erpa

Information Society Technologies


# Selecting Technologies Tool

September 2003

ELECTRONIC RESOURCE PRESERVATION AND ACCESS NETWORK

# Purpose and Scope

Success in preserving digital objects is in many ways dependant on what technologies are chosen, as technologies become obsolete in comparatively short time spans. This erpaTool will outline in the first part the role of technologies in the digital preservation area and show how to approach the technology issue. This part will be followed by an explanation of the prerequisites that must be available before one begins the decision process. Then, it will briefly describe all the essential factors that need to be taken into consideration when selecting and evaluating technologies for preservation of digital objects.

# The role of technology in digital preservation

The term *technology* in this document is used in a broad sense. It covers not only hard- and software, but also methods and procedures. Technology are all means that serve the purpose of preserving digital objects for as long as it is needed. Like the wheel, which is not of great use without an axle, every technology is part of another technology or needs another technology as part of it to be useful. Applied technologies form always a system of components whose architecture is often important and critical.

But, technology is not only a passive means that can be chosen and used. Technology itself is a driving force which does continuously change the characteristics of the digital objects to be preserved and therefore ask also for renewed technologies for their preservation. On the other hand, evolving technologies can provide for new means that are better suitable to preserve objects than it was possible before.

Technology is heavily dependent on the market. There are widespread commercial strategies aiming at steering the pace of technological change in order to create opportunities for selling new products and thereby making older products outdated and often incompatible with the new technology. Preservation goals may be in some aspects opposite to such strategies.

Digital technology is heavily dependant on a supporting infrastructure. All of its components are vulnerable and short-lived: Hardware devices will be damaged by accident or by wear and tear; software bugs or incompatibilities will cause failures of the preservation system, and all parts will become obsolete within relatively short time. Preservation institutions must ensure, that all their technology can be repaired or replaced as long as their digital holdings are not completely migrated to the next generation platform. As digital repositories usually grow very quickly such migration processes may need years to convert, transfer and check the archival objects.

That means: selecting technologies will not be a single decision, which you make once every ten years. Selecting technologies means as well constantly watching the technological developments to ensure

- that your preservation technology is able to adequately treat objects created with the latest technology, and

- that your preservation technology is still supported by manufacturers and that there is still a migration path open to the next technological generation.

Technologies have their life cycle. It starts with an idea, is followed by research and development work until there is a usable product. The first generations of products often are imperfect and contain bugs. Many products based on new technologies disappear after a relatively short time from the market. It is therefore important to chose products for preservation which are fully tested and proved in real applications. On the other hand, it is not recommended to chose products based on technologies that are likely to be at the end of their life cycle. Otherwise, you will soon be forced to migrate your preserved objects onto new technological platforms.

Moreover, the long and costly way to get from an idea to a proven product may prevent you from doing development work on your own. Nevertheless, preservation institutions may be forced from time to time to initiate the development of missing pieces in their preservation system architecture. It is recommended to do such work in close relationship with technology specialists and to do it step by step from a feasibility study, and prototyping to the final development.

Preservation technology is expensive, not only to purchase it but as well to keep it running and, after a relatively short time period, to replace it. As many experiences show, digital holdings are threatened much more by budget problems than by technological problems if there is no careful long-term financial planning from the beginning.

## Preconditions

Before thinking about selecting technologies you need develop a preservation policy and a preservation strategy. It is important to know

- what you want to preserve,
- for how long you want to preserve it,
- how you want to access and use the preserved material,
- what resources in term of knowledge, skills and money are available, and
- in what juridical and organizational framework you want to implement the technology.

In developing a preservation strategy you may realize that you need already to know what technological options are available and what benefits they offer. If you chose for example emulation as a part of your preservation strategy you need to know whether there exist already proven tools to emulate the system-context of the objects you want to preserve or not. Therefore, you need to perform a preliminary market analysis aimed at verifying available and really working technologies.

## Selection Process

The selection process starts when the preservation strategy is developed and the available preservation technologies are known with establishing a list of requirements

(see figure 1). In the requirements list you should describe in a precise and detailed manner what your system must be able to do in your specific context.

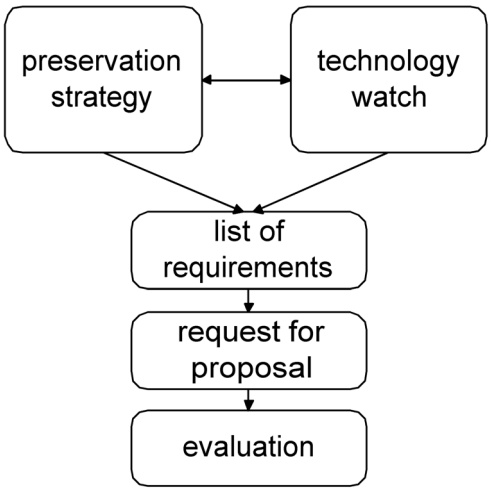


*Figure 1:*
*Selection process for preservation technologies*

Based on the requirements list you can prepare a request for proposal according to regulations about the procurement in your institution. As the procedures for invitations to tender and procurements differ from each national or institutional context to the other this document will not go into more details. However, as mistakes in this field may cause long delays and high costs it is recommended to consult people who are experienced in these procedures.

The evaluation of the proposals need to be based on all the requirements mentioned in the documents of the request for proposal. The list of evaluation factors in the following chapter of this document can not serve as a evaluation checklist for the tenders, because it is not specific enough.

# Evaluation factors

The purpose of the following list of evaluation factors is to give you a checklist which can help you choosing the right technologies in both tasks developing a preservation strategy for your institution and establishing a detailed list of requirements for the procurement process.

| | **Factors** | **Remarks** |
|---|---|---|
| **General** | Maturity | Is the technology fully developed and are there already systems in productive use? |
| | Experience | Are there already verifiable experiences in applying the technology for the preservation of similar objects? |
| | Spread | Is the technology widespread enough to guarantee that it will be supported by the manufacturers during the desired lifespan of the preservation system? |
| | Standardisation; open specifications | Is the technology based on standards and are the specifications of all the critical elements laid open by the manufacturers or at least deposited with a independent and trusted third party and available there in case of the dissolution or downfall of the manufacturers? |
| | Reliability | Does the technology work reliable and can the reliability of the outcome easily be checked? |
| | Modularity and Flexibility | Is it easily possible to add new components at low cost, to change or update them? |

| | | |
|---|---|---|
| | Costs | It is important to include not only the price of system components, but all cost of implementing and maintaining the system. See for this purpose the *erpaTool* on *cost orientation.* |
| **Objects** | Legislation | Are the objects subject to specific legislation which asks for a specific form, format, storage medium, or accessibility? Such regulations are basic conditions for the selection of technologies. |
| | Characteristics | How can the main characteristics of the objects and their context be preserved without threatening authenticity and integrity?<br>As conversion of digital objects for preservation is often difficult and costly, all selected technologies must be able to treat current and, as far as possible, also future objects. Consider also carefully what consequences a selected technology has regarding the creation or preparation of the objects for preservation. |
| | Preservation period | As digital systems only have a life span of about 5 to 10 years at highest and digital objects must be preserved for much longer periods, it is important that the system is able to efficiently export objects and their context data in standard formats in order to migrate them into a new system. |
| **People** | Skills | Does the selected technology need specific skills which must be available in-house? Are these skills already available or can they easily be acquired? |
| | Staff for maintenance | Is the appropriately skilled work force in the right number for the maintenance available? |
| | Experience | Is there sufficient experience with the technology for support in case of difficulties available? (in-house or easily accessible in the region) |
| **Procedures** | Workflow | Can the technology easily be implemented in the preservation workflow or can the workflow be adapted to the technology without major difficulties or loss of efficiency? |
| | Flexibility | Can the technology flexibly be implemented? Does it allow changes in the preservation procedures? |
| | Good Practices | Are good practices in using the technology already established? |
| | Quality requirements | Can the technology meet the previously defined quality standards?<br>However, automatic or semi-automatic techniques are difficult to be applied for heterogeneous collections, complex objects, and high quality requirements. |