

## **I. Introduction**

The University Archives and Historical Collections (UAHC) of Michigan State University is seeking \$298,450 to develop an electronic records archive, *Spartan Archive*, for the university's born-digital records and publications. During the three year project, MSU will use a proof-of-concept approach to test the sustainability of an archival solution for the long-term access and preservation of database records. *Spartan Archive* will be based on traditional archival principles and the Open Archival Information System (OAIS) model; utilize Integrated Rule Oriented Data Systems (iRODS); collaborate with multiple units within Michigan State University; and share results with the members of the Committee on Institutional Cooperation (CIC) and other interested universities.

UAHC is proposing to develop *Spartan Archive* by focusing on three large record series produced by Michigan State University's Registrar's Office (RO) – the full catalog of Academic Programs, the Description of Courses offered each semester, and the annual Student Directory. These records series have permanent retention periods due to their institutional and historical value and are considered vital to the business of the university. Michigan State University has produced the Academic Programs, Course Descriptions and Student Directory since the university's founding in 1855. The three record series were originally published in bound book volumes and distributed to MSU faculty and students annually or bi-annually. All three record series are used heavily by MSU students, alumni, faculty and the general public due to their evidentiary value as proof of attendance, degree and coursework as well as their family history and genealogy documentation. As the official “depository for university records which are no longer administratively useful...”<sup>1</sup> the UAHC has been responsible for maintaining and providing access to these university publications since 1969. However, in the past decade, the

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<sup>1</sup> University Archives & Historical Collections, Michigan State University, “Collection Policy,” May 29, 2009.

UAHC has struggled to preserve these vital records. Michigan State University's Student Directory is no longer printed, and there are limited numbers of paper-based Academic Programs and Course Descriptions produced each year. These records are now born-digital, existing only in a transactional database system maintained by the Registrar's Office, and accessible online in real-time on the MSU web site.

This project will include all components of the archival process – from the *appraisal* of born-digital records, to the *accession and ingest* of electronic records, along with the long-term *preservation and management* of database records and finally, the *online access* and research use of the record series. UAHC plans to capture the three records series directly from the records creator and will work with the Registrar's Office (RO) to appraise their SQL databases and determine which data fields hold historical information. Those data fields that are identified as having historical value and subject to permanent retention will be extracted from the RO's databases and transferred to UAHC's custody for long-term preservation and research use. UAHC will select and implement archival management software to enforce administrative control of the transferred records; utilize iRODS as a means for long term preservation and storage; and develop web access to the archival records to enable real-time access by the user community. The *Spartan Archive* project will result in UAHC creating policies, procedures, and a technical infrastructure to accession, provide access, and preserve database-born records in the university environment.

### **University Archives & Historical Collections**

Michigan State University (MSU) was established in 1855 by an act of the Michigan Legislature to create an agricultural college. MSU received the land grant for the state of Michigan in 1862 becoming the nation's pioneer land grant college. In its one hundred fifty-four years, MSU has

grown to a tier one research university with significant national and global impact. As the nation's first agricultural college, MSU established itself as a leader in innovation and technology. MSU's tradition of leadership and innovation has carried through in UAHC's approach to automating archival functions and preserving the university's records, regardless of format.

In 1969, MSU's Board of Trustees established the University Archives and Historical Collections. UAHC was mandated to collect and preserve the historical records of MSU and to provide the university community, scholars and the general public access to these records. In addition, the director of the UAHC was given the responsibility of approving the final disposition and destruction of university records. The UAHC actively assists university units in the efficient administration and management of official university records. Now in the twenty-first century, the focus of UAHC includes the management, collection and preservation of electronic records.

### **Current State**

Several enterprise-wide business initiatives are currently making records management a major focus at MSU; one such initiative is the Enterprise Business Systems Projects, (EBSP). In 2006 MSU began a multi-year series of projects to replace the current business systems on campus. Executive leadership desired improved systems to provide more flexibility, transparency, standardization and delegation in facilitating the work of the university. To achieve these objectives, the new systems will support an approach to data and information that is more open, apparent and intentional. These new systems will also facilitate improved documentation and consistency in the way common tasks are accomplished across campus. This large project is laying the foundation for major changes in thought and application at UAHC.

University administration recognized the contribution UAHC staff could make in achieving the EBS projects' goal to manage data and information. In response, the previous UAHC director contracted with Rick Barry, the principal of Barry Associates, to analyze UAHC's current state, and to draft an electronic records policy. His work was based on standards drafted by the Big Ten Committee for Institutional Cooperation's University Archivist Group in 2002. Barry's work was circulated internally and seriously considered within UAHC and the larger administrative unit of Libraries, Computing and Technology (LCT). As a result, staff positions within UAHC were revised and the position of Electronic Records Archivist was created to meet the added demands of the university's electronic records and the EBS projects.

Two electronic records archivists were hired by UAHC early in 2007; Deborah I. Gouin, CA, an archivist and records manager; and Richard C. Adler, a recent graduate of the University of Michigan with a specialization in archives and records management. In January 2008 the director of UAHC retired, allowing the university to re-assess the position and its impact across the university. The UAHC directorship was changed from a tenured position to executive management status in order to align with other administrative positions responsible for the development of university policies and procedures. The responsibilities of the position were expanded to include an active focus on the management and preservation of electronic records and participation in the Enterprise Business Systems Projects.

Cynthia A. Ghering, an information professional with ten years of archives, library and museum experience, was hired as director in January 2008. Ghering and her team are working to ensure that the university's new information systems and related business processes provide appropriate records management and archival functionality. UAHC is leading the effort at MSU to build an infrastructure to support the accession and preservation of born-digital university records.

## **Institutional Support**

UAHC reports directly to the Vice Provost of Libraries, Computing and Technology (VPLCT) along with the MSU Libraries, the EBSP initiative and both the academic and administrative information technology units – Administrative Information Services (AIS) and Academic Technology Services (ATS). UAHC has received direct financial and technical assistance from the Office of the VPLCT including support for the new Electronic Records Archivist positions. In 2008 UAHC received funding for Ghering, Gouin, Adler and an Information Technologist, Ajay Patel, to attend the SAA Electronic Records Summer Camp at the San Diego Supercomputer Center to explore the use of Integrated Rule Oriented Data Systems (iRODS) in the management and preservation of electronic records. Additionally, Patel, a member of the EBSP team, is assigned to work with the UAHC staff to define the systems requirements for the effective management of electronic records, both within the EBSP environment and the university as a whole.

In September 2008, the Vice Provost of LCT, David Gift, funded a collaborative electronic records forum to open a discussion among the Committee on Institutional Cooperation (CIC) members. Archivists, technologists, registrars, legal counsel and librarians from the Big Ten Universities attended the two-day forum. Legal, records management and technical issues were discussed in a round-table setting, resulting in an agreement that the CIC archivists and technologists would openly share models and lessons learned for better management of university electronic records and digital assets. With its two electronic records archivists and institutional support, MSU is uniquely positioned to design and test an electronic records archive solution and shares its finding with CIC members and other colleges and universities facing similar issues.

## **Records Series of the Registrar's Office**

The three records series produced by the Registrar's Office (RO) are each created in different systems. The Student Directory is created in the mainframe-based Student Information System (SIS), while the Academic Programs and the Course Descriptions are created in two stand-alone client/server systems: Academic Programs (AP) and Course Descriptions (CD). The Academic Programs and the Course Descriptions are available online for student and faculty to access the public information in real-time. Older records, dating before the creation of AP and CD in 2006, have been scanned and are also accessible through the RO's website. In the case of the Course Descriptions, a small print run is made annually for limited distribution purposes. These convenience copies are printed on poor quality paper and are difficult to maintain, use and preserve. These three systems contain hundreds of thousands of vital records. In terms of bit and bytes, the SIS database totals 83 Gigabytes and the two RO systems, AP and CD, are 800 Megabytes in size.

The Academic Programs and the Course Descriptions catalog, list, and describe the fields of study available at MSU and the class requirements for graduation or certification. These record series provide vital documentary evidence of the majors and minors offered by the university; the degrees MSU awards; and the coursework and preparation required for graduation. This Academic Program database system contains information on more than 1200 programs. The Course Descriptions database contains information on nearly 20,000 courses dating back to 2005. Together these two records series equate to 21,200 database records. These records are vital to the university as evidence of the central business of the institution – the academic coursework completed by MSU students. These records are also significant to researchers and scholars and provide documentation of the educational experience at a major land grant and research university.

The third record series, the Student Directory, once an annual paper publication distributed to students, faculty, and staff, is no longer in print. Students' contact information is available solely through an online search function on the MSU website, and only while they are currently enrolled at the University. Furthermore, the Family Educational Rights and Privacy Act (FERPA) gives any student the right to deny public access to his or her contact information through this MSU "People" search. On average, MSU enrolls over 50,000 students per academic year including full-time, part-time and non-credit students. This equates to 50,000 database records per year.

For nearly a decade, the RO has addressed the archival copy of Student Directory information by printing it annually in the fall and sending it to UAHC for preservation. However, the printed report is generated from the Student Information System and comes to UAHC as one continuous printout from a laser printer. While the listing is in alphabetical order, it is almost impossible for researchers to use and poses a serious challenge to UAHC to preserve for future generations. The information once preserved within the Student Directory is also vital to the business of MSU and provides documentation of all students that have enrolled at MSU for any length of time, including those that may not have received a degree or certificate from the university. Student Directories are heavily used by university administration, current and former faculty and students, historians, researchers and genealogists.

### **Future State**

The design, development and implementation of *Spartan Archive* as a proof-of-concept model will allow UAHC to achieve multiple objectives in the unit's long term goal to preserve and provide access to the university's permanent records, regardless of format. A large number of the university records are now created and maintained in database systems. This initial design of

*Spartan Archive* will focus specifically on structured records and the workflow and infrastructure necessary to appraise, accession, manage, preserve and access electronic records extracted from large transactional systems in a sustainable manner.

The cross-discipline team approach to *Spartan Archive* will help UAHC build strong partnerships with IT professionals in both the academic and administrative technology units and foster a more proactive approach to electronic records management. Focusing on the records of the Registrar's Office will give UAHC valuable experience in working with records creators to capture electronic records directly from the business system, while generating metadata to preserve the records content, context and structure. *Spartan Archive* will provide an opportunity to design a workflow that is automated, scalable and sustainable for archivists, technologists and records creators.

Finally, this proposal will allow the project team to explore the functionality and capabilities of iRODS and its utility for both the project's Dark Archive and other mass data storage needs. Project funding will allow a representative from the Data Intensive Cyber Environments group (DICE) to travel to East Lansing to train IT and archives staff from MSU and member CIC institutions in iRODS programming. MSU staff will use this knowledge to develop a secure, reliable and trustworthy digital repository for the university's structured electronic records. The development of two web interfaces, one for internal archival administration and one for public access and dissemination, will provide an archival technical infrastructure that can be used to capture, manage and preserve other university records in electronic format. All of the outcomes and products of this project will be shared with, and hopefully replicated by, the CIC members and other colleges and universities.



## **Collaboration**

A major component of UAHC's vision for electronic records management at MSU is increased collaboration within the university - including technology, legal, administrative and academic units - to address the challenges of record, document and content management in the digital environment. This proposal supports that vision and is based on a team approach to developing an electronic records archive for the university. The project team will include staff from the University Archives, Academic Technology Services, Administrative Information Services, the Enterprise Business Systems Projects team and the records creator, the Registrar's Office.

The project team will also share the results of the *Spartan Archive* project on a regular basis with the members of the Committee on Institutional Cooperation: University of Chicago, University of Illinois, Indiana University, University of Iowa, University of Michigan, Michigan State University, University of Minnesota, Northwestern University, Ohio State University, Pennsylvania State University, Purdue University, and University of Wisconsin – Madison. This collaboration will occur at twice yearly meetings of the CIC-University Archives Group during the Midwest Archives Conference and the Society of American Archivists conference. In addition, we will be inviting all members of the CIC-UAG to participate in the iRODS workshop planned for the first year of this project, if funded. The CIC Chief Information Officers (CIO) group is also pursuing distributed mass data storage for the member institutions and is interested in exploring both the use of iRODS for mass data file management and the possibility of building a collaborative CIC electronic records archive in the future.

## **II. Plan of Work**

### **Phase 1: Analysis and Appraisal**

*January 1, 2010 to June 30, 2010*

The first phase of the project will begin with the search for a full-time Information Technologist I (see attached job description) for the *Spartan Archive* project. Ghering and Gouin will develop appraisal criteria for the Registrar's Office databases containing the Academic Programs, the Course Descriptions and the Student Directory. Gouin will work with Matthew Cribley, an information technologist from the RO, to understand the database structure. 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 and Miller.

Simultaneously, the UAHC project team, consisting of Gouin, Ghering, Adler, and Miller, will conduct an assessment of archival management software. They will consider both open source solutions, such as Archivists' Toolkit and Archon, and proprietary software. They will evaluate the systems to determine which solution will best meet the demands of the current workload of UAHC and address the new workflows created for *Spartan Archive*. Adler will be leading this evaluation and reporting back to the project team. 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. All technical material produced by the project will be reviewed by Ajay Patel, who will continue as the MSU technical advisor to the UAHC. The project team will meet bi-weekly as needed.

## **Phase 2: Accession and Ingestion of Records**

*July 1, 2010 to December 31, 2010*

The second phase of the project will begin with 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.

A key part of *Spartan Archive* is the selection and installation of an archival management tool to interface with the electronic record archive. The software that was selected in Phase 1 will be configured and installed. This will be completed by the project information technologist (PT) and Adler. Once the software is installed, the current holdings will be uploaded and the new system will be tested. The PT will then build the web interface which the archival administrators will use to manage the database records. This presentation layer will integrate fully with the archival management software. The project team will continue to accession RO records while the web interface is being built.

Gouin will work with Cribley to complete an XML extraction of the identified data fields for the three records series. Gouin 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*. Ghering, Gouin and Adler will define the metadata that will be used to describe the records. 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 Gouin. Adler will work with the PT to develop the Archival Information Package (AIP) that utilizes the metadata defined by the project team. The manuals for the SIP and AIP will be drafted by Gouin and approved by Ghering. Ghering, Gouin and Adler will create archival administration reports for *Spartan Archive*.

### **Phase 3: Public Access and iRODS Installation**

*January 2, 2011 to June 30, 2011*

Phase 3 will begin with the preparation of a formal Dissemination Information Package (DIP) for online delivery of the records. Ghering and Gouin will document the structure of the DIP in the project manual. Gouin and others will beta-test the presentation layer for accurate retrieval and display of the DIPs. Ghering and Adler will test and monitor the performance of the archival management tool focusing on the integration of the archival management software with *Spartan Archive*.

While the performance testing is taking place, the iRODS work will begin. 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 Gouin, Ghering, and Adler 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 Dark Archives using iRODS. During this phase, Adler and Miller 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.

### **Phase 4: iRODS Testing and Refinement**

*July 1, 2011 to December 31, 2011*

Gouin and Cribley will repeat the extraction process from the RO for the previous academic year's records. They will prepare the SIP and the AIP, following the instruction manual created in Phase 2. 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, Gouin,

Adler and Ghering will do a checksum analysis on the active research copy of the records to verify that no corruption has occurred. Gouin, 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.

### **Phase 5: Documentation and Work Flows**

*January 2, 2012 to June 30, 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 conclude the programming and testing phase, and assist Gouin in the completion of the documentation. Patel will review the final system and the documentation. Ghering and Gouin will conduct a self-audit of *Spartan Archive* using *Trustworthy Repositories Audit & Certification: Criteria and Checklist*.

### **Phase 6: Reports and Conclusions**

*July 1, 2012 to December 31, 2012*

In the final phase of the project, the reports to NHPRC will be written by the project team, with Gouin and Ghering taking the lead. Parts will be contributed by Adler, Miller, 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.

Ghering, Gouin and Adler will propose and write articles for submission in *The American Archivist*, *Archival Issues*, *Information Management Journal*, *EDUCAUSE Quarterly* and other relevant professional publications. Ghering, Gouin and Adler will present 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*.

### **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; 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 *Archive 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 *Dark Archive*. Access to the Dark Archive will be limited to only specified data processes and archive administrators. The Dark Archive 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 Dark Archive to restore the data. This will insure 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 Dark Archive. 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 Dark Archive 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. 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.

#### **IV. 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.

Deborah I. Gouin joined the UAHC staff in March 2007 as its first Electronic Records Archivist. Gouin began her archival career on the NHPRC funded Records Management Administration Pilot Project with the State of Michigan in 2000. Gouin went on to work for IBM as the senior records management analyst supporting the DB2 Records Manager product. She was responsible for end user testing and training. Gouin also worked as a consultant in electronic records management for Xerox, Pfizer and other firms. She is a Certified Archivist. Gouin will spend thirty percent of her time on the *Spartan Archive* project.

Richard C. Adler joined the UAHC team in April 2007 as the second Electronic Records Archivist. In his two years at UAHC, he has upgraded the UAHC technical infrastructure and written the collecting policy for UAHC. His skills include MARC cataloging, EAD encoding and records processing. Adler will spend ten percent of his time on the 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. She has broad knowledge of the UAHC collections and the history of MSU. She is also a Certified Archivist. She will spend five percent of her 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. He has conceptualized and designed software and hardware systems. Currently, Cribley designs and modifies systems for the R.O. He is also a technical writer. Cribley will spend ten percent of his time on the project during the first year and five percent of his time for the remainder 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.

## **V. Evaluation**

The *Spartan Archive* project has six core objectives with measureable outcomes and evaluation criteria. The core objectives cover all phases of the project and all have quantifiable outputs. The first objective will be the *appraisal* of database records to determine which fields constitute the university's historical record. The project archivists will develop appraisal criteria for databases that will be compiled into guidelines and distributed to other universities with similar records.

In the second objective, *accession and ingest*, Submission Information Packages (SIPs) and Archival Information Packages (AIPs) will be developed for the three record series. The archivists will create the metadata standards for the SIPs and AIPs. The team will write both technical procedures and metadata standards. Most importantly, the project team will demonstrate that the SIPs and AIPs are functional by accessing the records via the archival administration web interface.

The project's third objective, *archival administration*, will be demonstrated by the ability to schedule the upload of SIPs, review and approve AIPs, manage security and access, and enforce rules and policy. This objective can be measured by demonstrating the seamless integration of the archival management software and the Metadata Management and Current Archive components of *Spartan Archive*. The third objective can also be evaluated by the documentation of new workflows and procedures.

The fourth objective, *preservation*, will be evaluated on the ability to produce micro-services used to store the data in iRODS for long term preservation. A library of applicable micro-services will be created and shared with other institutions that are doing similar work. Further evaluation will be achieved by the project team demonstrating that iRODS is capable of providing storage for a preservation copy of the data, and that it can be accessed and used to restore the data in the active system. The Dark Archive will also be evaluated by the self-audit conducted by Ghering and Gouin using the TRAC criteria and checklist.

Long-term *access* to these vital electronic records is the fifth objective. The project team will demonstrate that the presentation layer can provide public access to records in *Spartan Archive*. Results of the testing in Phase 3 and user surveys in Phase 6 and will be reported. Evaluators will be able to access the system directly and perform queries on the data to determine if *Spartan Archive* provides intuitive and user friendly access to the RO's records series.

For the sixth objective, the team will *disseminate* the results of this project in a variety of venues. A project website will keep colleagues informed on the team's progress, including monthly reports to NHPRC, drafts of manuals and procedures, and the development of metadata standards and workflow. The archivists will also give no fewer than three presentations at professional conferences and publish a minimum of one article in a professional journal. Finally, the team will offer to speak to archival administrations classes at nearby universities and share the lessons learned at each meeting of the CIC-University Archivists Group.