



# Full Circle

THE INDEPENDENT MAGAZINE FOR THE UBUNTU LINUX COMMUNITY

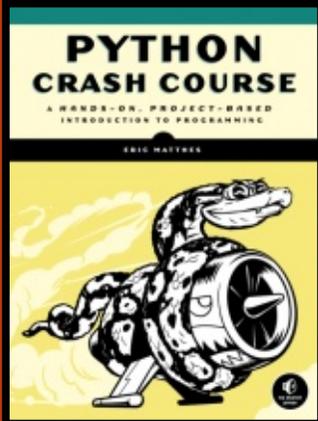
ISSUE #109 - May 2016



M10 REVIEW



BOOK REVIEW



## SMALL LTSP INSTALLATION THE LINUX TERMINAL SERVER PROJECT

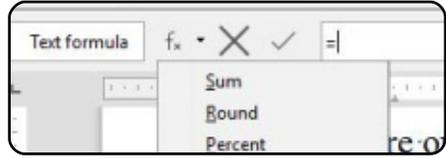
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## HowTo



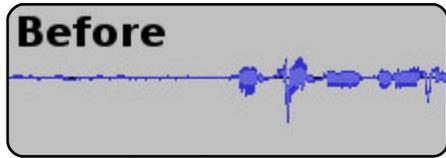
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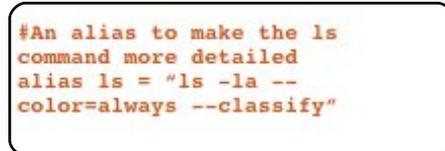


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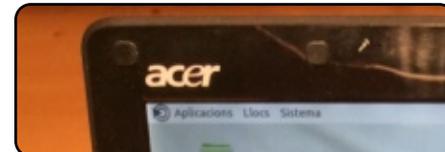
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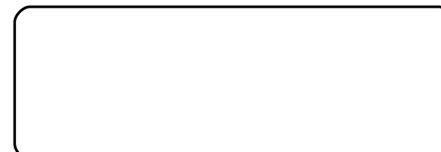
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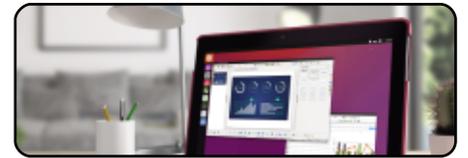
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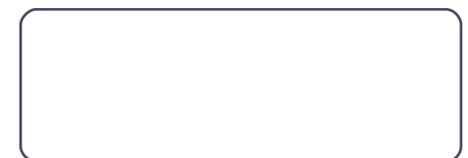
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## WELCOME TO ANOTHER ISSUE OF FULL CIRCLE.

It's another full house. We have Python, LibreOffice, VAX-VMS, Inkscape, Arduino (of sorts), and an extra HowTo, from me, on the absolute basics of using Audacity. I'm no audio expert, so it's pretty down and dirty, but that knowledge is what helps me make the **Full Circle Weekly News**.

Since I am now the proud owner of a **BQ Aquaris M10** Ubuntu tablet (FHD), I thought I'd better review it for you folks. I won't spoil it, but suffice it to say: it's not perfect, but I hope future OTA's will make it better than it already is. Oh, and, speaking of reviews, Greg is reviewing the book **Python Crash Course** from No Starch Press.

Restoring life to old machines seems to be theme for this month's Linux Labs. Alan and Charles both discuss using Ubuntu on old machines, but for different reasons.

I had hoped to discuss OTA-11 in this month's issue, but it's been delayed by at least a week, so it'll be June before it arrives.

Elmer bids us farewell with part 60 being his last LibreOffice article. It's been a pleasure to work with him over the years, and I wish him all the best. He knows the door is always open to return with more LibreOffice, or something else.

As ever, don't be shy about sending in articles. We need them to keep going. Show, discuss, review. Just write it up. Include (embedded in the article) screens/photos (JPG format) and email it to me at the address below.

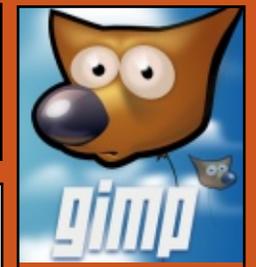
**All the best, and keep in touch!**

*Ronnie*

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## THE FULL CIRCLE WEEKLY NEWS



A short podcast (<10min) with just the news. No chit-chat. No time wasting. Just the latest FOSS/Linux/Ubuntu news.

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## NVIDIA 364.19 SHORT-LIVED LINUX DRIVER ADDS VULKAN 1.0 SUPPORT, WAYLAND FIXES

The Short-Lived branch of the Nvidia video driver usually gets the latest improvements and fixes, but it is not recommended to stable users because it changes too often and new releases are not thoroughly tested. Nvidia 364.19 is now the latest short-lived graphics driver, and it looks like it brings many interesting changes.

First, it adds support for the Nvidia Quadro M6000 24GB and Quadro M5500 graphics cards. Then, we can see a new kernel module, namely nvidia-drm.ko, which has been engineered to register itself as a DRM driver with both DRM KMS and PRIME support, as well as initial Direct Rendering Manager Kernel Modesetting (DRM KMS) support.

The Nvidia 364.19 short-lived graphics driver also adds a new RandR property called CscMatrix,

which can be used to specify a 3x4 color-space conversion matrix. As usual, numerous issues have been resolved, which you can see if you click the changelog attached at the end of the article.

### Source:

<http://news.softpedia.com/news/nvidia-364-19-short-lived-unix-driver-adds-vulkan-api-1-0-support-wayland-fixes-503325.shtml>

## HERE IS HOW YOU CAN FIX LINUX SCHEDULE BUG

Earlier this month, according to a lecture and paper delivered at the EuroSys '16 conference in London, the Linux kernel scheduler has deficits that stop a multicore system from making proper use of all cores for heavily multithreaded loads.

However, now a patch is available in a script provided by a third party for those who are running applications that might be affected and do not wish to wait

for a solution from the kernel team.

Titled "The Linux Scheduler: a Decade of Wasted Cores," the paper was authored by a sextet of researchers from the University of British Columbia and four other institutions. According to the paper, there are four bugs in the kernel scheduler that makes some CPU cores stay idle even when runnable threads are waiting to be dispatched to a core.

Desktop users are not affected by the bug. According to a discussion thread on Hacker News, the issue includes complications that arise when using the Linux scheduler on multiprocessor systems. In certain circumstances, the algorithm used by the scheduler to balance the load across cores flops. For example, a thread that was asleep in the past is woken up on an overloaded core, when other cores are not in use.

The paper mentions one test with apps written in the R language that suggests how the issue might

arise when doing math and statistical work in multicore Linux environments.

The researchers say that such bugs don't always proclaim their presence with a crash or a hang, but rather via poor performance, so they are not always noticeable.

Source:

<http://www.techworm.net/2016/04/can-fix-linux-schedule-bug.html>

## UBUNTU KYLIN 16.04 LTS ARRIVES FOR THE CHINESE LINUX COMMUNITY WITH BOTTOM UNITY

Ubuntu Kylin 16.04 LTS was officially launched as part of the massive Ubuntu 16.04 LTS (Xenial Xerus) release, and it introduces many enhancements, updated components, new tweaks and under-the-hood optimizations, as well as a brand-new Unity7 design with the Launcher placed at the bottom of the screen by default.

Powered by the same long-term supported kernel as Ubuntu 16.04

LTS, Linux 4.4, Ubuntu Kylin 16.04 is also an LTS release supported for five years with critical security fixes and software updates. The Ubuntu Kylin development team proved to be very ingenious this cycle, and we need to thank them for the ability to have the Unity Launcher at the bottom of the screen.

Release highlights of Ubuntu Kylin 16.04 LTS (Xenial Xerus) include a more concise and user-friendly lock screen and display manager, Ubuntu Kylin Software Center as the default graphical package manager, a revamped version of the China Weather Indicator, updated Sogou Chinese Pinyin input method, and the latest Kingsoft WPS office suite.

Source:

<http://news.softpedia.com/news/ubuntu-kylin-16-04-lts-arrives-for-the-chinese-linux-community-with-bottom-unity-503338.shtml>

## XUBUNTU 16.04 LTS AND LUBUNTU 16.04 LTS RELEASED, GET THREE YEARS OF SUPPORT

Xubuntu and Lubuntu are the last two official Ubuntu flavors released as part of the massive Ubuntu 16.04 LTS (Xenial Xerus) launch, and we're going to tell you a little about their presence.

First, we're going to tell all about the Xubuntu 16.04 LTS operating system, which had the smallest presence of all the Ubuntu flavors, and according to the announcement, release highlights include new community wallpapers, and the replacement of the Ubuntu Software Centre app with the GNOME Software graphical package manager.

While still based on the LXDE desktop, Lubuntu 16.04 LTS' presence was also quite small but a bit better, with features like massive artwork improvements for both the desktop theme and the icons, various updates to most of the LXDE components, the removal of the lubuntu-extra-sessions component from the default install, and several bug fixes.

Source:

<http://news.softpedia.com/news/xubuntu-16-04-lts-and-lubuntu-16-04-lts-released-get-three-years-of-support-503348.shtml>

## UBUNTU MATE 16.04 LTS OFFICIALLY RELEASED FOR RASPBERRY PI 3 AND RASPBERRY PI 2

The Ubuntu MATE 16.04 for Raspberry Pi port, which comes hot on the heels of Lubuntu 16.04 LTS for Raspberry 2, has been in development for the last few months. Thus, since the Beta 2 build introduced at the beginning of April, the team of developers behind this project have implemented several new tweaks and much-needed improvements.

Among these, we can notice the addition of OpenMAX IL hardware accelerated video playback to the VLC Media Player software, requiring users to enable hardware accelerated video playback via the "OpenMax IL" option implemented under Tools -> Preferences -> Video. Moreover, there is full support for Wi-Fi and Bluetooth

technologies for the Raspberry Pi 3 Model B SBC.

Source:

<http://news.softpedia.com/news/ubuntu-mate-16-04-lts-officially-released-for-raspberry-pi-3-and-raspberry-pi-2-503395.shtml>

## UBUNTU 16.04 BRINGS MORE PRIVACY AND BIG CHANGES TO THE DESKTOP

The release of Ubuntu 16.04 last week is good news for computer users who are upset over the recent development of Microsoft turning Windows into an operating system that is essentially spyware. As an open-source Linux distribution, Ubuntu is a great operating system for users concerned about privacy.

This marks the 24th release of the Ubuntu operating system, which has become perhaps the most popular Linux distribution in the world. Ubuntu 16.04 — codenamed Xenial Xerus — is also the sixth Long Term Support (LTS) release, meaning it will receive free security updates and support for five years. Canonical, the UK

software company which sponsors Ubuntu, has continued to show its commitment to providing a solid, smooth, reliable, open-source operating system for the desktop even while working toward convergence of the desktop, phone and tablet into one seamless operating system.

For Windows users looking for a privacy-minded operating system, this means that 16.04 stands on a solid foundation and should prove to be a good daily-driver.

Source:

<http://www.thenewamerican.com/tech/computers/item/23037-ubuntu16-04-brings-more-privacy-and-big-changes-to-the-desktop>

## UBUNTU LINUX AND OPENSTACK CLOUD COME TO IBM SERVERS

Last year, IBM introduced LinuxONE, a new pair of IBM mainframes along with Linux and open-source software and services. These new systems are the LinuxONE Emperor, which built on the IBM z13 mainframe and its little brother, Rockhopper.

LinuxONE is the heart of IBM's hybrid cloud efforts. At the OpenStack Summit, Angel Diaz, VP of IBM Cloud Architecture & Technology, said LinuxONE with Ubuntu and OpenStack can deliver the "speed and flexibility that businesses need to make the Benjamins money."

Mark Shuttleworth, founder of Canonical and Ubuntu, added that "Ubuntu is all about enabling users, such as Netflix, to create work easily without friction. On LinuxONE, you can just use Ubuntu without needing to know anything about the mainframe architecture."

Source:

<http://www.zdnet.com/article/ubuntu-linux-and-openstack-cloud-come-to-ibm-servers/>

## ARTIFICIAL INTELLIGENCE NOW FITS INSIDE A USB STICK

Movidius chips have been showing up in quite a few products recently. It's the company that helps DJI's latest drone avoid obstacles, and FLIR's new thermal

camera automatically spot people trapped in a fire, all through deep learning via neural networks. It also signed a deal with Google to integrate its chips into as-yet-unannounced products. Now, the chip designer has a product it says will bring the capacity for powerful deep learning to everyone: a USB accessory called the Fathom Neural Compute Stick.

The Fathom contains the Myriad 2 MA2450 VPU paired with 512MB of LPDDR3 RAM. The Myriad 2 is the chip found in the previously mentioned DJI and FLIR products. It's able to handle many processes simultaneously, which is exactly what neural networks call for. Because it's specifically designed for this -- its architecture is very different from the GPUs and CPUs that typically handle processing -- it offers a lot of grunt without requiring much power. It can handle up to 150 gigaFLOPS (150 billion floating-operations per second) while consuming no more than 1.2 watts.

Unlike Tegra's solutions for deep learning, the Fathom isn't a standalone system. The idea is you plug it into the USB 3.0 port of any system running Linux to get a "20-

30x performance improvement in neural compute." You can use the Fathom to rapidly prototype neural networks, moving to something with a lot more power once you're ready to deploy.

Source:  
<http://www.engadget.com/2016/04/28/movidius-fathom-neural-compute-stick/>

## LINUX KERNEL 3.12.59 LTS OUT NOW WITH CRYPTO & NETWORKING FIXES, UPDATED DRIVERS

Linux kernel developer Jiri Slaby announced the availability of the fifty-ninth maintenance release of the long-term supported Linux 3.12 kernel series, urging all users to update as soon as possible.

Looking at the appended shortlog, we can notice that Linux kernel 3.12.59 LTS is here to patch various security issues that have been discovered since the previous point release, version 3.12.58, which was announced two weeks ago, along with an important piece

of information, that the Linux 3.12 series will be supported until 2017 because it is used in SUSE Linux Enterprise 12.

Source:  
<http://news.softpedia.com/news/linux-kernel-3-12-59-lts-out-now-with-crypto-networking-fixes-updated-drivers-503495.shtml>

## MOZILLA FIREFOX 46.0 LANDS IN ALL SUPPORTED UBUNTU OSES WITH GTK3 INTEGRATION

Mozilla Firefox 46.0 is a pretty small release of the popular web browser, which is used by default in numerous GNU/Linux operating systems, including Ubuntu. It's worth mentioning that it only brings improved security to the JavaScript JIT (Just In Time) compiler, more WebRTC performance and stability enhancements, and various security fixes.

Of course, there were also a few other minor changes, such as better rendering for scaled SVGs (Scalable Vector Graphics) that use

a mask and a clip, improvements to the screen reader behavior with blank spaces for Google Docs, support for the document.elementsFromPoint HTML5 element, and HKDF support for the Web CryptoAPI.

Mozilla Firefox 46.0 web browser has finally been introduced for all supported Ubuntu Linux operating systems, including Ubuntu 16.04 LTS (Xenial Xerus), Ubuntu 15.10 (Wily Werewolf), Ubuntu 14.04 LTS (Trusty Tahr), and Ubuntu 12.04 LTS (Precise Pangolin), so please update as soon as possible.

Source:  
<http://news.softpedia.com/news/mozilla-firefox-46-0-lands-in-all-supported-ubuntu-os-es-with-gtk3-support-503489.shtml>

## ORACLE RELEASES VIRTUALBOX 5.0.20 WITH FIXES FOR LINUX KERNEL 4.5, SMALL CHANGES

Oracle has announced the release of VirtualBox 5.0.20, yet another maintenance version

of its acclaimed open-source and cross-platform virtualization software.

According to the release notes, Oracle VirtualBox 5.0.20 is a pretty small release that comes only one and a half weeks after the previous maintenance build, VirtualBox 5.0.18, which introduced initial support for the upcoming Linux 4.6 kernel.

Changes in today's VirtualBox 5.0.20 release include more fixes for the Linux kernel 4.5 series, especially when the CONFIG\_NET\_CLS\_ACT variable is enabled, support for listing processor features on VBoxManage's list hostinfo, TCP support in the DNS proxy feature, as well as better handling of port-forwarding rules.

Source:  
<http://news.softpedia.com/news/oracle-releases-virtualbox-5-0-20-with-fixes-for-linux-kernel-4-5-small-changes-503525.shtml>

## ELEMENTARY OS 0.4 "LOKI" TO BE BASED ON UBUNTU 16.04, PROMISES BIG NEW FEATURES

Now that Canonical has launched its most anticipated Ubuntu release, the Xenial Xerus, a.k.a. Ubuntu 16.04 LTS, it looks like the elementary OS community has flooded the forums with questions about the release date of the elementary OS 0.4 "Loki" operating system, which has now been finally confirmed as being based on Ubuntu 16.04.

Elementary OS 0.4 "Loki" is coming, and it promises big new features, which have not yet been revealed by the team of hard-working people behind what was previously known as the "most beautiful Linux distro." However, we do know there'll be better HiDPI support and, of course, the integration of the Birdie Twitter client.

Source:

<http://news.softpedia.com/news/elementary-os-0-4-loki-to-be-based-on-ubuntu-16-04-promises-big-new-features-503536.shtml>

## WHAT'S ON TAP FOR LINUX CONTAINER TECHNOLOGY IN 2016

White hot interest in containers has been driven by cloud computing's demand to simplify deployment, streamline time to production, and automatically deliver the resources an application needs. Linux containers provide that in a nice package: a simple tool for developing, testing and delivering an application to the end user.

Containers are designed to make it easier and quicker for developers to create complete application operating environments. Gone is the painful validation process of traditional application deployments that require developers to identify the minimum system requirements needed to run the application.

There are other important benefits. Linux containers package just about any type of server application to run everywhere – on your desktop, in a cloud, or anywhere Linux is available –

regardless of kernel version or Linux distribution. Containers also can have a considerably smaller footprint than VMs, which means your systems can see higher densities and run more cost effectively with containers than with VMs on the same host.

Source:

<http://www.networkworld.com/article/3065049/cloud-computing/what-s-on-tap-for-linux-container-technology-in-2016.html>

## NO UBUNTU BACK DOORS, WINDOWS AND MAC MIGRATIONS

Mark Shuttleworth said in an interview with eWeek.com today, "We will never backdoor Ubuntu." He said, "We don't do encryption to hide things; we do encryption so we can choose what to share. We will never weaken encryption." Watch the full interview for more on Ubuntu development, in particular plans for Mir. Speaking of Ubuntu, another announcement coming out of the UOS is that the size limit of Ubuntu desktop image will be raised. Releases surpassed the

limit a while back anyway, so they're making it official according to OMG!Ubuntu! The new limit is up from one gigabyte to two. OMG!Ubuntu! also posted of Ubuntu in the wild, April 2016 edition. And finally, one more Ubuntu note, Jesse Smith said today of 16.04, "Ubuntu 16.04 is a very nice release."

Source:

<http://ostatic.com/blog/no-ubuntu-back-doors-windows-and-mac-migrations>

## BEAUTIFUL SIMPLICITY LINUX 16.04 OS ARRIVES, BASED ON LXPUP AND THE LXDE DESKTOP

Simplicity Linux 16.04 is distributed in three main editions, namely Desktop, X, and Mini. The distribution has been in development for the past three months, since February, when it was initially released as Simplicity Linux 16.01.

Since then, the development team behind the Simplicity Linux project has managed to seed Alpha

and Beta builds to early adopters and public beta testers who volunteered to help them polish the final release of the operating system before it hit the streets, which happened on May 2, 2016, after a small delay.

Being based on the excellent and lightweight LX Pup GNU/Linux distribution, and built around the LXDE desktop environment, Simplicity Linux 16.04 is powered by a kernel from the 4.0 series (Linux 4.0.4) on the Desktop and Mini editions, and Linux kernel 4.4.5 LTS on the X flavor, which is the experimental branch of the OS, where all the bleeding-edge stuff happens before it lands in the more stable Desktop and Mini editions.

Source:

<http://news.softpedia.com/news/beautiful-simplicity-linux-16-04-arrives-based-on-lxpup-and-the-lxde-desktop-503654.shtml>

## HP LINUX IMAGING AND PRINTING 3.16.5 SUPPORTS UBUNTU 16.04 LTS AND DEBIAN 8.4

The team of developers behind the HPLIP (short for HP Linux Imaging and Printing) project, announced the availability of the fifth maintenance build in the 3.16 stable series of the software.

Today's release of HP Linux Imaging and Printing 3.16.5 is proof that the project is getting stronger with each day, offering you support for more HP printers than any other proprietary software. Newly supported HP printers in HPLIP 3.16.5 include HP OfficeJet 200 mobile printer series and HP OfficeJet Pro 8710 all-in-one printer.

Furthermore, the HP OfficeJet Pro 8715 all-in-one printer, HP OfficeJet Pro 8740 all-in-one printer, HP OfficeJet Pro 8720 all-in-one printer, HP OfficeJet Pro 8725 all-in-one printer, HP LaserJet Pro M501n, and HP LaserJet Pro M501dn printers are also supported by the HP Linux Imaging and Printing 3.16.5 release.

Source:

<http://news.softpedia.com/news/hp-linux-imaging-and-printing-3-16-5-supports-ubuntu-16-04-lts-and-debian-8-4-503712.shtml>

## CANONICAL ANNOUNCES THE AVAILABILITY OF UBUNTU CORE FOR SAMSUNG ARTIK 5 AND 10

Thibaut Rouffineau, an IoT & Ubuntu Core evangelist, has announced the availability of Canonical's Ubuntu Core operating system for Samsung ARTIK 5 and 10 IoT (Internet of Things) platforms.

Those of you who have been waiting to get their hands on the Ubuntu Core developer images for the Samsung ARTIK 5 and Samsung ARTIK 10 boards should know that they are available for download for free from the <https://developer.ubuntu.com/en/snappy/start/samsung-artik-iot-modules/> website.

These Ubuntu Core images will give developers access to a number of technologies of the two Samsung ARTIK IoT boards, including but not limited to Wi-Fi and Bluetooth, and they can also be used as a starting platform to build their next Internet of Things applications and devices.

Source:

<http://news.softpedia.com/news/canonical-announces-the-availability-of-ubuntu-core-for-samsung-artik-5-and-10-503744.shtml>

## M23 ROCK 16.2 LINUX DEPLOYMENT TOOL ADDS SUPPORT FOR UBUNTU 16.04 LTS CLIENTS

m23 Rock 16.2 comes exactly three months after the release of the Rock 16.1 version, which was a small update introducing support for the Univention Corporate Server (USC) and Linux Mint 17.3 "Rosa" operating systems, and it looks like it includes some very interesting additions, along with the usual bug fixes and improvements.

Probably the most important new feature added in the m23 Rock 16.2 update is the support for Canonical's recently released Ubuntu 16.04 LTS (Xenial Xerus) operating system, which means that you can now use m23 to make large-scale deployments of this OS.



The devs have also noted the fact that a set of desktop environments is available too for Ubuntu 16.04 LTS deployments. These include the popular Unity, as well as KDE, Xfce, LXDE, and MATE. It also looks like they had to make a lot of adjustments to the systemd init system implementation of Ubuntu 16.04 LTS, which didn't work as expected.

Source:

<http://news.softpedia.com/news/m23-rock-16-2-linux-deployment-tool-adds-support-for-ubuntu-16-04-lts-clients-503784.shtml>

## UBUNTU 16.10 (YAKKETY YAK) WILL SOON BE POWERED BY LINUX KERNEL 4.6

At the end of April, the Ubuntu developers have announced that the development of the next major release of the Debian-based operating system, Ubuntu 16.10 (Yakkety Yak), is officially open, which means that they will start uploading new package versions, sync the repositories with upstream, fix potential issues, and

rebase the kernel packages, as everything right now in Yakkety is based on Xenial.

The Ubuntu 16.10 (Yakkety Yak) daily build live ISO images have been made available for download immediately after the April 21st release of Ubuntu 16.04 LTS (Xenial Xerus), for early adopters, but most, if not all, of the packages, have the same versions as those in Ubuntu 16.04 LTS, including the kernel. But it looks like that will change soon, and Ubuntu 16.10 will be powered by Linux kernel 4.6.

Source:

<http://news.softpedia.com/news/ubuntu-16-10-yakkety-yak-will-soon-be-powered-by-linux-kernel-4-6-503812.shtml>

## FREE AS CAN BE: gNEWSense IS TRUE GNU LINUX

The Free Software Foundation-supported Linux distribution gNewSense is finally out in its fourth revision after a two-plus-year development cycle.

The FSF is best known for its unrelenting advocacy for software unencumbered by patents and protected for future use by the GPL, as embodied in software like the Linux kernel and the GNU toolchain. The gNewSense Linux distribution is assembled with the FSF's goal in mind of having no dependencies at all on proprietary binaries or other components that aren't compatible with the GPL.

Earlier gNewSense releases used Ubuntu as the base, but the project switched to Debian (from which Ubuntu was derived) because it already performs a lot of the work needed to remove GPL-incompatible elements.

Source:

<http://www.infoworld.com/article/3067280/open-source-tools/free-as-can-be-gnewsense-is-true-gnu-linux.html>

## BLACK LAB SOFTWARE ANNOUNCES BLACK LAB CLODBOOK PC AS A CHROMEBOOK REPLACEMENT

Black Lab NetOS is the company's brand-new cloud-oriented, Web-centric Linux kernel-based operating system, which Black Lab Software considers is the perfect ChromeOS replacement. In the same manner, the Black Lab Cloudbook computer comes as an alternative to Chromebooks.

Black Lab Software's NetOS operating system is based on Ubuntu Linux, but it differs from the main Black Lab Linux distribution in the way that it only uses cloud applications, just like Google's ChromeOS. However, users will also have direct access to the main Ubuntu software repositories to install any of the available packages.

The Black Lab NetOS operating system is built around the Xfce 4.12 desktop environment and includes popular applications like VLC Media Player, Google Chrome, and Skype, along with numerous Web Apps, such as Twitter, Facebook, Facebook Messenger, Netflix, Hulu, Outlook, Microsoft Office Online, or Slack.com.

Source:

<http://news.softpedia.com/news/black-lab-software-announces-black-lab-cloudbook-pc-as-a-chromebook-replacement-503876.shtml>

## CONFIGURING LINUX USAGE LIMITS WITH DOCKER AND AWS ECS

Linux has become a dominant OS for application back ends and micro-services in the cloud. Usage limits (aka ulimits) are a critical Linux application performance tuning tool. Docker is now the leading mechanism for application deployment and distribution and AWS ECS is one of the top Docker container services. It's more important than ever for developers to understand ulimits and how to use them in Linux, Docker and a service like AWS ECS.

The purpose of ulimits is to limit a program's resource utilization to prevent a runaway bug or security breach from bringing the whole system down. It is easy for modern applications to exceed default open file limits very quickly.

Limits are a critical application tuning parameter. Cloud Docker services have their own mechanism for configuring ulimits.

Source:

<http://www.computerworld.com/article/3067303/cloud-computing/how-to-configuring-linux-usage-limits-with-docker-and-aws-ecs.html>

## LINUX KERNEL 4.5.4 IS OUT, BRINGS AMDGPU, ARM, INTEL I915, WIRELESS, X86 UPDATES

Kernel developer Greg Kroah-Hartman announced the release of the fourth maintenance build in the latest stable and most advanced Linux 4.5 kernel branch.

While not many GNU/Linux operating systems have adopted Linux kernel 4.5, its development cycle continues at a fast pace, introducing more and more improvements, security patches, and new capabilities. According to the appended shortlog, which also includes the diff from the previous maintenance release, Linux 4.5.3,

the new update changes a total of 97 files, with 600 insertions and 238 deletions.

The biggest changes in Linux kernel 4.5.4 are updated drivers, in particular for things like GPU (mostly Intel i915 and AMDGPU), ACPI, ATA, CLK, CPUFreq, CPUIdle, general-purpose input/output (GPIO), HID, iio, InfiniBand, LightNVM, MD, MFD, NVDIMM, NVMEM, PWM, SCSI, SoC, USB, Xen, and networking

Source:

<http://news.softpedia.com/news/linux-kernel-4-5-4-is-out-brings-amd-gpu-arm-intel-i915-wireless-x86-updates-503966.shtml>

## CANONICAL PUSHES NEW FEATURES INTO THE SNAPPY INTEGRATION FOR UBUNTU 16.04 LTS

Canonical's Zygmunt Krynicki has announced that a new version of the snapd tool has been pushed to the stable repositories of Ubuntu 16.04 LTS.

snapd 2.0.3 is the latest and

most advanced version of the tool used in the latest Ubuntu 16.04 LTS (Xenial Xerus) operating system to interact with the Snappy infrastructure of Ubuntu Core, a variant of the Ubuntu Linux OS designed for embedded and IoT devices.

The list of changes implemented in snapd 2.0.3 continues with BlueZ interface improvements, the removal of the unused SetProperty function and D-Bus code, the addition of short and long description to snapd's man-page, improvements to the handling of snap sideload form, as well as re-enablement of several integration tests.

Source:

<http://news.softpedia.com/news/canonical-pushes-new-features-into-the-snappy-integration-for-ubuntu-16-04-lts-504014.shtml>

## UBUNTU-BASED EXTON|OS LINUX DISTRIBUTION NOW SHIPS WITH MATE 1.14, VLC 2.2.3

Earlier this week, we reported on the release of a new build

of the Ubuntu-based Exton|OS Linux distribution, version 160512, which was rebased on Ubuntu 16.04 LTS (Xenial Xerus).

However, it was a bit strange that the distro shipped with an older version of the MATE desktop environment, a clone of the old-school GNOME 2 (also known as GNOME Classic) graphical interface, version 1.12.7, despite the fact that MATE 1.14 was released last month.

Therefore, at the request of the community, Arne Exton had to upgrade the MATE package to the latest stable branch, version 1.14.0, which, unfortunately, he had to build from the freely distributed sources. The reason for that is because it looks like the MATE 1.14 desktop environment is not yet available in the main repositories of Ubuntu 16.04 LTS.

Source:

<http://news.softpedia.com/news/ubuntu-based-exton-os-linux-distribution-now-ships-with-mate-1-14-vlc-2-2-3-504071.shtml>

## NEW ARDUINO SRL SBC MERGES ARDUINO, WiFi, AND LINUX

Arduino Srl's new "Arduino Industrial 101" SBC includes Arduino circuitry and I/O, along with a soldered-on WiFi module that runs Linino Linux.

Last November, Arduino Srl promised an Arduino Industrial 101 carrier board for Dog Hunter's WiFi-enabled Chiwawa module, which is supported by the OpenWrt-based Linino Linux distribution. Arduino has now unveiled the resulting product: a \$40, sandwich-style single board computer with a soldered-on, Arduino-branded version of the Chiwawa module, along with Linino Linux support.

The sandwich-style Arduino Industrial 101 SBC, which includes the Chiwawa LGA WiFi module soldered on-board, is currently listed at Arduino Srl's shipping page for 35 Euros (\$40).

Source:

<http://hackerboards.com/new-arduino-srl-sbc-merges-arduino-wifi-and-linux/>

## UBUNTU BUDGIE 16.10 NOW IN DEVELOPMENT, BRINGS NEW BOOT SPLASH, WELCOME SCREEN

Budgie-Remix (soon to become Ubuntu Budgie) developer David Mohammed has informed about the availability of the project's first-ever newsletter for the community.

The newsletter is called Budgie-Remix Roundup, and the first installation is now live on the project's website, informing users about the latest innovations implemented in the operating system, whose main design goal is to give users an officially recognized Ubuntu flavor built around the Budgie desktop from the Solus Project.

From the newsletter, it looks like there are a few interesting things that are coming to Budgie-Remix very soon, targeting both the stable Budgie-Remix 16.04 and the now-in-development Budgie-Remix 16.10 release. Among them is a new boot splash screen for Plymouth.

Furthermore, a Welcome to Budgie-Remix/Ubuntu Budgie app will be available soon for the upcoming Budgie-Remix 16.04.1 release, as well as in the final Budgie-Remix 16.10 release, which the team hopes to rename to Ubuntu Budgie if the distribution is accepted as an official flavor, which Mark Shuttleworth himself said he would endorse.

Source:

<http://news.softpedia.com/news/ubuntu-budgie-16-10-now-in-development-brings-new-boot-splash-welcome-screen-504087.shtml>

## LINUX 4.6 TARGETS MOBILE WITH ARM, TOUCH SUPPORT

Aside from security improvements, version 4.6 of the Linux kernel, released over the weekend, offers enhancements for ARM processors and touchscreens.

Embedded ARM support in the upgrade features backing for 13 SoCs (system on a chip), including systems from Allwinner, LG, Qualcomm, and Broadcom. WiFi routers, the Nexus 7 smartphone,

and the Raspberry Pi nanocomputer, all will have improved support for their boards, according to the Linux Foundation.

The new version corrects an Infiniband interface problem as well. Linux creator Linus Torvalds said earlier this month that few would be affected by this problem anyway, and a workaround had been available.

Source:

<http://www.infoworld.com/article/3071113/linux/linux-46-targets-mobile-with-arm-touch-support.html>

## UBUNTU CORE NOW READY FOR SCREENLY, A DIGITAL SIGNAGE SOLUTION FOR RASPBERRY PI

Canonical has announced a partnership with Screenly to bring the Snappy Ubuntu Core operating system to the world's most popular digital signage solution for the Raspberry Pi.

As many of you are already

aware from our previous coverage, Snappy Ubuntu Core is a slimmed-down version of the Ubuntu Linux operating system, engineered by Canonical for deployments on a broad range of embedded and IoT (Internet of Things) devices, such as Raspberry Pi single-board computers.

Currently, Canonical provides developers and IoT enthusiasts with binary images of the Snappy Ubuntu Core operating system only for the Raspberry Pi 2 SBC, but images for the recently released Raspberry Pi 3 Model B are in the works and will be released later this year, most probably along with the Snappy Ubuntu Core 16 build.

Screenly is the most popular digital signage solution for the Raspberry Pi, and it looks like they recently joined forces with Canonical to build their infrastructure around the Snappy Ubuntu Core operating system, offering their customers a secure, stable, easy-to-use, robust, and simple-to-manage digital signage platform for Raspberry Pi boards.

Source:

<http://news.softpedia.com/news/ubuntu-core-now-ready-for-screenly-a-digital-signage-solution-for-raspberry-pi-504200.shtml>

## PURISM INTRODUCES PRIVACY-FOCUSED, LINUX TABLETS FOR \$599 AND UP

Purism is expanding its line of Linux-based computers with an emphasis on security, privacy, and open source software. The company's new Librem 10 is a Linux-based tablet with a 10 inch display and a starting price of \$599, while the Librem 11 is a higher-powered model with a bigger screen and a starting price of \$999 for early backers of an Indiegogo crowdfunding campaign. Both tablets are expected to ship starting in September.

Purism has been running crowdfunding campaigns for Linux-based laptops for a few years, but the company has sort of shifted its sales pitch a bit in the past year or so. Instead of promising a completely open experience (since the BIOS typically uses proprietary blobs), the company is instead

focusing on privacy.

One of the most unusual features of the Librem 10 and Librem 11 tablets will be "privacy kill switches," which are hardware buttons that will disconnect the webcam, microphone, WiFi, and Bluetooth.

Source:

<http://liliputing.com/2016/05/purism-introduces-privacy-focused-linux-tablets-599.html>

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I've always been a fan of electronics - be it Arduino, full-on computers, or something like a Raspberry Pi. However, I always try to balance out my purchases with actual need - which means I have never owned a Raspberry Pi. Until now. I recently ordered a model 3 off Amazon (in a complete bundle with a case, power supply and heatsinks - the SD card was missing, but as I own many of them, it wasn't necessary). The intended use for this Raspberry Pi was to connect it to our older Brother MFC-230C printer - which is USB only. There were two reasons for this - firstly, heading to the office to manually connect a USB printer was a pain, and secondly, I wanted some method with which I could enable Google Cloud Print. For those who don't know - Google Cloud Print is a service that allows printing from android tablets/phones and chromebooks to a printer connected to another computer. The small form-factor, and built-in wireless, in the model 3 made this a terrific way to connect the printer to our LAN - without

having to leave a desktop computer or laptop running all the time.

The main reason I selected this kit was because this bundle shipped with Amazon Prime - the other bundles had additional shipping costs.

## WHAT ARE YOU COVERING?

I'm going to focus on the setup of the Raspberry Pi (RPi) this month. Once I've given myself sufficient time to test out the CUPS setup and Google cloud print, I will follow this article up with those exact steps.

## WHAT DO I NEED?

You'll need a Raspberry Pi (and an SD card that is  $\geq 4GB$ ), a keyboard, a mouse, and a monitor. The last 3 items you'll need only for the actual installation of raspbian - everything else can be done via SSH or VNC later. Logically, you'll also need some device to download and copy the

NOOBS installer from the Raspberry Pi website to the SD card.

NOOBS installer:  
<https://www.raspberrypi.org/downloads/noobs/>

**NOTE 1:** There is also a manual installer, but I focused on the most typical use-case.

**NOTE 2:** There are torrents as well as direct downloads - but the torrents failed to work in rtorrent.

## HEATSINKS - DO I NEED THEM?

Heatsinks shouldn't really be necessary at all - most people agree that even under the most extreme conditions, the RPi will be fine without. However, heatsinks may be beneficial for me, as the RPi will probably be operating in a slightly stuffy room, with a high chance of direct sunlight via the window. Heatsinks may help keep the RPi a little cooler in these positions. As the RPi seems to lack

any sensors (for use with lm-sensors), I can't make any temperature comparisons.

## STEP 0: ASSEMBLY & PREP

I can't offer exact instructions here, as it all depends on your case (or lack thereof). It shouldn't be a difficult process.

For the SD card, the official site recommends a tool for Windows or Mac. But if you'd rather do it by hand, the SD card just seems to need to be FAT32 (should be the standard for any size less than and including 32GB), or FAT16. Unfortunately, any SD card that is  $> 32GB$  will be exFAT by default. In any case, I recommend reformatting just to be safe. After that, copy all the extracted files from the archive onto the SD card. Eject it, and insert it into the underside of your RPi.

## STEP 1: INSTALLATION

Once the case is set up, and the SD card ready, you'll want to



connect your peripherals, and then boot the device (by plugging in the power supply).

The RPi will then boot to a very basic screen. You can either connect to the internet and download/install something other than Raspbian - or just select Raspbian and choose "Install" (Recommended). I've used Raspbian for this project. After that, you'll need to just wait out the installation.

## STEP 2: BOOTED UP - NOW WHAT?

The first thing I did was connect my wireless, and tried to set a static IP (as my router doesn't allow reserving IP addresses). The GUI tool seems to just add an entry into `/etc/dhcpd.conf` with ssid information. This does seem to work - but resulted in the issue that the static IP was used for whatever interface came up first - so if I was using ethernet, it was used there instead (which shouldn't be the case as it lacks an SSID). In order to solve this (as I want ethernet to run via DHCP - that way I can connect it directly to a laptop for debugging), I simply

added the following line directly above the ssid line:

```
Interface wlan0
```

This tells dhcpd to apply the following settings only for the wireless interface - so ethernet runs normally on DHCP, and my wireless will use the static IP I chose when connected to my home network. Other wireless networks should default back to DHCP (so you'll never run into the issue that the RPi is assuming the wrong subnet). I have yet to test the RPi with another wireless network.

Once you have your IP reserved in your router, or statically assigned by the RPi, you're ready to disconnect your keyboard/mouse/monitor, and switch to SSH (if you prefer). I'll also cover installing tightvnc and using that, so you have access to the GUI apps.

## STEP 2.1: TIGHTVNC

TightVNC is a VNC (Virtual Network Computing) client that is offered in the Raspbian repos. To install it just run:

```
sudo apt-get install  
tightvncserver
```

Once it's installed, simply start it by running the command:

```
tightvncserver
```

This should result in some information in the terminal, telling you there is a new 'X' desktop. To save resources, I recommend killing the X session on :0, with:

```
service lightdm stop
```

## STEP 2.1.1: CONNECTING

If you use vncviewer on a Linux machine, just using the IP followed by the display number, you'll be fine. Such as `192.168.0.15:1`. If you're trying to connect using OS X's integrated screen sharing application, it will need to be a port - `5900 = :0`, `5901 = :1`, etc. So `192.168.0.15:5901` would work there. I haven't tested a connection on Windows, but one of the two options above should work.

If you set a password, keep in mind that RPi truncates passwords to 8 characters - so if a password isn't working, make sure it's not

too long - and if it is, just stop typing it after 8 characters.

## STEP 2.2: AUTOSTART

I used the Raspberry Pi Configuration tool to boot automatically into the CLI - as I only need SSH access, and the occasional VNC call.

If you want to automatically start a VNC session, I would recommend looking at the official documentation:

<https://www.raspberrypi.org/documentation/remote-access/vnc/>

## STEP 3: APPLICATIONS

Depending on what you want to do with the RPi, you may need to install other packages. In my case, I need to install the packages chromium-inspector (chromium browser - required for Cloud Print), and cups (for sharing the printer normally).

There are various articles out there for exact steps, so here are just a list of a few things people may want to install/enable:

- Bittorrent Sync (for sharing files).
- Bluetooth (requires various

packages - such as bluez bluez-hcidump, bluez-tools, blueman, etc). As this depends on whether you want GUI tools or not, I'd recommend following a guide that installs just what you need.

- LAMP - for running a web server.
- Docker - I'm not sure how well Docker would run on an RPi, but of the virtualization options I can think of, it would probably offer the best performance.
- Samba (for using the RPi to share a USB hard drive on the network).

## STEP 4: DEBUGGING

If, for some reason, your RPi isn't working properly, you have two options:

- Connect a monitor, keyboard, mouse and/or ethernet connection.
- Use SSH or VNC to debug issues.

Naturally, the first option can be difficult to achieve, depending on where you are, and where the RPi is set up. However, it is by far the least complicated to actually implement.

For option 2: It's not going to be an issue as long as your RPi is actually connected to a network,

and you know the IP (if it isn't on a static IP you assigned, check your router, as it may have picked up a fallback DHCP IP). If you can find the IP, then you shouldn't have any other issues connecting via SSH or VNC.

If, however, the RPi isn't connected to the network (because it's a new wireless network, for example), then you'll typically need to connect it via ethernet, or use a monitor, keyboard, and mouse to connect to the new network. If you're lazy and want to make life easier for you - you can simply set up a DHCP server on your laptop (on both Windows and Linux you'll need to install and set up some form of DHCP server, but OS X offers that option by default under System Preferences -> Sharing -> Internet Sharing). After the DHCP server is running, you can just connect an ethernet cable to the RPi from your laptop, and then start the RPi (it may work on an already running system, but I have tested it only from an off state). From your laptop, you should be able to get a list of clients and their IPs - this depends on the server and OS you're using. Once you get the IP of the client, you can just connect

via SSH or VNC, and work from there.

That about wraps it up for this month. If you have any issues, or questions, feel free to email me at [lswest34+fc@gmail.com](mailto:lswest34+fc@gmail.com). The same is true for anyone who has suggestions or requests for articles - ideas are always welcome!



## EXTRA! EXTRA! READ ALL ABOUT IT!

Our glorious news reporter (Arnfried) is posting regular news updates to the main Full Circle site.

Click the NEWS link, in the site menu at the top of the page, and you'll see the news headlines.

Alternatively, look on the right side of any page on the site, and you'll see the five latest news posts.

Feel free to discuss the news items. It's maybe something that can spill back from the site into the magazine. **Enjoy!**



**Lucas** has learned all he knows from repeatedly breaking his system, then having no other option but to discover how to fix it. You can email Lucas at: [lswest34@gmail.com](mailto:lswest34@gmail.com).





Last month, I suggested you get a number of parts and if you were able to get them, I hope that it didn't cost you too much. If you haven't gotten them, then follow along as best you can, and if there is a particular project you want to try, then get those components that are needed. I'm trying to do this on as little cash outlay for either you or me as possible. Frequently, you can recycle many of the items from older electronic items; many can be found at a local thrift store for pence on a pound. (Hopefully I got that one right. We say pennies on a dollar here, so at least give me an "F" for effort... ok?)

As I was laying last week, waiting for some surgery, I was thinking that if someone were to come up to me and ask directly why I'm doing this, what my answer would be. Before the wonderful chemicals they pumped into my body to make the process less horrible, I realized that the REAL reason is multi-part. First, is to create excitement in "non-programmers" when doing things

that seemingly could not be done without a ton of training. Secondly, is to show that the newer technology, like the Raspberry Pi and the Arduino, is not beyond the ken of the "general joe" out there, but that anyone can do things that have real world applications (hence the title of our series). That having been said, making LEDs blink is only the same kind of project for the hardware world as the "Hello World" program is in the programming realm. You have to take small steps before you move to the big race. Believe me, we will be doing some amazing things with all those little parts, whatsits and thingamabobs.

This month, we will be using the DHT11 Basic Temperature/Humidity Sensor with our Raspberry Pi. Next month, we will be doing the same sort of thing using the Dallas DS18B20 temperature sensor, and if there is time and/or space, we'll also talk about the 16x2 LCD display. In a few months, we'll switch from the Raspberry Pi to using the Arduino. Don't worry, none of the things we

are using now will go unused after a single project. For example, once we have a grasp of some of the Arduino basics (which WILL involve learning a small amount of 'C' like programming (sorry about that)), we'll be writing programs in Python on the RPi (or your local computer) to control the Arduino. The sensors we have learned about in our RPi experiments will be re-used when we learn about the Arduino, and many will be incorporated into some larger projects. Very shortly, we will be using DC Motors, Solenoids and Stepper Motors in some really basic projects, but we'll use them in larger projects, including building a Computer Controlled (RPi) Laser Engraver using a Laser Diode recovered from an old DVD Burner.

Enough about the future. Let's start with this month's project.

The DHT11 is the least expensive sibling of a series of temperature and humidity sensor sets. The DHT11 has a temperature range from 0° to 50° C with ±2° C

accuracy (32° to 122° F, ±3.6°F) and a humidity range from 20-90%RH ±5%. You can see that it's not the most accurate sensor on the market; there is a DHT22 that is more accurate and has a wider range (-40° to 80° C temp range) but about twice as expensive.

It's a bit of a funny looking thing. A blue rectangular plastic box with holes in it and something shiny inside it. It might come just as a single sensor with 4 pins, or already on a mini-circuit board with 3 or 4 pins. Either way, they are basically the same. For now, we'll use the discrete component (the one without the circuit board) for the sake of the discussion, and I'll address the differences as we go along.

Whenever you want to work with a new sensor, you should get a spec sheet (data sheet). A simple web search should turn up a number of results. Try to get something directly from the manufacturer if at all possible. For the DHT11, a good place to get one of the various data sheets



available is <http://www.micropik.com/PDF/dht11.pdf>. While this isn't directly from the manufacturer, it is from a company that sells it, and has "translated" the manufacturer's data into a 9-page PDF file.

You might already be asking, why do I need this? There's a bunch of information that, unless you have a PhD in Physics or something, you'll never need. Well, that is true, but there is a lot of information that IS relevant and can potentially keep you from blowing up either the sensor, the controller, or your work bench. In this case, we find that the DC operating voltage is between 3 to 5 volts and it pulls about 0.5mA during "normal" conditions (section 6). We also find that this is a rather slow device and that we should not try to pull data more than once per second. Basically we'll keep it around once every five seconds in our testing program, which is way more than we'll need in reality. Another thing: if the cable that sends the data from the sensor to the microcontroller (our RPi) is less than 20 meters, we should have about a 5K ohm resistor between the data line and the local power

supply (at the sensor) as a pull-up. One last thing (I'm going to stop here, but there's much more): Pin 1 is positive voltage, Pin 2 is the data pin, and Pin 4 is the ground pin. This gives us pretty much everything we need to know to safely connect this to our RPi. Below is the wiring diagram for a

"raw" DHT11 sensor WITHOUT a breakout board. If you have a sensor with a breakout board, see my discussion below the diagram.

Notice that I said earlier that a 5K resistor was needed as a pull-up. If you are going to use 3.3 VDC as a power source (RPi pin 1), then

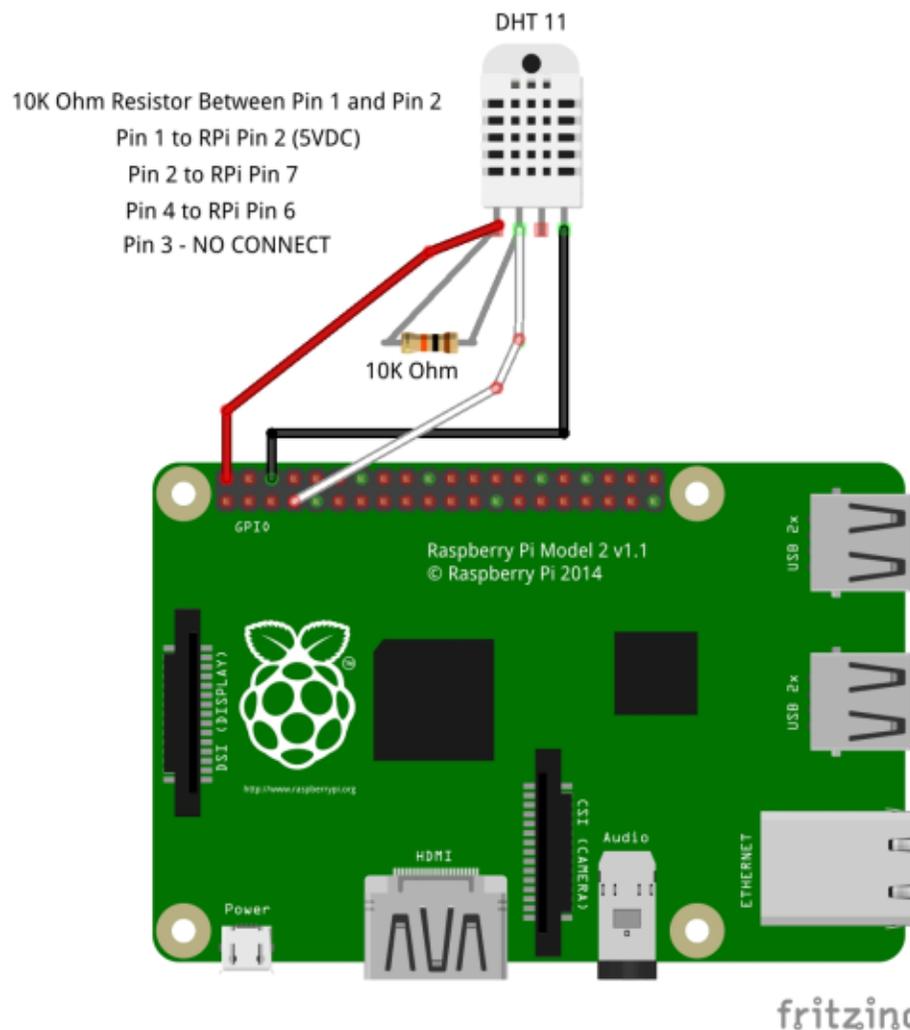
a 5K resistor works pretty well. If, however, you are going to use 5 VDC as shown in the diagram, use a 10K resistor.

You can see that it's fairly simple, just three wires and a resistor. For our simple project, don't try to make the wiring the entire 20 meters though.

If you have a DHT11 on a breakout board, you will likely have only 3 output pins on it. I have two sensors from different vendors, and (go figure) both have a different pinout. One is laid out [Data] [Positive Voltage] [Ground] and is marked "S-". The other is [Ground] [Data] [Positive Voltage] and is marked as such. Hopefully, yours has some sort of pinout definition printed on it. If not, you can use a multimeter to trace the ground pin and voltage pin directly from the sensor to the breakout pin. You can usually guess that if there are three output pins on the breakout board and you know ground and positive voltage, then the other SHOULD be the data pin.

Now our program code.

For the sake of getting things up and running quickly, we will be



using some code provided by the kind people at Adafruit.com – they provide the library for working with the DHT11. (They found that trying to run straight Python code for the library causes some timing issues, so the library is actually written in 'C'.) There are a number of steps involved, so follow the instructions carefully. I've paraphrased them so if something doesn't work, you can also find the instructions at the Adafruit website at <https://learn.adafruit.com/dht-humidity-sensing-on-raspberry-pi-with-gdocs-logging/software-install-updated>. Once everything is done, you can run my modified Python example presented at the end of the instructions.

In your "/home/pi" directory, run the following commands:

```
git clone https://github.com/adafruit/Adafruit_Python_DHT.git
cd Adafruit_Python_DHT
sudo apt-get update
sudo apt-get install build-essential python-dev python-openssl
```

Ignore any errors that state a

```
#!/usr/bin/python
# simpletest.py
#-----
# Original code information copyright below.
# Copyright (c) 2014 Adafruit Industries
# Author: Tony DiCola
# Permission is hereby granted, free of charge, to any person obtaining a copy
# of this software and associated documentation files (the "Software"), to deal
# in the Software without restriction, including without limitation the rights
# to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
# copies of the Software, and to permit persons to whom the Software is
# furnished to do so, subject to the following conditions:
# The above copyright notice and this permission notice shall be included in all
# copies or substantial portions of the Software.
# Code modifications by G.D. Walters for Full Circle Magazine
import Adafruit_DHT
from time import sleep
#-----
# Sensor should be set to Adafruit_DHT.DHT11,
# Adafruit_DHT.DHT22, or Adafruit_DHT.AM2302.
#sensor = Adafruit_DHT.DHT22
#-----
sensor = Adafruit_DHT.DHT11
#-----
```

package is already installed.

Next, install the library by running:

```
sudo python setup.py install
```

Once all that is done, you can move on to our sample code.

Above is my modified sample code "borrowed" from the Adafruit sample code.

All of the above can basically be boiled down to three lines of code.

The two import statements and the assignment of the variable 'sensor' to the class code.

```
pin = 4
sleep(3)
```

Here we define that the sensor is connected to GPIO pin 4 and then we wait 3 seconds for things to settle and be ready to work.

We use a simple loop (next page, top right) to grab the values for humidity and temp over and over. I never got the knack of

relating Celsius to "real" temperatures, so I convert it so that I can understand it. If you want Celsius, just comment out the conversion line.

Now (next page, bottom right) we check to see if we got realistic values for both humidity and temperature, then we display them and sleep for 5 seconds.

I must admit, when I run the program with one sensor, it gives some rather wacky results for the first two or three minutes, then

```
#-----  
# Here we loop over and over getting and displaying the  
data.  
# Use <Ctrl><C> to break out.  
#-----  
while 1:  
    # Try to grab a sensor reading. Use the read_retry  
    method which will retry up  
    # to 15 times to get a sensor reading (waiting 2  
    seconds between each retry).  
  
    humidity, temperature =  
    Adafruit_DHT.read_retry(sensor, pin)  
  
    # Comment out the next line to display Celsius  
    temperature = temperature * 9/5.0 + 32
```

settles down to values that I can trust. The other sensor seems to “lock in” faster, so I’m just writing it off to something in the first sensor.

Well, that’s it for this month. Remember, we’ll be using the Dallas temp sensor next time, so be ready.

Have a good time and I’ll see you next month.



**Greg Walters** is owner of RainyDay Solutions, LLC, a consulting company in Aurora, Colorado, and has been programming since 1972. He enjoys cooking, hiking, music, and spending time with his family. His website is [www.thedesignatedgeek.net](http://www.thedesignatedgeek.net).



The Ubuntu Podcast covers all the latest news and issues facing Ubuntu Linux users and Free Software fans in general. The show appeals to the newest user and the oldest coder. Our discussions cover the development of Ubuntu but aren’t overly technical. We are lucky enough to have some great guests on the show, telling us first hand about the latest exciting developments they are working on, in a way that we can all understand! We also talk about the Ubuntu community and what it gets up to.

The show is presented by members of the UK’s Ubuntu Linux community. Because it is covered by the Ubuntu Code of Conduct it is suitable for all.

The show is broadcast live every fortnight on a Tuesday evening (British time) and is available for download the following day.

[podcast.ubuntu-uk.org](http://podcast.ubuntu-uk.org)



# HOW-TO

Written by Elmer Perry

# LibreOffice Pt.60 - Quick Tips

This is part 60. The big six-zero. Five years worth of articles about my favorite office suite. Due to demands at work and ambitions to take my writing in other directions, this is also my last article in this series. It has been a privilege to write for you each month and teach you about the many things you can do in LibreOffice. Believe me when I say I have learned a great deal by writing for you.

In the years writing about LibreOffice, I have collected a lot of helpful hints that were too short to constitute an article of their own. So, for this final hurrah, I bring you 10 quick tips for using LibreOffice.

## 1. ICON SETS

You can customize LibreOffice in ways that work best for you. One of these customizations is the

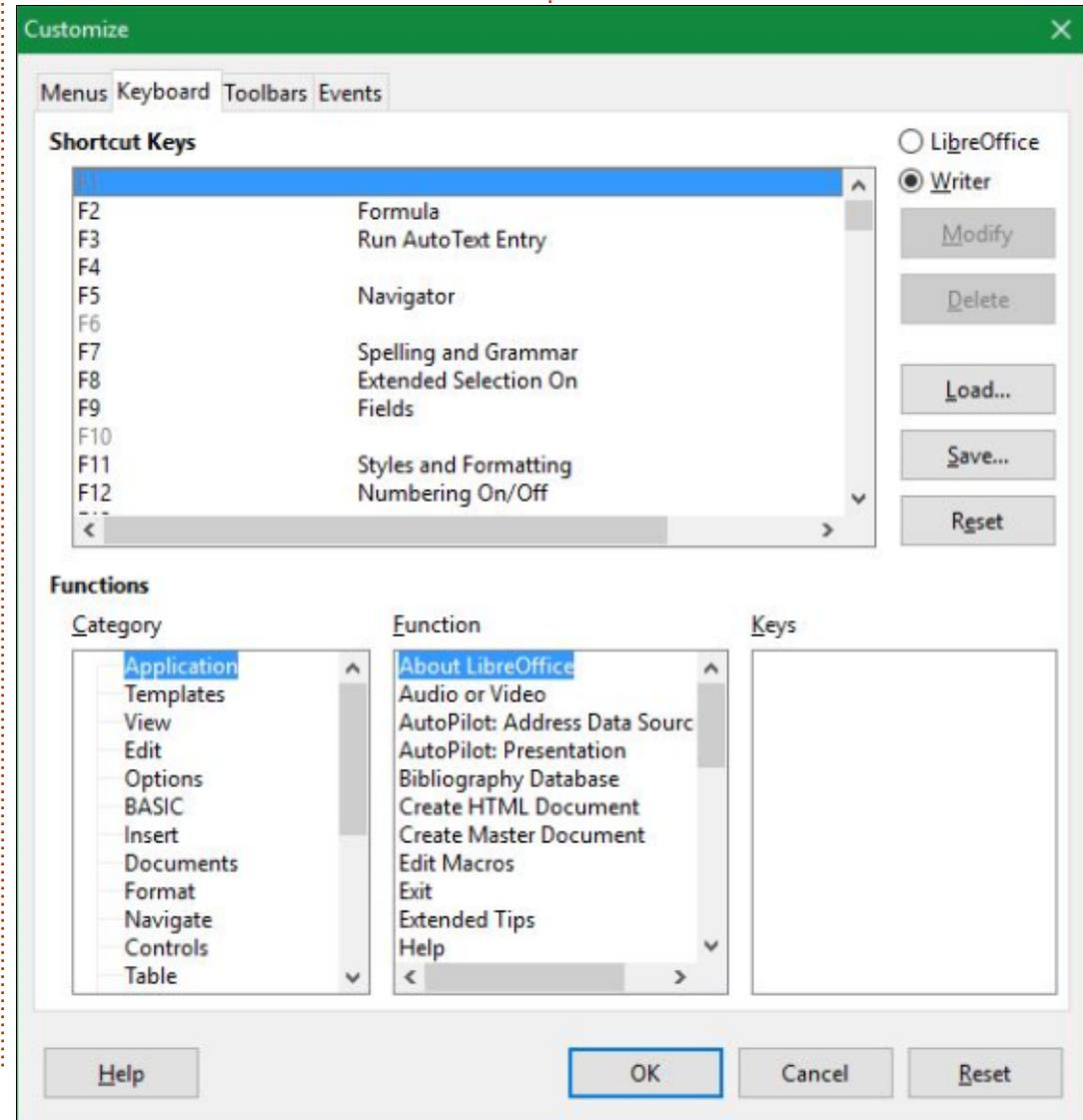
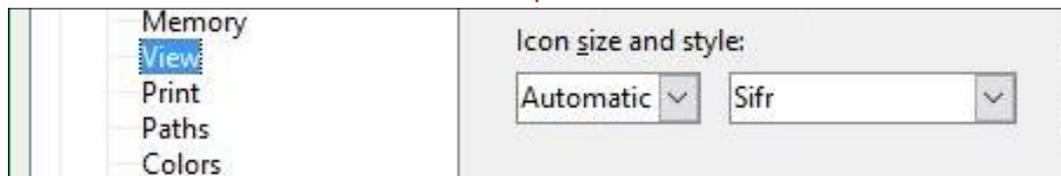
icon sets used for the toolbars. There are seven different icon sets in the latest version 5: Breeze, Galaxy, High Contrast, Oxygen, Sifr, Tango, and Human. Human is the default for Linux, and Tango is the default for Windows. Personally, I like Sifr. The flat black icons are easy for me to sort through. The colorful icons of the other sets are distracting for me. You can set the icon size and style at Tools > Options > LibreOffice > View.

## 2. KEYBOARD SHORTCUTS

Keyboard shortcuts are a great time saver. Instead of taking your hands off the keyboard to grab the mouse and do something, your hands can just stay at the keyboard and get the same results. Like any office suite, LibreOffice has a full basket of shortcuts. You can get a list of shortcuts at Tools > Customize. Select the Keyboard tab. Scroll through the list to see

what is available for LibreOffice in general, or for the program you are currently working in. It is worth your time get to know the

shortcuts and start using them. Don't try to learn them all at once. Take a block of them and get familiar with them. Once you have



that group down, start in on the next. In Tools > Customize, you can create your own shortcuts. The keys or key combinations in the list that are not grayed out are the ones that are available for changing. I would steer clear of those that already have assignments, and look for ones that don't. Select the category and function from the two lists below and click modify to assign that function to the key or key combination.

### 3. MOUSE ZOOM

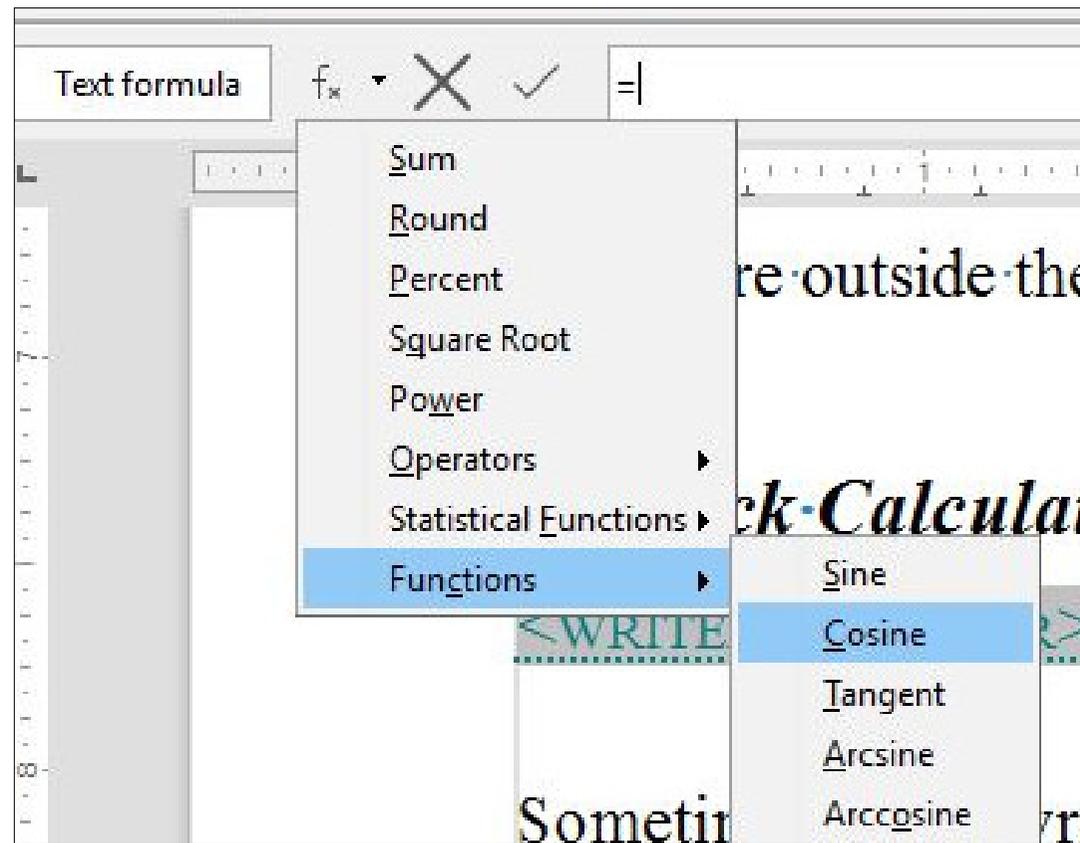
After preaching about keeping your hands off the mouse, my next tip is about zooming using the mouse. Most mice today have a scroll wheel, and you can use the scroll wheel to zoom in and out of your document. LibreOffice allows you to zoom from 20% (very small) to 600% (huge). Press the CTRL key while turning the scroll wheel to zoom in and out. Zoom in (make it bigger) by scrolling the wheel forward (away from you), and zoom out (make it smaller) by scrolling the wheel back (toward you). The amount of zoom is controlled by your mouse settings.

### 4. CROP AN IMAGE

You can now crop an image directly in LibreOffice. No more opening GIMP or some other image program just to crop an image. To crop a selected image, Format > Image > Crop. Or you can click the icon on the Graphic toolbar. The image is surrounded by eight control handles. Crop the image horizontally or vertically by dragging the center handles in the side and top/bottom edges. Dragging the corner handles crops both. Dragging while holding the SHIFT key maintains the image's original aspect-ratio. After cropping an image, you can resize it and still maintain your crop. Crop mode stops when you press ESC or click anywhere outside the image.

### 5. QUICK CALCULATIONS IN WRITER

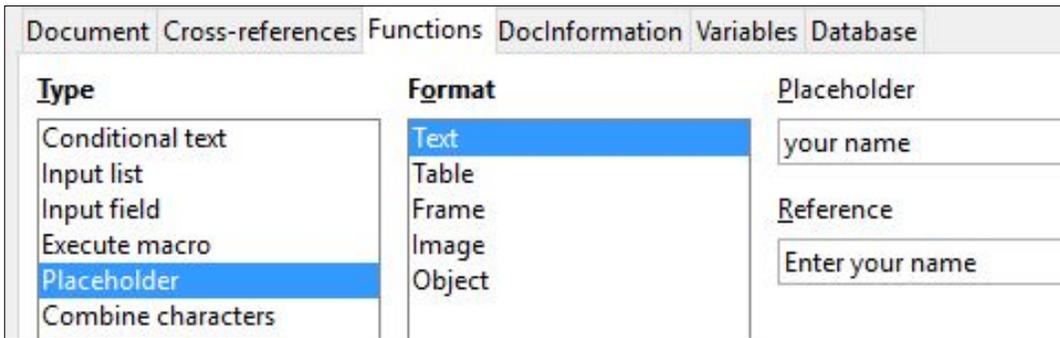
Sometimes while writing a document, you need to insert the results of a calculation. You could go to your computer's calculator program, but that means getting out of Writer to start another program. Instead, use the Formula toolbar built into Writer. View > Toolbars > Formula or pressing the



F2 key brings up the Formula toolbar. The bar works in the same manner as the formula bar in Calc, but you have a smaller set of functions you can use. Click on the fx button for a menu of the available functions. Once you finish, click the check button or press the Enter key. The result of the calculation will appear at the last position of your cursor.

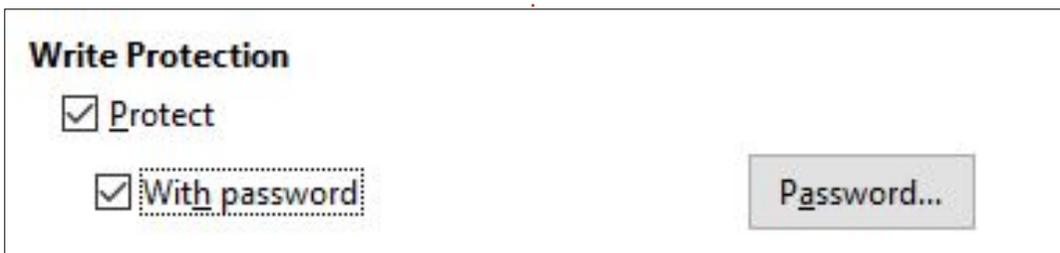
### 6. PLACEHOLDERS

Placeholders are useful in templates and Auto Text. They are special fields that act as temporary text until the actual text or object is inserted. For example, if you were creating a template for a contract, you wouldn't know the names of the parties involved in the contact while you are creating the template. You can insert placeholder fields in the template – to be filled in later when the template is used to create a document.



To create a placeholder, CTRL-F2 to open the Fields dialog. Click on the functions tab. Select placeholder from the Type list, and pick the placeholder type from the Format list. You can pick from Text, Table, Frame, Image, and Object. In the Placeholder text box, enter the text you want to stand-in for the placeholder. For example, with the Text format selected, you could enter "your name" to create a placeholder that reads <your name>. The Reference is a help tag that appears when you hover your mouse over the placeholder. Click Insert to enter the placeholder in your document.

To replace a placeholder with



the actual information for the document, click on the placeholder and start typing for a text placeholder. For the table, frame, and object placeholders, you get the appropriate dialog. For the image placeholder, you get a file dialog. The placeholder is replaced with text you type or object you set with the dialog.

## 7. PROTECTING SECTIONS IN WRITER

You can protect any section of a writer document from changes. Some sections, like table of contents, are protected by default. If you were creating a template for a legal document, and there were

parts of the document that should never change, you can protect them from changes with a password. Select the text you need to protect, then Insert > Section. Give the section a name. Check the Protect and Password check boxes. A password dialog will pop up. Enter and confirm the password. Click OK. In the Section dialog, click Insert.

To remove the protection and make changes, Format > Sections. Select the section you want to change. Uncheck the Protect check box, and enter the password when prompted. You can now make changes to the section.

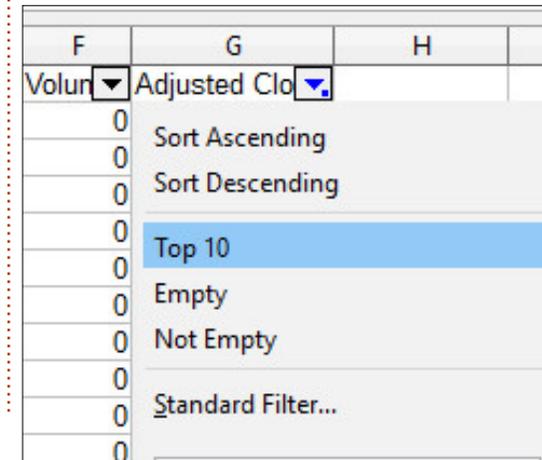
## 8. ENTIRE ROW/COLUMN REFERENCE

When creating a formula in Calc, you sometimes need to reference an entire row or column, usually because the column or row will grow and you have no way to know where it will end. Before version 5, you had to create a reference like A1:A1048576 for columns or A1:AMJ1 for rows. Now, you can use a short reference to the column or row. For columns, you can enter A:A to reference the

entire A column. For rows you can enter 1:1 to reference the entire row 1. You can even reference a range of columns or rows (A:B, 1:2).

## 9. AUTO FILTERS TOP 10

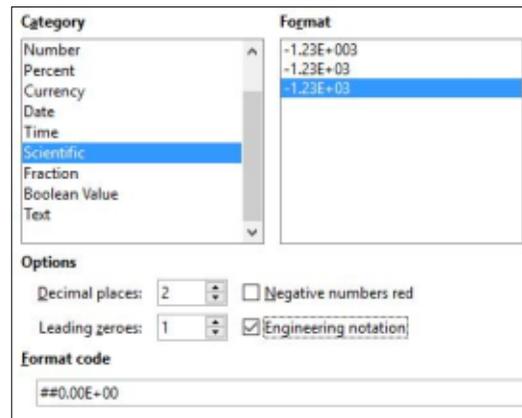
Calc allows you to easily show the top 10 values in any column through the AutoFilter function. To activate the filter, Data > Filter > AutoFilter. Once active, the filter shows a down arrow in the first cell of each column. Clicking on the arrow opens a drop down menu. One of the options is Top 10. Select Top 10 and you will get the top 10 records based on the values in that column. You could use it to determine your highest sales day, or the day of the highest peak on a stock. This tip works only for columnar data. To clear the



AutoFilter, select Data > Filter > AutoFilter again.

## 10. SCIENTIFIC FORMAT AND ENGINEER NOTATION

Scientific notation is used to express very large or very small numbers. The basic idea is to take a predetermined number of digits and multiply them by powers of 10. This allows scientists and engineers to express these large numbers without having to write out all the digits. Engineer notation is a subset of scientific notation where the powers of 10 are a multiple of 3.



Calc will allow you to express both of these. Let's take the rather large number 12455485785256. A rather large number to type over and over again. In Calc, we can

convert this number to scientific notation. Format > Cells. On the Numbers tab select Scientific from the Category list box. Click OK. Our number is transformed into Calc's version of scientific notation, 1.25E+13. 1.25 is the significant digits, E is the place holder for 10, and +13 represents the exponent of 10. If we want engineer notation, Format > Cells. Again, with Scientific selected, check the "Engineering notation" check box. Our number in engineering notation becomes 12.46E+12. Note that the exponent is now a multiple of 3.

## ONE LAST THING

I'd like to share one last thing with you that has been a big help to me while writing 60 articles about LibreOffice – documentation. I have a few helpful links to share with you. Each one provides something different.

The LibreOffice Community Support Page:  
<http://www.libreoffice.org/get-help/community-support/>

The Community Support Page

has links to documentation, online help, Ask LibreOffice, IRC, the wiki, and mailing list. You will want to check the document page often to see what manuals have been updated.

LibreOffice Documentation / Publication Page:  
<https://wiki.documentfoundation.org/Documentation/Publications>

If you can't wait for the official release of a manual, this is the page where you find the documentation team's drafts. Keep in mind that many of these documents are drafts and may contain mistakes and errors. When I was writing about Base, this was one of the only places to find documentation at the time. Of course, now there is an official Base manual. Just my luck.

Document Foundation Blog:  
<https://blog.documentfoundation.org/>

The Document Foundation blog is a great place to get news about new releases, tips, events, and more. They don't overwhelm you with posts, but they do keep you up to date.

With that, we come to the conclusion of my series on LibreOffice. It has been a great joy, and I wish many more successful years of publication for Full Circle. I will continue as a reader, and you may still see an article from me now and then, just not every month.

I leave you with one final thought, *"Don't work so hard that you don't take time to live, and don't live so hard that you can't enjoy work."*



**Elmer Perry's** history of working, and programming, computers involves an Apple ][E, adding some Amiga, a generous helping of DOS and Windows, a dash of Unix, and blend well with Linux and Ubuntu. He blogs at  
<http://eeperry.wordpress.com>



In the early days of computers, a company called Digital Equipment Corporation (DEC) created its 32-bit VAX computer using openVMS as its operating system. Because a VAX/VMS computer is so reliable, there are today - after more than 25 years - still a large number of them in use. But, in the end, even these reliable computers will have to be replaced. As described in part 1, you could migrate from VAX/VMS to Linux, as the way Linux works is largely compatible with VAX/VMS. If you use Pascal as your programming language, you will find that Lazarus/Free Pascal is a good replacement. But there are technical functions used in VMS with no apparent replacement in Linux. In this article I will describe the terminal interface DCL and ASTs.

## DCL

When you log on to a Linux system (or start the terminal), a program is started to prompt you for commands. This is called the shell, and in my case this program is Bash. When you log on to a VMS

system, the same happens. On VMS, this program is called DCL (Digital Command Language).

For the user, it looks like there is no difference, but the way these programs work is quite different. As mentioned in part 3, there is one big difference: DCL is a real shell, it wraps around a process and every time an executable ("image" in VMS) is started, it runs within this shell, within the same memory, with the same logicals and symbols (environment variables), and with the same process ID. Bash is called a shell, but it is NOT! It is a CLI (Command Line Interpreter). Every time an executable is started in Linux, it's started in a new subprocess with a different PID.

Another difference is the use of the "\$"-character. In VMS, it has no meaning and is frequently used in names of logicals (like SYS\$SYSTEM), system calls (like \$QIOW) and internal DCL functions (like F\$ELEMENT). In Bash, it denotes the translation of variables, even if in between

double quotes. This - and the fact that Free Pascal has a similar problem - is the reason why the migration tool replaces the dollar with an underscore.

DCL has a powerful set of built-in commands and functions. These are so versatile that entire programs have been written in DCL functions. When you migrate a VMS system to Linux, you will have to include these "programs". The functions of bash to replace the functions of DCL are so different in syntax and working, that the migration of DCL "programs" is a lot of work and some will simply fail to migrate as there might be no substitution for one or more

DCL functions. An example - to read a file is shown below.

In DCL every line must start with a "\$", or it will not see it as a command.

In Linux, the first parameter on a command-line is denoted as 1, while the same parameter in VMS is denoted as P1. The translation of a variable in Linux is done by prefixing with a \$; in VMS by enclosing in single quotes, hence \$1 in Linux is 'P1' in VMS. "echo" writes a line to the terminal in Linux; in VMS, "write sys\$output" is used. "sys\$output" is a process-logical (for explanation of logicals see part 3), so, by redefining

```

Bash:
while read a_line
do
    echo $a_line
done < $1

DCL:
$ open/read 'P1' file_var
$loop:
$     read/end_of_file=done file_var a_line
$     write sys$output 'a_line'
$     goto loop
$done:
$ close file_var

```

“sys\$output”, you can influence where the output is going.

“file\_var” in the above example is also a logical. As a consequence, this means that, if the file is not closed, it will still be open if the same script (command file) is executed again in the same session. That might be intentional if two scripts have to be executed consecutively, but it's usually a big problem when a script crashes and you start it again after fixing the problem. Then the file is still open and continues from the point where the script crashed, giving unexpected results. In this case, after a crash, you have to close the file manually by deleting the logical.

I cannot imagine how a migration tool would be able to create a working bash script from a DCL script (in VMS this is called a command-file, default file type is .COM). So I started working on the creation of a DCL clone. It will be able to process DCL command-files while accepting commands from the command-line using DCL syntax. An example: To get the list and translation of the group logicals in Linux, I must execute the case-sensitive command:

```
/VMS/show log -g "*" .
```

My DCL program will accept the standard case-insensitive command:

```
show log /group * .
```

This way, every existing DCL “program” will behave the same with only small adaptations.

## ASTs

In VMS, all communication with the terminal goes through the driver “TTDRV”. When the user gives a special command using control characters (mostly ^C, ^Y, ^T and ^Z), the driver will issue an AST (Asynchronous System Trap). Essentially, an AST is a system callback routine. As it is unknown when this callback routine is called, you must take special precautions. In VAX-pascal you signal this to the compiler through the attribute “[ASYNCHRONOUS]” for the procedure that is called, and the attribute “[VOLATILE]” for any variable accessed from within this procedure. The attribute “[VOLATILE]” prevents the compiler from doing any optimization that would make the

variable inaccessible, like using a CPU register for it. ASTs can be compared to signal catching in Linux.

The best equivalent of these ASTs is the use of the method “Synchronize” of the class “tthread”. To get the same behavior as in VMS, the DCL process is used to process all input from the terminal and output to the terminal. The DCL process communicates through pipes with a separate thread created at program start using the class “tthread”. When the user presses any of the special control characters, this thread will call a dedicated procedure - defined in the class, but executed in the main thread - using “Synchronize”. On ^C, the process will terminate; on ^Y, the main thread will be suspended; on ^T, status information will be sent to the terminal (if specified in the main thread), and on ^Z, a controlled termination will take place. When the main thread is suspended after ^Y, two things can happen:

- If “continue” is typed in the DCL process, the main thread will be resumed.
- If a new command is given, resulting in the start of another

process, the suspended process will be terminated.

To get this behavior, DCL must be aware of the control characters and act upon them.

Something like the attribute “[VOLATILE]” is not necessary as I have not seen Free Pascal doing any optimization (unfortunately).

On activation of a QIO(W) (see part 2) or timer, it is also possible to specify an AST to be called on termination. These are implemented the same way, as both work through the creation of a new thread.

## DETACHED PROCESS:

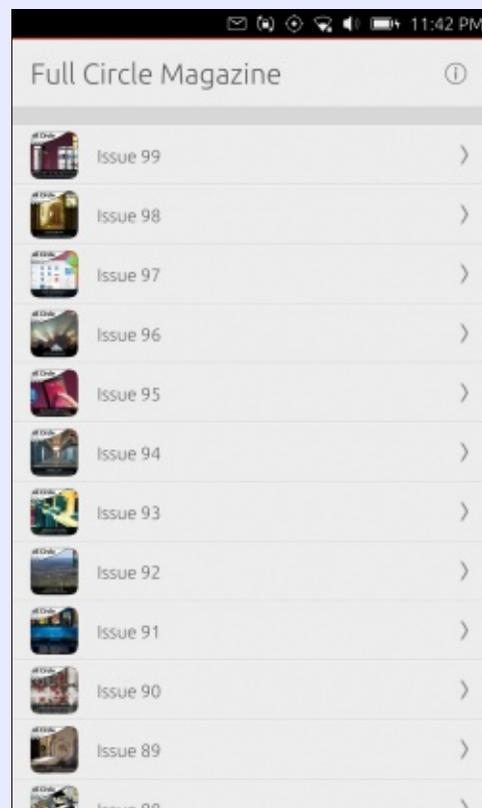
If you start a detached process (a process without a parent) in VMS, it is started without DCL as a shell. Some programs depend on the existence of DCL - if they call an internal function. To run such a program, you must create a command-file stating: “\$run program\_name”, and start DCL as a detached process with this command file as input. This proves that DCL itself is just a program which is called “LOGINOUT.EXE” .

The most common use of this is to execute a script (command-file) as a detached program, for example once a day to clean up, back up, or trigger an event.

## NEXT MONTH

In the next article I will go more in depth about the network database DBMS32 and its (dis)advantages.

## THE OFFICIAL FULL CIRCLE APP FOR UBUNTU TOUCH

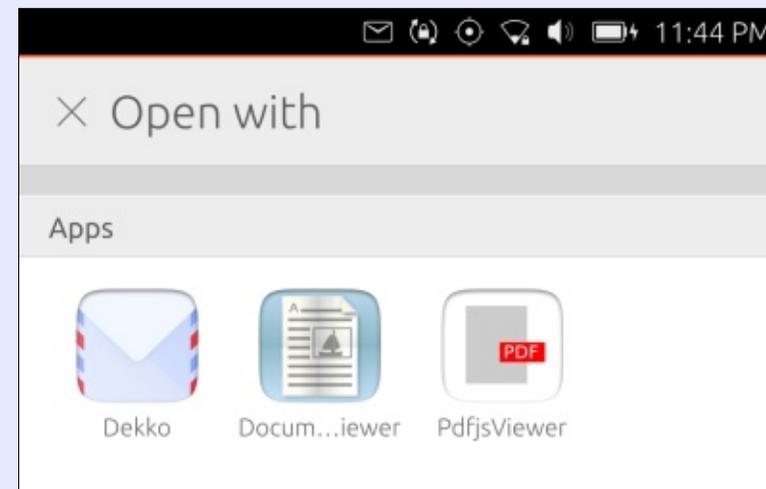
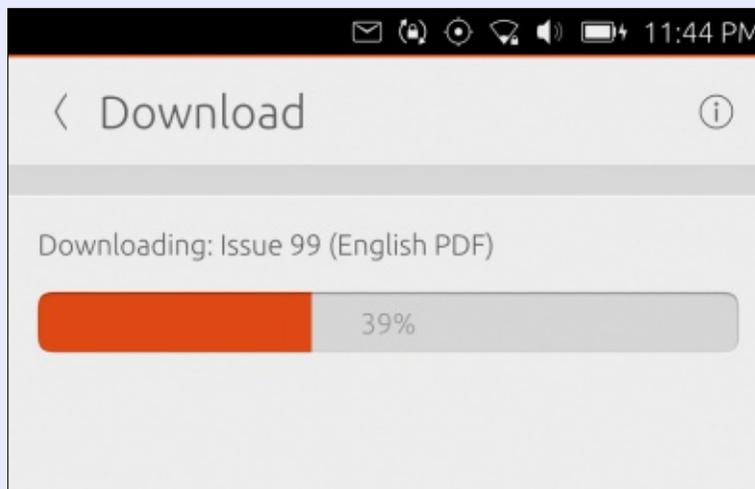
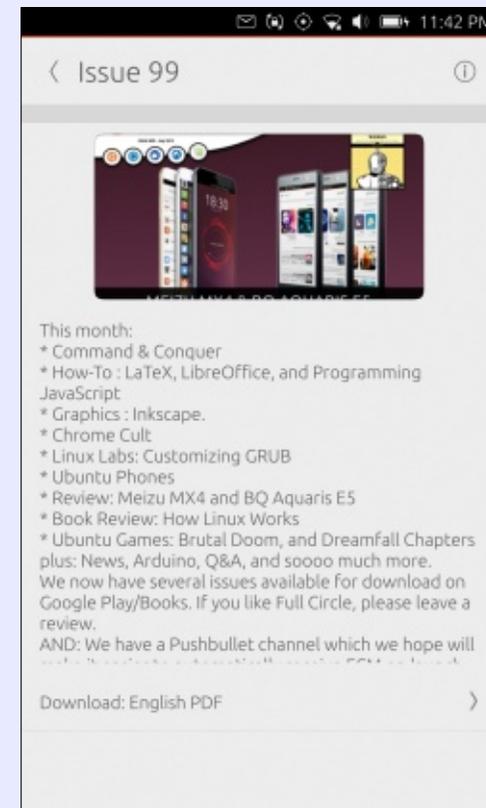


**Brian Douglass** has created a fantastic app for Ubuntu Touch devices that will allow you to view current issues, and back issues, and to download and view them on your Ubuntu Touch phone/tablet.

### INSTALL

Either search for 'full circle' in the Ubuntu Touch store and click install, or view the URL below on your device and click install to be taken to the store page.

<https://uappexplorer.com/app/fullcircle.bhdouglass>



After keeping VAX/VMS systems running for 30 years, **Theo** needed a new challenge and started from scratch with Linux to re-do every mistake he made all over again. You can email Theo at: [info@theovanoosten.nl](mailto:info@theovanoosten.nl)



# HOW-TO

Written by Ronnie Tucker

# Bare Basics Of Audacity

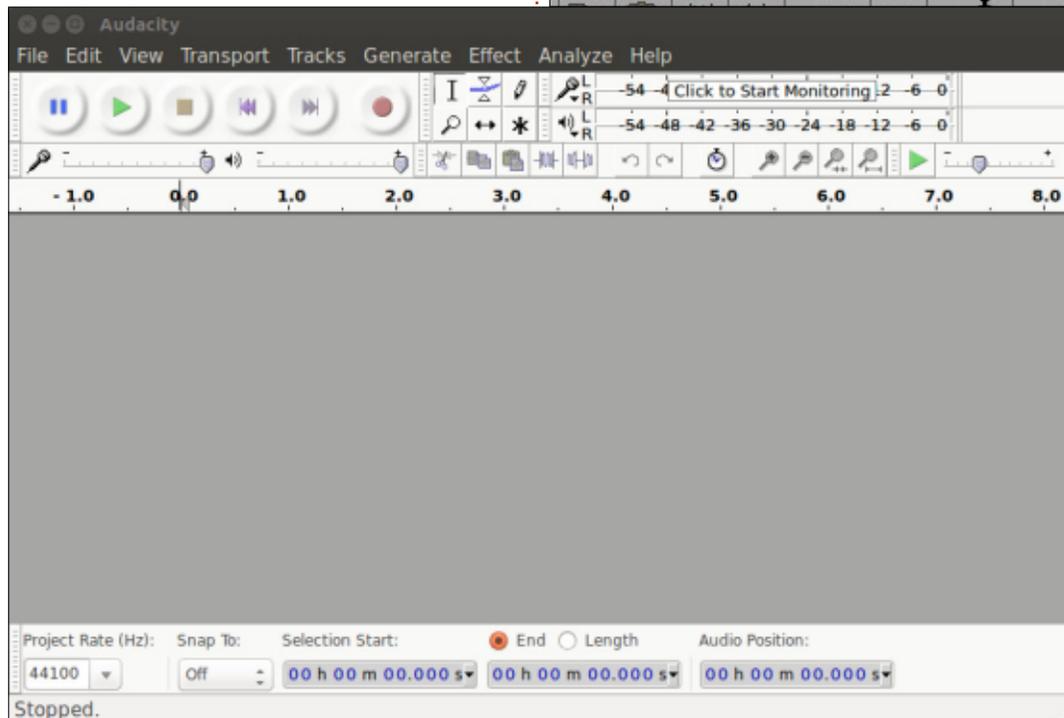
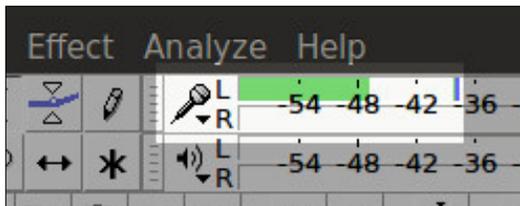
Since starting the Full Circle Weekly News (<http://fullcirclemagazine.org/podcast>), I've had to learn the basics of Audacity. Thankfully, since the podcast is short and pretty simple to put together, I only really need to use the absolute bare basics of Audacity.

## IN THE BEGINNING

While Audacity might look

somewhat imposing. Don't worry. We'll be using only a handful of the items in its arsenal.

The first thing you'll want to do (assuming you have a microphone plugged in) is click the microphone icon (below the menu) and select 'Start Monitoring'.



If your microphone is on and ready to begin recording, you should see a horizontal green bar flickering as the sound levels rise and fall.

**NOTE:** For the **Full Circle Weekly News**, I'm not going for high quality output. Hence, you'll see me using mono audio and low output settings. I'm trying to keep the final file size to an absolute minimum.

If you have a microphone plugged in, but nothing showing in the monitoring step, then you'll want to go to Edit > Preferences (in the menu) and in that window, select Devices. That's where you select your playback and recording

devices.

## TESTING TESTING

So, time to test things out. The main feature at the top of the Audacity window is the all-too-familiar controls such as pause, play, stop, etc.

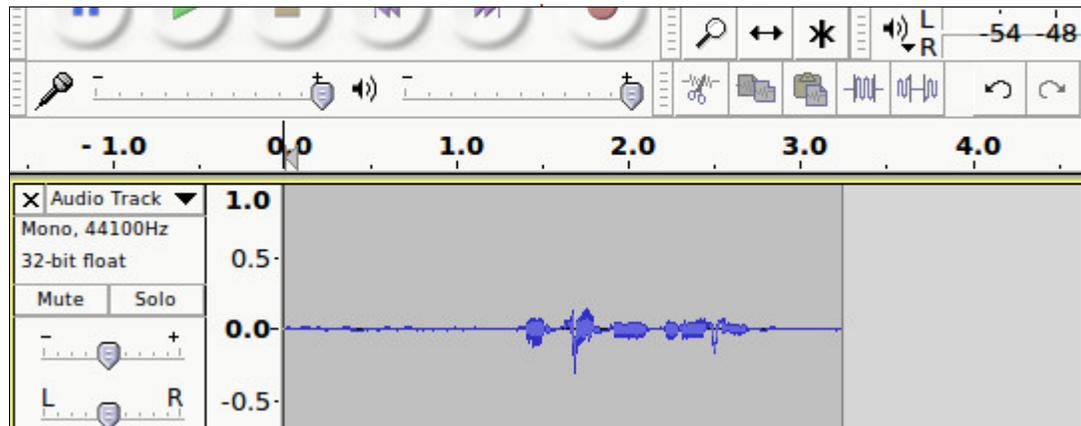


When you're ready, click the record button (shown left, the one with the big red dot on it), and pause

for a second or two before speaking. Why? I'll show you shortly.



Ok, now do your speaking. Press the stop button (shown left,



# HOWTO - BARE BASICS OF AUDACITY

square icon) to, well, stop recording.

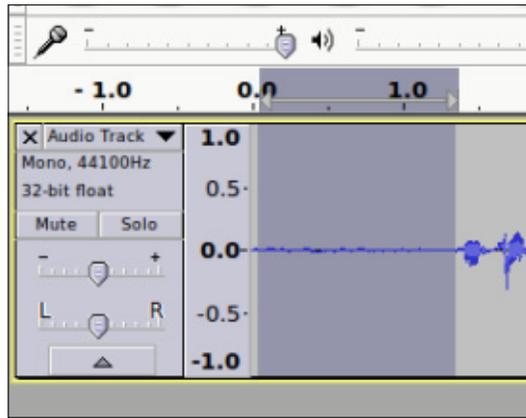
You should now see a waveform of your speech (previous page, bottom right).

 Pressing the play button (shown left, green triangle) will play back the speech you recorded.

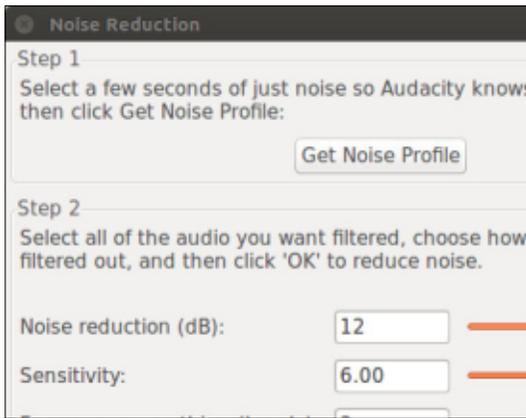
What's that? You had to turn the speakers up to hear it? OK, let's clean this up a bit and increase the volume on it.

## NOISE REDUCTION

 First, click the 'Selection Tool' (shown left, a vertical bar) from beside the record button. To zoom in/out of your waveform you can click the magnifying glass icons. What we want to do is select the empty portion of the waveform. That first second, or two. Click and drag at the start of the waveform to just where the waveform becomes taller. Like I've done in the screenshot.



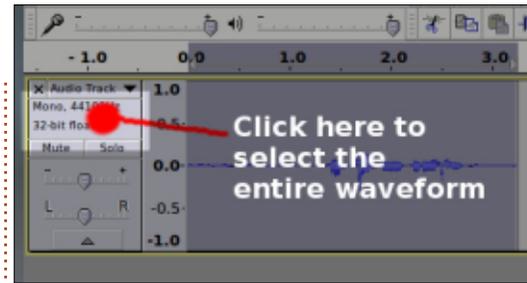
Now, in the menu, choose Effect > Noise Reduction. In the popup that appears, click the 'Get Noise Profile' button.



The window will close.

What we've done here is tell Audacity that the selected area is background noise.

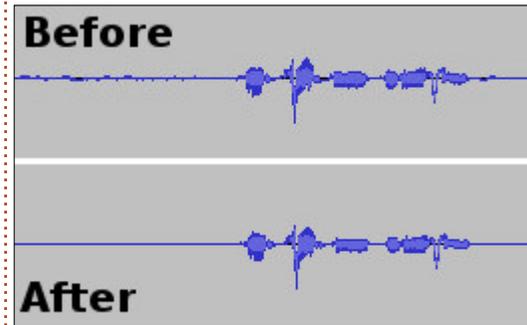
Now click the area to the left of the waveform – just above the small 'Mute' and 'Solo' buttons.



This will select the entire waveform for you. Nifty!

In the menu, again, click Effect > Noise Reduction, but this time just click OK. The rest of the settings are set for us from the last step.

It'll probably be small, but you'll see a change in your waveform. Here's mine before and after:

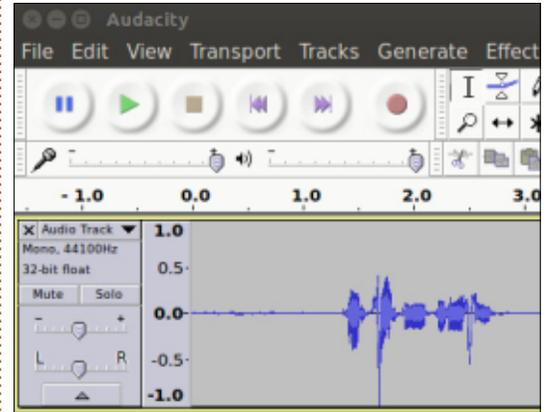


It's not much, but it's cleaned up the waveform.

## AMPLIFICATION

Now, in the menu, choose

Effect > Amplify. This effect will amplify the waveform to make it louder. Where it says 'Allow clipping' should be unchecked. If this is checked then it will mean the amplification could be excessive and it might distort your audio – making it sound bad. The amplification setting that Audacity has chosen for this waveform is 10.36. I'll go with that (by clicking OK).



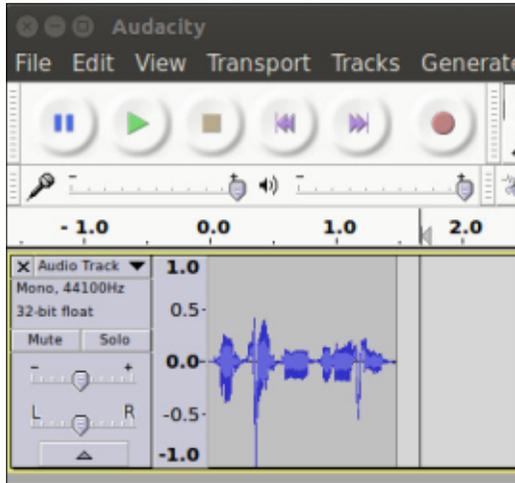
You can see that one of the spikes is just touching the bottom edge of the preview window. That's clipping. If I'd checked the box I could up the dB setting, but it would take the waveform out of the range and possibly cause distortion.

I could just as easily click Edit > Undo, select my waveform, do Effects > Amplify again and up the

# HOWTO - BARE BASICS OF AUDACITY

dB to try it out. Audacity is pretty good with its undo feature.

OK. I have my waveform cleaned, and amplified. Now I can select the blank space (as we did before) and press the delete key to remove it. Same at the trailing end of the waveform.



Now it's time to save your masterpiece.

## SAVING AUDIO

In the menu, click File > Export Audio. In this window you choose the file name, file format, and some quality settings. Like I mentioned earlier, with the podcast I go for low quality and a small file size, so I usually go with a

128Kbps MP3 file.

## SAVING PROJECT

Select the entire waveform again and, in the menu, do Edit > Duplicate. If you play the audio you'll get a slightly louder sound.



But click the 'Time Shift Tool' (shown left) and drag the bottom waveform to the right slightly. Now click Play.

Spooky!

But with the move tool you can also drag the waveform up. You can close the now empty track by clicking the X at the top left of the track. Now you'll get the same thing twice.

Pretty useless, but this shows you how to drag and drop waveforms within Audacity.

The whole point of this exercise is to show that there is a File > Save Project option too. That doesn't save an audio file. That saves an AUP file which is your Audacity project. This means you

can reload your layout and continue editing later.

## MORE?

Audacity can do a million other things, but I never use them. The things I've shown you above are enough for me to create a quick podcast.

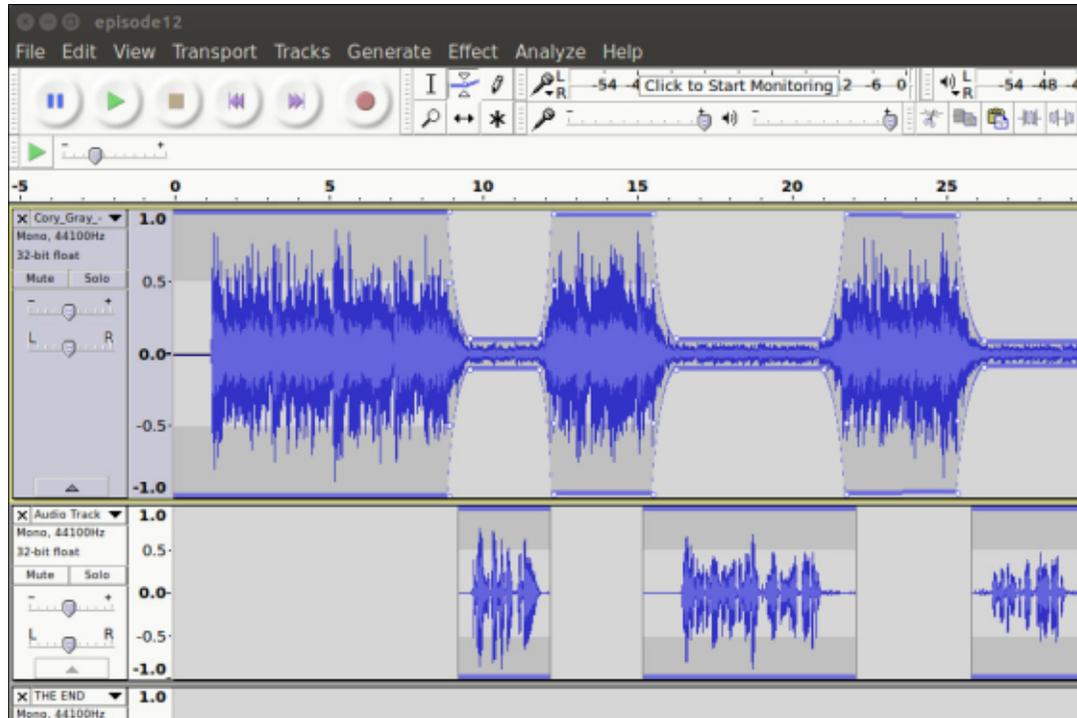
If you'd like to see more about Audacity do let me know. For another part, I could show you how to use the Envelope Tool to create nicely controlled fade in/out effects that I use in the podcast

intro (shown below).

If you've any Audacity tricks you'd like to share, feel free to email them to me, Ronnie, at: [ronnie@fullcirclemagazine.org](mailto:ronnie@fullcirclemagazine.org)



**Ronnie** is the founder and (still!) editor of Full Circle. He's a part-time arts and crafts sort of guy, and now an Arduino tinkerer.





# HOW-TO

Written by Mark Crutch

# Inkscape - Part 49

Last time, I introduced the Filter Editor dialog and demonstrated how to create a simple filter chain, resulting in a drop shadow effect. The chain consisted of three filter primitives: Gaussian Blur, Offset and Merge. I also used the Source Alpha and Source Graphic inputs. Recall that each primitive in the chain has one or more inputs, denoted by triangles, and a single output represented by the bottom of the primitive. The output from the chain as a whole is always the output from the last primitive. Therefore, in the Inkscape UI, our drop shadow chain looks like that shown below left

With a simple chain this is fairly

understandable but, as the complexity of your filters grows, a simple one-dimensional list becomes an unwieldy tool for looking at the complex arrangement of primitives that evolves. Mathematically speaking, filters are a "directed graph", consisting of a series of nodes (the primitives) and uni-directional lines connecting them. Such graphs are usually drawn in two dimensions, and you may find it easier to try to imagine your chains in that form. For example, our simple drop shadow could be represented like that shown below right.

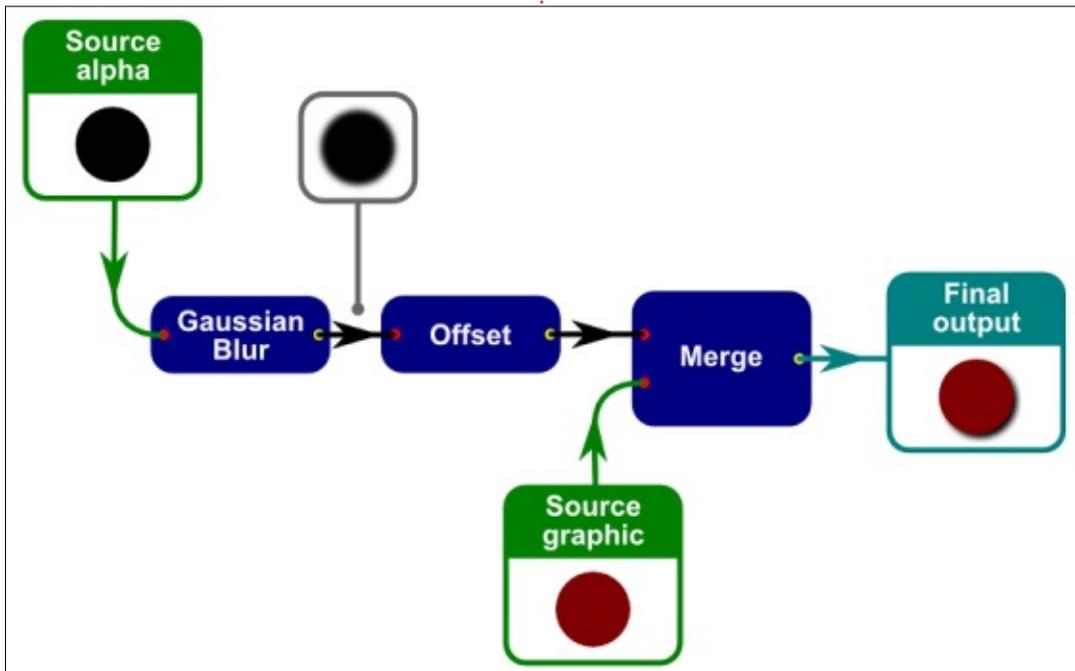
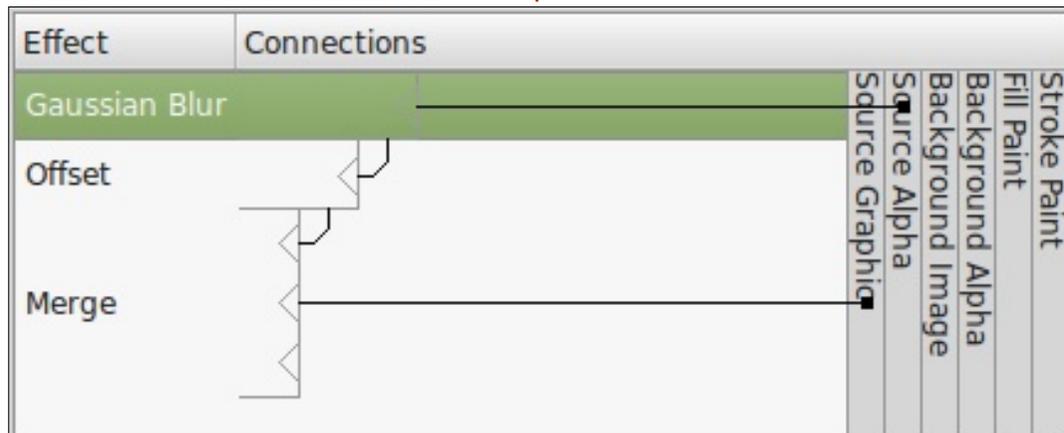
Here I've used blue boxes for the primitives, green for the image sources, and teal for the final

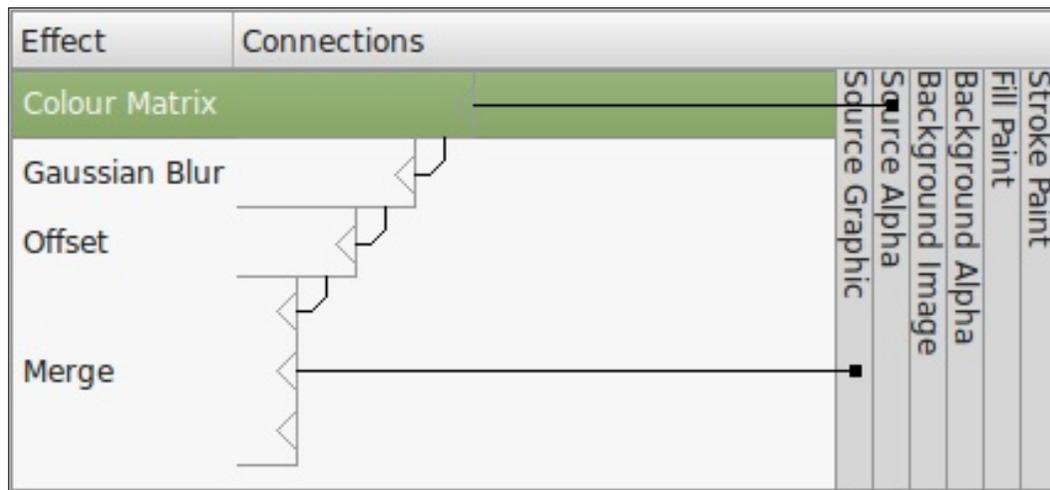
output. The gray box just shows the intermediate result that you would see if you could peek into the filter chain at that point. Hopefully you can see how this layout relates to the Inkscape UI, and I'll use this approach again to describe more complex filters as the series goes on.

One problem with our drop shadow is that it's based on the Source Alpha of the original object, which is essentially a black silhouette. But what if you want

your shadow to be more translucent – gray rather than black – or you want it to have a different color entirely? There is a filter primitive that lets us manipulate the color of the image in the chain, but unfortunately it's another case of a confusing UI that could have been made a lot more obvious.

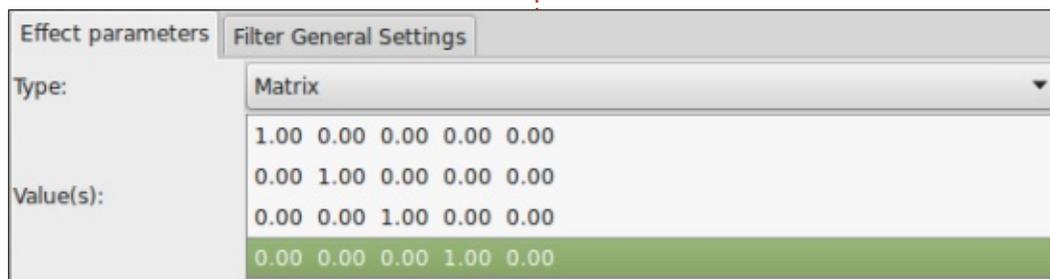
Start by adding the Color Matrix primitive to your filter. It will appear at the bottom of the chain, but you can drag it to another





location. We'll start by changing the opacity of the shadow, so it either needs to go after the Gaussian Blur step (to change the opacity of the already blurred image), or right at the top of the chain (to change the opacity before the blur is applied). Either approach will give roughly the same result, so I've chosen to put it at the top of the list. You then need to modify the connections so that the Color Matrix gets its input from the Source Alpha column, and the Gaussian Blur gets its input from the Color Matrix primitive.

With the Color Matrix primitive selected, take a look at the parameters at the bottom of the dialog. First there is a Type pop-up which lets you select between four different varieties of color manipulation. Three of them have simple, easy-to-use interfaces... so of course we need the other one! Select the Matrix option (this is also the default when you first add the primitive), and you'll be presented with a grid of numbers with little extra explanation (there is a lengthy tooltip, but I'm not sure it helps very much).



Input				Fixed Offset	Output	
R <sub>IN</sub>	G <sub>IN</sub>	B <sub>IN</sub>	A <sub>IN</sub>			
1.00	0.00	0.00	0.00	0.00	R <sub>OUT</sub>	
0.00	1.00	0.00	0.00	0.00	G <sub>OUT</sub>	
0.00	0.00	1.00	0.00	0.00	B <sub>OUT</sub>	
0.00	0.00	0.00	1.00	0.00	A <sub>OUT</sub>	

Above is that same matrix, presented with some headings to help clarify things:

$$R_{OUT} = (R_{IN} \times \mathbf{1.00}) + (G_{IN} \times \mathbf{0.00}) + (B_{IN} \times \mathbf{0.00}) + (A_{IN} \times \mathbf{0.00}) + (255 \times \mathbf{0.00})$$

Remember that filters are a way to manipulate the bitmap version of your vector image, just at the point it's converted to pixels. This matrix essentially holds some rules about how each individual pixel in your input image should be modified in order to produce the corresponding pixel in your output image.

Let's take the top row as an example. Suppose the first pixel in our image has an RGB value of (150, 128, 255) and it's completely opaque (an Alpha value of 255). To calculate the color of the output pixel we have to calculate its R, G, B and A values separately – the top row, therefore, is only concerned with the Red component of the pixel. The formula for calculating the Red output pixel value is:

The bold numbers in the formula are taken from the first row of figures in the matrix. Clearly only the first value has an effect in this case, as all the others are zero, so R<sub>OUT</sub> is simply the same as R<sub>IN</sub> × 1.00. In other words, with these figures the red component is passed through untouched, with a value of 150. If you repeat the process for each of the remaining three lines, you'll see that the default color matrix simply passes the input color through to the output without modifying it. It's an “identity” matrix, in mathematical terms. Because the same matrix is used for every pixel in the input image, the result is that this filter primitive will just copy the input image directly to the output without changing it at all.

To make the drop-shadow more translucent, we need to modify the output Alpha value. On the bottom row of the matrix, click on the 1.00 field and change it to 0.50 then press the Return or Enter key. Immediately you'll see the drop shadow change. You can choose any value you wish (between 0.00 and 1.00) in order to create a lighter or darker shadow.

What about changing the color of the shadow? There are a few ways to go about this, but we'll start by using the fourth column in the Color Matrix – the one labelled as “Fixed Offset” in my diagram. Consider that the black pixels in the Source Alpha image have an RGBA value of (0, 0, 0, 1) – with all those zeros it's clear that no amount of multiplication will change the output of the red, green and blue components. But the fourth column lets us add (or subtract) a fixed value. If you change the fourth column on the third row to 0.80, the formula for the blue component of the output pixels becomes:

$$BOUT = (RIN \times 0.00) + (GIN \times 0.00) + (BIN \times 1.00) + (AIN \times 0.00) + (255 \times 0.80)$$

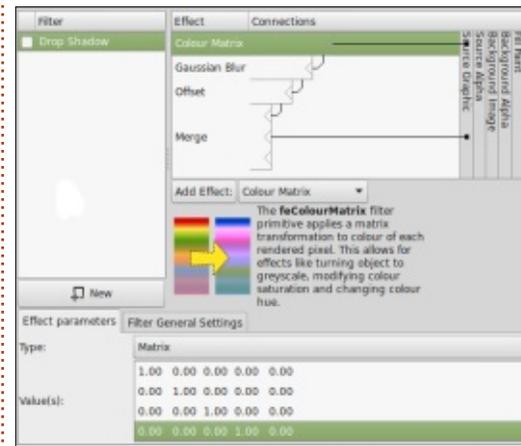
The multiplied R, G and B values all come to 0, but then we add  $255 \times 0.8$  onto the result, giving us a final blue component of 204. Our RGBA output value therefore becomes (0, 0, 204, 1), giving us a blue drop shadow. Try changing the values of the fixed offset for R and G as well and you'll quickly see that we can use this technique to produce any color of shadow we want, all from our black silhouette.

## DROP SHADOW

1.00	0.00	0.00	0.00	0.00
0.00	1.00	0.00	0.00	0.00
0.00	0.00	1.00	0.00	0.80
0.00	0.00	0.00	1.00	0.00

How about using the Color Matrix filter to go in the opposite direction – to generate a black shadow from a colored one? No problem, but first you'll need a colored image to work with. The easiest option is to move the input connection from Source Alpha to Source Graphic. You should also change your Color Matrix values back to the identity matrix to give you a known state to start from.

With that done, your drop shadow should now be the same color as your original object (red, in my case).



To convert our color to black, we have to set each component to zero. There are a couple of ways to do this:

- Put -1.00 into the Fixed Offset field for the R, G and B output values. No matter what the input values are, this has the effect of subtracting 255 from the output. This has the effect of setting each output to zero, because it's not possible for a color component to go any lower than that.
- Change the 1.00 values in the first three rows to 0.00 instead. Regardless of the input value, multiplying it by zero will give a zero output.

I took the second approach, to

give me a black drop shadow once more:

## DROP SHADOW

0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	1.00	0.00

Of course this is a terribly inefficient way to create a silhouette compared with just linking to the Background Alpha source, but it helps to demonstrate how output values are calculated from input values. So far, however, we've just looked at simple mappings, where red remains red and blue remains blue, but this filter primitive also allows you to map one input component to a completely different output. Consider a matrix like this:

0.00	1.00	0.00	0.00	0.00
0.00	0.00	1.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	1.00	0.00

It's similar to the identity matrix, except that the R, G and B columns are shifted by one place. The result is that the red component of the output pixel is taken from the value of the green component of the input, whilst the green output comes from the blue input and the blue output is taken from the red input. Let's see the result on a multi-colored source image:

Notice that this moves away from having a simple fixed color for the shadow, and instead produces different colors based on the corresponding pixel in the input image. If you include the output Alpha channel, things can get even weirder. Here's our multi-colored text with the RGB values zeroed to give us a black drop shadow again, except that the fourth row has been changed so that the Alpha channel is taken from the Red input component. Notice that colors with a high red value have dense, solid shadows, whilst those with no red in them

(such as the green S and blue O in "Shadow") have no shadows at all.

0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00

Although I've shown only relatively simple examples here, it's possible to create complex mappings between color channels. If you really want your red output to consist of 90% of the red input, less 10% of the green, less 35% of the blue, plus a fixed offset of 64, you just have to put values of 0.9, -0.1, -0.35 and 0.25 into the top row. Of course, predicting the output from complex combinations like this becomes rather difficult, so for normal use I recommend sticking with simpler, easy to understand mappings.

This ability to flexibly map color components to each other, or to and from the Alpha value, can be useful on some complex and

esoteric filters. Most of the time, however, you don't need that degree of flexibility, so the Type pop-up provides three other options to avoid you having to wrestle with the full matrix:

- **Saturate:** Provides a slider to let you change the saturation of your image. In other words, remove color from it, ultimately producing a grayscale result at the most extreme.

- **Hue Rotate:** Shift the color of your object by a fixed amount.
- **Luminance to Alpha:** Set the output alpha based on the RGB input values. In theory this makes dark areas more transparent and light areas more opaque, but RGB doesn't map neatly to the human perception of brightness, so this really works effectively only on grayscale input images. This can be used to punch holes in your filter output, based on the images produced in other parts of the chain.

Notable by its absence is a shorthand option for adjusting the opacity – where we came in at the start of this article. Unfortunately, if you want to make your drop shadow a little more transparent, you have no choice but to deal with the full matrix approach, even if

you are only changing a single value in the bottom row.



**Mark** uses Inkscape to create three webcomics, 'The Greys', 'Monsters, Inked' and 'Elvie', which can all be found at <http://www.peppertop.com/>



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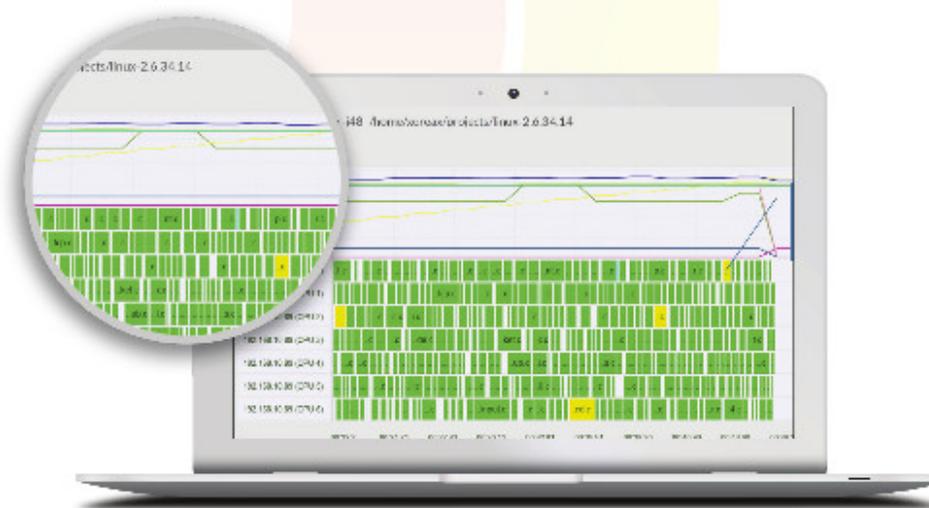
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palm of your hand.

Internally it uses an AT MEGA32U4 with an SSD 1306 OLED screen. Here are some other specs:

- Total Flash Memory: 32kb
- RAM: 2.5kb
- EEPROM: 1kb
- Frequency: 16mhz
- Monochrome Display: OLED
- Horizontal Pixels: 128
- Vertical Pixels: 64
- Lithium Polymer Battery: 180mAh
- Piezo Speaker: 1



A while ago I backed a Kickstarter project called **Arduboy**. Well, many months later, it has come to fruition and I finally have one of these incredibly small units.

Think of a marriage between a Nintendo Gameboy and an Arduino. That offspring would be the Arduboy. Measuring just 53mm x 85mm x 5mm, and weighing just 14 grams, it easily fits into the

The Arduboy comes with one game pre-installed (a Tetris clone) but there are many online games that can be uploaded to the unit.

Uploading games is something I haven't tried yet, but I'll try and cover that next month as I think it

is done by uploading the actual code, ala Arduino IDE, but I'll double check on that first.

<https://www.arduboy.com/>

Price: \$39





Over the course of the last year, I wrote exclusively about the Chrome OS. Consequently I became interested in the cloud. Future articles will be on cloud focused products, Chrome OS, and random thoughts of a Linux lunatic. This month I will review one cloud based item.

One item that touches the cloud is the Amazon Tap. Some reviewers consider it to be the real life version of a personal assistant. This is the vehicle for Amazon's virtual assistant named Alexa. Alexa is Amazon's answer to Cortana and Siri. Alexa can be found in an app—similar to Amazon Echo and Amazon Echo Dot. The Tap is a middle-of-road option. The Echo and Echo Dot are always active to answer your commands or questions. The Tap is not and requires a touch button to use it (see photos). Therefore the Tap has a longer battery life, since it is not always active.

I purchased the Tap directly from Amazon. The item was backordered for three weeks. It

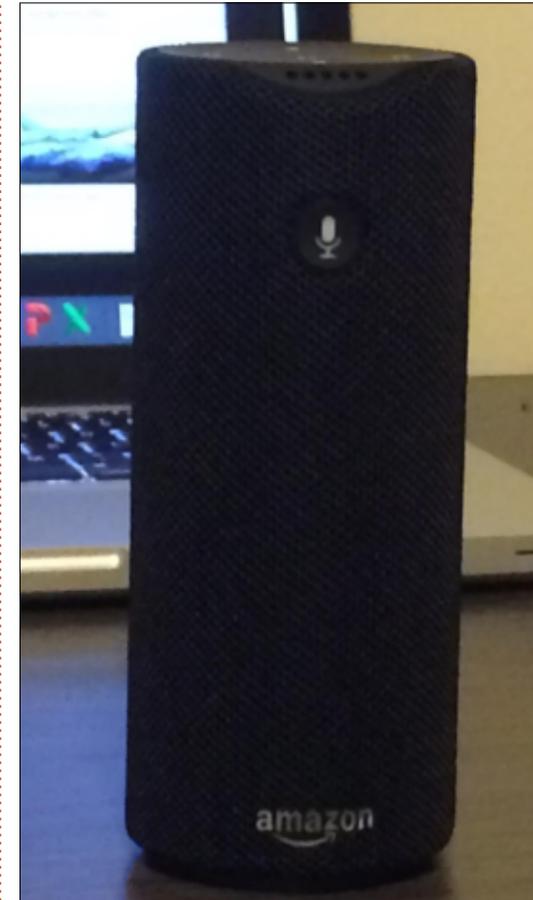
arrived in a simple black box with simple instructions. The Tap needs to be fully charged. I then downloaded the Alexa App to my iPhone. Using an iPhone, I connected to the Tap. After that successful connection, I tied the Tap into my Wifi. The Tap is tied to my Amazon Prime account.

I can ask basic questions, and listen to books, or music. The sound quality from the Tap is fine for the average owner. There is a learning curve to Alexa. You must learn how to give commands correctly to maximize Alexa's usefulness. Simply stating "Ramoness, I wanna be Sedated," does not work. You need to say "I want to hear I wanna be Sedated by the Ramones." Alexa will then query Amazon and start playing the song.

Alexa has a learning AI. She eventually recognizes your voice and preferences. Additionally, the Alexa App on my iPhone checks if my requests and fulfillment are done correctly. Alexa lists these as cards. These cards are a part of the

learning AI protocol developed by Amazon. To maximize Alexa, I have to interact with the iPhone App.

There are numerous cloud products to simplify our lives, which are unnecessary—Rocket Book One is such an example. It is a well made notebook, that is quite sturdy. However it is a notebook that uses QR codes, an app, and the camera on your smartphone. From these three elements, you can write your notes, take a picture, and it will label the page via QR code to reside on the cloud. Thus, I can have instant access to my notes on my iPhone. While it sounds magical, it is something I can already do with my iCloud account or Google Photos.



**SJ Webb** is a Linux Hobbyist and Research Coordinator. He enjoys fishing, hot rodding, and spending time with his kids and wife. He thanks Mike Ferarri for his mentorship.



## GUIDELINES

The single rule for an article is that **it must somehow be linked to Ubuntu or one of the many derivatives of Ubuntu (Kubuntu, Xubuntu, Lubuntu, etc).**

## RULES

• There is no word limit for articles, but be advised that long articles may be split across several issues.

• For advice, please refer to the **Official Full Circle Style Guide:** <http://url.fullcirclemagazine.org/75d471>

• Write your article in whichever software you choose, I would recommend LibreOffice, but most importantly - **PLEASE SPELL AND GRAMMAR CHECK IT!**

• In your article, please indicate where you would like a particular image to be placed by indicating the image name in a new paragraph or by embedding the image in the ODT (Open Office)

document.

• Images should be JPG, no wider than 800 pixels, and use low compression.

• Do not use tables or any type of **bold** or *italic* formatting.

If you are writing a review, please follow these guidelines :

When you are ready to submit your article please email it to: [articles@fullcirclemagazine.org](mailto:articles@fullcirclemagazine.org)

## TRANSLATIONS

If you would like to translate Full Circle into your native language please send an email to [ronnie@fullcirclemagazine.org](mailto:ronnie@fullcirclemagazine.org) and we will either put you in touch with an existing team, or give you access to the raw text to translate from. With a completed PDF, you will be able to upload your file to the main Full Circle site.

## REVIEWS

### GAMES/APPLICATIONS

When reviewing games/applications please state clearly:

- title of the game
- who makes the game
- is it free, or a paid download?
- where to get it from (give download/homepage URL)
- is it Linux native, or did you use Wine?
- your marks out of five
- a summary with positive and negative points

### HARDWARE

When reviewing hardware please state clearly:

- make and model of the hardware
- what category would you put this hardware into?
- any glitches that you may have had while using the hardware?
- easy to get the hardware working in Linux?
- did you have to use Windows drivers?
- marks out of five
- a summary with positive and negative points

**You don't need to be an expert to write an article - write about the games, applications and hardware that you use every day.**





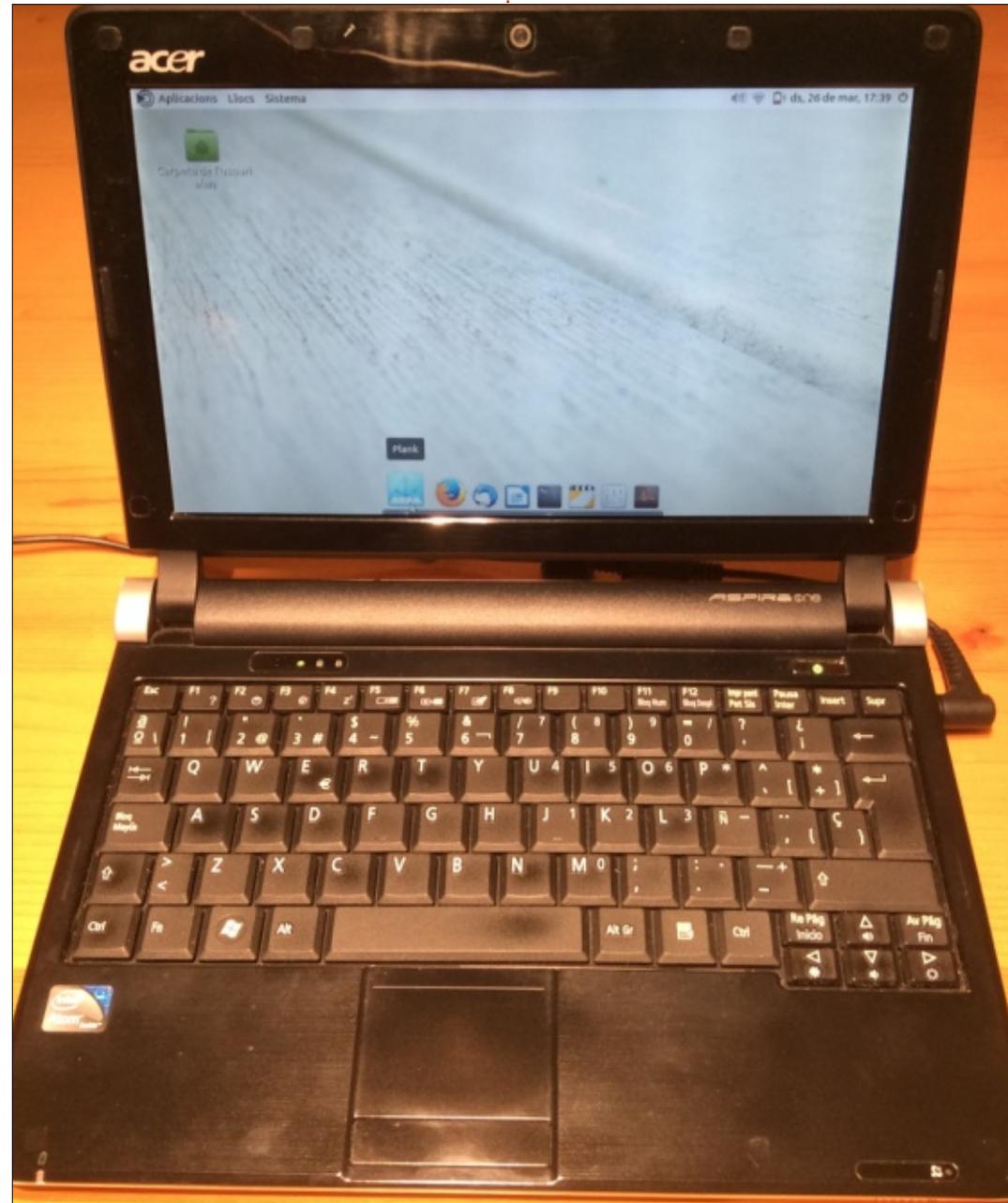
With 16.04 Xenial Xerus, all versions of our \*Ubuntu distributions are Long-Term Support (LTS). So, now seems a good time to cast a glance at what hardware is still capable of running them. People with aging computers may be on the fence on whether to stay with 14.04 -- still to be supported up until April of 2019 -- or to switch to a newer version. Better support for newer pieces of hardware (graphics cards, Bluetooth and whatnot) may not be of interest for users of older machines, but keeping an old but still working machine in business may well be.

The first piece of advice will naturally be: "If it ain't broke, don't fix it", meaning that if you are happy with your computer the way it is, there is no immediate hurry to change versions. Just keep it up to date, and you will mostly be fine.

With that out of the way, what about those who like to have the newest and greatest, while still running what would in some circles be considered "legacy" computers?

Netbooks are a breed that can still be of use thanks to their low weight and general ease of transport. Unfortunately, not many are offered new these days, being replaced by tablets and Chromebooks. I have nothing against such, but there are situations in which a good old VGA output or an Ethernet port can be of use... So putting an old netbook back into use as a nomad's computer can make sense in more ways than one (money being, naturally, a consideration as well).

However, not all netbooks are still quite up to the task. For example, the Asus eeePC can no longer handle a standard Ubuntu installation inside its puny 4 GByte internal drive. Older netbooks using the PC2700 memory modules may also be out of luck, since it may be difficult to find a combination of memory modules capable of getting a reasonable total amount of RAM. Most modules were, like these, of only 256 MByte capacity, and there used to be a maximum of two memory slots available in most



laptops.

For a reasonable minimum hardware starting point, perhaps an Intel Core Duo or Atom dual-core CPU with 1 GByte of RAM can be considered a bare minimum, below which the resulting system may very well be convinced to run, but no longer give a good user experience when actually working with it. To set an example, I will be using an Acer Aspire One (D250) from back in 2009. This particular computer has an Atom N2600 1.6 GHz CPU, 1 GByte of DDR3 RAM, a 10" screen with 1024x600 resolution, and supports internal 2.5" hard drives though a SATA-I compatible (1.5 Gb/s) connection. It also has a WiFi card, but no CD or DVD. It originally came with some version of Windows 7 (Windows Home, perhaps) though the sticker on the bottom is completely faded and I cannot be bothered to remember. In any case, it has run several versions of Ubuntu over the years, from 10.04 on up to the latest Linux Mint 17.3 MATE based on Ubuntu 14.04. But can it still perform under 16.04?

Since 16.04 had not yet been officially released at the time of writing, I used the Beta 2 releases

for Ubuntu and Ubuntu-MATE for this test. Naturally, the i386 (32-bit) architecture versions were chosen, as indeed they must be on most netbooks. 64-bit CPUs came late to these laptops compared to desktops or high-end laptops, and little can be found before AMD came into the market in later Aspire Ones, with an 11" screen.

Actually, the Acer does work quite well under Ubuntu 16.04 - yes, even under Ubuntu itself with the Unity desktop manager. I am typing this right now on Google Drive running the Live CD and Firefox. There is a noticeable lag between hitting the keys and

getting text to actually appear on screen -- especially when one of the images occupies some real estate on-screen -- but actual work can happen. It is in fact less annoying than a second computer on my desk at this particular time, which has Windows 8.1 getting purged of the various pieces of useless software the manufacturer stuck on it from new, and which now has the hard drive rumbling along, pegged at 100% usage. There are no hard drive noises from the Acer, which is running along nicely just from RAM.

There have been some annoyances along the way, though.

The main one on this computer was the insistence of the system to continuously go to sleep - every 10 seconds or so. This seems to be a bug that came with systemd. Not that I wish to bash upon systemd, but several bugs have appeared because of it over the months. In this case, a solution is easy to implement by opening a terminal, getting root access and editing file `/etc/systemd/logind.conf`:

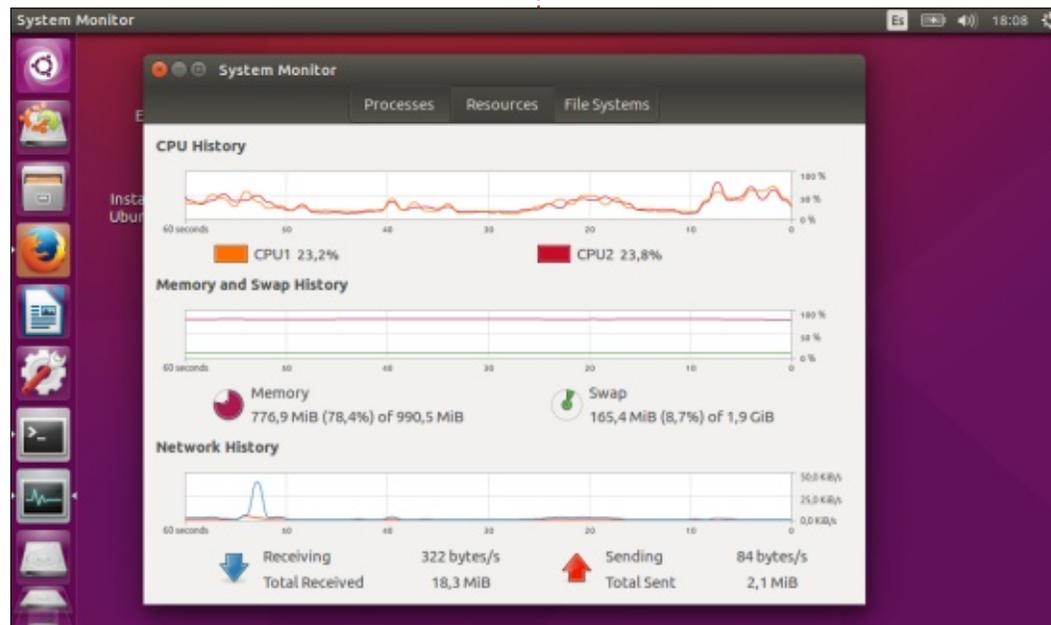
```
ubuntu@ubuntu:~$ sudo bash
root@ubuntu:~# editor
/etc/systemd/logind.conf
```

Two lines need to be added, that basically tell the power management system not to sleep if the lid closed sensor is triggered. There is no need to take any account of this sensor, basically because this computer does not have one! Anyhow, this is clearly an issue with this particular model, and should not happen with other makes or models. The two lines are:

```
HandleSuspendKey=ignore
```

```
HandleLidSwitch=ignore
```

Once done, we will need to restart the corresponding service.



On my computer, for some reason I also needed to restart the network management service. Perhaps the power management system also shuts down the WiFi card, though this is just me speculating:

```
root@ubuntu:~# service  
systemd-logind restart
```

```
root@ubuntu:~# service  
network-manager restart
```

```
root@ubuntu:~# exit
```

```
ubuntu@ubuntu:~$ nm-applet &
```

Once this is done, everything just worked - for me. For others, on different hardware, WiFi drivers may become an issue that needs to be handled in the usual way.

Memory usage is about 780 MBytes, including the basic system, the Unity desktop manager, Firefox, and the rather memory-hungry Google Drive web editor, which is to be expected since it makes an intensive use of JavaScript. It can be noted I had virtual memory turned on for this computer. The LiveCD has detected the swap partition from an existing installation on the hard drive, and is using it for some extra space. This does seem to speed things up a little since less page-

swapping occurs when our RAM is nearly full.

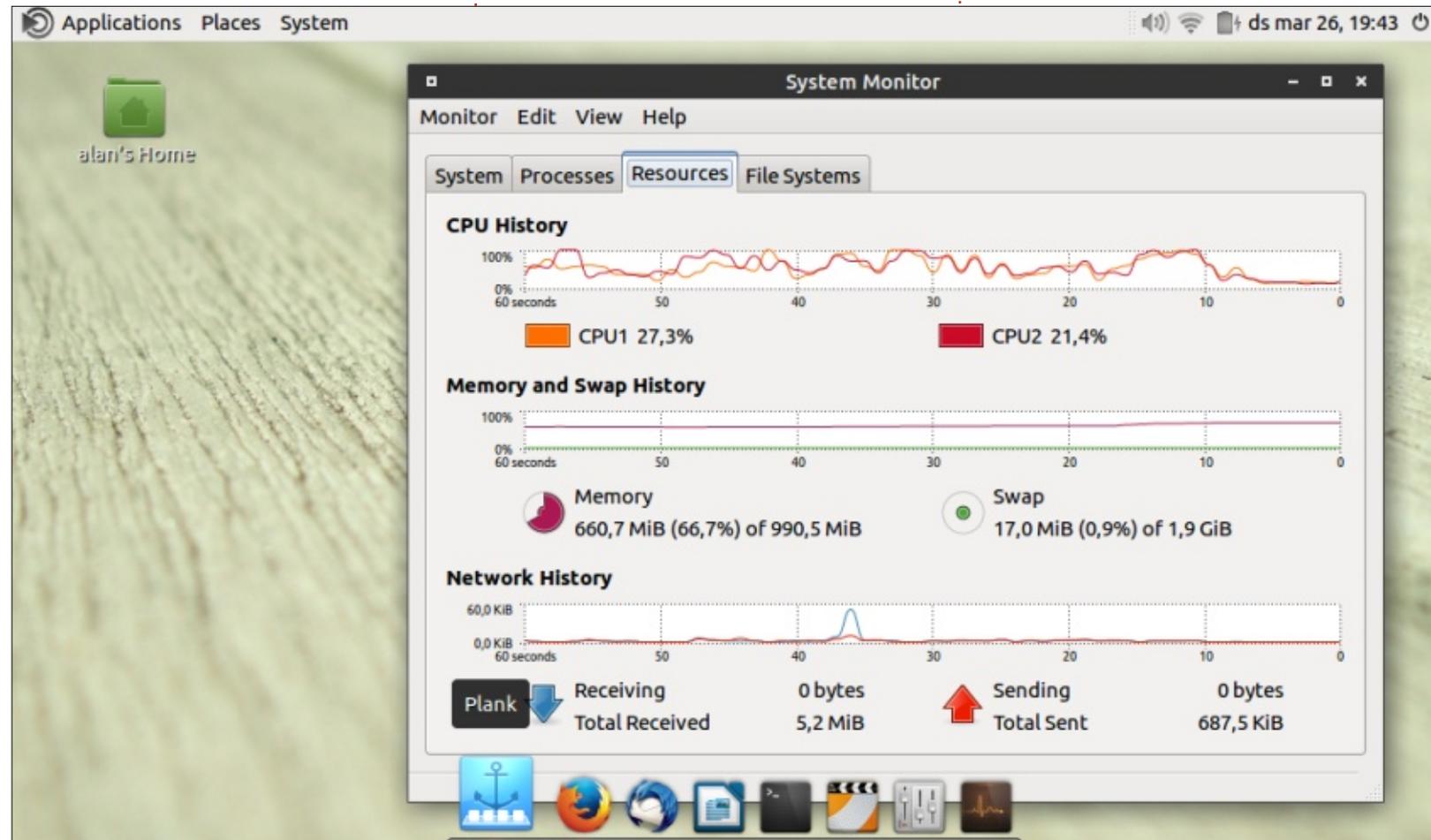
On the other hand, the processor is getting hit rather hard. The bottom of the netbook got quite toasty, as both cores were used consistently. Part of the fault does not in fact lie with the system itself or the programs, but rather with the integrated graphics

processor on these CPUs. The GPU in the Atom runs either at 200 or at 400 MHz - i.e. quite slowly. Its lack of processing power when calculating overlays and other graphic effects must be completed by the main CPU itself, which does tend to run hot as a consequence.

It may be noted that, as a result, battery life in these

conditions may be greatly reduced. The computer is also running on a battery that was manufactured back in 2009, so with less capacity than modern batteries and also not at its best due to much use during the intervening years.

Logically, one way to use less resources is to adopt a less power-hungry desktop manager. One of



the leaner versions of Ubuntu comes with the MATE desktop, so that was what I decided to install on this machine. The installation itself worked flawlessly, even though I made things slightly more interesting with a combination of ext4 (/boot) and btrfs (/ , /home) filesystems.

As expected, memory usage is lower with this desktop manager. With the same Firefox + Google Drive workload, usage went down a good 100 MBytes, which may not seem much but can make the difference between the system needing to swap, or not. Swapping out pages of memory to the hard drive is a slow process.

Processor usage was also down by quite a bit, leading to a slightly cooler underside for the computer, and less fan noise for the user. Even using an office application such as LibreOffice Writer works well on this one - better, in fact, than Google Drive since the RAM requirements are slightly lower.

Once we have established that Ubuntu 16.04 may be used on this class of hardware, some tuning may be undertaken. Perhaps the area in which most gains could be

expected would be through a processor swap. But it is indeed unfortunate that netbooks have CPUs soldered onto the main board, that simply cannot be changed - unlike a desktop computer. On the other hand, both memory and the hard drive can usually be easily exchanged.

On the RAM side of things, most netbooks came with a single module of PC-5300 DDR2 RAM. Many modules were of only 1 GByte capacity, though others held 2 GBytes. Since many netbooks contained only a single memory slot, upgrading from 1 to 2 GBytes may mean somehow sourcing a 2 GByte memory module - which may not be easy. Needless to say, they are generally considered obsolete and not usually carried anymore, and if you do find them it may be at stupid prices. Cannibalizing another, non-functional, netbook may be of use here.

However, care should be taken to use only the appropriate type of memory. SO-DIMM PC-5300 DDR2 RAM running at 333 MHz may be the most common type, but it is by no means the only one found out in the wild. The label on the module itself usually conveys the

necessary information, and memory module form factors also tend to be different, helping figure out which modules may or may not be installed in which computers.

As for hard drives, there is a tendency nowadays to swap laptops' original "spinning platter" drives for Solid-State (SSD) drives - and, with offerings such as this 120 GByte model for less than 50 Euro, this type of upgrade certainly makes sense for modern machines.

Now, we may consider the fact that operating systems such as Windows or OS-X usually weigh in at a minimum of about 20 GBytes

of disk space, whereas Linux variants may have ample disk space with just 5 GBytes, or even less. Ubuntu just uses the disk rather less than other operating systems, reading in and writing out less data at each system boot. So the gain obtained through switching to a speedier SSD, while certainly noticeable, is not as extreme as that obtained under those other, heavier, operating systems.

As for netbooks, unfortunately their main boards were usually designed to give adequate support for platter-type hard drives, which means typical data transfer speeds



in the 80 to 100 MByte/s range. A SATA-I connection is certainly up to that, topping out at 150 MByte/s. However, modern SSD drives can usually spit out data at 250 to 300 MBytes/s, requiring the faster SATA-II (300 MBytes/s) or SATA-III (600 MBytes/s) connections. If the computer's main board is only capable of SATA-I, at best the hard drive will be limited to just 150 MBytes/s - and at worst will simply not be recognized by the computer, which is what happened to my Aspire. So a best-case speedup of only about 2x may be expected by changing the hard drive, much less than that experienced on higher-grade machines with SATA-II or -III interfaces that can go up by 4x or 5x.

But this should not dissuade us from swapping the hard drive. As stated above, prices on SSDs have really gone down, to less than 1 Euro per Gigabyte especially for the lower capacities. Even if our netbook cannot handle the extra speed and will be limited mostly by the slow processor, there will be some advantages to having a new drive. One is that the original hard drive that came with the netbook may be getting on quite a bit in

age by now, and so may in all probability fail on us at some point. Another is that SSDs have no moving parts, may survive falls and other accidents even while being used, and so are better suited to computers that get hauled (and banged) about quite a lot during the working day. However, care must be taken either to source an SSD that also accepts SATA-I connections, or to ensure that the netbook's chipset handles at least SATA-II.

Ubuntu 16.04 has been hailed as the version of Ubuntu that will achieve convergence across many different platforms. While this is certainly true, perhaps we users should also be aware that the need to cater for hardware with varying levels of performance has no doubt brought about a new awareness within the developer community that certain previous versions of Unity were simply too slow. There has been a salutary reaction from developers. Things have certainly been turned around, and this newest version (for now) has regained some of the terrain lost. I have no precise numbers in front of me, but there is a distinct feeling that Ubuntu 16.04 is no heavier on a machine than 14.04,

and may be distinctly lighter when using a lightweight desktop manager such as MATE. Time will tell, but I get the feeling that 16.04 may be one of the keepers.



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## THE FULL CIRCLE WEEKLY NEWS



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Last month, our refurbishing not-for-profit was approached by a small not-for-profit community looking for a donation of used computers. The organization had recently been given some space in which to meet (they'd been meeting in member's houses before this), and now needed a few computers so members could learn basic computer skills. In my original discussion with the executive, they mentioned that the organization had no funding for computers. After a short discussion about licensing and what the

organization was looking for, it dawned on me that a Linux Terminal Server Project (<http://ltsp.org/>) might work for them. I pulled out a thin client we'd just received as a donation and asked the executive if they were interested in a client/server setup. The executive seemed excited at the prospect of getting thin clients (having worked with them before), but their timeline was very short—less than 1 week.

Having never even set up a PXE network boot server before, I needed clear instructions: I found

them at Bobby Allen's Blog: <http://blog.bobbyallen.me/2015/07/19/setup-a-ubuntu-14-04-lts-mate-terminal-server-with-ltsp/>

For the server, I used a retired desktop machine that our project once used as a SAMBA file server. The server had an Intel Core 2 Quad Q9400 (2666MHz processor) in it, and 2GB of DDR2 667MHz RAM. The drives we'd pulled and wiped a long time ago, so I installed a pair of matched 80GB hard drives. Initially I created a hardware-based RAID mirror (using the motherboard RAID controller), but I reconsidered the idea and decided just to ditch the hardware RAID and clone the installation drive once I was happy with the LTSP server setup. (In my experience people sometimes have "friends" with good intentions who install less than legitimate software on their computer, cloning the drive would at least give me some sort of backup should this happen). I also pulled the 2 x 1GB of RAM and inserted a matched pair of 2GB sticks for 4GB 800MHz DDR2 RAM.

Initially I understood that the organization had an existing Internet connection so I figured the best thing to do was to set up the server for DHCP and when I got to the facility get their system administrator to set a DHCP reservation for the server, then update the SSH keys and the image that gets built.

There are a few ways to build LTSP images, but building an image off an existing installation seemed like the simplest way to go and Bobby's instructions for updating an image are really clear. Some LTSP installations need 2 network interface cards, but Bobby's method uses only one card and the LTSP server acts as a proxy for the clients. The server acting like a proxy tripped me up when I first got LTSP running because I couldn't understand why the clients showed the server address when I ran the command: `/sbin/ifconfig`. After rebooting the client, I noticed a unique (non-server) IP address in the bottom right of the login screen. It's only on logging in that the client uses



the server's IP as a proxy.

Because all the clients would likely be 32-bit, and it wasn't likely that the organization would have more than 3 or 4 computers, I chose to install the 32-bit version of Ubuntu MATE 14.04 on the server.

As with any desktop or server installation, it's always a good idea to update before installing any new software:

```
sudo apt-get update
```

Some LTSP server setups use the paradigm of letting the server act as a DHCP server for clients. Because I didn't know the organization's network setup, it seemed a better idea to allow their router to do DHCP, but the server would act as a proxy for the router - dnsmasq provides this functionality. Dnsmasq can be set up as a DHCP server, but, in this case, I used it to forward DNS to the clients.

The LTSP image had to be deployed to the clients some way. Bobby mentions in his blog that dnsmasq can also act as a tftp server, but that the functionality is

broken in Ubuntu 14.04. Ubuntu actually has a few tftp server packages in the repositories, but the one that he used, and that kept coming up on all the LTSP-related sites, was tftpd-hpa. Lastly, the ltsp-server package is needed so the LTSP client environment can be built.

```
sudo apt-get install dnsmasq  
tftpd-hpa ltsp-server
```

The next step is to build the LTSP image that will be served to the clients. Because the build process has to download packages, this step can take quite a bit of time, especially on a slow Internet connection, so be patient. In my case, I was building a 32-bit version of Ubuntu MATE because the thin clients I picked (I actually ended up using some old HP DC7100

Pentium 4 based desktops with no hard drives instead, but more on this later) were 32-bit, and because I'd installed a 32-bit version of Ubuntu MATE on the server. Build a 32-bit client using the following command:

```
sudo ltsp-build-client --arch  
i386
```

If you're building for 64-bit clients, just remove the --arch i386. You'll also need to replace the i386 in several other places with amd64 including the next step, enabling the DHCP proxy support. For 32-bit images, run:

```
sudo sed -i 's/ipappend  
2/ipappend 3/g'  
/var/lib/tftpboot/ltsp/i386/p  
xelinux.cfg/default
```

Again, if you're building for 64-

bit, replace the tftpboot/ltsp/i386 with tftpboot/ltsp/amd64. Bobby also mentions that if you update your image, something I did several times, you'll have to rerun the above command. (Once I tested my image on the clients, I decided to add several graphics and educational software packages to the server, rebuilding built them into the client image)

DNSmasq needs to be set up so it can act as a proxy for the clients. At this point, I was stuck because I had no information about the organization's existing Internet connection. On further discussion with the executive (and to my horror), I found out that the Internet connection they had was a wireless connection that someone was letting them use. Clearly, this wasn't going to work, even with only 3 clients, they'd choke on a 54g wireless connection. We had a discussion about getting a wired connection, and I set up the rest of the LTSP configuration based on a wired router we had sitting around the shop. I also grabbed a 5-port gigabit switch. Although the router has 4 ports (in addition to the Internet port), all the ports were 10/100, so I connected the router and all the clients to the 5-port



gigabit switch. I set the router to hand out DHCP in the 192.168.80.x address range. My `/etc/dnsmasq.d/ltsp.conf` file looked like that shown right.

Again, if you're building a 64-bit image, replace `i386` with `amd64` in the line:

```
pxe-service=x86PC, "Boot from network",
/ltsp/amd64/pxelinux
```

With `dnsmasq` set up, it was only a matter of restarting the `dnsmasq` service and booting the thin clients (or so I thought). Restart `dnsmasq` by running:

```
sudo service dnsmasq restart
```

I turned on the thin clients, they started to network boot and download the Ubuntu MATE image and I ended up staring at a black screen... After a bit of research, I discovered the thin clients actually had a bit of storage on them, so I installed Ubuntu MATE directly on the storage and booted them to the same result -- it seemed that these particular clients didn't like to work with Xorg without further configuration. At this point, it was the last chance I'd get to work on the system before having to

```
#####
# Dnsmasq running as a proxy DHCP
#####

#
# TFTP
#
#enable-tftp
#tftp-root=/var/lib/tftpboot

#
# DHCP
#
dhcp-range=192.168.80.0,proxy
# Tell PXE clients not to use multicast discovery
# See section 3.2.3.1 in http://tools.ietf.org/html/draft-henry-remote-boot-protocol-00
dhcp-option=vend:PXECClient,6,2b
# Better support for old or broken DHCP clients
dhcp-no-override
# Enable this for better debugging
#log-dhcp

#
# PXE
#
# Note the file paths are relative to our "tftp-root" and that ".0" will be appended
pxe-prompt="Press F8 for boot menu", 3
pxe-service=x86PC, "Boot from network", /ltsp/i386/pxelinux
pxe-service=x86PC, "Boot from local hard disk"
```

deliver the news to the executive. I pulled out an old (but reliable) HP DC7100 Pentium 4-based computer we used to use as public computers, and set it up to boot (the first picture in this article shows the computer with the top of the case off) from network and voila, it successfully booted to the LTSP login screen.

Now I was left wondering

“what’s the default login username and password?” Google might be your friend, but it wasn’t mine that night until it dawned on me just to use the credentials I used to set up the server - and it worked! The next problem I ran into was that when I ran `/sbin/ifconfig` on the client computer it displayed the I.P. address of the server. This didn’t make sense at first because I thought it should display the an

address unique to the client. I thought I’d done something wrong when in fact things were working exactly as they should be. Once the client logs in to the server it actually is using the resources of the server and the proxy we set up was working as it should be. The clue that things were working correctly happened when I rebooted and noticed that each client does indeed get a unique I.P.

address that's displayed in the bottom right of the LTSP login screen.

The last problem I ran into was the fact I was using the LTSP server administrator credentials to log in to the server. When I went to shut down the client, and typed in the server admin credentials, I also shut down the server. To fix the problem I added a non-administrative account to the server. Clients would use this non-administrative account to log in. But as hinted at earlier, when you make changes you want incorporated into your image you have to rebuild:

```
sudo ltsp-update-image  
  
sudo sed -i 's/ipappend  
2/ipappend 3/g'  
/var/lib/tftpboot/ltsp/i386/p  
xlinux.cfg/default
```

These commands need to be run every time you want to rebuild the client image based on a change on your server. Remember to replace the i386 with amd64 for 64-bit images. I found myself updating the image several times before I got it to a point where I thought I had the right mix of

software for the community centre.

After work one evening, I headed to the community centre with one of the executives to install the server. The centre had already taken 3 clients. The centre still didn't have a wired Internet connection, but we set up the network and ran through some of the installed programs so they could get their members started learning keyboard skills (klavaro, I found tuxtyping to be too slow on the clients). When the centre gets a wired connection, I'll be revisiting them to reconfigure their server for whatever router is giving them DHCP (I'll add a DHCP reservation for the server on the router). At that point, it will also be necessary to update the ltsp ssh keys, and update the image:

```
sudo ltsp-update-sshkeys  
  
sudo ltsp-update-image  
  
sudo sed -i 's/ipappend  
2/ipappend 3/g'  
/var/lib/tftpboot/ltsp/i386/p  
xlinux.cfg/default
```

It's exactly the same process for updating the image with the exception of updating the ltsp ssh keys first.

I've asked the community centre executive to keep me in the loop to help members, and a person of their choosing with training to administer the server. The centre hasn't officially opened at the time of this article, so I expect I'll have a lot more to write about in a future article. It's worth noting that I didn't have a problem playing sound on clients, but ran into issues with USB devices. Initially I couldn't get USB devices recognized on the clients. With some searching, I managed to fix the problem, but then ran into the problem of not being able to get the drives to unmount without administrative privileges.

I also tried a system with a Core i5 processor as a client, and was surprised to find that it wasn't that much faster – slightly faster to boot, but not much of a discernable difference running software (because the server is handling almost all of the load).

## LTSP RESOURCES:

LTSP home page:  
<http://www.ltsp.org/>

Ubuntu LTSP community help:  
<https://help.ubuntu.com/community/UbuntuLTSP>

Bobby Allen's blog:  
<http://blog.bobbyallen.me/2015/07/19/setup-a-ubuntu-14-04-lts-mate-terminal-server-with-ltsp/>

Enabling USB and other local devices:  
<https://wiki.ubuntu.com/EnableLTP5LocalDevices>



**Charles** is the author of Instant XBMC, and the project manager of a not-for-profit computer reuse project. When not building PCs, removing malware, and encouraging people to use GNU/Linux, Charles works on reinventing his blog at <http://www.charlesmccolm.com/>.



# UBUNTU DEVICES

Written by Ronnie Tucker

No great, or important, Ubuntu device news this month. Next month we will have OTA-11.



# REVIEW

Written by Ronnie Tucker

# BQ Aquaris M10 Ubuntu Tablet

Finally, we get our hands on an Ubuntu tablet; the BQ Aquaris M10 Ubuntu Edition. The tablet comes in two flavors (more on that shortly), and if you pre-ordered it (like I did) then you also receive a cover and screen protector.

The M10 is, more importantly, the first Ubuntu device (in fact, any device) which can do the magical convergence trick that's so often talked about with Ubuntu Touch. Convergence is, simply put, one device that can have multiple uses. For example; alone the tablet is just that (a tablet), but with the addition of a bluetooth keyboard and mouse, the OS will adjust accordingly (giving you a desktop look) and you now, in effect, have a laptop. Output the tablet to a screen and you have the makings of a desktop machine.

## SPECS

As stated earlier, there are two versions; an HD version, and a Full HD (FHD) version. The HD comes in white, the FHD in black.

Both have 10.1" screens, are 246 x 171 x 8.2mm in size, weigh 470g, use a 16:10 aspect ratio, have 16GB of storage with 2GB of RAM, micro-SD slots (on the top edge) with micro-HDMI and micro-USB OTG slots on the left side, and with them, a headphone jack. The right edge has the power and volume buttons. Both have bluetooth 4, accelerometer, ecompass, brightness sensor, GPS, WiFi (dual-band) and come with Ubuntu 15.04 OTA-9. Upgradable to OTA-10.1 on first boot.

Obviously, they differ in resolution: the HD has 1280x800 while the FHD has 1920x1200.

The HD has a MediaTek QuadCore MT8163B CPU at 1.3GHz while the FHD has an MT8163A at 1.5GHz. Both have Mali-T720 MP2 GPUs with the HD's being 520MHz and the FHD at 600MHz.

They also differ with the HD rear camera being 5MP, FHD being 8MP. Front camera on the HD is only 2MP while the FHD is 5MP.

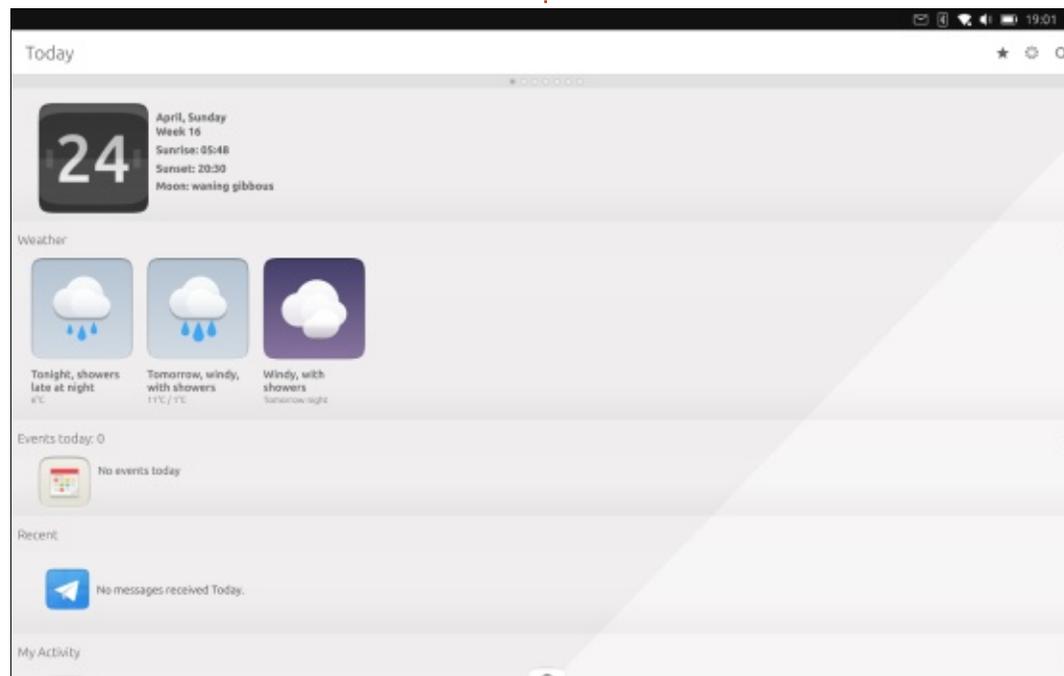
Neither come with a micro-HDMI cable, or OTG cable/hub. So if you want to try out USB devices, or hook it up to a screen, you'll need to buy some (cheap) extras.

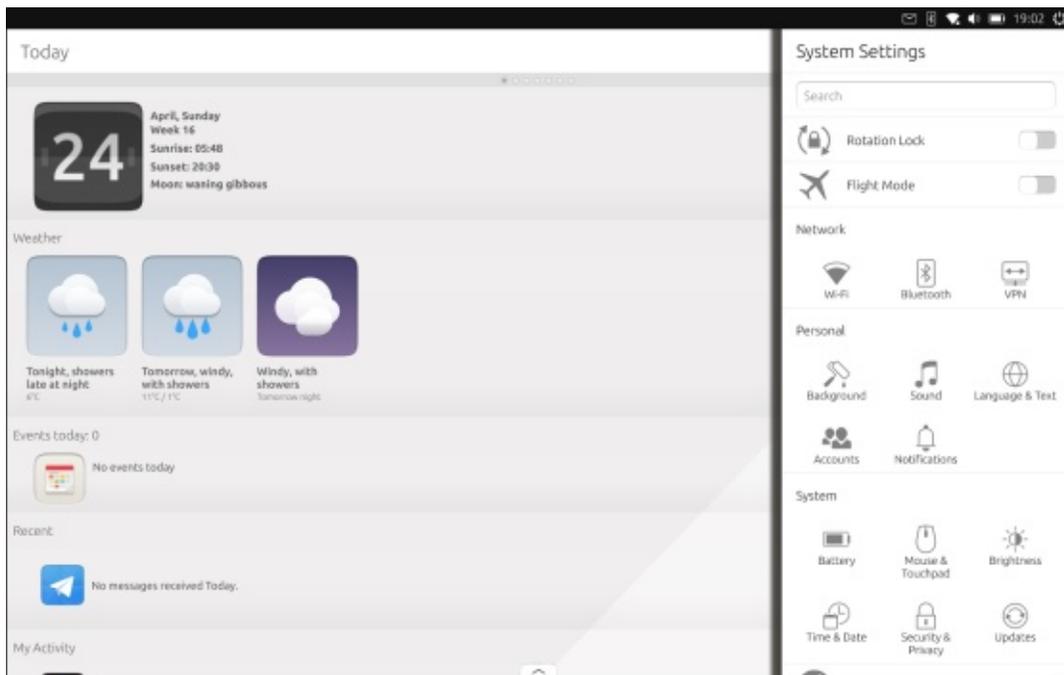
## UPDATES

I mentioned that the tablet comes with 15.04. While 16.04 has now been released on the desktop, it's not available as yet for mobile devices. I'm told that it will come later in the year, but it's a big job, so don't expect every desktop Ubuntu update to appear on your mobile device. But, don't worry, 15.04 (and future Touch versions) for mobile devices is still being looked after and you'll receive Over The Air (OTA) updates every month or two. As I write, 10.1 is the latest update.

Updating is done by simply going to the System Settings > Updates, and you'll see software and OS updates in here.

For more on using the OS itself, see my review of the Meizu MX4





phone. It's the exact same software.

## SIDE STAGE

A new feature found only on the tablet is side-stage. This is where you can have two apps on the screen side by side. The one on the right is overlapping the one on the main screen.

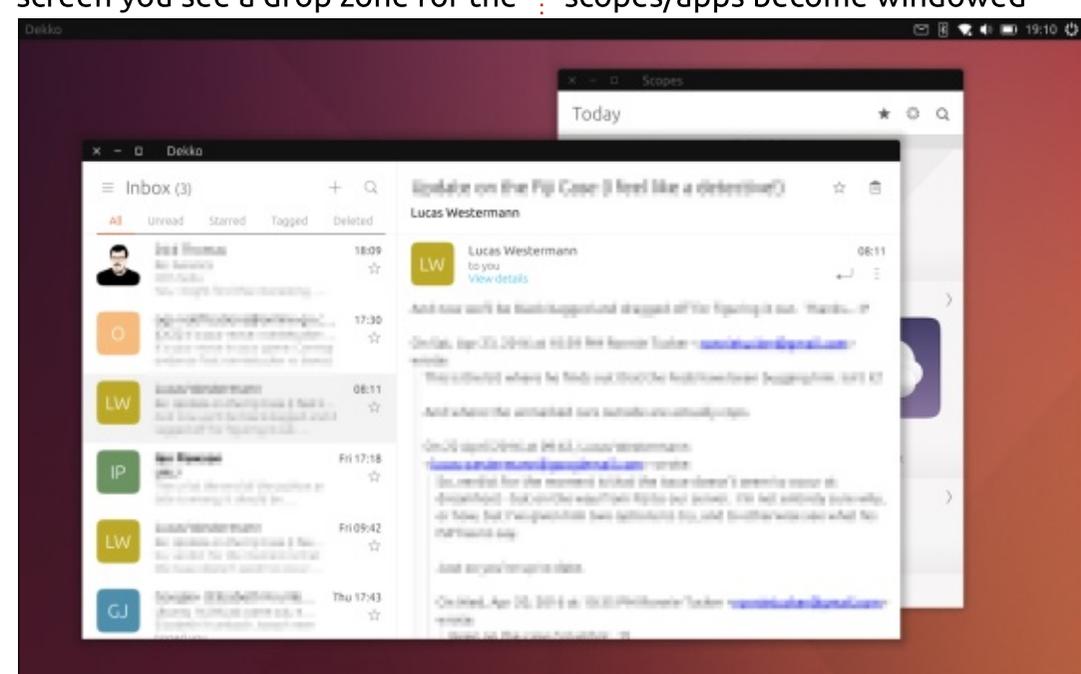
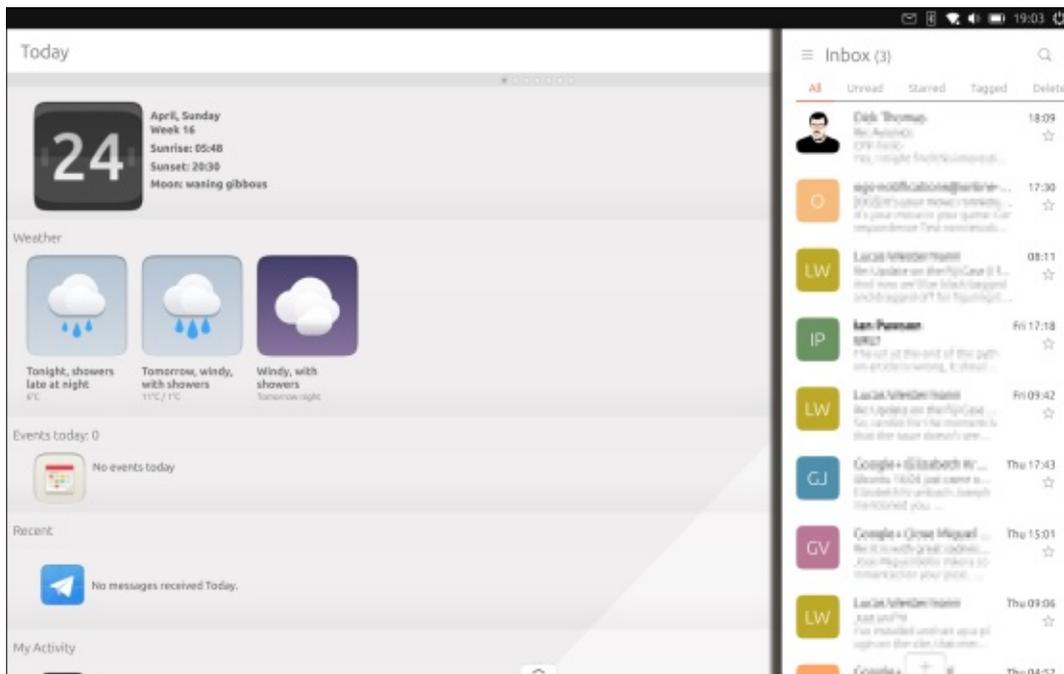
This is done by opening the app you want at the right side of the screen then, with three fingers, dragging the app to the right of the screen. As soon as you move your three fingers across the screen you see a drop zone for the

side-stage app.

Obviously, how well an app looks in side-stage is up to the developer. So don't worry if things look a bit odd at first. It's a handy feature to have your email (in Dekko), or the File Manager, always there at the side of the screen.

## CONVERGENCE

Adding a keyboard and mouse is when the magic starts to happen. The Ubuntu Touch OS switches into what it calls 'windowed mode' where your scopes/apps become windowed



# REVIEW - BQ AQUARIS M10 UBUNTU TABLET

and everything looks more like the familiar Ubuntu.

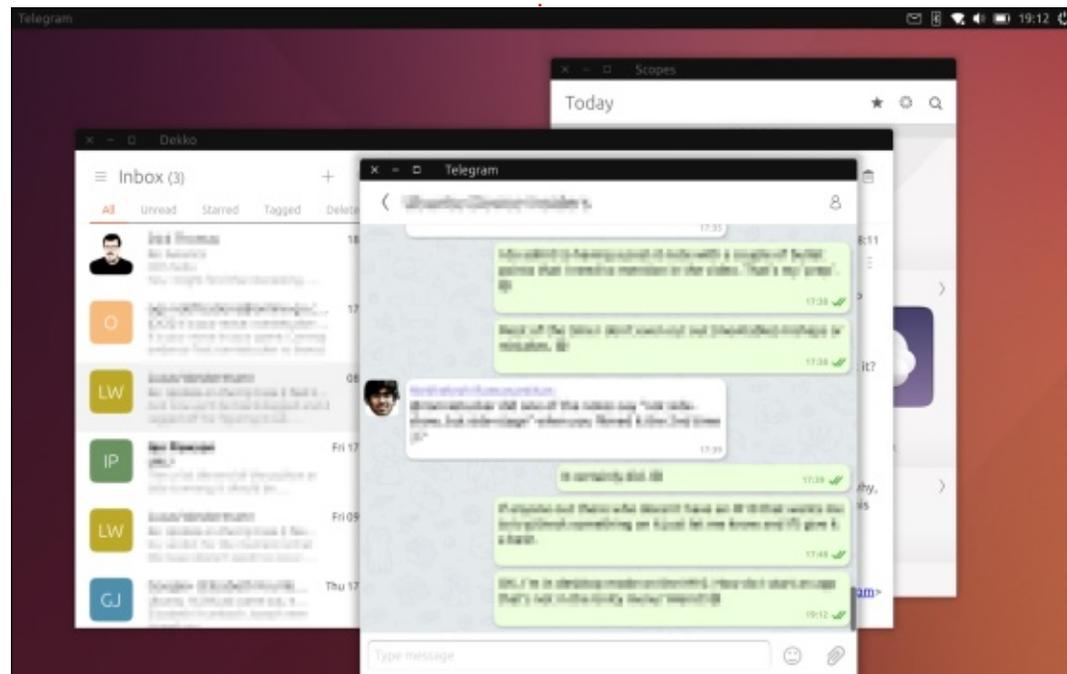
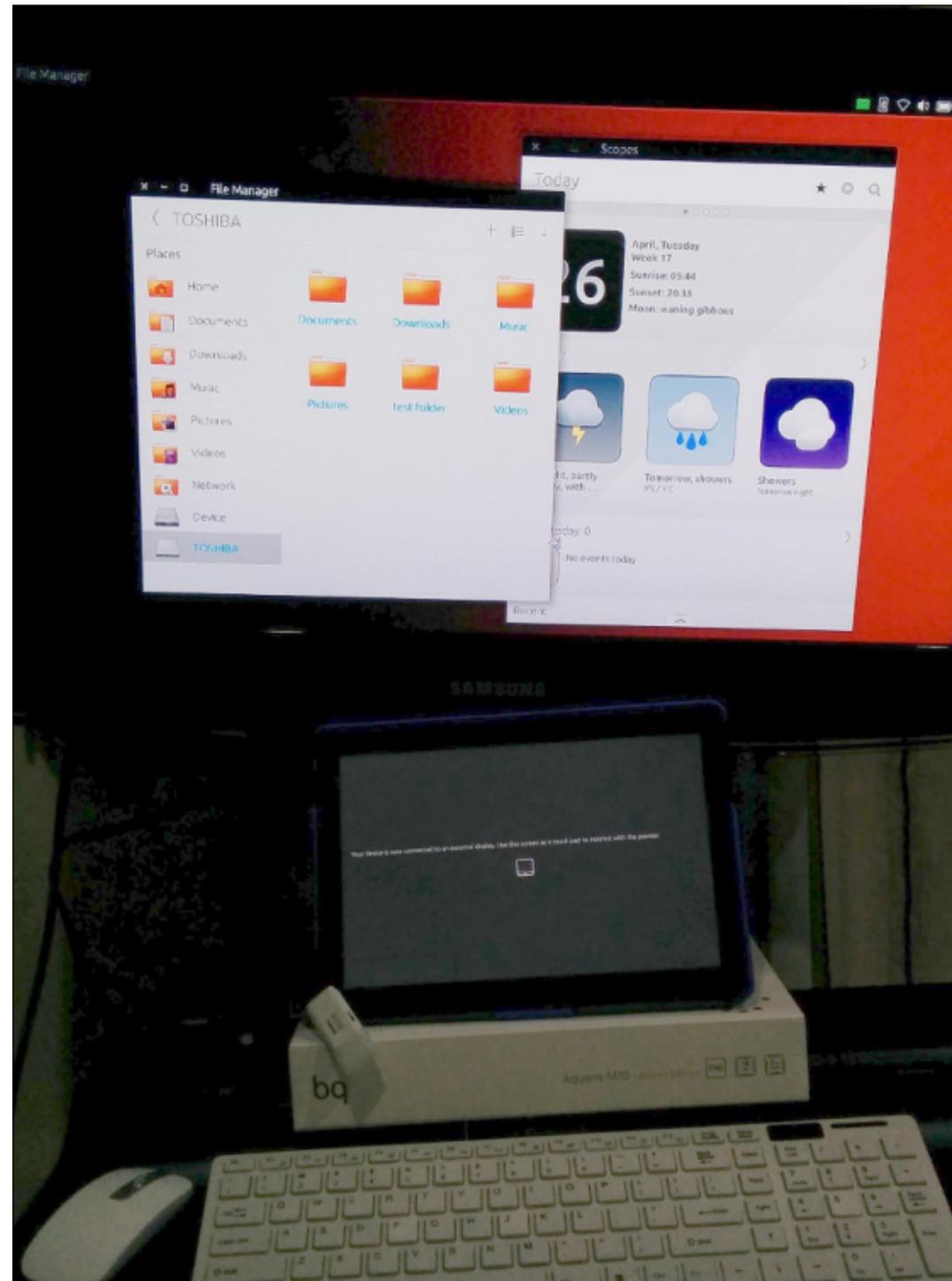
You now effectively have a laptop.

Pushing the mouse to the left edge of the screen will show the Unity side strip with the Ubuntu (ie: home) button and the apps you have open, or have pinned to the side. Pushing to the right brings in the switcher to let you choose other open apps (or to close apps).

And, in short, you use the apps like you would if it were a desktop/laptop.

I should also mention that plugging in an OTG cable/hub with a USB mouse/keyboard will trigger the desktop mode too. I also tried a wireless keyboard/mouse with USB dongle and it worked fine too. Heck, I even tried a gimmicky bluetooth laser projection keyboard and it worked!

Speaking of desktops... plugging in a micro-HDMI to HDMI cable between the tablet and a TV/monitor will pop the tablet into its third mode. This is the same display as the laptop/windowed mode, but now you're using a bigger screen. The reason it's a third mode is that the tablet



# REVIEW - BQ AQUARIS M10 UBUNTU TABLET

screen now goes blank (your display is on the TV/monitor) and the tablet screen now becomes a touchpad.

You can, if you want, keep the mouse/keyboard attached and have all the bells and whistles you could ever want.

In one of my photos, and I apologise about the quality of them but it's very difficult to photo a TV/tablet, you'll (hopefully!) see a USB stick plugged into an OTG hub which is plugged into the tablet (which also has the keyboard/mouse dongle). While you can use USB sticks, be aware

that you do need to install the File Manager from the Ubuntu Store (for free) and unlock the File Manager (from its menu) to gain read/write access to the stick.

This is also a good time to say that not all USB hardware will work. Some draw too much power from the tablet and just won't work. I tried my Wacom tablet, and, while it lit up, it wasn't recognised. Also bear in mind that if a USB device does work, it may drain the battery very quickly.

## LEGACY APPS

But the tricks don't end there.

There's more!

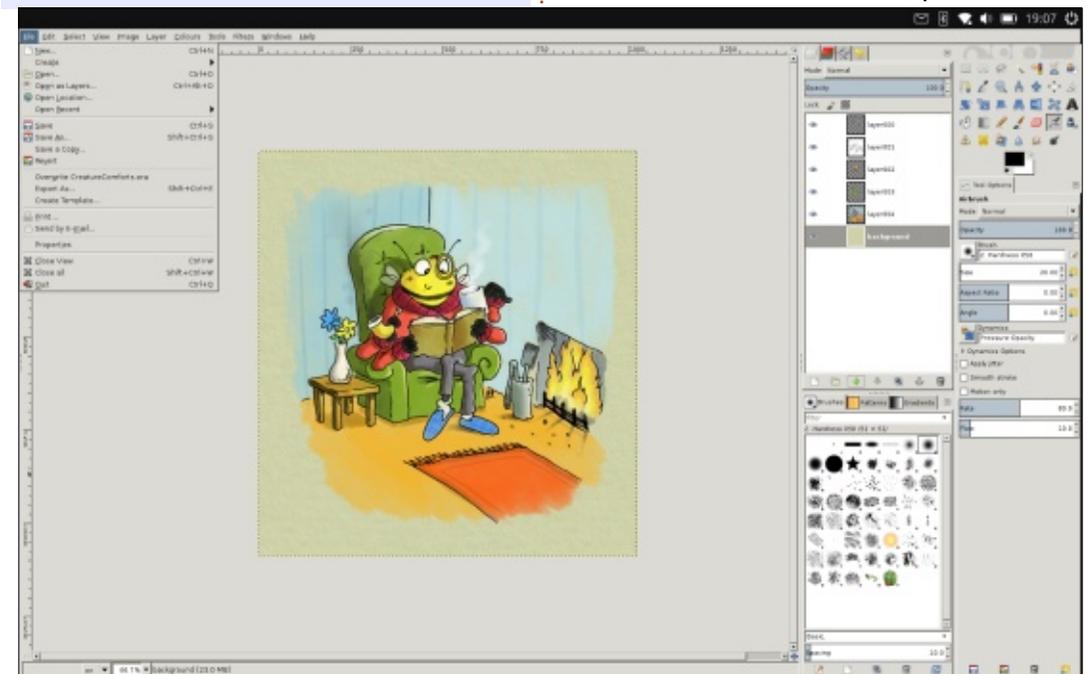
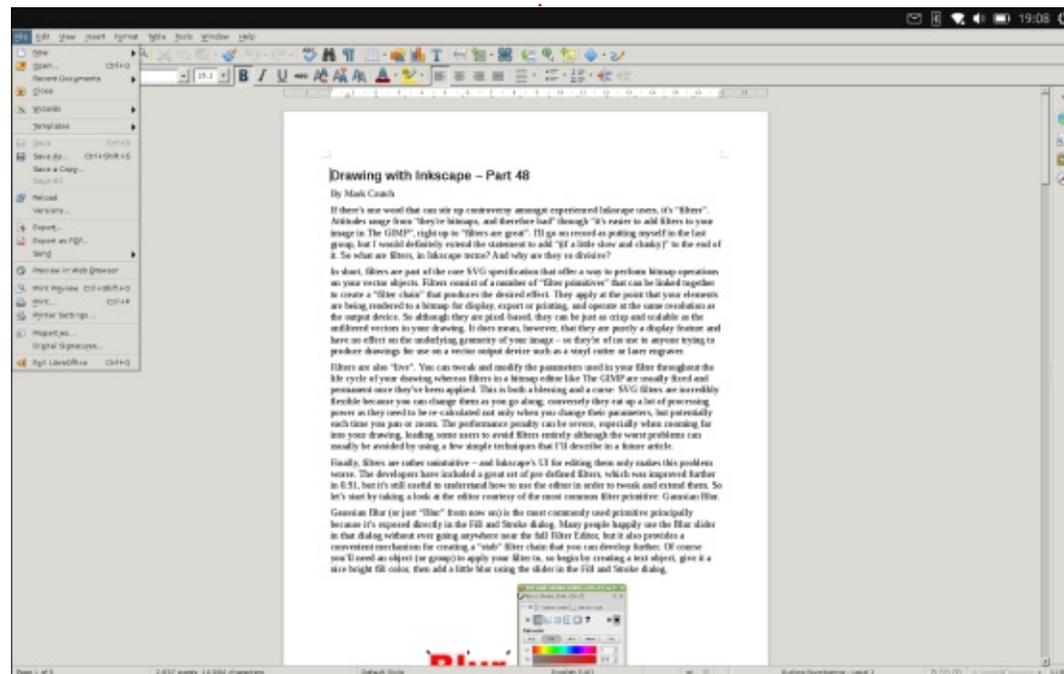
Pre-installed on the tablet are a couple of (what's known as) legacy apps. The apps are fully working versions of GIMP, LibreOffice, Firefox, Gedit and Gchat desktop apps!

That's right. You can use fully functioning GIMP, LibreOffice, etc. on the tablet.

**NOTE:** as of writing, and OTA-10.1, there is a bug whereby the legacy apps can't use the on-screen keyboard and need a hardware keyboard. This is a known bug and is being worked on.

One quirk of legacy apps is that they're, for want of a better term, sandboxed. So, for example, they can't see USB sticks. This means you need to save your LibreOffice document to the tablet then copy/paste it to the USB stick in the File Manager. It's a bit of a nuisance, but nothing major.

I haven't tested plugins in GIMP, but I did try addons with Firefox and the addons installed, and worked exactly as expected. While on the subject of Firefox, things like YouTube and Vimeo in Firefox are very stuttery, but fine (even at full screen) using available apps from the store. Netflix is,



# REVIEW - BQ AQUARIS M10 UBUNTU TABLET

unfortunately, a no go.

## SUDO APT

I know what you're thinking: great! So I can sudo apt my favourite software on the tablet?

Uh. No. The tablet uses the ARM processor. In short: it won't run bog standard desktop apps without them being possibly rewritten, recompiled and/or repackaged.

If you should happen to have an app that's ARM compatible then

I'm told that OTA-11 will bring a way to install it using a nice GUI app on the tablet.

## CONCLUSION

### Pros

- Lovely looking tablet.
- Side-stage handy for keeping eye on email/etc.
- Convergence is great. One tablet, multiple uses.
- Works well with OTG hubs, USB (kb/mouse), Bluetooth devices, etc.

### Cons

- No sync between devices. The old Ubuntu One cloud storage would have been handy now.
- No file/document manager by default. You need to install them from the store.
- As of writing, the legacy apps are a bit slow.
- Can't install any old app.
- Charging can take a couple of hours. Even from the mains.
- Small text in desktop apps.

The M10, and convergence, are great ideas, but non-geeks might be better waiting for OTA-11+. Having no file, or document,

manager by default seems a bit odd as they're something most people would need. Thankfully they're only a few pokes away in the Ubuntu Store.

I do hope they can get more speed into the legacy apps as they're a bit slow. Having said that, I did load up one of my larger, multi-layer, GIMP files, and it was completely usable and I could still apply complex filters quite quickly, considering it's a tablet.

Not being able to install just any desktop app will definitely be a deal breaker for most people, so I hope there's some easy, or easy-ish, way that this can be rectified.

All in all though, I'm still very happy with the tablet. I'm looking forward to future updates as, like the phones, it can only get better.



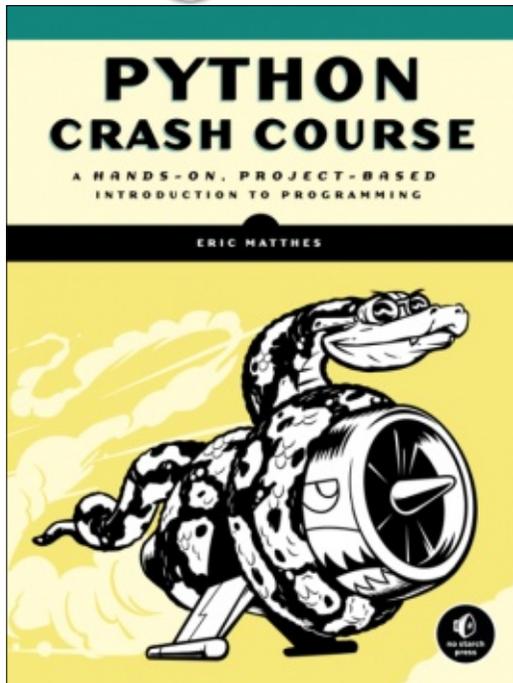
**Ronnie** is the founder and (still!) editor of Full Circle. He's a part-time arts and crafts sort of guy, and now an Arduino tinkerer.



# BOOK REVIEW

Written by Greg Walters

# Python Crash Course



## Python Crash Course: A Hands-on, Project-Based Introduction to Programming

By Eric Matthes  
January 2016, 528 pp.  
Publisher: No Starch Press  
ISBN: 978-59327-603-4

This book came to me just as I was having multiple physical issues and after two ER visits, one surgery and some recuperation time (and issues), I'm finally getting to finalize this review. The

sheer size of the book (528 pages) was, at first, a bit daunting because many books this size are on a level that is either so full of disjointed facts, thoughts and ramblings that it is dryer than the Sahara and one has to be an archeologist to dig out the information, or written in such a way as to come very close to insulting the reader's intelligence.

Happily, Eric didn't produce either of these types of books, but one that balances between the two. The layout of the material is well done. Part 1 gives more than the "normal" basics of Python programming in some 230 pages, which includes setting up the programming environment for the basics, all the way to writing test cases and code in a very clear and logical manner.

Eric's Project-based section includes such things as using PyGame to create a game like Alien Invaders, using matplotlib and pygal for data visualization, and creating web-based applications using Django. All of these projects are well thought out and

presented in such a way that learning the subject matter and implementing it is much more an enjoyable pastime rather than an onerous task that must be completed. Eric took the time to deal with some rather complex projects and lay them out in a consistent, logical and pleasant manner that draws the reader into the subject willingly, which unfortunately, many authors fail to do.

In Eric's Appendices, he covers various text editors, how to get help, and using GIT (something I've been meaning to discuss for years, but never quite got there, so BIG THANKS, Eric).

All in all, I have to give this book a 5 out of 5 star count! I'm happy to include this into my private library for a very long time.



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[ubuntuforums.org/forumdisplay.php?f=270](https://ubuntuforums.org/forumdisplay.php?f=270)

## SPEAKING KLINGON

I'm a relative newbie to Linux. I've played around in older versions of Ubuntu. However, I am yet to be admitted to the inner sanctum where phrases such as SUSE, Debian, REDHAT, Grub, Unity, GNU, and many others, are used with unquestioning authority. However, to me they may as well be in Klingon as they are just so much gak to me. Maybe an introductory 'Dummies' article would help demystify some of these terms and I'd feel more at home here. While my Unix background is helpful, (a long time user of fruit-inspired products) there is still much to be learned.

Owen McCarthy

## DEEPIN MIRRORS

Just a short comment on the Deepin OS review: Yes, the downloads from the "Deepin Technology Ltd" servers (I believe in Shanghai) can be anciently slow.

However, there are mirror

servers; I use the one from Kent University-UK providing download speeds as usual from elsewhere (in the UK). I was advised about the mirror servers via the Deepin Forum site.

Frank Dinger

## BQ M10 TABLET

Just viewed the YouTube on the BQ M10 (<https://www.youtube.com/watch?v=6LGmq38G0to>). I just received one this week. It is everything you say! One more plus: I live in the USA in central Ohio, and received the M10 shipped from Spain in less than a week from the day I ordered it. And the shipping was free. The unit with Duo Case and 2 screen protectors cost me 299 Euros or about \$330 – a bit pricey for a Tablet, but I am a fan of the Linux OS and want it to prosper.

I bought the M10 for my wife. Neither of us has used a Tablet, but the large cumbersome Windows 10 laptop she uses is slow and, for her, confusing. She's

finding the M10 has a relatively brief learning curve even though she's not a cyber whiz.

I've been an Ubuntu fan, though no Linux expert/nerd, for a few years now. For my desktop, I'm using a MintBox2 I got from an Israeli manufacturer. My laptop is a used Dell E6410, I bought cheap, on which I also use the latest Mint version. I've yet another old Toshiba NB505 that I'm using with a new installation of the latest version of Lubuntu. This minimalist Ubuntu works really great on a machine without much to offer.

Ron Payne

## VOICE INTERFACE?

I would like to use voice mainly as the interface with a computer. Any progress on using Cortana, Siri, Google or other bots on Ubuntu? A simple request that would probably need a vast amount of work.

Tom

## FULL CIRCLE NEEDS YOU!



Without reader input **Full Circle** would be an empty PDF file (which I don't think many people would find particularly interesting). We are always looking for articles, reviews, anything! Even small things like letters and desktop screens help fill the magazine.

See the article **Writing for Full Circle** in this issue to read our basic guidelines.

Have a look at the last page of any issue to get the details of where to send your contributions.



# Q&A

Compiled by Gord Campbell

If you have a Linux question, email it to: [misc@fullcirclemagazine.org](mailto:misc@fullcirclemagazine.org), and Gord will answer them in a future issue. Please include as much information as you can about your query.

**Q** I was finally able to get a separate (third) drive for Ubuntu. What I would like is, every time I turn on the computer, I get the option of which OS I boot into. I think the solution is to use a bootloader, but I have no idea how to pick one or even know if this is right. I have Windows 10 and Ubuntu 15.10.

**A** When you install Ubuntu, it will install the GRUB bootloader. If you choose "something else" during installation, you can specify where it should go. Select the first drive in your BIOS/UEFI boot order. You will need to use the drive sizes to figure out which drive is which. Probably the one with Windows will be first, identified as SDA. Probably Ubuntu will go on the third drive, SDC.

Since it is very easy to get this wrong, make sure you have an image backup of your system, and a way to restore the image, before you do anything! Macrium Reflect Free is a good program for doing this.

**Q** I've just upgraded one of my machines to 16.04, and now, on installing Folding@Home, I get a Python error.

**A** (Thanks to *khowe* in the Ubuntu Forums) wget [http://launchpadlibrarian.net/109052/python-support\\_1.0.15\\_all.deb](http://launchpadlibrarian.net/109052/python-support_1.0.15_all.deb)

```
sudo dpkg -i python-support_1.0.15_all.deb
```

Not sure why it doesn't install automatically, maybe a bug report is in order.

**Q** I have a dual boot system, Windows 7 and LXLE. Can I toss out LXLE and put Ubuntu Mate on my machine?

**A** During installation of any member of the Ubuntu family, you will reach a point where it asks where you want to place the installation: erase disk, alongside the existing system, or something else. Select something else.

You will see a list of the partitions on your hard drive. Select the one where LXLE resides and click on "change." Specify "use as" EXT4. Select the mount point "/" (root) and click on the box to format the partition, and OK.

**Q** I have been trying to run Picoscope under Wine, unsuccessfully.

**A** See this page: <https://www.picotech.com/downloads>

It says there is a picoscope for Linux. Since you need drivers for the computer to get data from the 'scope, there is almost zero chance you would get it running in Wine.

**Q** Whilst upgrading to 16.04, I was informed that removing old packages may take several hours. I didn't take the removal option at the time as I didn't have the time to wait. Is it advisable to remove them and if so how do I do it?

**A** (Thanks to *deadflowr* in the Ubuntu Forums)

```
sudo apt-get autoremove
```

will show all packages no longer needed. I think apt's man page makes a nice point about whether to remove or not to remove.

**Q** I have two security cameras and would like to know if I can attach them to my network and use some kind of software on my server machine to record the video. Also a way to remotely view it on an iPhone.

**A** (Thanks to *volkswagner* in the Ubuntu Forums) Zoneminder works with most IP cameras (need to send mpeg stream).

There is a paid app (zmNija) in Android and Apple app stores, that integrates well with ZM. You'll want to use the Ubuntu PPA for use of zmNija.



## Q&A

**Q** Is Synaptic package manager installed by default on Ubuntu Mate version 16.04?

**A** No, but it's easy to install post-installation of Mate.

**Q** I clearly remember downloading different debs and just click installing. This is not working for me anymore.

**A** Install Gdebi and use it to install .deb files.

**Q** I have a pack of fonts which I would like to add to Ubuntu 14.04. How can I do this?

**A** (Thanks to **CantankRus** in the Ubuntu Forums) If you have only one user, you can place them in ~/.fonts

That folder probably does not exist, so you have to create it. Then run this command:

```
sudo fc-cache -fv
```

If you want to make the fonts available to multiple users, you need to put them in /usr/share/fonts which requires

using sudo. Then run the same command.

## TOP QUESTIONS AT ASKUBUNTU

\* Is there any program for fuzzy string matching, which provides a match score?

<http://goo.gl/xnLFAf>

\* What is the 'Badlock Bug'?

<http://goo.gl/9wcaL1>

\* What is the name of the security concept that explains why Linux asks for root password?

<http://goo.gl/Fi0ehH>

\* How do I install and manage GNOME Shell extensions?

<http://goo.gl/sx3ES3>

\* Why doesn't the latest Ubuntu edition come with the latest stable Linux kernel version?

<http://goo.gl/N8748p>

\* How to run a Python program directly?

<http://goo.gl/vjHloF>

\* Ubuntu Server 16.04 installs on /sdc but fails to boot

<http://goo.gl/zdG27C>

\* No more boot logging since 16.04?

<http://goo.gl/r4RuvP>

\* Personal computer hacked: How do I block this user from logging in again? How do I find out how they are logging in?

<http://goo.gl/A39P3E>

## TIPS AND TECHNIQUES



### Really?

**A**s my bio says, I work part time in a mostly Windows environment. It's an accounting firm, and the typical desktop system has nearly 200 "applications" installed; all of them are Windows only. A new client walks in and says, "I haven't filed a tax return for a dozen years, and I have income in both Canada and the U.S." That's 24 "applications" right there.

The company has aligned itself with two primary software suppliers. This makes tremendous sense, and simplifies the IT workload.

One of the software suppliers has a no-charge add-on to its mainline product, which is very attractive. It's a "portal" for transferring files between clients and the firm, and it ties in nicely to the main product. When a new client asks, "how can I send you files," having a standard answer is very powerful.

The software is free. However, the suggested configuration is to have a separate server in its own "DMZ", which means a new router, a new computer, a new Windows Server license, a new domain name and a new SSL Certificate. The most expensive part of this? The Windows Server license! Argh!



**Gord** had a long career in the computer industry, then retired for several years. More recently, he somehow found himself "The IT Guy" at a 15-person accounting firm in downtown Toronto.





# Q&A II: THE XENIAL LAUNCH

Compiled by Gord Campbell

**M**ichael Kaulback hosted an Ubuntu launch party on April 21 in Toronto, Canada.

In addition to providing cupcakes and coffee, Michael (who is genii on IRC) proved his chops by helping to install Ubuntu 16.04, Xenial Xerus, on a nasty little X86-based tablet.

About 20 people attended, with a range of interest levels. A couple were merely considering using

Ubuntu, while others could delve into the internals.

Almost half the people brought computers, most of which were five to seven years old. Based on this small sample, it seems that any old computer with at least 2 GB of memory can run any member of the 'Buntu family reasonably well.

For more pictures:  
<https://goo.gl/photos/FfUmX1i54Rz2kncL6>



**Photo caption:** John Kerr (left) and Gord Campbell represented Full Circle Magazine at the Toronto Xenial Xerus launch party.



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# AVAILABLE WORLDWIDE



# UBUNTU GAMES

Written by Oscar Rivera

# Skullgirls

Over the last couple of years, Linux gamers have gotten quite the flurry of games ported over to Linux, and lately, some games have even been released for Linux at the same time as they're released on other consoles. However, not a single true fighting game had been made available for Linux users until now.

Move over Street Fighter and go chill with Mortal Kombat and your other pals, because Skullgirls has arrived! Skullgirls is a 2D fighting game developed by Reverge Labs (later renamed Lab Zero due to some financial and legal issues). It was originally released in 2012 for Xbox360 & Playstation 3, then, in 2013, it was released for Windows PC. Lots of Skullgirls fans, myself included, kept requesting a Linux port, and, in October 2015, it finally arrived on Linux as well as Mac OS X. The game was ported by a few dedicated fans who worked hard at making it available on Linux, but, after playing the game, you could never guess that the game was not originally intended to be played on

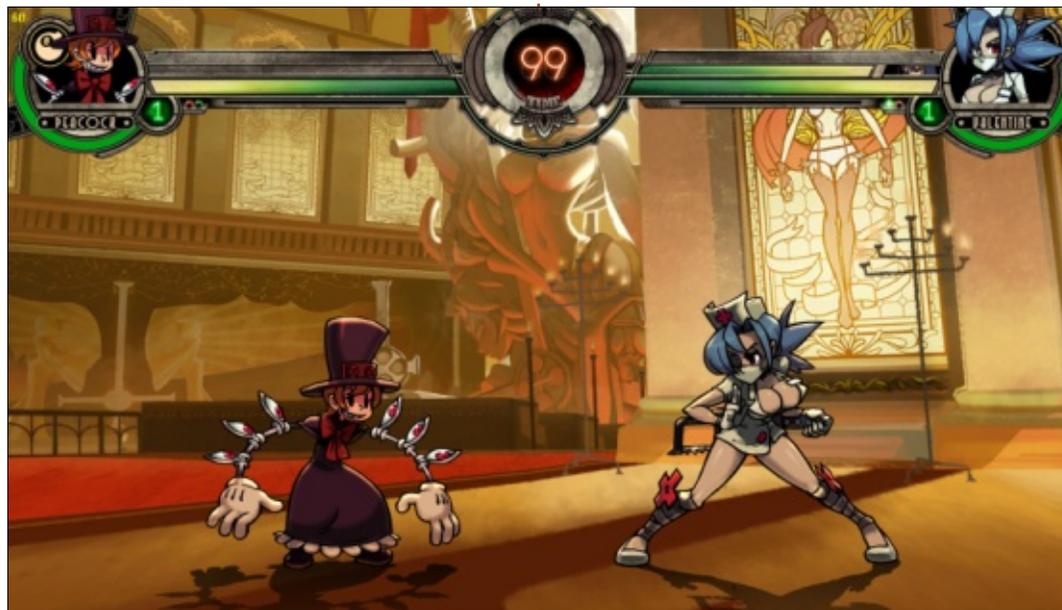
Linux. The game runs as smoothly as any other Linux native game, which was something of a concern for me when I heard that the original game developers were not involved in the Linux port. It was a small number of volunteers and a yet-to-be-named company who made the Linux port – not only playable and enjoyable but also as perfect as it could get. On behalf of the Ubuntu gaming community, I'd like to thank you.

Anyone who's played titles such as the aforementioned Street

Fighter, Mortal Kombat, or other fighting titles, will feel right at home playing Skullgirls. The game provides various modes of play depending on your needs. There is a single player campaign story-based mode, an arcade mode, a training room, and a single player versus, as well as a two-player versus mode that can be played online. I have played all of the different modes available, and there are very subtle differences between them. The online versus mode is fun because you get to play against another player, but I

would recommend going through some of the tutorial, single player versus (or arcade), or even the story mode first, if you're planning on not getting badly beaten right away. Some of the players you'll encounter online on a good day are quite good; however, other times there may not be as many players available online due to the game having had its initial release so long ago. The tutorial as well as the training room are great at learning and then improving your skills. Also, for some odd reason, if you decide to use a game controller, the button layout is rather unorthodox and it may take some time getting used to it (the same holds true for all other consoles as well as PC/Mac versions). It's almost like some of the control layouts are slightly counter-intuitive, but once you get used to them, they are not that hard to use and understand.

Skullgirls can currently be bought through Steam or through the Skullgirls website for around \$9.99 at the time of this writing. There are a total of eight playable



characters in the standard edition (yes, all of them girls). If you want to buy the Skullgirls 2nd Encore for \$14.99, then you get an additional five characters as well as all sorts of other added goodies. The five added characters can also be bought separately for \$1.99 each, which would be an additional \$10 for all five characters. By buying the Skullgirls 2nd Edition, you not only end up saving \$5.00, but you also get a few added bonuses – so I would recommend paying a bit more for the 2nd Encore to get your money's worth. Some of these added characters are girls, but some (such as Big Band and Beowulf) are not. Like all fighting games, each character has its own way of doing the basic moves (low kick, mid kick, high kick, low block, mid block, high block, etc). But, more importantly, each character has its own set of special moves which you'll have to memorize if you want to be able to perform them at will instead of by chance. It's not terribly hard to perform special moves; it just takes some time to get used to the button combinations for each character.

The story mode (as well as all other modes for that matter) revolve around the Skull Heart and

the power it can grant its owner. All eight Skullgirls are trying to get the Skull Heart back from Marie who is the nemesis of the game. I first started with the tutorials, then went on to the arcade, story, and finally versus and versus online modes. The story mode tells you a little bit about each character's past and why she wants to acquire the Skull Heart from Marie. The seemingly hand-drawn characters, as well as the intricate background art, in combination with the fast jazz-meets-punk spy music, have a certain quality to them that adds to its post-prohibition, cyberpunk, feel – which is reminiscent of the James Bond and Operation:

Impossible fictitious eras.

Surprisingly, I have not come across any deal-breaking glitches yet. I say surprisingly because it's my understanding that the Linux port was initially begun by a small number of Skullgirls fans and finished by a still unknown company. The only negative aspect of the game I would say has already been worked out with the 2nd Encore additions. Many people, myself included, used to complain about a short story-mode, and a lack of playable characters, but for only \$5 more, that issue has now been resolved. I still strongly believe that for the

low price of \$14.99, you get a good quality fighting game with lots of replay value even after completing the story and arcade modes.

This is a game that I most definitely recommend if you're looking for a fighting game, especially since as of now Street Fighter has only been promised but not yet delivered. You will not regret getting this game unless



you object to the outfits the girls are wearing in the game.

### Minimum System Requirements:

- OS: Ubuntu 15.04 / Fedora 22 / SteamOS
- Processor: Dual-core CPU
- Memory: 2 GB RAM
- Graphics: Intel HD3000\*
- Network: Broadband Internet connection
- Storage: 5 GB available space
- Additional Notes: \*MESA drivers 1.6.0 and 1.6.1 are not supported, please update to 1.6.2.





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## CHA CHA CHA CHANGES

Our admin went AWOL for months, and I had no idea if/when the site would/wouldn't get paid. Initially the plan was to move the site and domain name to my hosting, but eventually I managed to track him down and get the FCM domain name, and site hosting transferred to me.

The new site is now up. **HUGE** thanks to **Lucas Westermann** (Mr. Command & Conquer) for taking on the job of completely rebuilding the site, and scripts, from scratch, in his own time.

The Patreon page that I've set up is to help me pay the domain and hosting fees. The yearly target was quickly reached thanks to those listed on this page. FCM is not going away. Don't worry about that.

Several people have asked for a PayPal (single donation) option, so I've added a button to the side of the site

**A big thank you to all those who've used Patreon and the PayPal button. It's a big help.**

<https://www.patreon.com/fullcirclemagazine>



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### FCM#110

**Deadline:**  
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