

Free Audio-Visual Tools Research

by Jake Harries

March 2007- June 2008

I worked with help from Access Space in Sheffield to test the possibilities of using free and open source A/V software on no-cost and low-cost computers. This involved investigating hardware and software, and setting up an Audio Group at Access Space to give a series of practice-based workshops that developed into a rock band (which performed at the Open Source City festival, Liverpool, 2008).

Questions:

- Is it possible to carry out a range of creative multimedia activity using Open Source software on recycled or very low cost computer hardware with the equipment available and software freely downloadable from the internet?
- How easy is it for someone with little or no experience of Open Source software and operating systems to install the software and to be productive?

1. Investigating hardware and software

a) Identifying software

Software for several types of creative activity was selected: audio editing and sequencing, midi sequencing, video editing, animation and digital image processing. There is a large amount of open source software available and as some applications are very complex a focus was made on audio, video and creating a/v content for so called Net 2.0 e.g. YouTube, MySpace.

b) Identifying hardware

This began with descriptions and definitions:

◆ While the definition of a junk computer is one which a user or organisation has decided to throw away because it no longer works or no longer fits their requirements, the definition of a no-cost PC is one which can be created or acquired for free. I used Access Space as example of an organisation that consistently re-uses computer parts (which are donated by the public and organisations in the form of junk computers) to build working computers for use in creative activity. Computer parts available here, it was thought, would give an indication of the kinds of hardware people were throwing away and therefore most readily available for no cost.

◆ Secondly, a PC which one already owns can be described as “no-cost” as it has already been paid for. It may no longer be in use as the owner has up-graded to a newer, faster computer.

◆ Low-cost computers can be described as PCs made available for sale by individuals who no longer want them e.g. on GumTree, or what are described as “refurbished” computers for purchase from computer shops.

◆ Lastly, I wanted a computer to compare no-cost/low-cost computers with: the constituent parts of the above PCs were likely to be several years old. A 1.6GHz Pentium 4 PC, with 512Mb of SD RAM, from 2002 (which had been used successfully for creative activity with both “professional” proprietary audio-visual software on Windows and with Open Source applications on Linux, seemed a fair choice.

c) Software and hardware

◆ The first PC tested as part of the research was built from recycled parts in March 2007 had an 850 MHz AMD processor with 256 Mb RAM and was a representation of what was available in terms of computer parts at Access Space. Some of the software investigation was carried out on this PC, particularly initial installing and upgrading different Linux distributions and installing and testing a number of applications. However, by August 2007 the speed of processor and amount of RAM in many PCs available was roughly similar to or exceeded (e.g. a 2.6GHz P4 processor) that of the 1.6 GHz P4 PC used for comparison. Also, by the end of 2007 it was possible to buy, for instance, a second hand 1.8 GHz Athlon or 1.6GHz P4 PC advertised on the internet for as little as £100. The project was not proposed assuming this would be the case.

● Hardware investigated:

Intel Pentium 3 and Pentium 4 processors, AMD Athlon processors, 100 and 133 SD RAM, available soundcards, available video cards, CRT screens, Midi-USB interface, midi controller keyboard, headphones, computer speakers.

● Software investigated:

Audio: Ardour (audio sequencer/multi-track recorder), Rosegarden (midi and audio sequencer), Audacity (audio file editor), ZynaddsubFX (software synthesiser), AM Synth (software synthesiser), Jack/Qjackctl (sound server and its graphical user interface), LADSPA (audio plug-ins for a compatible host), LAME (audio file converter), ALSA (Advanced Linux Sound Architecture), snd (audio file editor and file converter), Qtractor (audio and midi sequencer), Specimen (sampler), Hydrogen (drum sampler/sequencer).

Video: Cinelerra (video editor), Kino (video editor), KDenlive (video editor), MMC (video file converter interface), Open Movie Editor (video editor), Flash plug-in for Mozilla Firefox web browser, ffmpeg (file converter), mencoder (file converter).

Animation: Blender (animation application), Open Mosix (application for parallel computing on a network used to create a Blender “render farm”).

Digital image processing: GIMP (image editing/processing), Inkscape (vector drawing application).

CD/DVD burning: K3b

Linux distributions: Mandriva 2007, Ubuntu Dapper, Debian Etch

Linux multimedia distributions: Ubuntu Studio, 64 Studio, Dynebolic and, latterly, Puredyne

d) Workshop

A demand for creative audio software skills was identified at Access Space. The Access Space Audio Group was established to give a series of three hour informal workshops involving tuition on using Open Source audio applications on the computer hardware available.

I supplied hardware that could not be provided by Access Space (midi keyboard, sound card with midi interface, midi to USB interface, microphones).

Participants were encouraged to bring their musical instruments and laptops (if they had one).

The idea of an "Open Source rock band" was suggested during the workshop period and creative collaboration within the group resulted in music being written and arranged using Open Source music applications and guitars. (4 participants in total were involved in this and 2 committed long term).

I continued the Audio Group on a voluntary basis after the period of initial workshops.

2) Findings

- ◆ Linux multimedia distributions, for instance, Puredyne, 64 Studio and UbuntuStudio, are by far the easiest ways of obtaining an Open Source operating system and a good selection of Open Source multimedia applications. They also include a pre-emptive real time multimedia Linux kernel necessary for running Jack (which is required by many Linux audio and some video applications).
- ◆ Linux multimedia distributions are freely downloadable from the web as ISO images which can be burned as bootable CDs or DVDS. The operating system and applications can be installed from these (currently with Puredyne, a/v applications are downloaded after installing the operating system)
- ◆ A Linux multimedia distribution can be no more difficult to install than re-installing Microsoft Windows and, in fact, as multimedia software is installed with the operating system it may take less time than setting up Windows with a host of third party proprietary applications (on the same PC).
- ◆ While a broadband internet connection is necessary for downloading operating systems/multimedia distributions and, with a package management system, for downloading and installing software, some multimedia distributions do not necessarily require any additional software for the user to start being productive so no internet connection is needed as long as the user has the bootable CD/DVD and documentation (printed or in some digital format). However, as there are resources on the web that a new user will find very extremely useful, an internet connection is recommended.
- ◆ Although a 6 year old computer containing a 1.6 GHz P4 or Athlon processor , 512 Mb of SD 133 RAM, or upward, and an ALSA compatible soundcard is sufficient to use a wide range of the Open Source multimedia applications available in 2008, depending on what one is intending to do, a much less powerful PC can be used for less resource hungry activities (e.g. audio editing, basic audio sequencing, digital image processing). A higher specification PC with graphics acceleration and/or a more powerful graphics card may be needed, for instance, for editing larger video files, complex animation, using a number of audio applications simultaneously synchronised with Jack Audio Connection Kit.

◆ One needs to investigate the limitations of the power of one's computer in the context of what one is intending to do with the software. This is no different what operating system nor what software one is using. As software may be created to take advantage of the upper end specifications of computer hardware available at the time it is written, discovering workflows to allow one to do what one wants on less powerful computers may be understood as part of the creative process

◆ While some Open Source A/V software is perhaps not yet as well developed as its "proprietary counterpart", or, for instance, is in beta stage development with work needing to be done make it useful for an ordinary user, there is no shortage of highly developed applications which, with an investigation of possible workflows, can be excellent creative tools.

3) Conclusions and outcomes

◆ 64 bit processors are now standard in new PCs.

It follows that as time goes on higher specification second hand 32 bit PCs will become less expensive and more readily available as owners upgrade to 64 bit. As long as Linux distributions continue to support 32 bit computing into the medium term (and this appears to be highly likely) users will be able to be run up-to-date Open Source a/v applications on faster 32 bit PCs for less or no financial outlay, or, in Access Space's case, computer owners will be donating faster computers for re-use and recycling.

◆ Those who might benefit most from using a completely free set of multimedia tools (young people with very few resources) could be encouraged to investigate creative A/V if there were role models making, for instance, music in a style they wished to emulate and develop further. While many artists are using Open Source a/v tools with great success to create their work, currently there appear to be no high profile role models using or publicising Open Source A/V applications.

◆ Members of the Access Space Audio Group and myself performed at Open Source City, Liverpool, on 20 June 2008. It demonstrates that the Open Source audio tools investigated can be used to compose pop music for a live performance in a similar way to some proprietary applications and that emerging artists with little creative audio software experience, but some musical experience, can find the Open Source audio tools investigated easy to learn to use. For the performance the group used recycled computers from Access Space.

The Audio Group's performance, under the name of The Apt Gets, is documented on Folly's website www.folly.co.uk

◆ A wiki has been set up at <http://favtr.lowtech.org/wiki/> and this report is available from <http://audiotools.lowtech.org>.

◆ A workshop, Free Audio-Visual Tool Kit, has been developed through this project.

Free Audio-Visual Tools Research was supported by a grant from the Arts Council of England, Yorkshire

