Conference Proceedings

Edited by:
Luciana Duranti and
Elizabeth Shaffer

The Memory of the World in the Digital Age: Digitization and Preservation

An international conference on permanent access to digital documentary heritage

United Nations
Educational, Scientific and
Cultural Organization

Memory of the World
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26 to 28 SEPTEMBER 2012
Vancouver, British Columbia, Canada
Sheraton Vancouver Wall Centre

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UNESCO Memory of the World Programme, Knowledge Societies Division

This book of Proceedings includes most of the papers and posters presented at the International Conference "The Memory of the World in the Digital Age: Digitization and Preservation" held on 26–28 September 2012 in Vancouver, British Columbia, Canada, by the UNESCO Memory of the World Programme, Knowledge Societies Division, and The University of British Columbia in collaboration with the University of Toronto.

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Preface

This publication presents the proceedings of the international conference 'Memory of the World in the Digital Age: Digitization and Preservation' which was held in Vancouver, Canada, from 26 to 28 September 2012.

More than 500 experts and other interested persons from all regions of the world participated in this knowledge-sharing and policy-driving event to discuss and exchange opinions on how to protect the world's documentary heritage. Although this heritage is the record of knowledge, its physical carriers are extremely vulnerable and can easily disappear without a trace. Whether recorded on a clay tablet or an electronic tablet, our methods of sharing content and knowledge need to be protected.

It is impossible to exaggerate the importance of documentary heritage in our lives. It governs our actions whether these relate to creating the basis of mutual respect between different civilizations and communities or building knowledge societies. Documentary heritage provides the foundation of peace, our identity and knowledge.

UNESCO's interest in this subject matter is as fundamental as its constitution with its mandate to contribute to building peace through the spread of knowledge from improved access to printed and published materials. These core materials, our documentary heritage, have been preserved in archives, libraries and museums for generations.

But while measures needed to maintain access to print materials are globally understood, the newer challenges related to preserving digital information are not keeping pace with technological development. The need for dedicated hardware and software, associated with their rapid obsolescence, hamper our ability to keep invaluable content accessible. Unless timely migration to newer technologies, operating systems and software platforms is assured, we face the risk developing digital Alzheimer's.

UNESCO's expectation from this Conference was to obtain a better definition of our expected role, and our contribution to setting a global digital agenda. The UNESCO/UBC Vancouver Declaration sets out specific recommendations which we will be implementing and incorporating into our digital strategy. Likewise, we expect that our Member States, professional organizations and private sector bodies will also implement the recommendations addressed to them.

Only through collaborative strategic alliances can we overcome the major challenges threatening the preservation of digital information. We believe that the presentations featured in this publication provide the basis for a global commitment to preserving the memory of our world in this digital age.

Jānis Kārkliņš
Assistant Director-General
for Communication and Information

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Challenges and Triumphs

Preserving HD Video at the UBC School of Journalism

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Abstract

This paper provides an overview of the InterPARES 3 case study on preserving HD Video at the UBC School of Journalism. A selection of the significant challenges, both technological and procedural, and the main recommendations are discussed, including: balancing the archival needs of preserving the video assets against the creative workflow and editing process; modifying the asset management software to incorporate elements of the InterPARES Chain-of-Preservation model; implementing the PBCore metadata schema; providing rapid, secure access to extremely large video files; and creating of a backup methodology to safeguard assets within the archives.

Author

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1. Overview

The University of British Columbia's (UBC) School of Journalism (SoJ) approached the InterPARES project team to request help preserving the documentary video footage created by the International Reporting Class. The SoJ has the distinction of being the only graduate level program in journalism in Western Canada, and is committed "to achieve the highest professional standards in journalism through instruction in journalistic practice and the scholarly understanding of journalism, critical thinking, and teaching of ethical responsibility."[1] In support of its mission, the SoJ has summarized its goals as:

- To produce a new generation of journalists with the specialized knowledge, cultural awareness and critical thinking skills needed to excel in journalism;
- To improve the practice of journalism through the education and training of journalists in scholarship, research and professional development; and
- To advance through rigorous research the understanding of the vital role of journalism in the public sphere and to contribute to the current body of journalism studies existing in Canada.[2]

[1] "Journalism – Degree Programs -- The Faculty of Graduate Studies -- Faculties, Colleges, and Schools -- Vancouver Academic Calendar 2012/2013," UBC Graduate School of Journalism, accessed 30 August 2012, http://www.students.ubc.ca/calendar/index.cfm?tree=12,204,828,1183.

[2] "About the Program: Mission Statement," Internet Archive, accessed 10 January 2010, http://web.archive.org/web/20070704014540/www.journalism.ubc.ca/mission_statement.htm.

This level of commitment has resulted in a series of collaborative projects, such as with world-renowned journalist Dan Rather on *The Dan Rather Project,* and an Emmy award for outstanding *Investigative Journalism* for the documentary on e-waste titled *Ghana: Digital Dumping Ground*.[3]

As a member of the Canadian Media Research Consortium (CMRC), a partnership between the journalism programs at the UBC Graduate School of Journalism, York/Ryerson Graduate Programme in Culture and Communications and the Centre d'études sur les Médias at Laval University, the SoJ recognized the advantages to providing other universities, journalists and the public access to the large number of digital source files created during the documentaries created by its faculty and students. Creating a centralized video archive of high-definition documentary footage would support the CMRC's mandate to undertake research in media and communications, with a focus on technological change; to promote collaborative research focused on Canadian issues; and to disseminate the research findings of its partners.[4] The SoJ recognized that the authenticity of, and long-term access to, the video assets contained within the archives would be of great importance if the archives was to be considered a trusted source of documentary video material.[5]

The SoJ project fit well within the objective of InterPARES 3 to" translate the theory and methods of digital preservation drawn from research to date into concrete action plans for existing bodies of records that are to be kept over the long-term by archives, "and was added as a case study.[6] The goal of the case study was "*To establish a digital video archive of high definition video footage created by the SoJ's students; devise means to ensure the preservation of the raw footage of student projects; and create policies allowing for the footage to be used internally and externally.*"[7] The case study focused primarily on the video assets produced by the International Reporting Class, while building into the design the flexibility to accept video assets from other classes and external donors in the future. The International Reporting Class is a yearlong course for second year graduate students enrolled in the Master's of Journalism program.

Students enrolled in the class study the history of foreign correspondence while focusing on modern-day documentaries that exemplify best practices. The design of the curriculum centers on planning and producing a documentary report on a chosen topic of international significance. At the end of the first semester, up to ten students, one professor and two adjunct lecturers move out into the field where they collaboratively create high-definition documentary footage on the selected topic from various locations around the world. Upon returning to UBC, the students import the footage from the source files[8] contained on tape and/or hard drive into the video editing system. During the editing process, the source files are broken into sub-clips,[9] portions of which are then intermixed and combined into the documentary itself using Apple's Final Cut Server (FCSvr) video editing system. Every documentary within FCSvr has

[3] "UBC Graduate School of Journalism wins Emmy Award for Outstanding Investigative Journalism," UBC Graduate School of Journalism, accessed 4 April 2012, http://www.publicaffairs.ubc.ca/2010/09/27/ubc-graduate-school-of-journalism-wins-emmy-award-for-outstanding-investigative-journalism/.
[4] "CMRC," UBC Graduate School of Journalism, accessed 1 Sept 2012, http://www.journalism.ubc.ca/about/cmrc/.
[5] For the purposes of this case study, authenticity is ascertained through establishing a record's identity and demonstrating its integrity.
[6] "Project Overview -- InterPARES 3," InterPARES, accessed 2 September 2012, http://www.interpares.org/ip3/ip3_overview.cfm.
[7] InterPARES 3, "UBC School of Journalism: Final Report," InterPARES, accessed 9 March 2012, http://www.interpares.org/ip3/display_file.cfm?doc=ip3_school_of_journalism_final_report.pdf.
[8] Source files are the un-edited raw media files as shot in the field, prior to the creation of sub-clips.
[9] Sub-clips are discrete video clips of one particular theme or topic that are of one continuous shot.

a corresponding project file, which is an XML-based file with pointers to every sub-clip used in the documentary, the location of the sub-clips at time of rendering, the order of the sub-clips within the documentary, and which portions of the sub-clips were actually used. In the last step of the editing process, the project file is rendered (the specified portions of the selected sub-clips are combined in the appropriate order) into a final project—a feature length, single video file suitable for television broadcast. Course instructors use the final project as the basis for assigning marks to the students enrolled in the class, and distribute the file to various news agencies for possible airing on their network.

2. Challenges

The first major challenge addressed in the case study was to define which video assets—source files, sub-clips, interim clips, project files, final projects, etc.—were to be stored within the HD Video Archives. The Dean of the School, the Chair of the Graduate Program, and the GRAs from the Archives and Journalism programs all possessed different views of: what the 'asset' was, the purpose of the HD Video Archives over the long-term, and the types of material that needed to be stored within the archives. Over the three years of the case study, the team continued to revisit the issue of what material 'should be' in the archives, with slight evolutions in the definition with each successive discussion. Determining which assets should be placed within the archives was complicated by the fact that, due to the collaborative nature of the final project drawing from a large number of sub-clips shot at various locations by any number of the participants in the class—student and instructors alike, determining the authorship of each sub-clip was virtually impossible.

Other challenges were presented in the form of specific constraints in the design of the HD Video Archives based on the existing practices and capabilities of the SoJ.

2.1 Artistic constraints

The SoJ considered the media assets stored within the archives as recyclable assets; that is, the intention from the beginning was that the assets in the archives were to be re-used for future works. The SoJ was less concerned about where the sub-clips came from and how they were used, but rather focused on how those clips could be used on other projects; as their view of the primary purpose of the archives was to centralize, organize, and preserve the assets for future journalistic pieces, by UBC students or external journalists. As such, the 'recordness'[10] of the sub-clips was of a secondary nature to the SoJ. The only pieces contained within the archives considered inviolable were the finished clips produced by the students and other completed works donated from outside sources.

The workflow constraints on the use of the media assets were also clearly articulated: any policies or procedures developed should not interfere with current workflow processes, add undue burden to the students' workload, or hamper the inclusion of the media assets in future productions. The archives is viewed by SoJ as a means to quickly and efficiently locate documentary footage that has been preserved in a way that ensures its authenticity in order to produce artistic pieces of journalistic expressions along a multitude of topics. The software used within the SoJ to create the documentary works, in this case

[10] Anne J. Gilliland and Philip B. Eppard, "Preserving the Authenticity of Contingent Digital Objects," *D-Lib Magazine* 6, no. 7/8 (July/August 2000), accessed 25 August 2012, http://www.dlib.org/dlib/july00/eppard/07eppard.html.

Apple's Final Cut—a product that in 2008 accounted for a 49% market share—dictated the workflow of how the assets are used.[11]

2.2 Technology constraints

Due to the limited budget at the SoJ, any recommendations had to work within the limited grant funds available while leveraging the existing technology environment to the extent practicable. Along with the budget constraints, the SoJ also had very limited technology support available to it. Most tech support for the School is received through the UBC Department of Technology, which provides "IT-related strategy, applications, infrastructure, and support services to the UBC community."12 While experienced at providing desktop and network technical support, UBC IT has little experience in supporting the Final Cut suite of products. Combined with the proprietary nature of the Apple product, there is a cap on the amount of customization that is possible to the existing software, both from an infrastructure/ programmatic perspective, as well as procedural.

2.3 Legal constraints

The SoJ is an academic unit with the UBC Faculty of Arts and therefore is governed by the policies of the University and the admissions and curriculum requirements established by the UBC Faculty of Graduate Studies. As such, the work produced by the students stored within the archives are more than simple artistic works of journalistic expression—they are also records in the classic sense[13] in that they are evidence of the SoJ's execution on its mission[14] as well as evidence supporting the students' marks received in the course. The fact that the final projects are 'records' places the additional requirement on those particular pieces of student work that they be managed in accordance with the approved UBC retention schedule. The SoJ is also subject to the requirements of the *Freedom of Information and Protection of Privacy Act*, R.S.B.C. 1996, c. 165 requiring disclosure of those records maintained by the SoJ not explicitly exempted. UBC Policy 88 states that students retain intellectual property rights over the works that they produce, which mirrors the intellectual rights and moral rights laws. In Canada, while the intellectual rights can be assigned to third parties, the moral rights stay with the creator.[15] As mentioned earlier, due to the collaborative nature of the works created at SoJ, ownership over the materials—and by extension the SoJ's right to place the material online for public access—required review by UBC legal counsel specializing in intellectual property.

2.4 Resource Constraints

The need for a HD Video Archives was not recognized in time to submit requests for additional funding, staff or resources in the current budget cycle. As a result, the SoJ had extremely limited funds and staffing

[11] "Final Cut Pro Apple of Oscar's Eye," C/Net News, accessed 3 March 2012, http://news.cnet.com/8301-13579_3-10465202-37.html.
[12] "About UBC Information Technology," UBC IT, accessed 15 August 2012, http://it.ubc.ca/about.
[13] "A document made or received in the course of a practical activity as an instrument or a by-product of such activity, and set aside for action or reference." From the InterPARES Terminology Database, accessed 4 September 2012, http://www.interpares.org/ip2/ip2_terminology_db.cfm.
[14] UBC School of Journalism Academic Calendar, op. cit.
[15] Luciana Duranti, "The long-term preservation of the digital heritage: a case study of universities institutional repositories," *Italian Journal of Library and Information Science* 1, no. 1 (2010): 160.

that it could dedicate to the development of the archives. What funding they did have available was received through a grant to support the preservation of the International Reporting Class's documentary footage—the grant was from the same source who donated the funds for the creation of International Reporting Class. The donated funds allowed the school to hire a technical consultant to install the FCSvr system; and, fortuitously, this consultant was able to arrange the donation of additional servers and a Storage Area Network (SAN) from a third party. The collaboration with InterPARES supplemented the limited staff and provided the much needed knowledge and experience in digital preservation. Toward the end of the project, the SoJ hired two additional summer interns to assist with the importing the 2009 and 2010 International Reporting Class footage into the archives. After the first summer, one of the interns continued on the project for eight months until the funds ran out.

3. Creation of the HD Video Archives

After a series of meetings to establish the project goal, expected outcomes, operating constraints, and timelines, the GRAs conducted an extensive investigation into the workflow used by the SoJ, the technical infrastructure available, and the current policies and procedures used by the students. The GRAs then researched journal publications, the findings from InterPARES 2,[16] and the practices of several other video archives and news bureaus in order to determine current best practices for preserving digital video in a production environment. From this baseline, the GRAs created a series of recommendations for the creation and management of a HD video archives.[17]

3.1 Define assets to be stored

Through three years of the case study, the types of materials that were to be stored in the archives evolved as technology, policies, and staffing changes presented new opportunities to open the archives up to a wider definition of what material was appropriate for inclusion. To provide a consistent approach to the selection of materials for inclusion in the archives, the SoJ formally defined what the HD Video Archives was, including its mission, targeted user group, and the types of materials that it would be accepting for inclusion into the repository. Having this definition in written form provided a consistent application of the rules for inclusion across the School, the many classes, and the students who perform the work. This definition is static; rather it should be periodically reviewed for expansion or clarification, as needed by the introduction of new hardware, software, or new partnerships/donors.

3.2 Establish required authenticity and preservation metadata

Maintaining the authenticity of the media assets in the archives over the long-term requires that a very specific set of metadata be captured and/or created at the time the media files are produced and expanded when the assets are added to the archives. InterPARES2 studied the metadata necessary for long-term preservation as detailed in the Chain of Preservation (COP) model. The COP model describes the

[16] InterPARES 2, *International Research on Permanent Authentic Records in Electronic Systems (InterPARES) 2: Experimental, Interactive and Dynamic Records*, ed. Luciana Duranti and Randy Preston (Padova, Italy: Associazione Nazionale Archivistica Italiana, 2008).
[17] For a more comprehensive description of the findings and recommendations, see the "UBC School of Journalism: Final Report," op. cit.

lifecycle of a record from creation through final disposition, i.e., destruction or permanent retention in an archives. From this model, the team created an extensive list of metadata pertaining to the authenticity of electronic records over the long-term.[18] In addition to archival and authenticity metadata detailed in the COP model, the GRAs heavily researched the PBCore and MPEG-7 metadata models used extensively in the media industry.

It was determined that the MPEG-7 model was too complex for the SoJ's purposes; to implement such a metadata model would violate the constraint of an efficient workflow production system. PBCore, on the other hand, matched a number of the COP elements and is a widely adopted metadata standard developed for the public broadcasting sector. The PBCore metadata schema allows for a high level of interoperability amongst public broadcasting stations and therefore strongly mirrored SoJ's desire to share the assets contained within the archives with other journalists and the public. The hierarchical arrangement of content classes, containers, sub-containers and, finally the elements within PBCore further allowed for the level of customization necessary to accommodate both the industry metadata elements and the archival metadata elements required. The content classes are "created as 'conceptual wrappers' that cluster together a list or structure of thematically-related Elements (metadata fields and their attributes and properties)."[19]

The four content classes allow for grouping the metadata elements into intellectual content (unique information about the asset such as title, unique ID, creator, etc.), intellectual property (owner, copyright holder, usage rights and restrictions, etc.), instantiation information (date created, aspect ratio, frames per second, video format and resolution, etc.) and finally the PBCore extension (additional metadata requirements that have been crafted by organizations outside of the PBCore Project.)[20] This last content class allowed for the inclusion of the COP metadata elements into the overall PBCore structure—allowing for the capture of the necessary authenticity and preservation metadata while still maintaining a high level of interoperability with other journalism organizations. The full list of metadata elements used in the HD Video Archives is in Appendix C of the Final Report.[21]

3.4 Establish Ownership over the assets in the archive

Establishing the intellectual rights ownership over the assets within the archives required a two-pronged approach: one for legacy materials and one for future materials. Working with UBC's legal department experts on intellectual property, the SoJ determined the appropriate measures to take in order to establish ownership of the video assets created in years past, while concurrently creating a licensing agreement for future SoJ students that will assign the ownership of material created to UBC. Even with the license in place, the issue how the use of those video assets by third party journalists will or will not conflict with the moral rights of the students creating the sub-clips has yet to be resolved. Additionally, several donors have also expressed interest in donating documentary video material to the SoJ for inclusion in the

[18] InterPARES 2, "Appendix Fourteen: Chain of Preservation Model Diagrams and Definitions," in *International Research on Permanent Authentic Records in Electronic Systems (InterPARES)2: Experimental, Interactive and Dynamic Records*, ed. Luciana Duranti and Randy Preston (Padova, Italy: Associazione Nazionale Archivistica Italiana, 2008), accessed 6 August 2012, http://www.interpares.org/ip2/display_file.cfm?doc=ip2_book_appendix_14.pdf.
[19] "Background of the PBCore Public Broadcasting Metadata Dictionary Project," PBCore, Corporation for Public Broadcasting, accessed 4 March 2012, http://www.pbcore.org/PBCore/PBCore_background.html.
[20] Ibid.
[21] "UBC School of Journalism Final Report," op. cit.

archives, and by extension reuse by SoJ students, other journalists, and the public at large. Given the potential diversity of sources and unknown provenance of some of the material within the archives, the ownership—or lack thereof—is described in the metadata schema along with the usage rights according to the designations created for the Creative Commons licensing matrix.[22]

3.5 Document current practices

Early research into the workflow process used at the SoJ between 2008 and 2009 found that although a workflow process theoretically existed for the International Reporting Class, it was determined that the students enrolled in the class were not following the expected workflows. Each student used the methods and processes that were most comfortable for them, resulting in a wide variety of storage locations, disparate folder names and folder structure, and naming conventions unique to each student. It was determined that this inconsistency was due, in major part, to the lack of a consistent training method and no identified trainer responsible to communicate the expectations to the students. Given that each subsequent year a new group of students is selected for the International Reporting Class, a large percentage of the group of individuals creating, describing and adding content into the archives possess no experience in the process. Such diversity in location and naming of the media assets would quickly make locating material in the archives extremely difficult. To mitigate this individualism in management philosophy, each student is now trained according to a workflow that details the expectations, policies, and procedures that they will need to be familiar with before starting their respective documentary projects. For the sake of consistency, the entire process was documented—with both textual descriptions as well as screen captures for illustration—for each type of camera that was used for the class. By the end of the case study, three generations of cameras were used, requiring three separate sets of documentations, as each camera captured and outputted the video files differently.

3.6 Assign staff to manage and oversee the archives

The students enrolled in the International Reporting Class create a majority of the content of the archives; meaning that every year a new crop of students will be creating, indexing, and managing more assets that need to be included in the archives. This presents two challenges to maintaining a trustworthy archives over the long-term: first, students, in general, tend to be more focused on satisfying the requirements for their class than they are on accurately describing assets for future use by parties unknown; and second, every year begins a new group of students with little to no experience describing digital assets, resulting in often very divergent approaches to indexing amongst themselves and from the procedures manual they are *supposed* to follow. While the instruction and documentation discussed above can overcome these challenges to some extent, they are not a panacea to the problem.

To provide a check on the work of the students, as well as to refine the current policies and procedures, the SoJ hired project staff to perform quality assurance checks on all the new assets added to the archives. The QA staff, having the most familiarity with the system and indexing criteria, has the reasonability to train the students. Prior to the class going into the field, the QA staff reminds the students of the accepted methods and provides them with copies of the documented procedures to take with them. Once the students return, the QA staff conduct checks on the assets that were added into the system—

[22] Tama Leaver, "Creative Commons: An Overview for Educators," *Screen Education* 50 (Jan 2008): 38-43.

making corrections as necessary and additional training as required. The QA staff members—previous students who have already experienced the process start to finish and free-lance journalists who can come back year after year—also have the primary responsibility for processing of the backlog of assets that have accumulated over the years.

3.7 Provide necessary resources for rapid access, expansion

Given that the primary purpose of the HD Video Archives is to provide long-term trustworthy access to documentary material for reuse on future projects, and given that these assets can be several gigabytes in size, it is important to the success of the project that the system be able to move these assets from the storage subsystem out to user—whether they are on campus or across the globe—quickly and accurately. Providing a robust user experience requires implementing sophisticated technology, which is at odds with the low budget, low-staff constraint established by the SoJ. Moving large video files around from storage devices to editing machines is best-accomplished utilizing Fibre Channel protocols through SAN sub-systems. Fortunately, a large video production house in Vancouver donated some older SAN equipment to the SoJ.

In addition to providing fast access to large files, the SAN system will also allow for a relatively seamless expansion of the storage pool following a growth-on-demand approach. That is, by starting with a relatively modest four terabytes of SAN storage, the SoJ will be able to add additional terabytes of storage by purchasing storage enclosures without having to purchase additional servers or storage controllers—equating to a lower *per terabyte* cost moving forward. Due to the speed of the Fibre Channel protocol, standard Cat-5 wiring does not have sufficient bandwidth to maintain pace with the storage sub-system. To ensure the fastest transfer possible of the video files from the archives to the video editing stations located through the building, SoJ installed optic cables at key points. While this provides a robust user experience within the building, external users are still limited by the capacity of their internet provider.

3.8 Develop backup policies and procedures

The urgency for a robust backup of the HD Video Archives is two basic issues: first, equipment fails—donated electronic equipment that has already been heavily used more so—and best practices recommend creating a backup to protect against any single point of failure; second, FCSvr is a proprietary system—meaning that subsequent versions may not be backward compatible or the vendor may, at some point, stop supporting it altogether. As part of the backup policy, the assets in the archive are mirrored onto a second set of hard drives to protect against the failure of any single hard drive or storage component. A tape drive was acquired with appropriate back up software, but funding has limited the number of tapes that could be procured. In the short term, this constraint is limiting the extent to which the entire system can be safe guarded against localized events (fire, flood, earthquake, etc.). The preferred backup strategy would entail both local backup through replication to a secondary storage array, as well as a tape backup that is maintained at a location 30kms or more away from the primary system to protect against data loss due to localized disasters. In the next budget cycle, the SoJ will be requesting additional funds to extend the backup policy to allow for both quarterly full backups as well as weekly incremental backups. Backup policies are only as good as there execution; it is important that the backups been routinely screened for accuracy by restoring the backups and comparing the results to the originals. This strategy has the twofold

benefit of ensuring that the backup policy accurately protects the specified material[23], and providing the IT staff with the familiarity of how to quickly and smoothly conduct the backup and restore procedures in the event that the system needs to be restored.

3.9 Export data

Maintaining the assets exclusively in a proprietary system places said assets at risk of becoming inaccessible as time and technology render the software platform obsolete. Based on the findings of the previous InterPARES projects, the SoJ was encouraged to maintain a copy of the original media assets, along with the corresponding metadata uniquely tied to the original asset, outside of the FCSvr system. The reasoning behind this recommendation was that in the event that the software platform becomes obsolete, is no longer supported, or the SoJ moves to a different software/hardware/technology platform, the original assets could be migrated onto the newer platform along with all the metadata that was created for the asset.

3.10 Use standardized naming conventions and descriptions

Unique file names are necessary to differentiate one media asset from another. While this function can be handled by the database contained within FCSvr through the use of GUIDs,[24] the GRAs on the project recognized two scenarios where the media assets themselves needed to be human recognizable. The first related to the fact that one of the primary purposes of the archives is to provide public access to the assets in the system. As it is unlikely that a majority of the external users will have FCSvrs of their own, these users will have to export the assets from FCSvr and store them locally. Outside the FCSvr system, the GUID file nomenclature would be of little use to the journalists. The second scenario centered on the goal of this case study to provide long-term access to the media assets created and stored within the archive. The GRAs determined that reliance upon a piece of proprietary software to maintain the link between file and metadata was not in the best interests of the project. One way to avoid this reliance on a proprietary software intermediary is to create a file name that makes sense to the people using the files.

Guided by Anne Thompson's work on standard naming conventions,[25] the GRAs recommended the naming of individual media assets using the following elements:

1. Course number
2. Project name
3. Date
4. Sequence number

Following the recommended nomenclature allows for a basic understanding of the context of creation of the asset without having to open the file itself. Additionally, two other key indexing fields within the FCSvr workflow provide further information about the media assets in a standard format.

[23] That is, the backup copy is able to completely reproduce those files it was instructed to backup and that the restored files are exactly the same as the originals that they are reproducing.
[24] Globally Unique IDs – GUIDs are 128 bit values typically stored as a 32 bit hexadecimal values allowing for 2^{122} possible values that can be assigned.
[25] Anne Thompson, "Standard Naming Conventions for Electronic Records," accessed 14 November 2009, http://www.sfu.ca/archives2/rm/rm_fundamentals/07UKFileNamingConventions.pdf. The naming conventions recommended were developed according to the format outlined in this document.

For the description field, the description starts with the type of clip it is—interview, b-roll, A camera, B camera, etc.—followed by the formal name(s) of the interviewee(s), the name(s) of the interviewer(s) and the primary subject or purpose of the shot. The location is described first with the formal name of the location of the shooting (e.g., name of hospital, park, or place of business), the city where it is located, the state or province, the country, and the date of creation in ISO format.[26] The file naming convention combined with the description format provides sufficient information about the file to provide users a basic understand of what the context of the file, such as when and where it was shot, the names of the main parties involved in the footage, and the type of footage it is. Most importantly, the video assets are identifiable outside of the FCSvr system; providing a limited failsafe in the event that the need arises to replace the Final Cut product.

3.11 Migrate to supported products

Within information technology, the only surety is change. Moore's law states that speed and capacity double every eighteen months,[27] and as a result, the lifecycle of software products averages two to four years. With the introduction of new products, older products are no longer supported. On average, new versions of major software products are released every two to three years, with technical support typically available only for up to the three previous versions.[28] This approximately equates to a ten year window as a theoretical maximum in which to use software before it is no longer supported. This window can be much shorter based on major changes to hardware and operating systems, such as the migration from 32-bit computing to 64-bit computing. It is in the best interests of the archives that the SoJ maintain the system using vendor supported versions of software—resulting in an software upgrade every two to six years in order to stay within a support window.

Without vendor support, the archives will become increasingly more difficult to maintain and potentially become incompatible with future technology releases. A lack of vendor support will require the SoJ to keep the current generation of software and hardware operational indefinitely. Over the short term this is a plausible approach to the problem, but as the file sizes continue to increase exponentially (such as with the adoption of the 4K family of digital video)[29] and hardware migrates fully to the 64 bit computing platform, the current generation of technology may not be able to handle the increased demand put on the system. To maintain the compatibility of the existing system with newer technology, the SoJ would need to conduct extensive testing of the newer technology prior to introducing any changes to either the hardware or the software platforms. At some point in the future, it is highly likely that FCSvr will simply no longer function on the latest generation of technology.[30]

[26] International Standards Organization, ISO 8601:2004 Date Elements and Interchange formats – Information Interchange – Representation of dates and times. 2004.
[27] G.E. Moore, "Cramming More Components Onto Integrated Circuits," reprinted in *Proceedings of the IEEE* 86, no. 1 (Jan 1998): 82-85.
[28] "Office Family Product Support Lifecycle FAQ," Microsoft Corporation, accessed 14 August 2011, http://support.microsoft.com/gp/lifeoffice.
[29] Current HD technology utilizes 1080 lines of resolution, each frame equivalent to a two-megapixel photo. The large-budget movie industry is switching over to the newer 4K platform that captures 4096 x 3072, or each frame having the equivalent of a 12.6 megapixel photo.
[30] For example, WordStar and Dbase, two widely adopted programs (for word processing and database management, respectively) from the 1980s ceased to function on the x86 platforms of computers of the 1990s.

4. Conclusion

The SoJ requested InterPARES3 to "research, create, and implement a plan to preserve and index a high definition digital video archive in online and electronic formats."[31] What resulted from this case study was an in-depth analysis of the existing workflows, policies, procedures, training, technology, and staffing used in the International Reporting Class. Based on the analysis and extensive research into existing best practices used by major news bureaus, a series of recommendations were presented to the Dean of the SoJ and a majority of the recommendations was put into practice. Along with the recommendations, the GRAs created procedures manuals for each type of camera being utilized in the class, the UBC legal department developed a licensing agreement for each student to sign before going into the field, and a new metadata schema was developed that would allow for the capture of management, archival and preservation metadata.

By the end of the case study, the SoJ under the direction of the InterPARES GRAs installed an entirely new hardware and software system. These upgrades expanded the capabilities of the SoJ to provide UBC students and the public access to a growing collection of video assets while providing increased system response, a noticeable improvement in the movement of the files across the network, greater storage capacity, and remote backup of the assets and their associated metadata. Rules of operation were created within the FCSvr workflow system allowing for rights based access to active and donated media files, identity management allowing for the identification of file creators and editors, and controllers over the editing and deletion of inactive media assets (such as student's final projects and donated material). Lastly, the design of the network allows for the seamless addition of servers or storage following a growth-on-demand philosophy; allowing the SoJ to maximize its limited funds through targeted hardware procurement.

Shortly after the case study ended, the first great challenge to the longevity of the archives arose. One of the 'worst case scenarios' came to light—Apple announced that the Final Cut Server software upon which the archives was built was going straight to end-of-life.[32] Dealing with this scenario will prove a robust test to the veracity of the recommendations implemented by the SoJ. When a product reaches end-of-life, Apple will no longer provide any support for the product, nor would they test the compatibility of the legacy product with upcoming Apple Operating System software or provide patches/fixes/updates to any issues that arise. The current strategy at the SoJ for addressing this issue is to keep the current generation of hardware and software functional for the foreseeable future, while addition funds are requested to upgrade the entire system to a newer platform. If funding can be obtained, a new round of research will be conducted into the capabilities of current the video editing systems to meet the needs of the SoJ, its students, its mission, and its ability to continue to share its invaluable media assets with journalists and the public around the world. Until such a time as the migration to a new platform becomes feasible, the SoJ will continue to back-up the images and export all of the metadata via XML files in preparation for migrating the same into the new system.

[31] "UBC School of Journalism Final Report," op. cit.
[32] "Final Cut Server has been discontinued," Apple Corporation, accessed 14 Mar 2012, https://discussions.apple.com/thread/3131590?start=0&tstart=0.

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