

Digital Continuity: Software Lifecycle Management for Long-term use of Digital

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Introduction

Modern archives inevitably use digital technologies to make their holdings widely accessible either through digitization of physical artefacts or enabling access to the documentary heritage in the digital form. Generally, digital media are amenable to a broad distribution and far reach. However, due to a high pace of innovation in computing technologies, they suffer from a rapid technological obsolescence that present significant challenges to long-term digital preservation. Thus, it is key to devise methods and practices that ensure digital continuity, i.e., a reliable use of preserved digital artefacts over long term.

Digital content is fundamentally computational: a digital file requires a compatible software to present its content. PDF files and the PDF reader are an example of the files and software pairing that is widely used. Generally, a given digital artefact can be experienced only while the corresponding software is running. Therefore, a key to digital continuity is a careful management of the software installations throughout the software lifecycle, from its release to upgrades and retirement.

Producers of software typically provide upgrades during the market lifetime of their software, including the archiving solutions adopted for record keeping. In most instances, they ensure backward compatibility of new software versions. However, the lifetime of software is much shorter than the retention period of digital files which may span decades.

In some instances, the presentation of digital content, e.g., video or music files, can be enabled to a high fidelity with new software. However, for digital artefacts that are highly dynamic and interactive, involving data analyses and visualization, it is less likely that an equivalent software exists. In highly regulated sectors, use of any new software must be validated through careful comparison with the original software.

Fortunately, modern software virtualization techniques enable us to create and validate installations of original software, even when it is decades old. The software lifecycle is thus extended through a careful management of software installations in secure and stable virtual environments. The legacy software is fundamentally non-secure and requires special care.

We demonstrate how software installations within the INTACT Software Library platform are used to enable access and readability of decades-old, archived content, turning standard digital archives into Executable Archives. By considering archiving practices in the pharmaceutical sector, we discuss strict software validation requirements that are needed for long-term data integrity and reliable reconstruction of archived studies. These practices are generalizable and applicable across domains.