

## An Approach to Audit and Certification

### *What and why?*

As digital repositories accumulate increasingly large quantities of information their technological, organisational and resource infrastructures must be subjected to a level of scrutiny that reflects their responsibilities. Information depositors, curators, consumers and funders each have expectations which can be satisfied only if the repository has objectively demonstrated its ability to ingest, preserve and disseminate its holdings. These, and other related characteristics are often described collectively in terms of trust; a trusted digital repository is one in which administrative responsibility, organisational viability, financial sustainability, technological suitability, system security and procedural accountability are all assured. In order to formally establish the satisfaction of these criteria a great deal of support has been offered for the establishment of one or more systems for audit and certification of digital repositories.

### *Activities to Date*

A number of existing strategies for certification have been proposed as it is increasingly acknowledged that there is an urgent need for some kind of infrastructure to evaluate the means by which we store information over the long term. These vary in their emphases, their level of demand and in terms of the intellectual foundations upon which they are built. It is anticipated that success will depend on the establishment of some kind of formal, and international consensus.

Among the first to explore the characteristics of a Trusted Digital Repository was the 2002 Research Libraries Group (RLG) and Online Computer Library Centre (OCLC) Working Group on Digital Archive Attributes paper entitled *Trusted Digital Repositories: Attributes and Responsibilities*. Following this the RLG and US National Archives and Records Administration (NARA) Digital Repository Certification Task Force published its 2007 Trustworthy Repository Audit and Certification (TRAC) Criteria and Checklist, which presents almost 90 organisational, technological and digital object management criteria for digital repositories. Many are based heavily on the principles, terminology and functional characteristics outlined in the 2002 *Reference Model for an Open Archival Information System (OAIS)*, published by the Consultative Committee for Space Data Systems (CCSDS) and subsequently galvanised as international standard ISO 14721.

These documents provided a foundation for subsequent, work undertaken by the US Center for Research Libraries (CRL), the UK Digital Curation Centre (DCC), and DigitalPreservationEurope (DPE). The CRL Certification of Digital Archives project conducted pilot assessments at the *Koninklijke Bibliotheek* (the Dutch National Library), and at *Portico* and the *Inter-University Consortium for Political and Social Research* in the United States. The DCC also conducted a pilot audit programme in late 2006, with assessments taking place in a range of international archives, libraries and data centres, including the British Atmospheric Data Centre, the National Library of New Zealand and the Florida Digital Archive. A key outcome of the DCC work has been the

development by DCC and DPE of the Digital Repository Audit Method Based on Risk Assessment (DRAMBORA). This tool presents a methodology for self-assessment, encouraging organisations to establish a comprehensive self-awareness of their objectives, activities and assets before identifying, assessing and managing the risks implicit within their organisation. Within DRAMBORA, digital curation is characterised as a risk-management activity; the job of digital curator is to rationalise the uncertainties and threats that inhibit efforts to maintain digital object authenticity and understandability, transforming them into manageable risks. Six stages are implicit within the process. Initial stages require auditors to develop an organisational profile, describing and documenting the repository's mandate, objectives, activities and assets. Latterly, risks are derived from each of these, and assessed in terms of their likelihood and potential impact. Finally, auditors are encouraged to conceive of appropriate risk management responses to identified risks. The process enables effective resource allocation, permitting repository administrators to identify and categorise the areas where shortcomings are most evident or have the greatest potential for disruption. The process itself is an iterative one and therefore subsequent recursions will evaluate the effectiveness of prior risk management implementations. Following the successful completion of the self-audit exercise, organisations can expect to have:

- Established a comprehensive and documented self-awareness of their mission, aims and objectives, and of intrinsic activities and assets;
- Constructed a detailed catalogue of pertinent risks, categorised according to type and inter-risk relationships, and fully described in terms of ownership, probability and potential impact of each risk;
- Created an internal understanding of their successes and shortcomings, enabling them to effectively allocate or redirect resources to meet the most pressing issues of concern;
- Prepared themselves for subsequent external audit.

Further facilitated self-assessments, overseen jointly by the DCC and DPE are ongoing throughout a range of European repositories during the summer and early autumn of 2007, intended to inform subsequent development of the DRAMBORA methodology to support repository assessment, and to validate its usability, robustness and applicability.

Related work has been done in Germany, with the *Deutsche Initiative für Netzwerk Information (DINI)* leading a certification effort to establish quality of service, visibility, interoperability and reliance on standards within institutional document and publication repositories. The *DINI* certificate, launched in 2003 by the Electronic Publishing working group established a minimum set of requirements for repositories and their administering institutions, covering, among others, issues of server policy, legal issues and long term availability. Although restricted to just document formats, the *DINI* effort represents one of the only fully implemented digital repository certification schemes.

The *Network of Expertise in Long-term Storage of Digital Resources (nestor)*, is another German based initiative, aiming to raise awareness for digital preservation issues, promote best practice and provoke the inception and development of an associated community of expertise. Within *nestor* a working group is exploring the development of a procedure for certification as well as a

criteria catalogue for “trustworthy archives”. More expansive than the *DINI* criteria, this work covers the technical, organisational and financial characteristics of a digital repository.

### ***How would we progress the audit? What methods do we employ?***

The pilot assessments will enable comparison with those that have been already taken place, and will formally adopt and assess the methodology described within DRAMBORA. The audit process itself will begin some time prior to a visit even taking place, with initial research being undertaken into the institutional infrastructure of the selected information holder, the nature of its collections and the broad demographics of its depositors and consumers. Supporting documents will be requested and gathered in advance, in order to ensure that time spent on-site is optimised.

The visits themselves will be undertaken over a period of two to three days. This will provide an opportunity to establish a sufficiently comprehensive insight into the institution’s organisational and procedural infrastructures and to expose it to appropriate risk identification and analysis. Repository work-flow will be analysed by following the progress of individual digital objects throughout the intrinsic ingest, preservation and dissemination functions. Profiles of resource allocation, finances, business and continuity models and technological infrastructure will be built and refined from observation of practice, analysis of documentation and extensive interviews with repository management, employees, stakeholders and users. Following the audit a debriefing will be held with the repository staff themselves, detailing the findings, offering reassurance in areas of success, and explaining alternative practices that might be undertaken in areas of concern. A scaled-down report will be issued at this stage, to be accompanied at a later date by a longer and more formal coverage of the audit and its results.

### ***The DCC and DPE assessment team***

Professor Seamus Ross, Associate Director of the DCC, Principal Director of DPE and Director of HATII at the University of Glasgow coordinates this activity, and has extensive experience performing key directorial roles within a range of UK and international digital curation and preservation projects that also include Erpanet and the DELOS Digital Libraries Network of Excellence. Andrew McHugh, also of HATII, leads the audit and certification efforts within the Digital Curation Centre. His experience in systems administration, software development, project management and legal issues equip him to address many of the issues associated with the multifaceted evaluation of digital information repositories. Raivo Ruusalepp, based at the Estonian Business Archive, leads DigitalPreservationEurope's audit and certification research and development work, bringing over ten years of digital archive and electronic records management experience. Ross, McHugh and Ruusalepp are three of the four primary authors of DRAMBORA. Perla Innocenti, again based at HATII, contributes considerable experience to DPE's efforts in this area and completes the team of DRAMBORA assessors.

***What will be the outputs of this process?***

The outputs of the pilot audits will be multi-fold. The first will be an in-confidence document for the participating organisation itself, detailing the results of the evaluation, offering guidelines for future work and representing an invaluable tool to facilitate success in any subsequent formal audit. This will be presented as a structured registry of risks that have been identified within the organisation, assessed in terms of their likelihood and potential impact, and associated with appropriate plans and projections for ongoing risk management. We will also publish our own findings, critically appraising the DRAMBORA methodology and offering some conclusions about necessary revisions. We'll feed these results to our international partners and peers, in order to ensure that the global effort to conceive a set of parameters for institutional audit can benefit from our own experiences. We'll also be able to understand and document the characteristics that accredited auditors must offer to successfully conduct a full audit and certification programme, and a more complete notion of associated costs will also be formulated. It is hoped that by exploring these issues now in a hands-on fashion that all parties will benefit, and that the value associated with audit and certification, as well as the methodologies that might successfully underpin it will become increasingly evident.