Spartan Archive: An Electronic Records Archive at Michigan State University

NHPRC Project #RE-10025-10

Interim Narrative Progress Report, March 31, 2013 - November 30, 2013

Status

Background

This report addresses activities undertaken on "Spartan Archive: An Electronic Records Archive at Michigan State University," a National Historical Publications and Records Commission (NHPRC)-funded project between April 2012 to November 2013 (subsequently referred to as Spartan Archive in this report). The Michigan State University Archives & Historical Collections (UAHC) is using a proof-of-concept approach to build and test an archival solution for the long-term access and preservation of four large electronic records series produced by MSU's Office of the Registrar (RO). The original grant proposal and supporting documents for the project may be found at
http://spartanarchive.wordpress.com/project-documentation/.

During most of 2012 and early 2013, the project experienced several unforeseen situations which resulted in a request to NHPRC program officer Nancy Melley for a no cost extension for an additional year. This request was officially submitted in early March 2013 and followed soon after with a report that included both a status update and the revised approach for the final, extended year. The revised approach was specifically addressed the longevity of the Spartan Archive project which became too focused on targeting the Office of the Registrar record series. Information technology staff from central IT at Michigan State University joined the new revised project that included both the original, narrowly-focused project code and research, testing, and development towards a long-term, university-wide Trusted Digital Repository, subsequently referred to as TDR in this report.

The following report summarizes the progress of the project over the past six months, based on the revised approach as outlined in the request for one year's no cost extension.

Gap Analysis Updates

Status of the gaps that were identified both in the March 5th letter for a no cost extension (NCE) and March 31st status report (SR0313) are detailed below.

Lack of Robust Storage Infrastructure

Storage infrastructure exists. The Spartan Archive project currently uses a large centrally-supported storage solution with backup which replaces the dark archive. This current

storage infrastructure and process is suitable for the project, but is not an economically viable long term solution. A long term solution based on two storage devices where one will be available to access mechanisms and another to be used as a dark archive has been put in place for the TDR. Eventually, the work of the Spartan Archive project will need to be moved to this long term solution.

Incomplete Programming Development

Both NCE and SR0313 indicated that there would no longer be a single point of failure due to lack of programming resources. The NCE said there would be a buy-out of several programmers. We have been fortunate to get a current IT Services staff programmer, Eric Holp, assigned to this project 100% time soon after the NCE was submitted. Eric Holp has Java programming skills and other related experience. Other IT Services staff have also been assigned to the project. The project has a much bigger technical team, but still only one person who is knowledgeable and can focus on the Java code.

Dissonance with TRAC

Dissonance with TRAC was included in the NCE and then addressed in the SR0313. In late spring 2013, Cynthia Ghering gave a presentation to technical staff about ISO 14721: 2012, Open Archival Information System (OAIS.) More work continues being done in regards to educating technical staff. Information technologist Felicia Berryman has been involved with the Spartan Archive project since spring 2012 and had been recently taking a larger role in educating IT staff about the work of archivists. In essence Felicia is learning about archival workflows and translating these processes into system requirements for the technical staff. The ability to bridge the different cultures and languages of the archives and IT world has been a major challenge of this project and a critical component in developing a sustainable TDR for the university.

Lack of Scalability

UAHC staff began investigating additional tools and processes in order to align the Spartan Archive Project better with its original goal which was to develop an electronic records archive for the university, through a proof of concept system archiving the four records series from the Registrar's Office. As mentioned in the NCE, the project got off target in 2011 with programming and workflow focused narrowly on the RO records-series. In other words, programming code that worked only with the current iteration of the RO databases and impossible to scale to include updated versions of the RO databases let alone other digital records transferred from other university offices. Significant effort was put towards implementing Archivematica to expand the workflows and processes to accommodate ingest of a variety of born-digital record series. Information Technologist Raman Padmanbhan has dedicated significant work towards the TDR, particularly with his work with the Archivematica software. He's also been available to help the project with research and explanation of some of the more technical aspects of the project.

Project Administration

As identified in SR0313, a project manager was assigned to the project. Patrick Pramov was identified in SR0313, but was replaced by Kenneth Jodway after Patrick Pramov took a job elsewhere. There have been marked achievements in regards to the area of project

management, a critical component in the success of a complex technical project spanning several university departments. A detailed Project Plan was developed in Microsoft Projects and includes major milestones, detailed tasks, resource alignment including staff with specific technical skills and frequent "red, yellow, green" status reports focused on achieving our tight deadline. A biweekly "scrum" meeting (based on the concept of agile development) is held in central IT and all major participants attend to report on their progress over the past two weeks. Staff working on the project are much more aware of the status of each task, when/where/if the project is slipping and the upcoming two week goals. If tasks are not achieved and are categorized as "yellow" or "red" the constraints or roadblocks are identified quickly and workarounds are established, thereby reducing out of scope work or task slippage.

Gaps in Submission, Ingest, and Processing Workflows

Eric Holp has been able to identify and fix many errors in the Java programming developed by the former programmer and former project manager. Errors identified previously in last report:
1. Lack of an official submission process.
2. Missing agreement and contextual donor/office information.
3. Lack of notification back to the producer.
4. Acknowledgement that a submission was received.
5. And lack of notification to the archivist that files have been transferred from client.

The following progress has been made in each of these areas:
1. TAPER[1] has been installed and customized. Early tests have been successful, but some additional modification work will be needed in order to incorporate TAPER into MSU's TDR workflow.
2. See above, TAPER.
3. The notification error has been fixed and tested, but still needs to be launched in production.
4. Same as #3.
5. Same as #3.

Project Administration and Staff

University Archives and Historical Collections

Cynthia Ghering, Project Director

Cynthia Ghering is the Primary Investigator and Project Director of the Spartan Archive project, NHPRC RE-10025. She is director of the Content and Collaboration Teams in central IT Services and director of the University Archives and Historical Collections at Michigan State University. The IT Services Content and Collaboration Teams coordinate tools and services that support productivity tools including content management and repositories, core office services, institutional messaging (e-mail) and calendaring services, web development and hosting, call-in

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[1] TAPER: Tufts Accessioning Program for Electronic Records funded by NHPRC from 2008-2011.

service centers, and desktop support. Cynthia is an intermittent instructor at the University of Michigan's School of Information and teaches in SAA's Digital Archives Specialist program.

Portia Vescio

Portia Vescio is the assistant director of UAHC and manages the day to day activities of the archives and records management program. Portia has taken a management role in the project, specifically as it relates to the contributions of the electronic records archivists. She continues to educate herself on the OAIS framework and is working towards a Digital Archives Specialist certificate through SAA's new digital archives curriculum.

Lisa Schmidt

Lisa Schmidt is an electronic records archivist for UAHC. She was originally the project manager for this project, RE-10025. Lisa has continued working on the project and has assisted in the implementation and testing of Archivematica and the development and testing of new workflows. She is also conducting our self audit based on the TRAC criteria and developing documentation to address several important components of the checklist. Lisa is also exploring collaborative opportunities with the MSU Libraries and their development of an Electronic Thesis and Dissertation (ETD) repository.

Ed Busch

Ed Busch is an electronic records archivist for UAHC and has taken on additional responsiblity in the project than originally envisioned in 2009. Ed is developing and testing new workflows for the ingest, accessioning and processing of born-digital records. Ed is a former IT software developer and is using his past experience to help develop technical requirements for OAIS based functionality still needed in MSU's TDR. Ed is also a leader in the Mid-Michigan Digital Practioners' Group, based on the Library of Congress and National Digital Stewardship Alliance's (NDSA) call to action.

Office of the Registrar, Spartan Archive Client

Kristin Schuette

Kristin Schuette is the Associate Registrar for Technology. She has been the acting RO systems analyst on the Spartan Archive Project since Fall 2010. Kris initiates the transfer of the digital files from the RO's databases and re-submits as needed until the files have been successfully ingested and validated.

Central IT, IT Services

Trevor Barnes

Trevor Barnes works for IT Services on the Web Development and Hosting team. Trevor Barnes is a web designer with a specialization in design, usability and branding. He has been assisting both with the original Spartan Archive pages and TDR portions of the project with design mock-ups for the public interfaces - both the MSU version of TAPER for university offices to submit transfer agreements and the user access interface to search and browse the four

archived record series from the Registrar's Office. Trevor has also provided support with technical research and consulting.

Felicia Berryman

Felicia Berryman works for IT Services on the Collaborative Services and Support team. She has been involved with the project since April 2012 as a system administrator and database administrator. She often served as the sole point of contact for technical questions from UAHC staff until the recent project expansion. She has helped educate IT Staff on archival processes and continues serving in the role of intermediary between UAHC (archivists) and IT Services (technical support.) Felicia Berryman has helped out considerably with documentation, especially in the technical arena. Felicia has also participated in the collaborative digital preservation initiatives with the MSU Libraries.

Anthony Beyers

Anthony Beyers works for IT Services on the Web Development and Hosting team. He is the systems administrator for the majority of centrally-supported web hosting for MSU. Tony has contributed to the project by installing Islandora, a potential web access solution for the TDR, and assisting with infrastructure design of access technology, and exploration of cloud storage as a potential backup storage solution.

Jeffrey Daniels

Jeffrey Daniels works for IT Services on the Web Development and Hosting team. He has worked on many content repositories and content management systems, including the web content management system, Hannon Hill's Cascade Server, powering msu.edu. Jeff is a search and retrieval expert and developed and maintained search.msu.edu, keyword search and several online directories. Jeff researched extensively in the area of Fedora, Islandor, Hydra and other sustainable access interfaces for the TDR. He is also the functional lead of the Islandora software implementation tasks and is working on system requirements and configuration. Jeff is also participating in collaborative initiatives with the MSU Libraries.

Steven Devine

Steven Devine is the Assistant Director of IT Services Content and Collaboration and brings considerable programming, system administration and technical management experience to the project.. Steven Devine manages many of the IT technical staff in the project and reports directly to Cynthia Ghering. Steve is playing a significant role in the design of the technical infrastructure and consulting on system requirements. He put in place several development systems and worked directly with staff in the virtual server team to set up the necessary server environment to support the complexity of the TDR. Steve has also educated himself on the OAIS framework and digital preservation and is applying this knowledge directly in the administration of this project.

Denyson Figueiredo

Denyson Figueiredo works for IT Services on the Collaborative Services and Support team as a storage administrator. He has helped configure storage for both development, test, and long term production storage for the TDR including the "quarantine" area and pre-ingest holding area.

Andrew Gianni

Andrew Gianni was mentioned in the last narrative report, but left MSU before he could work on web development. Eric Sampson has been hired as his replacement on the Web Development and Hosting team.

Eric Holp

Eric Holp works for IT Services on the Collaborative Services and Support team. He is a programmer and has been dedicated to the project full time since March 2013. He has done extensive testing on the current code base. In addition, he has been able to fix multiple errors in the original Spartan Archive code, salvaging months of programming work. Eric installed and customized a test version of TAPER which will be used to facilitate submission agreements as university units transfer born-digital records to UAHC. Eric created a preservation verification solution for systematic and consistent checksum validation of the files preserved long-term in the TDR storage. Eric also participates in collaborative initiatives with the MSU Libraries.

Kenneth Jodway

Kenneth Jodway works for IT Services on the Collaborative Services and Support team as a project manager. Ken facilitates bi-weekly project progress meetings in addition to working individually with all project staff helping direct progress and task achievements. Ken's efforts in performing the "red, yellow, green" status updates are vital to the success of the project.

Debbra Malcangi

Debbra Malcangi manages the Web Development and Hosting team. She has helped allocate resources and provide consulting for the project design and technological design. Debbie also brings considerable technical project and resource management experience to the project. She has educated herself on the OAIS framework and is an invaluable resource in breaking the project into small achievable tasks.

Raman Padmanabhan

Raman Padmanabhan works for IT Services on the Collaborative Services and Support team. Raman Padmanabhan has assisted UAHC for the past few years on virtual retention services. Since the last narrative report, Raman has set up numerous development, test, and production environments of Archivematica for the TDR. He has helped with technical research for UAHC in many ways with a recent example was his investigation of the ACE, Audit Control Environment, software that may one day be incorporated into the TDR. Raman has also been available to be an additional technical contact for UAHC staff

Patrick Pramov

Patrick Pramov was mentioned in the last narrative report, but shortly after left the university. His duties were taken over by Ken Jodway.

Eric Sampson

Eric Sampson is a recent hire to the Web Development and Hosting team. He has a background in web programming and application interface development. Eric also brings experience in search interface design and development..

Ryan Wells

Ryan Wells worked for the Web Development and Hosting, but has recently left that team before getting to the Usability Centered design and ADA testing that was mentioned in the last narrative report.

Design, Development, and Implementation

Improved Integration with IT Services Personnel

From the start of Spartan Archives, there has been collaboration with IT Services. New possibilities for collaboration were opened when Michigan State University's central information technology units combined and reorganized into one unit, IT Services. During the reorganization, UAHC and a new department in IT Services, Content and Collaboration, were aligned under Cynthia Ghering who serves as director to both areas. Content and Collaboration now consists of seven teams with a staff of 65 FTE. In April of 2012, Felicia Berryman was assigned to assist with the Spartan Archive project as systems and database administrator. Felicia Berryman was also the primary contact for all technical issues related to the Spartan Archive project. In June of 2012, storage administrator Denyson Figueiredo began contributing to the project with work towards setting up sustainable storage. His past experience includes working on similar storage devices to the ones purchased for the TDR. In November of 2012, Raman Padmanabhan helped assist as an additional system administrator, primarily with the Archivematica software in the TDR. Project manager Patrick Pramov was enlisted to put the Spartan Archive project into a formal project management plan in February 2013. Patrick Pramov left the university in June of 2013. Project management was re-assigned to Kenneth Jodway. Programmer Eric Holp was assigned to work on Spartan Archive full time March 2013.

Integration between UAHC and IT Services was substantially increased starting June 2013. Bi-weekly scrum[2] meetings were scheduled to review the project plan and status update. Participants included not only the IT Services members listed above, but also archivists and those from IT Services who would be needed to work on access solutions and additional proof-of-concept testing for the TDR, with a focus on sustainable solutions for the MSU technical environment. Details describing the work of all the IT Services participants are listed above under the Project Administration and Staff section.

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[2] **Scrum** is an iterative and incremental Agile software development framework for managing software projects and product or application development. Its focus is on "a flexible, holistic product development strategy where a development team works as a unit to reach a common goal" as opposed to a "traditional, sequential approach". Source: Wikipedia, accessed December 2013.

IT Services Technology Integration

A university-wide, web-accessible shared storage solution (AFS with NetFiles web front-end) was used for transfer between the RO and UAHC. Centrally-supported storage is used for the processing work space. The long term university electronic records repository storage solutions have been put in place for the TDR as a proof-of-concept and are configured by experienced staff with an emphasis on security and preservation.

Library Collaboration

Lisa Schmidt of UAHC has had multiple interactions with the MSU library. One of those interactions was with the Data Interest Group (DIG). DIG is advised by Cynthia Ghering. Informal conversations regarding digital repositories have become formalized during Fall 2013 through the formation of the Campus Digital Repositories Operations Group (CDROG). CDROG meets quarterly. The founding members of CDROG are Lisa Schmidt and Aaron Collie from the MSU Libraries. Other CDROG members include Spartan Archive project staff Felicia Berryman, Ed Busch, Jeffrey Daniels, and Eric Holp. The purpose of CDROG is to develop shared infrastructure, resources and cost-sharing models to support extant digital repositories across campus. There is a proposal to form a university-wide Digital Scholarship Collaboration of which CDROG would be a sub-group.

Continued Development of Spartan Archive for RO

Eric Holp was able to contribute additional improvements to the original Spartan Archive software. He has put considerable effort into fixing the errors referenced in the gap analysis section of this report. Eric also conducted unit testing[3] of the entire code base. Through this testing, Eric was able to isolate and identify other potential errors within the original code and implement fixes where applicable. Again, this work, while laborious, made it possible to salvage a year's worth of programming and provide much needed documentation and consistency to the code base. This open source code will be made available through the project web site, an MSU code repository and global code libraries such as Git Hub and Source Forge.

Storage and Verification

Verification (check sum validation of files pre- and post-ingest) was put in place by the original Spartan Archive programmer Richard Burgis. The current storage process is being evaluated in terms of sustainability and best practice. The Spartan Archive AIPs will possibly be moved to the TDR proof-of-concept storage.

Selection and Testing of Islandora for Access

Jeffrey Daniels researched repository access solutions and wrote a brief report of his findings for UAHC. Jeff's criteria included performance as well as a realistic assessment of MSU's ability to

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[3] In computer programming, **unit testing** is a method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures are tested to determine if they are fit for use. Source: Wikipedia, accessed December 2013.

support and maintain various software systems. Jeff narrowed down our options to Hydra[4] and Islandora.[5]

Islandora has been installed in a test environment by Anthony Beyers. Felicia Berryman and Jeffrey Daniels are working on configuring Islandora and Fedora for integration. Additional Islandora Solutions Packs will need to be installed. Islandora work is ongoing. The Spartan Archive project has limited public access, but is focused only on the four RO record series. Islandora may prove to be a future access method for the TDR. The MSU Libraries is also exploring Islandora as the access interface for the ETD repository under development.

Archivists Toolkit to ArchivesSpace

Data cleanup of UAHC's Archivists' Toolkit (AT) implementation continued under the direction of electronic records archivist Ed Busch. In March 2013, name heading conversions into valid Library of Congress headings stood at 73 percent complete; imported finding aid editing for catalog and EAD export work was in progress; and all MSU serials were added. This work is now 100% complete. UAHC has volunteered our Archivists' Toolkit instance for beta testing of ArchivesSpace. UAHC and MSU Libraries are a Founding Institutional Member of the new ArchivesSpace initiative with migration planned for after the completion of the Spartan Archive project in Spring 2014.

Progress to University Electronic Repository

Archivematica 0.10
Lisa Schmidt and Ed Busch of UAHC have worked closely with Raman Padmanabhan to install, test, and put into limited production the digital preservation system Archivematica (https://www.archivematica.org). Archivematica 1.0 release is behind schedule. After the close of the Spartan Archive project, staff will continue working together to implement Archivematica 1.0. A budget request for special funding has been submitted to the university's central administration to become an institutional member of Archivematica. UAHC and the MSU Libraries are currently using the un-supported "free" version of Archivematica in our workflows.

Storage and Verification with Archivematica Examples
Currently in the TDR, submission Information Packages (SIPs) are transferred to Archivematica through a centrally-supported shared drive used as a processing work space with access managed by Felicia Berryman. Storage for Archival Information Packages (AIPs) and Dissemination Information Packages (DIPs) produced by Archivematica have been set up to go

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[4] **Hydra** is an ecosystem of components that lets institutions deploy robust and durable digital repositories (the body) supporting multiple "heads": fully-featured digital asset management applications and tailored workflows. Its principal platforms are the Fedora Commons repository software, Solr, Ruby on Rails and Blacklight. Source: projecthydra.org, accessed December 2013.

[5] **Islandora** is an open-source software framework designed to help institutions and organizations and their audiences collaboratively manage, and discover digital assets using a best-practices framework. Source: islandora.ca/, accessed December 2013.

to the Spartan Archive long term storage service managed by Denyson Figueiredo. Access to this storage was made available to the archivists by Felicia Berryman. Eric Holp created a verification program to routinely check the data integrity of the Archivematica-generated AIPs and DIPs. Reports are sent regularly to UAHC staff.

Access of Archivematica DIPs through Islandora

We are currently exploring the possibility of using Islandora to access the DIPs created by Archivematica for the TDR.

Implementation and Customization of TAPER

The Tufts Accessioning Program for Electronic Records (TAPER) has been installed and configured for the new TDR workflow. TAPER will make it possible to submit submission agreements at the same time as transfer of an office's digital files. Two years into the Spartan Archive project it was realized that the narrow focus of the project plan ignored the need for submission agreements as part of the Ingest function of the OAIS framework. Currently the Office of the Registrar submits manual submission agreements each time a transfer is instigated. However this is not a long term, nor scalable solution for a true TDR. With the use of the TAPER software, client offices throughout campus will be able to provide submission agreements electronically at the time of transfer of born-digital records. See attached "MSU_Implemetation_TAPER.pdf" for a beta version of MSU's implementation of TAPER.

Work on TAPER involved UAHC and IT Service staff. Steven Devine prepared and provided development infrastructure to Eric Holp so he could customize TAPER. TAPER is integrated with our current client transfer process based on a centrally-supported shared drive system (AFS). Trevor Barnes worked on designing an improved interface and branding for TAPER which was put in place by Eric Holp. A screenshot of the beta version of TAPER is included in Appendix 1. The final version of TAPER will include a new MSU branded name (with full credit given to TAPER and NHPRC for funding this project.) During this process, MSU staff talked with staff at Tufts University and learned that no other institutions have used the TAPER code. Our programmer, Eric Holp, implemented and modified the existing TAPER code to allow for a more "generic" implementation. Several of our partner universities in the Big Ten have expressed interest in borrowing this code and establishing their own electronic submission agreement process based on TAPER.

Cloud storage investigation

Anthony Beyers was tasked to investigate cloud storage solutions. The long term storage solutions currently put in place may eventually reach their storage limits within a few years. The current solution can be expanded, but UAHC and the central IT Services are jointly interested in exploring possible cloud storage solutions.

Workflows, Policies, and Procedures

During a recent TRAC audit of the project deliverables, project staff identified the following areas that require documentation. Lisa Schmidt is taking the lead on developing this documentation with assistance from Ed Busch, Portia Vescio and other staff as needed. Draft documentation is approximately 25% complete in most of these areas and will be 100% by March 2014 and submitted as a deliverable to NHPRC and published on the project website.

Workflows
- Processing and Ingest workflow that incorporates the Archivematica software. *(See "Archivematica_0.10_Proceesing_Workflow_draft.pdf" and "PreIngest_Workflow_draft3.pdf" and "Processing_Ingest_Workflow.pdf")*
- Electronic Records Processing Pre-Ingest Procedures for Removable Media *(See attached "PreIngest_Workflow_draft3.pdf")*
- Risk analysis and disaster recovery

Policies
- Draft of Archivematica Format Policies and Normalization
- Templates and outlines of MSU TDR Digital Preservation Policy Framework

Procedures
- DIP Disaster Recovery Draft
- Updated version of the scheduled accession transmittal form *(See attached "Scheduled_Accession_Transmittal_2013_v1.pdf")*

In the past six months the archives staff drafted requirement documents for each of the remaining OAIS functional areas that still needed technical processes. This activity has helped the archivists better define our needs as well as translate our archival processes into language that can be understood and acted on by technical staff. This process has also helped us realize that some of the OAIS functions in our TDR environment may not be automated at this time due to staff, funding, and time constraints. However, an OAIS compliant system can consist of both manual and automated processes - as long as all processes and workflows are documented and supported.

- MSU TDR Submissions Console Requirements
- MSU Trusted Digital Repository Data Management Functions and Requirements
- MSU Trusted Digital Repository Administration Requirements *(See attached "TDR_Administration_Requirements_draft.pdf")*
- MSU Trusted Digital Repository Access Functions and Requirements *(See attached "TDR_Access_Requirements_draft.pdf")*

Project Dissemination

Conferences

- Ed Busch attended MAC April 17-19 in Indianapolis.
- Ed Busch attended MAA June 20-21 in Ann Arbor and led a discussion on AT.
- Cynthia Ghering and Portia Vescio attended the Digital Directions 2013, Fundamentals of Creating and Managing Digital Collections in July 2013.
- Cynthia Ghering, Felicia Berryman, Ed Busch, Jeff Daniels, Lisa Schmidt, and Portia Vescio attended the Mid-Michigan Digital Practitioners Conference on August 2nd at the MSU Library. Cynthia Ghering presented as part of a panel. Lisa Schmidt presented on our TDR. The meeting was organized by the UAHC and the MSU library, http://msuarchives.wordpress.com/2013/07/31/mid-michigan-digital-practitioners-meeting/
- Portia Vescio, Steve Devine, and Jeffrey Daniels attended the DAM conference in Chicago Sept 26 and 27.
- Ed Busch attended the Fall MAC Symposium "Refining the Digital Presence of the Archives" on September 26-27 in Green Bay, Wisconsin.
- Lisa Schmidt and Eric Holp attended the first MSU Hackathon in October. Lisa and Eric along with participants from the MSU Library focused on ways to customize Islandora for ingest and access with Archivematica integrated as the preservation piece, https://www.eventbrite.com/e/msu-hackathon-tickets-7827433063. (Hackathon explained at https://en.wikipedia.org/wiki/Hackathon.)
- Lisa Schmidt presented at the Best Practices Exchange November 12-15 in Salt Lake City. Ed Busch helped field related questions. http://www.bpexchange.org
- Lisa Schmidt and Ed Busch participate in monthly National Digital Stewardship Alliance (NDSA) phone conferences.

Proposed

- Lisa Schmidt contributed to a session proposal for the 2014 Midwest Archives Conference annual meeting.
- We are currently planning another Mid-Michigan Digital Practitioners Conference for March 14, 2014 at Grand Valley State University.

Education

- Lisa Schmidt attended Digital Archives Specialist (DAS) Training on the following:
  - Inreach/Outreach for Digital Archives (March 2013)
  - Copyright for Digital Archives (March 2013)
  - Developing Specifications and RFPs for Recordkeeping Systems (April 2013)
- Ed Busch attended Digital Archives Specialist (DAS) Training on the following:
  - Beginners Guide to Metadata (January 2013)

- ○ Thinking Digital … A Practical Session to help You Get Started (January 2013)
- ○ Developing Specifications and RFPs for Recordkeeping Systems (April 2013)
- ● Trevor Barnes, Ed Busch, Felicia Berryman, Jeff Daniels, Eric Holp, and Lisa Schmidt participated in phone calls and webinars on various technologies, including Fedora, Hydra, Islandora, Archivematica.
- ● Ed Busch and Lisa Schmidt had a conference call with Pennsylvania State University about ArchiveSphere on August 2013 to talk to them about how they will be developing their archival repository.

Moving Forward

Project Plan

The goal of the Spartan Archive project is to develop an electronic records archive for the university's born-digital records and publications using a proof-of-concept approach. The methodology of the Spartan Archive project correlates with the OAIS framework and uses the four records series of the Office of the Registrar as a beta test. Uncompleted tasks in ingest, access, preservation, data management, and administration are viewable in the attached project plan See attached *"Project_Plan_for_Spartan_Archive.pdf"* which will guide our remaining work.

Some of the key tasks that need to be completed for a future, sustainable TDR solution are described below in the following sections. The details in the following sections are not in the attached project plan because they are outside the scope of the original grant proposal to NHPRC but were determined to be critical components of scalable, sustainable TDR. These tasks are included here because a major deliverable of the grant was to use this proof-of-concept approach to identify the many functions, processes, and workflows of an OAIS compliant Trusted Digital Repository for the preservation and access of the university's born-digital historical record. The following sections are concepts still in need of further investigation, but not necessarily completion by the end of the grant funded project in March 2014.

Submission

A manual, paper-based submission agreement was put in place with the Office of the Registrar submissions without much thought early on in the project. However, this is not an optimal long-term solution. As mentioned earlier in the report, TAPER was investigated and customized. We would like to further build TAPER into the long term TDR as time permits, but integrating it into the current Spartan Archive code focused on the Office of the Registrar record series may have to continue as a work-in-progress at the conclusion of the grant project.

TRAC Audit

Cynthia Ghering, Lisa Schmidt, and Felicia Berryman plan to conduct another TRAC self-audit before the end of the grant period. TRAC self-audits are an iterative process. As such we will

continue to review the TDR environment using the TRAC checklist as the electronic infrastructure and workflows evolve.

Access

Search and browse functionality of the four Registrar's Office series in both their structured data format and PDF format of the Academic Programs and Course Descriptions already exists in a very basic interface. We plan to improve the current access interface with branding and possible additional functionality. The current access solution is focused primarily on the four Office of the Registrar record series and will not be the final access solution for the TDR, though it may be a part of it. Islandora may be able to be used as an access bridge to various electronic records. Building the greater access piece will continue to be a work-in-progress.

ADA testing by Ryan Wells was identified in the last narrative. With recent staff changes, this work may continue as work-in-progress after the project end date. Earlier in the project, Lisa Schmidt and Richard Burgis conducted numerous usability reviews of the search and browse functionality, specifically with a focus group of reference librarians from MSU Libraries. Other staff in the IT Services Web Development and Hosting team will be able to assist with further usability testing. In addition, we will aim to pass a web accessibility checklist like the one developed by WebAIM (Web Accessibility In Mind) based on Section 508 of the Rehabilitation Act at http://webaim.org/standards/508/checklist. This is just an example checklist for ADA compliance. Accessibility guidance at MSU is currently under review with the most recent policy at http://webaccess.msu.edu. Usability testing will continue past the conclusion of the NHPRC funded project and will remain a long-term, interactive work-in-progress for the entire lifecycle of the TDR.

Archival Storage

The current Spartan Archive storage is on a centrally-supported storage space that is shared by UAHC staff. Access to the Spartan Archive records area is not writable by archives staff and is only editable by the Spartan Archive programs. The entire 2TB of allocated storage is backed up centrally with an enterprise backup solution. There is also a long term storage solution that was put in place and mentioned in the last narrative plan for the greater TDR. Archive records processed with Archivematica are currently stored in this TDR storage space. It will be an eventual goal to move the Spartan Archive records to the long term TDR storage. However, that work will likely continue to be a work-in-progress at the end of the grant.

Another, larger sustainability question also looms for MSU. How will UAHC secure funding to continue to develop and maintain terabytes of digital archives? Currently UAHC has physical space to store paper and other media based archives built into our general operating budget. Archiving born-digital historical records is an unfunded mandate and requires special funding from the university's central administration. The Spartan Archive project and its proof-of-concept approach has allowed us to extrapolate the storage costs and estimate an annual growth rate. This information will be included in annual budget requests until, hopefully, the university also

supports the cost to store its born-digital records in the same way it preserves and provides access to its physical heritage.

Preservation Planning

Richard Burgis originally created an automated file verification program (automated check sum validation) that is still operating. Eric Holp created a similar verification program for the born-digital records ingested and processed through Archivematica and stored long-term on redundant IX storage devices of 10 TB each. (See Storage diagram for more details.) Raman Padmanabhan with Felicia Berryman and Eric Holp researched various preservation management tools and documented their analysis. One promising tool Lisa Schmidt asked Raman to investigate was ACE, Audit Control Environment, https://wiki.umiacs.umd.edu/adapt/index.php/Ace:Main. ACE has two components. First, a file audit to check files in registered directories against stored hashes to ensure files have not been corrupted. Second, a token audit to check the stored hashes against a remote Integrity Management Server to ensure no one has tampered with the stored hashes. This work will continue past the conclusion of the NHPRC funded project.

Documentation

- At the April 2013 Midwest Archives Conference (MAC), the CIC-University Archives Group had a face to face meeting. PI Cynthia Ghering shared a candid update (e.g. the successes and the failures) on MSU's NHPRC project and subsequent request for No Cost Extension. Cynthia distributed copies of the revised technical infrastructure including a renewed focus on the OAIS framework. The MSU Archives continues to share all documentation on the project site, http://spartanarchive.wordpress.com/, and plans to share our final results, including open source software code, of the Spartan Archive project grant project in the spring of 2014.

- Requirement documents regarding backup and hardware support have been created. Additional documents may be developed as part of a requirements package to share with colleagues at other universities. For example, technical staff currently monitor the various components that make up the Spartan Archive system, although there continues to be room for improvement in this area.

- The final report submitted to NHPRC will focus on what we accomplished as a proof-of-concept attempt at building a functional OAIS compliant preservation environment, including workflows and processes. We will also document the areas that remain works-in-progress and list in detail the tasks to be accomplished as we build a more mature and sophisticated TDR for the university. Our final report will also include experienced advice for working with rapidly changing technology and suggestions on how to build a culture that supports iterative development within the evolving electronic archiving solutions space.

Strategic Integration with IT Services

In September 2013, the MSU IT Services Action Plan was published at
https://itservices.msu.edu/actionplan/ and includes several joint initiatives between UAHC and
various IT Services teams including the development of a MSU Policy Repository, disposition of
data with the Enterprise Business Systems and the development of long term storage for the
university's born-digital historical records. In November of 2013, the IT Services Annual Planning
letter was sent to MSU's executive leadership and requested sponsorship for digital archives and
electronic records management. IT Services dedicated almost one half of a page of a six-page
document just on this request. Sponsorship requests included application of retention schedules
to enterprise business systems and centrally-funded electronic archives storage space. Other
departments on campus have terabytes of data to archive, such as Communication and Brand
Strategy, that are also supporting our request for additional funds to build a digital archive for the
university. The high visibility of this project demonstrates the success of the NHPRC funded
Spartan Archive. Including, most importantly, institutional ownership of these critical issues.