

Roadmap to a generic workflow

Born

digital  
art  
film/video  
photography  
and  
architecture

*digital  
cultural*

heritage is

*endangered*

sustained  
access  
to  
digital  
collections

heritage

BORN DIGITAL  
HERITAGE

for born digital heritage in the domains of art,  
film, photography and architecture

## Why this brochure?

Born digital cultural heritage is endangered heritage. It is created digitally, without an analogue equivalent. Due to rapidly evolving technology and the often individualised use of IT techniques (in the realm of digital art, for example), this type of heritage material is especially vulnerable. Hardware and software are ageing quickly and will eventually be obsolete. As a consequence, we may one day find ourselves unable to use or access our digital heritage. Every domain within the cultural sector is faced with this problem. In order to continue to guarantee the sustained accessibility of these digital objects, the necessary care for our heritage must now be extended to digital collections, too. Doing so is crucial if cultural institutions wish to maintain their value in the future.

In 2014, the Cultural Coalition for Digital Preservation (CCDD) conducted an investigation into the state of affairs regarding sustained access to born digital heritage in the cultural sector.

This investigation reviewed and tested the various methods of ensuring the long-term preservation and accessibility of born digital cultural heritage. Specific attention was paid to the domains of art, film, photography and architecture. This brochure presents a summary of the conclusions from the investigation and offers recommendations on what the next steps should be. By providing this information to the cultural sector now, we hope to contribute to our goal of forging a stronger connection to the national digital infrastructure in the future.

## The investigation

In 2014, the Cultural Coalition for Digital Preservation (CCDD) investigated the state of affairs regarding sustained access to born digital heritage material in the domains of art, film, photography and architecture as well as design. The project was commissioned by the CCDD, supported financially by the Ministry of Education, Culture and Science (OCW), and carried out by Gaby Wijers (director of LIMA) and Hannah Bosma (project officer for CCDD). It aligns closely with the first phase of the CCDD's Work Programme 2013-2018, and the results are embedded in the execution of Work Package 3 (Sustainable Digital Heritage) of the OCW programme Digital Heritage Network (NDE), led by the Netherlands Coalition for Digital Preservation (NCDD).

### Goals

The investigation was aimed at reviewing and testing the range of best practices, tools, standards, protocols and workflows for sustaining the preservation and accessibility of born digital cultural heritage, with the goal of making these tools publicly available and generically applicable.

The project yielded the following results:

- An inventory of best practices, tools, workflows and standards for sustained access to born digital cultural heritage material;
- A proposed research agenda, as part of a na-

tional strategy for digital preservation;

- A final report. With the conclusions of this investigation in mind, appropriate decisions can be made regarding follow-up projects, and priorities can be set in composing a research agenda for the future.

### Methodology

The project consisted of three phases:

- Based on both desk and field research, an inventory was made of existing best practices, tools, standards, protocols, workflows and proposed research projects;
- The information thus gathered was analysed,

and conclusions were drawn regarding the usability and applicability of these tools and practices for generic application in cultural institutions' primary work process;

- With the outcome of the previous steps in mind, an outline was made of the recommended follow-up steps, concerning, among other things, the national strategy for digital heritage and how to connect to it.

Details of the results of the investigation were included in the research report. You can download the report (in Dutch) at [www.den.nl](http://www.den.nl). Enter 'onderzoeksverslag CCDD' into the search bar.



## The current situation

The investigation has produced a clear picture of the state of affairs regarding the preservation and management of born digital cultural heritage. The following are its most important findings:

1. The methods of collecting and sustainably storing born digital heritage material used by Dutch heritage institutions are as yet underdeveloped.
2. Heritage institutions are aware of the importance of, and the specific problems associated with, the preservation of born digital cultural heritage.
3. Preliminary research into needs and approach-

es has been conducted, at some time and to some extent, in each domain examined in this investigation, but has often not been followed up on.

4. The amount of digital heritage materials collected by heritage institutions and the manner in which they are managed and preserved vary greatly between domains. A uniform programme, extending to every domain, is impossible, at least for the moment. Even within domains, large differences exist between institutions in the approach taken to born digital heritage issues.

5. Generally, specialised knowledge of digital preservation and man-

agement of born digital heritage is not structurally shared or taken advantage of.

6. The workflow is marked by a difference between customised work on small amounts of diverse and complex materials and a bulk approach for large amounts of uniform materials.

7. The management and preservation of digital heritage begins with its production. When it comes to preservation and proper, efficient archival, the source is both part of the problem and part of the solution: file formats, the associated software and hardware, the quality, structure and selection of files and the

sustained  
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‘When it comes to *preservation and archival*, the source is both part of the problem and part of the solution’

digital  
preservation  
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by  
domain

digital art  
film/video  
photography  
and  
architecture



information provided about those files are all determined at the level of the source. File storage on-site with the creators is also a point of attention.

8. In the field of born digital heritage, the pioneering facilities provided by LIMA (digital art) and EYE Film Institute

Netherlands play a leading role. An e-depot (see box) managed by LIMA sustainably preserves media art pieces from 22 collections. EYE has brokered an agreement with the Netherlands Institute for Sound and Vision to sustainably store large volumes of digital film at the latter organisation's e-depot.

9. Heritage institutions in the Netherlands do not have a coordinated policy on the selection and long term storage of born digital heritage materials. Generally speaking, early born digital objects have not been collected. Structural archival and collection of born digital film material has been performed at EYE since



PANORAMIC ACCELERATION  
Marnix de Nijs, 1999  
registration of interactive installation  
collection LIMA

#### WHAT IS AN E-DEPOT?

An e-depot is a sustainable digital repository. One definition used in the archival sphere, but applicable more broadly as well, is as follows: "The entirety of organisation, policy, processes and procedures, financial management, personnel, data management, data security and hardware and software, that enables sustained management of the digital archive material to be stored".

2010; for media art, it has been performed at LIMA since 2005. Museums are focused on their own, specific collections. The Cultural Heritage Agency (RCE) barely covers born digital art, while the Netherlands Institute for Art History (RKD) collects documentation on art, but not the works of art themselves. In the

domains of architecture and photography, respectively, neither Het Nieuwe Instituut (HNI) nor the Nederlands Fotomuseum have started collecting born digital heritage in any structural way.

10. Rapid and unceasing technological developments demand a continuous build-up of knowledge, translation and adaptation of best practices, workflows, tools and standards.

11. Many collection managing heritage institutions are reporting a lack of options for communicating information on born digital objects in their collection management systems. Metadata schemes and exchange formats must be developed further.



## Conclusions and recommendations for further research and projects

Based on the investigation's findings, outlined above, a number of important conclusions have been formulated. Some of these conclusions relate to facilities that need to be built, others to knowledge that is still lacking. For every conclusion, a recommendation is also made for further research and other projects.

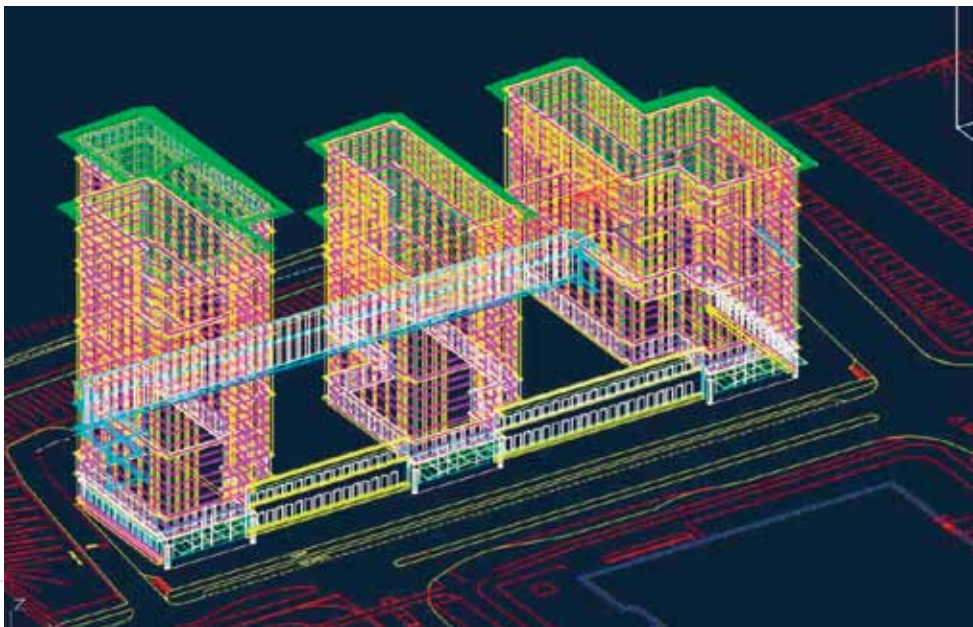
### Conclusion 1

**Facilities are needed that meet the specific needs of each domain**

The investigation has concluded that it is preferable for the preservation and management of born digital cultural heritage to be performed within domains and in an international context. The facilities that make up the national infrastructure for digital preservation (under development within the NCDD and NDE programme; see

'The investigation' above) must be connected to the specific practices and circumstances within the different domains. We need a customised, step-by-step approach, tailored to an organisation's actual situation and aimed at the long-term sustained accessibility of born digital material. In order to gain insight into the level of development an organisation has attained, which steps may be taken to improve it and how to reach the desired situation in the

'We need a customised, step-by-step approach, tailored to an organisation's actual situation'



QUEENS TOWERS, AMSTERDAM  
Carel Weber / de Architecten Cie.  
1997-2000 tentative design  
1 x screen print AutoCAD dwg  
collection HNI

long term, the use of the following instruments is recommended: the digital preservation Score Model developed by the DEN Foundation and PACKED, the NDSA (National Digital Stewardship Alliance)'s Levels of Preservation model and the OAIS model (see boxes).

#### INSTRUMENTS FOR A STEP-BY-STEP APPROACH TO SUSTAINABLE DIGITAL STORAGE

##### SCOREMODEL

The Score Model, developed by the DEN Foundation and PACKED, is an online questionnaire that supports heritage institutions in determining policy, strategy and implementation of sustainable digital storage. It can be seen as a first step on the way to certification of a digital repository. The Score Model can be found online at [www.scoremodel.org](http://www.scoremodel.org).

#### LEVELS OF DIGITAL PRESERVATION

The Levels of Digital Preservation are a layered set of recommendations, developed by the American National Digital Stewardship Alliance [NDSA], that an institution can use to set priorities among the necessary activities surrounding digital preservation. For more information, see [www.digitalpreservation.gov](http://www.digitalpreservation.gov).

##### OAIS MODEL

In the context of this report, the acronym OAIS refers to the Open Archival Information System reference model. This model provides a framework for the creation of an information system for the long-term storage of digital data. Go to [public.ccsds.org](http://public.ccsds.org) and use the search function [search for 'OAIS'] to find an extensive publication on this subject.

## Recommendations

Develop a step-by-step plan for the creation of specialised data and knowledge centres for each domain, in order to realise both domain-bound and cross-domain facilities. Stages of development differ between the various domains, and so should the details of these step-by-step plans as well as any further research projects.

- Storage in an e-depot has now been realised for the EYE Film Institute's film collection. It could develop into a domain-specific e-depot and knowledge centre, transcending the individual institution. The collaboration between EYE and the Netherlands Institute for Sound and Vision may serve as an example for other heritage institutions.
- In the sphere of digital art, LIMA has already developed into a domain-specific e-depot and knowledge centre, tran-

scending the individual institution. The collaboration between LIMA and other organisations in its domain, too, may serve as an example for other heritage institutions. Support is needed to continue, certify and innovate this partnership in the short term. Furthermore, specific attention must be paid to forging a sustained connection between LIMA and the

Digital Heritage Network, as well as to LIMA's role in creating national facilities.

- For architecture, HNI can fulfil a similar role: domain-based organisation, supported from the field. Concrete needs and wishes regarding the connection to a national e-depot may be investigated.
- For photography, the Nederlands Fotomuseum can begin formulating an approach within the domain that will, in the long term, connect to cross-domain facilities.
- Other domains can follow this same route.





## Conclusion 2

Specialised e-depots are needed for each domain

Within each domain, there is a need for high-standard, safe and affordable sustainable digital storage. Already we see EYE (in collaboration with the Institute for Sound and Vision) and LIMA (in collaboration with its domain) developing into national knowledge centres and e-depots for film and digital art, respectively. They are also developing training courses for colleagues within these domains. In the same way, HNI could function as a knowledge centre and e-depot for architecture. In the domain of born digital photography, knowledge centre and e-depot facilities have yet to be developed. This may be a task for the Nederlands Fotografie-museum.

### Recommendations

The further expansion of a scalable and modular facility, within which cultural heritage institutions can discuss and collaborate on the provision of storage services, is to be recommended. This will also allow for the connection to domain-specific and, if possible, cross-domain and national facilities. The creation of a digital 'pre-repository' for creators may also be considered. This would allow born digital objects to be sustainably stored with an outside party, instead of having the creator store them, less safely, him- or herself.

'A domain-based solution offers a great result with relatively little effort'

## Conclusion 3

Active knowledge centres and networks are needed for each domain

Heritage institutions have a need for specialised knowledge centres connected to a distributed knowledge network. Within each domain, organisations could share knowledge and experiences, create projects and determine a common policy on digital preservation. These knowledge centres and knowledge networks can facilitate the necessary contact with, training of, and provision of services to the creators of born digital heritage. Through the knowledge centres, an international exchange of knowledge can occur. They may also serve as hubs for the exchange of knowledge between the various domains.

A knowledge centre can – potentially in collaboration with the network or individual organisations – offer training, advice and services, organise information meetings and courses, and publish manuals. It is important that this exchange of knowledge is concrete and practical, so that it has a real effect on organisations' activities. The relationship with actual practice is crucial in this regard. In each domain, examples of production, purchase, maintenance and preservation of born digital heritage material must be set, and employees and creators must be trained. To this end, knowledge centres and networks should set up research and pilot projects. Hardware and software may also be shared and kept sustainably accessible through the knowledge centres.

A domain-based solution is easily implemented at this time and offers a great result with relatively little effort. Structural financial support for knowledge development will serve to stimulate this development.

### Recommendations

#### 1. Digital preservation training by domain

Training is important to every aspect of digital preservation, and the earlier it is implemented in the overall process, the more effective digital preservation becomes. Collaborative training projects in each domain should ideally focus on:

- Future creators: raising awareness of, and teaching skills for, digital archival, both within and outside of professional art education;
- Creators and producers: writing tips and tutorials for each domain, so producers and creators can learn to work appro-

# GENERIC

priately with the material and manage born digital archives themselves.

- Employees of museums and institutions: promoting awareness of the demands and costs of preservation, developing checklists and standard contracts, and teaching the technical skills needed to determine the state of the material.

## 2. Shared knowledge development

New digital forms, works of art and media products like websites, apps, interactive works and transmedia all make unprecedented demands of management and preservation and transcend the existing, pillarised facilities. This allows for the achievement of a higher level of knowledge development and cooperation.

- **Investigate the preservation and management of complex born digital objects in their context**

Investigate ways of preserving complex born digital objects for the future together. The choices to be made in this process are influenced by the context in which these objects are created and displayed. A pilot project by EYE, LIMA and the Netherlands Institute for Sound and Vision, aimed at collaborative research into the preservation and management of complex born digital objects, enjoys the benefit of the joining of forces from different fields and points of view.

- **Investigate metadata for born digital heritage in Collection Information Systems (CIS)**

Tackle the modification of CIS together, within SIMIN (Information Services

Section for Museums in the Netherlands). Based on existing knowledge and experience, and the PREMIS standard for born digital heritage metadata, an inventory can be produced of the information in question. With this done, it will be possible to see to its accommodation. In Flanders, Contemporary Art Heritage Flanders (CAHF) is running a similar project.

- **Peter Struycken archive research project**

Use digital pioneer Peter Struycken's archive as a pilot for a networked approach to long term management of born digital heritage material. RKD, HNI, NA and LIMA are formulating an approach based on this case study and are testing the existing Flemish and Dutch archive guidelines.

## Conclusion 4

There are gaps in our born digital heritage collection

Gaps appear in the born digital heritage collection of the Netherlands.

These include:

- Domains falling outside the fields targeted by NCDD, CCDD and the national digital infrastructure, like design, music, theatre and dance;
- New media falling outside the traditional domains altogether, like games, websites and apps;
- Complex, mixed, (partially) digital objects composed of a combination of different media and disciplines;
- Born digital objects that are extra vulnerable due to experimental, non-standard technology;
- Born digital objects dating from a period when no collection policy for such objects (yet) existed.

## Recommendations

'Keeping everything' is problematic, but stimulating the development

of a conscious preservation policy combined with a minimal form of sustainable storage (*bit preservation*, see box) seems appropriate, both to justify the spending of community funds and to ensure the preservation of valuable heritage and history.

To this end, we recommend creating an inventory of digital preservation in the performing arts.

Digital techniques have been playing an important role in the creation, performance and documentation of music, theatre and dance for a long time, but these disciplines are not represented in the CCDD. No overview of born digital collections and digital preservation in this field exists. The locations of born digital collections for music, theatre and dance should be mapped, as should the ways in which they are managed and maintained, and what the problems and needs in this sphere are.



### WHAT IS BIT PRESERVATION?

In bit preservation, the focus is solely on perfectly preserving bits of data. Keeping formats and other digital objects readable is not taken into account.

INSIGHT  
Sebastian Diaz Morales, 2012  
collection LIMA

## Roadmap to a generic workflow

Based on conversations, literature review and input given at the expert meeting, an outline was created for a generic workflow for all types of born digital cultural heritage material. This generic workflow consists of a number of stages, leading from the preliminary trajectory to delivery. Special emphasis is placed on the pre-ingest (see box), with an inventory meeting, acquisition visit, quick scan or assessment, checks on the quality and completeness of the material, documentation and information, and the provision of feedback to the creator, archivist or provider. Stimulating and investing in a conscious preservation policy in this phase will prevent potential problems from arising at a later stage. Joint research and sharing of knowledge is necessary in order to gain further insight into these instruments and their value, and to develop them for generic knowledge and use.

### WHAT IS PRE-INGEST?

Several stages are distinguished in the OAI model. The ingest - the intake of objects - is an important example of such a stage. The pre-ingest [which is not a part of the current OAI model] covers every action that needs to be taken before a digital object is stored in a depository. This includes acquisition, digitalisation, description etc.

This brochure was commissioned by the Ministry of Education, Culture and Science and will be presented during the Digital Heritage Week, 9-12 March 2015.

### About the CCDD

The Cultural Coalition for Digital Preservation (CCDD) is a knowledge network that brings together cultural heritage institutions in order to collaborate on ensuring the long-term accessibility of (information on) digital objects. The CCDD is a network of professional cultural institutions. For more information, visit [www.ncdd.nl/culturele-coalitie/](http://www.ncdd.nl/culturele-coalitie/).

### About the DEN Foundation (Digital Heritage Netherlands)

DEN is the Dutch knowledge centre for digital cultural heritage. From this position,

it has committed itself to the sustained accessibility of digital cultural heritage material for the benefit of the knowledge society. DEN promotes cooperation between heritage institutions in digital infrastructures, focusing especially on efficiency, value creation and demand responsiveness. It works towards this end by strengthening statistical knowledge about digital heritage. For more information, visit [www.den.nl](http://www.den.nl).

### About LIMA

LIMA preserves, distributes and researches media art. It works to promote the sustained accessibility of media art by facilitating a translation to modern times and technologies, and bridging the gap between theory and practice. LIMA distributes its sizeable collection around the world and manages a specialised e-depot, which is actively used by museums for modern and contemporary art, academies, and corporate and private collectors. For more information, visit [www.li-ma.nl](http://www.li-ma.nl).

## Colophon

### Title

Born digital cultural heritage is endangered heritage

### Subtitle

Roadmap to a generic workflow for born digital heritage in the domains of art, film, photography and architecture

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