Describing Digital: The Design and Creation of a Born-Digital Archival Description Standard at the University of California Libraries

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ABSTRACT

This case study outlines the process of creating a set of standards to guide description of born-digital archival collections materials in an archival context across the University of California (UC) system. The authors outline the need for such a standard, including the research methodology that helped establish this need, and the procedures by which these new guidelines were created, refined, and accepted across the UC. The paper goes into detail about the processes, considerations, and discussions that went into drafting rules for each descriptive element included in the standards. The authors argue that much of the specific guidance for describing born-digital materials that is present in these new standards does not exist elsewhere, and that existing archival description standards could benefit from consideration or incorporation of these new descriptive rules. This is identified as an area for future work.

Introduction

Finding aids help researchers determine whether information within an archival collection is relevant to their research and readily accessible. Beginning in the 1990s, a series of content-neutral national and international standards were developed to formalize and guide archival description worldwide.[1] Although these rules were

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1. The International Council on Archives formally adopted the first editions of ISAD(G): General International Standard Archival Description in 1994 and the International Standard Archival Authority Record for Corporate Bodies, Persons and Families (ISAAR[CPF]) in 1996. Describing Archives: A Content Standard (DACS) is the U.S. implementation of those standards. It was first adopted by the Council of the Society of American Archivists in 2004; the Second Edition was officially adopted in 2013.

intended to apply to all types of material, digital archivists employed within the University of California[2] system (UC hereafter) found that, in practice, it was not always possible or clear how to apply them to certain kinds of archival content. For born-digital material, none of the available standards adequately addressed the various processing and description practices as they had emerged at participating UCs.[3]

The lack of guidance in this area has resulted in widely-varying practices for describing born-digital material across campuses: different descriptive elements were used to express similar information; disparate units of measure were used to indicate size and extent; wording was frequently vague or misleading; and crucial processing information was routinely excluded from finding aids altogether. The increasing presence of born-digital material in collections coupled with the proliferation of finding aids that were failing to consistently express the status, quality, quantity, and accessibility of digital material created an acute need within the UC system to standardize the description of born-digital archival content.

To meet this need, digital archivists from UC Los Angeles (UCLA), UC San Diego, UC San Francisco, and UC Berkeley worked together to develop a common set of guidelines for describing born-digital archival material that could be employed systemwide. Eight months of intensive research and collaborative decision making produced version 1.0 of the UC Guidelines for Born-Digital Archival Description (UC Guidelines hereafter). In addition to establishing descriptive norms and a required minimum baseline for archival description of born-digital material in the UC system, the guidelines have been instrumental in promoting consistency and in improving the overall clarity and usefulness of finding aids across campuses.

In this article we provide the institutional context from which this systemwide standard was born and detail the collaborative decision-making process through which our guidelines came into being, with a particular focus on the research and rigorous discussion that produced these recommendations. In addition to outlining the considerations that shaped the descriptive elements addressed in the UC Guidelines, this article also seeks to highlight the field-wide need for updated standards that mirror real-world digital processing practices, and suggests opportunities for future research and work in this area.

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2. For those unfamiliar with the institution, the University of California has 10 campuses across the state of California which serve around 240,000 students and their wider communities. Each campus has at least one library and archival repository, and some have more than one. Cross campus communication and coordination among the various repositories is common, yet local practice is still the predominating guide for each campus.

3. Although standards and data dictionaries exist for describing and generating metadata about digital objects on an item and event level, there are no guidelines that provide adequate guidance about describing born-digital materials in an archival context – i.e., the aggregated hierarchical description in a finding aid.

Project Origins

The initial need for these guidelines arose from the frequent discussions among the four individuals appointed as Digital Archivists in the UC system in 2016 about how to approach description for born-digital material. Our need for regular consultation stemmed from the scant documentation at our respective institutions about describing born-digital material—which was in turn symptomatic of a field-wide lack of coherence and agreement in this area. We found that the dearth of internal policies and procedures for born-digital archival description meant that archivists had to make ad-hoc decisions on a collection-by-collection basis. This yielded finding aids that differed dramatically in their basic approach to this task. Not only did "reinventing the wheel" diminish the quality and consistency of the finding aids being produced within the UC system, it was also inefficient.

As we consulted one another for advice about different aspects of archival description, we began to realize that the frequency of our conversations alone pointed to the need for guidelines that would systematically address the various facets of born-digital description across the UC system. We shared the conviction that such a resource would harmonize and align disparate descriptive practices and ultimately improve the overall quality of the finding aids we produced throughout the UC system.

UC Common Knowledge Groups

Fortunately, there was an existing infrastructure within the UC system that was designed to facilitate this kind of work: the UC Born Digital Content Common Knowledge Group (BDC CKG). The BDC CKG is one of several CKGs in the UC system, which are groups intended to "foster innovation and continuous improvement by providing a venue for staff across campuses and from various levels to exchange ideas and collaborate on systemwide initiatives."[4] The BDC CKG was charged with, among various other possible projects, "develop[ing] and explor[ing] guidelines, best practices, or standards… (for) description and metadata" of born-digital archival collections and materials.[5] As members of this group, we recognized an opportunity to create a set of guidelines for born-digital archival description. This would enable us to work quickly to research and draft standards, and turn to the larger group for support and feedback in later stages of the project. Additionally, receiving input from other BDC CKG members would help our resulting documentation and guidelines, once complete, to become more widely disseminated throughout the UC system.

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4. "Common Knowledge Groups" UC Libraries, last modified March 21, 2018, https://libraries.universityofcalifornia.edu/ckg (accessed April 2, 2018).

5. Born Digital Content Common Knowledge Group, "Born Digital Content Common Knowledge Group Charter," November 4, 2013, https://libraries.universityofcalifornia.edu/groups/files/ckg/docs/BornDig_CKG_Charter.pdf (accessed April 2, 2018).

Such a project was not entirely without precedent. The Council of University Librarians had previously requested the creation of the "Guidelines for Efficient Archival Processing", which subsequently fell under the care of the Heads of Special Collections (HOSC) CKG. This document is intended to guide processing practices across the UC system,[6] and has done an admirable job of defining goals and processing priorities among UC archival repositories.

We aimed to build on the legacy of this first UC-wide standard by modeling our work on its successful CKG-to-publishing workflow. In addition, we hoped to create a flexible set of guidelines that could respond to shifts in practice and archival theory—a necessity in a field that is constantly evolving. Our goal was to cement these Born-Digital Archival Description Guidelines into UC practice by acquiring system-wide buy-in by soliciting feedback from a variety of UC stakeholders and by obtaining approval from the HOSC CKG. With the support of the BDC CKG, the four UC Digital Archivists began meeting as an independent group to research, draft, and propose a set of guidelines for the description of born-digital materials in an archival context.

Resources Consulted

We began the research phase of this project by comparing finding aids from a variety of different institutions that described born-digital archival materials to some extent (pun intended). With the help of graduate students in the Center for Primary Research and Training (CFPRT)[7] at UCLA—Tori Maches, Scott Reed, and Patricia Ciccone—we collected and studied 51 finding aids from 36 different institutions worldwide. Our review of these finding aids found wildly varying descriptive practices in every area of description ranging from the complex, such as the level of detail used in describing processing activities, to what seemed like more straightforward choices, like the units used to describe digital Extent.[8] The wide array of practices we observed underscored some of the challenges inherent to born-digital archival description, and also made clear the need for standardization among the UCs—if not the field at large.

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6. Next Generation Technical Services POT 3 Lightning Team 2, "Guidelines for Efficient Archival Processing in the University of California Libraries," September 18, 2012, https://libraries.universityofcalifornia.edu/groups/files/hosc/docs/_Efficient_Archival_Processing_Guidelines_v3-1.pdf (accessed April 2, 2018).

7. The Center for Primary Research and Training pairs students with archival projects in their areas of interest, introducing them to archival practice through hands-on training, and their work results in making special collections materials more accessible to the research community. More information can be found at: http://www.library.ucla.edu/special-collections/at-this-location/center-primary-research-training-cfprt.

8. We have chosen not to include more detail on the results of the survey in this article because quantifying our observations in this area has not yet yielded any further information beyond the fact that descriptive practices vary wildly. We intend to more specifically examine this survey and attempt to better quantify its results in future work.

Our next step was to assess why there was so much variation in the first place. To do this we analyzed a variety of existing content models as well as archival description and encoding standards to identify gaps as well as areas of overlap and disagreement. We consulted ISAD(G): General International Standard Archival Description,[9] *Describing Archives: A Content Standard* (DACS),[10] and Encoded Archival Description (EAD).[11] A cross-walk of these respective standards revealed a number of areas where real-world processing practices conflicted with standards, or where standards conflicted with one another.[12]

We found that there was often a gap between what the guidelines recommended and the spectrum of challenges associated with real-world born-digital archival processing practices. Additionally, the premium these guidelines place on neutrality made it difficult to apply effective description. The content- and output-neutral manner in which the guidelines had been designed and written meant that they often did not provide recommendations that were sufficient, specific, or applicable to digital material.

We were not the first to observe this. In 2013-14, a group of United Kingdom-based archives practitioners spearheaded an initiative to adapt ISAD(G) so that it would better meet the particular use cases and needs of born-digital archival material. The result of this work was the Best Guess Guidelines for Cataloging Born-Digital Material,[13] which was published in draft form under the aegis of the Archives and Records Association Descriptive Standards Roundtable in 2016.

The Best Guess Guidelines project is a worthy effort to provide archivists with additional clarity and guidance for describing born-digital material; it was an important point of reference for us. Moreover, of all the resources we consulted, the Best Guess Guidelines was perhaps the most directly relevant to our work because it had been written specifically to bridge the gap between an existing standard and its

9. International Council of Archives, "ISAD(G): General International Standard Archival Description, Second Edition," https://www.ica.org/en/isadg-general-international-standard-archival-description-second-edition; adopted by the Committee on Descriptive Standards in September 1999.

10. Society of American Archivists, "Describing Archives: A Content Standard (DACS), Second Edition," https://www2.archivists.org/groups/technical-subcommittee-on-describing-archives-a-content-standard-dacs/dacs (accessed April 2, 2018).

11. Technical Subcommittee for Encoded Archival Description, "EAD: Encoded Archival Description, Version EAD3," https://www.loc.gov/ead/ (accessed April 3, 2018).

12. For example, while many repositories in the United States use DACS and EAD together, EAD is actually mapped more directly to ISAD(G). In practice this means that in some cases there is a lack of alignment between the rules defined for a metadata field by DACS and the rules defined for that field by EAD. See this article's section on "Conditions Governing Access" for some specific examples of this.

13. Descriptive Standards Roundtable, "Best Guess Guidelines for Cataloguing Born Digital Material," published 2016, http://www.archives.org.uk/images/Data_Standards/Best_Guess_Guidelines_v1.0_160325.pdf (accessed April 3, 2018).

application to born-digital archival materials in the wild. Nevertheless, the Best Guess Guidelines provide practitioners with general principles for born-digital description rather than explicit rules. As a result, many of the recommendations made in the Best Guess Guidelines lack the degree of detail and specificity which would be required to meet our goal of aligning born-digital descriptive practice at all UC Campuses.

In addition to reviewing the Best Guess Guidelines, we also thoroughly evaluated DACS. Because DACS is the primary standard used within the UC system to guide archival description, we were particularly interested in assessing where and how it fell short. We found DACS to have several major areas of ambiguity, including its recommendations (or lack thereof) for the Extent (DACS 2.5), Date (DACS 2.4), Technical Access (4.3) and Processing Note (7.1.8) fields. We concluded that these descriptive elements all require special attention or consideration when dealing with born-digital material that the current iteration of DACS does not provide.

Although DACS does include some guidance for born-digital material, it has been slow to incorporate and respond to digital archives theory and practice. We found this to be noticeable for certain descriptive metadata elements that are especially relevant to born-digital practice, such as Processing Note and Technical Access. In our roles as digital archivists, we have found that Processing Information or Processing Note can be particularly important to alert users to significant actions that have been taken on digital materials during processing such as changing of erroneous or computer generated dates, computational re-naming of files where necessary, or deletion of empty directories or duplicate files, for example.[14] Usually one would turn to DACS 7.1.8 to look for guidance on describing these activities, but this chapter of DACS does not currently mention digital materials at all.[15]

In other areas of DACS that do mention digital materials, for instance the Technical Access element (4.3.6), the guidelines outline a processing practice from which the digital archives field has largely moved away—namely, that born-digital material might be accessed on the original hardware for which it was created, rather than viewed, emulated or manipulated as raw data.[16] The latter has emerged as a

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14. These are not exactly migration activities but are other types of information crucial to note in order to guide researchers in their use of the materials. See the "Processor and Processing Information" section on page 7 for more information about our thoughts on this issue.

15. See: "7.1 Notes (Added Value)," DACS, last updated February 23, 2016, https://github.com/saa-ts-dacs/dacs/blob/master/part_I/chapter_7/1_notes.md.

16. See: "4.3 Technical Access (Added Value)," DACS, last updated February 20, 2016, https://github.com/saa-ts-dacs/dacs/blob/master/part_I/chapter_4/3_technical_access.md.

more sustainable preservation practice and access policy for most of the material in our repositories.[17]

Finally, we also surveyed existing standards and data dictionaries that exist for describing and generating metadata about digital objects on an item and event level. These standards, especially PREMIS, informed our approach to standardizing collection or series-level description, especially for descriptive elements that include technical and preservation metadata like Processing Information.[18] Reviewing the various standards for item-level born-digital description also highlighted the fact that this problem—specific rules for item-level born-digital and digital preservation description—was largely solved. However no one had sufficiently tackled the problem of series or collection level born-digital description.

Working Methods

Drafting guidelines of this scope and magnitude required careful organization and communication. Through a series of weekly conference calls starting in February 2017, and building on some of the research performed by the CFPRT Digital Archives Program Scholars, we developed a general plan for the guidelines using Google Docs. The original outline started with fields from DACS and EAD that we felt merited more immediate attention: Physical Description and Extent, Physical Characteristics and Technical Requirements, Scope and Content, and Processing Information.

During each call, we self-assigned sections to be written before the next meeting. Using Google Docs' commenting features, we were able to ask one another questions, seek help with editing, and critique drafts in between meetings. Being able to communicate so quickly and easily made writing the guidelines speedier than if we had written sections in separate documents and relied on email for edits. It also meant that our sections were in fairly good shape and had perhaps even been fully reviewed by each subsequent meeting.

As the guidelines grew in length, the need for tiered recommendations became apparent. This also helped the guidelines align with processing practices throughout the UC system, which are heavily influenced by the More Product Less Process

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17. See: AIMS Work Group, "AIMS Born-Digital Collections: An Inter-Institutional Model for Stewardship," published January 2012, http://dcs.library.virginia.edu/files/2013/02/AIMS_final.pdf (accessed April 3, 2018); Matthew G. Kirschenbaum et al., "Approaches to Managing and Collecting Born-Digital Literary Materials for Scholarly Use, White Paper to the NEH Office of Digital Humanities, Level 1 Digital Humanities Start-Up Grant," May 2009, https://drum.lib.umd.edu/bitstream/handle/1903/9787/Born-Digital%20White%20Paper.pdf (accessed April 3, 2018); and Ben Goldman, "Bridging the Gap: Taking Practical Steps Toward Managing Born-Digital Collections in Manuscript Repositories," *RBM: A Journal of Rare Books, Manuscripts, and Cultural Heritage* 12, no. 1 (2011): 11–24.

18. PREMIS Editorial Committee, "PREMIS: Preservation Metadata Maintenance Activity," http://www.loc.gov/standards/premis/ (accessed April 3, 2018).

approach articulated by Mark Greene and Dennis Meissner.[19] Since archival collections will always require differing levels of description, we reviewed what we had written to determine which standards could be described as *required*, *recommended*, or *optional*. Sections that were especially unique to born-digital archival description or crucial to understanding born-digital materials were deemed required. Recommended suggestions were those that would be helpful in many cases, but not necessary in all. Optional suggestions were those that would occur rarely or that were not crucial to understanding a collection.

Once we had written the first draft of the guidelines in May 2017, we presented it for a peer review by the BDC CKG. After a one-month open comment period, we reviewed the feedback and comments and then incorporated suggested edits into the second draft of the document. We then shared the second draft with the BDC CKG and extended our request for comments and feedback to all collection management and processing staff across the UC Library system. After that second one-month open comment period, we made final revisions and edits. Among the additions to our initial draft were several appendices, including a mapping to the Resource Description and Access framework (RDA), a sample finding aid, and a controlled vocabulary for born-digital media and related terms.

The UC Guidelines were shared with the HOSC CKG in September 2017 for final review and approval, which was obtained in October 2017. At that time, the guidelines were accepted by the HOSC CKG as a UC-wide standard and were approved for dissemination and implementation by the UC Libraries.

Descriptive Elements

The rest of this article will be dedicated to exploring in depth our reasoning, process, and justifications for making the descriptive requirements and recommendations that we have chosen. The guidelines themselves can be accessed via GitHub in their entirety.[20]

Processor and Processing Information

The Processing Information note (DACS 7.1.8) was the area where we noticed the widest gap between existing standards and current practice. Decisions made during processing can greatly affect who, what, where, when, why and how researchers access and understand the digital material within a given collection. For us, the Processing Information section is therefore one of the most important aspects of any finding aid that describes born-digital materials. In particular, processing legacy born-digital material can often involve changing the nature of the data to preserve it and

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19.   See: Mark Greene and Dennis Meissner, "More Product, Less Process: Revamping Traditional Archival Processing," *The American Archivist* 68, no. 2 (September 2005): 208–263.

20.   Guidelines located at https://github.com/uc-borndigital-ckg/uc-guidelines.

make it accessible. This may include migrating to different file formats, redacting or removing Personally Identifiable Information (PII), extracting files, or normalizing filenames. It is essential that this information be recorded to ensure that future archivists and users understand where the materials came from, how they were created, and the process by which they are able to access the materials.

DACS clearly states that the Processing Information note should describe any of the actions taken during processing that might affect or inform a researcher's understanding of the material. However, when we reviewed finding aids from peer institutions, we noticed that crucial information about how collections were processed was routinely vague, scant, or often omitted entirely. This suggested that there was a strong need for clear, specific guidelines that detailed what information should be included in the Processing Information section.

Our decision to develop such a thorough set of guidelines for this element was based on the idea that many of the tools we rely on and policies we enact to preserve and make accessible a set of files are inherently transformative—for example, file normalization, cleaning up file names, or removing empty directories. Although they may be routine, these actions can potentially affect and inform how a researcher perceives or experiences the digital material within a given collection, and therefore should be described in a finding aid.[21]

Another reason we chose to place such heavy emphasis on the importance of the Processing Information note was to provide some level of transparency about how a collection was processed. The recently proposed draft revisions to the DACS Statement of Principles affirms that "Archivists must document and make discoverable the actions they take on records."[22] In this vein, we felt that describing actions and techniques employed during processing is of paramount importance, as is describing who performed these actions.

Although neither DACS nor EAD contain a standalone Processor element, we elected to require the inclusion of these details in the Processing Information note. The proposed draft revisions to the DACS Statement of Principles make it clear that "Archivists have an obligation based in professional values of accountability and responsible custody to thoroughly and transparently describe their own interventions

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21. An alternative option could be to put this kind of information in a "Conservation" (DACS 7.1.4) note, as born-digital processing actions are often performed for preservation purposes. However, using a conservation note may not always be appropriate. For example, file normalization may be performed for preservation or access reasons. Were we to use both sections, processing actions would have to be split along lines that are often fuzzy and difficult to ascribe.

22. The 2017 proposed revisions draft of the *Describing Archives: A Content Standard* (TS-DACS) "Statement of Principles" by the SAA Technical Subcommittee, https://docs.google.com/document/d/1ylCCzWh5yWNuIvakme3kKTJzFaWwjA1XMKLFRQvNhtk/edit (accessed April 3, 2018).

in the course of their work."[23] Providing a record of who worked on a collection and when the digital material was processed are key considerations that should be communicated to researchers. We believe that this information is especially relevant in the context of born-digital materials, given that the digital portion of a collection is frequently processed by a different person and often at a later date than the physical portion of the collection.

Finally, we shared a conviction that providing detail about how a collection was processed would serve to educate researchers, and also make visible the often invisible labor that processing born-digital material requires. If researchers better understand how collections are processed and what goes into preserving and making them accessible, they have the opportunity to become better and more engaged users of that material.

Physical Description and Extent

This field was especially interesting because we encountered a large degree of variation in the examples which had been collected at the outset of this project. The fundamental challenge of describing the extent of born-digital materials lies in the lack of any clearly defined and consistently applied unit of measure. Our recommendations for Physical Description and Extent remain in line with existing uses of the fields, but add degrees of specificity about born-digital materials that DACS and EAD lack. We have specified that Extent statements for born-digital materials should always include both the total size of the materials (expressed in GB) and the total number of files that have been made accessible. Additionally we have specified that any additional Physical Descriptions that will help a researcher to gauge the size of a collection should be included here, along with descriptions of numbers and types of computer media for collections which are unprocessed. This could include, for example, the total number of emails, websites crawled and the number of corresponding .warc files, or overall runtime for a series of digital video files.

These recommendations are in line with both DACS 2.5 and ISAD(G) 3.1.5, which state that Extent should be used for specific, quantitative and numerical descriptions of collection size.[24, 25] These are expressed using the format of "number" and "unit". An additional consideration for born-digital records is that using Extent consistently in this way ensures that it will be a machine-readable field.[26] Finally, we have also

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23. Ibid.

24. See: "2.5 Extent (Required): Purpose and Scope," DACS, last updated February 20, 2016, https://github.com/saa-ts-dacs/dacs/blob/master/part_I/chapter_2/5_extent.md (accessed April 3, 2018).

25. See: "3.1.5 Extent and medium of the unit of description," ISAD(G), https://www.ica.org/sites/default/files/CBPS_2000_Guidelines_ISAD%28G%29_Second-edition_EN.pdf (accessed April 3, 2018).

26. We are grateful to our colleague Alice Prael for continuing to point this out in our discussions.

clarified that for such digital material, the digital extent should always be recorded separately from the physical extent.

Drafting these rules brought up some interesting questions during the course of our revisions. The initial feedback we received suggested an overwhelming appreciation for specifying that all Extent statements referring to storage size should be recorded in GB (and that this term should be recorded "GB" and *not* "Gigabytes," "Gb," "giga byte," "GBs" or any other variation). Multiple reviewers stated that having this guidance alone answered some of their more persistent questions about recording this kind of metadata. It was striking to us that, rather than receiving concerned feedback about not including other measurements of collection size, we received what could almost be described as relief for the establishment of a rule in this area.

We had not initially composed any guidelines about whether or not to include unprocessed collections materials in Physical Description or Extent statements because we assumed that this was out of scope for this project. However, one of the first and most common questions that we received was whether or not these materials should be included, and if so how they should be recorded. The number and frequency of requests for guidance about describing unprocessed born-digital material leads us to believe that many reviewers have not yet begun to process their born-digital material in earnest, and that one of the most practical applications of these guidelines will be to provide a helpful starting point once they have the capacity to process these collections. Toward this end, we hope that the UC Guidelines can help practitioners take a step forward; even if an institution doesn't have the resources to process digital collections currently, at least they can acknowledge the materials are there and provide some initial description. Additionally, it underscores the desire amongst archival professionals to be sure that even inaccessible or deteriorating materials be described, even if they are not available for use by researchers.

Abstract

If organizations use the Abstract element, then we have recommended that such use of this element include a brief mention of the fact that a collection contains born-digital material, if present. Given the small size of most abstracts, space in this element is valuable real estate, and so this recommendation has proved somewhat contentious.

Our guidance also includes the recommendation that information in the Abstract should not overlap with information in Scope and Content. If, for example, Scope and Content contains a brief list of the different media formats that are present in the collection, then the Abstract should not contain this same information, but instead should briefly mention that the collection contains digital material.

This was a point of debate for several reasons. First, it is the practice of several repositories in our system to copy some or all of the Scope and Content note directly

into the Abstract so that they both contain the same content. For this reason several institutions did not find our recommendations to be in alignment with their existing practices. After much discussion about this, we decided to keep our recommendations as they were, on the justification that repeating the same content in two fields negated the reasons for having two separate fields, and that it was better descriptive practice to keep the use of these two elements separate conceptually, thus our guidelines should continue to reflect that.

Additionally, several colleagues were hesitant to include born-digital content in the Abstract at all; this concern seemed to us to have more validity. As our colleagues pointed out, few archivists would be likely to include such media-specific details as, "contains correspondence in envelopes" or, "moving images on Betamax videocassettes" in the Abstract because these descriptions are too specific. Our decisions in this area ended up being partly based on our existing understandings of the way in which many of these finding aids will be accessed. Most of the sites or repositories of finding aid data for our institutions—especially the Online Archive of California (OAC), which will be the access point of record for finding aids from any given UC—show the Abstract element in the "preview" of a collection, but do not show any other elements which might contain information about the presence of born-digital collection materials. Part of the point of establishing these guidelines is to standardize descriptive practice in order to make processes and collections more transparent for researchers. This is especially the goal when, as is becoming the case at most of our institutions, it is necessary for the researcher to make additional preparations in order to access born-digital material. At all of our institutions, it is common for researchers to come in to request materials for which they have only ever looked at the "preview" of a collection on the OAC. Often they are disappointed to find that they are not able to view born-digital material for a period of several days while the material is prepared, or in some cases not able to view it at all if it has not been processed.

Given that part of our goal was to provide researchers with a clear a set of expectations, we decided to stick with the recommendation that the presence of born-digital content should be mentioned as early as possible. Since the Abstract element is one of the few that is guaranteed to be placed in front of the researcher when they first view a collection's finding aid, we felt that mentioning the presence of born-digital material when it is possible and feasible would help prepare researchers for the extra steps that may be involved.

Scope and Content

We emphasize that the purpose of the Scope and Content element remains the same for all archival collections, regardless of whether or not they contain born-digital materials. Users need a concise summary to determine whether a collection is useful to their research. The presence of born-digital content and information about its creation is significant, and in most cases should be specifically stated. DACS and ISAD(G) represent this clearly. According to ISAD(G), the Scope and Content

element is used "to enable users to judge the potential relevance of the unit of description."[27] DACS elaborates on this to state that the Scope and Content element may include information in six major areas, four of which we explicitly interpret in our guidelines:[28]

1. "The function(s), activity(ies), transaction(s), and process(es) that generated the materials being described." This is an appropriate place to describe the operating systems, hardware, software, and significant media used to create the born-digital materials. A description of the original computing environment provides important context for the output of the creator, which may be affected by limitations or specifications of the file system, the properties of the software, or the capacity of removable media.

2. "The documentary form(s)…[or types] of the records being described." This may include correspondence, minutes, reports, data sets, web pages, videos, photographs, or other specific formats. We recommend that archivists consider adding file format types in a large, complex collection (for example, .jpg, .pdf, .xlsx), along with the number of each type of file, to allow researchers to determine whether the file formats represented are likely to contain relevant information.

3. "The content dates, that is, the time period(s) covered by the intellectual content or subject of the unit being described." DACS 2.4 provides straightforward instruction to record "the dates that the documents in the unit being described were originally created (e.g., date of writing a letter, drawing a map, or painting a portrait) or the date that an event or image was captured in some material form."[29] However, this guidance is another example of how born-digital records introduce new questions not previously considered under existing standards. Metadata for digital files typically includes a last Modified date and a last Accessed date, in addition to a Created date.[30] These dates are recorded and updated by the file system whenever a file is created, accessed, or modified, meaning that this metadata may change during the process of creating a record. The Created date only indicates when a file was generated, not when the actual content was written or finalized. In many cases, the last Modified date more accurately represents

27. See: "3.3.1 Scope and content," ISAD(G), https://www.ica.org/sites/default/files/
CBPS_2000_Guidelines_ISAD%28G%29_Second-edition_EN.pdf (accessed April 3, 2018).

28. See: "3.1 Scope and Content (Required): Purpose and Scope," DACS, last updated February 20, 2016,
accessed https://github.com/saa-ts-dacs/dacs/blob/master/part_I/
chapter_3/1_scope_and_content.md (April 3, 2018).

29. See: "2.4 Date (Required)," DACS, last updated February 20, 2016, https://github.com/saa-ts-dacs/
dacs/blob/master/part_I/chapter_2/4_date.md (accessed April 3, 2018).

30. Frequently referred to as "MAC" dates.

the date a resource was produced in its existing form. Another important consideration is that the Created date changes whenever a file is copied to a new location (such as when the creator migrates or backs up their files), because the file system is recording when the *copy* was generated, not the original. If known, processors should note when and how files were transferred while in the creator's custody as well as during archival accessioning, and note if Created dates were affected during any transfer. We also recommend using last Modified dates in the Scope and Content note to provide a more reliable date range for description.

4. "Any other information that assists the user in evaluating the relevance of the materials, such as completeness, changes in location, ownership and custody while still in the possession of the creator, and so on." Although the concept of authenticity has always played an important role in archives, given digital media's inherent vulnerability and the ease with which files can change, be duplicated, or become corrupt, it is an especially crucial aspect of born-digital processing and preservation. It is important to include information about the completeness and authenticity of digital material if this information is available. This might include information about the creator's file management and backup practices, whether or not the creator shared a computer with other users, whether any files were lost due to file corruption or backup failure, and/or details associated with the file's accompanying metadata, such as the assignation of Universally Unique Identifiers (UUIDs), hash values or checksums.

We recommend using Scope and Content notes at any appropriate level. For smaller, more uniform collections, a collection-level Scope and Content may suffice. For larger, complex collections, a concise Scope and Content note can be used at the series, folder, or, if warranted, item-level, to guide the user to contextual information pertaining to a specific group of born-digital materials.

Conditions Governing Access, Restrictions, Reproduction and Use

As we discussed the descriptive elements which relate to access and use, we found there was considerable confusion about the application of these elements, both among ourselves and our colleagues, even before we started applying them to born-digital collections. We have chosen to carefully clarify these elements in the UC Guidelines to encourage their consistent use for both analog and born-digital materials.

ISAD(G) groups the following elements under the heading "Conditions of Access and Use"[31]: "Conditions Governing Access" (3.4.1), "Conditions Governing Reproduction" (3.4.2), "Language/Scripts of Material" (3.4.3), "Physical Characteristics

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31. See: "3.4 Conditions of Access and Use Area," ISAD(G), https://www.ica.org/sites/default/files/CBPS_2000_Guidelines_ISAD%28G%29_Second-edition_EN.pdf (accessed April 3, 2018).

and Technical Requirements" (3.4.4), and "Finding Aids" (3.4.5). Conversely, DACS lists these elements in separate and distinct areas; "Conditions Governing Access" (DACS 4.1) specifically excludes any mention of physical and technical aspects affecting use and refers the processor to sections 4.2 and 4.3, respectively, and "Conditions Governing Reproduction and Use" are separated out into DACS section 4.4. To further complicate matters, the EAD3 Tag Library maps its encoding elements to ISAD(G) and not to DACS,[32] but we found that many archival processing staff in the UC system consult DACS when creating metadata that will subsequently be encoded into EAD finding aids.

As our guidelines dictate, the Conditions Governing Access element should be used to provide information about access restrictions on files *due to the nature of the information* in the materials being described. This may include restrictions placed on the files by the donor agreement, institutional privacy policies, federal or state privacy regulations, donor stipulations, or the presence of PII or protected health information (PHI). We recommend that these restrictions should be noted in a Conditions Governing Access note at every applicable level to ensure that researchers are aware of them. These notes should summarize any restrictions placed on analog material as well as born-digital files.

The Conditions Governing Use element should be used to note, "any restrictions on reproduction due to copyright or other reasons, as well as restrictions on further use of the materials being described, such as publication, after *access has been provided*" (emphasis added).[33] Again, this element should be used exactly the same way for analog and born-digital files; and may be guided by an organization's own policies and procedures for reproducing or using digital or physical material. While policies and procedures for reproducing or using digital material may differ from those established for physical materials, they should still be noted in the same Conditions Governing Use note along with any policies or procedures for reproducing physical materials.

Physical Characteristics and Technical Requirements

Our suggested use of Physical Characteristics and Technical Requirements does not differ from its stated purpose in EAD, where it appears as the element tag <phystech>. EAD3 describes Physical Characteristics and Technical Requirements as being "used to capture any physical or technical characteristics that affect the storage or use of the materials described. This may include details of their physical

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32. See: "Tag Library Version EAD3: ISAD(G) to EAD3," EAD, last updated August 2015, https://www.loc.gov/ead/EAD3taglib/index.html#appendix-ISAD(G)toEAD3 (accessed April 3, 2018).

33. See: "4.4 Conditions Governing Reproduction and Use (Added Value)," DACS, last updated February 20, 2016, https://github.com/saa-ts-dacs/dacs/blob/master/part_I/chapter_4/4_conditions_governing_reproduction_and_use.md (accessed April 3, 2018).

composition, preservation requirements, or particular hardware or software needed to access the materials."[34] This note combines DACS elements 4.2 Physical Access and 4.3 Technical Access, which make mention of software or hardware-related access challenges, but which do not leave room for information regarding processing requirements—which will affect access.

Because of the nature of many born-digital materials and the relative nascence of digital curation in the archives field, it is likely that users will encounter access limitations related to software or hardware requirements, even with processed records. We felt it necessary to emphasize the importance of the Physical Characteristics and Technical Requirements note for transparency and to ease any challenges Public Services staff might encounter in serving the material to researchers. For example, some born-digital records may require migration to a more appropriate format for access, which could necessitate extra time and advance notice. Managing user expectations as they adjust to new access procedures is crucial, and as such, this is a required note. In some cases, files may not be accessible onsite due to the lack of necessary software or hardware, but could be accessed if the correct software were to be obtained. Transparency is paramount to engaging users with the material and acclimatizing them to what will quickly become standard in research. The library may not have the necessary specifications to open certain files, but an enterprising user may be willing to assist in obtaining the required software or hardware.

The section is divided into required and recommended fields, as with the rest of the guidelines. For example, we require archivists to describe unprocessed born-digital material contained within a processed collection. Materials that could not be processed due to issues with legacy media or lack of appropriate technology for processing must be mentioned so that users are aware of their existence. As with access challenges posed by lack of needed software, processing challenges can be aided by the right researcher, and transparent and complete description allows for this possibility. In addition, it is necessary that we introduce researchers to the challenges inherent to born-digital records. This is especially true of files derived from legacy media, which may be degraded or so specialized that they cannot be processed or accessed through regular practice.

Immediate Source of Acquisition and Appraisal Information

Both the Immediate Source of Acquisition and Appraisal Information elements were areas where we recommend changing existing practice as little as possible, and defining as few rules for born-digital material as possible. Both of these elements are listed as optional for description of born-digital materials.

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34. See: "<phystech>: Physical Characteristics and Technical Requirements," EAD, last updated August 2015, https://www.loc.gov/ead/EAD3taglib/index.html#elem-phystech (accessed April 3, 2018).

In the case of both of these metadata elements we have recommended archivists *not* use them to include technical details, which is in line with their definitions in DACS and ISAD(G).[35, 36] We have recommended instead that the Processing Information Note element be used for this purpose. Our recommendations for both of these elements are highly adaptive to fit local description practices, and require archivists to consider noting various information where fitting. In the case of Immediate Source of Acquisition, for example, we have recommended that archivists consider briefly noting that a certain donation included digital media, but putting any further specific information about the processing and of nature of that media in different fields. In the case of Appraisal Information, we have recommended that archivists consider noting briefly if certain files were weeded on ingest, but either linking to library policy or using a more detailed metadata element, such as Processing Information Note, to describe this process in greater detail.

Organization and Arrangement, and Container List and Inventory

The Organization and Arrangement element is based on DACS element 3.2, System of Arrangement, the EAD3 <arrangement> tag, and MARC field 351. We do not recommend using the element any differently from existing standards, but we do emphasize that it is important to note whether digital materials have been segregated into their own series or grouped with analog materials. This scenario will mostly be encountered in hybrid collections, where digital materials are often arranged separately according to format, or may seem to describe duplicative materials. As is standard in most arrangement notes, if the digital folder structure has been manipulated or artificially imposed, we recommend making note of it in this section.

In addition, our guidelines briefly discuss the file inventory or directory list, which is often automatically generated during processing, and which *can* be helpful for users and researchers. Tools such as Karen's Directory Printer, Print Pro, and Directory List can be used to create a spreadsheet or text file of file paths, folder formats, and directory structures of a digital collection. Sometimes, in smaller collections, processors may simply create the spreadsheets manually.

While file inventories and directory lists should not serve as the only description of born-digital files, especially those generated from large or complex collections, they can be very helpful to researchers and can be incorporated into a finding aid, usually as an attached document or reference. However, it is important to note that

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35. See: "5.2 Immediate Source of Acquisition (Added Value)," DACS, https://github.com/saa-ts-dacs/dacs/blob/master/part_I/chapter_5/2_immediate_source_of_acquisition.md (accessed April 3, 2018); and "5.3 Appraisal, Destruction, and Scheduling Information (Added Value)," DACS, https://github.com/saa-ts-dacs/dacs/blob/master/part_I/chapter_5/3_appraisal_destruction_and_scheduling_information.md (accessed April 3, 2018).

36. See: "3.2.4 Immediate source of acquisition or transfer" and "3.3.2 Appraisal, destruction, and scheduling information," ISAD(G), https://www.ica.org/sites/default/files/CBPS_2000_Guidelines_ISAD%28G%29_Second-edition_EN.pdf (accessed April 3, 2018).

original folder names or file formats may be false, misleading, or useless to anyone other than the creator. Because this is sometimes the case, we stress in our guidelines that these lists should not be the only description made available to researchers, if possible.

The feedback and editing process around this section of the guidelines was particularly interesting, because we were struck by how many archivists suggested that file or directory listings might, in the case of born-digital materials, take the place of the traditional container list—the latter being an intellectually-arranged document. We saw several problems with such a suggestion. Based on our own experiences, these lists can be difficult to decipher and do not by themselves increase the accessibility of the files.[37] One of our primary jobs as archivists is intellectual arrangement and control, and it is important that we provide description that helps users better understand the material, and work to keep description from obfuscating content. After deliberation, we decided that it was important to encourage archivists to attach directory or file lists when they were helpful and available, but to be clear about the fact that these lists cannot stand in for the intellectual arrangement or added description which is present in a thoughtful and intentionally constructed container or series listing.

Controlled Vocabulary, Appendices, and Supplemental Material

Some additions were made to the appendices of the UC Guidelines as part of the revision process based on feedback from stakeholders and our own realizations. The most significant of these materials included a metadata crosswalk, a sample finding aid, and the Controlled Vocabulary which grew out of collaboration with a UCLA-based Lightning Team.

What began as a localized, guidelines-specific controlled vocabulary, intended primarily for ourselves as the authors, turned into a much larger project. As we wrote the first draft, we realized that there was "consistent inconsistency" among common terms used to describe born-digital materials by other institutions, and sometimes within our own guidelines.[38] We undertook a brief review of language used to describe media, file formats, and other born-digital terminology and drafted an appendix to which we could refer while writing. This original controlled vocabulary was informal and we had planned to remove it from the document entirely once our draft was complete. However, we received substantial feedback during the comment period that a controlled vocabulary would be helpful and is needed by the community, so we decided that including a more robust and formalized resource was necessary.

37. As an example, consider a cursory file list generated solely from filenames, which would give the user only the information: "draft.doc, v2-3.doc, draft2.doc" etc.

38. For example, an early draft of the UC Guidelines used "3.5" floppy disk", "3 ½-inch floppy", and "3.5-inch floppy disk" interchangeably to describe the same media format.

At the suggestion of one of our team members, we reached out to a group at the UCLA Library that had begun to develop a controlled vocabulary for their own use in Library Special Collections. This vocabulary was intended to cover both audiovisual and born-digital materials, and the development team, comprised of Courtney Dean, Margaret Hughes, Kelly Kress, and Shira Peltzman, was willing to temporarily narrow their focus to the born-digital to help our guidelines project. The team started with a standards crosswalk that included common terms, pulling mostly from the Public Broadcasting Metadata Dictionary (PBCore), The Getty Art and Architecture Thesaurus (AAT) and RDA, and then they identified gaps in those authorities, such as inadequate, conflicting, or missing terminology.[39, 40, 41] The result of the extensive research and evaluation the team performed is the Controlled Vocabulary that appears in the UC Guidelines. We are immensely grateful for the work they performed, for the sake of the UC Guidelines and the community at large.

Also included in the UC Guidelines is a metadata crosswalk that shows how each section of the guidelines matches up to other descriptive standards, including DACS Second Edition, EAD3, ArchivesSpace, MARC, RDA, and ISAD(G).[42] This crosswalk helped guide our decisions and will hopefully help institutions implement recommendations easily, regardless of which standard they follow.

Finally, we added a complete sample finding aid that incorporated our recommendations.[43] Using a real-life collection and pre-existing finding aid from UC Berkeley, Kate Tasker fleshed out and highlighted all added description for a born-digital accrual, incorporating our recommendations as best fit the collection and UC Berkeley's existing descriptive practices. To make it even easier to see how the guidelines would impact description, all of the born-digital edits were highlighted in a different color, showing exactly how much description was new. We hope that this will demonstrate that despite the depth of the guidelines, enhanced description for born-digital content will not overwhelm a finding aid or the users.

Accessing the Guidelines

The UC Guidelines for Born-Digital Archival Description have been published in two places. To enable online access and version control, we created a GitHub

39. "PBCore – Public Broadcasting Metadata Dictionary Project," http://pbcore.org/ (accessed April 4, 2018).

40. The Getty Research Institute, "Art & Architecture Thesaurus Online," http://www.getty.edu/research/tools/vocabularies/aat/ (accessed April 4, 2018).

41. OCLC, "About RDA," https://www.oclc.org/en/rda/about.html (accessed April 4, 2018).

42. Our endless gratitude to Michelle Mascaro of UC San Diego, who mapped the guidelines to RDA.

43. With many thanks to Laurel McPhee of UC San Diego for the sample finding aid recommendation.

repository to host the most current and up-to-date working version.[44] We encourage use of this online resource and welcome feedback. Suggested text and edits are also welcomed via GitHub pull request. In addition, a final copy of version 1.0 of the Guidelines has been deposited in the UC systemwide open access repository, eScholarship, with subsequent versions to be deposited as the Guidelines are revised over time.[45] We hoped that by pursuing a two-pronged publishing scheme for these guidelines we would be able to fulfill both the requirement for an official UC-stewarded and centralized source in addition to a dynamic and changing resource.

Future Work

We anticipate that future work will focus on incorporating the findings from the UC Guidelines for Born-Digital Archival Description into revisions of other descriptive or processing standards, such as the "Guidelines for Efficient Archival Processing in the University of California Libraries," or DACS. We are encouraged by the recent proposal to add subject-specific supplements to DACS and view our own project as a potential vehicle to quickly share recommended practices for born-digital description prior to a more thorough DACS revision.[46]

Additionally, we intend to come back to data collected from the informal survey of digital description practices which was performed by CFPRT graduate students Maches, Reed, and Ciccone, and to dig deeper into these findings. We are particularly interested in establishing means by which the qualitative results that were collected might be coded in order to quantitatively analyze digital descriptive practices across the field. If in future work we are able to establish, for example, that most archival repositories are describing something in a certain way or using a certain practice, it would be worthwhile to further probe the reasons for that practice through the assessment of finding aids or through interviews with archivists from those repositories. Such further investigation would not only strengthen the foundation of these guidelines, but would also allow us to expand the network of influence and feedback for this project even further outside the UC system.

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44. UC Guidelines for Born-Digital Archival Description at https://github.com/uc-borndigital-ckg/uc-guidelines.

45. Annalise Berdini, Charles Macquarie, Kate Tasker, Shira Peltzman, et al. "UC Guidelines for Born-Digital Archival Description," UC Office of the President: University of California Systemwide Libraries, October 26, 2017, https://escholarship.org/uc/item/9cg222jc (accessed April 3, 2018).

46. With gratitude to the Music Library Association's Working Group for the Archival Description of Music Materials (a sub-group of the MLA Archives and Special Collections Committee). See: Music Library Association Working Group for Archival Description of Music Materials, "Archival Description of Notated Music: A Supplement to *Describing Archives: A Content Standard*" working draft February 2018, http://c.ymcdn.com/sites/www.musiclibraryassoc.org/resource/group/2b79fab4-0a05-4039-8779-d01ada0861c8/Archival_Description_Notated.pdf (accessed April 4, 2018).

We are also extremely interested in continuing the discussions which arose around our recommendations for expanding the Processing Information Note, and our responsibility as archivists to make processing work and decisions more transparent. We see this as deeply connected to the growing calls to make visible the frequently invisible labor in archives, and to fully recognize and acknowledge the work and expertise required to enable free and open access to archival collections.[47] Incorporating these guidelines and the work performed in drafting them into ongoing profession-wide discussions about descriptive practices and projects to quantify levels of access to born-digital archival materials are just a few of the ways we hope to better integrate efforts in this area.[48]

Conclusion

The UC Guidelines for Born-Digital Archival Description were developed to meet an acute need both within the UC system and the field at large. While there are content models and archival description standards that should theoretically guide this work, the emphasis that they place on remaining content and output neutral has rendered them inadequate for describing born-digital material in practice. Compounding this are the emergent nature of processing practices and the lack of widely agreed upon best practices for born-digital archival description within the field. The lack of appropriate guidance in this area meant that decisions about what information to include and where to include it were made on a collection-by-collection basis—describing digital material was effectively a boutique procedure in every single case. As a result, finding aids were inconsistent and unstandardized, which presented a barrier to collections' access and use.

Using the BDC CKG as an umbrella for this work, we set out to create a set of guidelines that would specifically address the challenges inherent to describing born-digital material. Not only did we design the guidelines so they could be adapted to the tiered processing approach favored throughout the UC system, we rooted them in real-world processing practice. To ensure that they will be maximally useful to practitioners, we included examples for each of the descriptive elements that we addressed in addition to a complete sample finding aid. Thanks to the hard work of students from the UCLA CFPRT, we are also in a position to further assess profession-wide born-digital descriptive practices moving forward and perform detailed analysis of these practices to continue to strengthen these guidelines to ensure that they are grounded in the expertise and experience of archivists world-wide.

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47. For further reading, see: Stacie Williams, "Implications of Archival Labor," *On Archivy*, April 11, 2016, https://medium.com/on-archivy/implications-of-archival-labor-b606d8d02014 (accessed April 4, 2018); and Lucy Suchman, "Making Work Visible," *Communications of the ACM* 38, no. 9 (September 1, 1995): 56–64.

48. See, for example, the work of practitioners around the Born-Digital Access group which has emerged from within the Digital Library Forum.

We intend for these guidelines to be useful and used by archives professionals at each of the ten UC campuses, and to be a relevant resource for others in the profession who work with born-digital materials. Our goals were first, to provide practical, expert guidance for staff who process born-digital collections, and second, to provide a common standard throughout the UC system to enable more efficient processing and increased access to born-digital materials. Additionally, standardizing born-digital description presents exciting opportunities for future use or re-use of collection data for research purposes, or for streamlining collection analysis within and across institutions.

The guidelines have already helped to grow and sustain the digital archives programs at each of our institutions, now including a few outside of the UC system. The task of analyzing each of these descriptive elements has prompted critical thinking and discussion at our institutions around a number of born-digital workflow issues, and working through these discussions has helped to clarify procedures and provide practical answers to both description and processing questions. We hope to extend these discussions to include more perspectives from outside the UC system, to coordinate efforts with other colleagues who are tackling issues around born-digital description, and to further develop the Guidelines as we receive feedback from other professionals and institutions who implement them.

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