

# Projects on the Move



Lisa Young, 123RF

Accessibility for computer users with disabilities is one of the noblest goals for Linux and open source software. **Vinux, Orca, and Gnome lead the way in Linux accessibility.** *By Carla Schroder*

**A**ccessibility of any kind for people with disabilities has a long history of neglect and opposition. The US Rehabilitation Act of 1973 prohibited federal agencies from discriminating on the basis of disability (Sections 501, 503, 504, 508) [1]. Passing a law is one thing; enforcing it is another, and it took years of activism to make any progress. In the 1980s, the Reagan Administration targeted Section 504 (addressing civil rights for people with disabilities) for deregulation because it was too “burdensome.” Once again advocates organized, and after two years of intensive effort, they succeeded in preserving Section 504. However, years more of Supreme Court fights, legislative battles, and public education efforts had to be won. The culmination of that work was the Americans with Disabilities Act (ADA) of 1990, which addresses some of the basic aspects of everyday life: employment, public accommodations, telecommunications, and government agencies.

This law still leaves an awful lot of gaps. Designing for accessibility is more than just bolting on a few aids as an afterthought – it’s a matter of architecture, of designing for everyone from the ground up.

Accessibility covers a lot of ground, including:

- Impaired vision to complete blindness
- Impaired hearing to complete deafness
- Color blindness
- Difficulty or inability to type or use a mouse
- Cognitive, learning, or reading problems
- Low stamina, difficulty sitting up

Talking computers have existed in science fiction for decades, but the world isn’t much closer to having them than it was 10 years ago. The Linux/FOSS world has all the raw materials for making computing open and useful to all people, for overcoming individual impairments, and for elevating everyone. Witness the Adriane version of Knoppix [2] for vision-impaired users, which appeared on a Knoppix DVD in a recent issue [3].

Windows and Mac OS X are far head of Linux in supporting accessibility, and they’ve barely scratched the surface. I encourage anyone looking to contribute to Free Software to consider accessible computing. There are grand opportunities to make significant, meaningful, and lasting differences in the realm of accessibility with Linux and FOSS.

## Vinux

Vinux [4] is an Ubuntu remaster for the visually impaired created by Dr. Tony Sales, teacher of Psychology and Sociology at the Royal National College for the Blind in Herford, UK. Created in 2008, Vinux is now at stable version 3.01 (Ubuntu 10.04 LTS) and beta version 3.10 (Ubuntu 10.10). Most Linux distributions have accessibility features and applications, but users have to jump through a fair number of hoops to enable and configure them. Vinux provides a screen reader, full-screen magnification, and support for Braille displays out of the box (Figure 1).

## CARLA SCHRODER

Carla Schroder is a gadgets enthusiast and Linux expert who has written *The Book of Audacity*, *Linux Networking Cookbook*, *Linux Cookbook*, and hundreds of Linux how-to articles.

Vinux runs on a Live CD or USB flash drive, from a hard drive installation, or in a virtual machine on Windows. The Vinux name is a contraction of VI (visually impaired) and Linux. The Vinux developers chose Ubuntu as their base for its polish, ease of installation, and good hardware support.

The challenges with accessible computing are not just writing and supporting good software but also chasing upstream projects. Ubuntu, Gnome, and Firefox are three key players, and all are fast-moving, ever-changing targets. The Vinux team members are justifiably proud of the 3.01 release, but like all good FOSS developers, they are looking ahead, and the forecast consists of “hard choices and hard work ahead” because both Unity and the Gnome Shell are scheduled to be released with Natty Narwhal (11.04), with no support for accessibility.

Additional complications exist because both of these tools rely on 3D graphics hardware acceleration. Call me grumpy, but I was grouching about this very thing long ago. I don’t think making important functionality dependent on 3D hardware acceleration is a good idea. But it’s coming regardless of what I think.

So the Vinux team had discussions on whether they should move away from Ubuntu and build on Debian, Linux Mint, or something else. For now, they are staying with Ubuntu. Dr. Sales tells me they are “working closely with Luke Yelavich of Canonical to set up an automated build server which will allow us to use Ubuntu as a base but utilize any of the desktops available in the repository – so we are in no way tied to Unity, and in fact the accessibility profile in 11.04 will revert to Gnome 2.” He estimates it will be a year before Unity and the Gnome Shell work out accessibility issues enough to support visually impaired users.

I asked Dr. Sales if Vinux needed more contributors. He said, “We are always on the lookout for new people to contribute to the project, and there are many ways people can help, no matter what their technical ability – for example, testing and feedback, user support, documentation, publicity, and of course coding individual packages and the distro itself.”

He went on to say that the goal of the Vinux project is “to get VI developers together from all over the world to combine their efforts into one single project

instead of duplicating work and reinventing the wheel.

“We aim to produce a very user-friendly distro that is completely accessible out of the box – in other words, once you boot the Live CD, it talks to you, offers you a user guide and keybinding lists, talks you through the installation, and so on. Our primary target audience are disgruntled Windows/JAWS users who are fed up of paying through the nose for proprietary solutions (see the ‘JAWS’ box). Ubuntu is a brilliant and easy-to-use system for sighted users; we are just going one step further and making it an easy-to-use system for VI users. In an ideal world, all distros would be accessible, but in reality, accessibility is often an afterthought, and we are constantly playing catch-up with upstream changes. I believe there is a very real need for a Linux distro aimed specifically at disabled users, rather than expecting a disabled user to jump through hoops just to get a working system. This is especially important in third-world countries, where Windows and JAWS are simply not an option,” Sales said.

Some of the key accessibility applications in Vinux are the Orca screen reader/magnifier, the eSpeak Speech Synthesizer, Emacspeak, Speakup screen reader for the console, and the Compiz screen magnifier and zoom tools (Figure 2). Orca supports all Braille displays via the brltty daemon. USB Braille displays should work automatically, and serial displays should only need a bit of configuration. The Vinux team also include a batch of helpers like EasyInstall-Codex and EasyInstall-Multimedia. Vinux installs the UK keyboard layout by default. If you need to change this, go into *System | Control Centre | Keyboard*.

## Orca

The Orca screen reader is a feature-full Linux application for vision-impaired users, although it’s a long way from being a serious JAWS competitor. Orca began life in 2004 as a Sun Microsystems project, and over time, it acquired fund-



**Figure 1:** The default Vinux theme is beautiful and comes with full-screen magnification and support for Braille. The Orca screen reader starts by default.

## JAWS

Jobs Access With Speech (JAWS) [5] is a software screen reader for Windows that outputs screen text either in a synthesized voice or in Braille. It costs US\$ 895-1,095. It works with the Focus 40 and 80 dynamic Braille displays, which cost US\$ 3,895 and 7,795, respectively. Braille displays replace the computer’s monitor and are somewhat like little keyboards, except they do both input and output. The Focus displays have 40 or 80 Braille cells, and each cell is a refreshable Braille character, so people who read Braille can read them like a paper Braille document. The displays also support navigation functions like page up and down, scrolling, paging, and Windows keyboard shortcuts.

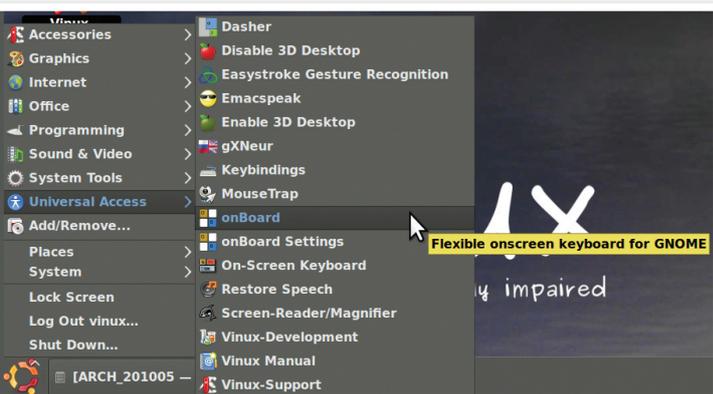


Figure 2: Vinux comes with a good-sized batch of assistive aids.

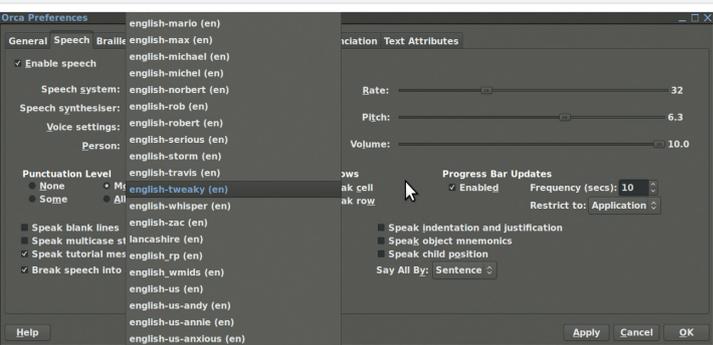


Figure 3: The Orca screen reader is easy to configure and supports multiple voice synthesizers and voices in different languages.

ing and support from various sources. Then, much of the funding went away, and when Oracle bought Sun, they laid off the Orca project leads. Orca now is entirely supported by the Gnome project.

An easy way to test Orca is to run a Live edition of Vinux. The boot screen of the Live media is not yet accessible, but the system boots with Orca enabled and talking to you (which helps illustrate the challenges of creating a complete out-of-the-box accessible distro). Orca supports multiple speech synthesizers and has configurable pitch and speed, with different voices to choose from, such as English-US-

standard encodes Braille characters as eight-dot glyphs. Not all Braille embossers and displays support this new form yet. To enable Grade 2 Braille, go to the *Braille* tab of Orca's *Preferences* menu and check *Enable Contracted Braille*. Just to keep life interesting, a Braille 3 is being developed that is even more compact than Grade 2 – like shorthand.

## Gnome

Gnome [6] has taken the lead in Linux accessibility with features like complete keyboard control of the desktop, software mouse clicking, onscreen keyboard, display magnification, and font and color themes to help people with different kinds of vision impairments. But, real accessibility consists of much more – remember the “it’s a matter of architecture” concept I mentioned previously? Applications must be designed to support assistive technologies. So, the Gnome team created an open accessibility architecture, the AT-SPI [7] (Assistive Technology Service Provider Interface). KDE will support AT-SPI [8], and it could become part of the freedesktop.org project specification [9].

## Talking to Your Computer

A *Star Trek*-style computer seems like the ultimate in accessibility – except for people who can’t talk, of course. I tested Dragon Naturally Speaking and IBM’s Via Voice back in 1999. They worked only on Windows, and they worked pretty well. The limiting factor was hardware; both were CPU-intensive, so there was a lot of lag.

Super-powered PC hardware has been around for years now, though, so great speech recognition shouldn’t be a problem, right? Sort of. Mobile devices like GPS units for vehicles and mobile phones have tiny vocabularies, and a decent number of speech recognition and dictation applications are available for Mac OS X and Windows.

Linux? Not so much. Speech recognition software has to know when you’re giving a command and when you’re dictating, and really cool speech recognition software recognizes different voices. I’ll talk about this more in the future; please see the Info section for links to open source speech-recognition projects [10]-[14]. ■■■

Annie and English-Tweaky (Figure 3). However, in Vinux, there isn’t much variation and most of the voices have the same robotic monotone. You can also choose voices in different languages. You won’t have to spend much time with Orca to get an idea of what vision-impaired computer users are up against. For example, try web surfing with it. Then, try experimenting with different configuration options. Navigation and choosing what text to read suddenly become complex tasks that have to be re-learned.

Orca supports both Braille 1 and 2. If you’re not familiar with Braille, named for its inventor, Louis Braille, it is (possibly) the first known binary-encoded language system. A Braille cell is a rectangle containing two columns of three dots, allowing 64 possible combinations of raised/not raised dots in each cell.

Braille was originally created to encode French, and now many languages are represented, along with music notation and mathematics.

Grade 1 Braille is a literal, character-by-character translation. Grade 2 Braille is more complex – full of contractions and shortcuts to make it faster to write and read. Adding to the fun, the Unicode stan-

## INFO

- [1] ADA homepage: <http://www.ada.gov/>
- [2] Adriane: <http://www.knopper.net/knoppix-adriane/index-en.html>
- [3] Knoppix 6.4 DVD, *Linux Magazine*, January 2011
- [4] Vinux: <http://vinuxproject.org/>
- [5] Freedom Scientific: <http://freedomscientific.com/>
- [6] Gnome accessibility: <http://projects.gnome.org/accessibility/>
- [7] AT-SPI C Bindings Reference Manual: <http://developer.gnome.org/at-spi-cspi/unstable/>
- [8] KDE Accessibility Project: <http://accessibility.kde.org/>
- [9] freedesktop.org: <http://www.freedesktop.org/wiki/Specifications>
- [10] Simon <http://sourceforge.net/projects/speech2text/>
- [11] RWTH ASR: <http://www-i6.informatik.rwth-aachen.de/rwth-asr/>
- [12] CMU Sphinx: <http://sourceforge.net/projects/cmuspinx/>
- [13] Julius: [http://julius.sourceforge.jp/en\\_index.php?q=en/index.html](http://julius.sourceforge.jp/en_index.php?q=en/index.html)
- [14] iATROS <http://prhlti.iti.upv.es/page/software>