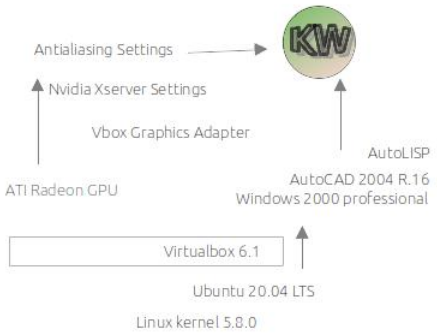

ENT

s a preservation strategy to ainable, collaborative extensive art museum

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Abstract – this paper briefly describes the establishment of a digital archival infrastructure to preserve one artwork from the late 90's and a complete artist archive. Within those digital preservation processes an accessible, transparent and sustainable infrastructure will be designed, implemented and evaluated, fitting the existing collection management structure. The most critical point is building a system relying on open source software in an institutional environment without dedicated knowledge and experience. While building, testing and integrating the Linux working station to virtualize and transform those artworks it is confirmed that this is an efficient method to built transparent institutional capacities and capabilities.

Keywords – software-based artwork, digital sustainability, virtualization, open source, cooperation
Conference Topics – (3) Enhancing Collaboration, (4) Building the Capacity & Capability

I INTRODUCTION

The Art Collection of the State of Lower Austria [1], owns more than 650 time-based media artworks from local artists. Most of them are film and video works. A significant number of artworks are based on obsolete computer environments and data carriers. Recently the collection acquired three different artworks: an interactive virtual artwork, a computer-based artwork from the late 90s and an artist estate which includes diverse digital sound material composed with a contemporary laptop and proprietary software.

The Art Collection belongs to the State of Lower Austria. Consequently the Information Technology infrastructure is build and controlled by the dedicated IT department, which leaves small scope to modify and adapt this system for preservation needs. The supported institutional operating system is the latest Windows version. The desktop working computers are replaced on a frequent cycle. For security reasons an individual specific configuration of those computers is restricted. The installation and execution of relevant programs requests special permission from the IT-department and can just be used temporarily. The IT is located in another building and do not have any time resources to support the conservation department.

Because of those reasons a cooperative collaborative seems hard to establish.

Facing those new acquisitions, considering the small number of non-preserved early computer artworks and the ambition to collect more digital artworks an efficient infrastructure needs to be established to ensure a transparent, sustainable and collaborative ingest and preservation process.

Based on two case studies (the new acquisitions: the computer-based artwork form the late 90s and the artist estate) the technical specifications of the digital preservation working station will be defined, designed, tested, and modified.

II SCOPE OF THIS RESEARCH

Through the virtualization of a computer artwork by Hans Kupelwieser from 1997 [2] (see Table I) the

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requirements of such a digital preservation structure and workflow will be illustrated.

TABLE I
View-path : hardware environment and dependencies

Self executable BAT script to start LSP program		
LiSP Program		
AutoLisp Programming Language		
AutoCAD 2004 R16.0		
Windows Operating System 2000 professional		
Windows Registry		
Control Panel 2 VGA Displays	ATI Driver and Panel	IDE Driver
Desktop Computer	ATI Radeon GPU	IDE Hard drive

II.A Focus

Facing the profile of the collection and the in-house resources the goal is to enable transparent, reproducible, durable, independent and self-documenting preservation actions. Automation is at this moment not primarily intended, since each artwork needs individual evaluation. This research makes use of the existing infrastructure and increase the efficient communication between the departments (IT, conservation, art history, media technology).

II.B Requirements

The challenge to built an (Alien-like) independent, Linux based working station with a local server inside the art storage was undertaken, based on the existing infrastructure: secure server system for backups, solid IT department with less time for art conservation, enthusiastic paper and sculpture conservators with growing experience in time-based media preservation and a fruitful cooperation with the curators for Art After 1960.

The requirements for the whole process have been defined:

- open source and open standards
- Interchangeability (with windows systems / other institutions)
- reproducible (well defined documentation methods)
- transparent (decision making)
- minimal external dependencies to enable a self-determined system which can be modified as needed by dedicated user
- usable for non IT experts (self-employed use without IT support)
- low cost
- adaptable (to extend the system)
- better integration (of IT knowledge: communicate but do not rely on them).

III CASE STUDIES

Two artworks have been chosen because of its complex techno-cultural context and narrative [3]. A software-based artwork which was created in cooperation with a programmer and modified over a long period of time for several exhibitions (see Fig. 1). The second case study includes an entire artist archive which references his conceptual way of working.

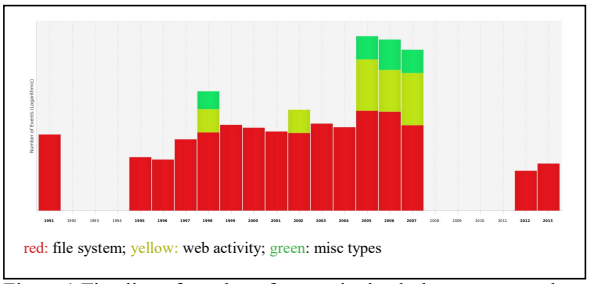


Figure 1 Timeline of number of events in the desktop computer by Hans Kupelwieser from 1997-2013

III.A CASE: Hans Kupelwieser Werkgruppe <Name> 1997

As shown in Table I this artwork is based on a *Windows 2000* operating system with an *AutoCAD 2004* template which is drawn by a LISP program.

The requirement was to document and understand the process flows of the program routine and to recreate the view path. Two strategies have been applied (logical vs. conceptual):

1. create a bit-exact copy of the hard drive to virtualize its hardware and software environment (logical).

2. re-create the view-path to comprehensively understand the dependencies (conceptual). This task justifies itself because the artist and programmer are still present and necessarily need to be interviewed. This re-engineering will rise more precise questions which consequently will be discussed and documented.

SIGNIFICANT PROPERTIES:

To evaluate the preservation actions the significant properties have been defined [4] as decision criteria: a deterministic sequence of geometric patterns is drawn on the display, respectively projected onto the wall. The resolution is defined (and restricted) by the display adapters, respectively by the connected output devices (VGA beamer and monitor and *ATI* VGA graphic card *Radeon 9250* GPU). The behavior is programmed and human readable in the script file (*BLITZ.LSP*). The color space and palette is hardware dependent and can be modified as the graphic card settings can be changed. Neither sound nor interaction is implemented.

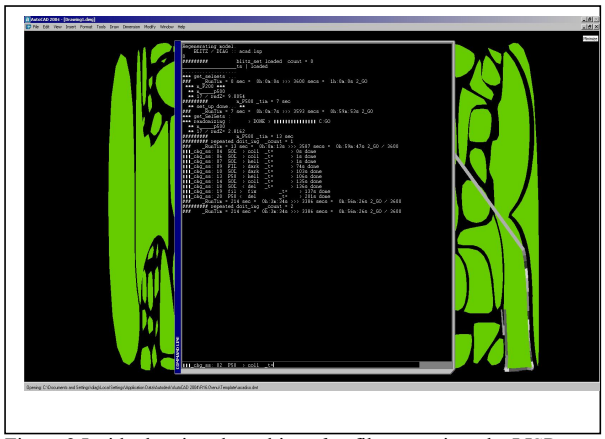


Figure 2 Inside the virtual machine: *.bat* file executing the LISP program

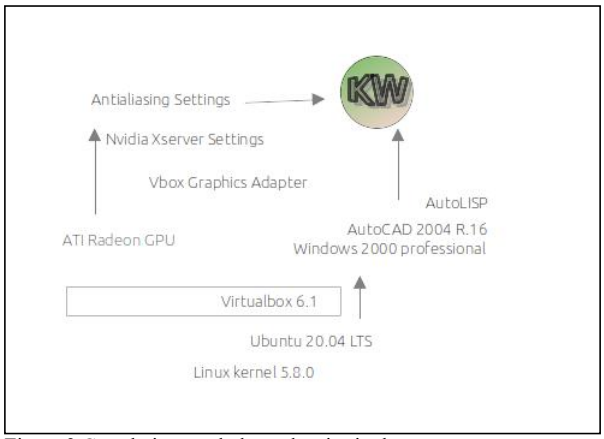


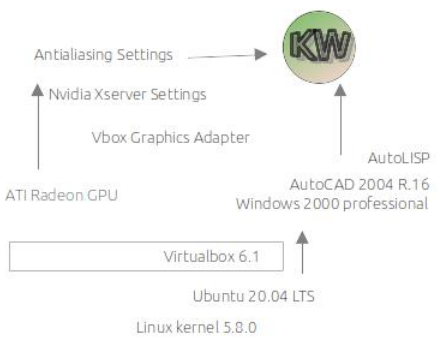
Figure 3 Co-relations and dependencies in the process

PRESERVATION PROCESS

The two different defined processes have been executed in parallel for efficient comparison:
- bit-exact copy of the hard drive via *dd,*
- mount the virtual drive and determine its content (conceptually),
- use the virtual hard drive to create a virtual machine (*virtualbox 6.1* has been used to fit our requirements of an open, transparent and reconstructable workflow),
- create a second virtual machine and re-construct the settings from the virtualized hard drive to examine the relational dependencies,
- extract the most relevant digital objects (LiSP scripts),
- analyse the virtual image in *autopsy* to document the history of the art object (see Fig. 1),
- export the virtual image into an open, transportable file format to ensure interchangeability (the *virtualbox* format *Virtual Disk Image (VDI)* has been chosen because *oracles virtualbox* was defined as target platform and the conversion to the open *VMDK* format via VboxManage is applicable),
- verify the integrity and test in different environments (host and guest systems).

POINTS TO DISCUSS:

The bit-wise logical copy of the hard drive is definitely preferred in the case of the preservation of the whole environment. But considering a digital infrastructure which is not prepared to access such file formats the risk is obvious.



The data needs to be accessible and documented on a conceptual level and at the same time a transparent digital archival structure must be ensured.

III.B CASE: Bernhard Leitner artist estate

One of the leading experimental sound artist of Austria, well known for the creation of site specific sound spaces [7] is handing over his physical and digital archive. Leitner composes (digitally) with recorded and generated sound material and a proprietary sound editing software. His working computer consequently can be understood as his digital memory whose content needs to be conceptually accessible [8].

TRANSFORMATION

In the case of Bernhard Leitner it is less intended to completely copy the hard drive but archive the project files of his digital compositional setting. The artist is working on a *MacOSX* laptop with *ProTools*. Both are not meeting the requests of an open, sustainable archive system. In accordance to his programmer/technician a migration to *audacity* Is possible. Which now has been defined as strategy to go but not completely evaluated. Since this transformation is still in progress no results can be reported. But the established local preservation working station is the equipped with the necessary tools and will be modified while the transformation. Besides the soft- and hardware implementation a valuable effect will be the inevitable training in utilization the working station. With the method "learning by doing" valuable knowledge on the side of the preservationist will be continually created and established.

IV LESSONS LEARNED : CONCLUSION

It has been proven to be crucial that preservation steps are undertaken by the in-house conservators in close communication with the IT department and a dedicated external conservator specialists. This practical approach creates a comprehensively institutional understanding of the artwork and its

significance. Further it creates a network of co-working beyond the department borders which makes efficient use of specific knowledge and experiences.

Even though such an autarchic system (*linux/ubuntu* platform inside a windows maintained institutional infrastructure) is requesting, it enables individual modification to the artworks techno-sociology-cultural specifications and needs. Transparency is a key point in a sustainable digital archive. It implements migration, documentation and communication as methods of preservation.

This builds the foundation of the organizational sustainability: the transformation of a static (physical) archive to a dynamic archive. It is essential to enable institutional sensibility and knowledge to keep the migration requests cycling. Besides the necessities of open, stable and transparent digital objects (*vdi, mkv, xml,* etc. ...) individual specific responsibilities must be assigned to facilitate the cross-divisional communication.

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