I.   Plan of Work

Phase 1: Analysis and Appraisal
April 1, 2010 to September 31, 2010

Due to staffing changes that occurred between September and December 2009, the project team now includes Lisa Schmidt and Edward Busch. Schmidt will be replacing Deborah Gouin's role in the project and Busch will replace Richard Adler's role. This staff replacement will have minimal impact on the project timeline and will positively affect the project's deliverables and outcomes. Schmidt has successfully implemented an NHPRC electronic records project at MATRIX here at Michigan State University and Busch had a previous career as a software developer and test engineer. Further details of Schmidt and Busch's education and experience can be found in the revised "Staff" section below.

The first phase of the project will begin with the creation of an advisory committee for the project. The committee will consist of the project team and representatives from central IT units and the Registrar's Office. The position of full-time Information Technologist I (see attached job description) for the *Spartan Archive* project will be posted and filled. The advisory committee will also act as the search committee for the project's Information Technologist position. In addition the advisory committee will help identify stakeholders in the project – the records creators and user communities – including the MSU community of administration, faculty, staff, students and alumni.

The core project team (Ghering, Schmidt, Miller, Busch, Patel and Cribley) will also begin regular meetings. The team will survey user needs and expectations through interviews with key University administrative units and representatives from faculty, students and alumni groups. The team will also build a website to inform colleagues of the project's progress. The website will contain monthly reports and deliverables from the project. In addition, Ghering and Schmidt will provide quarterly reports to the Committee on Institutional Cooperation – University Archives Group (CIC-UAG) and solicit feedback via the group's email list. All technical material produced by the project will be reviewed by Ajay Patel, who will continue as the MSU technical advisor to the UAHC.

As noted in the September 2009 Project Addendum, UAHC staff already began the evaluation and selection of a new archival management system. UAHC staff will begin the migration of collection data to the new archival management software in early 2010. Next, UAHC staff, with help from the project team, will begin developing new workflows for accessioning, processing and managing university records series, regardless of analog or digital format. The first task of the project information technologist (PT) will be to build a public interface for the UAHC's new archival management software. This web layer will provide the foundation for the public interface to the Spartan Archive later in the project.

Phase 2: Appraisal, Accession and Metadata
October 1, 2010 to March 31, 2010

In the second phase of the project, the project team will develop appraisal criteria for the Registrar's Office databases containing the Academic Programs, the Course Descriptions and the Student Directory. Schmidt and Busch will work with Matthew Cribley, an information

technologist from the Registrar's Office, to understand the database structure and conduct a full survey of the RO's databases. The user needs assessment, developed through the user interviews in phase one, will also influence the appraisal criteria. In addition, all applicable regulations, such as Family Education Rights and Privacy Act (FERPA), will be considered to ensure that no protected information from the Student Directory is accessioned. The completed appraisal will be reviewed by Ghering.

Ghering, Schmidt, Miller and Busch will define the metadata that will be used to describe the records. The metadata model will be based on Dublin Core and will be extensible to accommodate the specific needs of our designated community. MSU is interested in developing similar institutional metadata standards for description, preservation and recordkeeping. As mentioned above, UAHC plans to provide an opportunity for the designated community to define the preservation metadata (PDI) and help "ensure the Content Information is adequately understandable"[1] and includes reference, context, provenance and fixity information. The lessons learned during the *Spartan Archive* project will help shape metadata standards for the whole institution.

Phase 3: Ingest and iRODS Installation
April 1, 2011 to September 31, 2011

In the third phase of the project Schmidt will work with Cribley to complete an XML extraction of the identified data fields for the three records series. Schmidt will write the procedures for the extraction and Submission Information Package (SIP) to be approved by Ghering. While this work is being completed, the PT will write the scripts to ingest the records into *Spartan Archive.* The PT will build the queries that will be searchable by the end users. Role based access controls will be developed by the PT, Ghering and Schmidt. Schmidt and Busch will work with the PT to develop the Archival Information Package (AIP) that utilizes the metadata defined by the project team. In addition, the PT will integrate UAHC's new archival management software with the proposed Spartan Archive framework in the Archival Administration layer of the design. The manuals for the SIP and AIP will be drafted by Schmidt and approved by Ghering. Schmidt, Miller and Busch will create archival administration reports for *Spartan Archive.*

Also in the third phase of the project will be a visit from Reagan Moore, the director of DICE at the University of North Carolina, Chapel Hill. He will spend three days with the *Spartan Archive* project team to teach iRODS programming. The project team, as part of its collaboration with the Committee on Institutional Cooperation (CIC), will invite the University Archivists Group to attend this meeting. The workshop will also be open to technologists from within MSU and the other CIC institutions. Moore will explain the principles of iRODS and how it can be used in the preservation phase of the project. An iRODS "sandbox" will be installed and the PT and project team will begin defining the iRODS management policies and workflow.

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[1] Subsection B2.9, Trustworthy Repositories Audit & Certification: Criteria and Checklist, Version 1.0, February 2007: p 28.

Phase 4: Public Access and User Testing
October 1, 2011 to March 31, 2011

Phase 3 will begin with the preparation of a formal Dissemination Information Package (DIP) for online delivery of the records. Ghering and Schmidt will document the structure of the DIP in the project manual. Schmidt and others will beta-test the presentation layer for accurate retrieval and display of the DIPs. The project team will conduct user testing of the interface prototype with the user community.

The project team will test and monitor the integration of the archival management software with *Spartan Archive*. During this phase, Miller and Busch will create the archival administration reports; including audit trails and finding aids that will be used to track and describe the newly accessioned electronic records. Ghering will review these for consistency with the current archival practices of UAHC.

A programmer from DICE will visit MSU and provide intensive iRODS training for the archivists, the PT and other IT staff at MSU. Together they will install and program iRODS for the preservation stage of the project. After the team is trained, they will work with Schmidt, Busch and Patel to test a set of micro-services developed for the preservation of the database records. Copies of the records that were previously accessioned will be transferred to the Preservation Environment using iRODS.

Phase 5: iRODS Programming and Testing
April 1, 2012 to September 31, 2012

In Phase 5 a DICE programmer will visit MSU and provide the project team with five additional days of consultation on the iRODS programming. At this time the PT will address and resolve any outstanding issues with the iRODS programming. The project team will open this visit up for any MSU or CIC staff that needs additional training in iRODS.

The PT will continue to work on the iRODS environment, confirming that the preservation copy can be accessed and used to restore the access copy if needed. The PT, Schmidt and Busch will do a checksum analysis on the active research copy of the records to verify that no corruption has occurred. Schmidt, with assistance from the PT, will draft the procedures to complete a checksum analysis of the database records and Ghering will review the final draft.

The PT will conclude the programming and testing phase, and assist Schmidt in the completion of the documentation. Patel will review the final system and the documentation. Ghering and Schmidt will conduct a self-audit of *Spartan Archive* using *Trustworthy Repositories Audit & Certification: Criteria and Checklist*.

Phase 6: Documentation and Conclusions
October 1, 2012 to March 31, 2012

In the final phase of the project, the reports to NHPRC will be written by the project team, with Schmidt and Ghering taking the lead. Parts will be contributed by Miller, Busch, Patel, and the PT as necessary. In preparation for writing the reports, the project team will monitor the activity of *Spartan Archive* users. The archivists will conduct surveys via the website to determine user satisfaction and areas for improvement. These findings will be included in the final report.

The project team of Ghering, Schmidt, Miller, Busch, Patel, Cribley and the PT will propose and write articles in relevant professional publications such as *The American Archivist, Archival Issues, Information Management Journal, EDUCAUSE Quarterly*. Members of the team will propose presentations on the project at professional conferences to share results, challenges and successes. All final documentation of the system will be distributed to members of the CIC and other universities interested in the design and implementation of *Spartan Archive.*

II.   Staff

Cynthia A. Ghering was hired as the director of UAHC in January 2008 and brings over ten years experience in the acquisition, processing, cataloging, digitization and online access to archives, library and museum collections including born-digital objects and electronic records. Ghering has managed several large federal grant-funded projects such as the Institute of Museum and Library Services' Museums for America project *Connecting Ohio's History* and six United States Department of Education's Teaching American History projects with multiple educational partners. Ghering has also led a variety of team projects ranging from large digitization efforts to collection inventory and cataloging; including *Fight for the Colors: The Ohio Battle Flag Collection* and *OhioPix: Picturing Ohio's History*. Ghering will spend fifteen percent of her time on the project in a management capacity and will lead the bi-weekly project team meetings.

Lisa Schmidt joined MATRIX: The Center for Humane Arts, Letters and Social Sciences Online, a digital humanities research center at Michigan State University, in October 2007. Her work as electronic records archivist and project manager has included an NHPRC-funded project, "H-Net: Preserving and Improving Access to Specialized Electronic Mailing List Archives," to assess and improve the preservation practices for the H-Net academic e-mail lists. In a joint appointment with the MSU Archives, she is currently engaged in developing a digital curation plan for the university's digital assets. She received an MS in Information Studies from the University of Texas at Austin. Prior to joining the information studies field, she worked as a high technology marketing communications professional. Schmidt will spend thirty percent of her time on the *Spartan Archive* project.

Whitney Miller is the University Records Archivist with over ten years experience at Michigan State University Archives. Her role at MSU is focused on university records management and records retention compliance. Miller has broad knowledge of the UAHC collections and the history of MSU; she is also a Certified Archivist. Miller will spend five percent of her time on the project.

Ed Busch is a Processing Archivist and 2007 graduate of the Wayne State University's Master of Library and Information Science program. Busch processes university records series, both analog and digital collections, and performs other records management duties. Prior to returning to school for a graduate degree in archival administration, Busch was a software developer. He has over ten years experience as a software test and system engineer. Busch will spend five percent of his time on the project.

The project information technologist (PT) to be hired will provide independent complex professional support in software development, database administration and systems operations. Requirements include a BA in computer science or related field; previous experience is desired. The PT will be wholly dedicated to the design of *Spartan Archive*. The PT will work closely with the project team, especially the archivists, in the design and development of technical infrastructure and workflow. The PT will assist in the documentation of *Spartan Archive* and may be expected to present and publish on the project.

Matthew Cribley is a Systems Analyst I in the Registrar's Office. He has over ten years experience in the field of information technology. Currently, Cribley is involved in design, construction, modification, and implementation of information systems for the Registrar's Office. He is also a technical writer. Cribley will spend five percent of his time on the project during the first year, ten percent of his time in the second year, and five percent of his time in the last year of the project.

Ajay Patel has twenty-three years of experience in information technology at MSU. He is currently assigned to the Enterprise Business Systems Projects. Previously, Patel was part of the Administrative Information Services unit and the team that developed and implemented the enterprise Student Information System. Patel's skills and areas of interest include information systems analysis, design, and implementation; project management tools and techniques; computer-based statistical analysis, data analysis, and operations research packages; database tools, techniques, and query languages; and Enterprise Content Management and Electronic Records Management. He will provide five percent of his time to the project.

III. Products and Deliverables

Spartan Archive Conceptual Model

The proposed *Spartan Archive*, an electronic records archive solution, is based heavily on the Open Archival Information Systems (OAIS) reference model and will support ingestion, storage, management, search/access, and preservation of selected electronic records series at Michigan State University. (See attached "*Spartan Archive: Conceptual Model.*")

Preservation Planning activities will include analyzing the content, context and structure of each records series; engaging with the user community to understand their current and future needs; identifying individual data elements to be archived for each records series; determining preservation metadata requirements for each records series and the entire collection; and determining search, navigation, and access requirements for each records series.

Archival Administration components of the solution will involve use of a web-based interface and background processes to support security and access management, rules/policy management, archival storage management, Archival Information Package (AIP) review and approval, archive reporting, and occasional interactive upload of records series data.
Active records of the candidate records series are located in three different source systems. An automated *Extract/Upload* process will be developed to inspect the databases, extract data and metadata of the selected records series, and prepare *Submission Information Packages (SIPs)* for a given records series.

The *Accession/Ingestion* components of the solution will receive SIPs, verify SIP content, separate actual data from metadata (descriptive information), and prepare *Archival Information Packages (AIPs)* for review and approval by the Archival Administration components/processes.

When AIPs are ready for accession, metadata transactions will be provided to the Metadata Management and an archive stream of actual data will be provided to the Archival Storage.

Metadata Management components of the solution will receive and process AIP metadata transactions and populate/update the metadata database in the *Current Archive* repository. *Archival Storage* components of the solution will receive AIP stream from the Accession/Ingestion process and populate/update record content in the Current Archive repository.

Records series hosted on *Spartan Archive* will be available for research and inquiry. *Archival Access* will be provided through web-based interfaces and background processes. Archival Access components of the solution will accept report requests, metadata inquiries, and content requests from customers and provide requested reports, metadata inquiry results, and contents. Requests for reports will be directed to the Archival Administration, metadata inquiries will be directed to Metadata Management, and research (content) requests will be sent to Archival Storage. Reports will be received from the Archival Administration and passed to the customer. Metadata inquiry responses will be received from the Metadata Management and provided to the customer. Requested content will be received from the Archival Storage and *Dissemination Information Package (DIP)* prepared and provided to the customer.

Periodically, metadata and content of selected records series will be copied to the *Preservation Environment*. Access to the Preservation Environment will be limited to only specified data processes and archive administrators. The Preservation Environment will not be available for routine search and retrieval of archived records series. However, in the event of loss of the Current Archive, processes will be developed to use content saved in the Preservation Environment to restore the data. This will ensure that the information in *Spartan Archive* can be fully restored if necessary.

The proposed solution will use *integrated Rule Oriented Data System (iRODS)* to implement the Preservation Environment. Consequently, Metadata Management and Archival Storage components of the solution will use iRODS programs/services to provide related features/functions. A separate third-party product will be used to provide some or all features/services in the Archival Administration component of the solution. Remaining processes and components will be developed in-house at Michigan State University.

The *Spartan Archive* will be hosted on the virtual server network at Academic Information Services (AIS). Part of the project's service agreement with AIS will include a daily backup of *Spartan Archive*. This will ensure that the data maintained in the Preservation Environment can be restored if needed.

Dissemination

The archivists and the technologists on this project will create documentation about the project that will enable other university archivists to use *Spartan Archive* as a model to capture and preserve their permanent database records. A manual will be created that will guide the user through each phase of establishing a program based on the model. In the manual, the team will define how Submission Information Packages (SIP) are created and stored. The manual will provide instructions on how to create Archival Information Packages (AIP) and Dissemination Information Packages (DIP) and document how iRODS is used to manage and preserve the records.

To disseminate the information on the progress of the project, the team will establish and maintain a website. The lead investigators will post all documentation resulting from the project.

The manual will be posted online as it is being written. The team will provide monthly updates regarding their progress on the project, with open discussion of successes and challenges as they arise. The project team will report to peers in the CIC-UAG and solicit feedback through the group's email list. When substantial work is completed the project team will develop presentations for their peers to be delivered at archival, records management and/or information technology conferences locally, regionally and nationally. Archivists from the project will also give presentations to interested groups when requested. Finally, articles will be written and submitted to professional publications.