



NB-note 12-08

Policy for long term preservation of digital materials at the Royal Library

This document is updated and approved bi-annually by the Board of Directors of the Royal Library. Responsibility for revision rests with the administrator with the operational responsibility for the activity 'digital preservation', currently the department head of Digital Preservation in the National Library.

The document is published on the website of the Royal Library in both Danish and English versions so that it is available for general international evaluation of policies in this special area.

1. Introduction

This document describes the Royal Library's policy for the long term preservation of digital materials in the collections. It begins with a discussion of the challenges that digital materials give rise to both in relation to preservation and to continued provision of access to the materials. Following this the purpose of the policy is described and the activities it covers. Next is a section on the implementation principles on which the policy is based. The policy note concludes with a vocabulary list and a brief list of references.

The Royal Library has had a preservation policy for its physical collections since 2001. This policy is now supplemented by this policy for the long term preservation of the digital collections.

Large portions of the collections of the library will in future be digital and this creates a series of new challenges for the Royal Library. For the preservation of the physical materials the Royal Library already has storage space, a series of thoroughly tested and approved policies, as well as financing dedicated to this area. A corresponding situation must be established in order to be able to preserve access to the digital materials.

Digital materials confront us with these challenges:



- A new type of material, rapidly growing in the coming years, but with an as yet unknown specific volume
- Digital material cannot, as is the case with books, be left passive until needed, since systems, storage media, data formats and programmes are continually changing. Lack of action – also in the early phases – will therefore with certainty lead to loss of the capability to provide access to the preserved data
- There are no ready-made methods and solutions to deal with these problems, but international efforts in this sector are being made to develop strategies and techniques to manage some of the problems for certain portions of the materials
- Nor are there any ready-made models for what these activities cost, neither annual or collectively over the lifetime of the materials, but international efforts are being made to establish early versions of cost models.
- Legislation regarding storage and access to these types of materials is more restrictive than for physical materials

At present no Danish national policy exists for this area. This policy document is thus restricted exclusively to the Royal Library's own requirements in this area.

The preservation policy for Internet materials covered by legal deposit has been established in close cooperation with the State and University Library in Aarhus, which is its own, separate, preservation policy.

This document is part of a collection of documents, which also includes:

- *"Appraisal policy for digital materials at the Royal Library" [only available in Danish].*
- *"Strategy for preservation of digital materials at the Royal Library",* which describes how the library will attempt to carry out the approved policy.

The Royal Library normally stores its data in stable IT systems with backup. Backup is a short term solution to re-establish recently lost data in the same structures. Digital long term preservation is intended to secure data over a very long time span and is not the same as backup.

There is a vocabulary list at the end of this document.

2. Purpose

The broad purpose of this policy at the Royal Library is to introduce risk management in relation to the digital collections, which the Royal Library intends to preserve for a long time by

- Ensuring that digital materials in the collections that the Royal Library procures or produces within its collection profile will be accessible for researchers and others in up-to-date dissemination forms both for access and use on the short and the long term (> 100 years)
- Ensuring that the digital preservation processes are carried out in such a way that there continues to be a high degree of trust regarding the authenticity of the collections of the Royal Library



- Ensuring that the library's solutions follow international standards and best practice
- Ensuring that the library has the necessary organization and financing to carry out this responsibility

3. Activities covered by the present preservation policy

To ensure access to digital materials over the long term a series of preservation activities must be carried out which are covered by the common term "long term preservation". Long term preservation consists of two main activities:

- Bit preservation – the preservation of the bit sequence
- Logical preservation – preservation of the ability to interpret the bit sequence

Bit preservation consists of secure storage of the physical bit sequence, here to be understood as storage in systems with well-established risks, as well as control of integrity and error correction.

Logical preservation must safeguard the digital materials against technological obsolescence, so that both now and in the future will be able to read, understand and display/play the materials with standard programs and equipment.

3.1 Acquisition of material

Acquisition and discarding of collections covered by digital preservation is carried out according to the document "Appraisal policy for digital materials at the Royal Library" [only available in Danish]."

Bibliographic, preservation, access and administrative descriptions (including ownership and access rights) - referred to collectively as metadata – are worked out according to locally described norms, which are as close to international standards and 'best practice' as possible.

3.2 Preservation actions

For every collection the library acquires, a decision must be made with regard to what is to be preserved, in content, structure, functionality and appearance. For every collection there must also be a decision with regard to level of preservation, including *i.a.* bit preservation and encrypting.

Until financing is obtained, the extent of digital collections to be preserved is limited mainly to digital safety copies and born-digital materials in the collections, see "*The Royal Library's acquisitions and discarding policy for the digital collection materials*".

Preservation strategies must be established for all the Royal Library's digital collections which have been selected for preservation, see "*Strategy for preservation of digital material at the Royal Library*".

The composition and volume of these collections must be continually monitored and specific preservation action plans must be set up for those (sub) collections which might be threatened.



If, for either technical or economic reasons, it is not possible to preserve all functionality in a digital object in connection with carrying out a preservation action, the preservation of the digital object's intellectual content has as a rule the highest priority.

Correspondingly, the external environment (technological development of relevant tools/standards etc.) must be continually monitored, as well as developments in the requirements of users to functionality.

3.3 Access to preserved digital data in the collections

Access to the preserved digital master copies (collections) is, as a rule, regulated, restrictive and fully registered.

There must be access to the preserved digital collections of the Royal Library for the following purposes:

- On-demand from users for materials located, e.g. via REX (OPAC) interface
- Reproduction of up-to-date use copies
- Administration of the collections by the responsible collection department
- Performance of automated processes in connection with carrying out the preservation policy

4. Implementation principles

4.1 Use of standards

4.1.1. Models and framework

The standard "Reference Model for an Open Archival Information System (OAIS)" is universally used in the international library and archive world as a model of reference in the construction of solutions to deal with the tasks connected to management and preservation of digital objects. The Royal Library also uses this OAI model as our reference model in connection with the description and construction of our solutions.

The Royal Library also chooses an international level for other significant parameters: models for solutions, cost descriptions and certification as a "Trusted Digital Repository".

The Royal Library supports and practices the use of open source, which is especially necessary for this area, since no ready-made solutions yet exist.

4.1.2. Data and data formats

The Royal Library chooses open, standardised data formats with a reasonable assumption that they will be manageable with one of the preservation strategies that the library chooses to use.

When either practical or economic reasons dictate the use of compression of data, lossless compression algorithms are used.



Data in the collections is stored unencrypted out of consideration for preservation security. In the few cases where security of access carries more weight than security of preservation, a decision must be made whether or not encrypting should be employed.

In transmission of confidential data encryption is used where possible.

4.2. Legislation

Digital material is currently subject to the same laws as physical collection materials, though with more restrictions. Insofar as the library chooses to preserve the digital materials in the collections, this is to be done in such a way that the more stringent restrictions, which primarily deal with access, can be assured.

4.3. Technical infrastructure

The Royal Library establishes the necessary technical infrastructure to carry out preservation of its digital collections.

This infrastructure supports the necessary monitoring of systems, media and formats to ensure a pro-active effort.

The infrastructure encompasses tools which both support the decision-making processes as well as monitoring and performing specific preservation actions.

4.4. Financing

Preservation of digital collection materials is a new core responsibility for the national library function of the Royal Library. A significant part of the task will be to obtain the necessary continual financing to do the job now and in the future. Optimization of the use of the collections through partnerships and cooperation may be a part of this.

4.5. Cooperation with other institutions

Division of labour (primarily with regard to responsibility for choice of strategies for data formats) and operational cooperation between Danish state preservation institutions with the necessary competence should be agreed to as far as possible.

The Royal Library should secure a central place in the international network through strategic cooperative projects. This ensures that the institution is legally, politically and, with regard to knowledge, methods and tools, at the level of the medium-sized leading national libraries in Europe, with whom we normally prefer to compare ourselves in this area.

4.6. Personnel

It must be ensured that the library always has sufficient up-to-date expert personnel to maintain and carry out the preservation policy responsibly, whether it is done internally or outsourced.



5. Vocabulary

By **digital preservation** is understood the processes that ensure ongoing access to digital information despite changes in technologies (storage media, data formats and programmes for access) over time. Access in this connection means both that data is preserved without error, but also that they can be interpreted by future user groups in a perspective of a minimum of 100 years. Digital preservation is a task with many different aspects, where there are no ready-made solutions and answers today. Digital preservation is not the same as a backup. A backup is a short term solution to re-establish recently lost data in the same structures.

There are basically two main activities which both must be performed in order to speak of digital preservation:

- **Bit preservation** must be performed, i.e. the completely correct sequence of '0's and '1's must be preserved for posterity
- A **logical preservation** must be performed, i.e. methods must exist so that files can forever be transformed into something understandable by people. This last can basically be achieved from three different preservation strategies:
 - The **museum** approach, in which an attempt is made to save the original hardware and software in the form of the electronic reader apparatus continually developed for this purpose.
 - **Format conversion (also called format migration)**, where it is ensured that the material is always in a form in which the current reader apparatus / interpreters can read. There is always the risk of losing something in format conversion – typically not anything related to the document's intellectual content, but e.g. something bound up in the functional, such as look-and-feel. Format conversion is the easiest to do, since the task can start immediately with those formats for which there is a practicable solution.
 - **Emulation**, in which either in software or in hardware ensures an emulation of the original surroundings, so that when running the original programmes on the original data the original experience can be re-created. Emulation is the most difficult to achieve because all the challenges must be met as a whole.

A digital **master copy** is the copy of a digital object which is used as an archival copy. It is typically richer in information than the copies made for other purposes and thus normally also is larger. A master copy usually is the basis for the production of derived formats, e.g. for ordinary dissemination use.

If different formats are used for dissemination and long term preservation, a **dissemination copy**, which is a copy of a digital object only used in a dissemination situation, may be made. Typically it lacks some of the information in the master copy and is often adjusted for a particular dissemination purpose. The lifetime of a dissemination copy will often be far shorter than that of a master copy, since the demands on up-to-date dissemination constantly change.



6. Literature:

Erpanet Guidance: Digital Preservation Policy Tool, September 2003:

<http://www.erpanet.org/guidance/docs/ERPANETPolicyTool.pdf>

7. National Library of Australia: Digital Preservation Policy, 3rd Edition (2008)

<http://www.nla.gov.au/policy/digpres.html>

Neil Beagrie, Najla Semple, Peter Williams, and Richard Wright : Digital Preservation Policies Study, 30 October 2008, <http://www.jisc.ac.uk/publications/publications/jiscpolicyfinalreport.aspx>

Consultative Committee for Space Data Systems (CCSDS), Reference Model for an Open Archival Information System (OAIS), Magenta Book, Recommended Practice, CCSDS 650.0-M-2, 2012 (ISO14721:2003), <http://public.ccsds.org/publications/archive/650x0m2.pdf>

Hvordan laver man en bevaringspolitik og -strategi? [How does one make a preservation policy and a preservation strategy?] <http://digitalbevaring.dk/bevaringspolitik-strategi/>

Statsbibliotekets politik for digital bevaring [The digital preservation policy of the State and University Library]: http://www.statsbiblioteket.dk/om-statsbiblioteket/nyheder/filer/Politik_for_digital_bevaring_v%201%200.pdf