Re-awakening the Philips Videopac: From an old tape to a vintage feeling on a modern screen

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ABSTRACT

Preserving data for a specific system usually depends on the system in question. Different strategies for different file types are necessary to preserve all data for a system. In this demonstration we present tools developed for preserving data for a home computer system from 1984. We present how a tool we developed can be used to retrieve data stored on audio tapes and how this data is migrated to non-obsolete formats. We also present how the data is migrated on a bit-stream level only and can then be used in an emulated environment using a recently developed emulator for the system's hardware. We further show the features of the emulator that allow its proper usage for digital preservation purposes. The purpose of the demo is to demonstrate different types of digital objects for a system, the information layers of these digital objects and how the proper preservation strategy is chosen. Preserving static digital objects and understanding the difference to preserve dynamic and interactive digital objects like software is a key preparation for the preservation of distributed software as in Software as a Service (SaaS) and even whole business processes.

1. INTRODUCTION

Digital objects can be separated in two different groups. One group contains static objects that are rendered by a viewer application. These objects can usually be migrated into a different format, so a different (non-obsolete) viewer application can be used to render them. The other group contains objects which either can't be easily migrated to a different format, as their behavior is also significant, or they are actually programs that need to be preserved. The typical preservation strategy for these objects is emulation. On any given computer system usually both types of objects exist: Data in the form of images, text-documents, spreadsheet data or database entries on one side and on the other hand digital objects like enterprise software applications, process management applications, interactive digital art and video games.

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Figure 1: Philips Videopac+ G7400 with plugged in Philips C7420 Home Computer cartridge.

Concentrating on a comparatively simple system, a home computer system from 1984, we take a closer look at the different types of digital objects that exist for this system. We demonstrate two different applications that we developed in the past and that show two different preservation strategies: a migration tool that converts data stored by the original system to non-obsolete formats, and an emulator that allows us to execute original software in an emulated environment, but also allows us to manipulate and render data for the system using the applications the data has been created with. We show the requirements that an emulated environment has to fulfill to be properly usable for digital preservation purposes.

This demonstration proposal is structured as follows. First we present the home computer system and give an overview of the various data types that existed for the system. Next we present the two different tools for migration and emulation. Finally we discuss what we will have shown in the demonstration and how it aids the participants in their work.

2. THE HOME COMPUTER SYSTEM AND ITS DATA FORMATS

For our case study and demonstration we concentrate on an early home computer system manufactured by Philips in 1984. The Philips G7400 Videopac+ system was marketed as a video game system with a full keyboard that could be expanded to a full home computer system using the expansion module C7420 Home Computer cartridge as shown in Figure 1. The system itself was powered by an Intel 8048h processor, while the home computer cartridge used a Zilog Z80 microprocessor as it's main processing unit. For stor-

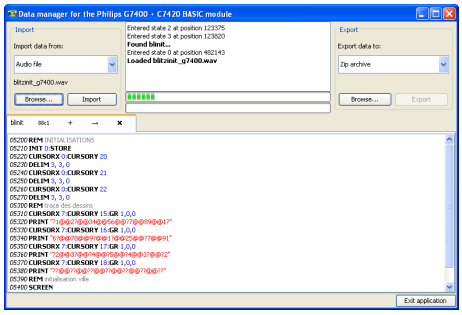

Figure 2: Migration tool for home computer data.

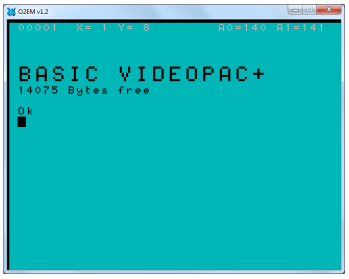

Figure 3: Start screen of C7420 Home Computer cartridge on O2EM emulator.

ing and loading data connectors to an external audio system (usually tape system) were provided.

The system was able to store the following different data formats as files on tape using different variations of its command for saving data 'CSAVE': Images (screenshots of the current screen), Arrays of data, Strings (up to 255 characters), Memory Dumps for raw binary data and BASIC programs to save any programs written in the system's programming language 'Microsoft BASIC-80'.

A detailed description of the available data formats and their storage in bit-format as well as the transformation between the analog audio signal used to store the data and the digital counterpart can be found in [2].

3. MIGRATING DATA TO NON-OBSOLETE FORMATS

The various data formats described in Section 2 most can be converted to a non-obsolete format. Even BASIC programs that are not directly runnable on a modern platform can be converted to text format. A migration tool that was presented in 2009 on iPres [1] and later in a paper for IJDC [2] was developed. It allows the migration of data between the original stored form in audio waves, the native bit-stream formats and non-obsolete formats (e.g. JPG for image data, text files for BASIC programs). A Screenshot of the migration tool is shown in Figure 2.

In the demonstration we will explain the difference between the formats (physical layer, logical (bit-stream) layer and conceptual format as well as discuss the context for the digital objects shown. The participants will learn to understand the difference and get to know which objects can be migrated and which can not.

4. RENDERING DATA IN AN EMULATED ENVIRONMENT

Some of the data objects retrieved from the storage medium are BASIC programs. Even though we will show how these can be migrated to human readable form in text format, they are not runnable on a current computer system. We show a recently developed emulator and demonstrate, how these programs can be executed in an emulated environment.

We will show some of the features present in the emulator that make it usable for digital preservation: Data injection using emulation of the original storage media, keyboard input and also the possibility to copy data from the host system into the emulated environment. Furthermore we show how data can be extracted from the emulated environment by copying the screen content to the clipboard, not only as screenshot but also in text format for further use. We explain how data that is stored in it's native bit-stream format and not migrated to a non-obsolete format can be rendered in the emulated environment. We also show how data that looses its context when migrated without the application creating the data can be loaded using the original (emulated) application and shown as interpreted by the original application.

5. CONCLUSIONS

The proposed demo shows participants the different data formats that exist for a computer system on the example of an early and comparatively simple home computer system from 1984. After the demonstration participants will understand the different layers of the data for the system. It will become clear how some digital objects can be migrated to non-obsolete formats while others have to be opened in an emulated environment. The usage of the emulator will show the complexity of emulation systems and the necessary features of emulators to support the work of archivists, librarians and any other party having to work with emulators in the digital preservation context. In the end of the demonstration we will discuss how the shown tools and methods translate to more complex systems to enable the preservation of standalone software but also for distributed software and enterprise application systems.

6. ACKNOWLEDGMENTS

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7. REFERENCES

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