Appendix 3: Preserving Electronic Records through Migration

Each organisation should migrate electronic records of continuing value through successive upgrades of hardware and software in such a way as to retain the functionality and integrity of the electronic records created in them. (see Appendix 1, Principles and Strategies 3)

What is migration?

Migration involves the recurrent transfer of electronic records from one hardware or software configuration or generation to subsequent configurations or generations. Migration is not a new concept, however, migration of electronic records to preserve their content, structure and context as evidence of business transactions is.

The purpose of migration

The purpose of migration is to preserve the integrity of electronic records and to retain the ability for users to access them as authentic records in the face of constantly changing technology.

Overcoming technological obsolescence in the preservation process

Traditionally, the focus for preservation of records has been on the longevity of the physical media on which the record is stored. This approach has been satisfactory in the past because the paper record is usually a discrete entity, and a number of techniques are known to enhance its stability over time.

Electronic records, however, can exist as single media or multimedia (image, text and sound). They are also comprised of a number of elements (hardware, software, data proper, and medium). They rely on metadata embedded in the computer software and hardware to link its content and structure to its context (to provide a record in a recognisable form). These features of electronic records make the challenge of preserving them significantly more difficult than other media. There is a need to preserve intellectual level connections and control mechanisms between the various elements in addition to the preservation of the elements themselves.

Further, the exponential rate of change of computer technologies is such that even the most fragile electronic media may outlive the continued availability of readers for those media. In this sense, the physical fragility of electronic media poses a less significant threat to the preservation of an electronic record's integrity than technological obsolescence. Such a trend renders the preservation of physical media as a short-term, partial solution at best. For example, a floppy disk containing a record in the traditional sense is essentially lost if the hardware required to read it becomes obsolete.

Factors effecting the integrity of a record in the digital landscape

While the retention of accessibility is the paramount consideration in the migration process it is critical for records that their integrity be maintained over time in order that they might be distinguishable as unique evidence of business transactions. The preservation of this integrity requires that the record be reliable, complete, authentic, and possess sufficient context.

Reliability
A reliable record is one that is trustworthy and has authority. The reliability is provided by the form and procedure of its creation and the ‘trustworthiness’ of the persons associated with the creation of the record. The trustworthiness actually derives from the institution or authority for creation rather than any individual characteristic. It also is dependent on the system (eg electronic system) used in the creation process as much as the individual or author.

Completeness

A complete record is one which has the characteristics associated with time and place (dispatch and receipt), details of the sender and anticipated receiver (ie who it might be addressed to), an authority stamp (ie signature or code or PIN number), a title or subject and, of course, content expressing the will or requirement of the author. In electronic transactions which occur automatically the will is expressed in the system and process design, not at the individual transaction level.

Authenticity

The authenticity of a record requires the preservation of a history of its creation, transmission, use and preservation over time. One issue, associated with authenticity, is the question of whether or not the record is the ‘original’. In traditional paper environments it is relatively straightforward to maintain all the attributes necessary to determine authenticity in the one physical package. It is more difficult to do this in the electronic environment. In fact to talk about an electronic ‘original’ in the sense we mean it in the paper environment, is somewhat misleading. In the electronic environment we consider that the ‘original’ means the content, structure and context of the original transaction but not all the attributes present in the original software or hardware platform. It is inevitable that some losses will occur at the point of migration from one version of the software to the next or one platform to the next but this is acceptable as long as the aspects of the record required for evidence are preserved.

Context

The context involves the associated links between individual transactions or documents (or even data) and the broader administrative processes to which they belong. For example, the many linkages between an individual transaction, such as passenger information logged at an airport terminal, and the ultimate control of the national immigration and tourism function.

If these requirements are not met the authenticity of the record will be jeopardised.

The development of migration strategies

In the face of rapid technological obsolescence and media fragility, two techniques have been proposed in the recent past. They are ‘refreshing’ digital information by copying it onto new media, or the more recent suggestion of the creation of archive emulators of software operating systems that would allow the contents of digital information to be carried forward and used in its original format. These options are, however, somewhat limited. In May 1996 the US Task Force on Archiving Digital Information reported that:

neither ‘refreshing’ nor emulation sufficiently describes the full range of options needed and available for digital preservation. Instead, a better and more general concept to describe these options is migration.

Migration is a set of organised tasks designed to achieve periodic transfer of digital materials from one hardware/software configuration to another, or from one generation of computer technology to a subsequent generation. The purpose of migration is to retain the ability to display, retrieve, manipulate and use digital information in the face of constantly changing technology. Migration includes refreshing as a means of digital preservation but differs from it in the sense that it is not always possible to make an exact digital copy or replica of a database or other information object as software and hardware change and still maintain the compatibility of the object with a new generation of technology.

Very broadly then migration becomes the focus of the preservation of continuing accessibility to electronic records rather than the preservation of individual items or formats. This is not to say...
that we should ignore the quality and capability of individual digital media, but it does mean that we should not be selecting media on the basis that it will last for 50 or 100 years.

**Build migration paths**

The development of electronic information systems requires building recordkeeping functionality into their design and ensuring migration issues are considered as a part of the design process. Organisational strategic information and recordkeeping requirements, including migration and continuing accessibility, need to be planned, coordinated and not left to chance.

There is a need within organisations to issue guidelines and advice for these processes, and encourage the adoption of:

- common usage rules;
- compliance with recordkeeping, information and data management standards; and
- selection of software applications that support recordkeeping and migration.

Organisations should also ensure that the following steps are observed before and during the migration process:

- determination of which records and data the organisation needs to retain access to (and by implication those which are not required post-migration – see AS 4390 Part 5 for appraisal guidance);
- gaining authority for the deletion/destruction of records from the Australian Archives;
- selection of software suitable for the migration task;
- testing the migration process before full implementation;
- testing the success of the migration process before any deletion/destruction of records occurs; and
- ensuring that all associated and relevant metadata is captured at the point of migration (for both the records and the migration process).