The National Records of Scotland and born digital records – a strategy for today and tomorrow

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1. Executive summary

The Keeper of the Records of Scotland has a statutory duty to preserve and make available, in the long term, records in all formats deposited by stakeholder bodies – that is the Scottish Courts, Scottish Government and Parliament, public bodies and related agencies, and private individuals, estates and organisations.[1] This strategy will enable The National Records of Scotland to better meet these obligations in relation to 'born digital' records in a manner which is efficient, flexible, high quality, and trustworthy.[2]

The strategy looks back at work done to date and defines the key requirements for the National Records of Scotland. It sets out what we will do over the next five years in order to establish a fully-functioning, sustainable digital repository, that encompasses policies and procedures for reliable, controlled access to secure archival digital records. The value of partnership working and the leadership role of the National Records of Scotland within the Scottish archives community are considered. Also highlighted are the value of national and international partnerships.

In order to deliver the strategy, we outline a 5-year National Records of Scotland Digital Preservation Programme.

2. A changing public sector landscape

Scotland's public authorities have been creating and managing digital records over the past two decades. Indeed, the transactions of more recently established bodies such as the Office of the Public Guardian and Office of the Scottish Charities Regulator, are now almost wholly electronic, with few paper records used for business purposes. Digital is now the default delivery channel for services in Scotland, and the Scottish Government expects that the public sector will:

> Adopt an approach of 'digital first' in service design that means that organisations will deliver online everything that can be delivered online.[3]

This strategy takes as its starting point the intrinsic value of digital records created within Scottish public authorities – their value to the authorities themselves, and to wider society. These records underpin transparency and support good governance, thereby maintaining the rights of citizens.

3. The challenge of born digital records

Born digital records present particular challenges to Scottish public authorities due to their sheer quantity (the Scottish Government's corporate electronic document and records management system holds 10.5 terabytes of records, or 258,000 files, for instance); their complexity (there are often integral links between born digital records,

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[1] The Public Records (Scotland) Act 1937, see http://www.legislation.gov.uk/ukpga/Edw8and1Geo6/1/43/contents
and the Public Records (Scotland) Act 2011, see http://www.legislation.gov.uk/asp/2011/12/contents/enacted
[2] Born digital materials are those which are not intended to have an analogue equivalent. They differ from materials which have been created from converting analogue originals, and those which may have originated in digital form but have been printed to paper. Digital Preservation Coalition, *Digital Preservation Handbook*
http://www.dpconline.org/advice/preservationhandbook/introduction/definitions-and-concepts
[3] The Scottish Government: *Scotland's Digital Future: Delivery of Public Services*, 2012, available at:
http://www.scotland.gov.uk/Resource/0040/00407741.pdf p.3

such as an email with attachments or an engineering drawing made up of many smaller files); and their susceptibility to obsolescence (born digital records do not exist in their own right, they can only be viewed with particular hardware and software).

As well as those challenges inherent in the nature of born digital records, there are broader management issues which are equally complex for the public sector. What happens to records when a key software vendor goes out of business? How does an organisation manage records in the context of 'bring your own device'? How does an organisation effectively transfer records between systems without loss of integrity? With the outsourcing of IT services, how can organisations best tackle the associated risk to records?

4. What is digital preservation?

Digital preservation is defined as the, "process of maintaining a digital object for as long as required, in a form which is authentic, and accessible to users."[4] "Digital Preservation combines policies, strategies and actions that ensure access to digital content over time."[5]

Digital preservation is neither an 'all or nothing', nor a 'once and for all' activity.[6] The National Records of Scotland cannot do everything now and then walk away from the issue. Rather, by adopting this strategy we will take a scalable, five-year approach which will set in place a strong foundation for the future. Throughout its course, we will seek to disseminate our work and to learn from others.

It is all too easy to take the view that looking after born digital records is a problem for 'tomorrow' or 'someone else'. These attitudes run the risk of 'failure demand', which can lead to expenditure that might have been avoidable had a longer-term view been taken at an earlier stage. Audit Scotland's report *Managing ICT contracts: An audit of three public sector programmes* noted for instance that, "key sections, such as whole-life costs, were left blank", in the business case for the Crown Office and Procurator Fiscal Service case management system (COPFS).[7]

5. Record formats

The Keeper has no powers to prescribe the format of records which Scottish public authorities may create. However, under statute, he is obliged to receive those records from creators which are deemed archival.[8] The National Records of Scotland therefore must develop systems and processes which are responsive to our diverse range of

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[4] Adrian Brown, *Practical digital preservation: a how-to-guide for organizations of any size* (Facet Publishing, 2013) p.XII

[5] American Library Association, Association for Library Collections and Technical Services: *Definitions of Digital Preservation*, 2007 http://www.ala.org/alcts/sites/ala.org.alcts/files/content/resources/preserv/defdigpres0408.pdf p.2

[6] Blue Ribbon Task Force on Sustainable Digital Preservation and Access: *Sustainable Economics for a Digital Planet: ensuring long-term access to digital information*, 2010 http://brtf.sdsc.edu/biblio/BRTF_Final_Report.pdf

[7] See page 4 of the following: http://www.audit-scotland.gov.uk/docs/central/2012/nr_120830_ict_contracts.pdf

[8] Archival records are those which display legal, transactional, or historical value, deemed worthy of long term preservation and reference. The actual medium of an archival record is irrelevant; what is important is that its creative context, content, structure and provenance is preserved so that it is fully decipherable and can be linked to others. C. Kitching, *Archives- The very essence of our heritage*, (Chichester, 1996) pp.9-18, E. Shepherd & G. Yeo, *Managing Records: a handbook of principles and practice* (London, 2003) p.2-5

record creators, but which are also affordable and achievable, so that these can be preserved and accessed for as long as necessary.

In order to manage the scope of records transfer as much as possible, it is crucial that the National Records of Scotland continues to build good working relations with record creators. This will allow us to work together on appraisal and selection of records by providing best practice advice and guidance on an ongoing basis – ideally at the system design stage. This guidance will include, for example; recommended record-keeping practices, advice on preferred file formats (including those to avoid), and the definition of metadata requirements.

In order to plan our programme, the National Records of Scotland also needs to actively keep abreast of what record creators are actually doing. We will need to consider what record systems they are using; what formats and metadata are in circulation; how many of these records are likely to be transferred to ourselves; define when we will expect to receive these; and assess how many of these contain sensitive or personal information.

The chart below illustrates the major digital record types we expect to receive from record creators. This list is not exhaustive:
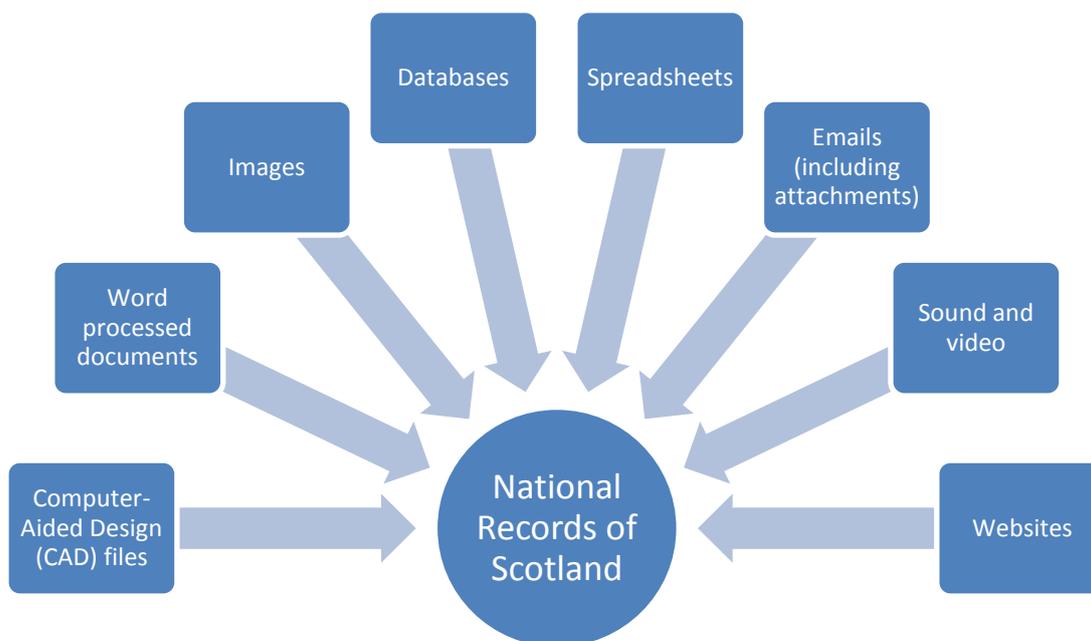
Given the huge range of bodies – both public and private – from whom we accept records, the structure and organisation of digital records will range from those well managed within an Electronic Document and Records Management System (EDRMS) or shared drives, to those with little or no organisation.

6. Scope

This strategy focuses on born digital records created by stakeholders who deposit records selected for permanent preservation with the National Records of Scotland. It therefore encompasses public authorities named in the schedule to the Public Records (Scotland) Act 2011 who send records to us (including our own corporate records); bodies subject to the Inquiries (Scotland) Rules 2007; and the large number of private

bodies and individuals from whom we accept records such as the Church of Scotland, the Institute of Chartered Accounts in Scotland etc.

The strategy's support for the wider archives community in Scotland is aimed primarily at local authority archives, but it will also be of relevance to other institutions with an archival remit. Where appropriate, cooperation in digital preservation matters with the wider archive community may be considered under the National Records of Scotland's Management of Portfolio process.[9] This will enable us to assess this widening of scope and its fit with our own strategic objectives, and therefore analyse its wider benefits within a Scottish context.

We have decided that digital surrogates of analogue records which have been created for access purposes by the National Records of Scotland will not be included in this strategy's remit. This are two key reasons for this: firstly we have created these surrogates and therefore have control over their lifecycle; secondly they do not present a known or imminent risk of loss, considering that analogue originals are kept.

7. Context

If digital records are not captured there can be no preservation and if there is no preservation there can be no access. Successful digital preservation relies upon the full commitment of an entire organisation. If record creators are not creating good quality, well managed born digital records in the first place, no amount of resource from the National Records of Scotland can successfully preserve these for the future. Successful digital preservation and access is therefore a collaborative activity between the record creator (whether public or private) and the destination archive – it is not 'someone else's job', it is everyone's job.

8. Strategic Vision

Scotland's born digital records are authentic and accessible for as long as required by the people of Scotland

In order for the democratic rights of the people of Scotland to be upheld born digital records created by Scottish public authorities should be created and maintained in a cost effective manner so that their authenticity is maintained (that is, it can be demonstrated that the records have not been altered in an unexpected way). Furthermore, these records should be accessible if required, for both the business purposes of the public authority, and in the longer term for those archival records selected for permanent preservation.

Practically speaking, this strategy outlines actions through which the National Records of Scotland will seek to develop and sustain our digital preservation capabilities, which will in turn enable us to effectively select, preserve and make available born digital records. By enhancing our own capacity in this area the National Records of Scotland will be better able to offer leadership across the Scottish archives sector.

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[9] More information on Management of Portfolio can be found within our 2012-2015 Corporate Plan:
http://www.nrscotland.gov.uk/files/about-us/nrs-corporate-plan-2012-15-business-plan-2013-14.pdf

9. Scottish Government National Outcomes

This strategy supports the Scottish Government's Wealthier and Fairer Strategic Objective through improving public services and by supporting national identity.[10]

10. National Records of Scotland Strategy 2012-22

Through adopting this strategy we will be in a stronger position to address the born digital element contained within Strategic Objective number one of the National Records of Scotland Strategy 2012-2022:

> To preserve the nation's records in our care, ensuring that the security of the information they contain is maintained, and to promote the preservation of records held elsewhere.[11]

11. Progress to date

The National Records of Scotland was formed on 1 April 2011, through a merger of two national institutions: the General Register Office for Scotland and the National Archives of Scotland.

The National Archives of Scotland had past experience in digital preservation, having published a Digital Preservation Policy in 2004. This policy led to the establishment of the Digital Data Archive project (DDA) to internally develop a digital repository for storage and ingest. In-house development was chosen as at that time there were no viable commercial or open source options. The repository was designed to follow Open Archival Information System (OAIS)[12] principles and utilise the PREMIS Data Dictionary[13] for preservation metadata. As well as software development and storage, the project included the creation of procedures and associated documentation, and the integration of Legal Admissibility principles into functionality.[14] However, a lack of resource beyond the initial project meant that we were unable to develop the DDA as technology advanced. By 2013, the DDA was no longer fit for purpose. In July 2013 we (in our new and current identity as the National Records of Scotland) took the decision to cease using the DDA and to seek a more sustainable digital preservation solution.

We continue to work on a long term digital respository solution. However, in the meantime, an interim storage solution for born digital records has been developed which provides for the temporary, secure storage of born digital records using onsite storage area network space. Records will be quarantined, stored securely along with fixity checking and file format information, and backed up. Existing born digital accessions will be ingested as well as new record transfers. The interim solution is not designed to provide integrated access for users, but if required ad-hoc access will be possible. There

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[10] Further information on this strategic objective can be found here:
http://www.scotland.gov.uk/About/Performance/scotPerforms/objectives/wealthierAndFairer
[11] NRS Strategy 2012-2022, http://www.nrscotland.gov.uk/files/about-us/nrs-strategy-2012-2022.pdf p.5
[12] ISO 14721:2012, *Space data and information transfer systems - Open archival information system (OAIS) - Reference model*, http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=57284
[13] PREservation Metadata: Implementation Strategies, http://1.usa.gov/1jzU7jJ
[14] *BS 10008 Evidential Weight and Legal Admissibility of Electronic Information*, http://www.bsigroup.com/en-GB/bs-10008-electronic-information-management/

is no preservation functionality within the interim solution nor is there integration with our CALM archive catalogue. The interim solution is designed to last for about 12-24 months.

The Electronic Records Unit has produced guidance on six key elements of electronic records management. Published on our website and promoted via social media, these instalments provide accessible overviews on the following:

- Starting Points for Electronic Records Management
- Simple Ways to Improve How You Manage Your Electronic Records
- Electronic Records Management (ERM) Systems
- Managing Email
- Standards and Requirements for Electronic Records Management
- Electronic Records Glossary

12. Existing and imminent born digital holdings

The National Records of Scotland currently holds about 256GB of born digital records, mainly from public bodies and public inquiries. The records have all been accessioned and quarantined, and duplicate copies have been made. They will be transferred to the interim solution. The full spectrum of text, image, database, spreadsheet, video and audio file types is represented.

Over the next twelve months we expect significant transfers of records from Registers of Scotland, and from one or two public inquiries. Our experience so far suggests that in advance of transferring any new record type, significant staff resource is required to analyse and understand its elements, and to document and agree transfer protocols. While this staff time is difficult to quantify, it is likely to take several days and involve colleagues from different areas of the National Records of Scotland. Resource will also be required from the record creator during transfer. In some cases this will include external contractors, and we expect this resource requirement to vary according to the type of records being transferred, and their arrangement. This resource requirement will be spread over several weeks, months or even years.

13. Collaboration

To date, the National Records of Scotland has collaborated with various national and international bodies in the broad area of digital preservation and electronic records. This includes joint working with the following:

Digital Preservation Coalition (DPC): we are a DPC board member; the Deputy Keeper of the Records of Scotland is DPC Chair; our staff actively attend and contribute to DPC events; we make use of DPC's consultancy service; and we regularly use DPC publications in our work.

Scottish Council on Archives (SCA): we provide office space for the SCA and we provide speakers for SCA events. The National Records of Scotland, SCA and the Association of Scottish Archivists Working in Local Government (ASLAWG) have had an initial discussion on forms of collaboration for a digital repository.

Sensitivity Review Project, managed by The National Archives and the University of Glasgow:[15] we have assisted in funding this project, and colleagues have assessed test data.

We also frequently share information and ideas with other national institutions in the UK and beyond, including the Public Record Office of Northern Ireland, The National Archives, and the National Library of Scotland.

European Archives Group (EAG): we were involved in compiling the second progress report of the EAG to the European Council. It is notable that recommendation eight of this report calls for greater cooperation between national archives in developing concepts and solutions for digital preservation. This is something we now strive to realise.

DLM Forum: we are a member of the EU-sponsored DLM Forum (DLM stands for Document Lifecycle Management). Amongst other initiatives, the DLM Forum published *MoReq2010 (Modular Requirements for Records Systems)*.

International Council on Archives (ICA): We are an active member of the ICA. The Head of our E-records Unit presented a paper on our progress at an ICA meeting in Vietnam in September 2014.

14. Implementation and delivery of the strategy

In order to implement and deliver this strategy and to meet the challenge of born digital records, the National Records of Scotland has established a Digital Preservation Programme. The primary objective of this is the procurement of a digital repository, as without this we will struggle to cope with the scale of born digital records which we will receive over the next five years. Programme elements will overlap, some will be dependent on the completion of others, and some will run simultaneously. However, all elements rely upon the continuous availability of infrastructure, resources and skills, so that we can keep pace with developments in recordkeeping and digital preservation within Scottish public authorities and in the wider world. Further detail on the Digital Preservation Programme is given in Appendix 1.

The Digital Preservation Programme will be strategically managed as part of the National Records of Scotland Management of Portfolios. A Programme structure and governance body will be put in place and the Programme delivered using PRINCE2 principles.

Key elements in our Digital Preservation Programme, along with indicative timeframes, will include:

- Develop internal policies and procedures relating to digital preservation (year 1-5)
- Procure and implement a digital repository (year 1-3)
- Develop an infrastructure for digital preservation which is secure, robust and scalable (year 2-3)
- Develop a means of providing trustworthy access to born digital archival records (year 2-4)
- Transfer procedures (year 1-5)

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[15] Available at: http://projectabaca.wordpress.com/publications/

- Ensure we are working to internationally recognised standards and best practice (throughout)
- Develop a web archiving programme focusing on key stakeholders (year 1)
- Gain an understanding of the types of records being created and their preservation and access requirements (year 1-5)
- Ensure continued access to born digital records by monitoring file formats and their environment; determine most appropriate format for access copies (3-5)
- Establish high quality stakeholder engagement channels (year 1-5)
- Jointly investigate options for sharing digital preservation knowledge and resources with wider Scottish archives community (year 3-5)
- Develop an effective business model for NRS digital preservation work (year 3-5)

These activities are crucial for facilitating progress in the preservation of born digital records. However, we will also continue to enhance existing procedures for the selection, transfer, cataloguing and provision of access to records which are fit for purpose in the digital environment in which record creators increasingly operate.

15. Key principles for digital preservation at the National Records of Scotland

1. Preventative spend – preventing problems before they occur[16]
We recognise the importance of the creation stage in managing costs throughout the record lifecycle, especially for those records to be archived with us.

2. Parsimonious preservation – preventing pointless processes[17]
We will seek economies of scale where appropriate (for instance by reusing existing work), in order to release resources for bespoke activities. We will make use of existing skills and expertise built up by others in the digital preservation field, and will reciprocate through greater engagement. We will take a realistic approach throughout our digital preservation work.

3. Importance of record capture and selection
We recognise that without record capture there can be no preservation. This is particularly important for bodies which are short lived, such as public inquiries, in which a very short window for record capture exists.

4. Scalability
We will develop our digital preservation activity gradually in order to ensure robustness. Potential options for digital preservation support with Scottish local authority archives will be explored.

5. Openness
We recognise that a commitment to openness is essential in order to build up trust in our digital preservation activity.

6. Wider applicability
Throughout our digital preservation work we will consider applicability to the wider archives community in Scotland.

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[16] *Commission on the Future Delivery of Public Services* (the 'Christie Commission'), 2011: 'preventative spending . . . seeks to prevent problems before they occur', http://www.scotland.gov.uk/About/Review/publicservicescommission p.54
[17] For more information see: https://www.nationalarchives.gov.uk/documents/parsimonious-preservation.pdf

7. Staffing

We recognise that a mixture of staff skills and knowledge is essential for effective digital preservation activity. These skills include (but are not limited to); security, infrastructure and business analysis, awareness of archival principles, and procurement. We recognise the importance of striking a balance between the need to embed and develop the necessary staff skills and experience for successful digital preservation along with the requirement to bring in specialists at particular points within the programme.

8. Authenticity

As a national archive we recognise the importance of demonstrable authenticity throughout our work with digital records.

16. Measuring Success

ISO 16363:2012 *Space Data and Information Transfer Systems – Audit and certification of trustworthy digital repositories* will be used to provide a formal assessment of the Digital Preservation Programme. We will carry out a baseline audit against which progress can be measured.

As the programme develops key performance indicators will be devised in order to chart success.

17. Risk Management

If the National Records of Scotland does not execute this strategy and take a whole life approach to digital records created by stakeholder bodies, the Keeper will fail to meet his statutory obligations in terms of the Public Records (Scotland) Acts of 1937 and 2011, and the Inquiries (Scotland) Rules 2007. We will also lose our reputation as a national archive and fail to meet the expectations of our stakeholders – record creators, other archives and researchers.

Appendix 1: National Records of Scotland Digital Preservation Programme – high level project descriptions

#	Title	Action	Summary	Key principle(s)
1	Policies and Procedures	Develop internal policies and procedures relating to digital preservation; develop further, focused guidance for record creators	• Review existing documentation • Gap analysis • New policies, procedures & guidance	✓ Authenticity ✓ Preventative spend ✓ Parsimonious preservation ✓ Importance of record capture and selection ✓ Openness
2	Digital Repository	Procurement and implementation of a digital repository	• Implement and test interim solution • Prepare specification of functional and non-functional requirements in collaboration with ICT/Security & Procurement • Procurement process • Negotiations with successful supplier • Implementation and testing • Pilot processing • Embed as core business activity • Transfer of existing records	✓ Authenticity ✓ Scalability ✓ Parsimonious preservation ✓ Importance of record capture and selection

3	Digital preservation infrastructure	Develop an infrastructure for digital preservation which is secure, robust and scalable	- Location within our network - Consideration of IL4+ records - Connection of pre-ingest & quarantine activities - Connection to public access module - Interaction with existing applications e.g. CALM - Digital 'laboratory'	✓ Authenticity ✓ Scalability
4	Access	Develop a means of providing trustworthy access to born digital archival records	- Availability within search rooms and via Internet - Access controls and restrictions - Retransmissions to depositors - Access copy demonstrably derived from original - Develop cataloguing standards for born digital records - CALM integration	✓ Authenticity ✓ Parsimonious preservation

5	Transfer	Enhance existing transfer procedures	• Ensure transfer mechanisms are secure • Investigate online transfers • Define minimum requirements • Update transfer documentation	✓ Authenticity ✓ Importance of record capture and selection ✓ Scalability ✓ Parsimonious preservation
6	Standards and best practice	Ensure we are working to internationally recognised standards and best practice	• Monitor national and international standards and best practice • Apply to all areas of digital preservation work • Contribute to standards development where possible • Liaise and collaborate with external colleagues	✓ Authenticity ✓ Openness ✓ Preventative spend ✓ Parsimonious preservation
7	Web archiving	Develop a web archiving programme focusing on key record creators	• Liaison with stakeholders • Selection policy for websites • Establish timetable for capture • Procurement of web archiving service • Liaise with NLS on breadth, depth and frequency of capture • Consider development of web continuity service	✓ Importance of record capture and selection ✓ Scalability

8	Knowledge of record creators	Understand the types of records being created and their requirements	• Analysis of published Records Management Plans and other relevant information • Along with record branches, develop outline timeline for record transfers • Formalisation of deposit agreements	✓ Standards & best practice ✓ Openness ✓ Authenticity ✓ Preventative spend ✓ Importance of record capture and selection
9	Preservation Planning	Ensure continued access to born digital records by monitoring file formats and their environment and by taking appropriate action. Determine most appropriate format for access copies	• Minimal intervention to records • Define policy on preservation planning including cost, risk, authenticity, maturity, open standards • Define policy on access copies	✓ Parsimonious preservation ✓ Standards & best practice ✓ Openness ✓ Authenticity
10	Stakeholder engagement	Establish high quality, two-way engagement channels to capture input from key stakeholders	• Identify stakeholder groups • Develop effective, efficient means of communication • Gap analysis of existing engagement channels • Training and awareness sessions for staff and record creators	✓ Staffing ✓ Openness ✓ Wider applicability ✓ Authenticity ✓ Knowledge of record creators

11	Scottish Archives	Jointly investigate options for sharing digital preservation knowledge and resources with wider Scottish archives community	• Carry out survey of readiness and needs • Partners – SCA, ASLAWG, others? • Archivmatica or similar? • Community cloud? • Multi-tenancy? • Resources? • Funding? • Training? • Opportunities? • Threats? • Ambitions? • Explore parallels e.g. Wales, Republic of Ireland, the Netherlands	✓ Scalability ✓ Openness ✓ Wider applicability
12	Business Impact Analysis	Develop an effective staffing model for our digital preservation work which combines sustainability with flexibility, skills development, consistency and readiness	• Skills audit • Benchmarking with comparable organisations • Staff engagement • Staff training – formal and on-the-job • Critical evaluation of staffing models • HLF Skills for the Future trainee • Secondments?	✓ Parsimonious preservation ✓ Staffing ✓ Authenticity

Appendix 2: Relevant Standards and Policies

ISO 14721:2012 Space Data and Information Transfer Systems – Open Archival Information System (OAIS) – Reference Model (http://www.iso.org/iso/home/store/catalogue_ics/catalogue_detail_ics.htm?csnumber=57284)

ISO 16363:2012 Space Data and Information Transfer Systems – Audit and certification of trustworthy digital repositories (http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=56510)

ISO 20652:2006 Space Data and Information Transfer Systems – Producer-Archive Interface – Methodology Abstract Standard (http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=39577)

PREMIS (Preservation Metadata Implementation Strategies) Data Dictionary for Preservation Metadata (http://www.loc.gov/standards/premis/)

NRS Cataloguing Standards For Use With ISAD(G) and Calm (First edition, March 2003) (http://theoracle/reference/cataloguing/catstandisad.pdf)

Guidance on the Use of Cloud Computing (ICO, October 2012) (http://ico.org.uk/for_organisations/guidance_index/~/media/documents/library/Data_Protection/Practical_application/cloud_computing_guidance_for_organisations.ashx)