world, making EAD a truly international archival standard.

Describing Archives: a Content Standard

While EAD provides the structure in which archivists could create finding aids for distribution across electronic networks, until recently there was no data content standard that could adequately provide guidance for the creation of these descriptions. *APPM* was the established data content standard in the United States; however, this standard was developed to guide archivists in the creation of MARC cataloguing records for archival collections, not to provide guidance for creating multilevel descriptions. To remedy this situation, the Society of American Archivists (SAA) embarked on a joint Canada-US project to create a standard for archival description that would be complementary to the EAD standard. The project was named CUSTARD (Canada-U.S. Task Force on Archival Description) and its aim was to reconcile the *Rules for Archival Description* with *APPM* to create a standard that is both compatible with the

[39] "Beta Test Version of EAD Available," http://www.loc.gov/ead/eadcopy.html (Accessed January 10, 2006).

[40] Daniel V. Pitti, "Encoded Archival Description: An Introduction and Overview," *D-Lib Magazine*, 5, no. 11 (November 1999): http://www.dlib.org/dlib/november99/11pitti.html (Accessed on January 6, 2006).

ISAD(G) framework and applicable to all levels of description.

The project began in 2001, but by early 2003 it became apparent that the differences between the practices of the Canadian and American archivists would not result in a joint content standard. Consequently, Canadian archivists began work on the proposed RAD2 standards and the US archivists modified the CUSTARD draft standard and created *Describing Archives: A Content Standard* (DACS). Officially sanctioned by the SAA, the *DACS* standard reflects an archival approach to description and moves away from the bibliographic model that was represented in both *APPM* and *AACR2*.[41] Furthermore, the *DACS* standard is closely related to the international descriptive standards *ISAD(G)* and *ISAAR(CPF)*. All of the 26 elements of *ISAD(G)* and *ISAAR(CPF)* are incorporated into the *DACS* standard. Unlike APPM, which was devised specifically to create catalogue records, *DACS* can be used to create a variety of descriptive products ranging from catalogue records to full multi-level finding aids.[42] The archival descriptions that are created using the *DACS* standard can be encoded and exchanged using data structure standards such as EAD and MARC 21.[43]

Alternative Approaches

Until recently, the majority of archival metadata standards have been based upon a life cycle approach to records, which was developed in the United States within the National Archives and Records Administration. The life cycle approach is premised on the idea that "records usage drops rapidly soon after they are created and continues to diminish until the records are either inactive and destroyed or are judged to have continuing value and are transferred to the archives and made available to secondary users such as historical scholars, journalists and genealogists."[44] The lifecycle approach clearly demarcates the work of records managers and archivists. With this traditional model, records managers maintain records systematically, identify appropriate records retention periods and apply authorized disposition actions on those records. Once records are passed into archival custody, the archivist takes on a central role in preserving the physical and intellectual integrity of the records.

Although the life cycle model has gained wide acceptance within North America and some parts of Europe, this model has recently been challenged by a records continuum approach to information management. First developed in Australia, the records continuum approach is "a consistent and coherent regime of management processes from the time of the creation of records (and before creation, in the design of recordkeeping systems) through to the preservation and use of records as archives."[45] Therefore, within the records continuum approach description is regarded as a series of recordkeeping processes that capture and link metadata to a record throughout its entire lifespan. The primary aim of the records continuum approach is to "provide the intellectual controls that enable reliable, authentic, meaningful, and accessible records to be carried forward through time within and beyond organizational boundaries for as long as they are needed for the multiple purposes they serve."[46]

[41] Society of American Archivists, *Describing Archives: A Content Standard* (Chicago: Society of American Archivists, 2004), vii.
[42] Ibid.
[43] Ibid., vi.

[44] Anne Gilliland-Swetland, "Electronic Records Management" *Annual Review of Information Science and Technology*, 39 (2005): 226.
[45] AS 4390.1-1996 *Australian Standard: Records Management* (Homebush, 1996), Clause 4.22.
[46] Sue McKemmish, Glenda Acland, Nigel Ward and Barbara Reed, "Describing Records in Context in the Continuum: The Australian Recordkeeping Metadata Schema," *Archivaria* 48 (Fall 1999): 8.

Electronic Records and Recordkeeping Metadata Initiatives

In recent years, a number of initiatives within the research community have been devoted to the challenges of working with electronic records. Several of these projects have attempted to define criteria for recordkeeping metadata. In this section, we will discuss some of the most influential research projects related to electronic records and recordkeeping. In a later section, current projects within the electronic records community will be highlighted.

One of the most influential projects in the area of electronic records management is the 'Functional Requirements for Evidence in Electronic Recordkeeping' Project at the University of Pittsburgh. Led by David Bearman and Richard Cox, the research team worked to identify what metadata was needed for electronic records to serve as evidence. The project was based on the idea that it is warrant (i.e. the standards laws and best practices of a profession or country) that dictate the requirements for evidence.[47] The project team felt that in order to preserve the content, context and structure of documents, metadata should be created at the time that records are created.[48] With this focus in mind, the project team worked to identify a metadata element set that a computer could automatically produce.

Unlike archival descriptive standards, which focus on the description of aggregate groups of records, the University of Pittsburgh's Business Acceptable Communications (BAC) model was focused on providing metadata for individual records. Rather than basing the model upon the principle of 'respect des fonds', the project team felt that the context of creation could be captured by documenting the transactions and functions that created records.[49] By linking all of the records pertaining to a transaction, the research team believed that this would obviate the need for aggregate level descriptions. The BAC model aimed to create a self-described, encapsulated record in which metadata would be added throughout its life cycle.

Starting at approximately the same time as the Pittsburgh project was the University of British Columbia's Protection of the Integrity and Reliability of Electronic Records Project (UBC Project). This initiative worked to identify and define the requirements for creating, handling, and preserving reliable and authentic electronic records. The principles and concepts of diplomatics and archival science provided the theoretical basis for the project. One of the major outcomes of the UBC Project was the development of document profiles that identify the necessary components for complete, authentic and reliable records. These document profiles significantly influenced the development of the U.S. Department of Defense Design Criteria Standard for Electronic Records Management Software Applications (DOD 5015.2 STD[50]).[51] The UBC Project also set the foundation for the ongoing research of the InterPARES Project.

As a result of the interest in the findings of the UBC Project, the project members of the from the University of British Columbia teamed up with

[47] Duff, "Evaluating Metadata on a Metalevel," 291.
[48] Ibid.
[49] Ibid., 292.
[50] The *Design Criteria Standard for Electronic Records Management Software Applications* (DOD 5015.2 STD50) has been reissued in 2002. The standard "sets forth mandatory baseline functional requirements for Records Management Application (RMA) software used by the DoD Components in the implementation of their records management programs; defines required system interfaces and search criteria to be supported by the RMAs; and describes the minimum records management requirements that must be met, based on current National Archives and Records Administration (NARA) regulations."
[51] Gilliland-Swetland, "Electronic Records Management," 237.

scholars and professionals from Canada, United States, Australia, United Kingdom, The Netherlands, Italy, Sweden, Portugal, France, China and Hong Kong to form the InterPARES1 (International Research on Permanent Authentic Records in Electronic Systems) research group. The InterPARES1 project focused on "the preservation of the authenticity of electronic records that are no longer needed by the creating body to fulfill its own mandate, mission or purpose."[52] One of the major products of the InterPARES1 project was a Template for Analysis that identifies "all the known elements of an electronic record based on the principles and concepts of diplomatics and archival science."[53] The research group also defined a series of requirements for determining the authenticity of records.[54] These authenticity requirements were mapped against existing records management standards, specifically the ISO Records Management Standard, the DoD 5015.2 Records Management Standard, the MoReq specification (Model Requirements for the Management of Electronic Record). Although the authenticity requirements were not specifically labeled as archival or records management metadata, many of the requirements mirror elements contained in other archival or records management standards and specifications. Phase 2 of the InterPARES Project, which will be mentioned in greater detail in the next section of the paper, is furthering the work on identifying the requirements for the authenticity and reliability of records, both within government and the arts and science communities.[55]

In Australia, Sue McKemmish at Monash University led the Strategic Partnership with Industry – Research and Training Project (SPIRT) with the aim to develop a "recordkeeping metadata framework for managing and accessing information resources in networked environments over time for government, social and cultural purposes."[56] The main product of this research project was a framework for standardizing recordkeeping metadata. This framework is firmly grounded in post-custodial theory and is based on the records continuum. The Recordkeeping Metadata Schema (RKMS) is focussed on the relationships between four classes of entities: business, agents/people, records, and business recordkeeping – a sub-class of the business entity class. The framework is also concerned with "the external and internal mandates that are associated with business, people/agent, and records entities and govern the relationship between them."[57] The SPIRT Project has been very influential in other recordkeeping initiatives such as the National Archives of Australia's Recordkeeping Metadata Standards for Commonwealth Agencies, the ISO Records Management Principles, and it also serves as the foundation for the work being conducted by the Clever Recordkeeping Metadata Project.

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[52] InterPARES1 Project. "Project Summary," http://www.interpares.org/ip1/ip1_index.cfm (Accessed April 20, 2006).

53 InterPARES1 Project. "Documents," http://www.interpares.org/ip1/ip1_documents.cfm?cat=atf (Accessed April 20, 2006).

54 InterPARES Project, "Requirements for Assesing and Maintaining the Authenticity of Electronic Records," http://www.interpares.org/display_file.cfm?doc=ip1_authenticity_requirements.pdf (Accessed January 7, 2006).

[55] Gilliland-Swetland, "Electronic Records Management," 237.

[56] Adrian Cunningham, "Recent Developments in Standards for Archival Description and Metadata," http://www.archivists.org.au/cds/cunningham.html (Accessed January 7, 2006).

[57] Wendy Duff and Sue McKemmish, "Metadata and ISO 9000 Compliance," *Information Management Journal*, 34, no. 1 (January 2000): 10.

Archival Metadata in Action

Clever Recordkeeping Metadata Project (CRKM)

As a continuation of the work of the SPIRT Project, Monash University's Clever Recordkeeping Metadata Project (CRKM) is working to develop tools that will support the exchange of metadata between business information systems and records management systems, as well as between records management and archival control systems. The Clever Project involves a team of researchers and practitioners from Monash University and UCLA as well as The National Archives of Australia, the State Records Office of New South Wales, the Australia Society of Archivists' Descriptive Standards Committee and an advisory group of international experts. The focus of the project is to demonstrate that records professionals can move away from manually supplied metadata that resides in stand alone systems and toward "an integrated suite of business systems and processes supporting recordkeeping and archiving functions, environments in which metadata is created once and used many times."[58]

Using the Australian continuum model[59] as its conceptual framework, and working within the frame of reference of the ISO Records Management Metadata Principles,[60] the project is developing a proof of concept prototype of an "integrated system environment with tools that support metadata exchange" employing user-centered and rapid prototyping techniques. The National Archives of Australia is serving as the test-bed for the first phase of the project which will develop and evaluate a set of tools that will facilitate the exchange and translation of metadata from office and workflow systems to enable their re-use for resource discovery and archival control. The second phase of the project will use two real life test-bed sites. One site will involve a single organization and the other a single function or activity across many institutions. The project will also build a small metadata registry, based upon the metadata schema registry of InterPARES2, to test how the Australian Recordkeeping Metadata Standard for Commonwealth Agencies can be reused for resource discovery compliant with the Australian Government Locator Service Metadata Standard[61] and the Commonwealth Record Series.[62]

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[58] Joanne Evans, Sue McKemmish and Karuna Bhoday, "Create Once Use Many Times: The Clever Use of Metadata for Multiple Archival Purposes," 15th Annual International Congress on Archives, Vienna, Austria 23-29 August 2004. http://www.wien2004.ica.org/imagesUpload/pres_174_MCKEMMISH_Z-McK%2001E.pdf (Accessed January 7, 2006).

[59] For an explanation of the continuum model, *see* Frank Upward, "Structuring the Records Continuum Part One: Post-custodial Principles and Properties," Archives and Manuscripts 24, no. 2 (November 1996): 268-85 ; Frank Upward, "Structuring the Records Continuum Part Two: Structuration Theory and Recordkeeping," Archives and Manuscripts 25, no.1 (May 1997): 10-35.

[60] International Standards Organization. ISO 23081-1:2006. *Information and Documentation – Records Management Processes – Metadata for Records* – Part 1: Principles (Geneva: International Standards Organization, 2006).

[61] The Australian Government Locator Service (AGLS) Metadata is a set of 19 elements for the description of government information and services. Based on the Dublin Core it purpose is to improve the visibility, accessibility and interoperability of government information and services. *See* National Archives of Australia "AGLS Metadata Element Set" version 1.3 (2002) at: http://www.naa.gov.au/recordkeeping/gov_online/agls/metadata_element_set.html (Accessed January 7, 2006).

[62] National Archives of Australia control system, The Commonwealth Record Series (CRS) System, helps manage, locate, retrieve, describe and make accessible the records under its control. The CRS contains four primary entities: organisations; agencies and persons; series; and items. "The Archives gathers information about each of these elements, so that by looking at the information about an agency you can also find which organisation controls it, details of its predecessors and successors, the series it produced, and the individual items in those series. Information can also be traced in the other direction – i.e. from the item to the series to the agency." National Archives of Australia "Factsheet 6: Commonwealth Records

ISO Records Management Metadata

As noted by Michael Day in the metadata chapter in this manual, the ISO Archives and Records Management Sub-Committee is developing a three part metadata standard that builds on the Records Management Standard, ISO 15489. The standard aims to guide the understanding of metadata requirements and assist in the implementation and use of records management metadata in general. Part 1 Principles[63], published in 2006, sets out a framework for the creation, management and use of records management metadata. Part 2 will deal more directly with implementation issues and Part 3 with the assessment of metadata elements against the principles in ISO 23081 Part 1.

The Principles take a very broad view of the purpose of records management metadata defining it as, "data describing the context, content and structure of records and their management through time". It does not delineate a set of metadata elements[64]; however, it identifies the type of information needed to document important characteristics and activities of records, the business rules or policies and mandates that relate to records, agents that create or use records, business activities and processes, and records management processes. Furthermore, it differentiates between the information related to each of these entities at the point of records capture and the layers of metadata that relate to the management of records as well as their use in various business processes. The Principles state that metadata (and records) can be reused for numerous purposes and require interoperability between different systems. It also suggests that metadata created by records creators that reside in business systems can also be used for records management as well as for archival purposes.

The Principles also provide guidance on the management of metadata outlining the roles and responsibilities of various agents to records management metadata as well as the relation of this metadata to other types of metadata, such as rights management, preservation, resource discovery and metadata for e-government. The importance of metadata to the authenticity and integrity of records is highlighted in the standard; it points out that metadata must be maintained through time and any changes to them must be governed by rules and procedures.

The standard is closely linked to the ISO records management standard, and although it was only published as a technical specification in 2004 (it is not yet a full standard), it is already being used and cited by records management projects and initiatives.[65]

InterPARES2

InterPARES2, an international collaborative research project building on the results of InterPARES1, is investigating issues related to the authenticity, reliability and accuracy of records "produced in complex digital environments in the course of artistic, scientific and e-government activities"[66]. In support of this work the Description Cross Domain team, chaired by Anne Gilliland-Swetland and Sue McKemmish until 2005, is focusing on issues related to the role of metadata schemas, and standards in the creation,

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Series (SCS) System," http://www.naa.gov.au/Publications/fact_sheets/FS06.html (Accessed January 6, 2007)

[63] First published as a Technical Specification (ISO/TS 23081-1:2004 *Information and Documentation – Records Management Processes – Metadata for Records – Part 1: Principles*), it is now a standard.

[64] Part 2, of the standard, however, plans to indicate generic metadata types.

[65] Joanne Evans & Lori Lindberg, "Describing and analyzing the recordkeeping capabilities of metadata sets." In Z. Deming (Ed.), *Proceedings of the International Conference on Dublin Core and Metadata Application* (DC-2004). (pp. 75-80). Shanghai, China, 11-14 October.

[66] InterPARES Project Homepage, http://www.interpares.org/ (Accessed January 7, 2006).

maintenance, control, appraisal and preservation in traditional, digital and web environments.[67]

The aim of this work is to contribute to the evaluation and scholarly discussion of metadata schemas and make recommendations related to existing schemas. It also aims to develop an intellectual framework for the "extension and development of metadata schemas, descriptive standards and metadata and tools for the records under examination."[68] To date the team has developed a database for literary warrant (i.e., the mandate from law, professional best practices, professional literature and other social sources) that requires the creation and continued maintenance of metadata that supports the accuracy, reliability, authenticity and preservation of records, a standardized XML metadata schema for registering, describing and evaluating recordkeeping-related metadata schema and a prototype for a metadata schema registry. The schema groups the information about the schemas into the following categories: registration, identification, description, rights, provenance, documentation, relationships, accessibility, and administration. The team is also evaluating the existing metadata sets against the requirements delineated in the ISO records management metadata standard, the InterPARES1 Benchmark and Baseline Requirements, and the Australian Recordkeeping Metadata Schema (RKMS) to identify what metadata is currently being captured and what elements are still missing from the existing frameworks.

Victoria Electronic Records Strategy

With the move toward e-government and the concomitant growth in the number of important digital records that are being created, a number of national and state archives have developed metadata schemas for use by their government agencies and departments. For example, the National Archives of Great Britain, National Archives of Australia, and the Minnesota State Historical Society are just a few of the archives that have promulgated well developed schemas for records. The Public Record Office of Victoria has also managed a comprehensive project that aims to ensure records maintain the metadata needed for their long term preservation. The Victoria Electronic Records Strategy (VERS) began in 1995 with a report "Keeping Electronic Records Forever" that addressed the issues related to the long term preservation of electronic records. The report was followed by a project in 1998 that developed a pilot system for business workflow (ministerial correspondence) that captured and maintained records using the VERS Encapsulated Object (VEO) format.[69] Within the VEO specification, the types of metadata that must be captured with the document data include: encoding metadata, document metadata, record metadata, object metadata and the VEO description. The demonstrator system proved that it was both possible and practical to capture records from existing business systems with the metadata needed to maintain the records over time. The demonstrator system included a record capture component that simulated the desktop environment of a government agency, a repository that managed the archives records and a records discovery component that allowed users to access the records.

The VERS format was promulgated as a standard (PRO 99/007) in 2000 with version 2 of the standard being released in 2002. During this time,

[67] Joanne Evans & Lori Lindberg, "Describing and analyzing the recordkeeping capabilities of metadata sets."

[68] Description Cross-domain Research Team, "Research Design Statement," http://www.interpares.org/display_file.cfm?doc=ip2_policy_research_design(200404).pdf (Accessed January 7, 2006).

[69] "VERS Story Background," http://www.prov.vic.gov.au/vers/vers/background.html (Accessed January 7, 2006).

the Department of Infrastructure obtained $4.8 million to implement the first VERS compliant recordkeeping system. This project developed a system that captured records from both the desktop and applications and stored them in the VEO format in a recordkeeping system. In 2002, the Victoria Government established the VERS Centre of Excellence to oversee the implementation of VERS throughout the government. The Centre provides advice, guidance and resources to departments, conducts research on the long-term preservation of electronic records, and oversees the digital archives at the Public Record Office. VERS demonstrates that developing a metadata standard for government records is only a small part of a metadata project. To ensure compliance to the standard, government agencies require software to automate the process, a sophisticated infrastructure to support its implementation, and a digital repository that maintains and provides access to the archival records.

Encoded Archival Context

While much of the current research is taking place in the area of recordkeeping models and schemas, there is also significant work taking place to extend the functionality of the EAD data structure standard. Encoded Archival Context (EAC) is an ongoing initiative in the international archival community to create and implement an XML standard for encoding descriptions of agents (i.e. people, families and organizations) that have important relationships to records. While the EAD standard is used to encode descriptions of archival finding aids, EAC is intended to be a complementary standard to encode the descriptions of agents. By providing descriptions of the individuals, families and organizations that create, control, own, use or are the subjects of records, archivists will be better able to facilitate access to archival records. The EAC specification also opens up the possibility for archives to share and exchange contextual information related to records creators.

The EAC Project began in March 2001 when a group of archivists and information scientists met in Toronto to discuss and lay down the foundations of a prototype standard for encoding descriptions and contextual information related to people, families and corporate bodies. In this meeting, the working group came up with the "Toronto Tenets: Principles and Criteria for a Model for Archival Context Information" which laid down the principles governing the proposed encoding standard, discussed its structure and content, and outlined various technical issues and relationships to existing standards. It was also in this meeting that the proposed encoding standard was named "Encoded Archival Context". In the statement of principles, the scope of the standard was outlined: "Archival context information consists of information describing the circumstances under which records … have been created and used. This context includes the identification and characteristics of the persons, organizations, and families who have been the creators, users, or subjects of records, as well as the relationship amongst them".[70]

In August 2004, the Ad Hoc Working Group on Encoded Archival Context released a Beta version of the EAC XML DTDs, Schemas, Tag Library, and other documentation for trial and experimentation within the archival community. Intended to be compatible with the *International Standard Archival Authority Record for Corporate Bodies, Persons and Families* (ISAAR (CPF)), the Encoded Archival Context specification will identify record agents; record their names and designations; describe their characteristics, functions and activities, the places and dates in which they were active; and record

[70] "Technology Reports: Encoded Archival Context Initiative," http://xml.coverpages.org/eac.html (Accessed January 7, 2006).

other information that aids in the interpretation and understanding of records.

In Per-Gunnar Ottoson's account of recent developments with EAC, he outlined the structure of an EAC record as follows:

- The header of the EAC record: elements for maintenance history, and declarations of languages, rules, and source.
- The identity area: elements necessary for identifying the person, corporate body or family, such as names and additions to names.
- EAC relations: elements for linking and explaining the relations between EAC records.
- Resources relations: links to resources, such as the archival descriptions, catalogue records, or web pages.
- Links to controlled vocabulary and description of the functions or activities of the person or corporate body.
- A systematic description of the entity and its environment.
- A biography or administrative history in the form of an essay or a chronological list.
- The rescue for all legacy data not fitting into the EAC structure: other context description.[71]

As evidenced by the structure of an EAC record, the information captured is not metadata that describes information resources, rather it consists of information related to the entities and the circumstances under which the records have been created and used.[72]

The EAC specification can be viewed as an extension to EAD because it offers more flexibility in defining the relationships between records and their creators. As Daniel Pitti notes, the relationship between record, records creators, activities and functions is often not simple: "Creators are related to other creators. Records are related to other records. Functions and activities are related to other functions and activities. And each of these is interrelated with the others."[73] Since EAC enables information about agents to be stored in separate records, and facilitates the linking of EAC records to other EAC records and to numerous resource descriptions, the proposed schema supports a system that recognizes and documents the complex relationships between records, agents and functions. In 2006, the Society of American Archivists will establish a working group to develop further the EAC schema.

Although the development of standards for archival context descriptions is still in its infancy, projects are beginning to emerge in this area. In Scotland, the Glasgow University Archive Services is exploring the use of archival context standards for functions in the higher education sector. The Gateway to Archives of Scottish Higher Education (GASHE) project is centred on the premise that intellectual arrangement, based on the traditional and static interpretations of the principles of provenance and original order, cannot adequately preserve the context of complex groups of records.[74] To remedy this

[71] Per-Gunnar Ottoson, "Encoded Archival Context (EAC) - Recent Developments," http://www.crxnet.com/leaf/news_online.html#eac2 (Accessed January 8, 2006).

[72] "Toronto Tenets: Principles and Criteria for a Model for Archival Context Information," http://www.library.yale.edu/eac/torontotenets.htm (Accessed January 7, 2006).

[73] Daniel V. Pitti, "Creator Description: Encoded Archival Context," *Cataloging & Classification Quarterly* 38, no.3/4 (2004): 207.

[74] Victoria Peters, "Developing Archival Context Standards for Functions in the Higher Education Sector," *Journal of the Society of Archivists* 26 (April 2005): pp.75-85.

problem, the GASHE team is working to develop a functional approach to archival description. Rather than produce single, static hierarchical descriptions, the project team is creating contextual records related to creators, functions and activities. By recording this contextual information separately from the descriptions of the actual records, the project team is working to create a more dynamic descriptive system, better tailored for complex administrative structures.

Future Developments

Despite the effort devoted to the development of archival metadata standards and records management metadata schemas and specifications, there are still areas where work remains to be done. Four possible areas of research include:

- implementation of new recordkeeping schema
- automated metadata extraction
- user evaluation and testing
- applying records management models to non-bureaucratic environments

Implementation of New Recordkeeping Schema

There have been several initiatives that have developed recordkeeping models and schema, but very few of these models have been implemented and tested iteratively in a range of recordkeeping environments. Margaret Hedstrom has noted: "What we lack is an evaluation of the usefulness of these findings from the perspective of organizations that are responsible in some way for preserving and providing access to electronic records. We need assessments from the administrators of archival and records management programs about the feasibility of putting the proposed policies, and models into practice. We need reactions from people outside the archival community especially where related research and projects are being conducted."[75] While Hedstrom was speaking more generally about electronic records policies and models, this statement could be equally applied to the area of recordkeeping models and schema.

While practical implementations of recent recordkeeping models are few, there are some research studies that are working in that direction. For example, at Indiana University, Philip Bantin led the Indiana University Electronic Records Project to "develop a strategy and methodology for incorporating recordkeeping requirements into Indiana University's transaction processing and information systems."[76] One of the project's goals was to implement the functional requirements laid out in the University of Pittsburgh project and "make the model easier to use and more cost effective without sacrificing in any way the integrity of the model."[77] The Clever Recordkeeping Metadata Project is also an implementation project seeking to test the Australian Recordkeeping Metadata Schema (RKMS) and demonstrate "how standards-compliant metadata can be created once in particular application environments, then used many times to meet a range of business purposes."[78] Also, as mentioned in the previous

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[75] Margaret Hedstrom as cited in Peter Hirtle, "Archival Authenticity in a Digital Age." In *Authenticity in a Digital Environment* (pp. 8-23) (Washington, DC: Council on Library and Information Resources, 2000), 19.

[76] Philip Bantin, "Strategies for Managing Electronic Records: Lessons Learned from the Indiana University Electronic Records Project," http://www.indiana.edu/~libarch/ER/rmarticle2.pdf (Accessed January 7, 2006).

[77] Philip Bantin, "Functional Requirements for Recordkeeping Systems – Evolution of the IU Functional Requirements," http://www.indiana.edu/~libarch/ER/nhprcfinalfuncreq.doc (Accessed January 7, 2006).

[78] Records Continuum Research Group, "Create Once, Use Many Times - The Clever Use of Metadata in eGovernment and eBusiness Processes in Networked Environments - Overview of the Project," http://www.sims.monash.edu.au/research/rcrg/research/crm/ (Accessed January 7, 2006).

section, Part 2 of the ISO Records Management Standard will deal directly with implementation issues. While all of these projects are working on practical applications of recordkeeping schemas and models, more real life implementations need to be done to test their feasibility.

Automated Metadata Extraction

Many of the recordkeeping models, such as the University of Pittsburgh's BAC model and SPIRT's RKMS framework, are based on the premise that metadata can be automatically extracted from recordkeeping systems. It is known that many business systems already capture large amounts of data that meet the requirements of the recordkeeping metadata standards. The information contained in these systems often relates not only to the records, but also to the business processes that create them. These business systems can also be used to identify and describe people, activities and functions. In addition to business systems, corporate recordkeeping systems also contain metadata relating to business functions, mandates (i.e. standards, codes of practice, legislation, and regulations), people, and information pertaining to the locations and uses of records. While all of this metadata is available, what is not yet known is how to automatically harvest this data from these systems. Work in this area must be done with other groups, such as the digital preservation community, as they are also working in this area.

New initiatives, such as the proposed Encoded Archival Context (EAC) standard are based on the notion that contextual information relating to records creators can be extracted from a variety of websites, directories of services, and biographical dictionaries, and incorporated into EAC records. Questions remain as to exactly how these records will be populated. Will the creation of EAC records be a completely manual process, or can we devise some way of automating this process using metadata crosswalks? Crosswalks between various metadata standards abound, but are these crosswalks reliable? It is only through implementation of projects, such as the EAC and Clever projects that archivists will understand the feasibility of automated procedures for harvesting archival metadata.

Developing a Better Understanding of Archives Users

Another area of future research is in developing a better understanding of the needs of the users of archival metadata. With all of the innovative developments in the area of electronic records metadata and digital archiving and preservation, little attention has been paid to the function of retrieving and disseminating digital objects to its users, and no formal definition of the interaction/interface between the archive and its user communities has been offered to date.

Archives acquire and hold materials that are created by individuals and organizations in particular contexts and that are re-used by individuals and organizations in different contexts. However, to effectively re-use materials, one must have access to the material, as well as access to information about the material. Different users will require access to different types of information to access and understand the same object, and the same user may require different types of information to access and understand different types of material. Many archival standards and digital preservation models, such as the OAIS model, define the types of metadata needed to preserve archival material, but the types of metadata needed to access and understand material from the archives has not yet been delineated. While the metadata needed for access will undoubtedly build upon recordkeeping metadata, more work needs to be done to identify the metadata requirements of users.

Digital material holds great promise to achieve greater social inclusion and increase the impact of

archives on society, but this promise will only be realized if archives are able to customize their services and enrich their content delivery to various user communities. Archival material in digital form is reaching a wider and more diverse user population, but without customization, the investment in the preservation of digital content currently being made by archives[79] will not reap the potential benefits if the digital content objects do not get fully used. Customization requires an understanding of the various user populations and little is known about the types of material archives users require and the types of information they need to understand the material. However, to ensure diversified access, we need a far greater understanding of the various user communities who will access and utilize digital objects from archives. Although research in this area is still in its infancy, AX-SNet (Archival eXcellence in Information Seeking Studies Network), an international collaboration of researchers from the University of Toronto, the University of North Carolina and the University of Michigan, is working towards answering these questions related to identifying user requirements and improving access to primary archival resources.

Applying Records Management Models to Non-bureaucratic Environments

Additional research is also needed to assess whether any of the work done in the area of electronic records management metadata can be transferred to non-bureaucratic environments. So far, the development of electronic records management schema has come out of the government records community, and all of these models have an emphasis on bureaucratic recordkeeping and legal evidence.[80] What appears to be lacking is work that will assist in safeguarding the personal records that are now increasingly being produced in electronic form. Electronic records such as digital photographs, electronic mail, word processed documents and digital creative works are all becoming commonplace within personal record collections. Questions need to be answered as to whether recordkeeping metadata models can be applied to these uncontrolled and idiosyncratic digital records creation environments. While the InterPARES2 is currently researching the preservation of authentic and reliable records within the creative and performing arts communities, more investigation is needed in this area.

Conclusion

Standards for archival and records management metadata have developed along parallel but separate paths. Within the records management community, it was national archives and research projects that identified the elements required to describe current records. Conversely, archival descriptive standards were developed by professional associations and individuals within the archives community. The archival metadata standards developed in North America, notably *RAD* and *APPM*, were based on library standards such as *AACR2*. However, since the publication of *ISAD(G)*, archival descriptive standards have tended to move away from the bibliographic model of description and have aimed for compliance with *ISAD(G)*'s multilevel framework.

As the new archival metadata standards are shifting away from the bibliographic model, they are becoming closer aligned with records management metadata sets. This convergence is largely due to the proliferation of electronic records within both organizational and personal contexts. With electronic records becoming a mainstream form of communication, both

[79] The authors recognize that work in the area of digital preservation is still in its infancy. Interestingly, support for digital preservation will likely increase if these initiatives can be tied to improved access.

[80] Gilliland-Swetland, "Electronic Records Management," 247.

archivists and records managers realize that identification and intervention early in the record's life cycle is critical if electronic records are to survive for the long term. Adrian Cunningham rightly points out that "unless electronic records are created and managed properly in well-designed systems that can guarantee the authenticity, reliability, durability, usability and accessibility of those records, archivists are not going to have many records that they can preserve for long-term use or that will be worth preserving for long-term use." As paper records are rapidly shifting to electronic form, archivists must also shift their mindset to accommodate the processes of records creation and recordkeeping system design.

The new recordkeeping metadata standards are largely based on the Australian records tradition and go well beyond describing records. These innovative metadata models also describe the business rules, policies and mandates that relate to records, agents that create or use records, business activities and processes, and records management processes. The new metadata models, in conjunction with the development of electronic systems, will provide archivists and records managers with the opportunity to create and capture metadata at the beginning of the record's life cycle and later re-use this metadata in archival control systems.

These new electronic systems will allow archivists to move away from manually generating metadata and move towards extracting metadata from the electronic systems. The electronically produced recordkeeping metadata will not fully replace archival description; both types of metadata will still be required. Archivists will still play a role in description work, but will be able to concentrate their efforts on augmenting the already electronically-produced metadata, rather than recreating it. Further, this trend does not account for personal records, which still require the full attention of archivists. With robust and comprehensive recordkeeping systems, archivists will be able to produce metadata more cost effectively. Perhaps in the future, the role of the archivist will be to validate automatically generated metadata and further supplement it for users. As Cunningham notes, we need a set of "interlocking metadata standards for recordkeeping and archival descriptions" in order for this vision to become a reality.

Archival Metadata Terminology and Acronyms

The following terms and acronyms have been used in the chapter on Archival Metadata. Unless noted otherwise, all terms have been taken from the SAA's *Glossary of Archival and Records Terminology* (http://www.archivists.org/glossary/index.asp)

AACR2 – Anglo American Cataloging Rules. A standard for creating catalogs of collections, especially library collections, including the consistent description of those materials and the formation and assignment of access points under which those descriptions are arranged.

APPM – Archives, Personal Papers and Manuscripts. A standard for developing a catalog of archival materials, principally at the collection level, with consistent descriptions and access points that can be integrated into bibliographic catalogs constructed using *Anglo-American Cataloguing Rules*.

Archival Description – The creation of an accurate representation of a unit of description and its component parts, if any, by capturing, analyzing, organizing and recording information that serves to identify, manage, locate and explain archival materials and the context and systems which produced it. This term also described the products of the process.[81]

BAC – Business Acceptable Communications. This model envisions records as dynamic, self-managing metadata encapsulated objects. The metadata is specified in layers, namely the handle (or identification), structure, content, context, terms and conditions, and use layers. The context metadata is most relevant to the immediate transactional business context of the record, and does not provide for description of the broader contexts in which records are created and used.[82]

CRKM – Clever Recordkeeping Metadata Project. A collaborative project between Monash University, UCLA as well as The National Archives of Australia, the State Records Office of New South Wales, the Australia Society of Archivists' Descriptive Standards Committee and an advisory group of international experts. This research project will develop a proof of concept prototype to demonstrate how standards-compliant metadata can be created once in particular application environments, then used many times to meet a range of business purposes. The prototype will be implemented in a test-bed site to provide a model for best practice.[83]

DACS – Describing Archives: A Content Standard. A standard for creating access tools for all forms of archival materials, including their archival creators and the forms of creator names.

EAC – Encoded Archival Context. A standard to mark up (encode) information relating to the circumstances of record creation and use, including the identification, characteristics, and interrelationships of the organizations, persons, and families who created, used, or were the subject of the records.

EAD – Encoded Archival Description. A standard used to mark up (encode) finding aids that reflects the hierarchical nature of archival collections and that provides a structure for describing the whole of a collection, as well as its components.

Finding Aid – 1. A tool that facilitates discovery of information within a collection of records. 2. A

[81] (ISAD(G))

[82] "SPIRT Recordkeeping Metadata Project – Glossary," http://www.sims.monash.edu.au/research/rcrg/research/spirt/glossary.html

[83] "Clever Recordkeeping Metadata Project – Overview of the Project," http://www.sims.monash.edu.au/research/rcrg/research/crm/

description of records that gives the repository physical and intellectual control over the materials and that assists users to gain access to and understand the materials.

Fonds – The whole of the records, regardless of form or medium, organically created and/or accumulated and used by a particular person, family, or corporate body in the course of that creator's activities and functions.[84]

InterPARES – International Research on Permanent Authentic Records in Electronic Systems. A research project with members from several countries that is investigating the problems of the authenticity, reliability, and accuracy of electronic records throughout their life cycle.

Inventory – 1. A list of things. 2. DESCRIPTION · A finding aid that includes, at a minimum, a list of the series in a collection. 3. RECORDS MANAGEMENT · The process of surveying the records in an office, typically at the series level.

ISAAR(CPF) – International Standard For Archival Authority Records for Corporate Bodies, Persons and Families. A standard published by the International Council on Archives to establish controls for the creation and use of access points in archival descriptions and to identify the kinds of information that should used to describe a corporate body, person, or family.

ISAD(G) – General International Standard Archival Description. A standard published by the International Council on Archives that establishes general rules for the description of archival materials, regardless of format, to promote consistent and sufficient descriptions, and to facilitate exchange and integration of those descriptions.

[84] Ibid.

Level of Description – The position of the unit of description in the hierarchy of the fonds.[85]

Life cycle – The distinct phases of a record's existence, from creation to final disposition.

MAD – Manual of Archival Description. A British guideline for describing archival collections written by Michael Cook and Margaret Proctor.

MARC AMC – MARC Format for Archival Manuscripts Control. A standard data communications format that specifies a data structure for description of records (archives and manuscripts).

Metadata: generically defined as "structured data about data". Descriptive metadata is simply a new term for the type of information that has existed in records and archives systems throughout time. Traditional archival finding aids, index cards, file covers, file registers, the headers and footers on paper documents, and all of their computerised counterparts are rich in metadata that helps recordkeepers to identify, describe, authenticate, manage and provide access to records.[86]

Metadata Schema – A semantic and structural definition of the metadata used to describe recordkeeping entities. A schema describes the names of metadata elements, how they are structured, their meaning etc. The metadata community also refers to a metadata schema as a metadata set or specification.[87]

Multilevel Description - A finding aid or other access tool that consists of separate, interrelated descriptions of the whole and its parts, reflecting the hierarchy of the materials being described.

[85] Ibid.
[86] "SPIRT Recordkeeping Metadata Project – Glossary," http://www.sims.monash.edu.au/research/rcrg/research/spirt/glossary.html
[87] Ibid.

Original Order - The organization and sequence of records established by the creator of the records.

Pittsburgh Project – University of Pittsburgh Electronic Records Project. A research project that identified requirements for preserving evidence in electronic form. The requirements, published as *Functional Requirements for Evidence in Recordkeeping* and frequently referred to as the Pittsburgh Project, were based on law, customs, standards and professional best practices accepted by society and codified in the literature of the legal, auditing, records management, information technology, management, and medical professions. Because they focus on the preservation of evidence, rather than application requirements for archival or recordkeeping systems, they can be applied to manual, electronic, or hybrid systems.

Provenance – The relationship between the records and the organizations or individuals that created, accumulated and /or maintained and used them in the conduct of personal or corporate activity.

Record – Recoded information in any form or medium, created or received and maintained, by an organization or person in the transaction of business or the conduct of affairs.[88]

Recordkeeping metadata – Standardised information that identifies, authenticates, describes, manages and makes accessible through time and space documents created in the context of social and business activity. Traditionally some of this metadata has been captured in records systems and some in archival control systems and finding aids. And some of it has been present in the physical form, ordering, juxtaposition and location of records. Increasingly recordkeeping metadata is also captured in workflow, document management and knowledge management systems, and it is essential to make what was before evident in the physicality of the record explicit in metadata.[89]

RKMS – Australian Recordkeeping Metadata Schema. The Australian Recordkeeping Metadata Schema (RKMS) is the major deliverable of the SPIRT Project. "The project's conceptual frame of reference was the Records Continuum Model and the Australian Series System. The RKMS uses recordkeeping understandings to make explicit connections between business, defined broadly to encompass all social and organizational activity, the people or agents who do business, and the records which are by-products of that business."[90]

Records Continuum - A model of archival science that emphasizes overlapping characteristics of recordkeeping, evidence, transaction, and the identity of the creator.

Records management metadata – Records management metadata can be used to identify, authenticate and contextualize records and the people, processes and systems that create, manage, maintain and use them and the policies that govern them.

[88] (ISAD(G))

[89] "SPIRT Recordkeeping Metadata Project – Glossary," http://www.sims.monash.edu.au/research/rcrg/research/spirt/glossary.html

[90] Sue McKemmish, Glenda Acland, Nigel Ward and Barbara Reed, "Describing Records in Context in the Continuum: The Australian Recordkeeping Metadata Schema."

Respect des Fonds – The principle that the records of a person, family or corporate body must be kept together in their original order, if it exists or has been maintained, and not be mixed or combined with the records of another individual or corporate body.[91]

RAD – Rules for Archival Description. A standard for the description of archival fonds.

SGML – Standard Generalized Markup Language. An international standard (ISO 8879) metalanguage used to define sets of tags to identify the relationship between document content and structure for use by information processing applications.

UBC Project – Preservation of the Integrity of Electronic Records. A research project at the University of British Columbia designed to identify and define the requirements for creating, handling, and preserving reliable and authentic electronic records.

Unit of Description – A document or set of documents in any physical form, treated as an entity, and as such, forming the basis of a single description.[92]

VERS – Victoria Electronic Records Strategy. VERS is a framework of standards, guidance, training, consultancy and implementation projects, which is centred around the goal of reliably and authentically archiving electronic records. VERS has been developed by Public Record Office Victoria (PROV) to provide leadership and direction in the management of digital records.[93]

XML – Extensible Markup Language. A standard to promote sharing information over the Internet by specifying ways to describe the information's semantic structure and to validate that the structure is well formed.

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[91] Bureau of Canadian Archivists, Planning Committee on Descriptive Standards, *Rules for Archival Description*, (Ottawa: Bureau of Canadian Archivists, 1990), Glossary, D-6

[92] (ISAD(G))

[93] "VERS Story – Welcome," http://www.prov.vic.gov.au/vers/vers/

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