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Happy Birthday Knoppix 6.4

Ten Years On

Ten is a fair age for a Linux distribution that doesn't have massive staff resources to back it up. Klaus Knopper looks back with a sense of satisfaction after just having compiled version 6.4. As a tribute to the community, this version includes only free software. *By Jan Kleinert*

When the Knoppix 6.0 CD hit the repositories in 2009, users had many reactions: "Back to the command line?" "I always said Unix was an operating system for geeks." "Help, my computer's talking to me!" What had happened? Klaus Knopper had simply set the talking Adriane menu for visually impaired users [1] as the default boot menu, which confused the majority of sighted users.

But this wasn't a mistake on the part of the then 40-year-old Austrian. The Release Notes correctly documented that if you pressed Enter in the boot menu, it launched the original graphical desktop as the boot option. Knopper was being deliberately provocative: He wanted people with normal vision to experience what it felt like using a computer without a GUI and possibly without a display, stirring up some interest in the topic of accessibility at the same time.

This anecdote shows that Knoppix [2] [3] isn't a commercial distribution that bows to the whims of the mainstream. Knopper occasionally travels down experimental paths that the managers of commercial distributions wouldn't dream of taking. This endearing trait is not the only one: Klaus Knopper doesn't see Knoppix as a separate distribution, but as a Debian release optimized for Live media (see the "Interview" box).

Slot-In as a Mass Phenomenon

Klaus Knopper's modesty might be technically justified, but it does play down the importance of Knoppix. Because Knopper's project started to produce stable results, whole generations of sys admins, Linux consultants, and PC engineers have slotted Knoppix CDs and DVDs into their own and their customers' computers. Knoppix celebrates its tenth anniversary at the end of this year – an amazing success considering the vast numbers of Linux distributions available in the wild [4].

Knoppix 6.4

To celebrate this anniversary, Knopper published version 6.4 on his website. As a tribute to free software and the community that backs it, the inventor of Knoppix has not included any proprietary software for various chipsets with this distribution.

You will not find a Flash Player, Adobe Reader, or NVidia drivers, and Knopper replaces Oracle's Java with OpenJDK, including the Java plugin for Firefox.

A list of new features among the 3,000 software packages is extensive, with the Debian community continually providing updates and testing new features that Knopper adds to each version. Knoppix 6.4 is thus at the same level as the future Debian Squeeze, as a couple of examples illustrate:

- Kernel 2.6.36 in 32-bit compatibility mode will run with most Intel and AMD CPUs.
- The free Nouveau module for X.org, which supports accelerated 2D, 3D, and Compiz on various NVidia cards.
- Modules for the Intel i915, Radeon and Nouveau now all use Kernel Mode Setting (see the "Knoppix with NVidia Cards" box).
- Cloop 2.636 real-time block decompression transparently unpacks the 4GB data archive on the DVD and some 9GB of software at run time.
- Thanks to Knopper's custom, optimized, Udev scripts, Knoppix identifies partitions and filesystems faster than previously at boot time.

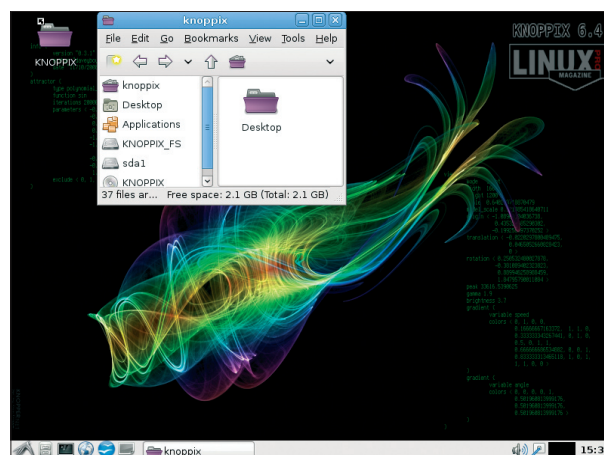**Figure 1:** Klaus Knopper was inspired to feature the fractal wallpaper image in Knoppix 6.4 after meeting with Austrian math teachers.

■ INFO

[1] Adriane: *http://knopper.net/knoppix-adriane/index-en.html*

[2] Knoppix: *http://knopper.net/knoppix/index-en.html*

[3] "Knoppix 6.3" by Klaus Knopper, *Linux Magazine*, April 2010, pg. 32

[4] Distrowatch: *http://distrowatch.com*

[5] Busch, Heather, and Burton Silver, *Why Cats Paint: A Theory of Feline Aesthetics.* Ten Speed Press, 1994

[7] Chaoscope: *http://www.chaoscope.org*

[8] Knoppix support: *http://knopper.net/kontakt/index-en.php*

On very rare occasions, the following, more radical, approach might be needed: `knoppix acpi=off noapic nolapic`. For an extensive list of boot options, try the `KNOPPIX/knoppix-cheatcodes.txt` file on the DVD and the help texts, which you can display by pressing F2 and F3 at boot time.

Klaus also has added a couple of math packages for teachers, for example (X) Maxima with links to TeXmacs, GeoGebra, and Scilab. Inspired by math, Knopper also chose the fractal "fish" as the wallpaper for version 6.4 (Figure 1).

The Chaoscope [7] program used to calculate the wallpaper may be a Windows program, but it is free, will be released on the GPL at some point, and will run perfectly with Wine on Linux, according to Knopper.

Knoppix on Flash Media

Knoppix boots more quickly from a USB stick than from a DVD. Just as with 6.3, a USB image is easily created. The *Install KNOPPIX to flash disk* in the *Preferences* section helps (Figure 2). The stick with a primary FAT partition should be 8GB or

have at least 5GB of free space to allow for your own files and settings in the overlay filesystem.

Like its predecessors, Knoppix 6.4 can be installed on disk. Surprisingly, the Knoppix installer is one of the fastest methods of installing Debian on a hard disk because of its reduced feature set.

Beware of kernel updates, because the Knoppix kernel integrates hard disk and media support modules. The original Debian kernel still uses an initial ramdisk. Then again, the kernel doesn't normally update automatically. ∎∎∎

KNOPPIX WITH NVIDIA CARDS

Knopper had to sacrifice the framebuffer console for graphics modules with Kernel Mode Setting. This means that, with the Nouveau driver in particular, NVidia card users can't access the text console from X11. When you press Ctrl+Alt+F1 to toggle, the GUI screen just stays put, but not the computer, although it might look that way. Ctrl+Alt+F5 takes you back to X. Because Framebuffer is missing, you also shut down your computer in the dark. But to

compensate for this, the Compiz 3D desktop now works with the Nouveau driver.

If users with more exotic NVidia cards see a black or broken display after booting, they can enter the following options one after another at the boot prompt:

```
knoppix xmodule=nouveau

knoppix xmodule=nv

knoppix xmodule=vesa

fb1280x1024
```
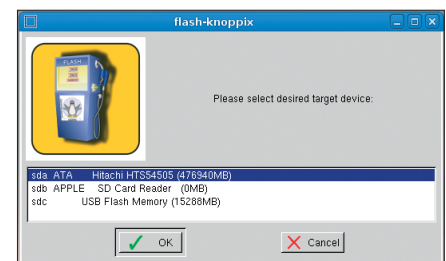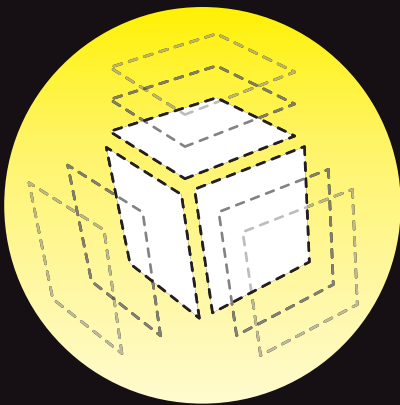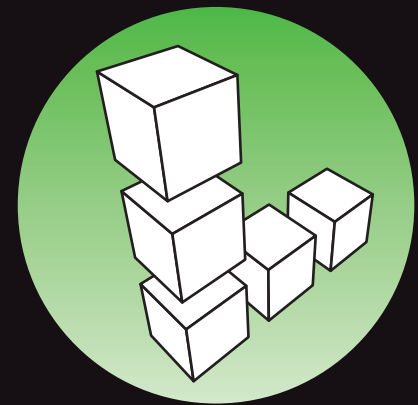

Figure 2: **Knoppix boots most quickly from a USB stick. An additional tool guides users through the process of creating one.**

Interview with Klaus Knopper

Knoppix inventor Klaus Knopper was born in 1968 and earned an electrical engineering degree from Kaiserslautern University of Technology. We talked to Klaus about the major differences between developing a distribution 10 years ago and now, his relationship with Debian, and his cats' artistic ambitions.

Linux Magazine: *Klaus, what made you decided to cook your own distribution back then?*

Klaus Knopper: Originally, Knoppix was just a big experiment intended as a learning tool for myself – I just wanted to get to know the workings of GNU/Linux and try out the latest Linux software. When it actually booted from a CD after a few attempts, it was only logical to put my favorite software on a Live system – and not just a promotional Live CD for some commercial distribution.

Knoppix is designed for productive use with a representative selection of software, without having to go to the trouble of installing.

If I had suspected how quickly it would spread at the time, I would have chosen a better name than "Knopper's Unix System," especially considering that people tell me that "Knoppix" sounds more like a candy bar than a famous distribution.

LM: *What do the last couple of weeks in the run up to a release look like from your perspective?*

KK: Most of the effort today doesn't go into adding new features, but into debugging the basic distribution. To keep it up to date and stable, Knoppix uses a mix of Debian Stable, Testing, and Unstable, and occasionally packages from Experimental.

The newer Debian packages still have bugs despite multiple stages of quality management. I integrate workarounds into the boot system to fix them. Bugs caused by new and relatively complicated frameworks are often hard to find.

When I say this, I'm thinking of HAL, PolicyKit, and the like that Debian regularly ditches and replaces with their successors – which doesn't make them any less complex and can involve some teething pains.

Recently, we haven't seen so many spectacular leaps as when the 3D desktops were introduced. This is good on the one hand because you can plan for it. On the other hand, the space requirements and the learning curve are pretty daunting for major extensions. Now I'm quite happy to publish a release with fewer new features but also with fewer bugs.

LM: *Did you start off on your own? How many people now work on Knoppix apart from you?*

KK: In the first few years, I still had a relatively large amount of time for experimenting and developing new features. Because of the unbelievable number of new concepts and systems, this is no longer something a solitary person can do in their leisure time. I am very happy that a couple of developer friends are there to help me test and bugfix. First and foremost is Martin Öhler, who put together the first Games Knoppix with commercial 3D games and still works on many Knoppix-related projects today.

My wife, Adriane, helps me make Knoppix more accessible to computer users with special vision needs. She extensively tests new features and is very tenacious about proposing improvements. Apart from this, we have no regular staff, possibly because we don't have an official development platform apart from the typical Debian support structures.

Adding the Occasional Gimmick

LM: *Cooking up a release is one thing, but maintaining an active distribution is another. Does this give distributions like Fedora, Debian, or openSUSE, with their larger communities, an unbeatable advantage?*

KK: My main work is to optimize and extend my own boot process – which is optimized for Live operations – and occasionally add a couple of gimmicks that bundle standard services, such as the Knoppix terminal server, which is made up of a DHCP server, TFTP, NFS, and Squid. With the use of PXE boot on Linux, users can run a whole classroom from a single DVD. The interactive part of the terminal server, like most Knoppix-specific parts, is a shell script that handles configuration tasks and launches the required services.

Happy with Debian

LM: *Would moving to another basic distribution be an option for you?*

KK: I've already had several recommendations concerning this, but I'm actually quite happy with Debian. A community-only distribution can't be bought out, and nobody can levy patent claims against it. Knoppix's structure would allow me to build it on the basis of some other distribution because the script system is pretty much independent of distribution. The very first test version of Knoppix was based on Red Hat before I moved to Debian in 2001.

LM: *One of your special concerns seems to be improving the accessibility of Linux for users with visual impairments.*

KK: Computers can be a very practical and easy-to-use tool for people with special vision needs, assuming they come with the right kind of software and user interface – and this doesn't necessarily mean a GUI. I was aware of this before I met Adriane, but it was hard to convince her that the computer and the Internet are a practical thing to have if you just take time to get used to them.

Today, nobody would understand why Adriane was so skeptical because she now works faster on a computer than many sighted users. We added many free accessibility components – the SBL screen reader, the eSpeak voice synthesizer, or the JavaScript-capable ELinks text browser – to a menu system, which gives excellent accessibility to newcomers to computing, particularly those with special vision needs.

The vision accessibility tools also include the Orca graphical screen reader in combination with Compiz Fusion for real-time magnification of the screen content. We use OCRopus and Tesseract to read printed email and Gnokii/Gammu to access text messages via cell phone.

LM: *And you teach at a university?*

KK: I have half a teaching job at the Technical University of Zweibrücken, where I teach operating system-independent software technology and software engineering. My "main job" is to advise companies on IT and custom development of open source software as a freelancer. Knoppix is extremely useful for this – many commercial projects are based on a free version or closely related to it. You really can live on open source.

LM: *According to our research, you managed to get your cats interested in making music. Could you add a cat music sequencer to Knoppix 6.5, which you will be completing in spring 2011?*

KK: I have a couple of ideas for 2011, but I don't want to talk about them right now. They have to do with Linux tablet PCs but not with cats. But the fact that cats really can make music and paint pictures [5] makes them interesting as contributors for future Knoppix artwork. I will meditate about this with my purring companions some night.