How can the UNESCO PERSIST Programme bring about Digital Sustainability through Legacy Software Services?

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ABSTRACT

This workshop will address the topic of sustained access to digital content by providing a legal framework and a technical platform for hosting and distributing functional legacy software. Both aspects represent key areas of the UNESCO PERSIST[1] [12] Programme that will focus on the preservation of the digital heritage under the UNESCO Memory of the World Programme.

The objective of the workshop is to engage Digital Preservation Practitioners, Memory Organizations, the ICT industry and policy makers in the discussion of (1) use cases for the international platforms of legacy software services, e.g., applications to preserving increasingly complex digital objects, (2) engagement models among the stakeholders that would lead to revenue streams and economically sustainable services, and (3) legal frameworks that ensure flexible use of legacy software in the far future, e.g., policies to guide life-cycle management of critical software and 'fair use of software' beyond its market lifespan.

The workshop fits most naturally into the innovative practices in digital preservation strand due to its pragmatic approach, but will also cover some research into digital preservation given the novel nature of the topic.

KEYWORDS

Digital Sustainability; Legacy Software Services (LSS); Software Preservation; Hardware museums; technical environment metadata; file formats; technical registry; emulation; virtualization; computing platform; virtual machine.

1. UNESCO "PERSIST" INITIATIVES

It is well recognized that digital information is difficult to preserve both in the short and the long term. Most storage media are short lived. Floppy disks and CD-ROMs were widely used for archiving digital content but are now outdated. Without a concerted effort to move the content to new storage media, content becomes inaccessible. However, even that measure is not sufficient. We may not be able to use the stored content because the software required to interpret the digital encoding cannot be run in the contemporary computing ecosystem. In other words, the software became obsolete and unusable and that, in turn, makes the legacy content inaccessible.

Software obsolescence is a side effect of the ongoing innovation in ICT industry. All software becomes outdated as vendors respond to market needs adding new features to existing products, or replacing them altogether. With diminished demand for previous versions of products, it becomes economically unfeasible to maintain them. Yet, without continuous updates the software becomes unusable and that, in turn, makes the content inaccessible in its original form. This is a key issue for the memory institutions who need to preserve digital content far longer than the life-span of software products and software vendors.

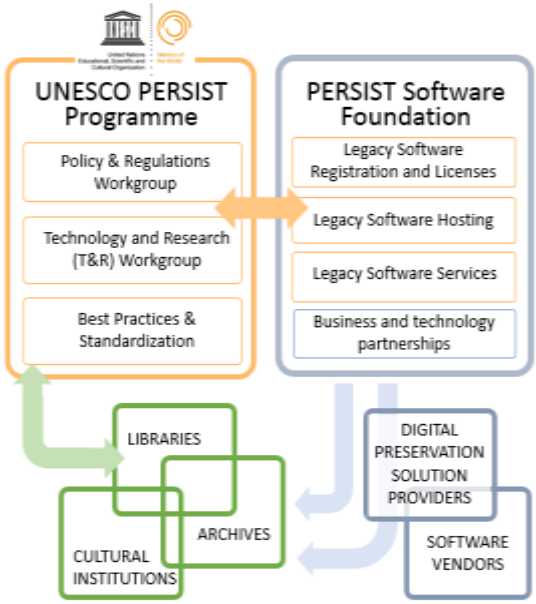

Figure 1. Roles of the UNESCO PERSIST Programme and the PERSIST Software Foundation in securing sustainability of digital computation and digital content

One of the key mandates of the UNESCO is the preservation of world's heritage and unrestricted access to documentation to all. As cultural heritage is increasingly digital, UNESCO has recognized the global need to addressing the problem of digital obsolescence.

In December of 2013, UNESCO convened an international meeting in The Hague, the Netherlands, involving representatives from the ICT industry, governments and heritage institution to discuss opportunities to join forces and address the issues. In an open discussion of the business principles that guide the technology innovation, including input from Microsoft and International Chamber of Commerce, it has become clear that there are three essential aspects: legal, economic and technological issues. All three need to be addressed in parallel to enable long term access to digital legacy. Such a task requires thought leadership and coordination. For that reason, UNESCO established the UNESCO PERSIST Project comprising three taskforce focused on Technology, Content selection, and Policy.

In March 2016, UNESCO adopted PERSIST as its internal programme, as part of the well-established Memory of the World Programme, and structured it to include three Workgroups: Policy, Technology & Research (T&R), and Best Practices (see Figure 1).

1.1 Towards Sustainable Computation

Key to providing long term access to digital computation is reducing or eliminating the cost of software maintenance while retaining functionality. Virtualization/emulation technologies

[1] PERSIST stands for Platform to Enhance the Sustainability of the Information Society Transglobally.

can shift the cost of software maintenance to the maintenance of virtual machines which can host a range of applications. Thus cost is spread across many applications and, potentially, many users.

Emulation is now a viable preservation strategy, supported by resources developed within publically funded research initiatives:

- Keeping Emulation Environments Portable (KEEP) project [10] produced an Emulation Framework [8], the Trustworthy Online Technical Environment Metadata (TOTEM) registry [11], and a media transfer knowledge base [9].
- bwFLA provided the DPC award-winning 'Emulation as a Service' [4, building on the TOTEM data model. This brings emulation within the technical grasp of memory institutions (legal issues are still to be addressed [1]).
- Digital Preservation Technical Registry (DPTR), underpinned by the TOTEM data model, is an ongoing effort carried out by the UoB (previously UoP), NLNZ, NLA, NASLA and NARA.
- The BitCurator set of tools [3] use digital forensic techniques to tackle media transfer and complex digital preservation tasks.
- The Preservation of Complex Objects Symposia (POCOS) project [7], concerned with preserving video games, digital art and archaeological 3D images, uses emulation as a key preservation approach, in addition to virtualization, software preservation [6, 5] and retaining hardware in computing museums [2].

1.2 Towards Policy and Legal Framework

In order to ensure a pervasive use of legacy software, it is key to establish a legal framework to manage the transition from commercial software licenses, designed to support vendors' business models, to the licenses appropriate for long term use of legacy software. Particularly important is the use of 'orphan' applications without legal guardians after the vendors stop trading.

1.3 Towards Economic Sustainability

Services that host and provide long term access to software need to generate sufficient value to users in order to generate revenue and sustain their operations. Thus, it is key to understand use scenarios that the services should support. The legacy software use is expected to be rare but important, particularly for computationally intense and interactive applications.

In order to provide effective services, UNESCO PERSIST Programme intends to incorporate a PERSIST Software Foundation, a non-for-profit legal entity with a formal partnership with the UNESCO but otherwise esponsible for its economic sustainability. Figure 1 outlines services that could form the core of the PERSIST Software platform and generate revenue streams.

1.4 Partnerships

Critical to the success of the UNESCO PERSIST Programme is the cooperation with the Digital Preservation community, ICT industry, solutions providers and the professional organizations that are already committed to the innovation and best practices, including ICA, IFLA, LIBER, etc.

2. WORKSHOP DISCUSSION POINTS

We will invite Workshop participants to engage in in-depth discussions of (1) use cases that could use Legacy Software Services (LSS), (2) engagement models with the platform that would lead to revenue streams and economically sustainable services, and (3) issues that the legal frameworks should cover in order to support the work of memory institutions. Among the discussion points it would be important to include:

- How could LSS complement current DP services?
- What specific services should LSS offer to the memory institutions and in what form (remote access, on premise, etc.)
- How will Open Source community collaborate with LSS?
- How will software vendors interact with the LSS?
- What would be role of Cloud infrastructure providers?

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