

Princeton University Library Digital Preservation Framework

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Introduction

The Princeton University Library is central to the intellectual life on campus. It exists to serve a distinguished faculty, dedicated to the highest standards of teaching and research; an accomplished group of graduate students, striving to combine advanced study and original work of their own; and some 5,200 undergraduates, who have chosen a university famous for its emphasis on independent research. PUL builds and maintains collections, both analog and digital, to meet the needs of all of these groups and the unforeseen needs of researchers in the future.

Purpose

The Library has a strong commitment to preservation of materials in all formats. [Digital objects](#)—with their unique capabilities and characteristics—dwell in a dynamic, technologically rich environment. The goal of preservation of digital objects is the same as that of analog collection materials, to ensure access, however the means of achieving it require a related but different set of strategies and expertise.

The Digital Preservation Framework is an organizational tool that informs all aspects of [digital preservation](#). It does not advocate for a new program across the Library, rather, its intention is to serve as a guide to ensure that we do the best we can using existing resources. Its purpose is to support the maturation of the Library's digital preservation activities as we move from a project-based orientation to a program-based one. This document:

1. Offers a framework for improving and increasing digital preservation capability through the coordination of digital preservation activities across the Library.
2. Articulates general organizational responsibilities for the operation of a cohesive digital preservation approach by building upon current strategies within various Departments.
3. Provides a basis for planning and implementing policies and procedures that, where possible, adhere to prevailing standards and best practices in order to ensure effective use of resources.

Overall, the framework suggests a holistic way forward that will ensure the Library has well-managed digital objects in the short-term and, over the long-term, secures their preservation and sustained access by Princeton University faculty and students as well as the greater research community.

Objectives

Princeton University Library engages in digital preservation to ensure that its digital objects retain their availability, [persistence](#), [renderability](#), and [authenticity](#). The Library will achieve this goal through the following objectives:

1. Identify, promote, and implement preservation strategies that will ensure the long-term viability for all digital objects for which the Library is the primary or sole steward.
2. Guide Departments and their respective Units to achieve their distinct intellectual and curatorial requirements while adhering to a shared digital preservation approach.
3. Where feasible and cost-effective, implement shared community standards—both technical and descriptive—for digital preservation and access that align with national and international standards and best practices.

Commitment

A commitment to digital preservation and access requires acknowledgement both of the stakeholder mandates and the scope of materials that this digital preservation framework addresses. The following stakeholders require or expect the Library to ensure the long-term preservation and access of digital materials:

1. **The Princeton University Board of Trustees**, which authorizes the Princeton University Archives to collect and preserve permanent records produced by the University, including its administration, academic offices, and student life, the evidence of which is increasingly digital in nature;
2. **Princeton University faculty, students, and staff**, who depend on the Library to serve the teaching, learning, and research needs of the University community;
3. **Collection donors and creators**, who assume their materials will be accessible irrespective of technological changes;
4. **Financial donors** that expect assurance of the Library's infrastructure and capacity to meet the terms of their gifts;
5. **Consortia members and partners** such as ReCAP, Borrow Direct/Ivies Plus, and the HathiTrust, that rely on shared contractual obligations, including sustainable digital preservation at member institutions;
6. **External grants funders** that, through grant terms or memorandums of understanding, require institutions to ensure the long-term preservation and access of digital objects and research data in accordance with best practices.

Scope

The digital objects Princeton University Library is responsible for preserving can be classified into five broad categories:

- **Born-digital** archival collections, books, or materials that the Library purchases or acquires, where we have custody;
- Analog materials that are at risk of loss due to their extremely poor condition that the Library digitizes for preservation (for example, brittle books, reel to reel films and cassettes, and magnetic tape);
- Analog materials that the Library digitizes as a result of defined projects, patron requests, or external requests;

- Materials the Library receives, creates, and maintains through participation in external partnerships (e.g., Google Books Project) and consortial agreements (e.g. Borrow Direct, ReCAP);
- Materials the Library outsources for digitization (e.g., AV Preserve, Crowley, DDD, etc.).

Principles

Digital preservation and access at Princeton University Library aspires to the following principles. We:

1. Choose a [Curation Lifecycle Model](#) approach for the curation of digital objects that is facilitated and strengthened by documented guidelines or procedures for each lifecycle stage: conceptualization, creation, selection, acquisition, preservation, storage, access, and transformation.
2. Recognize that the planning and implementation of digital preservation is a shared responsibility that draws upon the expertise of many stakeholders throughout the Library.
3. Adhere to established national standards as well as community-based best practices to ensure well-managed collections over time.
4. Conform to archival principles pertaining to [provenance](#), [original order](#), authenticity and [integrity](#) of digital objects.
5. Comply with intellectual property, copyright, and ownership rights for all content.
6. Acknowledge that the dynamic nature of digital preservation necessitates the Library actively monitor technological developments in order to periodically assess and adjust its operations, resources, and procedures to ensure continued preservation and access.
7. Value [interoperability](#) in system design and use [open-source](#) technologies when possible.
8. Contribute to the development and direction of the broader digital preservation community.

Roles

Ensuring the long-term preservation and access of digital objects requires collaboration and distributed roles within and beyond the Library. Those roles include:

1. **Creators**, who donate or deposit digital objects to the custody of the Library;
2. **Content specialists**, who appraise, select, acquire, manage, and curate digital objects;
3. **Format specialists**, who digitize or otherwise migrate content from one format to another for preservation and/or access purposes;
4. **Metadata specialists**, who ensure digital objects are described according to applicable standards in order to facilitate long-term access;

5. **Preservation specialists**, who advocate for the long-term preservation and access of digital objects by lending guidance and support to Content and Format specialists;
6. **Technology specialists**, who develop software, procure hardware, implement backup and replication policies and procedures, and conduct auditing and reporting of systems.

Responsibilities

The execution of these roles occurs at three levels of responsibilities across the Library: organizational, functional, and technical. **Note:** The tables below do not add responsibilities onto any single department or individual, but instead simply map existing organizational duties with the language of digital preservation.

A. Organizational Responsibilities

Responsibility	Role	Notes
Define strategies to support long-term access to digital objects	Content, Preservation, and Technology specialists	Examples might include but are not limited to: Deputy and Associate University Librarians, Preservation Librarian, and Developers
Develop policies that specify the scope of collecting activities	Content specialists	
Create and maintain submission agreements for digital objects	Creators and Content specialists	Examples might include but are not limited to: Curators and Subject Librarians

B. Functional Responsibilities

Responsibility	Role	Notes
Facilitate responsible creation, acquisition, and submission of digital objects	Creators, Content, and Format specialists	‘Responsible’ in this capacity refers to practices reflecting the principles outlined in this document.
Document preservation strategies and monitor preservation environment	Format, Preservation and Technology specialists	Examples might include Digital Imaging Studio Manager, Preservation

		Librarian, Developers, and Digital Archivist
Specify storage for and monitor integrity of digital objects	Preservation and Technology specialists	
Identify baseline descriptive information required for discovery and access	Format, Content, and Metadata specialists	Examples might include but are not limited to: Library and RBSC Technical Services cataloguers and processing archivists, and selectors who advise about how content is discovered

C. Technical Responsibilities

Responsibility	Role	Notes
Employ technology watches or other technology monitoring notification systems	Format, Metadata, Preservation, and Technology specialists	This may include reading publications, subscribing to list serves, or working in inter-institutional working groups
Define process for refreshing storage media and updating hardware and software	Technology specialists	
Manage locations of copies of all digital objects and ensure data synchronization	Metadata and Technology specialists	Synchronization in this instance refers to the process by which digital objects are updated across all locations when and if changes occur to data in one location
Maintain a systematic analysis of security risk factors	Preservation and Technology specialists	Examples include reviews of data, systems, personnel, and physical plant
Create and maintain plans for disaster preparedness and recovery	Preservation and Technology specialists	

Appendix A: Glossary

authenticity: The quality of being genuine, not a counterfeit, and free from tampering, and is typically inferred from internal and external evidence, including its physical characteristics, structure, content, and context. [7]

born-digital: A descriptor for information that is created in digital form, as opposed to digitized from analog sources. [5]

Curation Lifecycle Model: An approach that documents the relationships between all stages of digital information—conceptualization, creation, selection, acquisition, preservation, storage, access, and transformation—to enable active management of the resource over time, thus maintaining accessibility and usability. [4]

digital object: A conceptual term that describes an aggregated unit of digital content comprised of one or more related digital files. These related files might include metadata, derivative versions and/or a wrapper to bind the pieces together. [6]

digital preservation: The series of managed activities, policies, strategies and actions to ensure the accurate rendering of digital content for as long as necessary, regardless of the challenges of media failure and technological change. [6]

integrity: The quality of being whole and unaltered through loss, tampering, or corruption. [7]

interoperability: The capability of a computer hardware or software system to communicate and work effectively with another system in the exchange of data, usually a system of a different type, designed and produced by a different vendor. [1]

open-source: A descriptor of a computer program for which the source code is made available without charge by the owner or licensor to encourage the rapid development of a more useful and bug-free product through open peer review. [1]

original order: The organization and sequence of records established by the creator of the records. [7]

persistence: The ability to address and locate a digital object on a network or in a digital archival system over an extended period of time. [1]

provenance: 1) The origin or source of something; 2) Information regarding the origins, custody, and ownership of an item or collection. [7]

renderability: The capability to process a digital object (generally with a software application) in order to view, listen to, or interact with the content. [2]

submission agreement: A legal document through which a creator grants an institution the right to electronically store, convert, and copy digital objects for preservation purposes. [3]

Glossary Sources

1. ABC-CLIO *Online Dictionary for Library and Information Science* http://www.abc-clio.com/ODLIS/odlis_A.aspx
2. Archives New Zealand Glossary of Digital Continuity Definitions <http://archives.govt.nz/advice/continuum/glossary/digital-continuity-definitions>
3. California Digital Library Glossary <http://www.cdlib.org/gateways/technology/glossary.html>
4. Digital Curation Centre (UK) Glossary <http://www.dcc.ac.uk/digital-curation/glossary>
5. Inter-university Consortium for Political and Social Research (ICPSR) Glossary of Social Science Terms <http://www.icpsr.umich.edu/icpsrweb/datamanagement/support/glossary>
6. National Digital Stewardship Alliance Glossary <http://www.digitalpreservation.gov/nds/nds-glossary.html>
7. Society of American Archivists Glossary of Archival and Records Terminology <http://www2.archivists.org/glossary>

Appendix B: Resources Consulted

A. Strengths and Limitations of Digital Preservation Policies

- Beagrie, Neil, et. al, “Digital Preservation Policies Study,” 2008 October.
http://www.webarchive.org.uk/wayback/archive/20140615022334/http://www.jisc.ac.uk/media/documents/programmes/preservation/jiscpolicy_p1finalreport.pdf
- Knies, Jennie Levine, et. al. “Catching Up: Creating a Digital Preservation Policy After the Fact,” 2014. <http://libjournal.uncg.edu/index.php/ap/article/view/870/532>
- MetaArchive Cooperative, “Preservation Policy Template,” 2010 October 15.
http://metaarchive.org/public/resources/pres_comm/policy_planning/Digital_Preservation_Policy_Template.pdf
- Noonan, Daniel W. “Digital Preservation Policy Framework: A Case Study,” 2014 July 28. <http://www.educause.edu/ero/article/digital-preservation-policy-framework-case-study>
- Sheldon, Madeline, “Analysis of Current Digital Preservation Policies,” 2013 July 22.
<http://www.digitalpreservation.gov/documents/Analysis%20of%20Current%20Digital%20Preservation%20Policies.pdf?loclr=blogsig>

B. Policies of Peer Institutions

- Columbia University Libraries
<http://library.columbia.edu/services/preservation/dlpolicy.html>
- Cornell University Library
<http://ecommons.library.cornell.edu/bitstream/1813/11230/1/cul-dp-framework.pdf>
- Dartmouth College Library
<http://www.dartmouth.edu/~library/digital/about/policies/preservation.html?mswitch-redirect=classic>
- Florida Digital Archive <http://fclaweb.fcla.edu/uploads/FDAPolicyGuideversion3.0.pdf>
- Inter-university Consortium for Political and Social Research
<http://www.icpsr.umich.edu/icpsrweb/content/datamanagement/preservation/policies/dpp-framework.html>
- State Library of North Carolina and State Archives of North Carolina
http://digitalpreservation.ncdcr.gov/digital_preservation_policy_dcr.pdf
- The Ohio State University Libraries
http://library.osu.edu/documents/SDIWG/Digital_Preservation_Policy_Framework.pdf
- UMass Amherst Libraries
<http://www.library.umass.edu/assets/aboutus/attachments/University-of-Massachusetts-Amherst-Libraries-Digital-Preservation-Policy3-18-2011-templated.pdf>
- University of Manchester Library
<http://www.library.manchester.ac.uk/aboutus/strategy/ files2/Digital-Preservation-Strategy.pdf>
- University of Maryland Libraries
<http://drum.lib.umd.edu/bitstream/1903/14745/1/DigitalPreservationPolicyUMD2013-07Final.pdf>

- University of Minnesota Libraries <https://www.lib.umn.edu/dp/digital-preservation-framework>
- University of South Carolina Libraries http://library.sc.edu/digital/USC_Libraries_Digital_Preserva.pdf
- University of Utah Library <http://www.lib.utah.edu/collections/digital/digital-preservation.php>
- Yale University Library <http://web.library.yale.edu/sites/default/files/files/YUL%20Digital%20Preservation%20Policy%20Framework%20V1%200.pdf>
- Yale University Library <http://www.library.yale.edu/iac/DPC/revpolicy2-19-07.pdf>

C. Standards and Concepts

- Audit and Certification of Trustworthy Digital Repositories <http://public.ccsds.org/publications/archive/652x0m1.pdf>
- Digital Curation Lifecycle Model <http://ijdc.net/index.php/ijdc/article/view/69/48>
- Reference Model for an Open Archival Information System (OAIS) <http://public.ccsds.org/publications/archive/650x0m2.pdf>
- The Five Organizational Stages of Digital Preservation <http://quod.lib.umich.edu/s/spobooks/bbv9812.0001.001/1:11?rgn=div1;view=fulltext>
- Trustworthy Repositories Audit & Certification: Criteria and Checklist (TRAC) http://www.crl.edu/sites/default/files/d6/attachments/pages/trac_0.pdf