DLF Aquifer Business Plan
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Executive Summary

Business Concept:
DLF Aquifer is an initiative of the Digital Library Federation. Envisioned as a means of leveraging digital library content, DLF Aquifer will create scalable solutions to enable teaching, learning, and scholarship. Beginning with a significant, well-bounded collection of digital content in the area of American culture and life, DLF Aquifer will create a test-bed of tools for selecting, collecting and providing access to quality digital content. Grounded in the thinking that libraries add value through the organization of information, DLF Aquifer offers opportunities for collaboration among libraries and with partners building repositories, content management systems, course management systems, and other solutions that support the scholarly process. Future broader scale collaborations can be modeled on the DLF Aquifer experience.

Financial Features:
DLF Aquifer is supported by the Digital Library Federation, a membership organization, through contributions from DLF capital funds and by grant funding. DLF Aquifer will not generate revenue with service charges in the first phase but may develop fee-for-service models during the course of the initiative.

Financial Requirements:
Development of collections, tools, and services will require systems resources and staff. Potential sources of revenue are DLF capital funds, DFL operational funds, grant funds, and contributions by DLF Aquifer participant libraries and others. DLF members are already investing heavily in the project with DLF capital funds.

Current State:
DLF Aquifer is in the project planning and prototype stage.

Principals:
The DLF Aquifer director leads the initiative and reports to the president of the Digital Library Federation board of trustees.

Major Digital Library Federation Achievements Underpinning Aquifer:
Promulgation of Open Archives Initiative (OAI) metadata standards and best practices, collection registry support, user evaluation, and tools registry development have laid the groundwork for the DLF Aquifer initiative.

DLF Aquifer Business Plan

Plan Background and Specifics

Introduction:

The digital library landscape is complex and volatile. Individual libraries have made great progress in providing digital collections and services to their communities. However, the additional value libraries can offer by collaborating to aggregate existing digital collections and create services to support scholarship will allow a far more rapid rate of development than any single library could sustain.

To that end, the Digital Library Federation promotes development of DLF Aquifer, a test-bed suite of tools and services for the scholar, applied initially to a significant, well-bounded collection of digital library material in American culture and life. A clear implementation path, building on existing DLF initiatives will enable a prototype collection aggregation and first generation services to be ready for evaluation by the 2006 DLF Spring Forum.

The DLF Aquifer Vision:

DLF Aquifer supports scholarship by building and maintaining quality collections of digital material and by making these collections available through a suite of library services tailored to scholarly discovery and use. Discovery will be improved through metadata normalization and enhancement. Tools for selecting, organizing, visualizing search results and digital information, annotating, and authoring will be available within the service context of each library that implements DLF Aquifer.

DLF Aquifer emerged as the re-awakened strategic direction of the Distributed Open Digital Library initiative of the Digital Library Federation in May 2003. The Digital Library Federation was established in 1995 to "bring together -- from across the nation and beyond -- digitized materials that will be made accessible to students, scholars, and citizens everywhere, and that document the building and dynamics of America's heritage and cultures"[1]. The first goal in the DLF charter is:

> The implementation of a distributed, open digital library conforming to the overall theme and accessible across the global Internet. This library shall consist of collections -- expanding over time in number and scope -- to be created from the conversion to digital form of documents contained in our and other libraries and archives, and from the incorporation of holdings already in electronic form.

The Digital Library Federation has been working towards this strategic goal since it began through support, coordination, and participation in the development of prototypes, proofs of concept, and test-beds that will form the DLF Aquifer foundation. Through DLF Aquifer, participants will assemble pieces that DLF members and others have already constructed, identify areas for development, and in phases, create a suite of collections and library services that can continue to be enhanced and maintained over time. The current climate offers favorable circumstances for existing work to form the

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[1]Digital Library Federation Charter (1995). (http://www.diglib.org/about/dlfcharter.htm)

foundation for what have been described as the signature services of the Digital Library Federation.

Additional qualities that differentiate the DLF Aquifer concept from other digital library efforts are:

- o Integrated access to multiple digital formats
- o Tools and services enabling deep sharing of digital objects across domains
- o A focus on the needs of scholars in the humanities and social sciences through library collaboration with faculty and students

The combination of these features differentiate DLF Aquifer from the mass digitization of text being done in collaboration with Google™, from aggregations of digital material within an institution, and from digital collections that exist outside of the scholarly communication context.

Positioned within the Digital Library Federation, DLF Aquifer has access to standards-based tools development that will be leveraged in support of the DLF Aquifer service mission. DLF Aquifer participants and other DLF members hold rich collections within the American culture and life theme and are well placed to contribute quality content.

Of strategic importance is DLF Aquifer's link to initiatives in different but related problem spaces. The DLF and DLF Aquifer participants have strong ties to the digital repository community through the development of several digital repository solutions, with digital preservation initiatives through participation in a number of NDIIP grants, to the course management community through the Sakai™ project http://sakaiproject.org/, and through a broad spectrum of other content management efforts such as the Technology Analysis of Repositories and Services led by Johns Hopkins http://dkc.jhu.edu/repository.html.

Management:
DLF Aquifer is an initiative of the Digital Library Federation. DLF Aquifer has been run by a committee of the whole called the Aquifer Prototype Group, comprised of the library directors of the participant libraries and their delegates. Names and organizational affiliations of the Aquifer Prototype Group are listed in Appendix I. As DLF Aquifer moves into the implementation phase, the management structure is changing. DLF Aquifer now has a director, Katherine Kott, who reports to the president of the Digital Library Federation board, currently Michael Keller. The DLF Aquifer Implementation Group, led by the Aquifer Director, will supersede the Aquifer Prototype Group.

The DLF Aquifer Implementation Group will consist of the chairs of four DLF Aquifer working groups: collections, services, architecture/technology, and metadata. Three at-large members will also be selected from amongst the DLF Aquifer participant libraries or allies. As an initiative of the Digital Library Federation, it is important that DLF Aquifer have close ties to its parent organization and that the DLF Aquifer director has mechanisms for staying informed about other DLF initiatives. To promote these

connections, the executive director of the Digital Library Federation will serve *ex officio* on the DLF Aquifer Implementation Group, which will set policy and create overall project plans for the initiative.

Participation in DLF Aquifer is open to all DLF member libraries. Participants may join and leave the project depending on their level of interest and ability to commit during any given phase of the project. For the initiative to remain operational, at least six DLF member libraries will need to be actively engaged.

Scenarios for participation include, committing two staff members to actively contribute to a working group or hosting a DLF Aquifer sub-project such as the collections registry. Collections contributions are also taken into account.

Pricing:
In the first phase of the initiative, DLF Aquifer collections and services will be made available to DLF Aquifer participants, DLF members, the library community, and beyond without cost to the user. Future project phases may include modeling fee for service scenarios.

Target Audience:
DLF Aquifer is aimed at meeting the needs of scholars in the humanities and social sciences. Aligning services with scholars' needs and building rich collections in context will make DLF Aquifer attractive for inclusion as a suite of library services in course management system portals. With strategic collaborative partnerships, the Digital Library Federation anticipates that DLF Aquifer will enjoy a high rate of adoption by scholars and will inspire and inform more ambitious library collection aggregation.

Current Landscape:
While areas that support the scholarly communication process are changing rapidly, there remains a vital role for libraries, aggregating quality collections through curatorial activities and developing library services to aid in selection and use of this content. DLF Aquifer proposes to differentiate itself from mass digitization efforts by providing tools for a variety of more granular approaches to collections. DLF Aquifer will serve content that repositories such as DSpace and Fedora™ preserve and will integrate with and complement services that support re-purposing of content for teaching and learning in course management systems. The field is wide open for a variety of collaborative efforts.

CONTENTdm from OCLC and RLG Cultural Materials are bounded products that enable access to digital collections. Although both OCLC and RLG are membership organizations, DLF Aquifer participant libraries will set project priorities and work more directly to accomplish project goals. While DLF Aquifer tools and services will be built with respect to particular collections, it is anticipated that the DLF Aquifer suite will be less tightly integrated than the OCLC and RLG offerings. Rather than being implemented as a stand-alone product, DLF Aquifer will be designed to be incorporated into an individual library's suite of services.

DLF Aquifer Business Plan

Some perceived competition for DLF Aquifer comes from the for-profit search service marketplace. Anecdotal evidence suggests that many undergraduate students and a growing number of faculty members view Google™ as a complete research solution. Independent scholars, who often experience barriers to receiving library services, embrace Google™ solutions to meet their information needs. Clearly identifying the value that DLF Aquifer brings, promoting DLF Aquifer broadly, and supporting a service model that allows DLF Aquifer collections and services to be freely distributed will be important aspects in differentiating DLF Aquifer from Google™ and in insuring a place for DLF Aquifer as a distillation of selected content from an ocean of possibilities.

Course management systems such as Sakai™ are developing services for selection of course building content. As DLF Aquifer is designed, it will be important to include capability for interoperating with course management systems. In addition, a key component of the DLF Aquifer marketing effort will be to document best practices for integrating DLF Aquifer, as a suite of tools, into broader content selection, use, and re-purposing environments as library services that support teaching and learning.

Development Status:
DLF Aquifer is in the project planning and prototype phase. A number of participant libraries have been actively engaged in components of the project and in grant-funded activities that reach beyond DLF. The IMLS funded collections registry effort in which the University of Illinois is participating has already fed into the DLF/DLF Aquifer collections registry effort. The AmericanSouth.org project created by Emory University will provide collections and models for working with faculty. The American West project led by California Digital Library will greatly enrich DLF Aquifer holdings. IMLS has also funded DLF to build the "next generation" OAI-based finding aid for library services http://www.diglib.org/architectures/oai/imls2004/index.html. Work has begun to identify collections for inclusion in DLF Aquifer and to identify metadata practices for the project. Services and architecture definitions have been discussed, but not formalized. DLF efforts focused on collections, tools and user studies registries, and OAI metadata-harvesting tools will be leveraged in the effort. DLF Aquifer services will be delivered within the first project phase.

In addition to the work Emory University has done with faculty, the University of Virginia Library has also developed partnerships with faculty that demonstrate ways in which services to scholarship in the humanities and social sciences can be enhanced by library participation in the organization of content. Indiana University's focus on understanding scholarly requirements for digital material in music and art provides additional texture for content other than text. Collaboration with faculty requires brainstorming with individual faculty members, especially cultural leaders. Building on partnerships with faculty members who are catalysts in their fields will be fundamental.

Next steps are to create detailed project plans and workflows, formalize collection policies, select collections based on the policies, define an initial set of services for the selected collections, and develop and implement technical solutions to implement the services.

DLF Aquifer Business Plan

Project Plan:
DLF Aquifer will be implemented in three, one-year phases, beginning with Q2, 2005. The initiative will move from development into maintenance in the fourth phase. The chart below provides a high-level view of the work. Each phase will likely be broken into discrete, distributed projects by category. **Appendix II** outlines work group charges and initial tasks at a more detailed level and the proposed budget identifies required resources.

Category	Phase I Leveraging Existing Initiatives	Phase II Enhancement	Phase III Deep sharing	Phase IV Maintenance
Project Management	Create and implement detailed Phase I project plan	Create and implement detailed Phase II project plan	Create and implement detailed Phase III project plan	Implement sustainability plan
	Submit grant proposal for Phases II-III		Create sustainability plan	
Collections	Integrate DLF collections registry with UIUC/IMLS registry efforts	Solicit and add collections to fill collection gaps	Implement digitization projects to fill collection gaps	Continue to grow by adding collections and formats
	Create collection policy and guidelines for contributors	Plan to digitize collections to fill collection gaps		
		Integrate new formats into collection		
Metadata	Implement OAI metadata harvesting for DLF Aquifer collections	Develop tools for enhanced retrieval (metadata, semantic web, etc.)	Implement metadata requirements for rights management	Provide metadata enhancement services to contribute to sustaining project
Technology	Flesh out tools registry and implement selected tools	Integrate new formats into collection	Collaborate with NDIIP partners on "deep sharing"	
Services	Document scholars needs through user studies registry	Develop tools to transform scholarship, interoperate with CMS	Deliver objects across domains	
	Draw upon existing DLF work with scholars to define services	Enhance context with visualization tools, etc.		
		Develop an understanding of requirements for rights management in preparation for deep sharing		

DLF Aquifer Business Plan

Project Support:
Overall project management is the responsibility of the Aquifer director. Most project activity will be distributed with various component projects managed by member libraries. Two additional full time technical project staff will most likely need to be added centrally.

Administrative support for the DLF Aquifer initiative is provided through the DLF office. DLF resources consist of a program associate and an administrative associate. DLF Aquifer support is balanced and prioritized with other DLF administrative and program needs by the DLF executive director.

In the first phase, DLF Aquifer participant and DLF member libraries will contribute collections. Libraries are encouraged to view collection contributions to DLF Aquifer as permanent in nature. In future phases, specific targeted collections may be digitized to fill collection gaps and collections may be solicited from outside the DLF. Digitization projects may be part of an in-kind member library contribution or may be supported by grant funding. Models for procuring outside collections will be generated as the initiative develops.

DLF Aquifer technology solutions may be built or bought and integrated into DLF Aquifer. Open source solutions are preferred. Hardware will be housed at DLF Aquifer participant institutions or at other institutions, by contract on a fee for service basis. By mutual agreement between DLF and the service provider, fees may be waived. For example, discussions are underway with the University of Illinois, Urbana-Champaign to host the collections registry as an outgrowth of their IMLS grant funded project. Mapping out specific locations of technology is not critical to successful implementation as long as adequate infrastructure to deliver services is present in the environment. Services will be available to users regardless of location.

Budget:
The separate draft budget spreadsheets show preliminary costs for four project phases. Each phase is estimated to be one year in duration. Phase I will begin in 2005 Q2. Costs are shown centrally, although work will actually be distributed. Project oriented budgets will be developed as working groups get underway. Revenue is not shown. First year revenue is assumed to be from DLF funds with possible supplemental grant funding.

Capital Requirements:
Capital equipment expenditures and initial staffing costs will be made from DLF capital funds. Most equipment needs will likely be met by in-kind contributions from participating libraries. As indicated in the support section above, service and equipment costs will be noted and in-kind contributions will be recorded as a transaction between the contributor and DLF.

DLF Aquifer Business Plan

Cash Flow:
Although some of the requirements of the initiative can be met through participant contributions, external funding will be needed to meet the goals of each project phase over a four-year period. It is realistic to expect that participants will contribute staff time to such activities as developing functional specifications, setting standards and identifying project tasks and managing workflow. The level of work that will be required in task areas such as collection analysis, data mapping, tools integration and administrative support will require outside funding for the initiative to progress at a satisfactory rate. As outlined in the budget section, the project will require an infusion of cash.

Marketing and Promotion:
DLF Aquifer will be designed to meet the needs of scholars. It will be promoted through libraries and by librarians to the scholarly community using a variety of methods and in a variety of venues. The DLF Aquifer initiative has a web presence on the Digital Library Federation web site. DLF Aquifer will be promoted through presentations at conferences, including the Digital Library Federation fall and spring forums. Participants will use local opportunities to promote the initiative with scholars in their environments. Phase III of the project will include events designed with faculty in mind to encourage and promote use of DLF Aquifer collections, tools, and services.

Risks:
There is some risk to the success of the DLF Aquifer initiative because of the perception that commercial search services such as Google™ will provide access to the content that is needed for scholarship. The DLF Aquifer concept has also been confused with offerings such as RLG Cultural Materials. It will be important to get the attention of people who could benefit from DLF Aquifer and continue to differentiate the collections, tools and services that it offers. A recent report sponsored by the Pew Internet & American Life Project indicates that the majority of Internet searchers "paint a very rosy picture of their online search experiences."[2] These searchers are using commercial search services such as Yahoo® and Google™ that are often embedded in their Internet access. DLF Aquifer will not have the exposure that these commercial search services enjoy and will need to develop other channels to establish a user community.

While DLF Aquifer participants are clearly motivated to contribute to the project, libraries have many competing priorities. It is possible that DLF Aquifer participants will not be able to sustain the level of commitment that will be needed to keep the project moving. If the goals of the project are not aligned with individual institutional goals, university librarians may have difficulty justifying their contribution to the project as other institutional priorities compete for scarce resources. Funding levels will influence the ability to progress the initiative. Although it is likely that the values and goals of the initiative will appeal to funding agencies, there is some chance that the project direction will need to shift to be in closer alignment with the interests and directions embedded in current funding support.

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[2] Fallows, D. (2005). "Search Engine Users." Washington, D.C., Pew Internet & American Life Project. (http://www.pewinternet.org/pdfs/PIP_Searchengine_users.pdf)

DLF Aquifer Business Plan

Conclusion:
The DLF Aquifer concept has been refined since the DODL initiative was proposed in May 2003. The fundamental goals have remained closely aligned with the goals stated by the DODL Initiative Committee in their May 2003 document, "Framework for a Distributed Open Digital Library."

The DLF Aquifer initiative, originally called the Distributed Open Digital Library of the Digital Library Federation, has been established to:

- o Create a framework for shared digital content, tools and services among the DLF membership and broader community
- o Catalyze collaboration among digital library stakeholders in the development of rich content and innovative services
- o Develop an extensible architecture to leverage existing digital library assets, enable the development of layered services, and explore models for managing digital content rights in a collaborative environment
- o Generate, facilitate, and evaluate use of digital library content and services

Many successful Digital Library Federation initiatives have created and continue to form the "basin" in which DLF Aquifer collections will be pooled and from which resources can be piped in usable quantities through DLF Aquifer tools and services. Conditions are favorable for existing work to be leveraged to create what have been described as the signature services that will carry the Digital Library Federation into the future.

DLF Aquifer Business Plan

Appendix I: Aquifer Prototype Group Participants

Directors:
California Digital Library **--** *Daniel Greenstein*
Digital Library Federation – *David Seaman*
Emory University – *Linda Matthews*
Indiana University – *Suzanne Thorin*
Johns Hopkins University – *Winston Tabb*
Library of Congress – *Deanna Marcum*
New York University – *Carol Mandel*
Stanford University – *Michael Keller*
University of Illinios Urbana-Champaign – *Paula Kaufman*
University of Michigan – *Bill Gosling*
University of Minnesota – *Wendy Lougee*
University of Virginia **--** *Karin Wittenborg*

Participants, August 5th 2004 meeting at Stanford:
California Digital Library **--** *Daniel Greenstein, Peter Brantley*
Digital Library Federation – *David Seaman*
Emory University – *Martin Halbert*
Indiana University – *Suzanne Thorin*
Johns Hopkins University – *Winston Tabb*
Library of Congress – *Caroline Arms*
New York University – *Jerome McDonough*
Stanford University – *Michael Keller, Jerry Persons*
University of Illinios Urbana-Champaign – *Paula Kaufman, Beth Sandore*
University of Michigan – *John Price Wilkin*
University of Minnesota – *Eric Celeste*
University of Virginia **--** *Karin Wittenborg*

Participants, October 25th 2004 meeting at the DLF Forum in Baltimore:
California Digital Library **--** *Daniel Greenstein, Peter Brantley, Robin Chandler*
Digital Library Federation – *David Seaman*
Emory University – *Martin Halbert, Linda Matthews*
Indiana University – *Jon Dunn, Kristine Brancolini, Suzanne Thorin*
Johns Hopkins University – *Sayeed Choudhury*
Library of Congress – *Caroline Arms*
New York University – *Jerome McDonough, David Ackerman*
Stanford University – *Michael Keller*
University of Illinios Urbana-Champaign – *Beth Sandore*
University of Michigan – *John Price Wilkin*
University of Minnesota – *Eric Celeste*
University of Virginia **--** *Martha Blodgett, Michael Furlough*

Also attending from Council of Library and Information Resources **--** *Nancy Davenport, Abby Smith*

DLF Aquifer Business Plan

The DLF Aquifer Implementation Group will replace the Aquifer Prototype Group. The DLF Aquifer Implementation Group will be chaired by the DLF Aquifer director and will report to the president of the Digital Library Federation board. The DLF Aquifer Implementation Group will set policies and project plans for the DLF Aquifer initiative and develop charges for working groups to focus on collections, services, technology/infrastructure, and metadata.

DLF Aquifer Implementation Group

Charge: The DLF Aquifer Implementation Group sets policy and creates project plans for the initiative, transforms the policies into strategy and tactics and develops actionable charges for the four working groups.

> *Membership:* Katherine Kott, *DLF*, Chair, Michael Keller, *Stanford University*, Daniel Greenstein, *California Digital Library*, Martha Sites, *University of Virginia,* Winston Tabb, *Johns Hopkins University*, Jon Dunn, *Indiana University*, Sarah Shreeves, *University of Illinois, Urbana-Champaign,* Martin Halbert, *Emory University*, David Seaman, *DLF, ex officio*

Collections Working Group

Charge: The Collections Working Group creates collections policies and recommends them to the DLF Aquifer Implementation Group. The working group designs processes for collection selection and identifies resources required to implement the processes. The Collections Working Group chair communicates the resource requirements to the DLF Aquifer director.

> *Membership:* Winston Tabb, *Johns Hopkins University*, Chair, Perry Willett, *University of Michigan*, Robin Chandler, *California Digital Library*, Linda Matthews, *Emory University*, Ben Stone, *Stanford University*, Abby Smith, *CLIR*, Leslie Johnston, *University of Virginia*, Linda Phillips, *University of Tennessee*

Services Working Group

Charge: The Services Working Group recommends service specification and level policies to the DLF Aquifer Implementation Group. The working group develops functional specifications for DLF Aquifer services, working closely with scholars. The Services Working Group is also responsible for designing processes to measure DLF Aquifer usability.

> *Membership:* Martin Halbert, *Emory University*, Chair, Beth Sandore, *University of Illinois*, Michael Furlough, *University of Virginia*, John Walsh, *Indiana University*, John Butler, *University of Minnesota*, Laine Farley, *California Digital Library*

DLF Aquifer Business Plan

Technology/Architecture Working Group

Charge: The Technology/Architecture Working Group recommends architecture and infrastructure policy to the DLF Aquifer Implementation Group. The working group designs technical solutions for DLF Aquifer Implementation, identifies the resources required to create these solutions and communicates the resource requirements to the DLF Aquifer director.

> ***Membership*:** Jon Dunn, *Indiana University*, Chair, Cory Snavely, *University of Michigan*, Eric Celeste, *University of Minnesota*, Jerry Persons, *Stanford University*, Tim Cole, *University of Illinois Urbana-Champaign*, Thornton Staples, *University of Virginia*, Anthony Smith, *University of Tennessee*, David Ackerman, *New York University*

Metadata Working Group

Charge: The Metadata Working Group recommends metadata policies and best practices to the DLF Aquifer Implementation Group. The working group designs workflows for metadata harvesting, creation and enhancement.

> ***Membership:*** Sarah Shreeves, *University of Illinois*, Chair, Jenn Riley, *Indiana University*, David Reynolds, *Johns Hopkins University*, Liz Milewicz, *Emory University*, Gary Shawver, *New York University*

DLF Aquifer Business Plan

Appendix III: February 28, 2005 Aquifer Prototype Group Meeting Participants

John Butler, *University of Minnesota*
Tim Cole, *University of Illinois, Urbana-Champaign*
Robert Dizard, *Library of Congress*
Jon Dunn, *Indiana University*
Michael Furlough, *University of Virginia*
Daniel Greenstein, *California Digital Library*
Martin Halbert, *Emory University*
Michael Keller, *Stanford University*
Katherine Kott, *Aquifer/Digital Library Federation*
Linda Matthews, *Emory University*
Jerome McDonough, *New York University*
Molly McGehee, *Emory University*
Jerry Persons, *Stanford University*
Henry Rossman, *Library of Congress*
David Seaman, *Digital Library Federation*
Martha Sites, *University of Virginia*
Winston Tabb, *Johns Hopkins University*
Suzanne Thorin, *Indiana University*
John Price Wilkin, *University of Michigan*
Perry Willett, *University of Michigan*