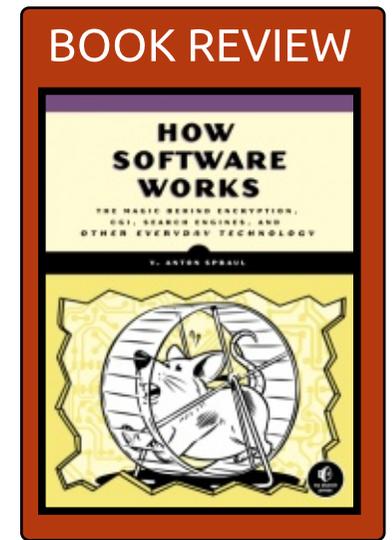
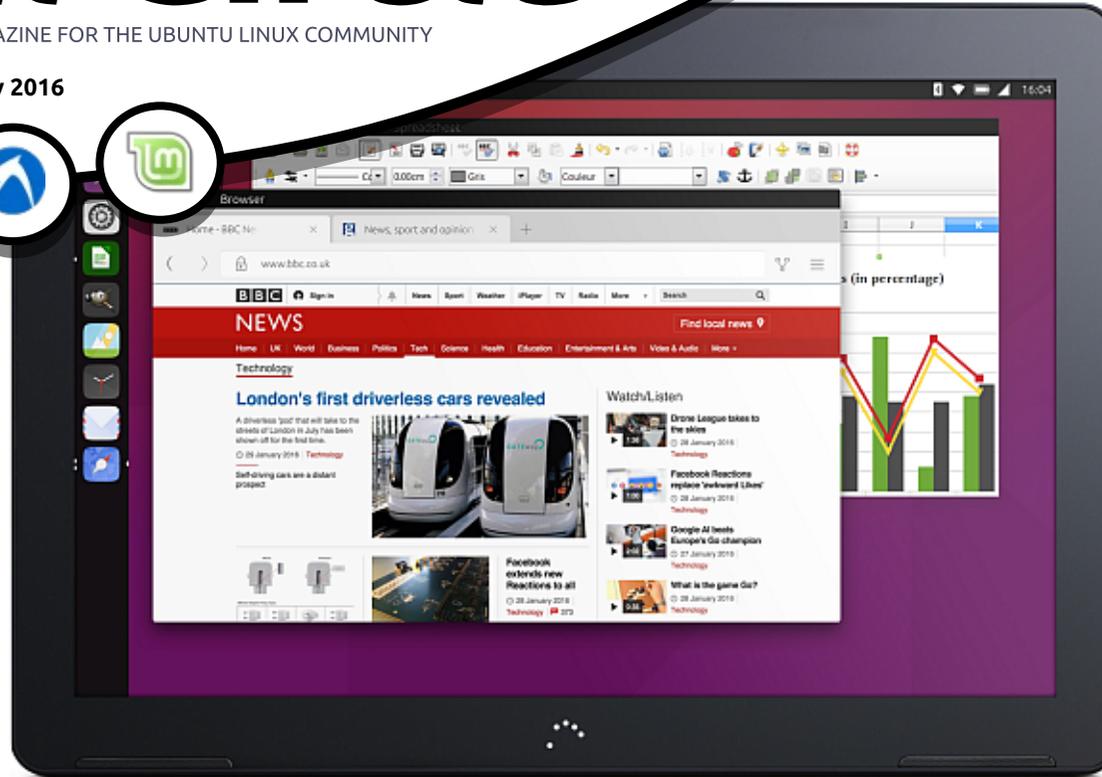
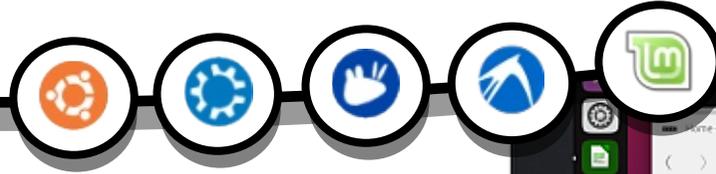




Full Circle

THE INDEPENDENT MAGAZINE FOR THE UBUNTU LINUX COMMUNITY

ISSUE #106 - February 2016



THE UBUNTU TABLET BQ AQUARIS M10 ANNOUNCED

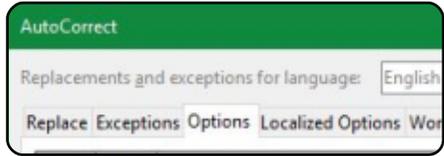
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HowTo



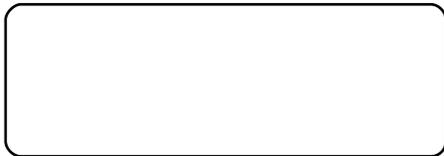
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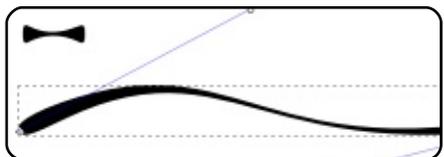
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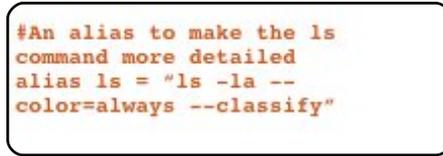


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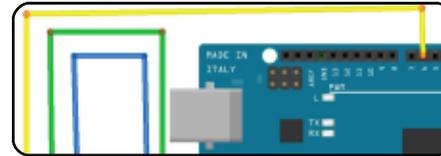
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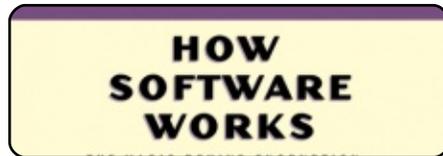
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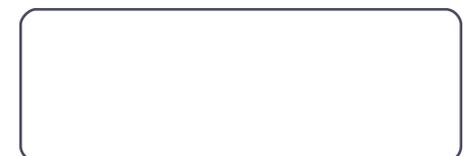
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WELCOME TO ANOTHER ISSUE OF FULL CIRCLE.

No Python this month, I'm afraid, but we still have LibreOffice, part two of the VAX-VMS tutorial, Inkscape, part three of my 3D printer build, and lots of other goodies. Standing in for Python we have an interesting article on running a full system from a USB stick.

I've changed the section on Ubuntu Phones to now read Ubuntu Devices since Canonical and BQ have announced that an Ubuntu tablet, the M10, will be available either at the end of March or beginning of April. I'm hoping to get a unit for review as soon as they're available. I'm looking forward to it as this will be the first official convergence device. You can read more about it in that section.

Speaking of Ubuntu Touch, don't forget that we have an official Full Circle app. No, not the webapp that I made. That one is discontinued. This one is by Brian Douglass, is a native app, and allows you to browse through available issues, download, and read them. And all on your Touch device! Just search for 'full circle' in the Ubuntu Store.

The **Full Circle Weekly News** show seems to have been well received. What I've been doing is recording the news items as Arnfried is sending me them. Then, compiling them into a final show MP3 which I've been releasing on Saturday mornings (UK time). Within a day, or two, each seems to get a couple of thousand plays. Which is great. If you've been listening, do let me know what you think about it.

All the best, and keep in touch!

Ronnie

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

RSS:
<http://fullcirclemagazine.org/feed/podcast>



SPOTIFY VIDEO IS NOW ON ANDROID AND IOS

Spotify's new video content section, dubbed Shows, hit Android devices this week. And though the feature wasn't supposed to make it to iOS devices until sometime next week, there is a way for you to access it right now. You won't be able to access it from the Browse page, as you would on an Android. Instead, iOS users will need to first navigate to the Your Library page and look for the Shows listing under Playlists. That's it. Once you're in the Shows page, you'll be able to browse and search through video content from more than a dozen providers including the BBC, Comedy Central and ESPN.

Source:
<http://www.engadget.com/2016/01/29/spotify-video-is-now-on-android-and-ios/>

YOU CAN NOW USE AN UBUNTU PHONE'S SCREEN AS A TOUCHPAD, MIRACAST COMING SOON

Google+ user Richard Somló published a few interesting photos earlier on his profile page, showcasing the new functionality on his Nexus 4 Ubuntu Phone connected to an LCD as a converged desktop and using the latest Ubuntu Touch mobile operating system from the rc-proposed channel (only for developers and early adopters).

"Nexus 4 - rc-proposed channel: You can use the phone screen as a touchpad. And if you click in a text field the keyboard appears on the phone screen instead of the external screen," said Richard Somló in the Google+ post.

We were very intrigued by the whole thing, so we've contacted Michael Hall from Canonical regarding the images posted by Richard Somló. Mr. Hall reveals exclusively for Softpedia that

Nexus 4 devices currently support this functionality, and you can even use two-finger scrolling and three-finger tap for right click.

Source:
<http://news.softpedia.com/news/you-can-now-use-an-ubuntu-phone-s-screen-as-a-touchpad-miracast-coming-soon-499823.shtml>

KDE NEON OFFERS THE LATEST AND GREATEST KDE SOFTWARE ON A STABLE UBUNTU BASE

KDE Neon is a product of the upstream KDE community, an international body that works to advance the development and availability of free software for both Unix-like and Windows systems. One such piece of KDE software is the Plasma Desktop, a popular and customizable desktop environment used with many Linux distributions. KDE Neon will provide packages of the latest Plasma Desktop as well as other

KDE apps for long-term-service versions of Ubuntu: currently Ubuntu 15.10, but also Ubuntu 16.04 when it's released in a few months.

Source:
<http://www.pcworld.com/article/3029069/linux/kde-neon-offers-the-latest-and-greatest-kde-software-on-a-stable-ubuntu-base.html>

ANDROID WEAR GETS VOICE CALLING AND MESSAGE DICTATION IN MAJOR UPDATE

Android Wear is getting updated in a big way this month. Google is beginning to roll out an update with some major new features for Android Wear, including the ability to make and listen to calls directly on the watch. You'll need a watch with a speaker to do that, of course, and only two watches currently have one: the Huawei Watch and the 49mm model of the Asus ZenWatch 2. The update also adds in expanded support for controlling Wear watches with gestures — though you may need someone to decode them for you — and the ability to dictate messages to be sent from

apps like Hangouts and WhatsApp.

Source:
<http://www.theverge.com/2016/2/4/10917308/android-wear-gestures-voice-calls-dictation-update>

FAIRPHONE 2 UBUNTU TOUCH PORT IS IN THE MAKING, HERE'S WHAT WORKS

While Canonical employees are working hard these days on the enablement of the Ubuntu Tablet device, it looks like we're getting the Ubuntu Touch mobile operating system on the Fairphone 2 smartphone.

How did that happen? Well, you might have heard of Marius Gripsgård, the skilled developer who managed to port Ubuntu for Phones on the OnePlus One smartphone.

He teased us earlier, on his Google+ profile page, with a photo of the Ubuntu mobile OS working on Fairphone 2. So we just had to get in touch with him to find out a

few more details about what's going on, what works right now on the device, and what users should expect in the coming months. Please note that Marius Gripsgård is part of the ubports.com community, a group of devs trying to port Ubuntu Touch to as many devices as possible.

Source:
<http://news.softpedia.com/news/fairphone-2-ubuntu-touch-port-is-in-the-making-here-s-what-works-500105.shtml>

EXTON|OS LIGHT IS ONE OF THE FIRST LINUX DISTRIBUTIONS BASED ON UBUNTU 16.04 LTS

Based on the Ubuntu 16.04 LTS (Xenial Xerus) operating system, which, of course, is in heavy development at the moment, Exton|OS Light is, in fact, one of the first distributions to adopt the upcoming OS from Canonical. The good news, however, is that it doesn't use the Unity 7 user interface, nor Ubuntu 16.04 LTS' kernel packages.

"I've made a new extra version of Exton|OS based on upcoming Ubuntu 16.04 (alias Xenial Xerus) 64-bit with only a minimum of packages pre-installed," reveals Arne Exton for Softpedia. "Exton|OS Light's Window manager Openbox guarantees lightness and elegance. My special kernel 4.4.0-3-exton, equivalent to kernel.org's latest stable kernel 4.4.1."

Source:
<http://news.softpedia.com/news/exton-os-light-is-one-of-the-first-distributions-based-on-ubuntu-16-04-lts-500106.shtml>

FIREFOX 44.0.1 Now AVAILABLE FOR ALL SUPPORTED UBUNTU OSES

The Ubuntu maintainers of Firefox have been quick to push the new version into the repositories in less than a day. They moved pretty fast and now Ubuntu users can benefit from the changes and improvements that have been implemented.

In the past few months, the Ubuntu maintainers didn't wait

around too long to push the latest version of Firefox in the repos, and they have kept this habit. Long gone are the days when Ubuntu users had to wait for days before the upgrade was made available.

USN-2880-1 fixed vulnerabilities in Firefox. This update introduced a regression which caused Firefox to crash on startup with some configurations. This update fixes the problem," reads the security notice.

Source:
<http://news.softpedia.com/news/firefox-44-0-1-now-available-for-all-supported-ubuntu-oses-500134.shtml>

INTEL UNVEILS ANDROID PHONE THAT CAN BE USED AS LINUX DESKTOP

Intel has grabbed attention with a smartphone prototype that can also create a desktop PC experience. No, it's not running on Windows 10 Mobile and is not using Continuum for phone software. Rather, the smartphone is a low-power phone with an Intel Atom x3 processor and two

operating systems: Android and a custom version of Debian Linux. You can use it like a phone and run Android apps, or you can plug it into an external display with an HDMI cable and run desktop-style apps on a big screen. All one has to do is connect a keyboard, mouse and display to make it a desktop Linux device.

"Android is based on a Linux kernel, so we're running one kernel, we have an Android stack and a Linux stack, and we're sharing the same context, so the file system is identical. The phone stays fully functional," Intel's Nir Metzer, Path Finding Group Manager, told The Register.

Source:
<http://www.valuwalk.com/2016/02/intel-android-phone-linux-desktop/>

STEAM AND LINUX GAMING POISED TO THRIVE AS VULKAN API WILL COME GUNNING FOR DIRECTX

Linux-based Steam machines and mobile devices will get enhanced graphics due to the

upcoming Vulkan API (application programming interface).

Vulkan is useful in many applications, but games benefit from it more than most. It performs the same actions as DirectX does for Windows, but it is far better adapted to new technologies.

Vulkan is a welcome upgrade to OpenGL, which starts to show its age, 25 years after its launch.

The Vulkan API should ensure that Mac systems, Linux and mobile devices get better visuals in games. What is more, games will use system resources more judiciously as well as save more battery life in mobile devices and laptops.

Source:
<http://www.techtimes.com/articles/133521/20160214/steam-and-linux-gaming-poised-to-thrive-as-vulkan-api-will-come-gunning-for-directx.htm>

PARSIX GNU/LINUX 8.5 (ATTICUS) OFFICIALLY RELEASED, BASED ON DEBIAN 8 "JESSIE"

Dubbed Atticus, Parsix GNU/Linux 8.5r0 is the first stable release of the distribution, which has been in development for the past three months, during which the project's developers have announced no less than three test builds with all sorts of improvements and updated packages.

Prominent features in Parsix GNU/Linux 8.5r0 (Atticus) include the long-term supported Linux 4.1.17 kernel injected with the BFS, TuxOnIce 3.3, as well as several other extra patches, the latest GNOME 3.18 desktop environment with the GNOME Shell 3.18.3 user interface, and GRUB 2 as the default bootloader.

Being based on the latest Debian GNU/Linux 8 (Jessie) operating system, Parsix GNU/Linux 8.5 (Atticus) has been fully synchronized with its default software repositories as of February 13, 2016. Also, the Live

ISO images, which are now available for 64-bit and 32-bit systems, have been compressed with the XZ and SquashFS methods.

Source:

<http://news.softpedia.com/news/parsix-gnu-linux-8-5-atticus-officially-released-based-on-debian-8-jessie-500411.shtml>

NVIDIA RELEASES 361.91 DRIVER AND IMPROVES LINUX SUPPORT

Street Fighter V is coming out tomorrow, and Nvidia is making sure that gamers can hadouken each other with maximum graphical fidelity. The company has just released its WHQL-certified 361.91 drivers, which offer some tweaks for Capcom's fighting game and a bevy of SLI profile updates for other titles.

Linux-using gerbils will be happy with another tidbit of news. Nvidia has released signed firmware blobs for cards with GM200 and GM204 GPUs, paving the way for the open-source Nouveau project to enable full

hardware acceleration on those chips.

Until now, Linux gamers had to use Nvidia's closed-source driver to get 3D acceleration support, a situation that's likely to change soon. Phoronix says the Mesa and Nouveau teams expect to have support for GM200 and GM204-based cards baked into the Linux 4.6 kernel cycle.

Source:

<http://techreport.com/news/29717/nvidia-releases-361-91-driver-and-improves-linux-support>

UBUNTU 16.04 LTS BETA 1 LAUNCHES FEBRUARY 25, REMAINS BASED ON LINUX KERNEL 4.4.1

On February 19, 2016, Canonical's Joseph Salisbury reports for the Ubuntu community the latest news from the Ubuntu Kernel Team, which just released their weekly newsletter with information about the latest kernel work for Ubuntu 16.04 LTS.

"Our Xenial kernel remains

based on v4.4.1 and is available for testing in the archive, i.e linux-4.4.0-6.21. Please test and let us know your results. Also, as an early reminder, Xenial Kernel Freeze is Thurs, April 7. We encourage anyone needing kernel patches pulled into Xenial to please submit them well in advance of Kernel Freeze to allow for as much testing as possible," developers explained.

Please note that Ubuntu itself won't be part of the first Beta release, but it will be ready for public testing during the Final Beta announcement on March 24, 2016. After that, the development cycle of Xenial Xerus will continue with the Final Freeze on April 14, when the Release Candidate images will be available internally, and the final release of Ubuntu 16.04 LTS on April 21.

Source:

<http://news.softpedia.com/news/ubuntu-16-04-lts-beta-1-launches-february-25-remains-based-on-linux-kernel-4-4-1-500681.shtml>

JAVA 9 TO ADDRESS GTK GUI PAINS ON LINUX

Plans are afoot to have Java 9 accommodate the GTK 3 GUI toolkit on Linux systems. The move would bring Java current with the latest version of the toolkit and prevent application failure due to mixing of versions.

The intention, according to a Java enhancement proposal on openjdk.net, would be to support GTK (GIMP Toolkit) 2 by default, with GTK 3 used when indicated by a system property. Java graphical applications based on JavaFX, Swing, or AWT (Advanced Window Toolkit) would be accommodated under the plan, and existing applications could run on Linux without modification with either GTK 2 or 3.

Source:

<http://www.infoworld.com/article/3035505/java/java-9-to-address-gtk-gui-pains-on-linux.html>



Near the end of January, I was informed that a local retailer would be receiving a shipment of NUC6i5SYH (the i5 Skylake NUC with a 2.5" drive bay). So I promptly ordered one with 16GB of DDR4 RAM, a 256GB m.2 drive, and waited semi-patiently for it to arrive. In this month's article, I want to cover what I'm using it for, my thoughts on it, and Linux support for Skylake.

PURPOSE

I ordered the taller model for the 2.5" drive, since I own a few spare drives, in case I need more storage space down the line. The goal is for this to become an "always-on" PC. It hosts a DNS for my internal network, a PXE boot server (for network booting ISOs), and will soon run NGINX + Apache. In order to help with my development work, it is now also hosting my Git repositories, which I can clone and keep up to date from other devices. But that's not all! I have a 3TB MyBook external USB drive that I keep my larger

files on. When I got the NUC, I reformatted it into btrfs, and shared it as a samba share on my network, meaning I can just simply log into the network and download whatever Linux ISO I may need for a virtual machine, or access my design asset library.

And, finally, I've also set it up with AwesomeWM (and GNOME3) for my desktop usage. It's currently powering two monitors, and provides PulseAudio loopback for passing my PS4 audio through my PC speakers.

I realize what some of you are probably thinking: "Can it do all of that?". The answer (so far at least) is: Yes! I'm probably just as surprised as anyone else - I firmly expected to have to cut back on my list of uses for it. The only point where it fails currently is running GNOME3, as there are some Intel driver bugs for Skylake graphics (which required me to disable hardware acceleration). Knowing the Linux community though, the bugs will probably be fixed sooner rather than later.

THE SETUP

- 1 x Intel NUC6i5SYH
- 2 x 16GB Kingston HyperX Impact DDR4 SO-DIMM C13 2133 K2
- 1 x M.2 Samsung 850 EVO Basic 250GB SSD
- Running ArchLinux (64 Bit).

Peripherals:

- Anker 7-Port USB 3.0 HUB, connecting:
- Keyboard & Mouse
- MyBook 3TB
- USB surround sound audio card

I chose ArchLinux because I love the Arch User Repository, and it's been my distribution of choice for many years. However, Ubuntu (or any other distribution) should offer much the same experience. Maybe with slightly fewer bugs (as Arch is a rolling release).

MY THOUGHTS

Overall, this device is pretty much what I expected. It's quiet, quick, and graphically powerful enough to do everything I want

(when the drivers work, at least). Not to mention small. Looking at the numbers doesn't do it justice. It's only about 2% wider/deeper than the coasters I keep on my desk, and the height (SYH model is 48mm, and SYK is 32mm) is really not that noticeable. Personally, if I was going to mount it to something thin using the vesa mount, I would take the SYK model. If you want to use the mount on something else (under a desk, on a wall, etc.) I think you'd be fine with either. That isn't to say that I think the mount wouldn't work with the taller model, I just find it may look odd, or make some smaller monitors too back-heavy.

For anyone concerned about noise - during the UEFI screen, the fans spin at full blast. To me, it's no louder than a loud 3.5" mechanical drive. The moment the OS starts, the fans spin down, and almost everything on my desk is louder than the NUC. My external drive is by far the loudest device on my desk now (but even that is easily overpowered by even just quiet music over my speakers).

Nice bonus: The NUC comes with a world plug, meaning it has connectors on the universal power supply that should work anywhere in the world.

Enough of the good - most people are probably interested in what it's lacking. I don't feel like the port options on the NUC are bad - I do feel like without a hub of some sort, you may run into issues (or simply not have any plugs free for thumb drives). That being said, I always prefer having a hub that I can position closer to me for ease of use (and they aren't terribly expensive). That being said, there is one port I would have liked to have on the NUC. A USB Type-C Thunderbolt connector. According to rumor, the Skull Canyon model (core i7 model) should have one. Whether this is the case or not, we will have to wait and see. However, with the advent of type-c monitors with USB hubs and integrated power passthrough, it does seem like an odd omission to make. Especially for a device you could technically mount on the back of a monitor, and with type-c, you could reduce the cable clutter immensely.

I'm sure some people would have preferred to see something besides a mini-displayport plug next to the HDMI. However, as someone who has owned and used a MacBook, I've grown accustomed to those adapters (not to mention having plenty lying around).

Lastly, design: I would have preferred the A/C adapter plug to be on the bottom edge of the device, instead of the top. However, based on the layout of the internals (and the mounting capabilities), I'm not sure this would have been possible.

The last negative thing I have to say about this setup isn't really a knock at the device itself. Driver support. I realize that the Skylake processors are new, and as such, you can't expect everything to run perfectly. That being said, having hardware acceleration enabled in the drivers currently causes my 4.4.1-2 kernel to crash. Not X, but the kernel itself. I've tried the 3 different acceleration methods (sna, uxa, and glamor), as well as disabling DRI (3d acceleration). I even tried to just enable DRI2. Nothing has completely solved the problem. Disabling 3d acceleration helped delay the crash, but it still

occurred. Same with all the typical kernel boot options (intel_iommu=igfx_off, etc). Disabling all acceleration (recommended in the ArchLinux Wiki) has resulted in a usable system - but did require me to switch to AwesomeWM, as GNOME3 was slow (thanks to the integrated effects). Not a big deal for me (as I like AwesomeWM as well), but still slightly frustrating. This is especially so, because I hadn't had any issues using the previous kernel 4.3.3-3. While I could theoretically roll back to the last kernel, there were plenty of other updates, and it would become a dependency nightmare. **For a possible fix, read on.**

Prior to publishing, I was able to find a fix that appears to work. Adding the kernel boot parameter `i915.enable_rc6=0` seems to have solved the stability issues. It does disable powersaving in the i915 drivers, ensuring that the CPU is always running in high performance mode. However, I imagine this step will be necessary only temporarily, until the drivers handle the power states better. I'm leaving the original paragraph in place, for anyone who may be facing similar issues.

Summary:

Pro

Quiet
Powerful/Fast
Light and small
World power supply

Con

No USB Type-C
Positioning of A/C port
Mini-Displayport (con for some)

Overall, I'm extremely happy with the NUC. The driver issues are unfortunate, but don't really impact my main use-cases (as I could just as easily run it as a headless server). Basically, my list of Pros, while quantity-wise are equal with the cons, I give much more weight and importance to the pro list. The port gripes on the Con list are really not that big of a deal to me, and the drivers should improve as time goes on. Not to mention the fact that it had actually been working better previously.

COST

I did not mention cost in this review at all. This is largely for two reasons:

- Availability - the devices and hardware are pretty new, and as such, you may be limited in where to find it. This can impact the cost/ability to find bargains.
- I chose the best performance/quality hardware I could find for a reasonable price (as I had a lot I wanted to do with it). Bargain hunters could easily find cheaper combinations. I.e. using DDR3L memory instead of DDR4.

BOTTOM LINE

Yes, I would recommend it.

Caveat: However, only to those who have done their research. Be it into the best distribution for Skylake, or the best model for your purposes (and which hardware to choose). This is not the perfect device for everyone, but if you have a perfect use for it, the NUC is an excellent choice.

I hope this review/article has been useful to some. If there's anyone out there who feels overwhelmed by choices and what hardware to select for their NUC - don't worry. I imagine as time goes on, manufacturers will start marking their hardware as "works

with NUC", or retailers will simply start recommending the correct hardware. Barring that, download the product brief from Intel for your model, and compare the specs (especially voltages) on the device. If you have questions or comments (or a fix for the intel drivers!), let me know at lswest34+fc@gmail.com.



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.



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!**



Many years back, when USB pendrives of over 4 GBytes started to become commonplace, I did an experiment in Linux systems administration with a class of future computer science engineers, that consisted of using such drives as the basis of a full-blown Ubuntu installation. Yes, back then 4 GBytes was sufficient to hold the system itself - at about 2.2 GBytes - with some space available for user documents. That experiment was somewhat of a success, though it was immediately apparent that drive speeds were a limiting factor that precluded actually using such equipment in a production system. The then-current USB 2 had speeds at about 48 MBytes/s, though the characteristics of the Flash-based drives themselves brought that down to the 20-22 MBytes/s range - obviously much lower than the 100-120 MBytes/s that could be expected from an internal (spinning platter) hard drive.

Forward to year 2015, and modern pendrives are offering much larger capacities at lower

prices. Some models are also available with USB 3 connections. The advertised useful speeds of the 32 GByte Sandisk model used in this test go all the way up to 130 MBytes/s, comparable to a laptop's internal platter hard disk drive. It can be noted that these speeds are still much lower than USB 3's theoretical 500 MBytes/s maximum speed, so the Flash technology used in the drive still seems to be the limiting factor. This part cost me 18 EUR (about 20 USD or 13.30 GBP).



To install the system, I chose to try out Elementary OS stable version 0.3.1 for the AMD 64-bit architecture. This is a relatively light derivative of Ubuntu Trusty (14.04) that I had previously reviewed in FCM#77 (<http://fullcirclemagazine.org/issue-77/>), and Michael Davies has also examined in its beta version in FCM#91 (<http://fullcirclemagazine.org/issue-91/>). The distribution itself comes with the GTK 3-based Pantheon desktop manager, reminiscent of Apple OS-X. Few

applications are installed by default (Midori web browser, Geary mail client, no office suite), though the standard offering is available as usual from Ubuntu's repositories. Needless to say, other distributions based on lightweight desktop managers such as Mate, XFCE or LXDE could certainly also be considered.

INSTALLATION

The first task was to install the system on the target drive - without affecting my laptop's regular drive. There are several ways to make sure of this. This first point is, naturally, making sure any data on the computer is fully backed up.

I then proceeded to format a second external USB pendrive (a smaller 2 GByte model) I had lying around, with the Elementary ISO image. There are several ways of doing this, such as using the official Ubuntu USB creator (<http://www.ubuntu.com/download/desktop/create-a-usb-stick-on-ubuntu>), the unetbootin tool, or

just plain dd. This second USB drive is used only as a bootable medium to install the system, and can later be repurposed for other uses.

Noting each drive's identification letter can be enough to make sure - exercising some care - that the installer does not overwrite existing data. In general, the internal hard drive should come up as `/dev/sda`, while succeeding USB drives should appear as `/dev/sdb`, `/dev/sdc`, etc. So, if we are booting off `/dev/sdb`, and installing to `/dev/sdc`, we should be good to go.

However, just to be on the safe side, I opted to simply disconnect the computer's internal hard drive. This is relatively easy on a desktop computer, since one simply needs to disconnect a SATA cable from the hard drive. On a laptop, the entire hard drive usually needs to be removed.

What I was basically working with was a diskless computer on one hand, the 2 GByte USB bootable medium and the 32 GByte USB target drive on the other. I placed the 2 GByte drive in an ordinary USB 2 connector, and the 32 GByte in the computer's

only USB 3 connector - that can be identified by the blue plastic flange inside the connector or, on some models, by the "SS" ("Super Speed") badging. Using an USB 3 external drive in an USB 2 connector is certainly possible, but negates the availability of the speed boost given by version 3. This is highly noticeable in practice.

The BIOS on most modern computers can be convinced to boot off a specific drive by holding down the F12 key while booting, but this depends a bit on your exact hardware. Some experimentation may be needed to get the BIOS to recognize and boot off the bootable medium USB. Actually reading the manual can at times come in handy on some models (been there, done that).

Once up and running, the Elementary live desktop environment comes up as expected. The Ubuntu-derived installer recognized the 32 GByte target drive with no problems as an available hard drive. Partitioning was performed in the usual manner. It should perhaps be noted that I immediately chose to use the entire drive for the Linux

system. Using separate partitions for root and home directories on such a small drive is probably not really useful, and moreso taking into account expected usage patterns. Aside from that, the installation process was completely uneventful - yet another case of no news being good news.

USING THE NEW SYSTEM

It is clear that the main advantage of using a small drive is transportability. The drive can be slipped onto your keychain and carried around with much ease. However, it will probably never be a complete replacement for a user's main system, which will potentially hold many GBytes of documents, music, multimedia files, etc. So this experiment became a case of deciding what precisely I wanted to use the drive for.

I basically wanted to access data related to projects I was currently working on. I usually use a combination of Dropbox and Google Drive to make these files available when away from home.

Having a complete operating system of my choice with me that I can plug into and boot from on whatever computing platform is available to me, has the advantage of being able to work on the files with my own choice of software, on top of simply having the files available. This will obviously depend on each user's specific needs, but, for me, a combination of the following works well:

- Google Chrome and Dropbox, to access files from the cloud.
- LibreOffice 5, mostly to work with presentations.
- Thunderbird, with the Enigmail plugin to handle the encrypted and signed mail I sometimes need to use.
- Some more specific stuff, such as LaTeX, to prepare scientific communications.

I have found that, in practice, all regular applications found by default in the various Ubuntu distributions work well off the USB drive. This is also true for graphical applications such as Inkscape or Gimp, in the latter case even up to image files in the 2 to 5 Mpixel range. Due to space considerations - but also disk speed - I will not be trying out applications that are known to require more processing

power and speedy disks, such as the Eclipse + JBoss combination to develop Java applications, or Kdenlive to edit videos. Such extreme use cases are probably still better left to serious rigs with the appropriate drives and peripherals. Other than that, more mundane tasks such as browsing the Internet or text processing can very well be undertaken in some comfort. Putting my words into practice, so to speak, I am writing this on the USB drive itself - and not noticing much difference from using the internal hard drive.

Some computer hardware seems to interface better with USB 3 than others. At times, reading files from one device on the USB bus and writing it to another seems to run into bottlenecks. Another fact to take into account is the well-known difference in speeds when writing to a Flash-based medium, as opposed to reading from it. Actual file-write speeds have been measured in the vicinity of 15.4 MBytes/s. These speed levels are rather lower than the advertised 130 MBytes/s maximum - which is probably a best-case statement, and relative only to reading activity - but are in practice sufficient for usual

workflows.

SECURITY

Carrying a certain amount of your data around on such a small drive exposes it to the typical accidents to life, such as loss or theft. Keeping your data secure acquires a new dimension on devices that are mobile by their very nature, and it is well to keep security in mind. To my mind, the very least that should be done is to encrypt users' home directories. Luckily, this is easy to set up during the installation process, and does not seem to impact data transfer speeds in a meaningful way. However, it does mean no



autologin, since the home directory is encrypted until the password is entered manually.

Going further and encrypting the entire disk may also make good sense, since that would, in principle, make installing backdoors or trojans on your drive more difficult for a potential hacker. This article in The Simple Computer (<http://thesimplecomputer.info/full-disk-encryption-with-ubuntu>) has a full description on the process. I would recommend giving the "The What & The Why" section a read, even if the final choice lies, as always, with you, the owner of the hardware.

Perhaps the most practical recommendation to be made here is to simply always keep the pendrive physically within your sight, and if possible on your person: no leaving it connected to a computer that is running, while you go out of the room. Booting the system up costs less than 30 seconds on my computer - including the time needed to enter the password - while shutting down costs 5 to 6 seconds. So there is really no excuse for not shutting down the computer and

extracting the pendrive when needing to leave "for a minute".

With these simple precautions in mind, using a USB drive to carry around your computing environment of choice is a way of making use of modern technology to reduce the physical stress of having to cart several kilograms of electronic equipment around all day. In the modern world, most places we go to can make a computer available to us. Working off our own drive makes it possible not only to work with our stuff on our own terms, but also to leave the computer behind us in the state we found it in, with none of our files littering the desktop and potentially risking embarrassment for ourselves and for others.



Alan holds a PhD in Information and the Knowledge Society. He teaches computer science at Escola Andorrana de Batxillerat (high-school). He has previously given GNU/Linux courses at the University of Andorra and taught GNU/Linux syadmin at the OU of Catalunya.



HOW-TO

Written by Elmer Perry

LibreOffice Pt.57 - AutoCorrect

I'll admit it. I'm not the world's greatest typist. In fact, I fall somewhere in the range of bad. I never learned standard touch-typing, and at my age, there is little sense in trying to retrain digits to do anything different than what they have picked up through years of repetition. Believe me, I have tried. Learning touch-typing slows me down to the point that I get frustrated and give up. As long as I don't have to copy from a page, I do okay. I just copy from the text in my head.

With that being said, I'm happy for the tools in LibreOffice that make my task a little easier, spell check and AutoCorrect. I misspell more words because I have fumbling fingers than I do because I'm not sure of the spelling. Spell check can mark these fumbling mistakes, but AutoCorrect actually corrects some of the more common ones. The options for AutoCorrect are many, so let's take a look and see what it can do for us.

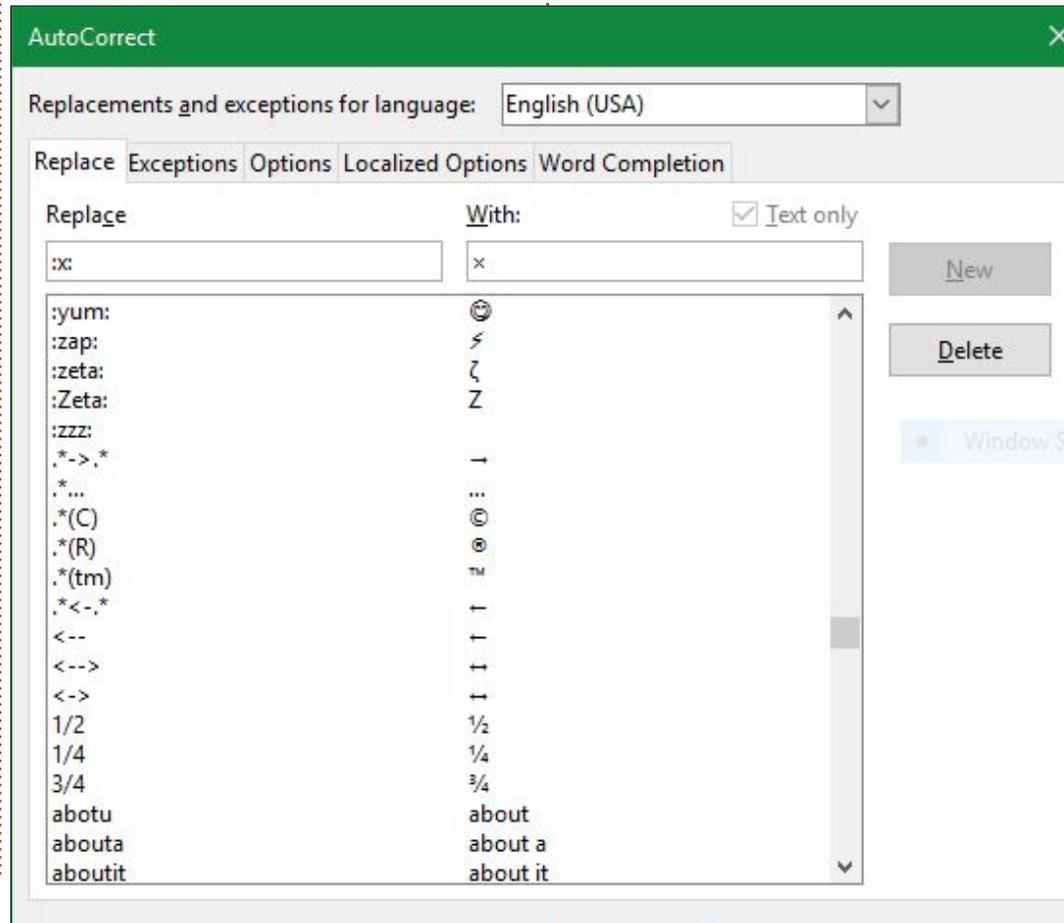
To open the AutoCorrect dialog,

Tools > AutoCorrect Options.

REPLACE TAB

The Replace tab of the AutoCorrect dialog contains a table of replacement text and symbols. I did explore the list as there are

many interesting replacements for symbols, Greek letters, and common fractions. The symbols are created by enclosing the text between colons (:). And while being able to generate these symbols, letters, and fractions is cool, it doesn't solve the mistyping problem.



Once I got past the colon bracketed replacements, I found the spelling corrections. When AutoCorrect is on and I mistype the word as it appears in the Replace column, it is replaced by the entry in the With column. The program comes loaded with many of the common finger-fumbling misspellings out there. It's like magic when I see it happen.

I can also add my own. I just type my common misspelling in the Replace text box, the correct spelling in the With box, and click on the Add button.

EXCEPTIONS TAB

The Exceptions tab is for setting exceptions to two of the AutoCorrect rules (see Options tab later). The two rules are: 1. Capitalize the first letter of every sentence, and 2. Correct two initial capitals in a word. These two rules are great for fumbling fingers, but get in the way when you actually need two initial capitals (CDs) or to use abbreviations.

The Abbreviations box lists the abbreviations already in the system. This allows the system to see them as abbreviations rather than the end of a sentence. Enter a new abbreviation in the text box above the list, and click the New button to add an abbreviation. Select an abbreviation from the list, and click the Delete button to remove it from the list.

The Words With Two Initial

Capitals box lists the words with two initial capitals already in the system. I can add and delete them just like the abbreviations.

The two Autoinclude check boxes allow me to automatically add new abbreviations and words with two initial capitals when I force the issue in my document. To force the addition after LibreOffice has "corrected" the mistake, I go back and undo the

correction. When LibreOffice sees me force this correction, it will add the change to the appropriate list. Autoinclude is only active when the two rules in question are activated.

OPTIONS TAB

The Options tab is where I find the settings for AutoCorrect. There are two columns of checkboxes in the tab. They are

labeled M and T. M is for the actions being active when I'm Modifying existing text, and T is actions active when AutoCorrect While Typing is active. Turn on AutoCorrect While Typing at Format > AutoCorrect > While Typing.

Here I found the options for the two capitals and start every sentence with a capital. I found an option about whether or not to



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use the replacement table from the Replace tab. There's an option for controlling whether or not double-dashes get converted to em-dashes. A very handy option that automatically corrects those times when you accidentally press the caps lock key (I knew someone who removed their caps lock key because they kept turning it on by accident). One more fumble-fingers saving setting in AutoCorrect.

Rather than boring you with the detailed list of all the options, here's a link to all the options <https://help.libreoffice.org/Comm on/Options> 3. Just for your information, I just unchecked the URL option in order to paste in that link without LibreOffice automatically turning it into a link.

LOCALIZED OPTIONS TAB

The localized settings are more specific to how I want things done according to my language and location. Just like the Options tab, it has two columns for the settings, M for corrections while modifying text, and T for modifying while typing.

The Add non-breaking space before specific punctuation marks in French text puts a space before “;”, “!”, “?”, and “%” when the character language is set to French (France, Belgium, Luxembourg, Monaco, or Switzerland). If the character language is set to French (Canada), it adds a space before “:” as well.

The Format ordinal number suffixes (1st .. 1st) formats the

ordinals such as 1st, 2nd, and 3rd as superscripts. This applies only to languages like English that use superscription for ordinal suffixes.

The bottom half of the tab has to do with single and double quotation marks. If I check Replace, the standard straight quotes are replaced by the curly quote marks by default. I can also click on the Start Quote and End Quote character boxes to bring up

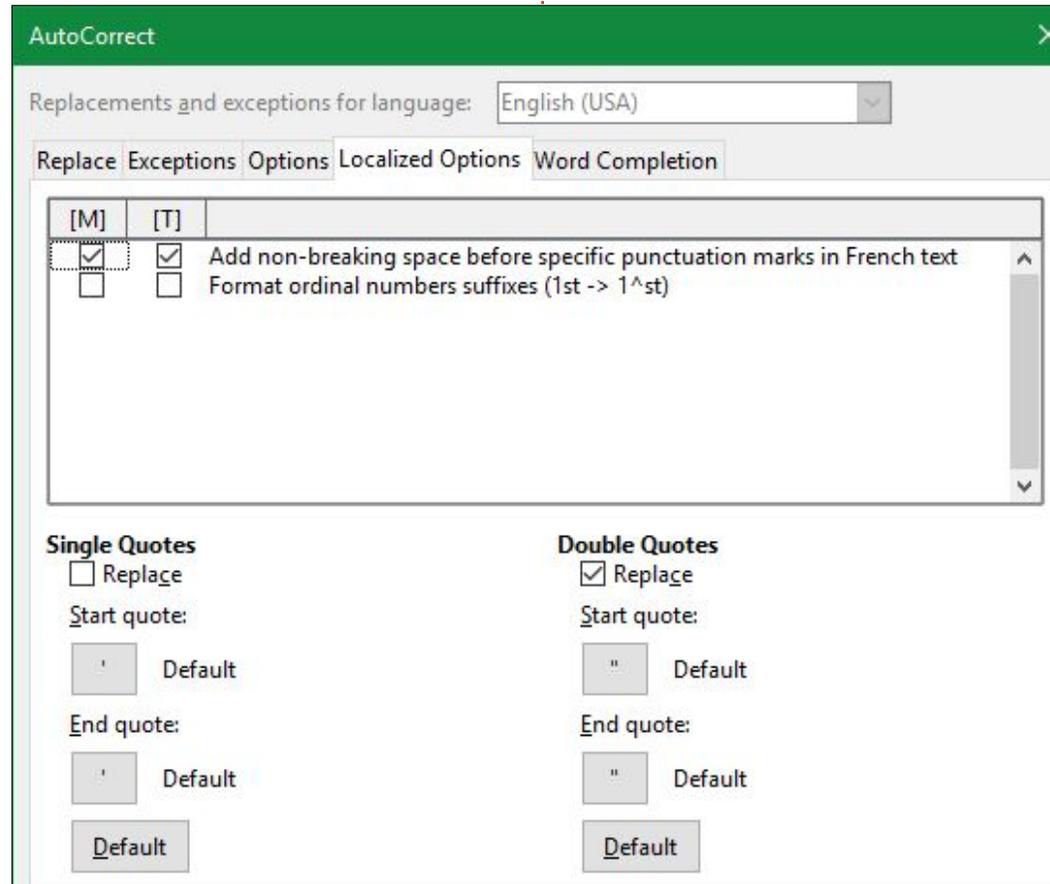
a font character table where I can select the character to use for opening and closing quotes. Click the default button to return them to their defaults.

WORD COMPLETION TAB

The Word Completion feature is a system of collecting words from a document while I'm typing that are over a minimum length and prompting me with the replacement to complete the word quicker. This is especially handy when I repeatedly use a word that is long and complicated to spell. Instead of typing out the whole word, I can use the accept key to insert the word that appears in the tip box.

The left-hand side of the tab shows a list of words the program has collected from my documents. To remove any of the entries, I select the entry and click the Delete Entry button at the bottom of the list. I've never felt a need to remove entries from this list, but you might have a word you want to expunge from the list for whatever reason. The option is there should you choose to use it.

On the right-hand side of the



tab are the options for controlling if and how word completion works. Enable word completion allows me to enable and disable the word completion feature. Append space will add a space at the end of the word after I accept it. I usually leave this disabled as it means hitting the backspace to make a noun plural by adding "s" or "es", or a verb past tense by adding "ed". If I check Show as tip, a tip

balloon with the replacement word will pop up over the word I'm typing. If unchecked, the replacement word shows inline with my typing.

Collect Words allows me to enable and disable the collection of new words. I also have a checkbox for removing words collected from the current document when I close the

document. If I purged the list and turned this feature on, then I would see only replacement words related to the currently open documents.

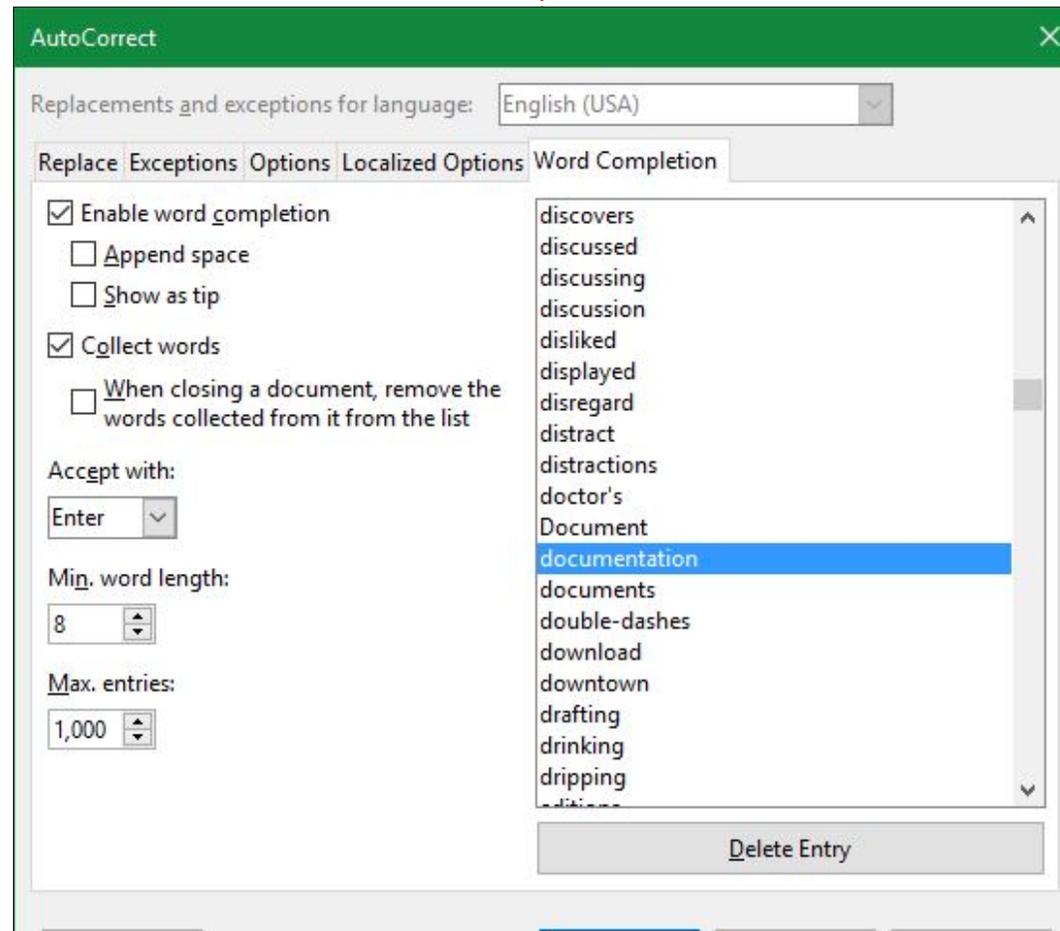
The Accept With setting tells LibreOffice which key will accept the suggested word completion. I can chose from End, Enter, Space, Right or Tab. I prefer the default Enter. Space has gotten me into trouble. For example, I want to type computer and Writer is suggesting computers. When I press the spacebar to create the next word, I get computers when I wanted computer. So, I stay away from Space as the accept key. Enter works for me, but whichever works best for you is your choice.

The default minimum word length is set to 8. If you use a lot of sesquipedalian words, you might want to increase it, but I wouldn't go any lower than 8. The default maximum entries threshold is 1,000. I can see decreasing the threshold, but I can't see going much higher. Too high and you run the risk of bogging the program down.

One last note on Word Completion. When I start to type a

word, the word suggested is not always the one I want. If I think the word I want is in the completion table, I can use the CTRL-TAB key combination to scroll through the list. To scroll back I use the CTRL-SHIFT-TAB combination.

For fumble-fingers like myself, AutoCorrect is a time saver. It corrects my typing mistakes on the spot. But AutoCorrect does so much more, providing me with ways to insert symbols without hunting through a character chart and control the way ordinal numbers display, and the word completion feature can speed things along on those new, long complicated words. And it's all adjustable to suit my needs, whatever they are.



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 how eventflags can be replaced.

THE ART OF MIGRATION

The best way to do a migration is to leave the source code as much unchanged as possible. This saves work, but, more important, it prevents errors caused by changes.

When you encounter a function with no counterpart in Linux, you could rewrite that part of the code, or you implement the function. The latter is what I have done with functions concerning eventflags. Let me start by explaining what eventflags are and what they are being used for.

WHAT ARE EVENTFLAGS?

Eventflags are, in essence, global booleans. The reason why they are important is the fact that they are used consistently throughout the entire system in VMS, including kernel and drivers. Their main function is synchronization between processes and drivers, processes and other processes, or even within a process, between threads. But they can also be used to maintain (system-wide) statuses or as a binary semaphore.

An eventflag can be set or cleared implicitly or explicitly. Implicitly when used while accessing a device (cleared upon starting and set when done), or

explicitly using the kernel routines \$SETEF and \$CLREF. When set or cleared with the kernel routines, the kernel will return the previous state of the eventflag as its result. This makes it possible to use the eventflag as a binary semaphore, as only 1 process can set the flag and get the result "WASCLEARED", the others get as result "WASSET". The VMS kernel uses the indivisible VAX machine code instruction test-and-set to do this. On a PC this would be the BTS instruction. Free Pascal does not contain a corresponding function, so I had to implement it in assembly (machine language). I didn't have this much fun programming since I created my own - functionally identical - version of CP/M (something like DOS) back in the 80's....

HOW ARE EVENTFLAGS USED?

Only setting or clearing would be useless without reading the result. You can do this by asking the kernel if a certain eventflag is set or cleared (\$READEF), but its

main use is going to sleep and waiting for an eventflag to be set (\$WAITFR). You can use this - for example - if you have to analyze data from a file (or the Internet). You can read the first part of the file and - to save time - immediately give the command to read the next part while you analyze the data you've just read. When done, you might have to wait until the next part of the file is read. You have specified an eventflag to be set when done in your read command, so now you put your process to sleep until reading is done and the eventflag is set. In VMS this is an integrated part of the kernel.

You can even wait for one of a number of eventflags (within the same cluster) to be set (multiple events, \$WFLOR). Let's say in the previous example it is possible that the next part will never arrive! Then, you could start a timer that will set another eventflag when it runs out of time, and you specify that you want to sleep until either one of those two eventflags are set. When the process (or thread

within a process) wakes up, it reads the eventflags to see if the data has arrived or the timer has run out (do not forget to cancel the timer if the data has arrived before the timer runs out!). As the kernel is updating the eventflag as well as waking up the process, this is one of the fastest ways to respond to an event.

In VMS, all access to devices goes through a unified system call named QIO (Queued Input / Output). First you have to create a link to a device to get a handle. Each device has a different way to do this: To access a physical device directly, you use “assign”; to use a virtual device - such as a mailbox (IPC, described in part 4) - you use a kernel function to create an instance of that device. Then you use this handle in the QIO call to specify which device you want to access.

As the name implies, the kernel uses queues to store your request, a separate queue for every device. This means you do not have to wait for the request to finish. Therefore this function exists in 2 flavors: The \$QIO for asynchronous access, and \$QIOW if you want to wait for the result. In both cases you have to

specify an eventflag (the default is eventflag 0), used to signal that the request is executed.

To implement asynchronous calls to functions that are synchronous in Linux, I've used threads. The call to QIO creates a new thread in which the synchronous function is used, the eventflag is cleared and the program continues. When the function is ready, the eventflag is set and the thread is closed. This way, the program behaves on Linux as it did on VMS.

Fortunately, you do not always have to use the QIO call. There exist higher level calls that do the complex stuff for you, but the penalty is that this cannot be done asynchronously. As an example: Reading from or writing to a file is done with the VAX-Pascal “open” statement (in Free Pascal: assign), followed by reset/rewrite and readln/writeln (the same as in Free Pascal).

HOW MANY AND WHAT KIND ARE AVAILABLE?

There are 128 eventflags you can use, numbered from 0 to 127.

As they are implemented as 32-bit unsigned integers within the kernel, the eventflags are divided in 4 blocks of 32 each. Because eventflags can be used for different purposes, there are also different eventflags. The first two blocks (or clusters as they are called in VMS) are the process local eventflags (0..31 and 32..63). They can be accessed only by the process itself, and are mainly used when accessing a driver or using a timer. The last two clusters (64..95 and 96..127) are called common eventflags. These clusters exist only when created.

When you create a common eventflag cluster, you have to specify a name for the cluster. If separate processes in the same group (Linux: GID) specify the same name, they will reference the same cluster. This way, processes can synchronize: If one is setting an eventflag in such a cluster when done and the other is waiting for this same eventflag to be set.

Once created, they are not fixed to your process. You can switch between clusters (in VMS this is called mapping). Be aware that you can map a common eventflag cluster to a different

block. In this case, an eventflag mapped to eventflag 64 in one process could be the same as eventflag 96 in another process! You should better avoid this to prevent confusion.

VALID ONLY WHEN TESTED!

To test my functions, I created a program to show/change all eventflags and to create common eventflag clusters. In the past, there have been times I would have paid good money to have such a program when working with VMS. This small program will also be available as open source.

Next month: In the next article, I will go more in-depth on logicals.



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

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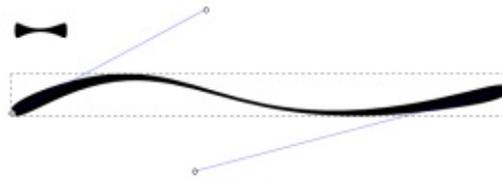


This month we'll conclude our tour of the Live Path Effects that are available in both versions 0.48 and 0.91 of Inkscape, starting with perhaps one of the most useful.

PATTERN ALONG PATH

This effect is often referred to as "PAP" in forum posts and bug reports so, for brevity, I'll do the same here. Like the Spiro Spline effect, PAP can be applied automatically as part of the normal drawing process. To do so, you simply have to draw a shape for use as your "pattern", copy it to the clipboard, and select the "Shape: From Clipboard" option when using the Pencil or Bézier tools. See part 17 of this series for more details on the technique, but suffice to say that the result is that your path will have the PAP effect applied to it – albeit with some default options selected. Whether you initially apply the LPE like this, or by explicitly adding it via the dialog, you'll find more controls available to you within the dialog's UI, in order to tweak the effect.

"Pattern along path" is something of a misnomer; it should more correctly be called "path along path" as the effect is one of taking a source path (the "pattern") and stretching or repeating it along the skeleton path. In part 17, for example, I drew a rounded bow-tie shape, copied it to the clipboard, then used it to provide the shape for the Bézier tool, resulting in strokes which appear thinner in the middle.



It's a useful technique, but the same visual result could also be achieved by using the Bend LPE. There's a philosophical difference between the two approaches, though: the Bend LPE uses your "pattern" as the skeleton path, then lets you distort it with an on-canvas path; the PAP approach, however, lets you copy the "pattern" to the clipboard, then stretches it to match the shape of

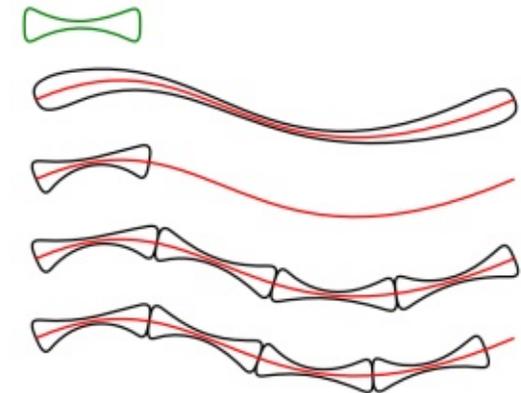
the skeleton path. On the surface, therefore, it all boils down to whether you want the skeleton path to be your pattern or your target, but there's more to the PAP effect than that. The difference really becomes apparent only when you start to change the settings.

Perhaps the most important setting is the "Pattern Copies" pop-up. This defaults to "Single, stretched", but there are three other options available, giving the following possibilities:

- Single, stretched – puts a single copy of your pattern onto the skeleton path, stretching it to the length of the latter (or shrinking it, if the skeleton path is shorter than the length of your pattern).
- Single – puts a single copy of the pattern onto the skeleton path. It's distorted to match the shape of the skeleton, but isn't stretched or compressed in length.
- Repeated, stretched – puts multiple copies of the pattern onto the skeleton path, stretching each of them in order to fill the length of the latter.

- Repeated – puts multiple copies of the pattern onto the skeleton path, but does not stretch them, usually resulting in a path that falls short of the skeleton's length.

You can see these four possibilities shown in order in this example – the green bow-tie at the top is the pattern that's being used, whilst the red line is the skeleton path.



The Pattern Source buttons are the usual quartet used to define the path that's used as the pattern – by editing an on-canvas path, using one from the clipboard, or linking to an existing path. In this case, it's usually easiest to draw



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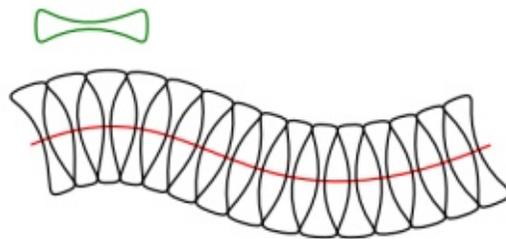
your pattern separately, then copy it to the clipboard and use the third button to apply it to your skeleton path. The first button can then be used to display a copy of the pattern on the canvas, for fine-tuning the shape.

The “thickness” of your pattern, perpendicular to the skeleton path, can be set with the Width parameter, with a checkbox to determine whether to use a fixed pixel width, or a multiple of the pattern's length. When using either of the “repeated” options, the gaps between shapes can be set using the Spacing field. Negative values are allowed, but only up to -90% of the pattern width. The Normal Offset can be used to push the pattern to one side or the other of your skeleton path, whilst Tangential Offset pushes it along the length of the path. The latter can be used to adjust the space at the end of the non-stretched options, but also works on the stretched modes to add some space at the start of the path, before the pattern begins. Once again, there's a checkbox to determine whether Spacing or Offsets are in fixed pixel values or proportional to the pattern length.

The penultimate control indicates to Inkscape that the pattern has a vertical orientation rather than a horizontal one. This is particularly useful to apply a vertical pattern to a vertical skeleton path:

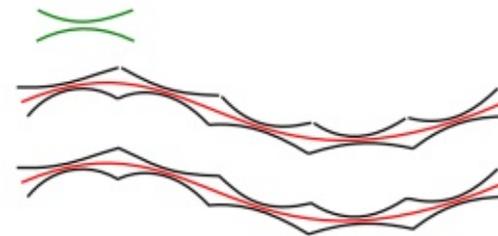


Because it effectively rotates the pattern through 90° before applying it to the skeleton, it can also be used to produce a different effect, when used with a horizontal pattern and path.

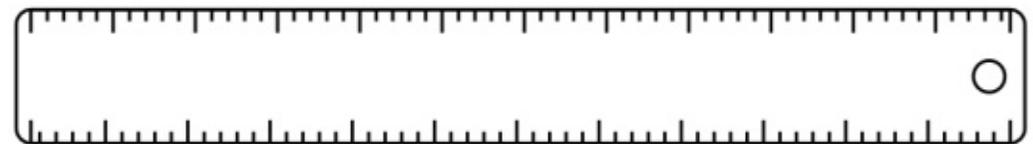


Of course, the same effect could be produced by simply rotating the pattern before it's used in the LPE.

The final control is used when your pattern is not a closed shape, but has unconnected ends. By setting this to a positive number, any line ends that are separated by less than the specified amount will be fused together to produce a continuous line. In this example, I've lopped off the ends of my bow-tie and slightly shortened the top section to exaggerate the effect. The two PAP examples show the effect of using this pattern with Fuse Nearby Ends set to 0, then set to a suitable positive value.



RULER



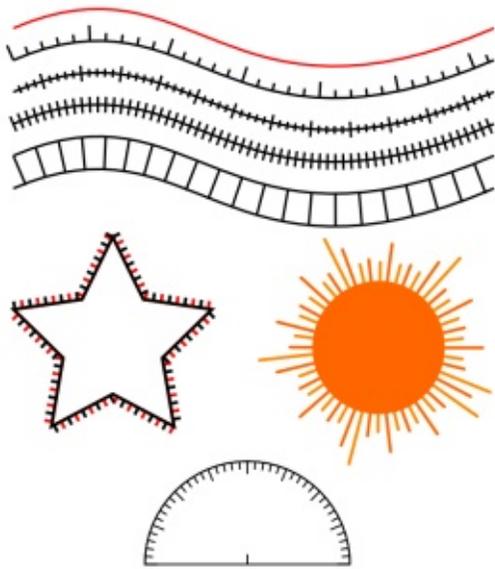
This LPE doesn't really require much explanation – it simply draws tick marks perpendicular to your skeleton path to give the appearance of the graduations on a ruler. You can define the distance between tick marks, the frequency of major marks, and the length of both the major and minor ticks. You can also determine which side of the skeleton the ticks will be drawn on, or have them centered to appear evenly on both sides.

One use for this effect is, as the name suggests, to create a ruler. For this example I've used a combined pair of parallel lines for the skeleton path, and overlaid them onto a rounded rectangle and circle.

It's also possible to use this LPE for more artistic effects, though. When combined with other shapes it's easy for your ruler to become a zipper, a simple pathway, or even a protractor. By copying the object and applying different settings and colors to the LPE, you can easily

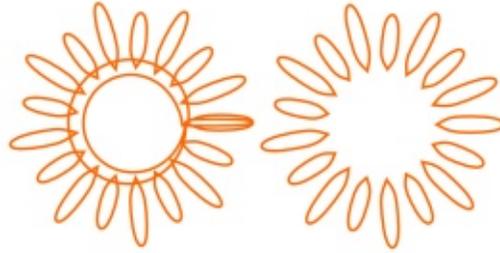
HOWTO - INKSCAPE

get the effect of coloured rays emanating from your shape.



One frustrating omission from this LPE is the ability to suppress the original skeleton path in the output. This makes it more difficult to chain this effect with others. A workaround is to use Path > Object to Path to “fix” the LPE before manually removing the skeleton path, then applying other effects – but you do then lose the ability to do live edits to the parameters. For example, chaining the Ruler, then PAP effects on a circle, gives a result like the one on the left here, whereas the example on the right shows the “fixed” version with the skeleton removed before the PAP

effect is added.



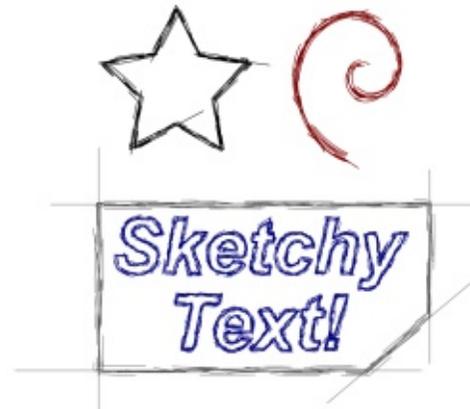
SKETCH

This LPE does one simple thing, but, like the Hatches effect, the number of controls greatly exceeds any practical requirements for such a deliberately un-tamed result. In short, this effect simply replaces each part of your path with a number of smaller paths, overlapping and with their ends offset from the skeleton by a semi-random amount. It gives the effect of having sketched your path with repeated strokes of a pencil – and can even include construction lines for extra effect.

At the top of the UI are the controls for setting the number of paths that will be used for approximating each section of the original, and for determining how long each can be and how much they can overlap. Usually it's

sufficient to adjust only the top couple of controls to set the “density” of the sketch strokes – fewer, longer strokes for a light sketch effect, more short strokes for the appearance of a more heavily scribbled line.

The Average Offset and Max Tremble controls are useful for determining the “thickness” of the sketched result. There's also a control for the number of construction lines – set it to zero if you don't want any. In this same area of the UI, the Max Length parameter is useful to sufficiently extend your construction lines from the original shape. As with the Hatches LPE, the dice buttons can be used to set a new random seed used for some of the parameters, which is only really of use for making otherwise identical copies look dissimilar.



Note that this effect can easily produce lots of new nodes, so be careful when using it as anything other than the last LPE in a chain. Here's a small showcase of the kind of results it can produce.

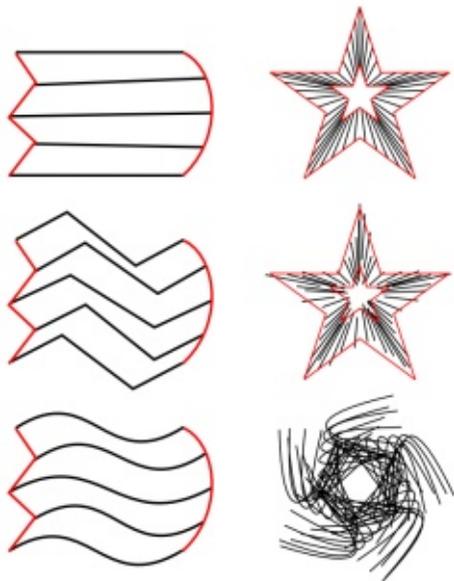
STITCH SUB-PATHS

This effect can be thought of as a perpendicular version of the Interpolate Sub-paths LPE that I described last month. Whereas that creates a connection between two sub-paths by introducing interstitial versions that gradually distort from the shape of one path to the other, the Stitch effect joins the two sub-paths directly with a series of new paths that link evenly spaced points on one path to evenly spaced points on the other. In other words, it draws some lines from one sub-path to another.

Once again there are too many controls to be useful. You really only need the first parameter – for setting the number of new paths to draw – and the quartet of buttons for manipulating the “Stitch path”. Most of the other controls are there to let you add some randomness to your stitches, should you wish.

HOWTO - INKSCAPE

In its simplest form, this effect just draws straight lines from one sub-path to another. It can work on shapes with more than two sub-paths, but, for anything other than simple shapes, it can be rather unpredictable as to what the result will be. By using the buttons to paste, link to, or modify a stitch path, you can replace the straight-line stitches with something more complex. It can be good for adding a little curvature to the lines, but once again it becomes difficult to control the result as things get more complex.

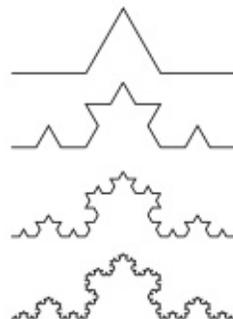


In the example above, you can see, in the left hand column, some

simple stitching between two basic shapes. The middle and bottom examples show the effect of altering the shape of the stitch path. The stars show a simple stitching, the application of some randomness via the UI, and the result of bending the stitch path (skeleton path omitted for clarity).

VONKoch

Finally we have the VonKoch LPE. If the name sounds familiar, then perhaps you've come across the Koch Snowflake – a fractal shape created by recursively replacing the middle of each side of an equilateral triangle with a smaller equilateral triangle. It was derived from a paper by Swedish mathematician Helge von Koch, who described the process for one side of the snowflake shape, creating a “Koch curve”. This image shows the first four iterations of the curve:

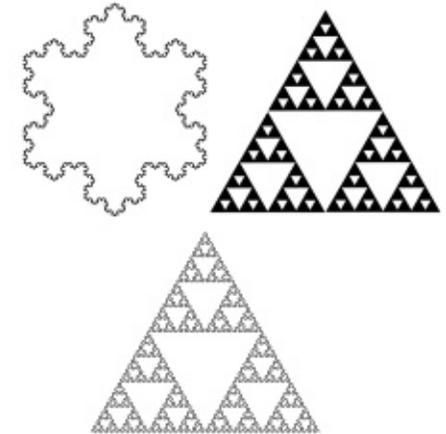


When you apply this LPE, you'll find that a pair of new copies of your path appear on the canvas. Within the UI you'll also find path buttons for a “Reference Segment” and a “Generating Path”. The two new paths you can see correspond to two sub-paths within the Generating Path. If you use the third button to paste a different path in, you'll see the number of copies change to reflect the number of sub-paths in the new Generating Path. Somewhat ironically, you have to paste in a new path to create a Koch curve, as this requires four copies, not two – so immediately the LPE makes it difficult for a layman to create its eponymous fractal! The Reference Path is used to position the copies on their Generating Path segments – essentially the skeleton is scaled and positioned such that the Reference Path lies on top of each Generating Path segment.

If that makes it all sound rather confusing, that's because it is! To adequately explain the operation of this LPE would require an article of its own. If you do wish to explore this one further, I recommend reading Tavmjong Bah's description in the official

Inkscape manual, which also includes step-by-step instructions for creating a Koch curve: <http://tavmjong.free.fr/INKSCAPE/MANUAL/html/Paths-LivePathEffects-VonKoch.html>

If you do persevere with this LPE, it can produce some impressive results – as well as a lot of frustration. I did manage to create a Koch Snowflake, the Sierpinski triangle (another stalwart of fractal geometry), and a Sierpinski arrowhead curve, but it is a far from intuitive process.



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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Richard Trotter
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So, with the basic plan thought out, it's now time to actually pick up some components and get building.

TEMPERATURE

Temperature sensing is highly important to this as it will determine when the heat mat should be switched on or off.

Rather than use the old DHT11 module, I'm using a DHT22 module this time. These are more sensitive and give a more precise reading. I'm also going to use an Arduino MEGA for this project.

BUILD 1

I've connected the DHT22 module using the three pins. One wire to +5V, one to ground, and the other to pin 6 on the MEGA.

Other than the serial monitor, there's no way to see the temperature. I prefer visuals, so I'm going to hook up the ESP8266 (WiFi) module and send my results

to ThingSpeak. The ESP8266 uses five of the eight pins that it has. One for +3.3V (NOT +5V or you will fry it) shown as a yellow wire in the diagram, one for the ground (black wire), one each for RX and TX (green and blue) and a reset pin (white wire) which also goes to +3.3V

That's the basic circuit for this first part.

The code for the DHT22 is pretty straightforward, so we'll look at that next. The ESP8266 is more tricky, and is quite often prone to not responding. If you think your code is right, and the ESP8266 isn't responding, try unplugging/plugging the two 3.3V wires from the breadboard. I find that gives a good reset to the module. When the code is running you'll see the RX/TX lights flash on

the Arduino and at that same time you should see a blue light on the ESP8266 flash.

CODE

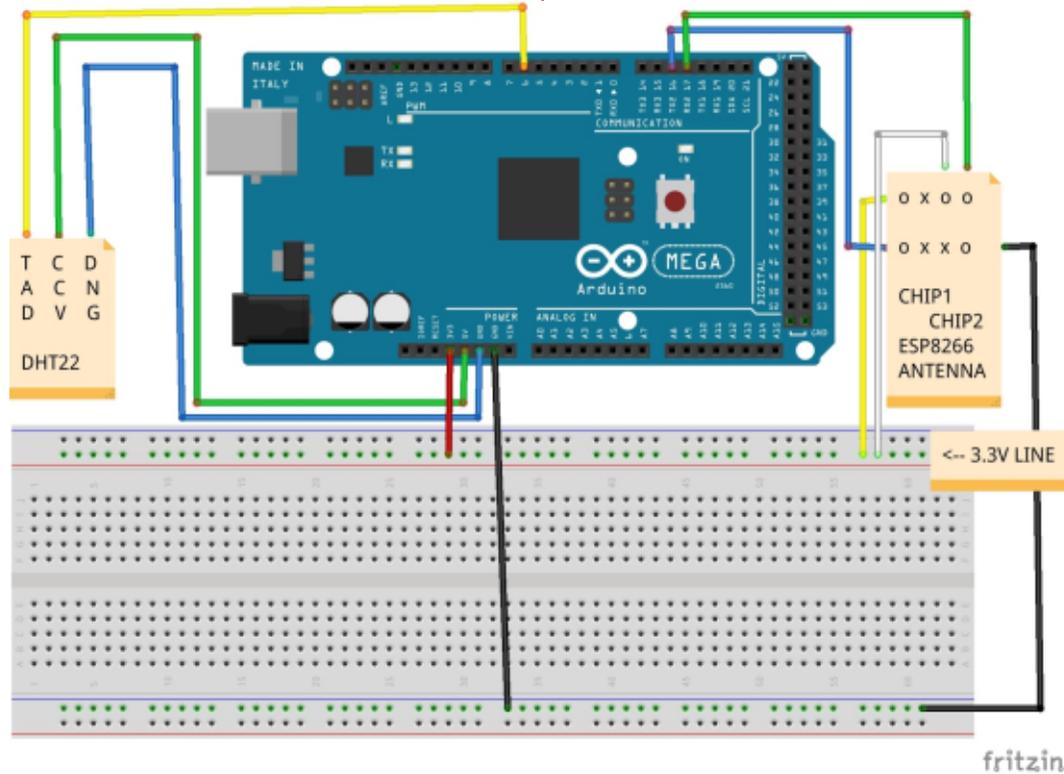
I'll be adding all my code for this project to this Github gist: <https://gist.github.com/ronnietucker/7fc62df161107116cf93>

By the time you read this, there will be many revisions of the code added to the gist, but this is revision 2 that I'm discussing here.

For the DHT22, I'm using the two libraries from here: <http://playground.arduino.cc/Main/DHTLib>

You'll need to copy/paste the text for the two files to new files, and name them accordingly. All the instructions for doing this are at that link.

I start by including the DHT library and define the pin for the DHT22. I then define my wifi SSID and password.



Now we're on to the main setup. I use two serial begin commands:

```
Serial.begin(115200);  
Serial2.begin(9600);
```

The Serial.begin is for the DHT22, so that I could get results to the serial monitor before I added the wifi module. The Serial2.begin is for the wifi module. If you're using an Arduino other than the Mega, then you may have only one serial RX/TX and need to modify the code accordingly. Now I set up the ESP8266.

```
//WiFi setup  
Serial2.println("AT");  
  
Serial.println("AT sent -  
checking...");  
  
delay(5000);  
  
char okcheck[]="OK";  
  
if(Serial2.find(okcheck)){  
  Serial.println("OK,  
found. Connecting");  
  connectWiFi();  
  Serial.println("Yay!  
Should be connected now.");  
}else{  
  Serial.println("NOT  
CONNECTED TO WIFI");  
}
```

When using Serial2, I'm talking

to the ESP8266. When using just Serial, I'm talking (or printing to) the serial monitor. I'm sending the command AT to the ESP8266 and printing text to the serial monitor to show me what is happening in the background. I wait five seconds, then run a Serial2.find to see if I got a reply of OK. If I did, then I'm going to try and connect (by jumping to connectWiFi()). If not, then I display the text to say 'not connected'.

Connecting to a wifi router needs the SSID, password and several commands.

```
boolean connectWiFi(){  
  Serial2.println("AT+CWMODE=1"  
);  
  delay(2000);  
  String cmd="AT+CWJAP=\"";  
  // add SSID and password  
  cmd+=SSID;  
  cmd+="\", \"";  
  cmd+=PASS;  
  cmd+="\"";  
  // send string  
  Serial2.println(cmd);  
  delay(5000);  
  
  // was the login accepted?  
  char okcheck[]="OK";  
  if(Serial2.find(okcheck)){  
    Serial.println("Login  
accepted");  
    return true;  
  }else{  
    Serial.println("Login not  
accepted.");  
  }
```

```
  return false;  
}
```

So, I send the command AT+CWMODE=1 to the ESP8266. Wait two seconds, create a string called cmd, and start with AT+CWJAP=\", then add to the string with the SSID, password, then send the completed string to the ESP8266. Again, I check for a reply of OK (or not) with an appropriate message to the serial monitor.

For the main loop, I first jump to TempHum() to get my temperature info from the DHT22.

```
Serial.print("DHT22, \\t");  
  int chk =  
  DHT.read22(DHT22_PIN);  
  switch (chk)  
  {  
  ...  
  }  
  // DISPLAY DATA  
  Serial.print(DHT.humidity,  
1);  
  Serial.print(", \\t\\t");  
  
Serial.println(DHT.temperature,  
1);
```

This is simply creating an integer called chk, and reading the DHT22 pin. I check the status of the DHT22 (the switch, which I've snipped that code here to save space), and print the temperature

and humidity to the serial monitor.

```
String SendTempLevel =  
String((float)DHT.temperature  
, 0);  
  
String SendHumLevel =  
String((float)DHT.humidity,  
0);
```

The two Strings are holders for the temperature and humidity and are what I'll send to ThingSpeak.

I jump to updateTemp(), taking those two strings with me. Now it's time to send to ThingSpeak. You'll obviously need to create a free account with ThingSpeak, create a channel, have two fields (for temperature and humidity), and obtain your API key.

```
String cmd =  
"AT+CIPSTART=\"TCP\\\", \\\"";  
  cmd += "184.106.153.149"; //  
  api.thingspeak.com  
  cmd += "\\\", 80";  
  Serial2.println(cmd);
```

Like last time, I create a string called cmd and send it AT codes, add the ThingSpeak IP and port, then send it to the ESP8266.

Again, I do a check to see if there's an error or not.

```
String getStr = "GET  
/update?api_key=";
```

ARDUINO - THE BREWDUINO

```
getStr +=  
"8KS0CVMQ12XXD817";  
getStr += "&field1=";  
getStr +=  
String(SendTempLevel);  
getStr += "&field2=";  
getStr +=  
String(SendHumLevel);  
getStr += "\r\n\r\n";
```

A new string, getStr, is created with a GET command – with my ThingSpeak API key, and temperature and humidity.

String cmd is created again with an AT command, and the getStr.length will tell us now long the getStr is. This is required for sending to ThingSpeak and to the ESP8266.

Like previous sends, we check for a reply. The greater than character (>) means good. Anything else is bad, and we send AT+CIPCLOSE to close the connection. Again, info is sent to the serial monitor to tell us what's happening.

Uploading the gist code to the MEGA should be error-free, and, when running, the serial monitor will tell you what is happening.

If you're seeing something like that shown in the serial monitor

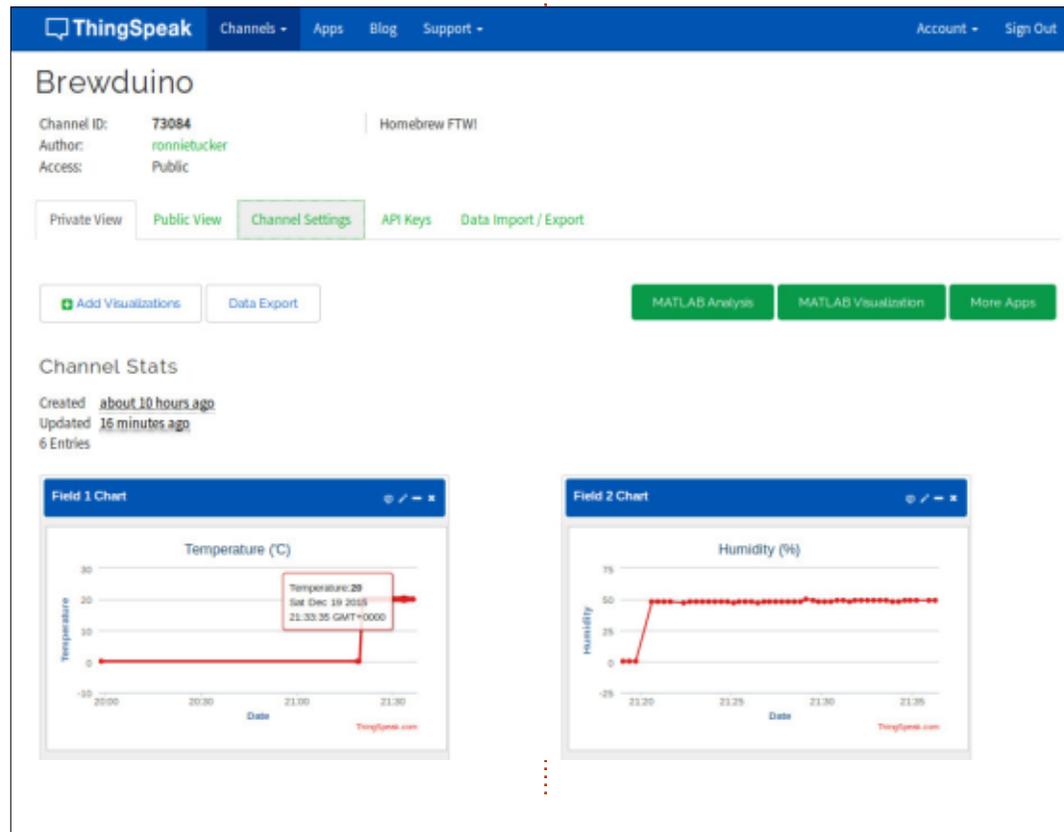
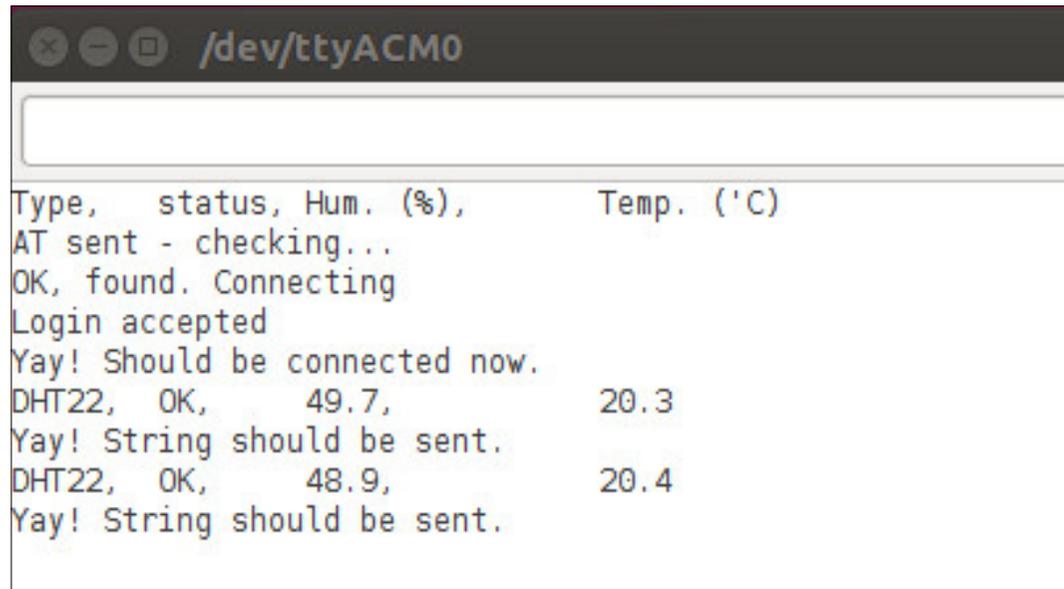


image here, then you're good to go. ThingSpeak should be receiving your data.

If you've gotten this far, then you've done great. As getting the ESP8266 to work, and sending data to ThingSpeak, are probably the most difficult parts of this project. The rest should be a breeze.

Famous last words!

I should add that I'm currently sending data to ThingSpeak every 20-25 seconds. This is obviously for testing at the moment. Before I use the Brewduino, I will change the delays to maybe every 30 minutes or so.

Next month we'll add an LCD screen, and test the relay switch.



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.



Last month, while researching the Apricity OS, I stumbled across mentions of Peppermint OS. **Britec09** at <http://www.britecomputers.co.uk> has a youtube video demonstrating making a pendrive USB drive for the Peppermint OS. I decided to give this cloud-centric version of Ubuntu a try. The pendrive worked well, but I would rather try the full experience.

Peppermint is based off Lubuntu Trusty Tahr 14.04. It installed easily onto my newer HP. A new version of Peppermint is

released yearly. This distro was released while Chromebooks were in beta testing. There is a strong instructional PDF and friendly community. Additionally, you can purchase the iso from their website as a wooden USB stick.

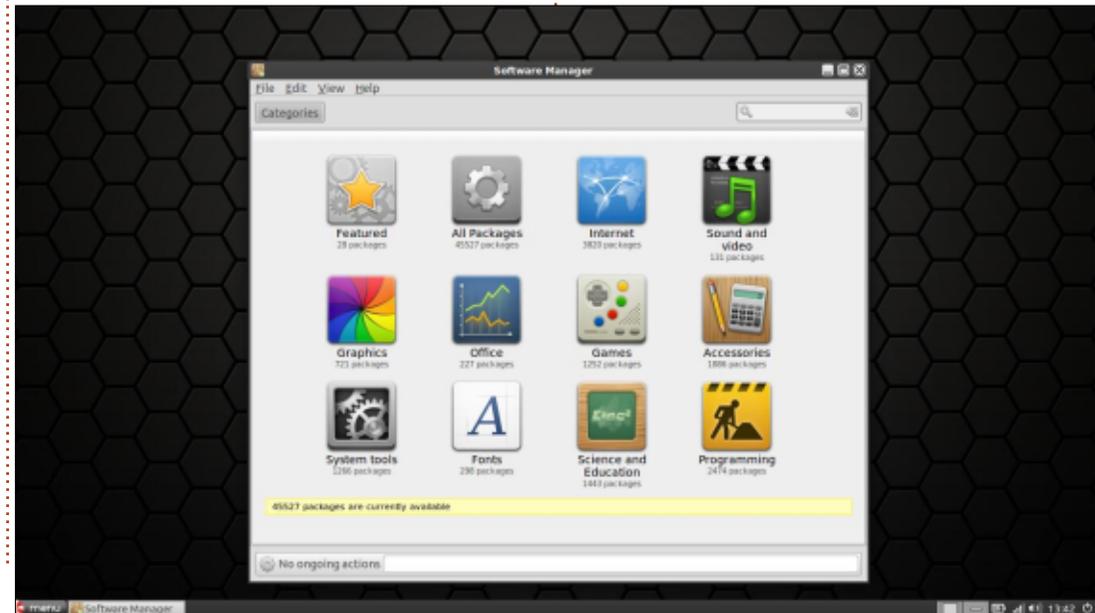
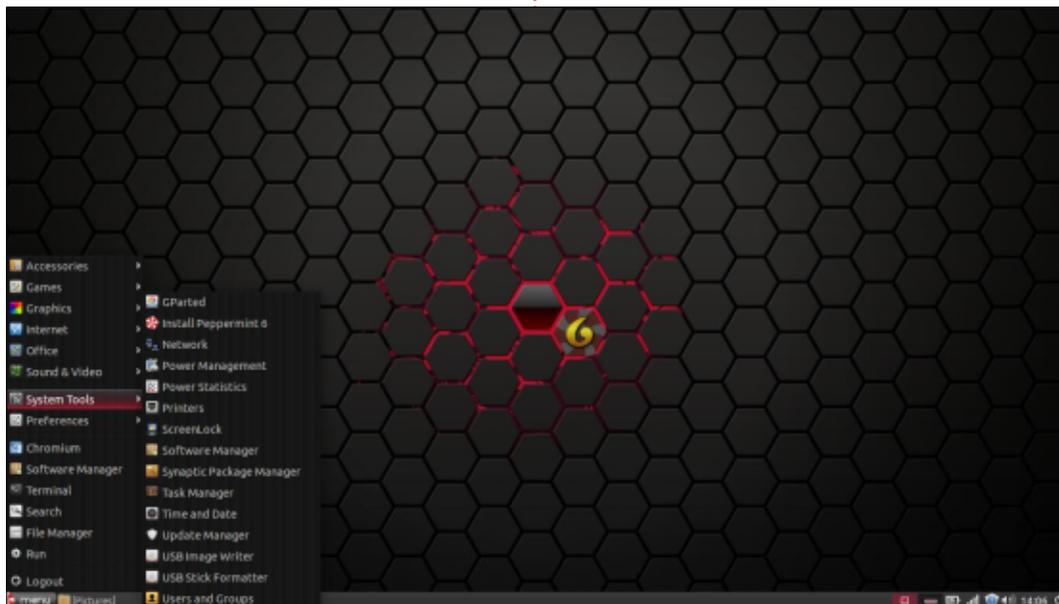


It uses the Linux Mint Software Center and Synaptic Manager. It uses the Nemo file manager from the Cinnamon DE. The Xfwm4 window manager is utilized to. It appears the Peppermint OS uses the best options from the other Ubuntu derivatives to improve the end user's experience. You can use the Peppermint Control Center to change the settings.

The strongest element to Peppermint is ICE. This is the strongest feature that helps create the hybrid cloud OS. ICE is found in

the Solus and the Apricity OS. This app will be reviewed in detail later on.

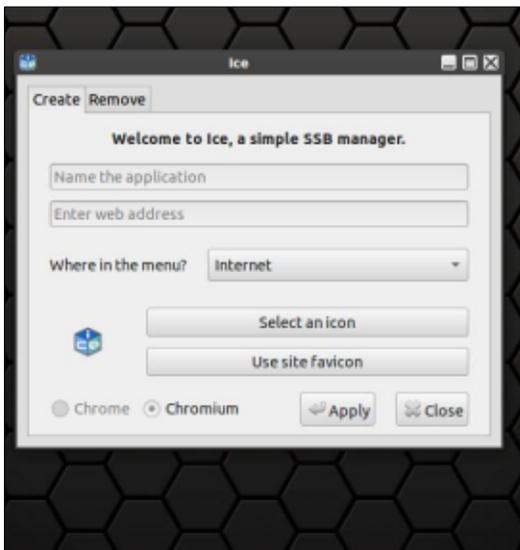
Peppermint is a nice OS with great support. The forum is not as busy as the other previously mentioned cloud centric Linux Distros; however the community is helpful. And I believe it might be the oldest of the cloud-based OSes. I can say this distro picks up the missing Chrome OS pieces for the end user to make a great stable system. My only gripe; the system update was not great. I had to refresh it two or three times to



CHROME CULT

get all the security updates. Additionally, my WiFi would drop, something that does not happen with Manjaro. I would need to change the antenna driver within Peppermint.

I used Peppermint for a full week. Once I was past the security updates, Peppermint is a stout and solid OS. It uses the Google Chrome browser; I prefer Chromium for browsing. It incorporates Google Drive as a quicklink to the internet browser for cloud drive access. The Dropbox App is installed by default. Peppermint felt fast and responsive, more so than Solus and Chromixium. It felt like Linux Mint in some regards.



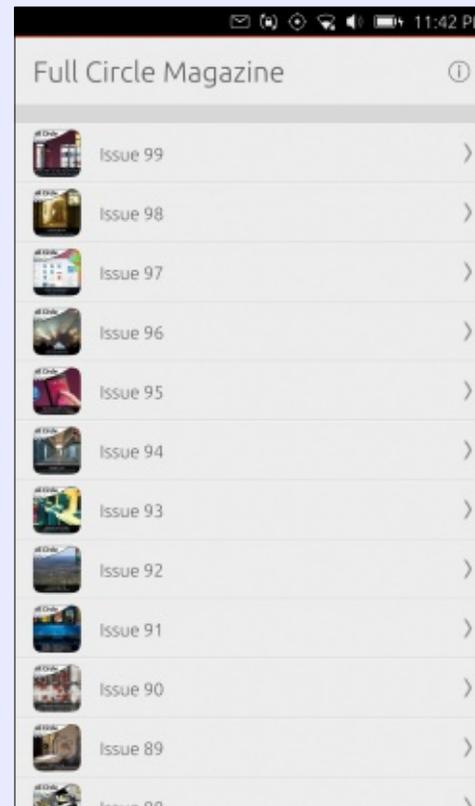
If I wanted to introduce a cloud-centered DE to a new user, I would choose Peppermint OS. Solus and Apricity OS are for more experienced users. Peppermint has the benefits of using Ubuntu's friendly first-user foundation. It has a simple and graphical installer; it can be fully installed in less than 15 minutes barring OS updates. It has an awesome array of well known apps: Twitter, Dropbox, Google, etc. The manual is spot on perfect from install to using ICE for streamlined operation. I can see me using Peppermint OS if the Chrome OS is completely destroyed by Google.

Next month, I will cover the Apricity OS in full detail.



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.

THE OFFICIAL FULL CIRCLE APP FOR UBUNTU TOUCH

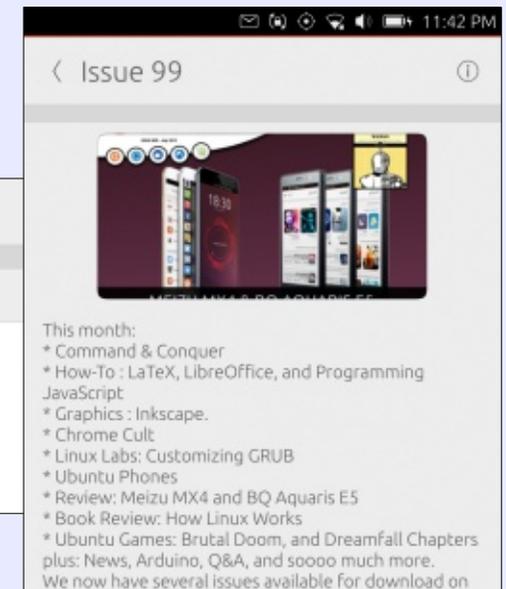
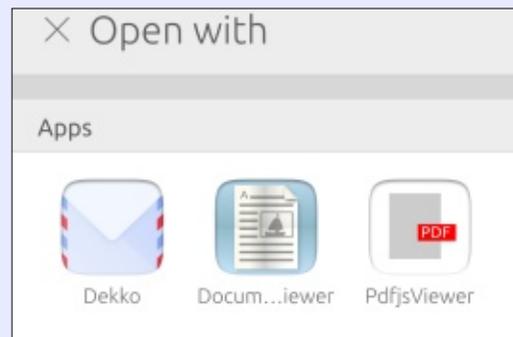


Brian Douglass has created a fantastic app for Ubuntu Touch devices that will allow you to view current issues, and back issues, and to download and view them on your Ubuntu Touch phone/tablet.

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>





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 :

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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.





All of the previous stuff was pretty easy. This is where things start getting a bit more difficult.

NOZZLE ASSEMBLY

This is the heated nozzle that I spoke about earlier. During printing, this nozzle will be heated to about 200°C. Attached to the nozzle is a metal block with two holes through it. Through the small hole we will (later) be putting a temperature sensing component, and the larger hole will hold the heater.

BOWDEN TUBE

The bowden tube is the tube that will connect the nozzle and the extruder. This is, quite probably, the most hair raising, and tricky, part of this assembly. You need to widen either end of this tube. You must use a slow drill, and a drill bit of exactly 2.5mm. Any other drill bit will mess this up. So it must be the right drill bit, and be done with a slow and steady hand. You drill about 10-15mm into

the tube. The idea being that when you screw the tube into the nozzle, the internal diameter of the tube would shrink. Since it's been drilled, it will shrink to the proper size. Same idea with the other end when you screw the little brass piece onto it.

THERMISTOR

The thermistor is used to sense the temperature as close to the nozzle as possible. Remember that hole in the metal block I mentioned? Well, we need to take some heatshrink, shrink it round the thermistor, and later we'll put the thermistor into that hole in the block.

HOT END AND EFFECTOR

With lots of other heat shrinking and what-not (I won't bore you with every detail), it's time to assemble the effector and heated nozzle.

This is where the thermistor goes into the small hole in the

nozzle block, the nozzle gets pushed into the effector, the heater goes into the larger hole in the nozzle block, the supplied fan gets clipped, and screwed, onto the effector, and a cable tie or two to keep things neat.

WIRING

This is where things need to be double and triple checked. The wires from the heating element, the fan and the thermistor go to a small socket. The wires must be in

the right sockets or there will be bad problems!

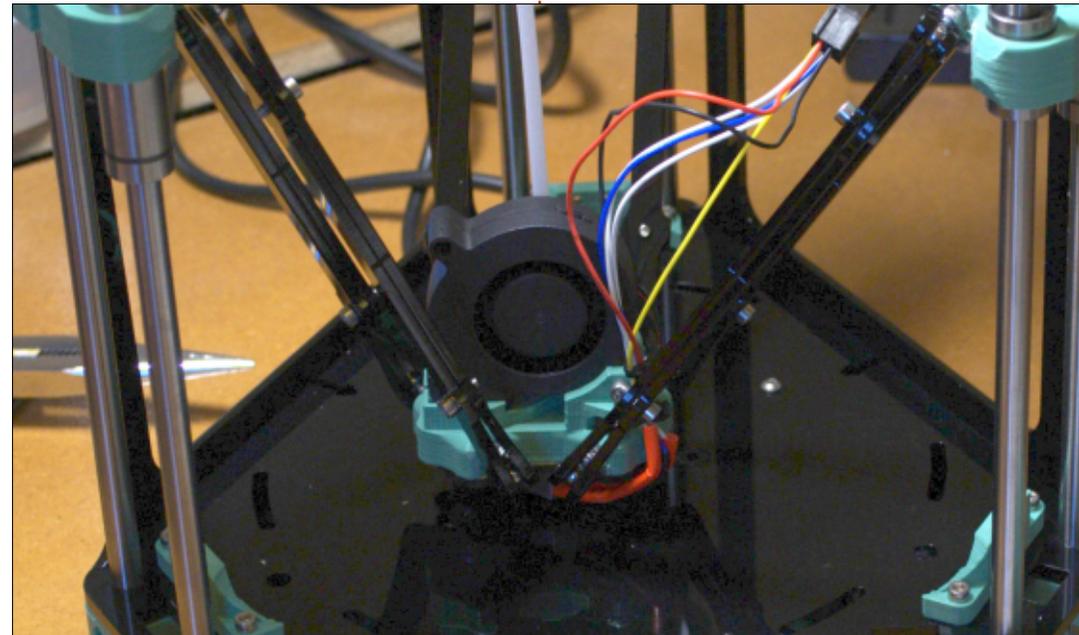
Now the effector can be mounted on the rods.

ELECTRONICS

Now it's time to get cabling.

There are several cabling looms that we must run up the inside of (what I call) the back panel.

First, we need to microswitch



the panel. Same as the other two.

Again, I won't bore you with every detail, but several looms are cable-tied to the inside of the panel, the extruder is mounted to the top of the panel, and the panel is screwed to the printer.

Now, this is where I hit my first problem. The Duet board inlet/outlets didn't match up with the holes in the panel. I ended up having to cut some pieces of rubber to make risers to have the Duet's power, network, and card slots match the panel. Normally that wouldn't be a problem, except only after I'd done a ton of wiring did I notice this. So, when you fit that last panel, check your Duet sockets before going further.

The looms are connected to the microswitches at the top, the bowden tube goes to the extruder, and the other ends of the looms go to the motors at the bottom.

The bed will sit on springs and touch screws that are on side pieces. These side piece screws are all linked together to form a loop, and when a screw on the bed is/isn't touching the side piece screws, the printer knows where

the bed is. After installing those wires, it's time to fit the power jack and connect up everything to the Duet board.

The wiring diagram is an ominous sight, but be careful and you'll be OK as most looms can only connect to one place. Worst case scenario here is that your X motor becomes Y and such like.

The bed of the printer is a plastic disc with a sheet that your hot filament will (hopefully!) adhere to.

As mentioned before, the bed sits on springs and has a screw in either corner to bring it into contact with the side pieces I also mentioned earlier.

There is a spigot to let you put the roll of filament onto the printer. I did attach this, but rarely have the spool on here. I usually leave the spool on the desk beside the printer. There's also a top plate which I didn't fit as I like to have my filament coming from above and down into the extruder.

DRIVE BELTS

After fitting more, incredibly tiny, screws into the pulley wheels, they fit to the three base motors.

So how do the motors move the carriages? Drive belts. The drive belt is fed up through the carriage, up over the idler (at the top), down over the motor, and back into the carriage where it is wedged into place. But with a twist. No, not a plot twist, a twist in the drive belt.

With all that done. It's time to commission and begin printing. But we'll leave that for next month.



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.

REPRAPPRO RIP



As FCM#105 was released it came to light that RepRapPro have ceased trading and closed their store.

This means there are no spares/help for RepRapPro devices.

While this is a great printer it is now unavailable, and I don't recommend you buy a second hand RepRapPro printer since there is no support nor spares available for these printers now.



Over the past eight years, our home network has changed quite a bit. We started with a cable modem connected to a wireless router and a separate “home phone” device (that runs over the provider’s private network, not the Internet) for telephone. At the time, we had two desktop computers, two laptops, and a rarely used netbook. One of the desktops was a workstation, the other initially served as our MythTV PVR. Both laptops were used as workstations, but we roamed around different rooms with them. Wireless coverage was okay, but after about 6 months, the router we’d purchased began dropping the wireless connection a lot so we purchased one of the Linux-based Linksys WRT54GL routers and installed the custom Tomato firmware.

After a couple of years, we changed Internet providers. Our old provider had increased their rates and drastically decreased their bandwidth cap. When we changed Internet providers, we also dropped the old provider’s

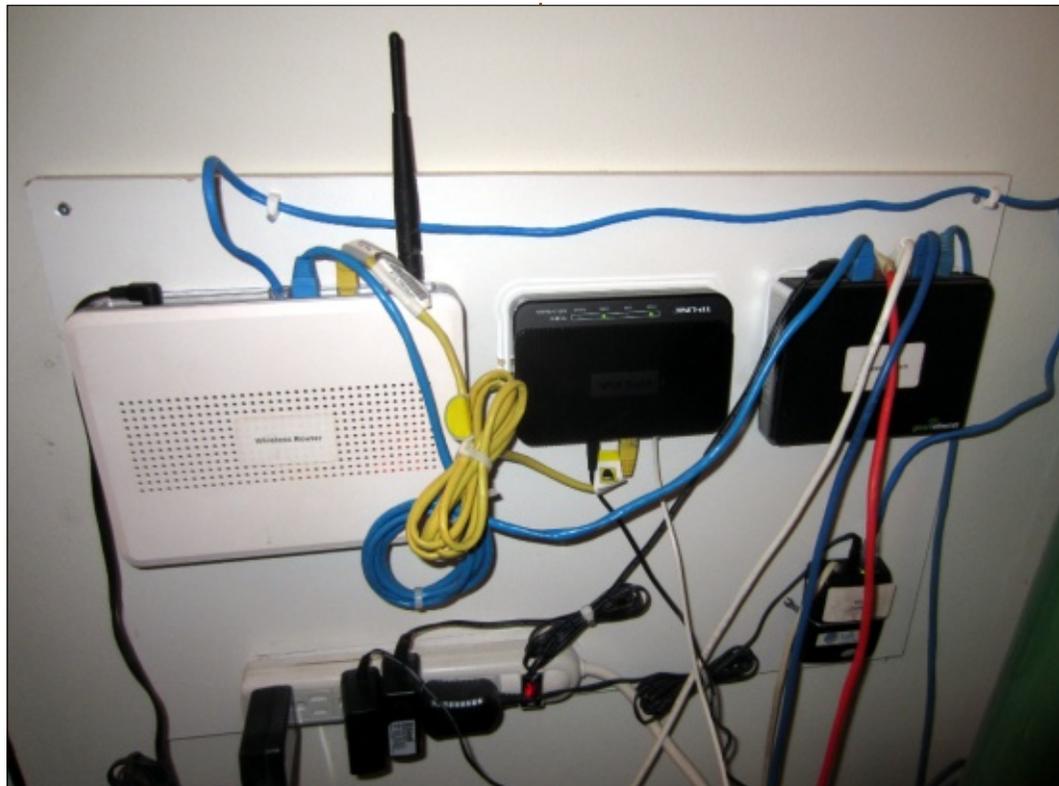
“home phone” service and bought a Grandstream VOIP ATA and signed up with a small VOIP provider. Initially we kept the old provider’s television service, but the two changes we made saved us more than \$70/month.

The new Internet provider offered some services the other provider wouldn’t offer home users. Servers were allowed, so for

a couple of years we had a third desktop computer on our network running a “The Mana World” server: <http://www.themanaworld.org/>. About this time, we got rid of the old PC running MythTV (MythDora) and connected the old netbook to our TV and ran XBMC. With the addition of the server PC we decided it was time to move the networking hardware off our TV

stand and onto a wall.

Bob Jonkman (sobac.com), coworker and computer consultant, had sparked the idea of wall mounting equipment. Most networking devices are easily mountable thanks to mounting holes on the bottom of the devices, but a few, like the Grandstream VOIP ATA, were a bit more difficult to mount. We started by cutting paper in the shape of each device and marking where the mounting holes were for each device on the paper. We then taped each traced sheet of paper to the mounting board and checked that each device would have enough space surrounding it. The trickiest part of the process was mounting the powerbar. The bottom of the powerbar we used had an odd layout for the mounting holes and we ended up putting the screws in the wrong spot because we flipped the paper the wrong way. Screws were screwed right into the paper and mounting board. Once we were sure everything fit snugly we removed the paper from the board



and mounted everything onto the screws.

Although we no longer use the Linksys WRT54GL it's worth mentioning that most Linksys devices of that era have removable rubber feet that can be mounted, then the router attached to the feet - it's one of the nicest devices we mounted.

The Grandstream VOIP ATA had no mounting holes on the bottom but was lightweight enough that we were able to mount it by simply running wire across the device and tightening it across mounting screws. Perhaps a better method is to use 3M double-sided tape, although it does leave a residue if you have to remove the tape. We found our method sufficient enough that the ATA hasn't really moved on the very rare occasion we've had to unplug it.

Over the past three years, the devices on our network have changed and grown. We've added tablets, cell phones, another three desktop PCs, subtracted a laptop and the XBMC netbook, and most recently a MyGica ATV582 streaming Android device.

Our living room entertainment system came somewhat full circle starting out as a desktop machine running MythTV, evolving into a netbook running XBMC with several external hard drives attached, and changing back to a KODI/XBMC Core 2 Quad-based desktop with 3 large drives for storage. Although it's a bit of an eyesore, the living room PC acts as a media server for all the devices in our place.

The two other desktop PCs added to the network are full workstations. One of the two replaced a laptop while the other was simply added because we needed something more modern than the other computers we had. Most of the time, the workhorse workstation is used for ripping Blu-ray discs. We've bought a lot of Blu-ray movies we wouldn't have purchased if we didn't have this machine, even though we have a couple of stand-alone Blu-ray players. Although we love the quality of Blu-ray, that alone wasn't enough to convince us to buy Blu-ray discs. In fact we had only 3 Blu-ray discs eight months after getting our first stand-alone Blu-ray player. It was the convenience of having Blu-ray

movies on our KODI server that led us to buy more Blu-ray discs.

The file sizes for Blu-ray movies are huge; some we have stored are as large as 45GB. Transferring those files from our workhorse workstation to the KODI box required gigabit. Although devices like the MyGica ATV582 feature wireless, we ran wire to every room and connected most devices (minus a notebook, tablets and phones). Our current router doesn't have any gigabit ports so we added a five-port gigabit switch to the wall mounted network center. We've also added another gigabit switch in one of the bedrooms so we didn't have to run two cables for the ATV582 and a desktop PC. Unlike the living room, we mounted the switch closer to the floor so it could be hidden behind smaller furniture.

Most of the devices on our home network run Linux. All our cell phones are Android. The single notebook left runs Ubuntu Gnome but doesn't get as much use as the workhorse workstation which runs Xubuntu. One of the tablets is Android based, and one iOS. The other two workstations run Windows.

Although our router is old, it's been running smoothly right up until recently, running DD-WRT custom firmware. We've recently replaced our old ADSL modem, not because the old one malfunctioned, but because we'd purchased a newer version of the same modem awhile back for troubleshooting purposes and finally got around to replacing it. Next change for us is switching out the old router for a new wireless router, but this will be a bit of a challenge. It would be nice to find a wireless router with five gigabit ports and strong enough wireless capability to sort through the (yes) 60+ visible wireless networks within range, but we'll settle for the second feature and keep our five-port gigabit switch for now. Suggestions?



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 has a blog at charlesmccolm.com.



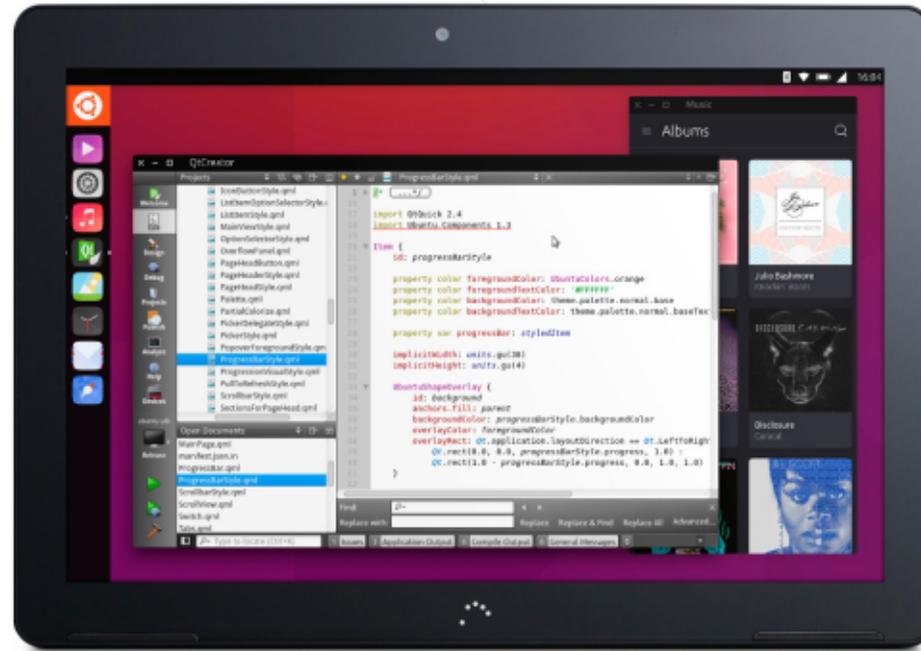
UBUNTU DEVICES

Written by Ronnie Tucker

As you can see from the page title, this is now Ubuntu devices. Why? Read on...

We all know and love the BQ E4.5 (and E5) and the Meizu MX4, but now there will be an Ubuntu tablet. In March, BQ will release an Ubuntu edition of its M10 tablet. This is the first official device which will allow you to use Ubuntu in a tablet setting, but, with the addition of a bluetooth mouse and keyboard, it will effectively be a laptop. Use the M10's HDMI port and you pretty much have an Ubuntu desktop machine too.

The M10 will also take advantage of a new feature called 'side stage'. This allows you to run two apps in split screen. With the convergence finally happening, we'll need software. Yes, the tablet will run standard desktop software such as LibreOffice, GIMP, Firefox, etc. Software for the tablet needs to be packaged slightly differently. While not every piece of software will be available on launch, you will be able to drop to a terminal to install



unofficial packages.

The Aquaris M10 Ubuntu Edition tablet will have a 10.1 inch multitactile FHD screen with Dragontrail Asahi protection. It is just 8.2 mm thick and 470 grams in weight. It includes a 7280 mAh LiPo battery, and a powerful MediaTek Quad Core MT8163A to 1.5 GHz processor. Price is, as yet, unannounced.

Also, this month, there will be more phone devices announced. Canonical is working with One+,

Sony, and Fairphone to bring Ubuntu to their devices too!

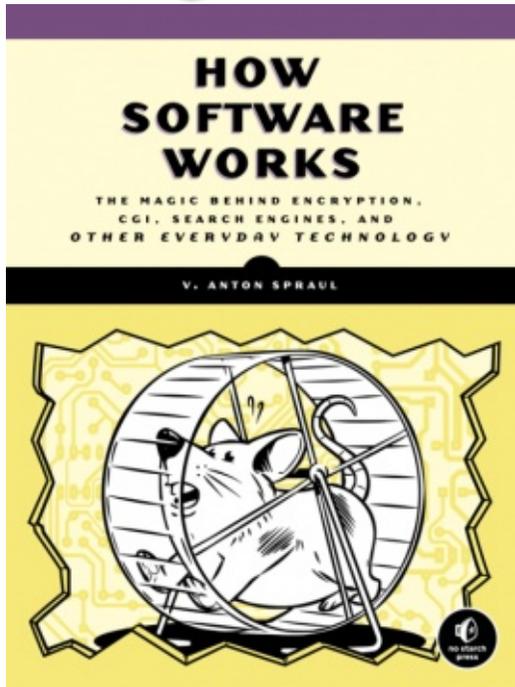




BOOK REVIEW

Written by Ronnie Tucker

How Software Works



How Software Works: The Magic Behind Encryption, CGI, Search Engines, and Other Everyday Technologies

by V. Anton Spraul
August 2015, 216 pp.
ISBN: 978-1-59327-666-9

The book starts with some basic encryption stuff, showing how you can swap numbers and letters, and such like, but, in no time, it's showing you AES encryption and discussing block chains.

With passwords, it's not about creating a password, or anything like that; it's about keeping passwords safe. Making sure that they're not compromised while being passed from you to the server, and things like that. Something that's definitely required, but not something I'd ever considered before.

Web security is almost a combination of the previous two (encryption and passwords), but it, of course, uses RSA encryption. Like the previous chapters, we're shown complicated stuff using tables and diagrams. Which is helpful for the more visual learner.

Next comes movie CGI. This really threw me for a loop. This chapter seems totally out of place. It does, very briefly, discuss a couple of old effects (such as mattes), but it's mostly dedicated to CGI as we all know from Jurassic Park.

Another oddity. Game graphics. Like the preceding chapter, this one does briefly discuss old school

pixel stuff, but this is mostly rendering and more modern stuff.

I think the problem with these two chapters is that the stage was set by the first three chapters (encryption, passwords, and web security). Placing CGI and games after those three is quite jarring.

Now we're back on track with data compression, Huffman encoding, binary, tables of numbers, and even some graphs! Of course, you can't end data compression without looking at our old friend – the JPG.

No, you won't get to see Google's secret sauce in this chapter on search. This starts focusing on data sorting and the kind of search you'd use in searching for files on your desktop, or within files. But then it does lead into how search engines get their data, and how it's served up in a manner that gives you the best to worst results.

Second-to-last chapter is on concurrency. This is how data is

quickly stored and retrieved. It's how data is kept in an order where things don't get mixed up.

Lastly we have map routes. This is one that I hadn't read about before and was pleasantly surprised to have this chapter. How does your GPS come to a particular route. How can it pick the shortest route (in miles) or the quickest route (in time)?

CONCLUSION

This is a great little book with very interesting information. It's good to know what's happening in the background when something is encrypting, or you're doing a Google search. I have to drop a point for jumping to CGI (and, to a lesser extent, game graphics) as, while it is something we see quite often, it's not something most of us will actually use. If they had to be kept, it might have been better to put them at the end to keep things flowing better.





LIBREOFFICE UPDATE

In your LibreOffice Gold special edition "issueLOGOLD01_en.pdf", LibreOffice - Part 4 (page 13) - When I insert the second frame, the second frame covers my first frame and does not show below the first frame.

I am using LibreOffice 5.0.4.2

Kamaljit Singh Dadyal

Elmer says: *The frames seem to behave differently in version 5. Set the Vertical Position to From Top by 2.5" (6.35 cm) to Margin. That sets it in the right position for me, just below the header frame.*

SUPPLIER GRIPE

I have a minor gripe with equipment suppliers regarding support and drivers.

Let me explain, I have a HP Laserjet P1102, which I purchased

on the belief it works with Ubuntu. Well it does, but Windows users have a few more bells and whistles.

I later had a problem with networking, and installed a D-Link. The instructions were for geeks.

Then my daughter bought me a Canon MG2540; to scan I have to enter terminal mode. Scangearmp does a good job, but well a bit Heath Robinson.

My suggestion would be for Ubuntu to have a listing of suppliers and models which are Ubuntu friendly. I for one would follow recommendations

Geoff Clarke

Gord says: *Google "Linux Hardware Compatibility Lists". If you ask about a specific product in the Ubuntu Forums, you will usually get an answer. Or just Google it, eg.: HP P1102 Ubuntu.*

Your comment about D-Link is, sadly, too true. In the vast majority of cases, the proper instructions are:

shut down your computer, plug in the D-Link, power up your computer.

MEMORIES

I would like to thank Mr. van Oosten for the walk down memory lane. It's been a long time since I have heard VAX mentioned in an article. Good to hear that there are still many of these old girls still running. Somewhere out in storage I have a disc pack with a couple of megs of DCL procedures. Why, I don't know.

John McGinnis

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ubuntuforums.org/forumdisplay.php?f=270

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.



Big Data is a term that has morphed into a buzzword that is doing the rounds in today's information technology circles. Managers speak of Big Data as a concept to somehow make use of the information that is collected by businesses from their customers. Computer system and software vendors see in it a commercial opportunity, and advocates of human rights and freedom are concerned about the social and personal implications - after all, Big Data rhymes well with Big Brother.

But what connections are there between the concept of Big Data and the Ubuntu distribution?

Let us start out by trying to define the concept somehow. It should be stressed that this cannot be a very definite and precise definition, since geometry is often variable in computer science and the concept of Big Data is about at the limit of what is possible with today's off-the-shelf hardware. Tomorrow's technology may change the basic tenets.

Naturally, Big Data is, in the first place, about large amounts of data, as the name itself implies. "Large" may have different meanings depending on context, so let us settle on the idea that "large" in "Big Data" is functionally equivalent to saying a data set "larger than what can be handled (stored or processed) in a reasonable amount of time on a single computer." As you can see, there is some imprecision here, since the capacities in terms of processing power and disk space vary quite a bit between my laptop and a large mainframe computer. But it is clear from this definition that parallel processing is very much part of what Big Data is all about.

This being said, parallel processing can very well take place in separate threads inside a single computer, so caveats apply.

Another way of clarifying the concept is by considering how Big Data is generated in the first place. In the initial stages of computer science, data was collected mostly

as written documents (printed matter, forms), and then entered painstakingly by hand into computers. Large companies employed whole rooms of people whose task was to type data into perforated cards, paper tape and then magnetic media.

This is no longer the case. Nowadays, large amounts of commercial data are actually entered by the user him- or herself. One of the effects of the growth of e-commerce, and its companions e-business and e-administration, is that normal people actually end up filling in more forms, and with larger amounts of information, than in the day of paper forms. The electronic nature of the data that is input also makes processing much easier and faster.

Finally, large amounts of information are now available that have been generated not through an active participation by a human being, but simply through automatic methods. Some examples may help clarify this. Let us say Average Joe walks out of his

house one fine morning, gets into his car and goes to the grocery two streets away for a loaf of bread. Naturally, he has his mobile phone in his pocket, so his local telephone utility company has automatic information on his whereabouts by tracking to which cell base-stations his phone connects. If he has left GPS connected on his phone, this may result in both a depleted battery life, and whatever app is running in the background and has been authorized to consult GPS data to track his physical movements. If his route has passed in front of a police automatic license plate reader, data has been generated on his car's movements. Finally, if he has used a credit card to pay for his acquisition at the store, at least two different financial organizations (his bank, and the store's bank), now have data on the whereabouts of his credit card, and its usage patterns.

It should be stressed that all of this data has been collected purely by automatic means, through the use of machines that are never turned off. Some of the

information may be considered private (a private transaction between Average Joe and his baker), but much of it will in fact be considered public information in many jurisdictions. A street is, by nature, a public place, and nobody can have valid expectations of privacy concerning his movements when exposed to public view.

Processing Big Data is also quite a handful. Although there is a wide variety of programming languages and data access APIs that can be used to “do” Big Data, the main paradigm is the MapReduce pattern introduced by Google, and nowadays often implemented by Hadoop. To produce an output from large amounts of data, two individual steps are taken - and both are parallelizable. In the first “Map” step, data goes through filtering and sorting. The output from this step is then piped through into a second “Reduce” step, where global outputs can be calculated.

For instance, we could consider a classical SQL query such as the largely self-explanatory:

```
SELECT SUM(salary) FROM  
employee WHERE division =
```

“Logistics”

In classical computing, this would require all employee files to be held within a single relational database table, which is then read sequentially - perhaps using an index - to select registers in which field “division” equals “Logistics”. The contents of field “salary” in the chosen rows are then added up and returned.

In Big Data, things are a bit different, since employee registers will probably be spread out over several different physical computers. Actually, this is seen as desirable, since each individual record can be replicated several times, thus giving us redundancy. This can be done automatically, for example using Hadoop’s HDFS (Hadoop Distributed File System).

In the “Map” step, each individual worker node will analyse the registers at its disposal, producing an intermediate output that consists of, for instance, the names and salaries of those employees that satisfy the criterion: division = “Logistics”. This data is then input into “Reduce”, where possible duplicates are eliminated and the final total is

computed.

Two interesting considerations arise here. In the first place, each worker node that performs initial selection and sorting is handling large amounts of data. Thus, it makes sense to try and keep the distance between the worker and the data it needs to work on as small as possible. In an ideal situation, the data would reside physically on the same computer system as the worker itself. A second point is that intermediate results are a digested version of the original data; for this reason they will, in most cases, occupy much lower volumes than the original complete set. This will then take up less space and network bandwidth when it needs to be reshuffled and distributed to other workers in preparation for the “Reduce” phase.

Now, let us consider the role our favourite operating system has to play, regarding both the storage and processing of Big Data, and its original collection. It will come as no surprise to the reader that most servers on the Internet run some distribution of the GNU/Linux operating system. This is pertinent to the handling of Big Data, since

the very concept could be said to have been invented by Google - who is in a privileged position to collect large amounts of data on its users, and who has been a market leader in trying to make commercial use of this information. Google is also known to be a large GNU/Linux user, at various levels (its own servers, in software development, and as a basis to build Android).

There are also quite a few large mainframes in service, running various operating systems. However, in a tendency started many years back, mainframe resources are often parcelled out into various virtual machines. System builders such as IBM are major players in this field, for example with the zSeries and “Linux on a z”: many instances of virtual machines running Linux coexist within the mainframe’s process and memory space. Others such as Amazon run large clouds of virtual machines, though on smaller servers with Intel x86_64 processors.

This is where Ubuntu comes in. There are several choices of Linux distributions for a virtual machine, but in actual practice a choice is

often made either from the RedHat subset of distributions (Red Hat Enterprise Linux with paid subscription, or CentOS without), or Debian's. In Debian's case, we find either Debian itself, without much choice of paid support, or Ubuntu Server with or without commercial support.

The insistence on the availability of paid support options may seem strange to some users. However, it should be taken into account that operating systems used as servers are in a commercial environment. Information systems are mission-critical to businesses' workflow. Computer department heads are under pressure to deliver, and make sure they can continue to deliver in a timely manner. With these considerations taken into account, it makes sense to pay for quality service to make sure that if and when problems occur, they can be dealt with using not only the company's own resources, but also high-quality external expertise.

This explains why most large Linux distributions propose specific solutions to set up and configure virtual computers in the cloud, often prominently displayed

in their web pages. CentOS proposes "a generic cloud-init enabled image" within their first paragraph (<https://www.centos.org/>). Both RedHat (<http://www.redhat.com/en/insights/openstack>) and Ubuntu (<http://www.ubuntu.com/cloud/openstack>) are actively involved in building cloud-based farms of virtual servers using OpenStack, thus making convergence between the two Linux server distributions quite straightforward.

The virtual (cloud) server technology is often applied to Big Data processing. In the first place, as has already been pointed out, it makes sense to have the workers placed near the data they will be working on, thus reducing network overhead. But most data processed by large organizations is already in the cloud, having been collected through e-commerce servers that are already virtual machines. When the collection point, storage and processing takes place within the same physical facility, data transmission costs are null to negligible, and transfers can take advantage of the server farm's LAN infrastructure for speed.

In the second place, using virtualization as a basis for data processing means organizations (which need to process large amounts of data) no longer need to acquire and maintain large server farms. The infrastructure costs are externalized to cloud computing providers such as Amazon, and leased only as needed. This introduces more flexibility, since smaller or larger numbers of servers may be provisioned as needed according to the size or complexity of each specific problem or data set.

Big Data processing today seems to be firmly in the domain of Linux-based virtual machines in the cloud, with Ubuntu as at least one of the main players in the field. But what about data collection in the first place?

Please take a moment to navigate to the Ubuntu project's homepage, <http://www.ubuntu.com/>. Now consider the main menu options. Beside "Cloud", "Server" and "Desktop", we find three further options that relate to devices that may be used for Big Data collection: "Phone", "Tablet" and

"Things". This last category can be interpreted as Canonical's interest in putting a version of Ubuntu (Core) on relatively lightweight and inexpensive computing devices, mostly based on versions of the same ARM platform that powers most phones and tablets.

Once these are used to make Average Joe's consumer electronics more smart - televisions, car entertainment systems, heating systems, and more - and above all more connected to the Internet, possibilities are endless to collect data and forward them on to whatever service provider gets in on the act.

Average Joe may even benefit from the innovation. Obtaining real-time access to traffic conditions while driving may be seen as a useful bit of progress for the large part of humanity that lives in congested urban areas. Being able to monitor and fine-tune home central heating at a distance, thus reducing heating bills and carbon emissions cannot be seen as a bad proposition.

Ubuntu Core is a perfect fit for this type of application, since its

MY OPINION

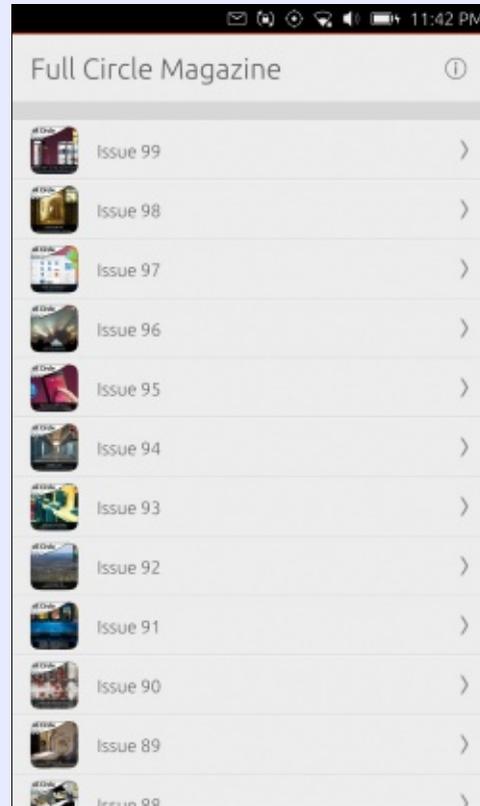
modular structure fits in well with getting “just enough Operating System” for lightweight hardware, leaving the system integrator just with the task of building his own code module for the specific task required of the system. So, basically, Ubuntu is well set to occupy large chunks of the Big Data ecosystem, from storage servers and processing workers in virtual machines, down to the very smart devices that populate data sets.

There is just one niggling doubt at the back of my mind.

What about individual freedom, including the freedom not to be tracked not only in the digital world, but also in our real-life physical existence? When will the community - and Canonical itself - stand up and clearly state its position on the matter?

Just saying...

THE OFFICIAL FULL CIRCLE APP FOR UBUNTU TOUCH

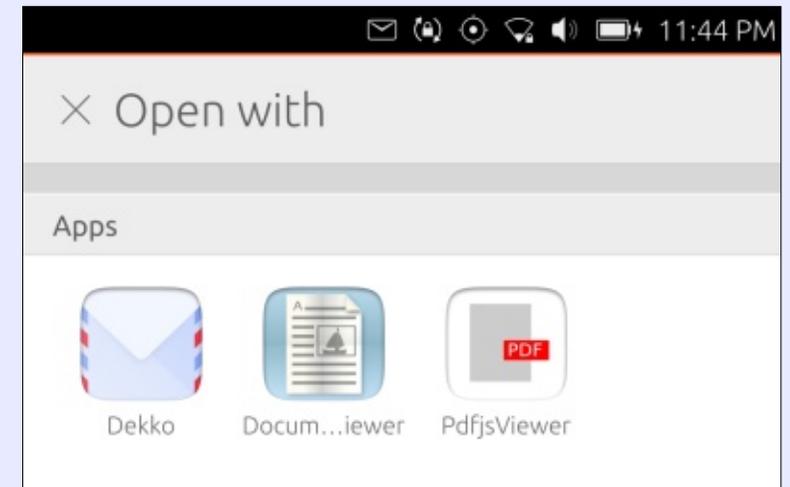
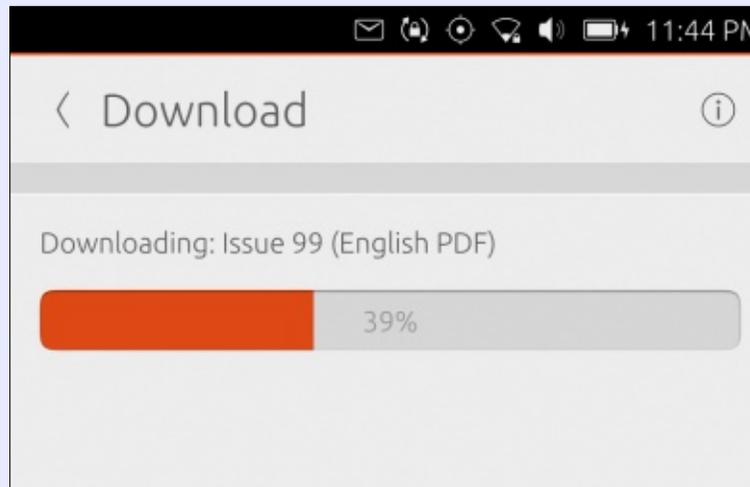


Brian Douglass has created a fantastic app for Ubuntu Touch devices that will allow you to view current issues, and back issues, and to download and view them on your Ubuntu Touch phone/tablet.

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>





Q&A

Compiled by Gord Campbell

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

Q Is my HP laptop compatible with Ubuntu? (Link to specs provided.)

A There is a good chance that your laptop is 100% compatible with Ubuntu. The most likely source of problems is the Wi-Fi adapter, and companies generally don't publish exact details of the Wi-Fi adapter, because they often change suppliers without rebadging the laptop.

The good news is that you can run Ubuntu, or any of its variants, in "live" mode. You boot from the DVD or flash drive, and select "try Ubuntu." If it says, "Wi-Fi networks are available," that means the Wi-Fi hardware is compatible.

Q I installed a new AMD graphics card (R9 380X OCE, ASUS brand), and it has major problems under Ubuntu 15.10.

A (Thanks to **QIII** in the Ubuntu forums) These are new adaptors, so the open source

driver may not have caught up to them yet. Install `fglrx-updates` from the repository.

Q I am trying to install Ubuntu on my PC, but every time I try to boot from USB, I am greeted by these messages:

```
[ 0.024346] Ignoring BGRT:
invalid status 0 (expected 1)

[ 2.937043] ACPI PCC probe
failed.
```

It happens with both Ubuntu 15.10 64-bit and Linux Mint 17.3 Cinnamon 64-bit.
MSI Z97 Gaming 5
i5-4690k
GTX 980 ti
GTX 970
ASUS Xonar STX
8GB DDR3 RAM
SSD 850 Evo 120GB
SSD CT256MX100
WDC WD10EZEX

A Both messages are warnings. Removing the second video card solved the problem.

Q I installed lubuntu on an Acer Aspire 3630 but I can't find how to install the SIS video drivers.

A There are no SIS video drivers.

Q What is the most popular method of backing up files? Where can I learn more?

A One possible answer is `rsync`. There's a nice tutorial here: <https://www.linux.com/learn/tutorials/836851-how-to-backup-files-in-linux-with-the-command-line>

The short link is: <https://goo.gl/OMAj3E>

Q I recently installed the Mate desktop environment and now, when I logout, I am no longer given the option to log in with Unity or any other desktop environment.

A (Thanks to **Vladlenin5000** in the Ubuntu Forums) That depends on what greeter you are

using. If it's still the same as the one you get with the standard Ubuntu, then you'll find a small circle at the top right of the login field.

Q I scanned my whole computer using: `clamscan -r /`, and I got 0 infected files, however found "Total errors: 23007". What does that mean?

A Under your username, you do not have access to many of the system files in the root, which generates an error. You should just scan your Home.

Q Is there a list of security vulnerabilities?

A Yes: <http://www.ubuntu.com/usn/>

The descriptions are quite technical, and don't point out how rare it would be to experience one of the vulnerabilities in the real world.



When I try to install new updates, I receive the following message:
`The package system is broken`

Check if you are using third party repositories. If so disable them, since they are a common source of problems.

Furthermore run the following command in a Terminal: `apt-get install -f`

I typed `apt-get install -f`. The output includes:

```
E: Could not open lock file /var/lib/dpkg/lock - open (13: Permission denied)
```

(Thanks to *pauljw* in the Ubuntu Forums) The suggestion was incomplete. Run this command:

```
sudo apt-get install -f
```

TOP QUESTIONS AT ASKUBUNTU

* Last upgrade crashes network manager (no internet connection, no applet)
<http://goo.gl/lTG4Pw>

* How can I limit or restrict access to an application?
<http://goo.gl/ad8qzD>

* How can I further secure my system using 2 factor authentication?
<http://goo.gl/UX0q0e>

* What do the `nomodeset`, `quiet` and `splash` kernel parameters mean?
<http://goo.gl/Hg7uuT>

* Delete PPA after install the software?
<http://goo.gl/v9WUN7>

* Prevent all commands from being defined as an alias
<http://goo.gl/91jaHk>

* View two text files at the same time, side by side
<http://goo.gl/puVYdk>

* New Zero-day exploit reportedly found affecting Linux/Android (CVE-2016-0728)
<http://goo.gl/JOwvGG>

* Unsupported Ubuntu - is it safe to continue with them?
<http://goo.gl/qMIOrx>

TIPS AND TECHNIQUES

Good Things Come to Those Who Wait

More than two years ago, I decided to see if I could use USB 3.0 with my "high performance" desktop computer.

I bought a card which plugged into the computer and provided a single USB 3.0 port. Along with it, I bought a 32 GB, USB 3.0 flash drive. The result was not what I had hoped for.

I could plug a USB 2.0 flash drive into the USB 3.0 port, and it worked just fine, at USB 2.0 speeds.

I could plug the USB 3.0 flash drive into a USB 2.0 port, and it seemed to operate faster than a USB 2.0 flash drive, but not dramatically so.

When I plugged the USB 3.0 flash drive into the USB 3.0 port, it simply didn't work.

OK, I can handle this. If you never have an experiment which fails, you aren't trying enough

experiments.

Come forward to 2016, and Xubuntu 15.10 running on the same hardware. It works! The USB 3.0 flash drive is almost as fast as an internal hard drive, which is going to make backups a lot faster.

Similar sequences occur with a lot of new hardware. Nvidia introduces a new video card, and it's nothing but grief for the first six months. Two years later, it just works.

The corollary of this story: if you buy a computer with the latest and greatest hardware, you need to try the latest version of Linux on it. In some cases, you will get the best results with a beta version of Ubuntu! But first, try the latest released version.



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.



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**AVAILABLE
WORLDWIDE**



In gaming, there are good Linux ports and there are bad Linux ports. I'm still trying to decide where Dying Light fits in. Dying Light was originally released January 2015 for Windows PC, Linux, PlayStation 4, and Xbox One. Dying Light is an open-world first-person survival game, similar in many ways to Dead Island, but different enough to stand on its own. It was developed by Techland and published by Warner Bros. Interactive Entertainment. I had wanted to play Dying Light ever since it was first released on Linux about a year ago, but was afraid to buy it due to its extremely high minimum requirements. Late last year I was able to download and play a demo version of it through Steam, and it played just fine on my system... so, a few weeks later when I found it on sale for under \$20, I bought it. The regular price for Dying Light on Steam is currently \$59.99, and, by the time you read this, there should also be a Dying Light: Enhanced Edition already released for about \$10.00 more.

I must admit that I've run into quite a few problems, but it may be due to the fact that it requires an AMD FX-8320 @3.5 GHz, and I only have an AMD FX-6100 @3.6 GHz. I meet all other requirements comfortably. The problems I've run into are that the game will make my entire system freeze. I can't go back to my desktop or even use Ctrl+Alt+F* to go to another virtual console and reboot normally, so I've had to manually hit the power button on my PC to do a hard reboot. However, I've also been able to enjoy it without the

freezing. I had a session last almost two uninterrupted hours, and quite a few 45+ minutes uninterrupted sessions, while other times playing for only 5 minutes before a freeze. I can't explain it and it seems like it happens to others as well, not only on Linux but also on Windows.

In order to get the best possible performance, I ran the game at its lowest settings. If anything, it seems to me like having my web browser open would lend itself to more crashes than having the web browser closed. When the game

plays, it is very enjoyable, but when it crashes it can be very frustrating. I played Dying Light with Nvidia's proprietary driver, version 346. Open source graphics drivers will not function properly with this game.

Dying Light is a first-person horror survival game where you're free to roam the open world and do whatever you want. However, it's advised that, for the first couple of days, you stick to the storyline – not only to get the hang of it, but also to learn new skills and upgrade your weapons. I used my Razer Onza game controller to play the game, which, for the most part, functioned properly. The only flaw with the controller was that my Start (Pause) button didn't work, so if I needed to pause or end my session, I had to resort to using the keyboard. When using the mouse/keyboard to control the game, everything went according to plan.

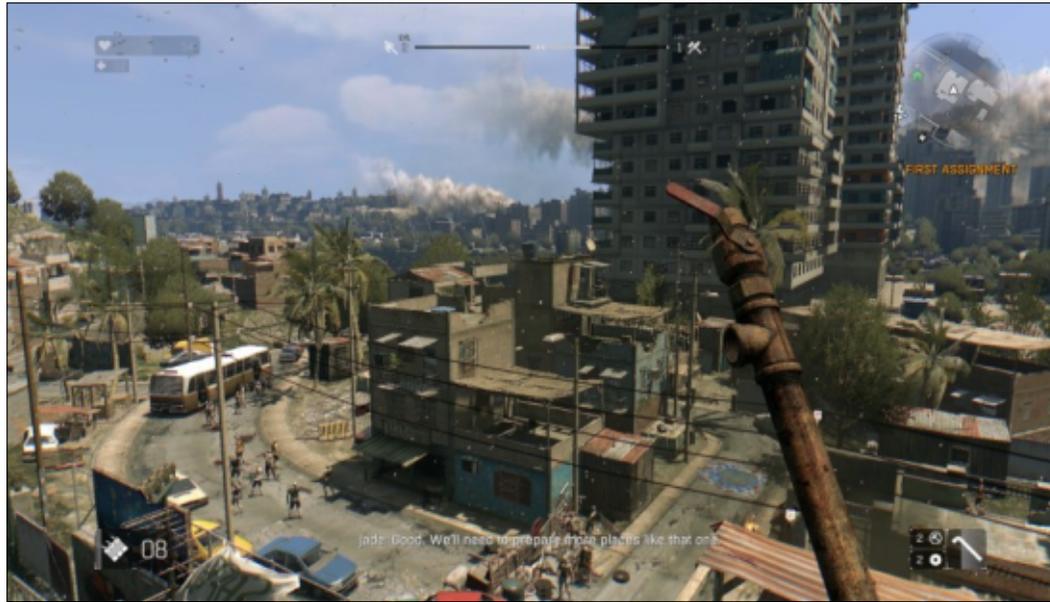
The controls are your typical first-person survival layout – with one main difference, which is what



sets *Dying Light* apart from other similar games – the parkour element. The best and possibly only way to stay alive in this game is to make use of the parkour mechanisms introduced in this game.

As is typical, you learn how to move as you progress through the game. There are a few different mechanisms which you must learn and master to evade the enemy in this game. As the game begins, you jump off an airplane into a zombie infested Harran (Harran used to be a thriving city in ancient Mesopotamia, located in what today is Turkey). As soon as you make landing, you're bitten by some attacking zombies, thus your future is immediately doomed. After being bitten, you pass out and wake up in a makeshift infirmary where you learn you have been given a temporary vaccine which slows down the virus that will ultimately turn you into a zombie. From here on, you are given various assignments to help out the diminishing human population in Harran.

In the daytime, the zombies are slow – very much like in most other zombie games. But, at night, the



zombies gain an unforeseen speed that makes the parkour skills you learned earlier essential for survival. Your first missions take place in the daytime and are basically about roaming around the city searching for other survivors, making preparations, and setting traps for the nighttime. To move about in the city, you immediately learn that it's best to jump on top of buildings, vehicles or other structures. The zombies are slow, and if you jump above them you are very much safe and out of danger.

Everything changes at night. As soon as it gets dark, the zombies can move about just like you can,

which makes them much more dangerous. They are fast and can jump just like you. To make matters even worse, your vision is very limited by the darkness all around you – so you have to use your “survivor sense”, which, in a nutshell, helps you survive by helping you spot various different things in your environment. Your weapons, unfortunately, deteriorate very quickly as you use them to smash zombies, so you're forced to continually keep searching for objects to make better weapons. Initially, weapons at your disposal might include something like a hammer or a wrench, but as you gather other items, and pick up blueprints,

you're able to craft better weapons which are more effective at fighting the undead. There are also firearms available but these are scarce and you don't get to use them until a bit later on in the game.

The graphics are awesome, even at low settings. When I took a risk and ran the game at mid-to-high settings, the graphics were even better. The infected who surround you, both living and undead, give way to a detailed concrete jungle full of lush green landscapes as a backdrop, and with an ever changing realistic sunlight which first fades away to darkness and then shines back with each new rising dawn. It isn't only the sunlight that changes, the weather also constantly changes with some days having perfect sunlight and others fog and even rain. The sound is phenomenal, especially if you can listen to it with stereo surround speakers or headphones.

All in all, it's a great game to play, and one which I would definitely recommend to anyone whose system meets the minimum requirements. If your system doesn't meet the requirements, then you can forget about playing

this game as you'll definitely struggle getting the game to play properly. It is because of the high minimum requirements that I am forced to take a star and a half away from the game rating since it quite possibly deprives a large portion of gamers from playing Dying Light.



Minimum Requirements:

Ubuntu 14.04 or newer
CPU: Intel Core i5-2500 @3.3 GHz /
AMD FX-8320 @3.5 GHz
Memory: 4 GB RAM DDR3
Hard Drive: 40 GB free space
GPU: Nvidia GeForce GTX 560 /
AMD Radeon HD 6870 (1GB VRAM)
Additional Notes: JFS & XFS file
systems are not supported

My gaming box:

AMD FX-6100 3.3GHz CPU (over-
clocked to 3.5GHz)
Gigabyte Windforce GeForce GTX
960 graphics card with 346.72
proprietary driver
16GB of Kingston Hyper X RAM
Ubuntu 14.04.3 LTS with Unity
desktop

NEW GAMES COMING TO LINUX

February (mostly confirmed):

Time of Dragons
American Truck Simulator
Dreii
It's Spring Again
5089: The Action RPG
Agatha Christie - The ABC Murders
XCOM 2
Dying Light: Enhanced Edition
Firewatch
NeonXSZ
No Pineapple Left Behind
The Lost Heir: The Fall of Daria
Spacejacked
That Dragon, Cancer
We Are The Dwarves

March (unconfirmed)

Rocket League
Evolve
31st: Payday 2
Total War™: ROME II - Emperor
Edition



Oscar graduated with a music degree from CSUN, is a Music Director/Teacher, software/hardware beta tester, Wikipedia editor, and active member of the Ubuntu community. You can email him at: 7bluehand@gmail.com



PATRONS

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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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