A business case is presented for a commitment to designing and implementing a digital infrastructure for the scholarly activities of the major research universities in Texas. The issues of scholarly resource management are sweeping, touching most aspects of the daily lives of all Texans. This document describes the purpose, value, composition, and plan for the creation of what will surely become one of the most important tools for research and education in Texas for the future.
The Texas Digital Library

Executive Summary

According to the "Regional Plan for Higher Education" published in 2004 by the Texas Higher Education Coordinating Board, the population of college aged Texans will produce more than 500,000 new college students and require more than 7,500 additional faculty by 2015. This means increasing demands on infrastructure that supports research and instruction – and specifically the production, preservation and dissemination of digital information throughout Texas universities. As projected enrollment targets are met, the demand for faculty will increase at a time when resources are scarce. It is imperative that we find new ways of working to meet the needs of faculty and students in higher education in Texas.

On university campuses throughout Texas an enormous amount of intellectual capital exists that is not readily available to faculty, staff, and students throughout the State. While the potential value of this intellectual capital may be high, its actual value is zero if it is not accessible in a timely manner to scholars, researchers, teachers, and students who need it. The costs associated with providing server and storage systems for institutional repositories that could provide access to these scholarly materials are substantial. A unified Texas Digital Library can help to mitigate these problems.

Institutions of higher education are creating open access journals and federated institutional repositories to publish the intellectual products of their faculty, reduce costs, and easily disseminate the results of research and scholarship to other researchers, scholars, and students on their campuses and beyond. Texas ARL universities and their systems must become part of this evolving new model of scholarly communication to reduce the rate of rise of the cost of information, serve better the needs of scholars and researchers, and partner with other major universities who are using such institutional repositories.

Here are seven positive ways the Texas Digital Library adds value to the existing work of our collaborating universities:

1. Serves as a center of excellence for the creation, curation, and preservation of digital scholarly information for the State in the broadest sense
2. Serves as a repository for research output, electronic theses and dissertations, faculty datasets, departmental databases, digital archives, course management and learning materials, digital media, special collections, etc.
3. Creates a competitive advantage for seeking gifts and grants by serving as a testbed for research
4. Provides a platform for continued leadership in the evolving scholarly communication system
5. Provides an innovative organizational model that effectively leverages advanced technology
6. Produces institutional efficiencies in operations, equipment, and staffing
7. Advances our core research and teaching missions

The TDL will offer a broad set of services to the university community, enhancing productivity and enabling a wider distribution and use of the intellectual output of our faculty and students. The following services are indicative of the types of services to be offered.
Institutional Repositories: Institutional repositories provide a secure storage facility for faculty and student material, while increasing the awareness and access capabilities for other researchers and the public. Typical uses include faculty research pages organized by college and department or individual research unit; a faculty self-archiving service for working papers, preprints, postprints and datasets; technical report series collections; and, the institution’s Electronic Thesis and Dissertation (ETD) collection.

Learning Objects Repositories and Courseware Management: Learning object repositories provide a secure storage facility for the materials used in teaching and learning, while increasing the awareness, access and reusability for other faculty and the public. Typical materials include slide sets, audio/video lectures, notes, syllabi, and bibliographies. Courseware management adds services to manage the day to day operations of a class and builds upon the learning object repository.

Scholarly Publishing: The Texas Digital Library Press will provide scholarly publishing services for the State. An open access, peer-reviewed, archival journal service will provide workflow models and secure storage to host scholarly community journals. Edited manuscripts and refereed conference proceedings will be accepted, archived, distributed electronically, and printed on-demand. The TDL press will also engage in explorations of new models of scholarly communication. The goal will be to support faculty, students, and staff with the highest quality and most timely information possible.

Collections Management: Collection management will provide curatorial services and a secure storage facility for the digitized artifacts found in our university archives and museums, as well as the scientific collections of our faculty. These collections run the gamut of all scientific and scholarly investigation. In addition, the TDL will seek to preserve those collections of great worth that might be in danger of being lost due to deterioration or neglect.

Preservation: Preservation is inherently a part of each of the other services. Robust preservation services are difficult to provide for digital collections and require distributed resource sharing and collaboration. The TDL will remove this concern from our faculties.

Specific recommendations for the formation of The Texas Digital Library are given on page 10.
Table of Contents

Introduction: 1
Statement of Opportunity: 2
Business Case: 3
Positive Effects: 3
Benefits: 3
Specific Services: 5
Impacts: 6
Project and Financial Overview: 7
Project Costs for the First Three Years: 7
First Year Milestones: 8
TDL Membership Options: 9
Recommendations: 10
Introduction

According to the “Regional Plan for Higher Education” published in 2004 by the Texas Higher Education Coordinating Board, the population of college aged Texans will produce more than 500,000 new college students and require more than 7,500 additional faculty by 2015. This means increasing demands on infrastructure that supports research and instruction – and specifically the production, preservation and dissemination of digital information throughout Texas universities. As projected enrollment targets are met, the demand for faculty will increase at a time when resources are scarce. It is imperative that we find new ways of working to meet the needs of faculty and students in higher education in Texas.

In Texas, the five Association of Research Libraries (ARL) universities and their systems comprise more than 40 campuses, 375,000 students, 30,000 faculty, and 100,000 staff. Each campus has digital resources that are stored somewhere—on a faculty desktop, in departmental databases, at a campus computer center, in a library server, on CD-ROMs. Each campus has or soon will have electronic theses and dissertations produced by its students (over 4000 theses and dissertations were produced at ARL universities in Texas last year alone). Each campus has libraries and museums that have important digitized collections. Faculty members at each campus have products of scholarship and research that may or may not have been commercially published. Retiring faculty want the research data and projects they spent their lives working on saved for posterity.

In short, on university campuses throughout Texas an enormous amount of intellectual capital exists that is not readily available to faculty, staff, and students throughout the State. While the potential value of this intellectual capital may be high, its actual value is zero if it is not accessible in a timely manner to scholars, researchers, teachers, and students who need it. The costs associated with providing server and storage systems, backup and recovery services, data migration/refreshment and staff to manage institutional repositories that could provide access to these scholarly materials are substantial.

A unified Texas Digital Library can help to mitigate both of these problems.

- A Texas Digital Library can collect and make accessible scholarly information resources that are now spread throughout the State. Faculty, staff, students, and others can have immediate and ubiquitous access to scholarly information they need but currently have no way of finding and no way of accessing. Imagine the research scientist in the biochemistry department at UT Austin working on molecular cell mutations having access to image collections and working papers on the very same topic by researchers at M.D. Anderson and the Texas A&M Medical School. Today such products as working papers, pre-prints, or other “grey literature” in effect do not exist even for researchers working in the same experimental areas.

- A Texas Digital Library, shared in common among collaborating institutions, can be a single source of scholarly information for everyone in the State and beyond. Each campus need not develop and operate its own institutional repository of scholarly materials. Fewer repositories, preserving and sustaining these electronic publications, would create economies of scale to be realized on each campus.
The term “digital library” is no longer novel. It no longer raises eyebrows. Today, digital libraries are flourishing around the world in research universities around the world. To remain competitive and to maximize their research capabilities, researchers, teachers, learners, and scholars in Texas need the services of a first rate digital library. The Texas Digital Library can:

- serve as a portal to scholarly information from our universities;
- serve as a repository for papers from ongoing research at our universities;
- serve as a repository of published, peer-reviewed journal articles reporting research conducted at our universities;
- provide a testbed for developing new working models for publication and dissemination of scholarly, research, and educational information;
- help to bring research dollars into Texas;
- reduce operations, equipment, and staffing costs for building institutional repositories;
- foster innovation in education and research in Texas and the nation;
- preserve scholarly information for future generations of researchers, teachers, students, and scholars in Texas.

This document describes the rationale for the creation of what will surely become one of the most important tools for research and education in Texas for the future.

**Statement of Opportunity**

Higher education is a primary producer and consumer of information. Our system of scholarly communication relies on using existing information to create new information. The key to creating new information, to adding value to the educational experience, and to driving innovation and development, is being able to provide the needed information to the researcher at the exact moment and in the exact format it is needed—to optimize the value of information and to maximize the capabilities of its users. The broader the dissemination, the more valuable information becomes. The Internet permits global and immediate dissemination of information, enabling an exponential increase in its value.

Information is becoming a more expensive commodity. Mergers of publishers with media firms are resulting in global information giants that are very aggressive in asserting their property rights. At the same time, university information budgets are being squeezed. Universities pay faculty members and researchers to produce information, and then pay to buy back the commercially published information. This paradigm cannot and will not continue. Institutions of higher education are creating open access journals and federated institutional repositories to publish the intellectual products of their faculty, reduce costs, and easily disseminate the results of research and scholarship to other researchers, scholars, and students on their campuses and beyond.

Texas ARL universities must become part of this evolving new model of scholarly communication to reduce the rate of rise of the cost of information, serve better the needs of scholars and researchers, and partner with other major universities who are using such institutional repositories to disseminate the products of their research and scholarship. The future of the scholarly world will be even more collaborative and Texas must be a contributor.
Business Case

The business case identifies in detail positive effects and benefits derived from the Texas Digital Library (TDL). Specific services that will be available are described and key areas of impact for those institutions willing to commit to designing, implementing and maintaining the TDL are given.

Positive Effects

Here are seven positive ways the Texas Digital Library adds value to the existing work of our collaborating universities:

1. Serves as a center of excellence for the creation, curation, and preservation of digital scholarly information for the State in the broadest sense
2. Serves as a repository for research output, electronic theses and dissertations, faculty datasets, departmental databases, digital archives, course management and learning materials, digital media, special collections, etc.
3. Creates a competitive advantage for seeking gifts and grants by serving as a testbed for research
4. Provides a platform for continued leadership in the evolving scholarly communication system
5. Provides an innovative organizational model that effectively leverages advanced technology
6. Produces institutional efficiencies in operations, equipment, and staffing
7. Advances our core research and teaching missions

Benefits

Let’s look at these seven positive effects in greater detail.

1. The TDL will serve as a center of excellence in digitization, metadata, and preservation for the State’s universities. New scanning technologies, digital formats, and metadata standards are currently being created and are under discussion at the national and international level. It is imperative that the TDL follow best practices by implementing international standards for digital collections management. Preservation is an inherently collaborative enterprise, as is the TDL, requiring robust distribution and replication processes. The TDL will serve as a nexus for the long-term archival storage of the intellectual digital assets of our universities.

2. The TDL will provide a repository for both instructional materials and faculty research, keeping them safe and secure for the future, while lifting this burden from the faculty and students and enhancing the value of these digital assets. As our intellectual output continues to make the transition from physical to digital media, a critical need is emerging for the secure storage and preservation of digital formats. Our students produce electronic theses and dissertations. Our faculties produce simulations, visualizations, scientific datasets, databases, digital image/video/audio collections, digital learning materials, and electronic manuscripts and journal articles. Our museums are digitizing their collections to enhance scholarly and public access.

3. The scale of the TDL provides unique opportunities for studying potential solutions to problems of mass distribution, archiving, and preservation of digital scholarly materials. The TDL must function in both a production and testbed capacity, as the scholarly community redesigns its communications media over the next few decades. The TDL will become a player in the global
digital library research community and will provide opportunities for broad research funding in computer and information sciences.

4. Open access publishing, institutional repositories, publishing of refereed scholarly journals by universities, creation and dissemination of electronic theses and dissertations—all of these are ideas whose time has come. Academe is taking control of the scholarly communications process back from monopolistic conglomerates. Linked or federated digital libraries will be the way the transition is made and will be the dissemination, storage, and preservation media of the future. The TDL stands at this threshold to the future and will provide a model of federation for others to follow.

5. The TDL will be the first digital library to encompass multiple State university systems and a private university. The TDL will leverage the existing networking infrastructure in the State, including Internet 2 and LEARN (Lonestar Education And Research Network), to provide broad distribution of scholarly resources to the State. The TDL will take advantage of the considerable work ongoing in the open source community on institutional repositories and protocols, such as OAI-PMH, for distributed resource sharing and virtual collection management.

6. The TDL will take advantage of the efficiencies of scale by sharing expensive scanning facilities for digitization, high capacity storage facilities for preservation, and staffing for metadata expertise, programming and system administration, resulting in more efficient use of State funds. Additionally, through our collaborations on best practices and adherence to international standards we will gain an unparalleled level of interoperability among ourselves and within the global scholarly community.

7. The research and teaching missions depend on the production and use of scholarly information. As a new model for the timely dissemination of scholarly information grows in significance, it becomes essential for research and teaching to continue to flourish. Texas cannot afford to continue to operate in the current model.
Specific Services

The TDL will offer a broad set of services to the university community, enhancing productivity and enabling a wider distribution and use of the intellectual output of our faculty and students. The following are indicative of the types of services to be offered. Of course, the TDL, as an institution, will evolve to meet the needs of its constituents, just as libraries have for centuries.

Institutional Repositories

Institutional repositories provide a secure storage facility for faculty and student material, while increasing the awareness and access capabilities for other researchers and the public. Typical uses include faculty research pages organized by college and department or individual research unit; a faculty self-archiving service for working papers, preprints, postprints and datasets; technical report series collections; and, the institution’s Electronic Thesis and Dissertation (ETD) collection. In the TDL, the institutional repositories of the collaborating institutions will be federated into larger repositories to take advantage of economies of scale and preservation opportunities.

Learning Object Repositories and Course Management Systems

Learning object repositories provide a secure storage facility for the materials used in teaching and learning, while increasing the awareness, access and reusability for other faculty and the public. Typical materials include slide sets, audio/video lectures, notes, syllabi, and bibliographies. Courseware adds services to manage the day to day operations of a class and builds upon the learning object repository. In the TDL, the learning object repositories of the collaborating institutions will be federated into larger repositories to take advantage of economies of scale and preservation opportunities.

Scholarly Publishing

The Texas Digital Library Press will provide scholarly publishing services for the State. An open access, peer-reviewed, archival journal service will provide workflow models and secure storage to host scholarly community journals. Edited manuscripts and refereed conference proceedings will be accepted, archived, distributed electronically, and printed on-demand. The TDL press will also engage in explorations of new models of scholarly communication. The goal will be to support faculty, students, and staff with the highest quality and most timely information possible. In the TDL, the TDL press will be a centralized archival repository to take advantage of economies of scale and preservation opportunities.

Collection Management

Collection management will provide curatorial services and a secure storage facility for the digitized artifacts found in our university archives and museums, as well as the scientific collections of our faculty. These collections run the gamut of all scientific and scholarly investigation. In addition, the TDL will seek to preserve those collections of great worth that might be in danger of being lost due to deterioration or neglect. In the TDL, collections of the collaborating institutions will be federated into larger repositories as necessary/desired for research or teaching purposes or to take advantage of economies of scale and preservation opportunities.
Preservation

As can be seen from the above services, preservation is inherently a part of each of the other services. Indeed, a faculty member may choose to use the institutional repository or collection management services only as an additional security measure. Robust preservation services are difficult to provide for digital collections. The TDL will remove this concern from our faculties.

Impacts

The following are the key areas of impact for those institutions prepared to make a commitment to design, implement and maintain a digital infrastructure for the scholarly activities of the major research universities in Texas:

1. Increases the institution’s visibility and impact
2. Increases accessibility to scholarship and research
3. Increases competitiveness for research funding
4. Maximizes the research capabilities of faculties by increasing the pace of scholarly dissemination and discovery
5. Increases stature as a leader in developing new working models for publication and dissemination of scholarly, research, and educational information
6. Advances core teaching and research missions by fostering innovation in education and research
7. Preserves intellectual assets for future generations of researchers, teachers, students, and scholars
Project and Financial Overview (Original from 2005)

Assumption: A centralized TDL technology plant located in Austin with significant storage space.

Project Costs for the First Three Years

Initial, start-up costs for Year One: $692,000

Ongoing costs for Year Two: $586,500

Ongoing costs for Year Three: $496,000

**Year One**

Executive Director $130,000 (A&M and UT)
Programmer/Analysts $65,000
System Admin/Prog. $65,000
Administrative Assistant $52,000 (UT)
Office supp./computers $15,000
Servers and Storage $200,000
Tape backup system $100,000
Software $50,000
Telecomm, travel $15,000

**TOTAL** $692,000

**Year Two:**

Executive Director $134,000 (A&M and UT)
Programmer/Analysts $67,000
System Admin/Prog. $67,000
Administrative Assistant $53,500 (UT)
Servers and Storage $200,000
Software $50,000
Telecomm, travel $15,000

**TOTAL** $586,500

**Year Three**

Executive Director $138,000 (A&M and UT)
Programmer/Analysts $69,000
System Admin/Prog. $69,000
Administrative Assistant $55,000 (UT)
TDL Servers and RAID $100,000
Software $50,000
Telecomm, travel $15,000

**TOTAL** $496,000
First Year Milestones:

- TDL website launches February 1st, 2006
  - Open Journal System
  - Journal of Digital Information [JoDI]
  - Manakin/DSpace
  - ETD Project
- Hiring
  - Administrative Assistant
  - Systems Analyst
- Computing Infrastructure implementation testing
  - Storage Resource Broker [SRB]
  - Vendor Specific Replication [SnapVault]
- Organizational Structure
  - Working Groups
- ETD Metadata standard
- Presentations
  - 8 presentations in 2005 - 2006
- Connections
  - Texas Higher Education Coordinating Board (THECB)
  - Texas Advanced Computing Center (TACC)
  - Lonestar Education and Research Network (LEARN)
TDL Membership Options

Tier 1: Founding
- ARL member
- Commitment of $100,000 per year for 3 years
- 2 local FTE (40 hrs/wk) commitment
- Managed by TDL Directors
- Participate in TDL Working Groups
- 1 seat each on the governing board
- Content contributor

Tier 2: Associate
- Institution of Higher Education in Texas
- $50,000 annual commitment
- 1 local FTE (40 hrs/wk) commitment
- Managed by TDL Directors
- Participate in TDL Working Groups
- Representation on the governing board is limited to 1 T2 member
- Content contributor

Tier 3: Affiliate
- Institution of Higher Education in Texas
- $25,000 annual commitment
- Content contributor

Contributors
- Institution of Higher Education in Texas
- Solicited content contributors

Membership Assumptions
- Participating ARLs each have a voting member on the Governing Board
- T2’s represented on the Governing Board through a single member recommended by the co-Directors
- T3’s and Contributors not represented on governing board
- Contributed staff managed by co-Directors
- Monetary contributions are central; staff contribution is local
Recommendations

Recommendation One: Deans/Directors of Texas ARL university libraries sign an agreement to design, implement and maintain the Texas Digital Library. The agreement will include pledges for the first three years of funding.

Recommendation Two: Founding (Tier 1) and Associate (Tier 2) institutions contribute key technical staff responsible for acting on behalf of the institution in negotiations, technical design meetings, etc. These key technical staff form working groups that represent the core decision making body for the design, implementation and maintenance of the Texas Digital Library.

Recommendation Three: The co-Directors and the working groups work together to identify opportunities to reduce operations, equipment, and staffing costs through collaborative sharing of resources. Recommendations should be made for courses of action that will reduce these costs while providing high quality services to our faculty, staff and students.

Recommendation Four: The co-Directors and the working groups work together to identify potential research funding opportunities and faculty at collaborating universities that can write grant proposals and applications to garner outside funding. The Texas Digital Library should be used to the maximum extent as a testbed for applied research in digital libraries.

Recommendation Five: The co-Directors and the working groups work together to form an outreach program to promote the widest possible use of the services of the Texas Digital Library. This includes producing high quality audio visual aids, brochures, and website materials. Presentations should be given at most of the university campuses in the State.

Recommendation Six: Electronic Theses and Dissertations (ETDs) represent an important, yet untapped, resource for our State. The collaborating institutions should work together to make ETDs be the first federated digital library collection hosted by the Texas Digital Library.