Introduction: The Library of Congress National Digital Information Infrastructure and Preservation Program

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This special issue of *Library Trends* is comprised of sixteen articles that tell fascinating stories about the ground-breaking efforts of numerous partners within the Library of Congress National Digital Information Infrastructure and Preservation Program (NDIIPP). Since its inception in 2004, NDIIPP has grown from an experimental program into a true partnership of concerned organizations working together to sustain access to digital information that is critical to scholarship and cultural heritage nationwide.[1] The seeds for NDIIPP were initially sown in a report issued in July 2000 by the National Research Council titled *LC21: A Digital Strategy for the Library of Congress.* The report, which was commissioned by the Library and Congress in 1998, was an on-site study of the Library's technology practices, an initiative conducted by a committee of the Computer Science and Telecommunications Board of the National Research Council.

Among the recommendations of the LC21 report was the point that the Library of Congress should take the lead in the preservation and archiving of digital materials, but that it must continue to work with other institutions in determining collection policies for digital information, and it must accelerate its efforts to meet the growing demand. In December 2000 Congress passed legislation asking the Library of Congress to develop a national program to preserve the ever-growing amounts of digital information, especially materials created only in digital format. This law was passed in order to ensure that this content would be accessible for current and future generations. This program was funded by a $100 million congressional appropriation and was formally called the National Digital Information Infrastructure and Preservation Program (NDIIPP). In December 2000 Congress released $5 million for the initial planning phase. From that point forward, the Library of Congress sought and solidified collaborations with numerous organizations, both public and private, to

present a plan for a national digital preservation program to Congress in 2002. In this plan, Librarian of Congress James Billington emphasized the urgent need to set in place a trusted solution for the preservation of scholarly and cultural heritage information nationwide through the NDIIPP program mission:

> Never has access to information that is authentic, reliable, and complete been more important, and never has the capacity of libraries and other heritage institutions to guarantee that access been in greater jeopardy. Recognizing the value that the preservation of past knowledge has played in the creativity and innovation of the nation, the U.S. Congress seeks, through the Library of Congress, to find solutions to the challenges posed by capturing and preserving digital information of cultural and social significance.

With these words and the funding from the United States Congress, the Library of Congress entered a new era that is marked by the necessity for cooperation and interdependence in order to sustain access to a highly distributed network of digital heritage and scholarship content. The sixteen manuscripts included in this special issue represent a microcosm of over sixty collaborative projects that were launched by the NDIIPP. They are organized around three important themes that emerged from the individual and the collective efforts of the partners. These themes coalesced around the shared critical need to preserve significant born-digital and digitized legacy information. The topics treated in this issue include, more specifically:

- new organizations and missions and new perspectives on sustainability;
- preservation of specific types of content, including Web content, cultural heritage and special collections, ejournals, and geospatial information, and the format and metadata standards to support ingest, management, and migration of digital content;
- interoperability, data transfer and storage, and the future of digital preservation systems.

Each article in this issue tells a compelling story conveying the sense of urgency that has pervaded the efforts of the numerous institutions and groups involved in NDIIPP, many with little else in common but the need to develop policy, structure, process, commitments, and technologies to preserve significant cultural and historical content into the future.

In the decade that has passed since the LC21 report was commissioned by the Library and Congress, there has been a significant amount of forward momentum aimed at setting in place the shared policy, practice, and technical infrastructure for the preservation of important yet at-risk cultural heritage and government information in digital form in this country. The NDIIPP Timeline document that follows this introduction (attachment 1) provides a detailed and rich chronology of the numerous

activities of the partnership and the Library of Congress that have focused on technical, policy, and organizational matters since the inception of the program.

Through the support from Congress, matched dollar for dollar by the over sixty partner institutions, the NDIIPP partners as a group have seized the opportunity to make headway on the challenges of a national yet decentralized digital preservation mandate through numerous coordinated efforts. NDIIPP is engaged in collecting and archiving at-risk content, cooperating on digital preservation best practices and standards, and developing tools and services to be shared within and beyond the partner network. The work of the partners comprises several critical areas including: selection and preservation; metadata for creative commercial content; tools and services for the network; collaborations to preserve state and local government information; U.S. Federal Agency working groups; the Section 108 Study Group; the National Science Foundation partnership; and the International Partnership for Archiving the Web. The NDIIPP Status document that follows this introduction (attachment 2) provides a more detailed description of the numerous collaborations and initiatives that represent the core of the national digital preservation partnership's working agenda.

From approximately 2004 through 2008, the participants in the NDIIPP partnership worked individually on specific projects and met periodically to work together toward defining a new construct—a nationwide digital preservation network. Through the collective experiences of the past several years, the NDIIPP partner institutions developed and communicated a strong and unified message about the critical need for institutions to work in concert to preserve digital scholarship and heritage information that the United States is at risk of losing permanently. The partners grappled with the daunting knowledge that although few institutions are able to appreciate and prioritize the urgent needs of digital preservation, there is great social capital in the shared understanding that all (scholars, Congress, and citizens) have critical needs for sustained access to the wealth of literature and information that is produced in this country. The adage "the whole is greater than the sum of the parts" became a strong and persistent foundation for the NDIIPP partnership.

As the NDIIPP partners addressed digital preservation challenges, the need for new organizations emerged—structures, policies, and processes that centered on digital preservation. The experience of the NDIIPP partnership suggests that groups that are focused on domain- or format-specific content have a strong likelihood of developing sustainable digital preservation models. In a number of these cases, new organizational models have been created to meet the emerging needs of these new collaborations. The articles in this issue that address the new organizational structures provide fascinating and diverse case studies in the approaches

taken by several institutions to reshape existing programs or to develop new organizational structures to meet the needs created by digital preservation programs. Often these groups had limited funding and time to capture critical resources at the risk of substantial loss of digital content due to deterioration of storage and the looming threat of obsolescence— of systems and content format. NDIIPP provided the impetus for some existing organizations to refocus their missions, integrating digital preservation into the core mission. In the case of public television (WNET/ Channel 13, and New York University), the NDIIPP program catalyzed a community around the development of standards and systems to support the preservation of public television content. Through the NDIIPP program, other organizations are redefining consortia partnerships, in the case of the social science data community (Data-PASS Project, Murray Archive), and some have formed new types of not-for-profit consortia among cultural heritage institutions for the purpose of preserving digital special collections. The Educopia consortium formed by the institutions involved in the MetArchive American South project provides a compelling story of the coordinated efforts of a group of U.S. academic institutions to preserve and make accessible the digital cultural heritage materials that document significant points in the history of the American South.

One of the most significant developments of the NDIIPP partners has been the shared understanding of the high value that sustainability brings to digital preservation activities, for individual projects as well as across the partnership. In their article describing the history of social science data curation and the development of the Data-PASS Project (Data Preservation Alliance for the Social Sciences), Gutmann et al. explore the challenges of preserving digital social science data. Their sense of urgency was fueled by the knowledge that after a significant shift in survey research methods had occurred in the 1930s, "less than half of the digital social science research content . . . has been preserved at a professionally managed archival institution." Altman also explores the changes in policies, process, and perspective that occurred with the preservation of digital social science data in the Henry A. Murray Archive. In his article on the preservation of business records from the Dot Com Era, Kirsch describes his pioneering efforts to rescue the digital records of defunct law firms that represented failed dot com businesses—in a sense, although these records had custodial support, they were "orphaned" without access due to legal restrictions. If not for Kirsch's efforts, with support from the NDIIPP program, the archive of the businesses' legal transactions would have been inaccessible and eventually lost, representing not only an institutional loss, but more important, a loss to historians and society of a significant record of activities from an era in U.S. history that could not otherwise be studied or well understood. LeFurgy's article explores the perspectives on sustainability of digital preservation efforts based on a survey of the NDIIPP part-

ners two years into the three-year term of their projects. His observations suggest that many of the participating institutions were grappling with the prospect of sustained funding and mainstream organizational models to support digital stewardship.

The development of reliable methods to preserve the at-risk content of the NDIIPP partners—scholarly journals, Web content, geospatial information, video, and audio files—formed the dynamic core of exploration and discovery in the NDIIPP program. The Library of Congress invested strategically in a number of institutions that pledged to investigate numerous challenges in preserving specific content formats. Many of the articles in this volume focus specifically on community information needs for re-use and sustained access to the various types of content, placing emphasis on standards development and best practices. The articles by Seneca and by Hswe et al. provide equally compelling yet different approaches to Web archiving that were developed by two NDIIPP-sponsored projects to serve various government information, state archives, and cultural heritage communities. The common concerns that fueled these and other Web archiving projects included the fleeting nature of content on the Web, and the adverse impact of "lost evidence" on many aspects of everyday activities that have come to depend on Web dissemination (e.g., federal, state, and local government agency websites, publications and legislation; scholarly presentations, technical reports, and working papers; etc.). The print counterparts for all of this information were previously deposited in libraries, archives, and organizations where the arrangements for stewardship of the print materials have been well established. With the advent of the Web, numerous government and private organizations that previously published materials in print have shifted to Web dissemination, many simply ceasing the crucial deposit of a print archival copy. Web archiving services provide the critical link that ensures long-lived access to digital documents that are now distributed through the Web.

The NDIIPP program also contributed substantially to the development of production archiving services for reliable and sustained access to vetted scholarly publications and digital-only materials. Two such services are featured in this issue, including LOCKSS and Portico, both which were initially developed to address e-journal archiving. The article by Reich and Rosenthal provides a rich account of the development of the LOCKSS (Lots of Copies Keep Stuff Safe) distributed approach to ejournal preservation, but focuses specifically on the concept of a Private LOCKSS Network (PLN). The Private LOCKSS Network extends the concept of the LOCKSS preservation strategy to fit the needs of a group or groups of institutions that share in a common commitment to preserve their collective digital scholarly content that is deemed to be significant to the group. Skinner and Halbert's article on the MetaArchive Cooperative, also in this issue, provides a working example of a successful PLN. In her article on

the development of the Portico ejournal archiving service, Kirchhoff relates the evidence gathered by Ithaka (echoed in similar surveys in the United Kingdom) that confirms the rapidly evolving reliance of scholars on ejournals to the core business plans of the Portico service. Libraries, publishers, and scholars seek affordable organizational solutions to ensure that they will have sustained access to digital scholarship into the future. Kirchhoff also outlines new preservation areas in which the scholarly community is keen for Portico to provide services, including e-books and digitized collections. Because the nature of digital preservation needs varies by institution and intent, both centralized (Portico) and distributed (LOCKSS) services address important aspects of digital preservation that are both complementary and necessary.

NDIIPP also provided support for cultural heritage institutions to move forward their work in the arena of geospatial information preservation. This issue includes two articles that focus on different aspects of geospatial data collection and preservation. A team from North Carolina (Morris et al.) pursued preservation of state and local digital geospatial data and addressed the challenges of identifying and collecting from approximately one hundred state and regional agencies geospatial data that is used in applications such as tax assessment, transportation planning, hazard analysis, health planning, political redistricting, and utilities management. The goal of the North Carolina effort was to start at the local level and work outward—establish a framework of partnerships among local, state, and federal agencies and work toward alignment of collection and preservation functions for GIS information, first at the state level, then forming partnerships among states and other GIS organizations. Taking a slightly different approach, a team from Stanford University and the University of California, Santa Barbara developed the National Geospatial Digital Archive (NGDA) with the goal of building a national, federated collecting network for the archiving of at-risk geospatial images and data. The article by Erwin et al. presents a compelling story of the challenge of developing a collection framework and establishing the requisite format and metadata standards.

One important evolutionary change that occurred over the course of the NDIIPP program was the gradual and shared realization that preservation as a function exists along the continuum of access to content. The results of innumerable conversations across the various user communities involved in NDIIPP surfaced an important point—digital preservation actually means, in many instances, the process of ensuring *sustainable access over time* to critical scholarly and heritage content. For the user communities, successful digital preservation programs were those that could guarantee *both preservation of and access to significant digital content into the future.*

Preservation systems and data ingest and transfer protocols play a critically important role in ensuring that digital information is sustained in its

original and intended form, or as close to that as possible. The articles in the final section of this special issue present the results of explorations in the technology of digital preservation systems and the movement of data both into and among preservation repositories. Each participant in an NDIIPP project committed at the outset of the program to transfer to the Library of Congress their digital content in the final year of the project. The article by Mandelbaum et al. describes the collaboration between the Library of Congress and the San Diego Supercomputing Center (SDSC) on models for mass data transfer and storage. This work considers the numerous human and technology factors involved in developing a reliable and replicable process for data transfer between two organizations. Research at the University of Maryland by JaJa and Song produced the ADAPT (Approach to Digital Archiving and Preservation Technology) framework for digital content preservation that is based on a layered, digital object architecture and includes a set of modular tools and services built using open standards and Web technologies. In their article describing a framework for repository interoperability, Habing et al. describe the development of the Hub and Spoke (HandS) Tool Suite. These tools were developed, implementing the METS and PREMIS standards for preservation metadata, to assist in the management of digital content in multiple repository systems while preserving valuable preservation metadata. The HandS model provides a standards-based method for packaging content that allows digital objects to be moved between repositories more easily while supporting the collection of technical and provenance information crucial for long-term preservation. The final article in this volume from Dubin et al. investigates the next generation of preservation repository architecture through the development of semantic repositories that take into account the *meaning* of relationships within and among digital objects.

With the start of NDIIPP, the Library of Congress and cultural heritage institutions in the United States entered into a new partnership focused on shared stewardship of significant cultural heritage and scholarly digital content. The members of this partnership have undertaken, along with the Library of Congress, to form the foundation of digital culture preservation in the United States. Other critical efforts underscore the need for this national partnership to take hold and embrace other types of critical digital content. The Interim Report of the Blue Ribbon Task Force on Sustainable Digital Preservation and Access underscores not only the importance but the urgency of digital preservation efforts like NDIIPP, and it seeks to identify sustainable economic models for accomplishing this goal.[1] Through the NDIIPP program, institutions have worked in concert to develop a strong sense of shared ownership in both the problem and the various solutions. This is reflected in the numerous cumulative accomplishments of the partnership, and the continuous growth in membership and outreach. The articles contained in this special issue of *Library Trends*

tell the stories of some of those initial efforts, and contribute to the cumulative understanding of the challenges and the accomplishments in digital preservation and access.

NOTE
1. For the most up-to-date information on the digital preservation efforts of the partnership, see http://www.digitalpreservation.org

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Attachment 1.
NATIONAL DIGITAL INFORMATION INFRASTRUCTURE AND PRESERVATION PROGRAM TIMELINE

http://www.digitalpreservation.gov

July 2000 National Research Council issues *LC 21: A Digital Strategy for the Library of Congress.* Commissioned by the Librarian of Congress in 1998, the on-site study of the Library's technology practices and initiatives was conducted by a committee of the Computer Science and Telecommunications Board of the NRC. Among its recommendations: the Library should take the lead in the preservation and archiving of digital materials, but it must continue to work with other institutions in determining collection policies for digital information and accelerate its efforts to meet the growing demand.

December 2000 Congress passes legislation asking the Library of Congress to develop a national program to preserve the burgeoning amounts of digital information, especially materials that are created only in digital formats, to ensure their accessibility for current and future generations. The program, funded by a $100 million appropriation, is formally called the National Digital Information Infrastructure and Preservation Program (NDIIPP). Congress releases $5 million for initial planning.

March 2001 Senator Ted Stevens (R-Alaska), Chairman of the Senate Appropriations Committee and Vice Chairman of the Joint Committee on

the Library for the 106th Congress, addresses the Federal Library and Information Center Committee (FLICC) of the Library of Congress on how to meet the challenge of preserving and providing access to authoritative federal information.

October 2001 The Library of Congress, in collaboration with the Internet Archive, webArchivist.org, and the Pew Internet & American Life Project, announces the release of a collection of digital materials called the September 11 Web Archive, available at september11.archive.org. The collection represents the Library's early attempts to capture information on the Web before it disappears from the historical record.

February 2002 The Library of Congress convenes a group to discuss possible scenarios for the development of an infrastructure for the collection, access and preservation of digital information. This scenario planning follows a series of convening sessions, held November 2001, that brought together a cross section of industry and other stakeholder communities for their input on the first stages of the digital infrastructure program.

October 2002 NDIIPP submits to Congress for approval the results of its extensive meetings and planning sessions for the digital preservation program. The "master plan," for a collaborative network to be formed by the Library of Congress, is called "Preserving Our Digital Heritage."

January 2003 Congress approves the plan and releases another $20 million. The remaining $75 million from Congress must be matched dollar-for-dollar from non-federal, in-kind, or cash contributions.

August 2003 NDIIPP issues an announcement seeking applications for projects that will advance the nationwide program to collect and preserve digital materials.

June 2004 The Library of Congress enters into a joint digital preservation project with Old Dominion, Johns Hopkins, Stanford, and Harvard universities to explore strategies for the ingest and preservation of digital archives. The Archive Ingest and Handling Test (AIHT) is designed to identify, document, and disseminate working methods for preserving the nation's increasingly important digital cultural materials, as well as to identify areas that may require further research or development.

June 2004 NDIIPP partners with the NSF to establish the first research grants program to specifically address digital preservation. NSF is to administer the program, which will fund cutting-edge research to support the long-term management of digital information. The effort is part of the Library's collaborative program to implement a national digital preservation strategy.

September 2004 NDIIPP announces awards of $13.9 million resulting from its August 2003 solicitation. The awards are received by eight consortia comprising thirty-six institutions. The award winners agree to identify, collect, and preserve specific types of born-digital materials. These awards from the Library are matched dollar-for-dollar by the winning institutions in the form of cash, in-kind or other resources.

March 2005 NDIIPP holds the first semiannual meeting of the eight award winners. This is the first opportunity for the partners in NDIIPP to meet each other and discuss how they will achieve the objectives of their own projects as well as those of the overall national program.

April 2005 The newly formed Section 108 Study Group holds its inaugural meeting at the Library of Congress. The goal of the group, named after the section of the U.S. Copyright Act that provides limited exceptions for libraries and archives, is to prepare findings and make recommendations to the Librarian of Congress by mid-2006 for possible alterations to the law that reflect current technologies. This effort will seek to strike the appropriate balance between copyright holders and libraries and archives in a manner that best serves the public interest.

May 2005 NDIIPP and the National Science Foundation award ten university teams a total of $3 million to undertake pioneering research to support the long-term management of digital information. These awards are the outcome of a partnership between the two agencies to develop the first digital-preservation research grants program. The awards are matched dollar-for-dollar by the institutions.

July 2005 Representatives from the institutions that received awards totaling nearly $14 million in September 2004 convened to discuss the progress of their digital preservation projects, learn about related NDIIPP undertakings, and discuss ways of moving forward. During the meetings, the partners break into so-called "affinity groups." These groups are formed based on issues that are paramount among the thirty-six project partner institutions. The four groups focus on intellectual property rights; collection and selection of digital materials; economic sustainability of the digital preservation projects; and the technical architecture.

August 2005 The Library of Congress launches a new public website to cover the groundbreaking work of the Section 108 Study Group. The site at http://www.loc.gov/section108 offers the group's mission statement, its schedule of meetings and links to relevant sections of the Copyright Act. The site also offers links to background papers pertinent to libraries and archives and the rights issues they encounter when working with digital materials.

October 2005 NDIIPP announces that it is making a $3 million grant award for the development of Portico, a nonprofit electronic archiving

service being developed by Ithaka. This award, to be matched by Ithaka, is being used to support Portico's development of the archives' technical infrastructure and an economically sustainable business model for a continuing archiving service for scholarly resources published in electronic form, beginning with electronic scholarly journals.

January 2006 Held in Berkeley, CA, the third meeting of the NDIIPP project partners draws the largest crowd ever for this semiannual gathering. The meeting is designed to continue the work done during the two previous partner meetings: update the participants on the program and provide them with a forum to inform fellow participants on what they have learned so far and the common issues they face.

January 2006 The Section 108 Study Group announces that it will hold two public roundtables in March 2006—in Los Angeles and in Washington, DC—to gather insights and opinions on how to revise copyright exceptions for libraries and archives under Section 108 of the Copyright Act. The roundtables are open to the public.

April 2006 The Library of Congress holds a strategy session with leading producers of commercial content in digital formats and learns that creators of television, radio, music, film, photography, pictorial art, and video games are keenly interested in the preservation of their digital materials for archival and other purposes.

May 2006 The Library of Congress holds sessions with the United Kingdom's Joint Information Systems Committee to discuss collaboration and common issues.

May 2006 The Library of Congress launches website devoted to effort to capture websites for preservation at http://www.loc.gov/webcapture.

June 2006 The Library of Congress makes a $700,000 award to Stanford University to collaborate on development of NDIIPP technical architecture.

July 2006 Digital preservation program seeks private sector partnerships with a request for expressions of interest to support preservation of creative works.

July 2006 The Library of Congress partnership supports preservation of foreign news broadcasts with an agreement with SCOLA (http:www.scola .org) to ensure access to television programming of long-term research interest

January 2007 NDIIPP partner meeting convenes at San Diego Supercomputer Center. Over one hundred attendees work within three tracks of breakout sessions to advance work on strategic outcomes.

January 2007 Congress rescinds $47 million in NDIIPP funds. Pending awards for more than $31 million to support technical infrastructure, collection of creative content and states information are suspended or reduced.

March 2007 Eight Digital Preservation Partners cooperative agreements are extended for eighteen months to run through spring of 2009.

March 2007 Four technical infrastructure projects are funded for one year at $3 million to develop tools for the capture and evaluation of digital content and shared storage services to strengthen the network of partners.

August 2007 The Library of Congress makes awards to private-sector producers of digital content in the areas of films, sound recordings, comics, pictorial art, video games, and virtual worlds to jump-start private sector preservation of their digital creative works.

November 2007 Martha Anderson is named new director of program management for NDIIPP.

January 2008 Twenty-one states, working in four multistate demonstration projects, receive a total of $2.25 million to preserve at-risk state and local government information.

March 2008 NDIIPP launches a monthly online digital preservation newsletter. http://www.digitalpreservation.gov/news/2008/20080303news _article_newsletter.html

March 2008 Section 108 Study Group releases its report with recommendations for alterations to copyright law that address the handling of information in digital formats.

July 2008 The Library of Congress releases the *International Study on the Impact of Copyright Law on Digital Preservation.* The report is a joint effort of NDIIPP, the Joint Information Systems Committee, the Open Access to Knowledge (OAK) Law Project, and the SURFfoundation.

Attachment 2.
National Digital Information Infrastructure and Preservation Program (NDIIPP) Partnership Network

October, 2008

Summary: The National Digital Information Infrastructure and Preservation Program (NDIIPP) is engaged with over one hundred partners collecting and archiving at-risk content, cooperating on digital preservation best practices and standards, and developing tools and services to be shared with the partner network.

Selection and preservation within a network
Sixty-seven partners from the academic library, archives, and non-profit communities

- Selection criteria and guidelines for at-risk born digital content, such as datasets, websites, geospatial, television, and business records.
- Preservation strategies for the selected content
- Tools and services for preservation of specific content types
- Development of collaborative networks for digital preservation
- Research on methods and infrastructure for preserving digital content

Metadata for creative commercial content
Twenty partners from the commercial content producer community

- Photographers, graphic artists, motion picture, sound recording, and interactive media producers
- Standards for commercial content formats and metadata to make the content discoverable by search engines

Tools and services for the network
Five partners from academic computer science and non-profit communities

- Development of tools to collect, analyze, and extract metadata from content published on the Web
- Development and deployment of storage and preservation services for a variety of content

Collaborations for the preservation of state and local government information
Twenty-three partners from state libraries and archives

- Collect and preserve state geospatial data, legislative records, court case files, Web publications and executive agency records
- Develop model data management and archiving systems
- Provide access to content for Congress and others

U.S. Federal Agency Working Groups
Eleven federal agencies
- Leading digitization working group for federal agencies includes National Archives and Records Administration (NARA), U.S. Government Printing Office (GPO), Smithsonian, National Park Service, Holocaust Museum, National Gallery of Art
- Leading standards working group for federal agencies for digitizing still and moving images includes GPO, NARA, National Library of Medicine (NLM), National Agricultural Library (NAL), National Technical Information Service (NTIS), U.S. Geological Survey (USGS), Smithsonian, Department of Transportation, National Gallery of Art, also

affiliation with Commerce, Energy, NASA, Defense Information Managers Group (CENDI)

Section 108 working group
Nineteen members

- A select committee of copyright experts charged with updating for the digital world the Copyright Act's balance between the rights of creators and copyright owners and the needs of libraries and archives
- Work completed and report published March 31, 2008

National Science Foundation Partnership
Ten research projects

- Co-sponsor with National Science Foundation (NSF) of digital preservation research agenda, DIG-ARCH
- Leader on NSF Task Force on Sustainability, convened January 2008

International Partnership for Archiving the Web
Thirty-nine national, state, academic, and non-profit libraries and archives

- Working together to develop standards, tools, and processes for archiving the Web
- Developing national Web archive collections based on common technical standards

Beth Sandore is associate university librarian for information technology planning and associate dean of libraries at the University of Illinois Library at Urbana-Champaign. In this role she focuses on shaping technology to foster accessible, effective library programs and services. The core of Illinois' library technology programs include developing and evaluating innovative digital library technology, and ensuring sustained access to research and cultural heritage content over time. Sandore received her A.M. from the University of Chicago in 1984 and has held appointments at Northwestern University, the University of California, the Illinois Institute of Technology, and the National Center for Supercomputing Applications (NCSA). Her research has been supported by the Institute of Museum and Library Services (IMLS), the National Science Foundation, the Library of Congress, and private foundations. She is currently a co-principal investigator with John Unsworth for Illinois' $2.7 million National Digital Preservation Partnership supported by the Library of Congress.

Patricia Cruse is the founding director of the California Digital Library (CDL) Digital Preservation Program. She works collaboratively with the ten University of California libraries to develop sustainable strategies for the preservation of digital content that supports the research, teaching, and learning mission of the University. Ms. Cruse has developed and currently oversees several of CDL's initiatives, including the NDIIP-funded Web Archiving Service and the IMLS-funded Digital Preservation Repository. Recent activities include specifying preservation services for the HathiTrust initiative and working with UC campus stakeholders to develop a set of digital curation micro-services.