

OpenDAW - a reference platform for GNU/Linux Audio

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Abstract

Not being able to give a definitive answer to the question "Will my application or hardware work reliably with GNU/Linux?" presents a barrier to adoption by pro audio users. The OpenDAW platform offers a potential solution.

Keywords

GNU/Linux distributions, reference platform, hardware support, business models

1 Introduction

For servers, network devices or high performance computing clusters, it's a redundant question to ask if a piece of hardware or a particular software component works with GNU/Linux. It's no exaggeration to say that GNU/Linux is a standard operating system in these fields, so a lack of support for the Free Software platform usually indicates a business model based on vendor lock-in. In other fields, such as mobile, GNU/Linux may not be installed on the majority of devices yet, but it has become too significant to be ignored. In particular, the standardization of the Android platform, and the associated marketing push given to GNU/Linux by Google and its hardware partners, have perhaps done more to put Free Software into the hands of end users than the many GNU/Linux distributions have achieved in the last twenty years. Web browser surveys for January 2011 indicate that Android phones already account for one third of all GNU/Linux based Internet client devices,^[1] despite the fact that the Android platform has only been available to the public on a certified phone handset for just over two years.

The audio software world, in general, is different. Proprietary operating systems are

deployed by the vast majority of users, with an unusually large number of Mac users compared to the general population. To give one example, the latest Sound on Sound magazine reader survey found that 58.4% of readers reported using a Mac, 54.7% reported using a PC, and only 1.6% reported not using a computer at all.^[2] This compares to web browser statistics for January 2011 suggesting that all Macs combined account for less than 7% of client devices.^[1]

What could be the reasons for such a high level of proprietary Mac adoption among audio users? It certainly isn't technical superiority, despite the smug attitude among members of the Cupertino cult. Macs didn't even have preemptive multi-tasking as standard until the launch of OS X in 2001. Before then, printing a large document on OS 9 often meant taking an enforced lunch break.

I would argue that perceived continuity and standardisation are more important to audio users than choice, or price/performance ratio. Apple has typically presented a very limited range of hardware choices, and yet this has somehow been presented as an advantage. Apple has not allowed its users to have a choice of hardware suppliers either, the notable exception being a brief period during the lifetime of System 7.

Apple hardware has often lagged behind PC hardware in terms of raw performance, for example towards the end of the PowerPC era, when the company was advertising the G5 as the 'world's fastest computer' right until they dropped it, in favour of x86. (In the UK, Apple was forced to withdraw this bold claim by both TV and print advertising regulators in 2003/2004).^[3]

Although Apple successfully presents the image of continuity through marketing - using the name Mac for more than 27 years - in fact, the company has disrupted its own development community and user base several times as it jumped ship from one

hardware option to another, or when it abandoned its own operating system for a proprietary UNIX flavour. The switch from OS 9 to OS X was marketed as a continuity from 'nine' to 'ten', even though it was a major disruptive change for both audio developers supporting the Mac platform, and the audio users who were compelled to scrap their PowerPC machines. Forced obsolescence is not only expensive and inconvenient for the pro audio community; it is also a significant contributor to the global problem of e-waste.

Dropping the 68K CPU, introducing PowerPC
Dropping Nubus, introducing PCI
Suppression of third-party Mac 'clones'
Endorsement of Mac clones for System 7
Suppression of Mac clones from OS 8 onwards
Dropping Old World ROM, introducing New
Dropping Mac OS, introducing OS X
Dropping the 'classic' GUI, introducing Aqua
Dropping New World ROM, introducing EFI
Dropping PowerPC, introducing x86

Figure 1: Some disruptive changes in Mac history

Neither do I buy the idea that Apple is particularly sensitive to the needs of pro audio users. For all the support of Apple by pro audio customers, those users remain a small niche market of the somewhat larger niche of creative professionals, almost insignificant in corporate profit terms when compared to the revenue from disposable consumer products like the iPod, iPhone and iPad.

I would argue that it is the third-party audio software and hardware developer support of a particular platform that have made it popular with audio users, rather than anything that the proprietary operating system vendors have done. This phenomenon is not exclusive to the Mac. If it were not for Steinberg creating ASIO, there might not be any pro audio users running Windows at all.

Perhaps this is because in audio, users are not fault tolerant. We deal with once in a lifetime or never to be repeated events on a daily basis, and they happen in real time. Waiting a few seconds for a task to complete is not acceptable. This might be what makes audio users relatively conservative

in their platform choice, sticking to Macs despite their limitations.

So we need to keep drawing the wider pro audio development community towards the Free Software platform. Unfortunately, the major commercial GNU/Linux distributions are about as interested in pro audio users as Apple or Microsoft are. The GNU/Linux server market may be worth billions of euros annually, but the special requirements of pro audio don't really figure in that market.

By learning from the lessons of continued Mac adoption among audio users, and the more recent upsurge of Android adoption among phone buyers, we can create a hardware, operating system and application ecosystem designed specifically by and for pro audio users.

2 The OpenDAW design

OpenDAW is a reference GNU/Linux distribution designed to create a minimal, stable and high performance platform for hardware manufacturers, system integrators and the application development community. It is also suitable for end users with some GNU/Linux experience. The emphasis is on providing a selection of known reliable packages with as little duplication of functionality as possible, in a standardized platform with continuity and long-term support. Hardware and software certification services are available from 64 Studio Ltd.

The base distribution is essentially a subset of Debian Squeeze amd64 with a real-time patched Linux kernel version 2.6.33 or later, using the proven design of 64 Studio distribution releases from 1.0 through to 2.1. The default desktop is GNOME, for continuity with these earlier 64 Studio releases.

Debian provides a very wide selection of packages, but a more important reason for selecting it as the basis of OpenDAW is its *quality threshold* rather than *date-based* release model. While Debian may be perceived as having a long release cycle, it was in fact only two years between the 5.0 'Lenny' and 6.0 'Squeeze' stable releases. This cycle length compares well with Windows and Mac minor releases. Windows XP and Mac OS X are both almost ten years old, typically having had a minor update or 'service pack' released every two years or so. (Windows XP users may be forced to upgrade to Windows 7

when they buy new hardware, because of forced obsolescence, but Debian offers continuity and the ease of performing full system upgrades on a running machine with apt).

The Linux kernel supports many more hardware architectures than either Windows or Mac OS X, and does not force users to change architecture. For example, Apple dropped the 68K processor with the introduction of the Power Mac in 1994, but this CPU is still supported in the Linux 2.2, 2.4 and 2.6 kernels.^[4]

A timeline of Linux releases shows that not only does the kernel enjoy long periods of stability between major releases, but that the long overlap between major releases means that forced upgrades of production systems are unlikely.

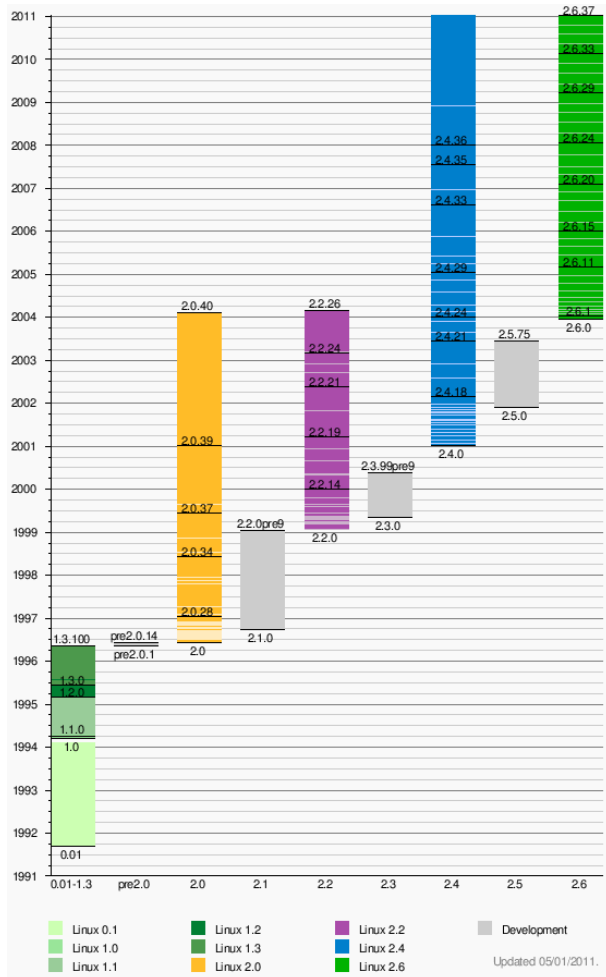


Figure 2: Timeline of Linux kernel releases. Source: Wikipedia (Creative Commons Attribution-ShareAlike License)

3 Distributions and upstream developers

In the early years of the GNU/Linux distributions, between 1992 and 1998, the target audience was almost entirely made of developers. The principle of free-as-in beer code reuse was equitable because a user was likely to contribute additional code, creating a virtuous circle. The initial public releases of the KDE and GNOME desktop projects, in 1998 and 1999 respectively, enabled GNU/Linux for a non-developer audience. Some of these non-developers contributed to the community by offering informal help on mailing lists, writing documentation, or producing artwork. However, as installation methods became simpler, it became possible to be a GNU/Linux user without being an active member of the Free Software community. It was no longer necessary to join a user group to puzzle out technical problems, and some users brought their consumerist expectations from proprietary platforms.

As the proportion of non-contributing end users increased through the 2000's, it could be argued that the relationship between developers and end users has become less equitable. Financial contributions are passively solicited by some development projects, but anecdotal evidence suggests that these contributions rarely add up to much. The LinuxSampler annual report for 2009 lists one donation, of two euros.^[5]

If only a tiny minority of end users donate voluntarily for Free Software, they disproportionately contribute, which is not equitable either. The alternative of developers providing direct support services is not always practical or desirable. Ironically, the better the software is, the less support that end users will need or pay for.

Distributions created by for-profit companies might actually make it harder for independent Free Software authors to redress the imbalance. Much of the value in these distributions is created by upstream developers who are not explicitly credited, let alone compensated.

Red Hat charges a compulsory subscription for its Enterprise distribution, but does not distribute this revenue to upstream authors, unless you count authors who are direct employees of Red Hat. At least Red Hat does employ a significant number of key developers, including real-time kernel contributors.

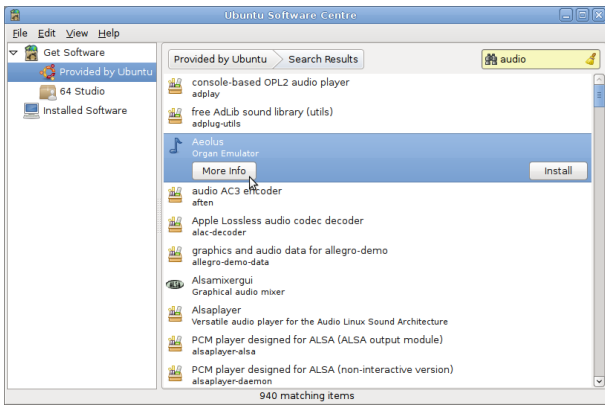


Figure 3: Screenshot showing a general lack of upstream developer credit in the Ubuntu Software Centre application. At least Apple gets credit in the caption of a package.

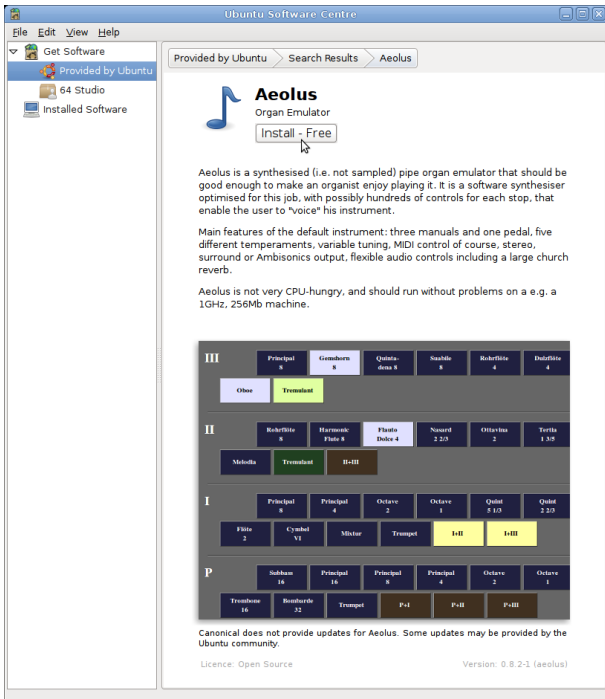


Figure 4: The 'Install - Free' button in distribution tools like the Ubuntu Software Centre might undermine efforts by upstream authors to raise revenue. Note the ambiguity about updates and licensing. Again, there's no mention of the upstream developer, and no link to the upstream website.

The Android Market^[6] offers a potential model for funding Free Software audio development. An application store model built into OpenDAW would enable end users to download certified applications for the platform, with full credit, a link to the upstream homepage, and optionally,

payment. Developers who wished to release their apps free-as-in-beer on the store could still do so.

The GNU GPL and other Free Software licences do not prevent charging end users for software, as long as source code is available to those users. The problem of distributions which are non-crediting and non-revenue-contributing remains, without the use of GPL exceptions, which are themselves problematic. An application store offering GPL software would have to compete on some other level with free-as-in-beer distributions, perhaps on certification or support.

Another problem with an application store model is that end users do not typically pay for libraries, or infrastructure such as drivers. This puts developers of libraries or drivers who do not also code end user applications at a disadvantage.

An alternative example of upstream development funding is provided by the independently produced online game, Minecraft.^[7] The developer of Minecraft directly asks users for a one-off payment, rising from 10 euros to 20 euros as the game is finished, providing an incentive to users to fund development early on. 10 euros isn't much for a user to contribute, but it adds up when you have almost four and a half million users, around 30% of whom have paid for the game. Minecraft uses some open source components, and the developer has suggested that he will release the source code to the game at some unspecified date in the future. This delayed source release model has prevented GNU/Linux distributions from shipping the game, for the time being, but the revenue has enabled the developer to set up a company to secure the future of the software.

Pricing is difficult - how do we value the priceless gift of software freedom? Does it cheapen the gift to ask users for a small amount of money? I would like to hear the views of upstream authors on these issues.

4 Conclusion

GNU/Linux provides the greatest continuity of any generally available operating system, on the widest possible range of hardware. It therefore provides an excellent platform for long-lived audio deployments and products.

The OpenDAW platform provides a reference distribution of GNU/Linux specifically designed

for pro audio users, with a two year release cycle and five years of deployment support as standard.

Because full source code is available, commercial interests cannot force 'end of life' obsolescence on the platform. This makes long-term deployment more cost-effective, enables hardware re-use, and reduces the generation of e-waste.

OpenDAW is not a semi-closed type of open platform, like Android. Our aim at 64 Studio is for all packages in the reference distribution to be Free Software. We may still have to include non-free firmware if pro audio cards require it, since there are no known 'Free Hardware' pro audio cards (yet).

This initiative is not meant to colonise or eliminate other audio distribution projects; diversity leads to innovation. Rather, it is meant to provide a standard which can drive GNU/Linux adoption forward in the wider pro audio community.

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