DIGITIAL PRESERVATION POLICY

Digital Scholarship and Initiatives
University Libraries

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I.   Executive Summary

The university libraries' Digital Preservation Policy directs the scope, use and management of the digital preservation program coordinated by the Digital Scholarship and Initiatives (DSI) team. The digital preservation program supports the lifecycle preservation of and access to digital records of administrative, scholarly and historical value to ensure the long-term viability and access to digital collections. The program promotes compliance with state policies and regulation. The policy also governs the general and specific practices of libraries' personnel and applies to all units and locally created digital content[i].

II.   Purpose

Digital preservation can be defined as, 'the series of management policies and activities necessary to ensure the enduring usability, authenticity, discoverability and accessibility of content over the very long term."[ii] (JISC) Digital preservation combines policies, strategies and actions to ensure the accurate rendering of authenticated content over time, regardless of the challenges of media failure and technological change. This concept applies to both born digital and reformatted content (ALA).[iii]

This policy reflects the university libraries responsibilities to collect, preserve and actively manage university records and scholarly information. The policy ensures the historical and cultural legacy of the university manifested in digital form will not be lost to future generations. This commitment is fulfilled through the adoption of strategic and technical measures for the long-term preservation of digital assets, including digital content produced by faculty, staff, and students, and that contained within special collections and archives. The adoption of the following policies and practices to capture, preserve, and make accessible the digital record of the products of the university will ensure the integrity, authenticity, transparency, and legislative compliance of the university's digital assets.

This policy outlines the university libraries' strategic approach to minimizing the risks associated with technological changes and ensuring that the digital collections remain reliable and accessible over time. This policy acknowledges that a viable and successful digital preservation program requires an ongoing commitment of resources—financial, technical, and human—from the university. As technologies mature and become viable options for digital preservation, library staff will identify, assess, procure, and implement technical and best practice-based digital preservation solutions.

III.   Audience

The intended audience for this policy includes staff of the university libraries, university employees, as well as donors of private papers and collections whose digital assets the libraries preserve in their collections.

IV.　Mandate

The libraries' are charged to preserve and administer official university records and collections as may be accepted into its custody, and to collect, preserve, and administer private and unofficial records and other documentary materials relating to the mission of the university. The assets and collections include the scholarly record (e.g. journals and monographs), special collections and primary sources, university archives, and other institutional and cultural records. This policy supports the mission and goals of the university and the libraries.

V.　Objectives

The digital preservation program preserves, maintains, and makes accessible digital assets, including those originating in digital format, sometimes referred to as "born digital", and those transformed to a digital form and referred to as "digitized."

The primary objectives of the digital preservation program are to:

- **Preserve** digital assets of the university that are either born digital or digitized.
- **Retain** a copy of the original bit stream of born digital material for authenticity purposes, as well as potential access in the future.
- **Migrate** records, as needed, into formats that are acceptable for long-term preservation and access.
- **Make strategic decisions**, based on long-term resources, system sustainability, and identified efficiencies, to establish processes and technologies that support both the Trusted Digital Repository standard (ISO 16363) and the Open Archival Information System (OAIS) reference model (ISO 14721).
- **Define policies and procedures** for the preservation and availability of digital assets while maintaining intellectual property ownership and rights.
- **Establish operational processes and procedures** to meet archival requirements pertaining to provenance, chain of custody, authenticity, and integrity.
- **Automate** preservation processes as technical capabilities and resources—financial and human— allow.
- **Ensure record authenticity** through preservation and technical solutions that promote and maintain composition (especially for assets with multiple objects or files), lineage, fixity, and validity.
- **Support and manage storage media** for archival copies (preservation master, security copies, and access copies) in accordance with environmental, quality control, security, and other standards. Sustain a storage architecture that provides strategically selected redundancy in the event of technical failure, natural disaster, or human error.
- **Provide tools** that facilitate the discovery of online digital assets from the university libraries.

VI.　Principles guiding digital preservation

The university libraries' digital preservation objectives are best achieved through the development of practices that comply with a coherent, and widely understood framework for reliable, accountable, and manageable digital archives. The digital preservation program is based on the following principles:

- **Access**. Digital preservation activities are performed with the understanding that long-term access is the primary goal. Access to digital collections will be supported to the best of our ability given available technology and resources, however perpetual access to digital materials cannot be guaranteed.
- **Authenticity.** Digital objects will be created with supporting metadata to establish authenticity and provenance. Digital objects will be managed to ensure that they are unaltered and the original data is preserved.
- **Collaboration.** The libraries will investigate and participate in collaborative agreements whenever they are a good use of resources. A collaborative approach to realizing a digital preservation program will involve stakeholders at all levels of planning, development, and implementation.
- **University and libraries missions.** This policy and actions taken to implement the policy exist in support of stated university and library missions.
- **Communication.** Communication will be maintained with peer institutions about opportunities for improved processes, monitoring the landscape for services offered by third party vendors and participation in national research projects regarding digital preservation.
- **Documentation.** The libraries will develop of consistent and current guidelines and procedures for each stage of the lifecycle (i.e., creation, selection, acquisition, ingest, preservation action—including reformatting and producing derivatives—storage, identification/cataloging, access and use, transform, dispose).4
- **Engagement.** Engagement will include the promotion of ongoing, sustained support by the libraries, university administration, information technology professionals, and the content and records creators.
- **Infrastructure.** The libraries will create and maintain an interoperable digital repository framework using the best technology available and incorporating open source options whenever feasible.
- **Intellectual Property**: The libraries are committed to providing access to digital materials while respecting and upholding the intellectual property rights of authors and obtaining prior consent when the creator's identity is known. Rights management actions will be documented and rights information will be preserved with digital content.
- **Review.** The libraries will review the policies and procedures on a regular basis, taking into account changes in the organizational, legal, and technical environment of the libraries, university, and relevant state agencies.
- **Standards and Best Practices.** The libraries will observe current standards and best practices as determined by international, national, consortial, and local institutions and governing bodies. [14] These standards pertain to the creation, maintenance, storage, and delivery of digital objects and metadata, and that inform preservation procedures and technology as well as archival requirements such as provenance, chain of custody, intellectual property rights, and authenticity.
- **Sustainability.** Digital preservation activities will be planned and implemented in ways that best manage current university resources and can be sustained into the future. Future access to digital resources cannot be assured without institutional commitment to necessary resources.
- **Training.** The libraries will commit to on-going training and development of staff in areas related to digital preservation, as well as outreach to inform faculty, students, and staff of the best practices for creating and maintaining digital objects.
- **Technology.** The libraries will fulfill digital preservation objectives by developing and maintaining necessary hardware, software, expertise, and protocols to ensure long term access.

VII.   Technical Principles

- **Authenticity.** The university libraries strive to ensure the authenticity of digital resources; the mutable nature of digital assets opens the possibility for unauthorized and undetectable changes. Confidence in the authenticity of digital records over time is particularly crucial owing to the ease with which alterations can be made. From the moment that digital resources are acquired, the university libraries undertake protective procedures to prevent, discover, and correct loss or corruption of digital assets due to either inadvertent or malicious intent. In addition, the libraries' staff will endeavor to secure supporting evidence, ideally in the form of metadata, from those creating the resources. This will enable those who access the resources to evaluate the authenticity of all preserved digital resources.
- **Metadata.** Metadata (descriptive, preservation and administrative) is fundamental to preserving and providing access to the libraries' digital assets. The preservation process includes maintenance of metadata submitted with the digital asset as well as the creation of additional metadata to manage the long term/active preservation and access of that asset. The program's staff is committed to identifying and collecting the needed metadata to preserve digital assets in its collection and to provide access to those assets.
- **Formats.** In acquiring digital materials, the university libraries will define and communicate levels of preservation appropriate to each type of format. The university libraries reserve the right to assign different preservation standards to different file formats.

VIII.   Access and Use

The purpose of preserving digital assets is to ensure that the assets remain accessible in the future, a purpose that requires the university libraries use the most up-to-date technology available. For digital materials that end users may download to their own computers, users will need to be informed of what software is necessary to render the digital record. Where possible, the university libraries will strive to make digital records available in openly-documented formats for which rendering tools are readily available (e.g. PDF files, TIFF files, WAVE files).

In some cases, the digital record may be so tightly coupled with its originating software program that the record can only be rendered through the application used to create the digital record (e.g. Esri Geodatabases). In order to ensure continued access, the university libraries may migrate assets to a new format. Some information may be lost during the migration but the fundamental information in the records will be accessible. Sensitive and confidential information will require appropriate restrictions for access and use. Any embargoes to access imposed by the creator will not present barriers to preservation management of the relevant digital items. Content intended for public dissemination will be available for public access and use. The privacy of the users accessing the digital collections will be protected at all times.

IX.   Scope of policy

This policy applies to all units in the university libraries. In cases of university records and archives, it applies university-wide. The digital preservation program is responsible for identifying, securing, and providing the means to preserve and ensure ongoing access to digital assets. Digital assets are those

objects that have been identified as having enduring scholarly, cultural, historical, and informational value to the university. Examples of digital assets include relatively simple formats such as word processing documents, spreadsheets, digital publications, or digital images, and complex application-specific digital assets such as email, websites, databases, and geospatial datasets. To become part of digital preservation program, a digital asset will be evaluated in accordance with records retention and disposition schedules and appraisal of its long-term or permanent value to the university and scholars world-wide. Digital assets selected for permanent retention will have ongoing usefulness or significance, based on the administrative, legal, fiscal, evidential, or historical information they contain that justifies their continued preservation.

The following types of records will be included under this program:

- Records and donations that contain scanned or digitized material for which no analog counterpart exists.
- Born-digital assets produced by the university's administrative requirements and academic programs, including student work such as theses and dissertations.
- Born-digital assets produced through scholarship and cultural preservation activities.
- Materials that are part of a private collection donated to the libraries.
- Archives or other library collections that are digitized and identified for long-term digital retention.
- Subscription information resources (e-journals, databases of primary sources, e-books, datasets, etc.) when the libraries retain ownership of such materials or preserve them on behalf of a consortial or other contractual arrangement.

With the ever growing volume of digital information, the libraries may need to allocate priorities for preservation action based on the relative significance of digital assets and the technical complexity of preserving and ensuring access to those assets.

X.   Roles and Responsibilities

The Digital Scholarship and Initiatives Team serves as the responsible party for digital preservation, supporting and sustaining the commitment of the university to preserve and provide public access to digital information and materials that support university administration, teaching and research. Primary stakeholders in the digital preservation of information include:

- **Libraries' administration** provides adequate managerial and financial commitment for the digital preservation program. As resource commitments are made, administration should take into consideration the extent to which digital preservation can enhance or replace existing services and functions.
- **Digital Scholarship and Initiatives** manages the program for the preservation of records and publications.
- **Special Collections** selects and prioritizes items for digitalization. Content selection other than SC?
- **University Archives and Records** ensures that all digital content in scope is collected and preserved.
- **Digital record producers and contributors** are responsible for complying with established submission requirements and working with the management of the digital archive to ensure successful transfer. Records producers will have the same financial responsibilities for preparing digital records as they currently do analog records.
- **Resource and Acquisitions Management** supplies metadata for the records

- **Technology Services** provides services that equipment specifications, purchasing, customization, and maintenance. Software and network infrastructure. Security (backup, recovery, disaster preparedness, access, how often). Disaster recovery
- **Information Technology Services (ITS)** provides security of systems and hardware under their management and collaborates with disaster recovery.
- **Institutional Research, Assessment and Planning** collaborates with the libraries and ITS in preserving institutional data as needed and feasible.

XI. Collaborators

Digital preservation depends on a network of collaborators who support different facets of the preservation environment and infrastructure. The university libraries is committed to supporting collaboration internally as well as externally with local and state government and other institutions, both within North Carolina and nationally to advance the development of the digital preservation program, share lessons learned with other digital preservation programs, extend the breadth of available expertise, and extend the digital content that is available to the public through cooperative efforts.

To further collaborative efforts, the university libraries will:

- Identify appropriate partners and stakeholders able to contribute to the preservation effort. Collaborators may include, but not be limited to, Information Technology Services, the Office of Institutional Research, the Office of Research, and University Counsel.
- Establish agreements regarding responsibilities and roles.
- Pursue agreements that provide a reliable basis for ongoing accessibility over time.
- Help identify and develop policies, procedures, and tools to support the management and preservation of digital information.
- Work with creators, publishers, and re-users of digital content to encourage practices that will enable, rather than hinder, preservation.
- Work with university administration to develop policy and funding frameworks that will enable cost-effective preservation.

XII. Digital Preservation Planning and Management

- **Preservation Actions.** The specific preservation actions used for libraries' digital resources will depend largely on the source and type of content, as well as existing technology, expertise, and ongoing support. Preservation actions based on current resources can be broken down as follows:
  - **Subscription-based resources.** If these resources are not owned or directly controlled by the Library, Library staff cannot manage them. Instead, subscription-based digital resources are primarily managed by agreement with the publisher or vendor to use third-party preservation services (such as Portico and LOCKSS). The Library will negotiate such preservation agreements when developing subscription and license contracts with publishers and vendors.
  - **Third party arrangements.** The libraries will also continue its participation in Portico, LOCKSS, and HathiTrust, in support of third-party archiving arrangements of resources not

owned by the Library. The value of participation in these and other such services will be regularly assessed.

- o **Resources created by or for, and owned by the university.** These resources will be comprehensively managed using the life cycle model outlined below. Expectation is that all Library-owned resource content and associated metadata will be developed according to current standards and best practices, and stored in a long-term repository within the libraries infrastructure or in a consortium-based repository system.

- **Life Cycle Management.** Digital objects will be managed using the life cycle model [15], which is a framework describing the stages that digital resources go through during their existence. The preservation of digital objects requires planning and action at every stage of an object's lifecycle, including each of the following areas:
  - o **Creation** will include creating and/or capturing administrative, descriptive, structural and technical metadata about the objects, as well as imposing a well-defined storage system. Content will be created following current standards and best practices for capture and formatting.
  - o **Selection** will be done in coordination with current use, existing libraries archival retention schedules, collection development policies, and collaborative agreements, while addressing specific format needs and budgetary limitations. All preservation actions will be taken under the assumption that materials selected for the library collections are intended for permanent retention unless explicitly stated otherwise.
  - o **Ingest** will follow local guidelines. These guidelines will include delivery of content to the responsible department/personnel, verification of file types, validation of file content, normalization of files as needed, creation or enhancement of metadata according to standards set forth in local metadata policies, and transfer of data and metadata to an approved long-term storage system.
  - o **Metadata** will adhere to industry standards and library policy. Essential preservation metadata includes: administrative, technical, structural, provenance and rights.
  - o **Storage** will occur in a manner that is consistent with accepted best practices in the digital preservation community. This will include both technical infrastructure (hardware, software, network access, data backup, facilities, maintenance, etc.) and ongoing preservation management activities. Best practice in digital preservation requires duplicating digital objects in both local systems and geographically removed systems.

- **Preservation Management** consists of a series of actions that need to be performed on digital resources prior to and during long-term storage, at varying levels depending on the source and type of resource. Detailed procedures and workflows for preservation actions will be created and maintained. Possible preservation actions include, but are not limited to:
  - o **Validation,** both of content and metadata.
  - o **Preservation audits** to ensure that activities are meeting stated commitments, that risks are reduced, and to verify authenticity and accessibility of content.
  - o **Ongoing file format review**
  - o **Migration** that converts data to new file formats and/or migration to new storage media as needed.
  - o **Backups** will be performed regularly and the libraries implement monitor backup procedures.
  - o **Maintenance** of technical components such as hardware and software used for storage and access.

- o **Access and Use that** relies on review and management of digital objects and collections to ensure that files are accessible into the future. Digital objects will be discoverable: created in a way that they may be easily found by all stakeholders.
- o **Transformation** that entails periodic modification. Possible reasons for modification include: to support new developments in scholarly research capability, to function optimally in new delivery systems, and to prevent format, hardware, or software obsolescence. Types of modifications that may be performed include creating new content or metadata, adding content or metadata, migrating content to a new format, or creating a subset of content or metadata.
- o **De-selection** includes the review and disposal of digital objects as needed, based on archival retention schedules and collection development policies.

XIII.   Incentives and Challenges

The university libraries have a legal mandate to preserve the record of the university's administration and scholarship. This mandate has profound implications for the efficient management of university records and cultural materials. Though the costs of preserving digital assets may be high, the costs and implications of failing to preserve them are even higher. Loss of a digital asset not only means loss of the university's historical, administrative and scholarly record, but loss of the original investment of staff time and resources required to create the asset. This is especially true for born-digital materials, which can be lost either at the point where the asset becomes technically impossible to access or where access is so cost prohibitive (time, money, software) that recovery of the asset is infeasible. Without the adoption of strategic and tactical measures to deploy adequate resources to capture, preserve, and make accessible the digital record of Appalachian State University's assets and records, the historical and cultural legacy of the region manifested in digital form will be lost to present and future generations.

The primary challenge is the technical complexity inherent in the design, development, and operation of a digital preservation system in a rapid shifting digital environment. Archivists and librarians must adapt their methods and workflows to change hardware and software and as media formats evolve and become obsolete. Hardware, software, and network failures threaten to corrupt digital assets. Natural disasters can destroy data centers. Human failure is an ever present challenge as digital assets are often unintentionally modified or deleted. There are also operational challenges such as adequately describing digital assets so that they are accessible, ensuring their technical characteristics are captured, and their archival provenance is maintained. Users must be able to access electronic records. Finding an appropriate user interface or building and supporting one is critical to enabling users to search and locate, and optimally retrieve digital assets that are of interest.

XIV.   Use of third party services

The libraries will, as needed, establish requirements and contractual terms to acquire third party services such as Portico, LOCKSS, CLOCKSS, NC DOCKS, and cloud services. Terms of service may include issues of access, security, privacy, adherence to standards and use of non-proprietary formats.

XV.   Information Security

Information Security is the preservation of confidentiality, integrity and availability of information. The management of risks related to University information resources and fostering resilient and safe computing environments for the University community are a primary focus.

The security policy and protocols adhered to are reflected in the University wide [Information Security Policy](), and [Data Management Standard]().

XVI.   Policy Review

This policy should be reviewed every 2 years and may be revised and updated at any time, in order to reflect technological, infrastructural, and operational developments in the digital preservation program.

XVII.   Relevant Policies

State

North Carolina Department of Natural and Cultural Resources, "North Carolina Digital Preservation Policy." April 2014. [http://digitalpreservation.ncdcr.gov/digital_preservation_policy_dcr.pdf;]()

Appalachian State University

University Archives. [http://policy.appstate.edu/University_Archives]()

Records Retention. [http://policy.appstate.edu/Records_Retention_Schedule]()

Privacy. [http://policy.appstate.edu/Policy_Statement_on_the_Family_Educational_Rights_and_Privacy_Act_of_1974,_as_Amended]()

References

[i] This policy has been adapted from North Carolina Department of Natural and Cultural Resources, "North Carolina Digital Preservation Policy." April 2014. Retrieved 9/23/2016 from: [http://digitalpreservation.ncdcr.gov/digital_preservation_policy_dcr.pdf;]() It has also borrowed language and structure from the Dartmouth College Library. See [https://www.dartmouth.edu/~library/digital/about/policies/preservation.html]()

ii JISC, Digital Preservation Coalition, Digital Archives Department of the University of London Computer Centre, Portico, 2009, http://www.dpconline.org/component/docman/doc_download/454-jisc-digitisation-programme-preservation-study

iii American Library Association. "Definitions of Digital Preservation." June 24, 2007. Retrieved 9/23/2016 from: http://www.ala.org/alcts/resources/preserv/defdigpres0408