

ZLOT
The Z Texas Implementation Component of
The Library of Texas

Project Overview

Adapted from *A Proposal of Services* previously submitted to

The Texas State Library and Archives Commission

by

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Abstract

This proposal to the Texas State Library and Archives Commission (TSLAC) describes an 11-month project by the Texas Center for Digital Knowledge at the University of North Texas to support the planning and implementation of three key components of TSLAC's major initiative, the Library of Texas.

The goal of this project is to demonstrate the viability and effectiveness of a standards-based approach for distributed access to Texas libraries' resources by Texans.

TXCDK will deliver services in the following major work areas:

- Project planning
- Requirements and specifications
- Proof of concept implementation
- Evaluation.

The deliverables as a result of this work include but are not limited to the following:

- A multiphase, multiyear project plan for implementing these components
- An architecture that provides a blueprint for integrating all components of the LOT
- A small scale viable demonstration of the virtual catalog and the integrating search and retrieval interface through a proof of concept approach.
- An evaluation plan for assessing the effectiveness and utility of LOT.

TXCDK will work as a partner with TSLAC and assume overall responsibilities to plan and support the work associated with implementation of the virtual catalog and integrating search and retrieval interface components of the LOT.

1. Introduction

The Library of Texas (LOT) is a virtual library initiative by the Texas State Library and Archives Commission (TSLAC). The LOT builds upon and expands Texas libraries' networked infrastructure to provide a new era of library content and services to Texas citizens. The LOT is a virtual library that encompasses a number of key components including:

- Online databases licensed by TSLAC for statewide access
- A government information locator and digital government information preservation program
- A virtual catalog enabled through the use of the ANSI/NISO Z39.50 information retrieval protocol
- An integrating enhanced search and retrieval interface to the LOT's multiple components
- A document delivery service framework based on interlibrary loan and other mechanisms.

Other components may be incorporated into the LOT over time.

The first two components are already in process. TSLAC has purchased or licensed a large number of online databases. The Texas Records and Information Locator Service (TRAIL) and a preservation program are underway.

Work is now needed on three components:

- The virtual catalog. Texans will be able to search across multiple library catalogs from a single interface (thus creating the sense of a virtual catalog) to identify library resources without regard to geographical location of either the searcher or the resources.
- The integrating search and retrieval interface. From a single interface, Texans will be able to search diverse resources easily, thus integrating access to library catalogs, the state licensed online databases, and other resources.
- The document delivery service framework. Once Texans have discovered and identified library resources through the above two components, the LOT provides an effective service to get these resources into the hands of the searcher (e.g., through interlibrary loan for borrowable materials or with the click of a button to access digital resources).

The first two of these components utilize the ANSI/NISO Z39.50 information retrieval protocol and build upon the work of the Texas Z39.50 Implementor Group and its Z39.50 specifications.

The Texas Center for Digital Knowledge proposes a one-year project to support the planning and implementation of these three LOT components. TXCDK's general approach will be to build consensus on the functional requirements, formalize the

requirements in detailed specifications, and prove out the specifications in actual implementations. The deliverables as a result of this work include:

- A multiphase, multiyear project plan for implementing these components
- An architecture that provides a blueprint for integrating all components of the LOT
- A small scale viable demonstration of the virtual catalog and the integrating search and retrieval interface through a proof of concept approach. These components may build upon the work of the Texas Z39.50 Implementors Group and its specification document, *Z Texas Profile: A Z39.50 Specification for Library Systems Applications in Texas*.
- An evaluation plan for assessing the effectiveness and utility of LOT.

The LOT is a leading edge initiative to bring the resources of Texas libraries to all citizens in the state. It is an initiative that requires the development and integration of new technologies and services. Ultimately, the LOT may encompass more than 600 Texas public and academic libraries, their resources, and their patrons. The work described in this proposal will result in information and implementation experience for decision making by TSLAC to choose one or more paths of development and evolution of LOT. As with any leading edge effort, development paths must be chosen with available information while accommodating external factors that can lead to modification of assumptions, timelines, and technologies. TXCDK's approach in this one-year project is to lay a solid foundation, minimize risk, and propose appropriate phasing in of LOT functionality as an operating virtual library.

The Texas Center for Digital Knowledge (TXCDK) is a research and development center at the University of North Texas. Its focus is on innovation and collaboration to respond to the challenges and opportunities of digital information and the networked environment (see attached brochure). TXCDK offers a unique interoperability testing service that will be available to the LOT. The Z39.50 Interoperability Testbed is a formal testing environment that will assist the libraries participating in the LOT virtual catalog to improve their Z39.50 client and server implementations. There is no other formal Z39.50 interoperability testbed such as this.

Dr. William E. Moen, the principal investigator, is an internationally recognized expert in the technologies and standards that are the foundation for the LOT. He served as advisor and facilitator in establishing the Texas Z39.50 Implementor Group and developing the Z Texas Profile. He currently chairs a National Information Standards Organization standards committee developing a U.S. National Z39.50 Profile for Library Applications. His expertise in networked information organization and retrieval and his experience in managing large projects are critical assets he brings to this initiative (for more information, see Section 5. Project Personnel and TXCDK Resources).

TXCDK will work as a partner with TSLAC and assume overall responsibilities to plan and support the work associated with implementation of the virtual catalog and integrating search and retrieval interface components of the LOT.

2. Project Goals and Objectives

The goal of this project is to demonstrate the viability and effectiveness of a standards-based approach for distributed access to Texas libraries' resources by Texans without regard to geographic location.

The following objectives will guide project activities to achieve the goal:

- Develop a multiphase, multiyear plan for implementing the virtual catalog, the integrating search and retrieval interface, and the document delivery service framework components of the LOT.
- Conduct research, collect appropriate data, and build consensus on the definition, requirements, and specifications of the virtual catalog, the integrating search and retrieval interface, and the document delivery service framework.
- Create architecture for the LOT that serves as a blueprint for integrating the multiple components.
- Coordinate and oversee the proof of concept demonstration of the virtual catalog and the integrating search and retrieval interface.
- Develop an overall evaluation plan for the LOT, including formative and summative evaluation, with emphasis on outcomes measures.
- Administer formative evaluation to assess utility and effectiveness of the virtual catalog and the integrating search and retrieval interface components that are the focus of this project.

3. Project Work Approach and Activities

TXCDK will provide services related to overall planning and support of the implementation of the virtual catalog and integrating search and retrieval components of the LOT, the document delivery service framework, and the evaluation of the LOT. The proposed work covers a one-year period beginning October 2001 and ending August 31, 2002. The LOT, however, will evolve in a multiphase implementation approach spanning a three-year time frame ending in August 2004. The cost of TXCDK services in the first year reflects work on critical activities (e.g., project planning, and LOT architecture) to establish a solid foundation for the multiphase, multiyear project.

TXCDK will deliver services in these major work areas:

- Project planning
- Requirements and specifications
- Proof of concept implementation
- Evaluation.

TXCDK will also provide appropriate technical and research activities necessary to support each work area.

TXCDK in consultation with TSLAC will establish a project advisory group shortly after the award of the contract. The advisory group will consist of representatives of various stakeholders of the LOT. The principal investigator has established advisory groups for his other projects, and these groups provide critical input and feedback for project activities. In addition, members of the advisory group can carry the message of the LOT to their constituents helping to build interest and awareness.

TXCDK will work with TSLAC in the early weeks of this project to build awareness and publicity for this work. This will be critically important for activities in the Project Planning Work Area and the Requirements and Specifications Work Area. The advisory group will be one mechanism for building awareness; direct outreach and public announcements are others.

The following sections provide a brief narrative description of each work area. For each of the work areas, TXCDK will identify a set of associated work packages, tasks and activities, deliverables, and timelines.

3.1 Project Planning Work Area

This work area focuses effort on collecting appropriate data and developing an overall plan for the virtual catalog, the integrating search and retrieval interface, and the document delivery service framework components of the LOT. The project plan will offer a phased approach to implementing the LOT. For the first phase (October 2001 through August 2002) the plan will identify high visibility deliverables in the form of a proof of concept of the virtual catalog and the integrating search and retrieval interface. The plan's phased approach also addresses LOT development through the second and third years of the project (e.g., phasing in the document delivery service in the second and third years).

Project planning activities include data collection in the form of a technology inventory and readiness assessment. This inventory will survey the more than 600 public and academic libraries that will be candidates to be included in the first roll out of the LOT. The inventory will identify the technology readiness of libraries to participate in the LOT and serve as a needs assessment tool to identify technology needed for participation. This readiness assessment will identify early adopters, middle adopters, and late adopters, and this information will be used to develop a strategy for the phased implementation approach of the LOT. The survey will incorporate questions to assist TXCDK with understanding potential technical, social, political, organizational, financial, and personal factors of the separate libraries that could jeopardize or be significant barriers to the ultimate success of the LOT. In addition, the survey will attempt to identify important special collections.

Project planning will determine the necessary resources to carry out specific activities leading to and including the proof of concept implementation. This includes identifying

people and organizations outside of TXCDK to carry out specific tasks and activities on a subcontract basis (e.g., developing the evaluation plan).

The project plan will detail tasks, schedules, milestones, and deliverables, and will include a reporting schedule to TSLAC and other stakeholders to publicize the progress on the project.

3.2 Requirements and Specifications Work Area

This work area focuses on defining the virtual library and identifying the functional requirements of the virtual catalog, the integrating search and retrieval interface, and the document delivery service. TXCDK will transform these requirements into an overall architecture for the LOT and develop a set of detailed public specifications to build the virtual catalog and the integrating search and retrieval interface.

TSLAC has begun to compile requirements for the LOT as a result of TSLAC discussions with the Texas Z39.50 Implementors Group. The LOT can be many things to many people, but the challenge is to identify high priority, immediate functionality that can be implemented in this one-year project versus the complete functionality that LOT can be as it evolves and matures.

TXCDK will bring together several groups of key stakeholders and users of the LOT to refine and build consensus on the required initial functionality to be addressed in the first year proof of concept implementations. The stakeholders and users (e.g., TSLAC staff, public and academic librarian managers and staff, regional systems directors and staff, Z39.50 implementors, interlibrary loan experts, and others) will meet in facilitated discussion groups or focus groups. TXCDK will synthesize the results of these focus groups and develop a ranked list of functionality based on stakeholder, user, and TSLAC input. An important role of the TXCDK is to build consensus on prioritizing the functionality, identify what can be implemented within the timeframe of this one-year project, and plan for phasing in LOT functionality over multiple years.

The output from the identification of functional requirements will be used to develop an overall architecture of the LOT with emphasis on the virtual catalog, the integrating search and retrieval interface, and the document delivery service framework. The architecture becomes the blueprint for the LOT's near term implementation (during proof of concept) and its long-term evolution. An appropriate architecture provides an efficient and effective typology to interconnect the state's libraries and may utilize existing organizational arrangements.

The LOT will require many different hardware platforms and software packages to work together to create the virtual library experience. To level the playing field for potential vendors to participate in building products that can be incorporated in the LOT, TXCDK will produce detailed public specifications based on the functional requirements and architecture.

To the extent possible, the public specifications will reference existing or emerging voluntary standards, community agreements, and other guidelines to build the LOT as a standards-based virtual library. This requires an additional effort in a standards and technology review to identify potential products (i.e., standards, guidelines, specific technologies, products, etc.) that can be used by libraries to participate in the LOT. The results of this review will be especially important to those libraries identified as not technologically ready (as determined through the technology inventory and readiness assessment) to assist them in choosing appropriate standards, hardware, and software to purchase to improve their readiness level for LOT participation. Special focus of this review will be on low-cost, public domain, and open source products that could be useful to TSLAC and local libraries. TXCDK staff performing this review will also be cognizant of best practices for these standards and technology both within and outside the library community.

3.3 Proof of Concept Implementation Work Area

The focus of this work area will be to involve interested vendors in producing components of the virtual catalog and the integrating search and retrieval interface (each of which will have subordinate components). The LOT is an initiative that is both innovative and developmental. Although several other states have made attempts at statewide virtual libraries, there are no acceptable models or products available to create an off-the-shelf virtual library. In this respect, the LOT has the potential to be a national showcase for a leading edge, standards-based virtual library.

To reduce the risks involved with such an innovative and complex undertaking and to phase in an efficient and effective virtual library, TXCDK proposes a ***proof of concept approach*** for the virtual catalog and the integrating search and retrieval interface components of the LOT. Proof of concept activities by vendors will be based on the public specifications resulting from TXCDK work. A proof of concept approach can validate the public specifications and/or focus attention on revisions to the specifications. The deliverables from the first year proof of concept activities will demonstrate the utility of the LOT to funders and other stakeholders.

TXCDK will invite vendors to produce proof of concept products for the virtual catalog and the integrating search and retrieval interface based on the public specifications. The target implementations during the proof of concept are:

- 20 to 30 online library catalogs interconnected via ANSI/NISO Z39.50 for the virtual catalog component
- an integrating search and retrieval interface that allows searching those library catalogs and a selected set of the TSLAC licensed online databases.

An important feature of any virtual library is the level of interoperability of the components. During the proof of concept phase, TXCDK will provide the services of our

Z39.50 Interoperability Testbed to participants in the virtual catalog component. TXCDK will coordinate testing Z39.50 configuration and other aspects of individual libraries' online catalogs to assess and improve interoperability.

The Z39.50 Interoperability Testbed is a unique service that TXCDK can provide. Its use will assure the Z39.50 products used in the LOT conform to relevant standards and requirements as detailed in the public specifications. Interoperability is a critical success factor for the ultimate utility of the virtual library.

3.4 Evaluation Work Area

The evaluation work area addresses the need for formative and summative evaluation of the evolving LOT. It is critical to design an overall evaluation plan for the LOT early in this project to ensure that appropriate data will be collected and available for assessing the components as well as the overall LOT. Evaluation methodologies need to be specified and special attention given to outcomes-based indicators and measures.

TXCDK will oversee the development and conduct the implementation of an evaluation plan for the LOT. The evaluation plan will specify and describe methods of data collection and analysis, measures, and indicators to assess and inform progress on the LOT (formative) and assess the effectiveness and impact of the LOT (summative). The plan will include outcomes-based evaluation to indicate to funders of this initiative the utility and impacts of the LOT.

TXCDK will administer the implementation of the evaluation, collect and analyze the data, and prepare periodic evaluation reports.

4. Project Deliverables

The project objectives indicated likely deliverables, and the preceding sections identified specific outcomes and deliverables of this one-year project. Table 1 summarizes the project deliverables.

TABLE 1. ZLOT PROJECT DELIVERABLES

	Deliverable	Description
A	Overall Project Plan	An overall project plan that addresses both this one-year project and the three-year time period of TIF-funded LOT development. The plan will guide phasing in functionality for the LOT over the three years.
B	Technology Inventory & Assessment	A report summarizing the results of the technology inventory and readiness assessment

C	Functional Requirements Compilation	A report of the functional requirements for LOT (near-term and long-term).
D	Architecture Design	A published architecture for LOT based on the functional requirements. (Standards and technology review is an activity in conjunction with the architectural design work.)
E	Public Specifications Development	Documented public specifications for the virtual catalog and the integrating search and retrieval interface. A report of the document delivery service framework (implementation of which will be considered for year two of the LOT work).
F	Evaluation Plan	An overall evaluation plan for LOT, including a formative evaluation of deliverables in this one-year project.
G	Implementing of Evaluation Plan Implementation Components	A formative evaluation of the virtual catalog and the integrating search and retrieval interface components during the proof of concept implementations.
H	Proof of Concept Planning and Coordination	A plan that will guide the proof of concept activities.
I	Proof of Concept Implementation	For the proof of concept implementations, TXCDK will work with TSLAC to ensure a small-scale feasibility demonstration of the virtual catalog and the integrating search and retrieval interface by August 31, 2002. More specifically the demonstration will include: <ul style="list-style-type: none"> • A virtual catalog involving 20 to 30 online library catalogs interconnected via the ANSI/NISO Z39.50 information retrieval protocol and configured to support the Z Texas Profile. • An integrating search and retrieval interface that provides single search capability across two or more online library catalogs and two or more TSLAC licensed online databases.

The proof of concept implementation is critical to enable TSLAC to choose a path for full-scale development of the virtual catalog and the integrating search and retrieval interface. The proof of concept implementations will provide TSLAC with a high visibility demonstration to the TIF Board, the legislature, and the public of the reality of LOT and its potential to serving the citizens of Texas.

The accountability of TXCDK for ensuring the deliverables of this proof of concept work area is dependent upon the resources being available to develop proof of concept implementations. The proposed budget (Section 6) requests \$200,000 to begin the proof of concept implementations. These funds will provide vendors and implementors with an incentive to produce proof of concept implementations in accord with the public specifications. The funds also provide TXCDK with leverage to ensure that vendors and implementors do not simply utilize their existing products for proof of concept implementations, where those products do not conform to the public specifications.

5. Project Personnel and TXCDK Resources

Dr. William E. Moen, Fellow in the Texas Center for Digital Knowledge, will serve as Principal Investigator for this project. Dr. Moen is internationally recognized for his work in the use of Z39.50 in library applications. He served as advisor and facilitator in establishing the Texas Z39.50 Implementors Group and its first two releases of the Z Texas Profile. He currently chairs the National Information Standards Organization Standards Committee that is developing a U.S. National Standard for a Z39.50 profile for library applications. He is acting chair of the international Z39.50 Implementors Group, and a member of the Bath Profile Group that issued an international Z39.50 specification for library applications. Dr. Moen received a National Leadership Grant from the U.S. Federal Institute of Museum and Library Services to establish the first Z39.50 Interoperability Testbed. He brings not only his expertise in the arena of networked information organization and retrieval but also his experience in managing large projects. He firmly believes that building consensus among stakeholders, rational project planning and management, and effective evaluation are critical success factors for any project. Dr. William E. [Moen's Curriculum Vitae](http://www.unt.edu/wmoen/curriculum_vitae.htm) is available from http://www.unt.edu/wmoen/curriculum_vitae.htm.

TXCDK will provide the necessary human resources to carry out the work described above. Most work will be carried out directly by TXCDK personnel. For some activities, the most cost effective approach will be to subcontract to non-TXCDK experts (e.g., design of evaluation plan). Decisions about subcontracting project activities will be made by TXCDK in consultation with TSLAC.

The following identifies TXCDK people or roles for carrying our responsibilities:

- **Principal Investigator** [1] (Moen): Overall responsibility for project design and administration, with expertise in Z39.50, interoperability, architecture, standards, and technology. Reports to the TSLAC LOT coordinator (Valerie Johnson)
- **Project Manager** [1] (TBD): A professional level position with responsibility for day-to-day operation and activities of the project. Reports directly to the Principal Investigator. PM will have a proven track record, expertise, and experience with relevant technology, standards, and project management.
- **Graduate Student Research Assistants** [2] (TBD): Part-time research assistants (not more than 20 hours a week) to assist in various tasks and

activities (e.g., carrying out data collection, compiling information, etc.). Masters or Ph.D. students in the School of Library and Information Sciences are likely candidates to fill these positions.

- **Z39.50 Interoperability Testbed Coordinator** [1] (TBD): Assist with interoperability coordination and testing for participants in Virtual Catalog. The testbed coordinator will have experience with the testbed and conducting interoperability testing.

TXCDK hosts the [Z39.50 Interoperability Testbed](#), a unique asset available for the LOT development. Testing of virtual catalog participants through the testbed will lead to improved interoperability for search and retrieval across the individual library's online catalogs. Without an acceptable level of interoperability within the virtual catalog, its success and utility will be jeopardized.

TXCDK will also provide necessary information technology to carry out all aspects of the project including data collection, data analysis, report writing, presentations, and interoperability testing.

6. Project Budget

TXCDK proposes to accomplish the work and services for this one-year project as described above and produce the deliverables listed in Section 4 for a total cost to TSLAC not to exceed \$495,564. Table 2 identifies the major cost categories.

TABLE 2. ZLOT PROPOSED BUDGET

	Deliverables & Cost Categories	\$\$
A	Overall Project Plan	\$12,000
B	Technology Inventory & Assessment	32,000
C	Functional Requirements Compilation	28,000
D	Architecture Design	17,775
E	Public Specifications Development	27,000
F	Evaluation Plan	45,000
G	Implementing of Evaluation Plan Implementation Components	10,000
H	Proof of Concept Planning and Coordination	9,000
I	Proof of Concept Implementation	200,000
J	Travel Costs	10,880
K	Miscellaneous Expenses	1,650
	UNT Indirect Costs	102,259
	TOTAL	\$495,564

The work for this project is human resource intensive and the majority of the funds requested are for the expert services and knowledge of the Principal Investigator (PI), for an experienced Project Manager (PM) to carry out day-to-day responsibilities and

tasks, and for two Graduate Research Assistants to assist the PI and PM with a variety of tasks and activities. These project personnel will carry out the vast majority of work described in this proposal.

The budget includes a specific amount for the development of the evaluation plan (the development of which is likely to be a subcontract to non-TXCDK experts in networked information services evaluation). The funds in the budget cover the cost of developing the plan for and coordinating the proof of concept implementations. Funds will be used to initiate the proof of concept implementations. A small amount of travel will be necessary for carrying out the work of the project, but these costs have been kept to an absolute minimum.

The total amount requested includes indirect costs charged to projects by the University of North Texas. Indirect costs are figured at the off-campus rate of 26%.

The University of North Texas will contribute \$30,302 in matching funds to purchase hardware and software to be used for data collection, analysis, report writing, and expanded interoperability testing capabilities.