



# Full Circle

THE INDEPENDENT MAGAZINE FOR THE UBUNTU LINUX COMMUNITY

ISSUE #128 - December 2017



Windows XP



Information

Framasoft  
les aventures d'un peuple migrateur

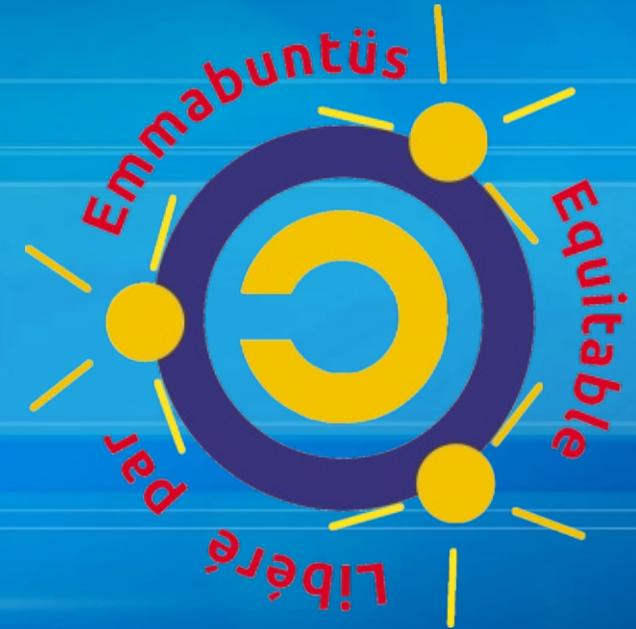
Un jour, le monde sera libre !



Linux  
for all



Emmabuntüs 2  
(Xubuntu 12.04)



## EMMABUNTUS 2

A DISTRO FOR OLDER HARDWARE



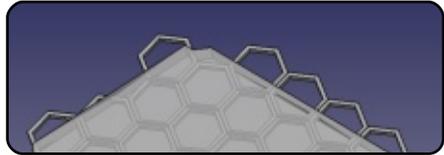
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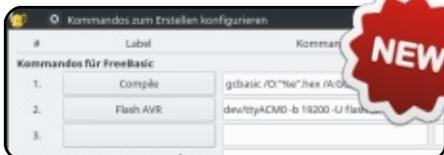
## HowTo



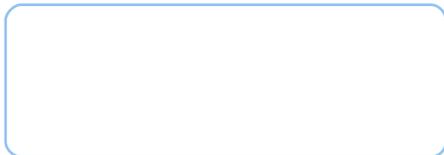
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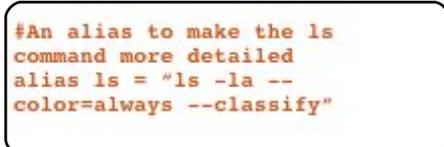


## Graphics

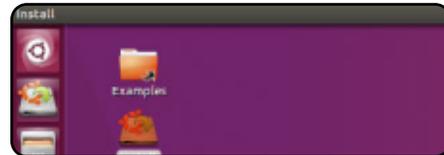


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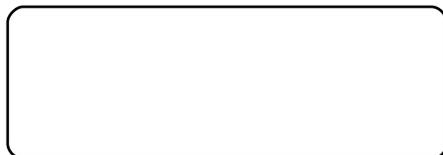
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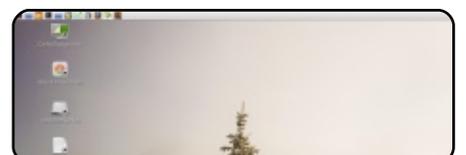
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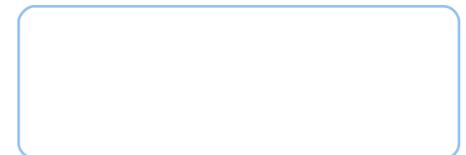
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## WELCOME TO THE LAST ISSUE OF FULL CIRCLE\*.

Yes, it's true. This is the last issue of FCM\*. This month we have the usual suspects: FreeCAD, Great Cow Basic, and Inkscape. But wait! 'What's with tmux making a return?' you may ask. Well, that was my fault. I completely forgot that there was a third part to it. Apologies to Simon for giving him a mini heart attack.

It came a bit too late for this issue, but the UBports team have released OTA-3 for Ubuntu Touch. It's mostly bug fixes, but there are a couple of new features. Also, they released a statement that future versions of Touch will run Android apps via Anbox. Anbox is short for Android-in-a-box and is a way for Android apps to run in Linux. I can see, initially, why Canonical didn't want Android apps running in Touch, but since the influx of Touch 'apps' were just mini-browsers loading up a link... most apps were pretty useless, and not even apps as such. Hopefully having Android apps running (containerised) in Touch will bring in more users.

Patreon made a bit of a blunder. They were changing their payment system to charge donors. It would mean that if you want to help FCM with \$1 per month. You'd actually be paying more than a dollar as you'd be paying the cost of the transaction on top of the dollar. After a lot of bad press about it, Patreon ditched the idea. Patreon's crazy idea is why I added DonorBox to the site. For those who want to donate, but not through Patreon.

Anyway, enough babbling from me. Enjoy the holiday season wherever you are.

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

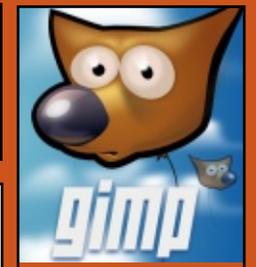
*Ronnie*

[ronnie@fullcirclemagazine.org](mailto:ronnie@fullcirclemagazine.org)

\* The last issue of 2017 that is. :)



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<http://www.stitcher.com/s?fid=85347&refid=stpr>



<http://tunein.com/radio/Full-Circle-Weekly-News-p855064/>



## BLACK LAB ENTERPRISE LINUX 11.5 OFFICIALLY RELEASED, BASED ON UBUNTU 16.04.3 LTS

Based on the Ubuntu 16.04.3 LTS (Xenial Xerus) operating system, Black Lab Enterprise Linux 11.5 uses the latest Xfce 4.12 desktop environment by default for the Desktop edition and it's powered by the upstream Linux 4.10.0-40 kernel. This is the first release of the OS to ship with two editions, Desktop and Core.

The Desktop edition of Black Lab Enterprise Linux 11.5 ships with popular apps like the Chromium web browser, Mozilla Thunderbird email and news client with the Lightning calendar extension, Shotwell image viewer and organizer, Dia diagram creator, Audacious audio player, Parole Media Player, and Skype VoIP client.

Source:

<http://news.softpedia.com/news/black-lab-enterprise-linux-11-5->

[officially-released-based-on-ubuntu-16-04-3-lts-518728.shtml](http://www.officially-released-based-on-ubuntu-16-04-3-lts-518728.shtml)

## NXP'S OPEN SOURCE OPENIL LINUX DISTRO HAS XENOMAI AND OPENTSN SUPPORT

NXP announced a Buildroot-based, Xenomai-hardened "Open Industrial Linux" (OpenIL) distribution designed for industrial, networking, and secure connectivity applications that require real-time, determinist performance. OpenIL is billed as being open source, community backed, and hardware agnostic. One of OpenIL's key differentiating features is support for OpenTSN (Time-Sensitive Networking) support, which is also supported on NXP's networking-oriented, dual ARMv8 core QorIQ Layerscape LS1028A system-on-chip. OpenIL is currently optimized for use with a new LS1021A TSN Switch Board that acts as an evaluation board for the LS1028A and NXP's earlier

LS1021A SoC.

OpenIL "simplifies and automates the process of building a complete Linux system for an embedded system, using cross-compilation," says NXP.

Source:

<http://linuxgizmos.com/nxps-open-source-openil-linux-distro-has-xenomai-and-opentsn-support/>

## DEEPIN 15.5 LINUX DISTRO RELEASED — GET A BEAUTIFUL AND EASY-TO-USE LINUX EXPERIENCE

After much anticipation, the deepin project has finally pushed the latest version of deepin Linux distro, i.e., deepin 15.5. Following its design philosophy, deepin continues to bring an attractive and easy to use desktop experience to open source enthusiasts. These capabilities have helped this OS to find a good place on our lists of most beautiful

and beginner-friendly Linux distros. As expected, deepin 15.5 continues to refine its already near-perfect experience and brings important changes that need to be mentioned.

This release has brought the full support for HiDPI and ensures that the appropriate resolution for HiDPI is identified. As a result, your experience with fonts, icons, and overall interface will turn out to be more pleasant.

Source:

<https://fossbytes.com/deepin-15-5-linux-distro-download-beautiful/>

## LAKKA 2.1 LINUX OPERATING SYSTEM WILL TURN YOUR PC INTO A RETRO GAMING CONSOLE

Based on the latest LibreELEC 8.2 embedded Linux operating system, Lakka 2.1 uses the recently released Linux 4.14 LTS kernel for the Allwinner images and the Linux

4.4.99 LTS kernel for Rockchip images. It supports S812 Amlogic TV boxes, improves HDMI audio for WeTek Play 2 systems, and fixes boot arguments of Odroid-XU3 and Odroid-XU4.

For Raspberry Pi SBCs and PCs, this release enables the performance governor and a real-time kernel by default to stabilize frame rate and reduce input lag. In addition, it adds the ability to use your Raspberry Pi as a Wi-Fi access point (AP).

Source:

<http://news.softpedia.com/news/akka-2-1-linux-operating-system-will-turn-your-pc-into-a-retro-gaming-console-518792.shtml>

## AMAZON SPINS UBUNTU-DRIVEN “AWS DEEPLENS” CAM AND AN AWS-SAVVY AMAZON FREERTOS

Amazon Web Services, Inc. (AWS) expanded its AWS cloud ecosystem with a Linux-powered deep learning camera and a FreeRTOS variant, both of which feature built-in connections

to AWS and the related AWS IoT Core platforms. The 4-megapixel, HD-ready AWS DeepLens development camera for machine learning is available for \$249 pre-order, with shipments expected in April. Billed as “the world’s first video camera optimized to run machine learning models and perform inference on the device,” the WiFi-enabled camera supports a newly announced Amazon SageMaker development framework for managing the machine learning model process.

The open source Amazon FreeRTOS for MCUs is available now for free download. The distribution expands upon FreeRTOS with libraries that add AWS- and AWS Greengrass support for secure cloud-based or local processing connectivity.

Source:

<http://linuxgizmos.com/amazon-spins-ubuntu-driven-aws-deeplens-cam-and-an-aws-savvy-amazon-freertos/>

## VIVALDI BROWSER NOW AVAILABLE FOR RASPBERRY

## PI AND OTHER ARM BASED LINUX DEVICES

Vivaldi, the new web browser from Jon S. von Tetzchner, the former co-founder of Opera, is already available for Windows, macOS and Linux (x86/x86\_64), but from today you can now run it on ARM based Linux devices, including Raspberry Pi.

The speedy browser offers useful built-in functionality such as tab grouping, screenshot capture, and ability to take notes. Part of Vivaldi’s appeal is it’s highly customizable, and the experimental new build offers even more options for tinkerers.

Users can optimize settings to boost overall performance, reduce resource usage by turning off animated GIFs, and there’s an advanced Reader Mode for clutter-free reading.

Source:

<https://betanews.com/2017/12/05/vivaldi-browser-available-for-raspberry-pi-and-other-arm-based-linux-devices/>

## “FAST AND LIGHT” PEPPERMINT 8 RESPIN RELEASED

The combination of regular desktop programs and cloud-based infrastructure is something that sets Peppermint OS apart from the endless crop of Linux distributions. It also finds a place on our popular list of best lightweight operating systems for older computers.

The latest version of this lightweight operating system was recently made available in the form of respin of Peppermint 8. While respins are known to be a minor release to fix known issues and bring security updates, Peppermint 8 Respin is a significant release with a multitude of important changes.

Available in both 64-bit and 32-bit versions, the latter one ships with full Secureboot and UEFI support.

Source:

<https://fossbytes.com/fast-lightweight-peppermint-8-respin-20171130-download/>

## “ROCK SOLID” DEBIAN 9.3 AND “LIGHTWEIGHT” BODHI LINUX 4.4.0 AVAILABLE

In early 2017, the Debian Release team pushed the Debian 9.0 “stretch” release, which would remain supported for the next 5 years. Named after Toy Story’s rubber toy octopus, this release has just witnessed its third update in the form of Debian 9.3 .

As expected, Debian “stretch” 9.3 ships with tons of security patches and fixes for some serious issues. Prior to this release, on various instances, security advisories for different issues have already been released.

There are a total of 68 bug fixes, including startup crash for certain video cards, Debian installer, different package rebuilds for the point release, Python dependencies for different packages, etc.

On the security front, Debian 9.3 got a total of 56 updates, which affect important packages like Tor, WordPress, curl, wget, firefox, chromium, vlc, samba, etc.

Due to being unmaintained and other security issues, libnet-ping-external-perl package was removed.

The Bodhi Linux developers have shipped the freshly baked images in the form of Bodhi Linux 4.4.0. Delivered three months after Bodhi 4.3.1, it’s a normal update release with an aim to keep all the packages up-to-date. So, don’t expect major changes or new features.

Built on top of dependable Ubuntu 16.04 Xenial base, Bodhi 4.4.0 comes with EFL 1.19.1, Terminology 1.1.0, and Ephoto 1.5. It’s powered by Linux kernel 4.13.

Source:

<https://fossbytes.com/linux-distro-releases-debian-stretch-9-0/>

## SYSTEM76 ENABLES HiDPI SUPPORT ON ALL OF THEIR LINUX LAPTOPS AND DESKTOPS

HiDPI support was becoming an urgent necessity for System76 as more and more

customers started asking for assistance in setting up their displays. And while the Wayland display server isn’t yet mature enough to be adopted by all GPU vendors and completely replace X.Org, there was a need for a compromise.

It took them a while, but full HiDPI support is finally here and will work with a wide range of multi-monitor configurations. System76 says that both Intel and Nvidia graphics cards are currently supported by the new HiDPI service, which is designed to listen for display events and optimizes display settings for the best user experience possible.

Source:

<http://news.softpedia.com/news/system76-releases-new-hidpi-daemon-for-all-of-their-linux-laptops-and-desktops-518932.shtml>

## BLACKARCH LINUX ETHICAL HACKING OS GETS LINUX KERNEL 4.14.4, UPDATED INSTALLER

The developers of the Arch Linux-based BlackArch Linux ethical hacking and penetration testing operating system have released a new ISO snapshot with the latest updates and security patches.

Coming hot on the BlackArch Linux 2017.11.24 ISO snapshot released two weeks ago with more than 50 new hacking tools, the BlackArch Linux 2017.12.11 ISO images are now available to download incorporating the latest version of the BlackArch Installer utility, which fixes a few critical bugs.

BlackArch Linux is now available only for 64-bit computers. Apart from updating the BlackArch Installer and Linux kernel packages, the BlackArch Linux 2017.12.11 ISO snapshot also addresses several bugs reported by users lately and updates all BlackArch tools and packages to their latest versions.

Source:

<http://news.softpedia.com/news/blackarch-linux-ethical-hacking-os-gets-linux-kernel-4-14-4-updated-installer-518933.shtml>

## JUNIPER NETWORKS' OPENCONTRAIL SOFTWARE DEFINED NETWORK JOINS THE LINUX FOUNDATION

The Linux Foundation is far more than just Linux. It's also the home of many open-source networking projects such as the software-defined network (SDN) OpenDaylight, Open Platform for Network Function Virtualization (OPNFV), and Open Network Automation Program (ONAP). Now, networking power Juniper Networks has announced that OpenContrail, its open-source network virtualization cloud platform, will join the others as part of The Linux Foundation.

Juniper bought Contrail, an SDN company, in 2012. The company followed this up in 2013 by releasing its Juniper Contrail products as open source. Earlier this year, Juniper expanded the project's governance to create an even more open, community-led effort to strengthen the project for its next growth phase. Adding this project to The Linux Foundation's networking projects

is meant to further OpenContrail's objective of growing this NFV/SDN in cloud ecosystems.

Officially Juniper states that with The Linux Foundation in charge, Juniper believes that a community led open-source project will foster greater innovation. With AT&T's attitude in mind, it's clear another major motivation was keeping its biggest customer happy.

Source:

<http://www.zdnet.com/article/juniper-networks-opencontrail-software-defined-network-joins-the-linux-foundation/>

## SPARKYLINUX OPERATING SYSTEM LAUNCHES FOR RASPBERRY PI, BASED ON DEBIAN STRETCH

This is the first release of the Debian-based SparkyLinux operating system to come to the tiny Raspberry Pi SBCs, most probably supporting both Raspberry Pi 2 and Raspberry Pi 3 single-board computers. The ARMhf port of SparkyLinux was in

development for the last couple of months.

Based on the latest Debian GNU/Linux 9 "Stretch" operating system, SparkyLinux 4.7 for ARMhf includes all the Raspberry Pi scripts and packages, and it's distributed in two flavors, a graphical version using the lightweight Openbox window manager and a text-based Lite edition that lets you customize the OS as you see fit.

The SparkyLinux 4.7 for Raspberry Pi operating system received a bunch of improvements since the last development release, and it's now powered by the long-term supported Linux 4.4 kernel series. For example, Thunar is now used as default file manager instead of PCManFM, as well as Aria2 as default download manager instead of uGet.

The devs also fixed all known issues reported by users, changed "volumeicon" with "pnmixer" for better compatibility with the default sound server and to allow users to use mouse wheel scroll to change the volume level via the panel icon, and switched to NetSurf as default web browser.

Source:

<http://news.softpedia.com/news/sparkylinux-operating-system-launches-for-raspberry-pi-based-on-debian-stretch-518966.shtml>

## UBUCON EUROPE 2018 UBUNTU CONFERENCE ANNOUNCED FOR 27-29 APRIL IN XIXÓN, SPAIN

The organizers of the Ubucon Europe conference for Ubuntu Linux users, contributors and developers announced the official dates next year's Ubucon Europe 2018 event.

Don't pack your bags just yet for the next Ubuntu conference, but at least you should mark your calendars for April 27, 28, and 29 of 2018, when the Ubucon Europe 2018 conference will take place. Where? The event will be held in Spain this time, in the city of Xixón, at the municipal facilities of Centro de Cultura Antiguo Instituto.

Put together by a group of dedicated Ubuntu community members, the very first Ubuntu Europe conference took place

November 18-20, 2016 in Essen, Germany, and was a success followed a year later by the second edition, which took place in Paris, France, September 8-10, 2017.

The conference gains more popularity each year, and it hosts three days full of Ubuntu Linux fun, where attendees can meet and talk with various members of the Ubuntu community on a wide range of topics, join workshops, listen to famous speakers, or learn how to use or get started with contributing to Ubuntu.

Source:

<http://news.softpedia.com/news/ubucon-europe-2018-linux-conference-announced-for-27-29-april-in-xix-n-spain-518972.shtml>

## AMD TO DELIVER ON ITS PROMISE OF AN OPEN SOURCED VULKAN LINUX DRIVER VERY SOON

As Phoronix notes, AMD promised the world over two years ago that it would open source its Vulkan driver for Linux,

but few probably realized it'd actually take quite this long to see the day. We can be thankful that this driver didn't just wind up like some Half-Life episode.

Currently, AMD is preparing the source for distribution, and it's expected to go live over the next couple of days. The company apparently uses a customized version of the LLVM compiler to process the code, but it seems likely that either that will be provided as well, or the code will be adjusted to better complement the standard configuration.

The open sourcing of this driver is important for those who wish to have as free an OS as possible, with every bit of software used requiring sources to be made available for developer scrutiny. If you only have the base driver 'AMDGPU' installed, and not the proprietary AMDGPU-PRO extension, AMD's driver is entirely open source. Shortly, that won't change once the Vulkan component is added.

A couple of important things to note is that this open sourcing doesn't affect non-Linux OSes. AMD deliberately stripped out

code relevant to other OSes from this driver, which isn't unexpected. And, in case it's not obvious, this is specifically for Vulkan; other API components are still closed source. This move ultimately means that if you have a Vulkan game to play on Linux, you could play it at full performance using entirely open-source drivers. That's pretty freaking sweet.

Source:

<https://techgauge.com/news/amd-to-deliver-on-its-promise-of-an-open-sourced-vulkan-linux-driver-very-soon/>

## RIP OPEN WEB: FCC OFFICIALLY VOTES TO KILL NET NEUTRALITY

The past one year's effort made by American citizens has been rejected by the Federal Communications Committee, headed by Ajit Pai, which has just voted to repeal the net neutrality rules established under the Obama administration. It looks like Christmas came pretty early for ISP giants.

In this process of killing net

neutrality, the vote was 3 to 2. Along the party lines, Republican Commissioners voted in favor of the order; Democratic Commissions voted against the same. While Pai titled his order as "Restoring Internet Freedom," Democrat Mignon Clyburn said it should be called "Destroying Internet Freedom."

Now, broadband won't be classified as a Title II service. As a result of this change, FCC won't be acting as an active regulator of the broadband industry, allowing the companies to throttle or block websites/content as per their wish. The rich technology players would be able to avail services like paid prioritization. However, ISPs will need to disclose such practices.

That's not all. Now, American states won't be able to override the new order with their own legislation.

This development means that a new and bigger fight has just started. But, not everything's lost. You can expect different lawsuits heading to courts in near future. Also, Congress has the power to pass a law and make things right.

Source:

<https://fossbytes.com/net-neutrality-vote-dead-fcc/>

## “ETHICAL HACKING” LINUX DISTRO PARROT 3.10 RELEASED WITH NEW FEATURES

About 1.5 months after the release of Parrot 3.9 “Intruder,” The Parrot Project has announced the release of Parrot 3.10. Parrot is often seen as the best alternative to Kali Linux, and it continues to improve its reputation by shelling out regular updates.

The latest version, which brings obvious security fixes and updates, comes with many noticeable new features that should please the ethical hacking crowd. The most important and foremost change is the introduction of a full firejail+apparmor sandboxing system.

This new mechanism protects the operating system by isolating the OS components. The first steps were already taken in Parrot 3.9

with the introduction of firejail.

The 3.10 release brings the latest Linux kernel 4.14 LTS, which brings improved hardware support for newer and older machines. Another big change comes in the form of new Firefox 57 Quantum web browser that was released to compete with Chrome.

That’s not all. Some of the popular pen-testing tools have also got important updates like Metasploit-framework 4.21. Maltegoe and Casefile were merged into a new launcher provided by Maltego 4.1.

For making the daily chores easier, todo list and planner program, mind map designer, and personal finance management suite have been added. Other important packages with Parrot 3.10 are MATE 1.18 and LibreOffice 5.4.

Source:

<https://fossbytes.com/parrot-3-10-ethical-hacking-distro-release-features-download/>

## ORACLE RELEASES VIRTUALBOX 5.2.4 TO FIX GNOME LOGIN SCREEN BUG WITH 3D ENABLED

VirtualBox 5.2.4 comes about one month after the November release of VirtualBox 5.2.2, and it's a small update fixing a few regressions and bugs reported by users lately. For starters, the user interface received better HiDPI support and support for adjusting desktop file for X11 window managers.

For X11 Guest Additions, the VirtualBox 5.2.4 update fixes a hang with the GNOME Shell login screen (GDM) when 3D was enabled in the application, and for Linux hosts it addresses a screen corruption issue that could happen when the virtual machine window is maximized and the host screen changes.

If you encounter any of these bugs with VirtualBox 5.2.0 or 5.2.2 on your GNU/Linux operating system, do make sure you update to VirtualBox 5.2.4 as soon as possible. You can download the binaries right now from our

website if you fancy installing the app manually on your favorite distro.

VirtualBox 5.2.4 also improves SB16 volume handling and fixes various other smaller audio issues, and addresses a USB/OHCI bug that could have caused the OHCI (Open Host Controller Interface) emulation to randomly drop data transfers. The full changelog is attached below for more details on the bug fixes.

Source:

<http://news.softpedia.com/news/oracle-releases-virtualbox-5-2-4-to-gnome-shell-login-screen-bug-with-3d-enabled-519052.shtml>

## EELO: AN OPEN SOURCE ANDROID-ALTERNATIVE BEING DEVELOPED BY MANDRAKE LINUX CREATOR

In 1998, Gaël Duval created Mandrake Linux (also known as Mandriva Linux). In those years of late 1990s, many enthusiasts began their Linux journey with this easy-to-install and user-friendly Linux distro. Eventually, things

went wrong between Duval and Mandriva management, and he was laid off by the company in March 2006.

These days he is busy with a new project named eelo mobile OS to breathe a new life into your smartphone. In the recent past, we've reported ongoing smartphone OS efforts from Purism and postmarketOS, and Duval's endeavor seems like a step in a similar direction.

In his announcement post, Duval said that he isn't happy with the current smartphone situation which is dominated by Apple and Google. This makes sense as iOS is closed source and Google leaves no stones unturned to track its users. About the eelo mobile OS development details, the new custom builds are being tested on a LeEco Le2 smartphone; work is also being done to bring to Xiaomi Mi 5S and LG G6. A new launcher named "BlissLauncher" has been created. Efforts are also being made to review all alternative web-services that would be eelo-compatible to make sure that the OS performs without any hiccups. For the web search feature, the team is looking at Google

alternatives like DuckDuckGo and Qwant. For Android applications, options like F-Droid and APKPure are being considered. The project is also running a Kickstarter campaign with an aim to deliver a product.

Source:

<https://fossbytes.com/eelo-mobile-os-open-source-android-alternative/>

## FIREFOX NOW AVAILABLE ON FIRE TV WITH SUPPORT FOR YOUTUBE

At the beginning of December, Google made the announcement that it'd be pulling its YouTube app from Amazon's Fire TV devices on January 1, 2018. Google's reason for this was due to Amazon not selling products like Chromecast and Google Home, and while Amazon's since started selling the former of those two things, Google's yet to revoke the YouTube ban.

Assuming Google does follow through and remove YouTube from Fire TV, Mozilla already has a workaround to ensure you can

keep watching all of your favorite online content.

On December 20, Mozilla announced that it'd officially launched its Firefox web browser for the Fire TV. This enables users to go to their favorite sites like Instagram, Google, Pinterest, etc., but as Mozilla hints at multiple times in its announcement post, it's also a great way for "watching web video."

This is, of course, referring to the fact that you can watch YouTube on Firefox, and based on the screenshots Mozilla has shared, the YouTube web app you can access through it looks a lot like the app that's currently available for the Fire TV.

Source:

<https://www.androidcentral.com/firefox-now-available-fire-tv-support-youtube>

## THE FULL CIRCLE WEEKLY NEWS



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

**RSS:**

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





This year's holiday season took me by surprise. It felt like I went straight from September to mid-December. Due to the gifting (and sales!) that occur during December, I felt like I might share some gift ideas for anyone who might be interested in getting themselves (or a significant other) a nice gift. I will split these ideas up into 3 tiers - cheaper, mid-range, and more expensive gifts. That being said, I will not be mentioning specific products, so within each range there's the chance of some outliers.

### CHEAPER GIFTS

For anyone who has almost everything (or perhaps whose budget is stretched a little thin), I can offer the following suggestions:

- Mouse bungee. These are small stands that can lift a wired mouse's cable off your desk - thereby avoiding it getting caught on edges or clutter. As my desk is almost always covered in notes,

containers, pens, etc, being able to keep my cable from getting stuck is a bit of a blessing (not to mention I no longer need to keep a space cleared). These are pretty cheap (between 10-20€), though I would make sure whichever one you buy has a good non-slip stand.

- Phone stand. I always have my smartphone sitting next to me as I work, so I can track notifications and missed messages/calls. Originally, I just let it sit on my desk - but that doesn't make it easy to read the screen without stopping what you're doing. Instead, I was gifted a small wooden stand to place my phone on. It can also work with a tablet (though it does depend on the tablet and the stand). I also own a Logitech gaming keyboard that comes with an integrated phone stand - so keep that in mind if you're gifting another.

- Grid-It Organizer - These come in a variety of sizes and price points, but are essentially a grid of elastic straps. I use it for managing my cables, USB sticks, carrying guitar capos, and so on. They have loops on them, which I use along

with a hook to keep them hanging neatly. When I need to head out somewhere, I just grab my travel-sized one and throw it in my bag.

- Linux - This may sound like a joke, but I am quite serious. A friend of mine gave me access to his Linux laptop in high school (running Ubuntu), and ever since I've always used Linux on at least one device. You can offer to set up Linux for a friend who's frustrated with Windows/macOS, or donate an old device with Linux to a good cause or a friend in need. Naturally, this may not appeal to some people, but it could just as easily inspire a new person to adopt Linux.

### MID-RANGED GIFTS

These gift ideas do require a little more of a budget, but are still fun!

- Mini Bluetooth speaker - when I say mini, I do mean mini. The one I have is an Anker Soundcore Nano, which measures 5cm x 5cm x 3cm (width x depth x height). It's small, rechargeable, and has decent

sound quality. It's also made of metal, meaning I don't worry about it taking a beating in my bag.

- Anti-Theft Backpack - I backed the XD Design Bobby Backpack on Kickstarter, and have been using it non-stop since receiving it. It's a compact bag that fits perfectly under airline seats (yes, even in Economy class), it's cut proof, and offers a TSA lock and kensington-style cable for securing it to your chair or desk in a public space (i.e. coffee shop). There are a variety of companies that offer bags like this, so I won't claim to be expert on them all.

- A poster from Displate - Displate is a terrific little company that makes metal posters. They have posters covering almost any topic you can think of, and regularly offer sales. I don't know too much about shipping (as the ones I own stayed within the EU), but the quality and price of the products are top-notch. Their method for hanging them is also clever - they are shipped with one large magnet (with adhesive backing). Just pop the magnetic square on the wall, and stick the

poster to it. I own two japanese-style posters in this format, and they have been hanging since I got them. Alternatively, some traditional posters (hung up using adhesive poster strips) have frequently fallen off the wall.

## EXPENSIVE GIFTS

- Game console/games - if you (or someone you know) is an avid gamer, these sorts of gifts will never go unappreciated. I have owned a great many consoles (starting with a PS1), but spend most of my (admittedly limited) free time on my Nintendo Switch or my PS4 Pro. If you're on the fence about the Switch, I recommend making sure you'll find at least two or three games that appeal to you before purchasing - though the library is constantly expanding.

- Mechanical keyboard/mouse - After switching to a mechanical keyboard (with Cherry MX Brown switches) 5 or so years ago, I've avoided buying any membrane keyboards since. I prefer the feel of the mechanical switches, and find I am both faster and more accurate typing on these keyboards than others. I've long

since been eyeing a split ergonomic keyboard (ErgoDox), but have unfortunately not yet found a cost-effective way of getting all the pieces (or a pre-built keyboard) without paying for import costs.

- Monitor - I've had an item on my to do list for nearly 3 years - "replace desktop monitors". I have not yet done so, even though I use my desktop daily for many hours at a time, and both my monitors have a few quirks (one doesn't always accept input, and one has a few broken plugs/color issues). However, I frequently can't justify the price of a new IPS monitor over something else I need to replace (most recently: my very broken tablet that I use for work). Naturally, monitors are a very subjective thing - but still a worthwhile gift if you can find a good way to pick one!

- Speakers or headphones - Stop me if this seems familiar to you: You have a great pair of headphones, until suddenly one ear (or both) stop working...occasionally. I frequently put up with the fiddling of cables or headphones until they stop working completely (or don't function around 80% of the time). I'm adamant I'll get my money's

worth out of them before ditching them and moving onto something new. Similarly with my speakers. I lived with a persistent hum and buzzing for a good year before I found a suitable replacement at a price point I could live with. So if you know someone suffering through broken headphones or speakers, you could always be their knight in shining armor!

Naturally, this list is not exhaustive (or, indeed, very specific). But if you're looking for ideas to spend your money on (for yourself or others), I hope my suggestions can inspire you. If anyone wants to share their favourite geek gift with me, send me an email at [lswest34+fc@gmail.com](mailto:lswest34+fc@gmail.com). Feel free to send me an email if you have questions, suggestions, or article ideas for me as well!



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



In the previous articles, we have learned what the tmux application is, how to install it, and what are the basics - in order to be able to command it. We know the window and pane handling as well. This knowledge is quite enough for daily usage to make our life simpler. Now we will learn how to customize the tmux environment to suit our personal wishes.

All of the utilization can be performed in the tmux configuration file. This is a human readable plain text file. Two places can be used - depending on the purpose of user range:

```
/etc/tmux.conf - for all users
```

```
~/.tmux.conf - for current user only
```

The exact place of the global configuration file depends on the operating system in use. In GNU/Linux, this is the "etc" directory, but, to be sure, the man page of tmux can be read that deals with the -f parameter. Also note that the current user level file

is a hidden file; its name starts with a dot character.

## GENERAL SETTINGS

Let's start with some general attributes. The most common modification is the change of the Prefix command. Default is the <Ctrl b>. The problem with this is that the "b" character is far away from the Ctrl key. The widely used setting is the <Ctrl a> for Prefix. Additionally, most users change the Caps Lock key to behave as Ctrl key. With this further change, the Prefix command is quite adequate. The new <Ctrl a> combination can be used by other applications as well (e.g.: in vim, it increases a numeric value), therefore we have to care about that as well.

```
# Setting the <Prefix>
command from <Ctrl-b> to
<Ctrl-a>
set -g prefix C-a
# Release the original <Ctrl-
b> <Prefix> keybinding
unbind C-b
# Ensure that <prefix>
combination can be sent to
other apps by pressing it
twice
bind C-a send-prefix
```

We can modify the escape key delay value, and make the tmux more responsive. By default it is 500ms, and this can be frustrating, for example in Vim.

```
# Setting the escape delay to
be more responsive
set -s escape-time 1
```

Generally the content of the tmux.conf file is loaded only during start-up of the program. The effect of any changes in the configuration file will have effect after restarting tmux. This is not so cool during the customization, therefore we will create a command binding <Prefix r> to be able to load the configuration file when we wish (keybinding is detailed in the next section). Additionally, the execution of the command will be signed with a message in the status bar.

```
# Reload the configuration
file with <Prefix r>
bind r source-file
~/.tmux.conf \; display
"Configuration reloaded!"
```

As mentioned in the previous article, the numbering of the

windows and panes starts from 0. This can be set to start from 1 for easier human processing.

```
# Setting the base index for
windows to 1 instead of 0
set -g base-index 1
# Setting the base index for
panes to 1 instead of 0
set -g pane-base-index 1
```

A big advantage of tmux is the mouse-free handling. Despite this, tmux has mouse support, but the availability of this feature can force us to really use it. Therefore my opinion is to disable it explicitly.

```
# Setting the mouse support
to off
set -g mouse off
```

It is also disturbing (at least for me) when tmux notifies us of every activity in a window. It can be also disabled.

```
# Setting the activity
monitoring to off
setw -g monitor-activity off
set -g visual-activity off
```

Now the general settings are done. Of course, it can be



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extended as you wish, but for the first shot, these are quite enough for a comfortable usage.

## CUSTOM BINDINGS

There are some tmux commands which have an uncomfortable key code. The tmux configuration provides a very simple method to override the default mapping (we have already used it in the previous section). It is called binding, and the “bind” command can be used for this purpose. Most tmux users change them according to personal preferences. I share with you my customization; feel free to override them.

It is much easier to remember the new commands of the window split combination as they are visually matching their functionality.

```
# Splitting panes with | and -
bind | split-window -h
bind - split-window -v
```

Most people will use the panes. Moving between them has to be as simple as possible, therefore the elimination of the Prefix key (-n),

```
TMUX_COLOR_DARKER_GRAY="colour234"
TMUX_COLOR_DARK_GRAY="colour235"
TMUX_COLOR_GRAY="colour240"
TMUX_COLOR_LIGHT_GRAY="colour245"
TMUX_COLOR_LIGHTER_GRAY="colour250"
TMUX_COLOR_GREEN="colour71"
TMUX_COLOR_RED="colour88"
# Setting the color of the status bar
set -g status-style fg=$TMUX_COLOR_LIGHTER_GRAY,bold,bg=$TMUX_COLOR_DARK_GRAY
# Setting the color of the window list
setw -g window-status-style fg=$TMUX_COLOR_LIGHT_GRAY,bg=$TMUX_COLOR_DARK_GRAY
setw -g window-status-current-style
fg=$TMUX_COLOR_DARK_GRAY,bold,bg=$TMUX_COLOR_LIGHT_GRAY
setw -g window-status-separator ""
# Setting the color of the pane borders
setw -g pane-border-style fg=$TMUX_COLOR_DARK_GRAY,bg=$TMUX_COLOR_DARKER_GRAY
setw -g pane-active-border-style fg=$TMUX_COLOR_LIGHTER_GRAY,bg=$TMUX_COLOR_DARKER_GRAY
# Setting the color of the active and inactive panes
setw -g window-style fg=$TMUX_COLOR_LIGHT_GRAY,bg=$TMUX_COLOR_DARKER_GRAY
setw -g window-active-style fg=$TMUX_COLOR_LIGHT_GRAY,bg=$TMUX_COLOR_DARKER_GRAY
# Setting the color of the command/message line
set -g message-style fg=$TMUX_COLOR_LIGHTER_GRAY,bold,bg=$TMUX_COLOR_RED
```

and the usage of the arrow keys, are the best combination.

```
# Moving between panes with
<Alt arrow> without Prefix
bind -n M-Left select-pane -L
bind -n M-Down select-pane -D
bind -n M-Up select-pane -U
bind -n M-Right select-pane -R
```

Sometimes, resizing of the panes is also necessary; this new combination is simpler. With the repeating feature (-r), the last key press is enough to continue the resizing of the corresponding pane. The number at the end means the amount of the resize; 2

pixels in our case.

```
# Resizing the panes with
<prefix H,J,K,L> by repeating
feature
bind -r h resize-pane -L 2
bind -r j resize-pane -D 2
bind -r k resize-pane -U 2
bind -r l resize-pane -R 2
```

Moving between windows is mapped to the <Prefix m> (next window) and <Prefix n> (previous window) commands.

```
# Quick window selection
bind -r m select-window -t :+
bind -r n select-window -t :-
```

## COLORS

After the previous settings, we can concentrate on another aspect of tmux: the visual style. The environment colors and status bar information content are as important for a daily user as the commands.

The settings can be made by the “set” command. The -g option means that it is valid for all sessions. The desired colors can be set with the “colourNNN” command where the NNN is the number of the predefined colors

```
TMUX_SCRIPT_CPU="uptime | grep -ohe 'load average.*' | awk '{print $3$4$5}' | awk -F\"\", \" ' {print $1\" \" \"$2\" \" \"$3}'"
TMUX_SCRIPT_MEM_USED="free -h | grep /cache: | awk '{print $3}'"
TMUX_SCRIPT_MEM_TOTAL="free -h | grep Mem: | awk '{print $2}'"
TMUX_SCRIPT_DISK_USED="df -h | grep '/dev/sda2' | awk '{print $3}'"
TMUX_SCRIPT_DISK_PERC="df -h | grep '/dev/sda2' | awk '{print $5}'"
TMUX_STATUS_LEFT="#[fg=$TMUX_COLOR_DARK_GRAY]#[bg=$TMUX_COLOR_GREEN] #H:#S "
TMUX_STATUS_CPU=" CPU: #($TMUX_SCRIPT_CPU) "
TMUX_STATUS_MEM=" MEM: #($TMUX_SCRIPT_MEM_USED)/#($TMUX_SCRIPT_MEM_TOTAL) "
TMUX_STATUS_DISK=" DISK: #($TMUX_SCRIPT_DISK_USED) (#($TMUX_SCRIPT_DISK_PERC)) "
TMUX_STATUS_DATE="#[fg=$TMUX_COLOR_LIGHT_GRAY]#[bg=$TMUX_COLOR_GRAY] %F "
TMUX_STATUS_TIME="#[fg=$TMUX_COLOR_DARK_GRAY]#[bg=$TMUX_COLOR_LIGHT_GRAY] %R "

# Setting the customized status bar
set -g status-left $TMUX_STATUS_LEFT
set -g status-right $TMUX_STATUS_CPU|" $TMUX_STATUS_MEM"|" $TMUX_STATUS_DISK$TMUX_STATUS_DATE$TMUX_STATUS_TIME
```

of 256-color mode. First of all, the base colors can be defined for better readability. My personal style is to use different gray tones. Almost every part of the environment can be modified: status bar, window list, pane borders, active and inactive panes, command/message line. The code (previous page, top right) contains my configuration; the comments describe the exact effect of the settings. The picture shows the result of the color change.

## STATUS BAR

The default status bar is not a big deal. It contains only the basic information in an ugly way. On the internet, a lot of layouts can be found; you can choose one or you

can use mine. I have created an own version that meets my needs.

First, the refresh rate is modified from the default 15 seconds to 5 seconds, with this I get more up-to-date information about my system.

```
# Setting the refresh rate in seconds
set -g status-interval 5
```

The default length of the status bar parts (left and right) is not enough for the desired information, therefore it has to be overridden.

```
# Setting the length of the status bar
set -g status-left-length 100
set -g status-right-length 100
```

The left part of my status bar is set to green and it contains:

- the host name of the system,
- the name of the session.

The list of the opened windows is right-aligned, and the active one has a gray background.

The right part of my status bar contains:

- the CPU load values,
- the memory (RAM) status,
- the used disk space in MB and in %,
- the current date and time with gray background for better readability.

The result can be seen in the picture within this article. In this part of the configuration (above), I

also use some constants for better readability.

## FINALIZATION

We have finished the first steps. I hope it was a pleasant trip and you are ready to use this amazing tool in your daily work. Of course, these articles did not cover all of the aspects of the tool, and also the covered parts are more sophisticated, so feel free to use the manual page of tmux, or the web, to get more information and customization possibilities. But I am sure that this is the minimum knowledge to start mouse-free development, and the content of the articles is enough to be more effective.

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Finally let me to propose a fantastic book regarding this topic:

Brian P. Hogan: **tmux 2**  
ISBN-13: 978-1680502213  
ISBN-10: 1680502212

<https://www.amazon.com/tmux-2-Productive-Mouse-Free-Development/dp/1680502212>

This book covers the topics of my three articles, but with more samples, and deeper and more detailed screenshots. Additionally, it writes about (from the table of contents of the book):

- Scripting customized tmux environments
- Working with text and buffers
- Pair programming with tmux
- Workflows

Get Productive! **Get tmux!**

## Command Reference

```
bind [key] [command]      Create a key binding to execute the desired command
bind [key] source-file [path]  Create a key binding to load the source file on the given path
bind C-a send-prefix      Ctrl-a can be sent to other applications by pressing it twice
unbind [key]              Remove an existing keybinding to release it
display "text"            Show the given text in the status bar

set -g prefix C-a        Change the default Prefix command to Ctrl-a
set -s escape-time N      Set the escape delay to N millisecond
set -g base-index 1      Set the indexing of windows from 0 to 1
set -g pane-base-index 1  Set the indexing of panes from 0 to 1
set -g mouse off/on      Switch off or on the usage of the mouse
setw -g monitor-activity off/on  Notify or not the user about window activity by highlighting its name
set -g visual-activity off/on  Display or not a message in the status bar about a window activity

set -g status-style fg=,bg=  Set the colors (foreground and background) of the status bar
setw -g window-status-style  Set the colors of the window list in the status bar
setw -g window-status-current-style  Set the colors of the current window in the window list
setw -g window-status-separator  Set the separator character of the window list
setw -g pane-border-style  Set the color of the pane borders
setw -g pane-active-border-style  Set the color of the current pane borders
setw -g window-style  Set the color of the inactive window/pane
setw -g window-active-style  Set the color of the current window/pane
set -g message-style  Set the color of the command/message line
set -g status-interval N  Change the update frequency of the status bar to N seconds
set -g status-left-length N  Change the amount of the visible characters of the left status bar area
set -g status-right-length N  Change the amount of the visible characters of the right status bar area
```

The screenshot shows a terminal window with a status bar at the top displaying system metrics: 4.1% CPU, 6.6% MEM, 343M/1.95G, and 00:15:32 uptime. Below the status bar is a table of processes with columns for PID, USER, PRI, NI, VIRT, RES, SHR, S, CPU%, MEM%, TIME+, and Command. The processes listed include htop, xfce4-panel, xfdesktop, tmux, and various system services. At the bottom of the terminal, the VIM editor is open, showing the help text for the 'i' command (insert).



**Gabor** is an electrical engineer who likes developing home-made embedded projects and he is an enthusiastic user of GNU/Linux.



In this series, we will be examining the world of FreeCAD, an open-source CAD modelling application that it still in Beta, but has been gaining acceptance in recent years. Naturally, it is readily available in the Ubuntu repositories. In the last (eighth) article on using FreeCAD, we used a mesh in combination with other, more standard, FreeCAD tools, to build a 3D representation of a modern building with a lattice roof structure.

In this part, we will go from a computer model to the physical world, using a 3D printer to create a physical representation of our construction.

### SOME NOTES ON 3D PRINTING

It will come as no surprise that 3D printing has become something of a fad in the last few years. Starting out as a bit of a hobbyist activity, it has found its practical application in many rather different fields, such as art and

crafts, design, engineering, and even some medical fields. Relatively cheap printers that come fully assembled and ready to print are making the technique more accessible to a large variety of users. However, it must be said that 3D printing is not yet quite as mature as traditional printing on flat pieces of paper, and some practical inclination is still very much a necessity for users. Dealing with platform placement calibration, nozzle stoppages, or other mechanical issues, may not be within everybody's comfort zone.

There are many techniques of 3D printing. They are usually seen as some form of additive construction, where the resulting part is built up progressively. This is in contrast to machining - for instance using a computer controlled lathe - where an existing block of material is cut down to the final desired shape by removing excess material. Some materials such as plastics lend themselves best to additive processes, while others such as metals are more

often than not best handled with subtractive methods.

Even within the domain of 3D printing, there are many variants. Some of the more expensive, such as sintering, involve heating small particles of the material with a laser to fuse them together and form the object being built. In others, a solution of material is locally heated, transforming the liquid solution into a solid layer. In the vast majority of commercial 3D printers that would be in the price range of the enthusiast or a small business, a plastic extrusion process is used. In this, a plastic filament is slowly extruded through a heated nozzle. The plastic melts when going through the nozzle, and fine points or lines of material are deposited in layers to build up the object from bottom to top.

This system has its quirks. The first main point to take into account is that very fine object volumes or parts may not come out as expected. Details of less than 2-3 mm thickness may be very brittle

once printed and, in fact, may easily be broken off when removing the printed part from the supporting plate. Naturally, the details depend on the actual printer used, and on the level of detail dialed into the printer. With thinner layers (0.1 mm instead of the more common 0.2 mm), finer details will come out better, but at the expense of a much longer print run. Time spans of 2-3 hours are not uncommon for small objects (1-2 cm tall), and can go up from there for larger objects.

The second point is that the upper layers of plastic are laid down on top of the lower layers. However, the plastic is quite liquid when leaving the nozzle, and so needs a stable base to rest on while solidifying. Structures such as overhangs or arches in the model will not come out well, if left unsupported.

Many printer control applications alter our model adding supportive structures. These are printed together with the model itself, and must be

removed after printing. In the accompanying image, a model of a wheel rim has been printed. Part of the mat laid down by the printer to fix the part to the supporting plate is still attached to the bottom of the part. The interior of the recess along the rim has been filled in with vertical column-like shapes by the printing software, in an effort to ensure the top edge does not fold down while still hot. These shapes are quite ungainly, but are also thin walls and may easily be pared off with a sharp knife (but do be careful with your fingers).

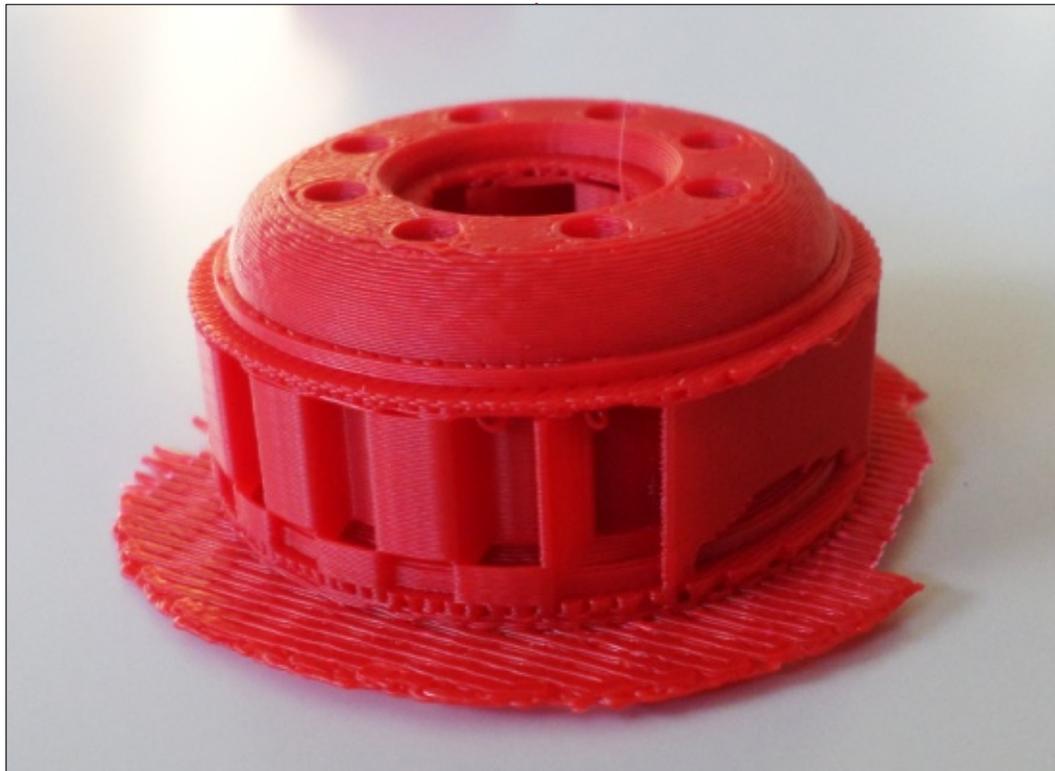
Depending on the shape of the model, cleaning up may be quite involved. In a recent project, a 4x4 link chainmail assembly took one hour of printing time, but then required two hours of manual cleaning up and surfacing. Material loss would also be a concern in an industrial environment: in this case, 3.3 g of the final object required a total of 7.2 g of printed material. A material efficiency of less than 50% can be seen as far from ideal.

### BUILDING AND PRINTING A SIMPLE OBJECT

The actual details of our workflow can vary, depending on which program set we choose to use. However, the main steps will be as follows:

- Build the computer model, using volumes. Thin, flat parts must be rendered as volumes, with a thickness that for best results should not go below 1 mm. In this series, we will naturally use FreeCAD for this stage. However, other options such as Blender are also quite suitable, as long as they can export object meshes in the STL file format.

- Use a slicer program to convert the object into a series of flat slices. These slices are then converted into a sequence of G-code commands, that in essence tell the printer to place its head at such-and-such coordinates, and turn the plastic extrusion on and off. A common choice for this stage is Slic3r (<http://slic3r.org/>).
- Use a third program to connect to the printer, and actually perform the printing process. Printron / Pronterface (<http://www.pronterface.com>) is a popular choice.



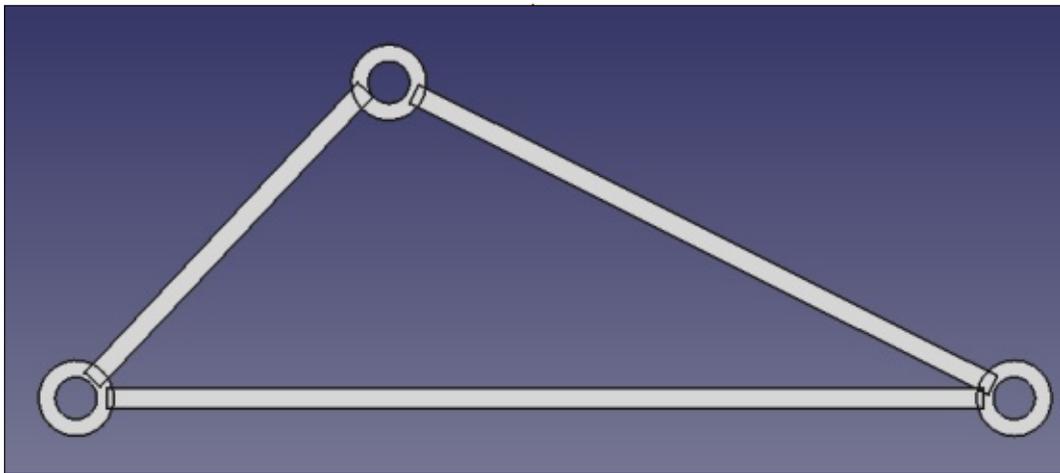
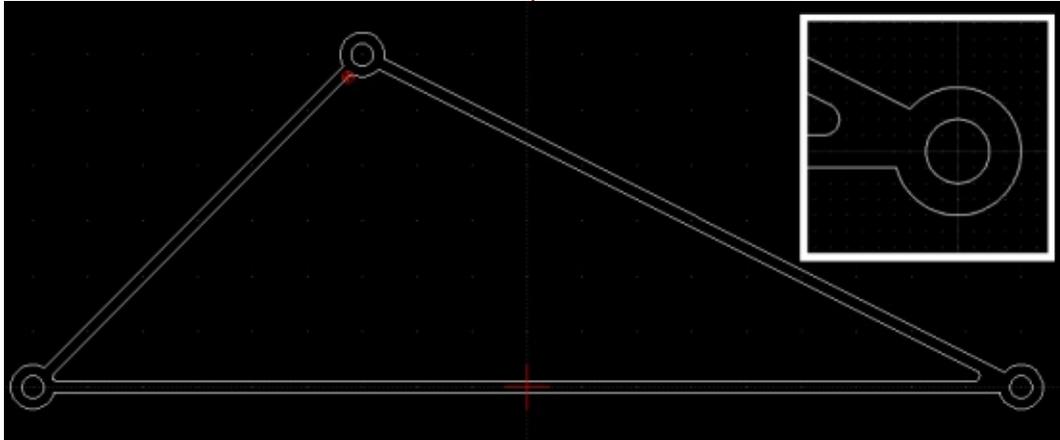
Two file formats form the glue between stages (a) and (b), and between (b) and (c). The STL format previously discussed in parts 7 and 8 of this series is a standard way to transfer our object's form from the design application to the slicer. Other choices do exist, such as OBJ files, but do seem to be slightly less well supported. G-Code files may be used to transfer data from the slicer to the printer controller, though this step is omitted if the slicer can also act as a printer controller. Applications such as Slic3r can control directly a certain number of printer models, mostly open-source hardware. However, many (commercial) models require their own software for slicing and controlling the printer, which is usually found only for Windows. This may be a point to take into account if or when selecting a printer to purchase.

Let us start with a simple truss object, basically a triangular structure of square bars connected with transverse circular bars. The first point we will need to get right is dimensions. Depending on your printer, there will be limits to the overall size of the object to be

printed. In this case, I chose to build a piece 120 mm in length, the size of the longest bar. Bar sections were 3 mm square, to make them easy to print. Finally, the circular joints have an internal radius of 3 mm, and 6 mm external. The overall height of this structure is 4.5 mm.

To set up this piece, a traditional CAD procedure would be to draw a flat representation of

the external shape, make sure all joints fit by trimming lines as required so that there is no intrusion of one bit into another, and then draw in the circles representing the holes in each joint. Using the more advanced features of modern 2D CAD applications such as LibreCAD, one could easily add some filleting to make joints a tad more robust at the unions between bars and cylinders.

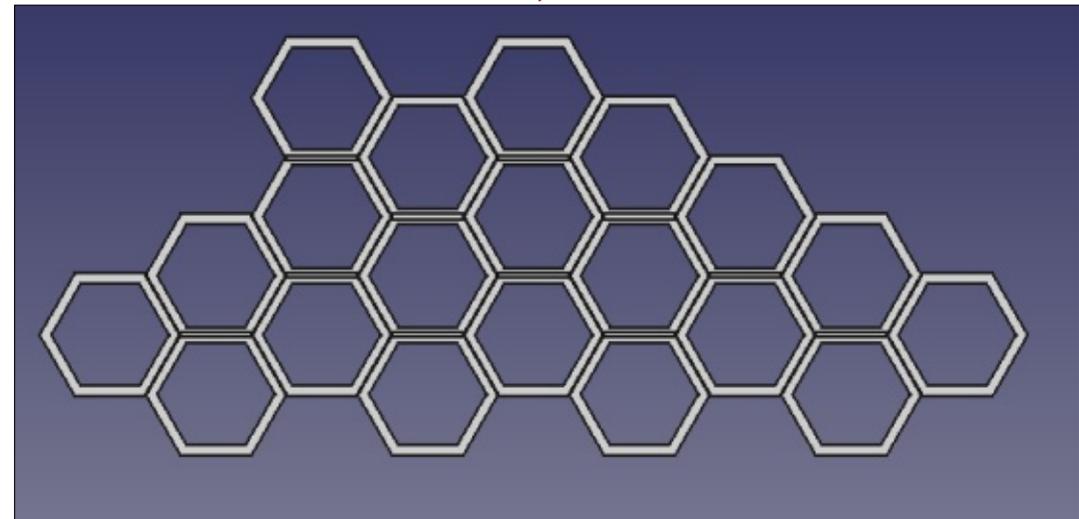


To build a 3D model, however, it is more convenient to think in terms of assemblies. I started out immediately in 3D by drawing a cylinder object in the Part workbench of FreeCAD, to represent one of the joints. I then draw a second, taller, cylinder to represent the cutout for the hole, and subtracted both objects to create a hollow cylinder. I then copied and pasted this complete part into the three final positions for the joints. I then created a flat bar of the appropriate section, and then copied, rotated and scaled it into position three times to form the triangular structure.

Some care needs to be taken in this assembly, since it is clear some overlapping of parts has occurred.

In the real world, the bars would need to abut to the outside surface of the cylinders, and bar extremities would need to be shaped accordingly. As an alternative, vertical slots could be cut into the cylinder walls, and the bar heads left square and slotted into the cylinders.

In the magical world of 3D printing, however, the intrusion of one volume into another may not be a problem. Most printing software can take care of this, so that the plastic material in each volume does not get printed twice over - which would result in a big mess. Instead, software is smart enough to perform a boolean union on all volumes and stitch them together correctly. It must be said, however, that not all printing



software is equal in this aspect, and some experimentation may be necessary to find the limits of a particular printer software and hardware combination.

Once the external truss had been built up, I wanted to fill in the center with a non-structural mesh. There are several ways of going about this. For instance, one could build a flat volume to fit the empty space, and then cut holes in it to suit. I wanted something a bit more fancy, along the lines of the beehive motives seen in some modern car grills. So I started by building a basic hexagonal shape in the same way I had done the cylindrical joints. I began by drawing a vertical six-sided prism

with sides 9 mm long and height 3 mm, then cut out another vertical prism with sides 8 mm long from the center. I then replicated this basic motif to fill the space in a honeycomb structure.

At this point, I had both the external triangle and the inner grille. However, the grille did protrude slightly from the sides of the triangle. So, it was back to the Draft workbench and I drew a rough approximation of the external triangle as a continuous Wire object. This object, extruded upwards, gave me the shape of the internal space, with some overlap with the triangle's bars. I then defined the grille as the intersection of the first grill and

this new volume, which in essence trimmed its shape down to fit within the interior space of the triangle.

The final piece is the combination of the external triangle, plus the grill. This assembly is then made into a single object using a boolean union.

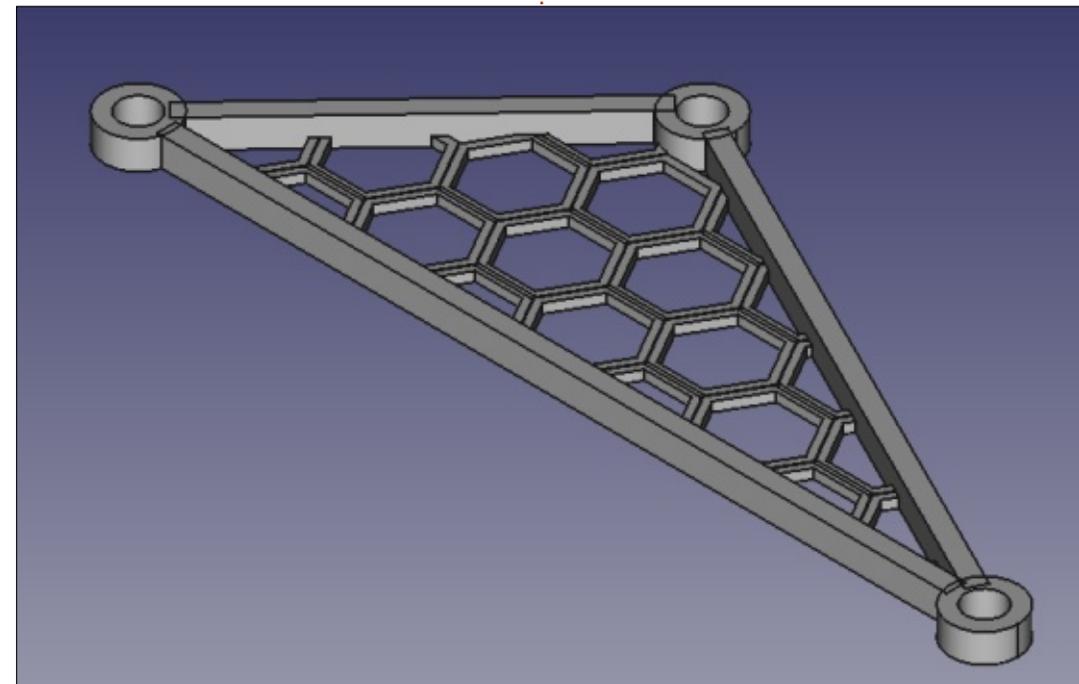
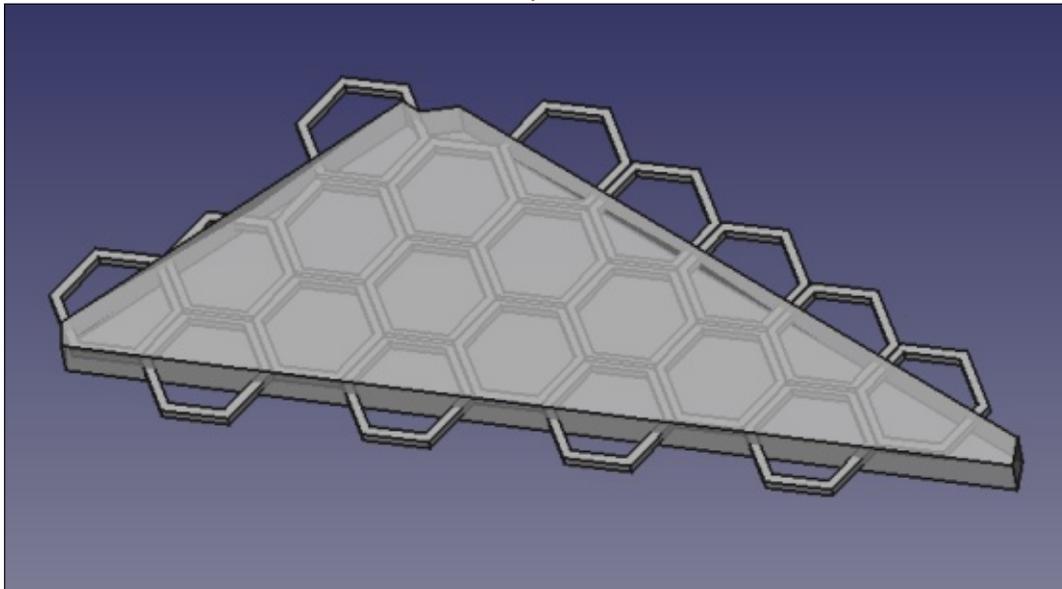
Once we have our object prepared, the printing process should be rather straightforward. Starting in FreeCAD, select the final part and export it into an STL file with menu option File > Export. From there, either use the Slic3r, or any equivalent slicer software,

to slice and print the model.

Once finished, the auxiliary mat can be stripped away. Some surface finishing will probably need to be done, specially on the lower side where it has been in contact with the mat.

### WHAT NEXT?

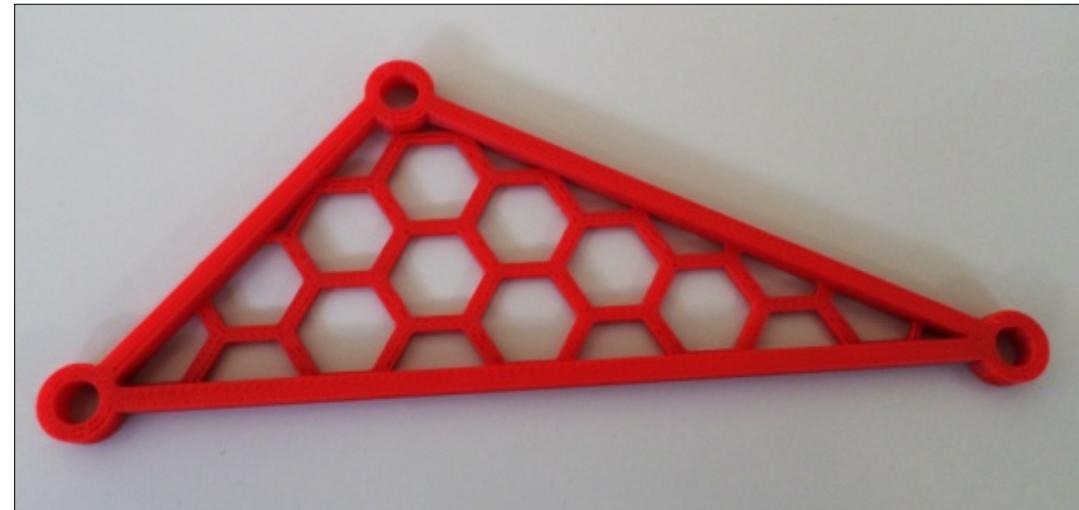
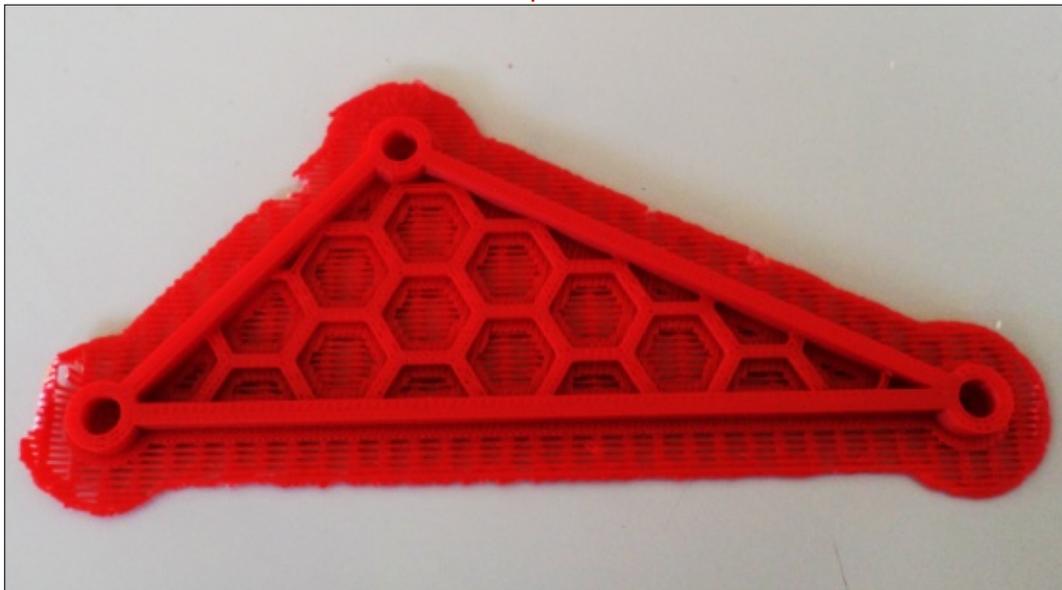
In this article on using FreeCAD, we explored going from a computer model to something physical, using a 3D printing technique. We went through both some of the strong points of 3D printing, and the weak points. We



## HOWTO - FREECAD

discussed 3D file formats, we built a model in FreeCAD, and printed it using the Slic3r software. This specific model, built in plastic, would probably have no intrinsic purpose. However, it could be used as a basis for a mold for a metal copy, or simply as teaching material on truss structures and internal stresses within a structural object.

In the next part of this series, we will change direction once more and explore some of the uses of copying objects to create a repetitive pattern such as chainmail.



**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 systems administration at the Open University of Catalunya (UOC).



In the first article, I introduced Great Cow BASIC and how you can flash an LED just by switching it on and off in a loop and let the microcontroller do nothing more.

This time, I want to show a more elaborate version – how to get the LED to flicker or fade. If I can manage the software pieces together by the end of all these articles, I will present a version of a light reactive night light with power-saving techniques.

But, before this. I want to get a text editor with syntax highlighting for ease of use. Geany is a lightweight text editor with syntax highlighting, and, in my opinion, is very comfortable to use with Great Cow BASIC. Install it with:

```
sudo apt install geany
```

Now, open it from your start menu. First, we get Geany to handle Great Cow BASIC code as FreeBASIC code. Most of the Great Cow BASIC syntax then gets highlighted. This works good for

```
26 Docbook=*.docbook;
27 Erlang=*.erl;*.hrl;
28 F77=*.f;*.for;*.ftn;*.f77;*.F;*.FOR;*.FTN;*.fpp;*.FPP;
29 Ferite=*.fe;
30 Forth=*.fs;*.fth;
31 Fortran=*.f90;*.f95;*.f03;*.f08;*.F90;*.F95;*.F03;*.F08;
32 FreeBasic=*.bas;*.bi;*.vbs;*.gcb
33 Genie=*.gs;
34 GLSL=*.glsl;*.frag;*.vert;
```

me. Edit the filetype\_extensions.conf under “tools - configuration files”, lookup the entry for FreeBASIC, and add “\*.gcb” (line 32 in the image above).

Afterwards, open up the menu “build - set build commands”, and change the compile command to

```
gcbasic /O:"%e".hex /A:GCASM
/V /NP "%f"
```

which then compiles the input file (%f means file with file extension, e. g. blink.gcb) to the

output file blink.hex (%e means filename without file extension). If the verbose output from the compiler bothers you, you can safely omit the “/V” parameter. The “/NP” parameter means that the Great Cow BASIC compiler does not wait for user input and is important for its use with geany, otherwise the compiler gets stuck. To flash the compiled programs to your microcontroller (assuming the ArduinoISP is used) from geany, you could change the build command to flash AVR:

```
avrdude -p t13 -c avrisp -P
```

```
/dev/ttyACM0 -b 19200 -U
flash:w:"%e".hex
```

This way, the compiled program gets right into your microcontroller. Beware: After those steps, the build parameters for FreeBASIC are overwritten, maybe it would be a good idea to save the original parameters somewhere to recover. Just in case you are about to write FreeBASIC source code in Geany as well.

## DIMMING LED

As a starting point, I introduced source code for a merely flickering LED. If you plan to create a program for a morse flasher or some kind of indicator light, this would be all there is to do. But, to fade a LED there is a bit more work to do. As the microcontroller only delivers digital signals which mean on / off - a different method is necessary to dim a LED. The LED has to be driven with fast and short pulses of current which tricks the human eye so that it recognize the LED brighter or darker (see ref. No. 2 for a detailed explanation).



'Out of the box' Great Cow BASIC offers 3 different Pulse Width Modulation (PWM) methods for Atmel AVR:

- a software PWM ,
- a fixed mode PWM, and
- a hardware PWM based on the Atmel AVR Timer0.

We can use either the software PWM or the hardware PWM modes. To set the hardware PWM for yourself, you would have to set the registers of the microcontroller yourself, at this time this is out of scope - maybe at a later point it could be necessary to squeeze out the last byte of the microcontroller's flash memory. If you have instant demand for tweaking please refer to the datasheet.

The software PWM switches the given channel with the required amount of current for the given number of cycles (called the duty cycle). Since the duty cycle is defined as a byte value, the duty cycle would be between 0 and 255, think of it like this: 255 means 100 % current, 127 would be around 50 % current and so on. The number of cycles defines the number of pulses of the software PWM and

```
'The software PWM:
#CHIP tiny13a, 1.2
#OPTION EXPLICIT 'provide that variables are dimensioned before use
#DEFINE RANDOMIZE_SEED Timer0 'Timer0 gives random values to the Random function
#DEFINE PWM_Out1 LED1 'SoftPWM channel 1
#OPTION VOLATILE PortB.1 'avoid glitches on the LED
'Set initial PIN direction and state:
DIR PWM_Out1 OUT 'set direction LED to output
'The main program:
DO
RANDOMIZE
PWM_OUT 1, RANDOM, 100 'Use Soft-PWM chan. 1 @random
WAIT RANDOM MS 'Wait some time
LOOP
```

defines how long the LED is dimmed. Although instantly repeated while in the main loop, the higher the cycles the smoother it will look. With the software PWM you can light up an arbitrary number of LEDs – contrary to the hardware PWM which is limited to the channels it is linked to. But it's at the cost that all is software calculated, and the microcontroller is busy while the LED is lit. With the following code you can set up a randomly flickering LED with software PWM.

The Setup of the software PWM is easy; you define one or more PINs used as a PWM channel. Then, the LED lights up at random brightness and goes off after the delay. This first result looks like an unsteady flickering candle; with

refinements to the code it will look a bit smoother. We will come back to this point later.

The hardware PWM, on the other hand, works similarly but uses hardware circuitry within the microcontroller to generate the required on/off pulses. The frequency and the duty cycle of the fixed mode PWM (ref. No. 6) can be set only once in the program out-of-the-box. This mode could be useful for applications where you want to light a LED at a constant level , or for other purposes which need a constant powerage. This can be changed, but you must change it within the source code.

For dimming the LED, we want to change at least the duty cycle.

Instead of calculating the timings in software, there is an oscillator in the Atmel microcontroller which gives the timing for the pulses. The attiny13a has one 8-bit Timer with 2 channels for hardware PWM. One channel 'OC0A' is not available for hardware PWM because it is sacrificed for other usages, eg, the pseudo random number generator. But the channel 'OC0B' can be used for hardware PWM and thus for dimming a LED. The hardware PWM that comes predefined with Great Cow BASIC uses the fast PWM mode of the attiny13a (see chap. 11.7.3 in ref. No. 5 for details). In short: it means the timer counts from 0 to 255, falls back to 0, and repeats until the timer is stopped. The frequency of the oscillator is calculated from the internal frequency of the

# HOWTO - GREAT COW BASIC

attiny13a. The microcontroller frequency is actually set to 1.2 MHz, which means the hardware PWM can be driven at frequencies of 1.2 MHz, 150 kHz, 18 kHz, 4 kHz and 1 kHz (rounded to full kHz). The speed is dependent of the microcontroller's frequency. When using the hardware PWM, the microcontroller drives the LED independently which means that other tasks can be processed virtually in parallel. If you want a fixed PWM for the LED, then you can set up the PWM this way (top right).

The fixed mode hardware PWM is easy to set up, but somewhat limited; the only manipulation that can be made during the execution of the program code is by switching the ON-OFF states with the WAIT statement. This first version looks like a candle in heavy wind conditions. Next, we will see that the setup of the fast mode PWM needs some more lines to define the hardware PWM parameter (bottom right).

To set up the Timer, the corresponding PWM channel must be set. With the attiny13a, you have only the Timer0 with channel B (constant AVRCHAN2 in Great

```
'The fixed mode hardware PWM:
#CHIP tiny13a, 1.2
#OPTION EXPLICIT
#DEFINE RANDOMIZE_SEED Timer0
#DEFINE LED1 PortB.1           'the hardware pin used
#OPTION VOLATILE LED1         'avoid glitches
#DEFINE PWM_FREQ 1            'Frequency: 1 KHZ should be ok
#DEFINE PWM_Duty 10          'Duty or brightness: 10 dim, 50 brighter [...]
DIR LED1 OUT                  'define the PIN as output
'The main program:
DO
    RANDOMIZE
    PWMON
    WAIT RANDOM MS            'short pulses in random length
    PWMOFF                    'switching the PWM off
    WAIT RANDOM MS
LOOP
```

```
'The fast mode hardware PWM:
#CHIP tiny13a, 1.2
#OPTION EXPLICIT
#RANDOMIZE_SEED Timer0
#DEFINE AVRTCO                 'Timer0 Compare Match B Output is used
#DEFINE AVRCHAN2              'declare Timer0 chan. 2 to be used
#DEFINE LED1 PortB.1         'the hardware pin used
#OPTION VOLATILE LED1         'avoid glitches
DIM FREQ AS BYTE
'Set initial PIN direction and state:
DIR LED1 OUT
FREQ = 1                      '1 KHZ looks good, maybe try 4 (kHz)
'The main program:
DO
    RANDOMIZE
    HPWM 2, FREQ, RANDOM
    WAIT RANDOM MS
LOOP
```

Cow BASIC) for the fast mode PWM, and can use only PIN PB1 for the blinking or fading LED. The

hardware PWM of this version looks like a candle where the wind has subsided, and, as such, looks

much smoother than the fixed mode PWM version.

## COMPARISON

**Hint:** Install binutils-avr via apt to get the tool avr-size; with it you can get the size of a hexfile in a human readable manner.

Type: `avr-size name-of.hex`

The software PWM needs some calculations and further program code to work, but the corresponding executable for one channel is rather small: Program Memory: 217/512 words (42.38%), RAM: 11/64 bytes (17.19%). The corresponding .hex file has a size of 440 KByte. The fixed and the fast mode hardware PWMs need a specific PIN of the microcontroller to work, which limits the number of LEDs you can use. But, once started, the PWM can operate independently (the plan is to prove that this is true for the idle mode, we will see this in a later part). The size of the code differs. For the version of the code with fixed mode PWM, it uses Program Memory: 244/512 words (47.66%), RAM: 9/64 bytes (14.06%). Or around 488 KByte. The fast mode PWM uses Program Memory:

```
'The TARDIS LIGHT
#CHIP tiny13a, 1.2
#OPTION EXPLICIT
#DEFINE AVRTC0                               'Timer0 Compare Match B Output is used
#DEFINE AVRCHAN2                             'declare Timer0 chan. 2 to be used
#DEFINE LED1 PortB.1                         'the hardware pin used
#OPTION VOLATILE LED1                        'avoid glitches
DIM FREQ, DUTY_CYCLE AS BYTE
'Set initial PIN direction and state:
DIR LED1 OUT
FREQ = 1                                     '1 KHZ should be ok
DUTY_CYCLE= 0
DO
    REPEAT 25
        IF DUTY_CYCLE >= 0 THEN DUTY_CYCLE = DUTY_CYCLE + 10
        HPWM 2, FREQ, DUTY_CYCLE
        WAIT 50 MS
    END REPEAT
    REPEAT 25
        IF DUTY_CYCLE <= 255 THEN DUTY_CYCLE = DUTY_CYCLE - 10
        HPWM 2, FREQ, DUTY_CYCLE
        WAIT 50 MS
    END REPEAT
LOOP
```

478/512 words (93.36%) RAM: 15/64 bytes (23.44%). Or around 936 KByte.

## CONCLUSION

All three types of the PWM will work out-of-the-box and are useful on their own.

The software PWM gives the possibility to drive LEDs (or motors, or other analogue driven things) without much hassle, but at the cost that other code has to be optimized to be run somehow (thus the microcontroller has so

called interrupts, we will briefly introduce this topic later). Secondly, the microcontroller must be in an active state, and cannot be set to the idle sleep mode while using the PWM.

The hardware PWM of the attiny13a is limited due to the few Timers (exactly one) on board, and the resulting code with random numbers will soon get too big to add more functionality. PWM on the tiny13a can look a little odd because of the low timer resolution of the attiny13a and the

gaps from the random values. So there is some space left for optimisation.

## BRING IT ALL TOGETHER

For fun (above), here is one example of a smoother fade effect, if you know 'Dr Who', it looks familiar - like the light on top of the TARDIS.

**Boris** holds a Bachelor degree in business administration, and works for an insurance company. While not working, he is a family person and enjoys playing with his kids or tinkering with his personal projects.



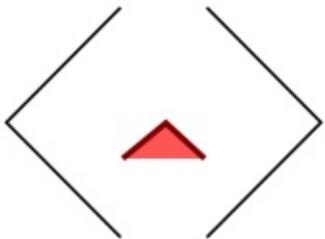
# HOW-TO

Written by Mark Crutch

# Inkscape - Part 68

Last time I looked at the “Fill Between Many” live path effect, so it makes sense to start this instalment with the closely related “Fill Between Strokes” LPE. I’ll race through this one quickly as, quite honestly, I can see very little benefit in using this effect over its more capable sibling.

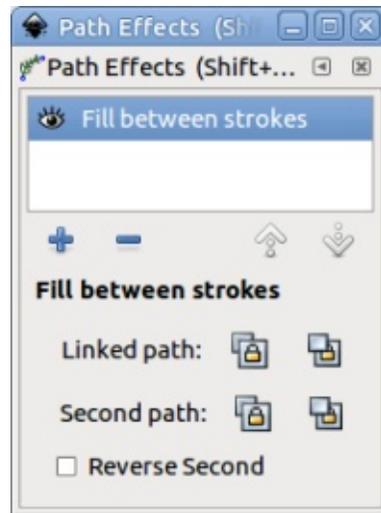
Whereas “Fill Between Many” allows you to create a new shape that connects numerous individual paths, “Fill Between Strokes” does the same job, but is limited to a single pair of paths. Once again we also need a sacrificial path to which the effect will be applied (and which will be the source of the style for the resultant object).



To demonstrate, my test image consists of a couple of black paths, plus a thick red path with a light red fill to use as the sacrificial path. I could have used a simple

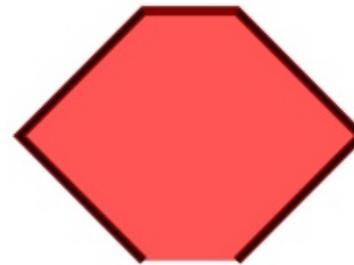
straight two-node path for the latter, but, by giving it a bit more shape, it’s obvious that there’s a fill applied.

The first step is, of course, to select the sacrificial path and apply the LPE. This results in a simple UI in the Live Path Effects dialog.



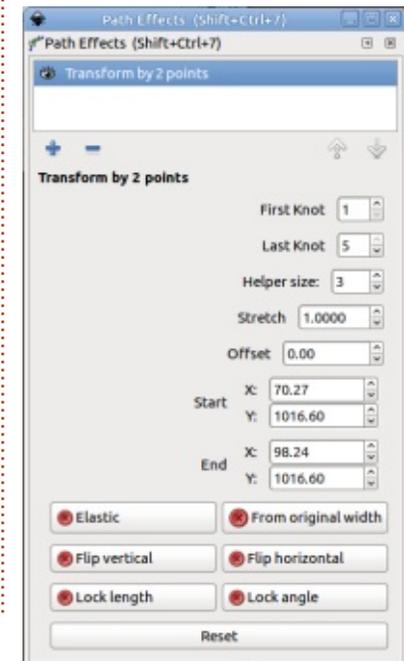
Now we have merely to add the two paths we wish to use. As usual when linking a path in an LPE this is a little contrived; you first have to select the path and copy it to the clipboard, but that de-selects the sacrificial path and you lose the UI in the dialog. Re-select the sacrificial path, then use the first

button on the “Linked Path” line to “paste” the link to the path into the effect. Do the same for the second path as well. If necessary, you can reverse the second path using the checkbox, but you can’t reverse the first path other than by changing it directly in your drawing. With those steps performed, the result looks like this.

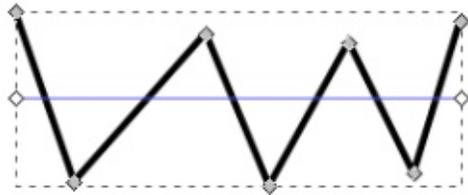


This is almost identical to using “Fill Between Many” with only two paths, except that the resultant path isn’t closed – you can see that the thick red stroke doesn’t continue along the bottom of the shape. Given that this appears to be the only real difference between the two effects, my general recommendation is to just stick with the more versatile “Fill Between Many”.

Having largely dismissed one not-so-useful effect, let’s take a look at a couple of others. The first is “Transform By 2 Points”. I’m sure most readers are familiar with the “pinch to zoom” effect on smartphones and tablets – and the extended version that includes rotation and panning which is often used in mapping applications. This LPE essentially brings that same functionality to bear on Inkscape paths. On adding this effect to a path, you’ll be presented with a complex looking interface:



This is another effect where the UI seems to be upside down – all the interesting things are in the bottom section. The buttons at the bottom act as a set of toggles, enabling and disabling different types of transformation. Begin by activating the “Elastic” and “From original width” buttons. If you now switch to the Node tool (F2) you should see that a thin blue line with diamond handles has appeared on your path.



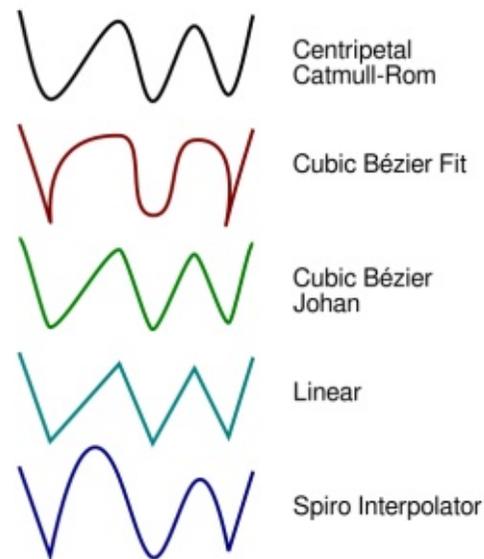
Drag either of the handles around on the canvas and you’ll see your path dynamically stretch and rotate in a very intuitive manner. Leave the “From original width” button enabled but try toggling some of the others on and off to see what effect they each have. It should be clear that this is a very fast and natural way to transform a path so that it fits in a specific gap, or connects visually to other elements in your drawing.

If you turn off the “From original width” toggle you can be even more specific about the path placement. Now the “First Knot” and “Last Knot” fields come into play, by letting you specify nodes in your path that should be used as the start and end of the transformation line. If you need to scale an arbitrary path so that its ends lie at specific points, this will do the trick nicely.

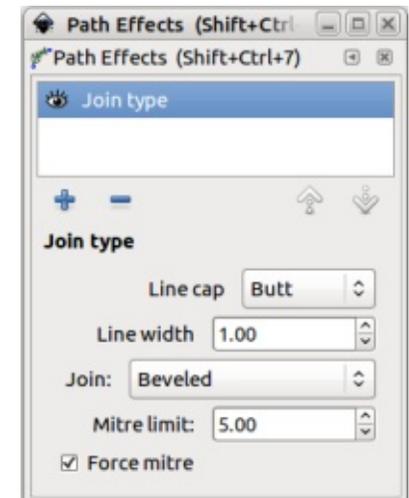
I quite like this effect, but I find it disappointing because it’s just that – an effect. It would be so much better to see a transform option like this make its way into the roster of top-level tools in Inkscape. That would allow you to use the same sort of intuitive control whether you’re transforming paths, shapes, groups or even text.

Next in the roster of effects is “Interpolate Points”. This simply redraws your path using one of five pre-defined interpolations between the nodes. The UI is so minimal that I’m not even going to bother with a screenshot – it’s just a pop-up menu to let you select the type of interpolation you want to use. There’s no way to change the Bézier handles or otherwise

adjust the curves, and the selected interpolation is applied to all the path segments; there’s no way to have different values applied to each individual segment or even sub-path. This effect is probably of most use as part of a chain with other LPEs, when you want to change the output of a previous step from straight lines to curves, or vice-versa – but otherwise there’s rarely any good reason to use this effect in preference to modifying your original path. Here’s an example of a simple path rendered using each of the five options:



The last effect I’ll be covering this month is “Join Type”. This lets you set the type of join used between path segments, in much the same manner as the Stroke Style tab of the Fill & Stroke dialog – except that it does have a couple of new tricks up its sleeve, and a big limitation to be aware of. On adding this effect to a path, you’ll be presented with this interface:



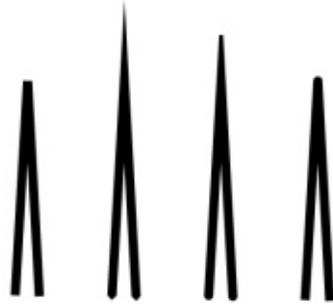
The Line Cap pop-up offers the usual options of Butt, Rounded and Square line ends. But it adds a new option as well: Peak. This gives the line ends a slight point, but there are no further options to set the size or angle of the shape. It’s certainly no replacement for the Taper Stroke effect. The Line Width control, on the other hand,

offers no surprises. It just alters the width of the stroke.

The Join pop-up again offers the usual options from the Fill & Stroke dialog (Rounded, Beveled, Mitre), but throws in four types of “Extrapolated Arc” options and “Mitre Clip”. More on those shortly. The Mitre option has the usual Mitre Limit control to set the limit at which really tight corners are rendered as beveled rather than a long, thin mitre – but this effect also offers a Force Mitre checkbox to force all the corners to render as mitres, regardless of the Mitre Limit. This is a nice addition that avoids you trying to work out just how large a limit you need to set if you want all your corners pointed.

With the Mitre Clip join type, and Force Mitre turned off, the Mitre Limit control takes on a new purpose. Rather than switching the join to beveled, the mitre is drawn - but cut off, as though truncated by a clipping path, at the length specified in this widget. When dealing with very sharp angles, it provides something of a halfway house between the excessive length of a full mitre and the stubby corner of a bevel. The

example below shows a simple path rendered using Beveled, Mitre, Mitre Clip and Rounded joins, with Butt, Peak, Rounded and Square line caps.



As for those Extrapolated Arc options – they do for curved lines what Mitre does for straight ones. The example below shows a path made up of a pair of curved lines with a sharp join between them. The first version has a simple Beveled join, the second extends the join linearly with a Mitre, losing the style of the curve in the process. The third version, however, shows the dramatic result of using an Extrapolated Arc.



The four types of extrapolated arc vary slightly in their rendering in most cases, but the differences can be more pronounced with some paths than others. It's easiest to just try all of them and see which suits your particular image the best.

As with the Interpolate Points LPE, this effect is all-or-nothing. There's no way to apply different join types to individual nodes, beyond the effects of the mitre limit. So if you want an extrapolated arc in the middle of a series of rounded joins, for example, you'll have to manually break the path into separate objects and apply the effect to each of them separately.

Now for the elephant in the room – and it's the usual pachyderm that we've encountered numerous times when looking at path effects. In order to remain compatible with SVG, the Inkscape developers haven't just added their own line cap and join types to the file format. Instead, as with the Power Stroke and Taper Stroke effects, the results you see here are produced by rendering the path as

a filled object. So if you want to use the beautiful extrapolated arcs (or the less impressive peak cap) on an object with a fill, you'll have to use one of the usual roster of workarounds that I've covered in the past – whether that's manually maintaining a second copy of the object to hold the fill, or using the Fill Between Many LPE to create a clone of your shape for filling.

This month, I've looked at what I consider to be some of the less useful new effects. They all have some interesting capabilities, but they also largely overlap with the functionality of other effects or tools. That's not to dismiss them out of hand, as they do have the ability to fill specific niche use-cases, but I doubt they'll ever be counted amongst the more commonly used tools in your Inkscape toolbox.



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



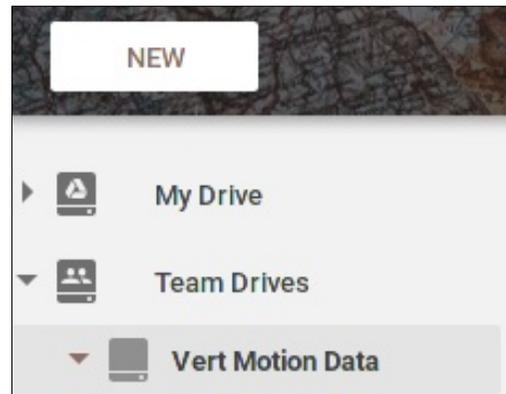
# RESEARCHING WITH LINUX

Written by S. J. Webb

This past month, my 'Researching with Linux' is a minimal feature. I supported off-site software developers, changed out laptops' hard drives, upgraded a laptop, and performed a software migration from Korora 25 to Korora 26. Essentially, I have very little to offer as informative or entertaining, yet I will discuss each topic.

Recently, we contacted an outside developer to review my Vertebral Motion Database. Their job is offer some possible explanations on the wildcat variables within the data files. This database is well over 8 GB and encompasses over 1,500 files. These files are in CSV and PNG formats. However, when working off-site, it is important that both parties have access to the same data set. The initial solution was to hand off a 16 GB thumb drive, and apply a soft-lock to the database. A soft-lock means that only one person can make changes to the data. This one person usually is the statistician. But in this case, the software developer will be

contacting me directly for data issues. So a soft-lock would not work. I suggested using a new feature from Google called Team Drives. The differences between Team Drives and a Google Folder are found here, I would like to credit Digital Inspirations for the clear differences table.



I like to think of Team Drives as a cloud network folder. This network folder can be assigned people and privileges, in a process very similar to the network folder offered by my university. After creating the Team Drives folder, I added the contracted developers. One of the developers contacted me after seeing a clear issue with one of the data files. I was able to correct the file and the developer

had quick access to complete the job.

I acquired my parent's 2 GB Ram Toshiba Satellite recently. My mother purchased a new Acer laptop. I upgraded the Toshiba to 8 GB Ram, and installed a 60 GB Patriot SSD with Korora 25 installed. The previous computer was an old Lenovo SL500. The Toshiba is a very robust and reliable laptop. However Korora 25 was at the end of life, so I updated to Korora 26 using the directions found here. It is a simple process if Korora 25 is current, then download the upgrade release, and finally a system upgrade implementation. This process is quite easy from the command line, but it takes about 2 hours or more depending on your internet speeds and connectivity. I have done 2 system upgrades on my laptops at home and work, and it was a flawless process. I am quite impressed at the level of stability from this small team with remixing Fedora.

So the Lenovo SL500 is still

available and a great hardware device. It has tons of USB ports and an optical drive, something that is not available on the newer laptops available today. I think all Linux enthusiasts are a bit of a technology pack rat. I could not throw the Lenovo out, so I decided to make it into a dedicated Kodi machine. I like having laptops being dedicated to one task. After some poking around on Distrowatch, I decided that I would install LibreElec OS onto the machine. I will write about the installation process and review the OS later this month.



**LibreELEC**  
Just enough OS for KODI

Until then Happy Holidays!





One of our Computer Recycling volunteers has been pining for some intellectual stimulation a bit different from our usual assemble/disassemble/troubleshoot PCs. The volunteer had picked up a book on Linux System Administration - hoping to learn more about managing systems. It's a bit beyond the scope of what we typically do, but after thinking about it for a bit, I figured it could help the person open up some new opportunities. The workstation the volunteer often sat at runs Windows 10. Although we could have set up a complete development environment and virtual server within Windows 10, the individual wanted to work in Linux, so we set up a dual-boot environment.

At first, we'd planned on installing Linux Mint 18.2 (I'd previously made a multi-boot USB key using the Windows version of the YUMI tool), but Linux Mint couldn't see the hard drive, it detected only the USB key. My second instinct was to try Kubuntu (because we're used to Xubuntu,

and it's sometimes nice to investigate a different set of software), but Kubuntu seemed to freeze booting from the key. Unity has never been my favourite desktop environment, but, to the surprise of both of us, it ran very well on the machine, and had no issues detecting and partitioning the hard drive - in fact it was one of the smoothest installations I've done in awhile.

The hardware:

- Gigabyte Z68P-DS3 motherboard
- Intel Core i5-2400 CPU (4 cores)
- 4GB DDR3 RAM

- 400GB Western Digital WD4000AAKS-0
- Nvidia Quadro FX580 (512MB) video card
- Dell SP2309W 23" LCD Monitor running at 2048x1152

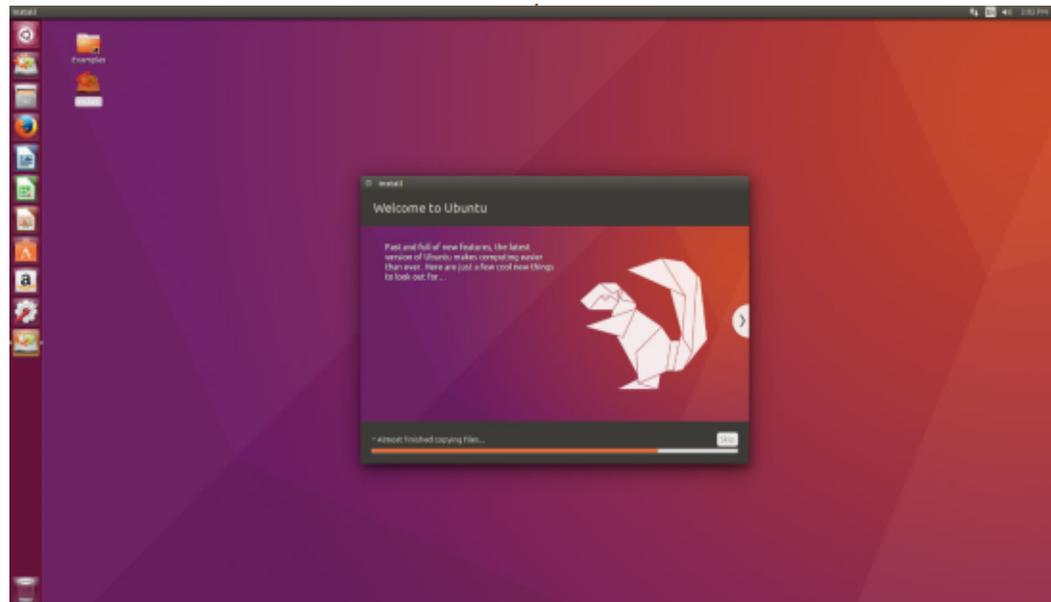
Hardly impressive by today's standards, but considering we still build Core 2 Duo and Core 2 Quad systems, it's got a bit more power than some of the systems we still use in Computer Recycling.

After Ubuntu installed, we installed all the updates, the proprietary Nvidia driver, and set

up a non-administrative account for the volunteer. Next, we downloaded an ISO of Ubuntu Server and installed Virtualbox.

At this point, I encouraged the volunteer to get a notebook for us to write down the usernames and passwords for all the accounts we'd set up and were about to set up. We jotted down the volunteer login for the Ubuntu desktop environment, then we proceeded to install Ubuntu server in Virtualbox.

One of the adjustments we made was to set up the server's network adapter in "bridged" mode. In bridged mode, we'd be able to access the Ubuntu server session from the same subnet. We gave the server a name, and jotted down the administrative username and password (for the server, not the desktop). During the server setup, we chose to install SSH, but not LAMP. We could have installed LAMP, but I knew installing afterwards is a simple matter of running taskset again. As it turns out, that was a good idea because,



on first try, we couldn't SSH into the server, this was when we discovered we needed to set the network adapter to bridged mode.

Next, we updated the server software; this proved to be a bit more challenging since the network we're on has a captive portal page. For those who don't know, a captive portal page is a sign-on page that prevents access to a network (Internet in this case) until a person performs some action dictated by the page (in our case entering a username and password). On the desktop, this isn't an issue; we simply open Firefox, load the page, and sign on. On Ubuntu server, it's a bit more of an issue since we had no browser installed. So, for a brief moment, I added the server to a network without a captive portal so we could download w3m (a text-based browser). Then I plugged the system back into the captive-portal enabled network. To simplify logging into the captive portal page, I wrote a very simple bash script:

```
#!/bin/bash
```

```
w3m http://portalpage/
```

The portal page URL is rather complex, and while the volunteer could have typed w3m <http://portalpage/> (the URL was really much longer), it seemed easier to just type something like `./portal.sh` (the bash script name). The script was a success and we were able to get past the portal page, but one of the gotchas of w3m is having to press ENTER to get into and exit each field (username and password).

After this, we ran updates on the server and installed the LAMP stack using tasksel. During the LAMP installation, we wrote down the mysql root password. Over the virtual server, we wanted to give the volunteer complete control. We also exported the server appliance so the volunteer could eventually work on the same server environment on another machine if they chose. Exporting the server also provided a kind of backup for the server if it got messed up (though we also snapshotted and cloned the server appliance). Of course, until that appliance is moved to another drive, it's not a real backup.

Back on the desktop computer, we installed Atom for editing code

and Filezilla for transferring files. At this point, we had a brief discussion about permissions and the location of the default `index.html` on Apache. I'm used to using vi for small edits - I haven't actually used Atom - but it seems to be well liked.

At this point the volunteer is practising SSHing into the server and executing simple \*NIX commands: `cd`, `cp`, `ls`, `pwd`, `less`. We had a look at the default Apache web page, modified the `index.html`, moved it to another file, and created an `index.php` with the `phpinfo()` function to show PHP was working on the server.

The following day we sat down and reviewed logging in to MySQL and running a few commands against a sample employees database you can download from the MySQL web site: <https://dev.mysql.com/doc/employee/en/>. Introducing MySQL at this point was probably a bit too much for the volunteer because, when I left and came back from lunch, I found the volunteer at a bash prompt trying commands, but failing because they didn't include spaces between commands and their arguments.

It's a start, but we probably need to create some visuals to help understand everything that's going on. I'm not a programmer, database expert, nor scripting expert, but one of the things I love about Linux is that, with a bit of looking around (and some help from a mentor), anyone can learn a bit about running a server, learning to program, or working with databases.



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



# MY OPINION

Written by Michael

# Which Distro?

There comes a time in every boy's life when his father must answer the 2 eternal questions:

- Is there life after marriage?
- Which distro?

The answer to the first is beyond the scope of Full Circle so I will concentrate on the second. As a developer in the Windows world reaching retirement I was looking for an inexpensive alternative that would like allow me to keep up my interest in computers and programming. I was introduced to Ubuntu first, and this was an ideal simple introduction which enabled me to become productive quite quickly. Unfortunately Unity came along and encouraged me to look at other distros; I was also interested in exploring how Linux worked. I am not complaining about Unity, but I am a caveman, and Gnome menus worked fine for me. I subscribe to the theory "If it ain't broke, don't fix it". Then I became a compulsive distro hopper.

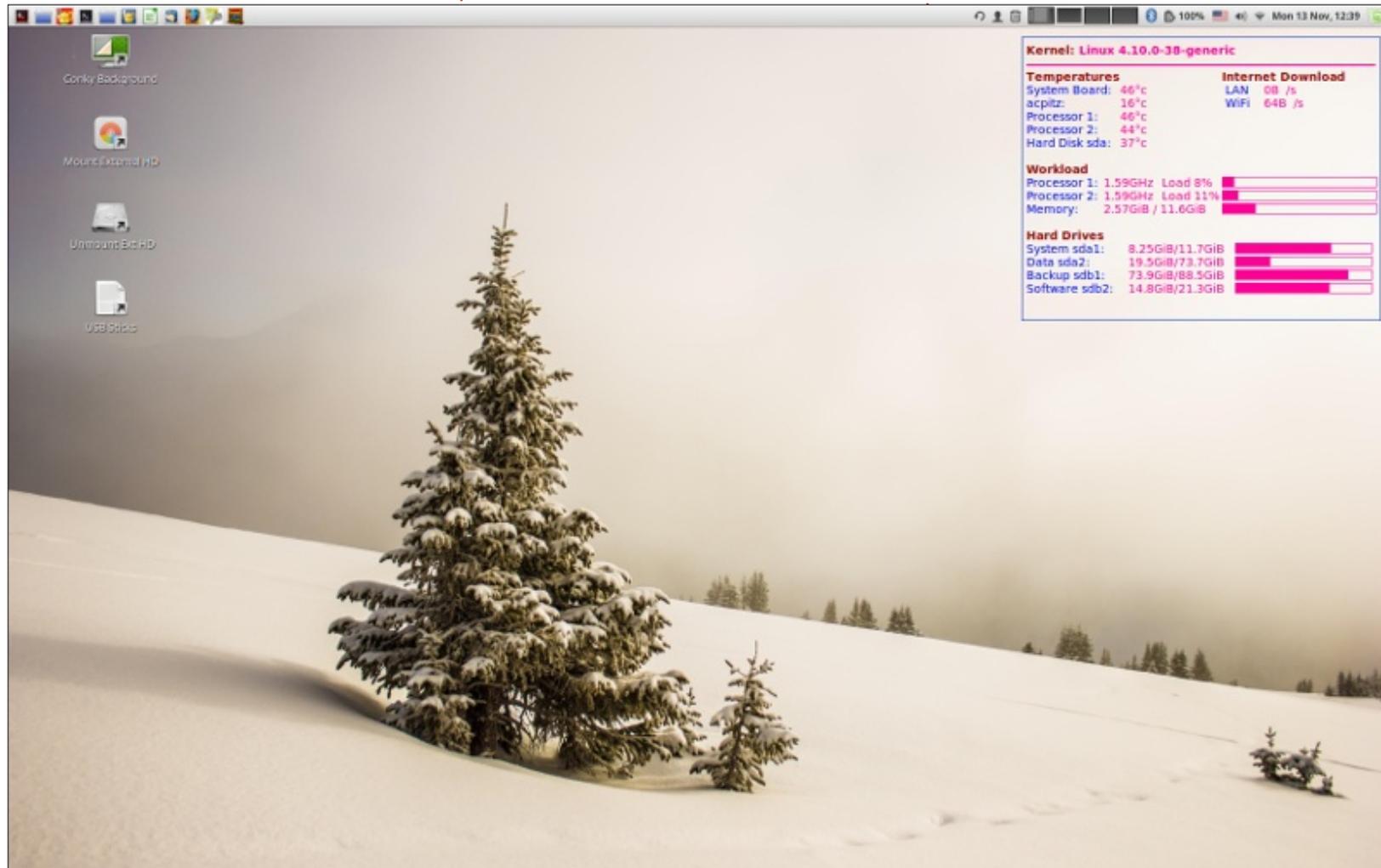
Now listen Son, distro hopping can become addictive, so pace

yourself. There are over 300 active distributions out there and they all have dedicated supporters. First, you will need a good working system, and separate partitions for experimenting with other distros; a

second computer would be better but I'm not buying you one.

For your daily use, I would recommend Linux Mint; there is a reason why it is top of the

DistroWatch rankings. I would suggest installing it on a 12Gb partition with your /Home folder on a separate partition. Generally, it will play nice with all video cards, Wi-Fi connections, and printer



drivers, but, for me, the clincher is the Cinnamon desktop with the categorised menu system configured to open on hover.

Ubuntu with Gnome desktop is another good choice, but, personally, I do not like the desktop full of icons seemingly randomly categorised. Most distros come with a choice of desktop, but, for a beginner, we will stick with the defaults.

This is getting boring so let's throw in a picture of my desktop:

The great thing about Linux is that desktops can be configured to any taste. I personally like light themes with an uncluttered desktop and I like to keep an eye on the status of my hardware. Mint Cinnamon has a good choice of themes and backgrounds.

Ubuntu and Mint are both based on Debian - which is a distro I always use as it is rock solid, but not for the beginner. You find a download via a html maze and then install with an outdated installer which is far from intuitive. You then have a system which will probably not recognise your network connections, video cards

or printer. These can be added later but it is not for the beginner.

Most distros are based on a solid base such as Suse, Red Hat, Arch, Debian, etc. Some distros have speciality purposes, such as security or gaming, but many are just slight variations of colours, fonts and default programmes. Some, unfortunately, do not boot or do not perform in a usable manner. We have to remember they are being produced by hard-working individuals, and I always try to isolate the problems and communicate them to the developers. Almost all distros have friendly and helpful forum groups.

I have a natural preference for Debian-based distros, but Red Hat's Fedora could be installed with Cinnamon desktop and, after a while, you would not know the difference. I also prefer smaller versions, without too many programmes included. They will take longer to download, and you may have to uninstall programmes to install your preference. I look for a basic set of tools, and I will add my applications later.

These tools should include a browser, email client, terminal, file

manager, software manager, system monitor, system log, and a disk partitioner. This is enough to test the look and feel of the distro. If I am happy with it, I will install my preferred applications (listed below if you are interested). And the great Linux benefit? They are all free! But do donate if you can, then all of us distro hoppers will be happy!

Finally, what if something goes wrong? Keep some tools on USB sticks, you can boot from these and fix most problems:

- **Gparted** – Disk partitioner can also create and restore partition images
- **System Rescue CD** - Similar to Gparted and also recovers 'lost' data.
- **Super\_Grub2\_Disk Boot Loader** – Essential to restore MBR.

My preferred applications:

- **Audacity** – Audio Editing
- **Clementine** – Music Player
- **Back-in-Time** – Data Backup
- **Calibre** – E-book Reader
- **Eclipse** – Development IDE
- **Java** – Development Environment
- **MariaDb** – Database manager
- **Gimp** – Image Editor
- **LibreOffice** – Writer, Spreadsheets, Presentations etc.

- **Handbrake** – Media converter
- **Openshot** \_ Video editor
- **VLC** – Video Player
- **Games?** Like Bitcoin, a complete mystery to me!

Now Son, about that first question, go ask your Mother.



It was a cold grey morning. Garth was on his way to work driving along the M1 (UK). The traffic was the same as usual but, at least, was moving steadily. Garth was feeling glum. He wondered why. Thinking of his wife and son, he decided they were not the reason for his negative feelings. Last night, David had amused them so much with his antics. He and Kim had retired to bed a happy and contented couple. Inwardly, he scolded himself for even allowing himself to think that his wife and child could be the cause of his gloom.

Then it came back to him.

“Of course!” he thought, “The whole world's troubles are caused by this operating system, and I am the sucker who has to look after it as well as all those idiots who use it.”

Glancing out of the side window of the car, he did not even want to bring the name of this operating system to mind.

He had been working for a few

weeks at a small college north of London. Their head of IT resigned, and his replacement needed someone to do a network audit and set up a network management infrastructure along with the daily chore of dealing with student and staff queries. So Linux had to be left at home - while he went to work on these machines that ran the unmentionable operating system. There was the root of his gloom. He was missing Tux.

As he drove into the college grounds, he noticed that some of the building's windows were lit; others were not. All of them were closed against the cold.

“Ironic.” he thought. “Ironic indeed.”

His movements from the car to his office were more or less mechanical. His reluctant steps were bringing him nearer to the source of his gloom. As the elevator took him to his floor, thoughts flashed through his mind. It occurred to him that there were some windows that he would not

mind opening at all. They were made of glass, with wood or steel frames, but then the cold would make working difficult. Also, there were windows to open in Gnome or ICE WM. That was appealing and would not freeze his office. His last thought was that even opening a window in KDE would be pleasant. The thought died as the elevator doors opened and the office door loomed. At least that is not a window! He did not notice a pair of unblinking eyes watching him as he trudged down the corridor towards the office door.

Garth sat down in front of his computer. As he reached forward to switch it on, he had a feeling that something strange was imminent. The computer booted in its usual manner, and he logged himself in as he had done on previous occasions. He had decided that today he would start the network audit and the thought of sitting quietly in his office was appealing. So far, none of the 'lusers' had come with their petty queries, so the day had the possibility of peace, but it was still

too early to tell!

The trouble started when the mouse cursor stopped responding. It had done that before. He was used to that. After trying the 'Vulcan death grip' without success, Garth pressed reset. The computer went through its usual boot-up, but the operating-system that has green, red, blue and yellow colours on a flag that looked as if it was being shredded by a storm, did not start correctly. The screen image was scrambled. Amongst the jumble of colours he thought he could make out the word 'Linux' in the bottom left corner. He blinked and looked again, wondering if he should have a cup of coffee. It was not clear and sharp like the lettering that he was used to seeing, but it was there. He did not notice that the unblinking eyes were still watching him and a faint smile appeared on the yellow beak below the eyes. Pinching himself, he realised he was not dreaming.

On impulse, Garth reached for the mouse. At the same time he

thought, "What's the point? There is no cursor."

But, as his hand reached the mouse, he noticed a pointer appear in the screen centre, pointing to the word in the bottom left corner. Like the word, the pointer was not clear. Garth wiggled the mouse tentatively. As he did this, the pointer moved towards the word. The more he wiggled the mouse, the more the pointer moved towards the word.

"Let's see what happens." Garth thought as he moved the pointer over the word. As soon as the pointer touched the word the screen went blank.

"Well," he thought. "It is, after all, that operating-system named after those door-like objects that you open and close depending on the weather."

He did not realise how wrong he was.

He sat for a few seconds wondering what he should do. He had not noticed that the pair of unblinking eyes were not watching him any more. In the tail of his eye, he did notice movement. The

computer network cable looked as if it was swelling. Like a balloon inflating. It was growing as if something, the size of a water melon, was passing through the connector and into the cable. He was thinking of getting out of the office as fast as he could when he noticed that there was something familiar about the object in the cable and the cable itself was not showing any sign of stress. The object moved through the cable and appeared to pass into his computer. It all happened smoothly and quietly, nothing on the desk was disturbed in any way.

The blank screen started changing. It looked like a light had been switched on, and the glow covered the screen gradually. The colours changed as the glow intensified.

"This looks like a screen-saver," he thought.

As the intensity reached its maximum, colours started to swirl around the centre of the screen. As different colours were added, Garth could see that familiar shapes were starting to appear. It was as if his video system was being rebuilt from the inside. The hard

drive light came on, and he heard the drive spin up to speed. Keyboard lights flashed on and off. As he watched, he thought that there must be something inside his computer doing repair work. Garth could now see that the image that he expected to see when that operating-system (that had a name that sounded like the object that filled holes in walls) was becoming clear. He was surprised to see that the system was now in its normal state after boot-up. He had not been asked to log in but here was everything on the screen, looking as if nothing had happened.

He was definitely logged in. He tried sending himself an email. It worked. He tried other programs, picking them at random, thinking that something would fail, giving him the BSOD. Everything worked quickly, smoothly and flawlessly.

Then he noticed a small movement in the bottom left corner of the screen. The word 'Start' was changing shape. The flag that looks as if it is being shredded by a gale, was disintegrating as if it was indeed being blown to pieces. Red, green and blue were pushed together to form a white blob. The black part

reformed and worked its way around the white blob. A new shape was forming. As yellow finally found its position with black and white, Garth found himself looking at an image of a little fat penguin giving the thumbs-up with a wink.

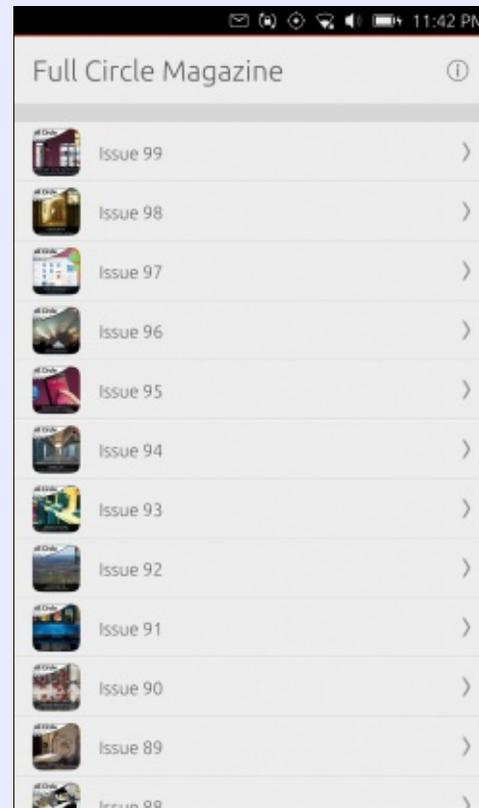
A soft knock at his door drew his attention away from the screen for a moment. It was one of the students who had come the day before with a nasty virus problem. She was passing by and stopped to thank Garth for his assistance. After she left, Garth recovered his breath, and turned back to his machine. The little penguin was gone and the tattered flag was back in its position. He also noticed the network cable was shrinking as the last of the melon-like objects passed back the way it had come. He wondered why it was that the student had not noticed the swelling in the cable, since she had stood near the point where the cable connected to the wall socket.

By now, Garth was feeling ebullient. His encounter with Tux had erased the gloom that he had felt earlier. He thought of the coming evening with his wife and

## MY STORY

child, supper, and maybe a drop of wine. Enthusiastically, he hurled himself at the task of the day and was amazed at how quickly he was able to finish the network audit. He sliced his way through student's and staff problems, sending them on their way - bewildered but satisfied. Unknown to him, as he worked, a pair of bright, unblinking eyes were watching.

## THE OFFICIAL FULL CIRCLE APP FOR UBUNTU TOUCH

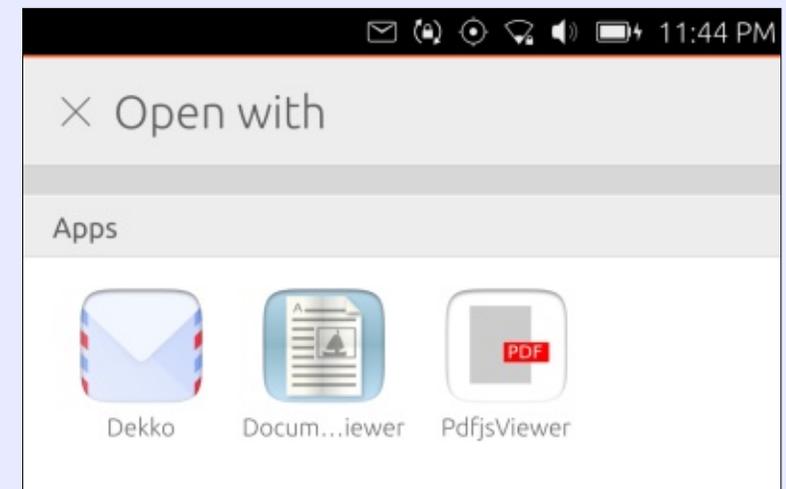
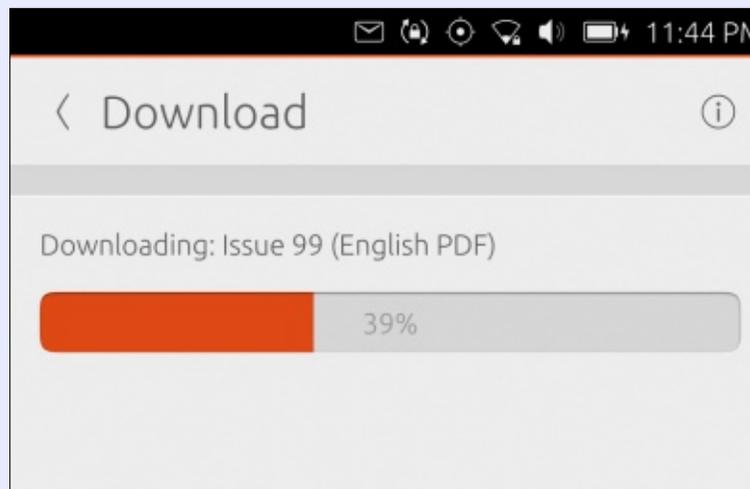


**B**rian Douglass has created a fantastic app for Ubuntu Touch devices that will allow you to view current issues, and back issues, and to download and view them on your Ubuntu Touch phone/tablet.

### 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 :

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

## TRANSLATIONS

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

## REVIEWS

### GAMES/APPLICATIONS

When reviewing games/applications please state clearly:

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

### HARDWARE

When reviewing hardware please state clearly:

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

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



# REVIEW

Written by Lucas Westermann

# Emmabuntus DE2 - Stretch 1.0

Emmabuntus is a French Linux distribution based on Debian 9 and available with either the Xfce or LXDE Desktop Environment. There are 32-bit & 64-bit versions available. On its website at <http://emmabuntus.sourceforge.net>, it claims that “the distribution was designed to facilitate the refurbishing of computers given to humanitarian organizations, especially Emmaus communities, and to promote the discovery of GNU/Linux by beginners.” This distribution has both impressed me but also disappointed me slightly. Overall, this is a fairly young distribution which has room to grow, and with great potential where the sky’s the limit. The reason I say that I’m both impressed but also disappointed with Emmabuntus is that I tried it on an older PC to test to see if their claims hold true, and this is where I had a bit of a problem. I’ll get to the details later, first I need to point out how I tested this OS.

## TESTING METHODOLOGY

To test this system, I figured I’d use the operating system for about a week in an older, early 2000’s PC originally with Windows XP, and, to contrast, I also used my current PC with 1-3 year old hardware. I’ll give my experience on both computers, but you should know that the bulk of my testing was done on the newer machine.

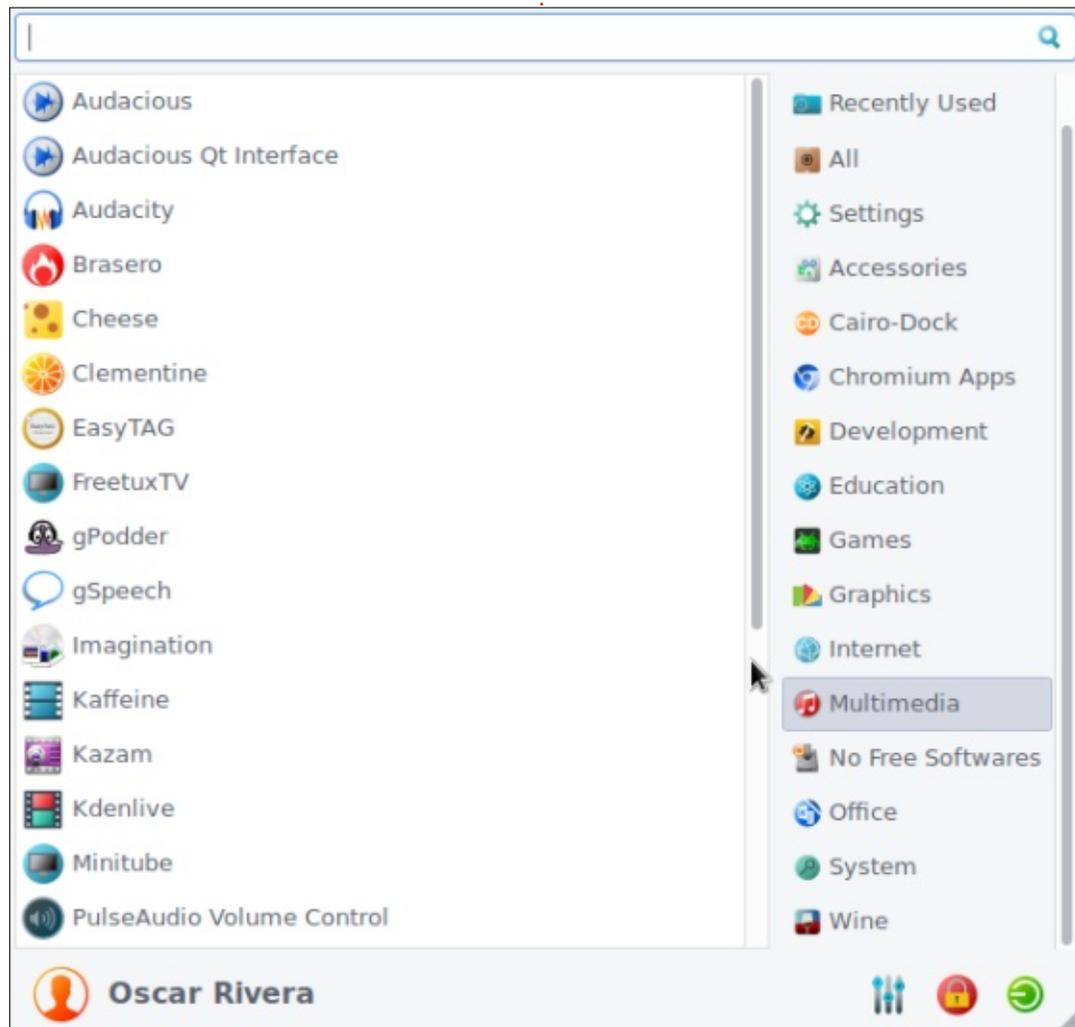
## INSTALLATION

Emmabuntus can be run from a Live CD/DVD if you so desire - which makes it an ideal way to test it. However, if you want to install it on your computer, then the process is fairly easy. The Emmabuntus installation is based on Debian installation. If you come from the Ubuntu world then the installation will feel a bit different but overall the process is fairly simple. I had a couple of problems during installation on the older computer, but it ran very smoothly on the newer one. On the new computer, I successfully installed the system in less than 25 minutes, while on the older one I had to try 3 times until I finally had a good

running system, in under an hour. Detecting my hardware was a breeze in my newer PC, and good-to-fair with the older PC.

## EASE OF USE

Here is where my testing with the older computer ends as I ran into a rather crucial problem and I didn’t feel like it was worth it that I continue the testing on the older computer. The problem was with



# REVIEW

the Wi-Fi - I couldn't get it to connect no matter what I tried. I don't think it was a problem with the hardware because I actually used 3 different Wireless cards at 3 different times and all of them showed similar results. The Wi-Fi cards were able to find my network, but then, after I would type in the password, they could never connect. After trying three different Wireless cards, I gave up and stopped the testing with that computer. With the newer computer, I never ran into that problem. On the contrary, everything from here on with the newer computer ran very smoothly and left me very impressed. My regular everyday use was extremely pleasant on my newer PC. Even the occasional system-wide updates were quick and easy. Side by side snapping of windows comes enabled by default. One thing that I didn't realize I'd missed, because I hadn't enjoyed it after it was taken out of Ubuntu, is the Screen-saver that comes standard with Emmabuntus. It was a nice nostalgic touch. You see, newer monitors no longer have a need for a screen saver; the newer monitors don't need "saving" from a blank screen or from the same unchanging screen, that's why

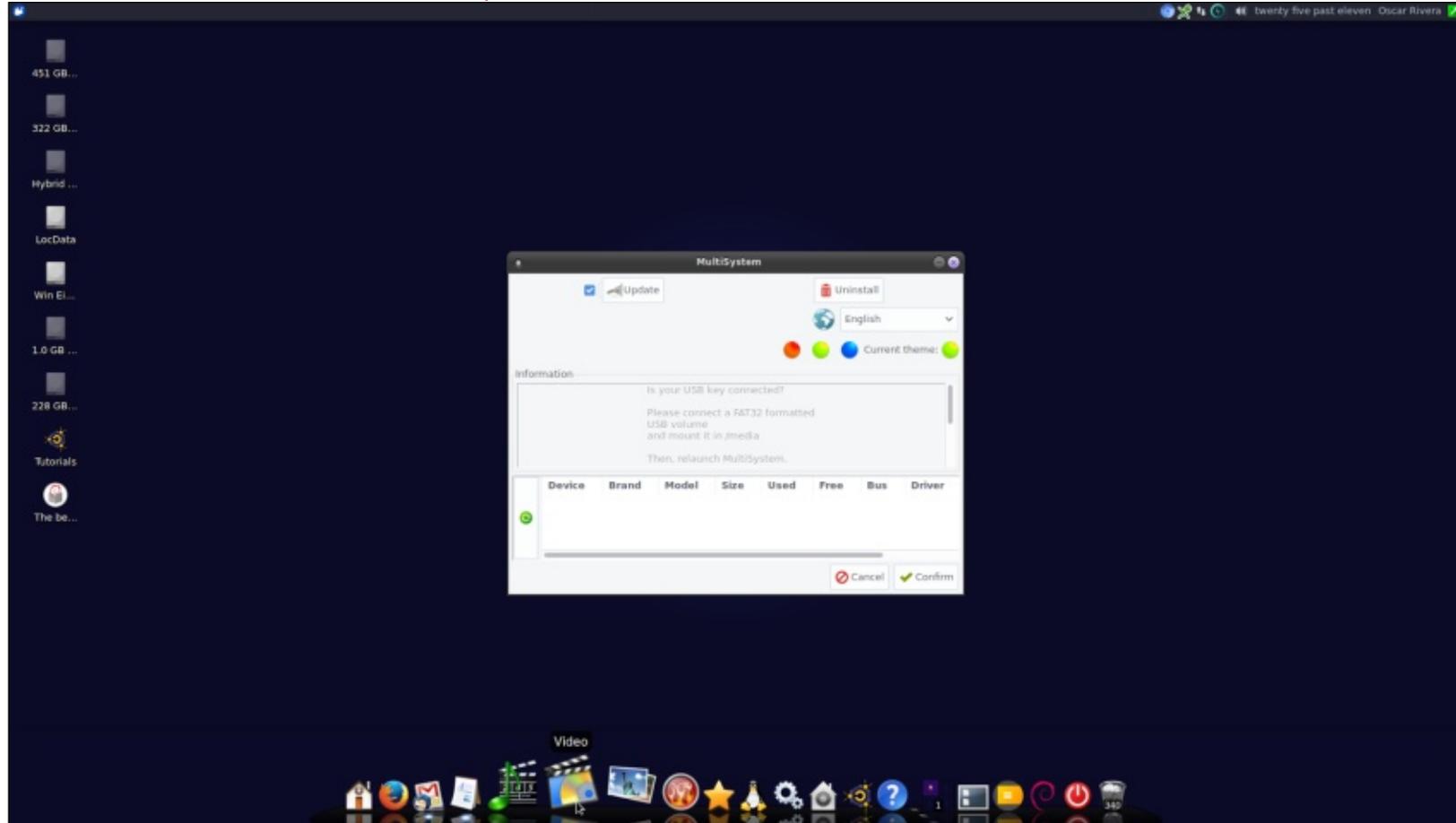
they've been removed from most modern distros.

## SOFTWARE

This distribution comes pre-loaded with lots of software that I've used throughout the years but also with lots of software that I'd never used before. The version that I tested came with the Xfce desktop environment and was

really easy to use. There is a pull-down menu from the top left, but it also comes with a dock-down at the bottom which can make the transition for a Mac OS X user very pleasant. Its default file manager is Thunar 1.6.11. It comes with most of the standard software that you would expect from most Ubuntu derivatives, but then there are a few more little bits of cool software sprinkled throughout. For example, it comes with Firefox

AND Chromium for web browser choices. Then, for all of your bit-torrent needs, you can choose between Transmission & qBittorrent. There are 17 apps under the "Graphics" category, which includes stuff like digiKam, Fotoxx, E-Book Viewer, GIMP, Inkscape, Pinta and more. There's a multi-media category with 25+ apps, some of which include Audacity, Clementine, tuxguitar and VLC just to name a few.



## REVIEW

There's an education category with 11 apps, Development, Office, System, Accessories and WINE categories, and a few others that I haven't mentioned.

I was pleasantly surprised to find a few apps that I ordinarily don't find on most default distributions. Apps such as VLC, Sound Juicer, KeePass X, a GUI USB-Image Writer & MultiSystem (for easy installation of multiple Operating Systems onto a single USB flash drive), Adobe Flash, and many, many more. Overall, I was really impressed with the selection of software out of the box. If you happen to need any extra software, then you're in luck because it comes with Synaptic Package Manager and Gdebi, and

you can even install games through a default installation of Play-On-Linux, which I thought was pretty cool. I was able to install a few additional apps and the process was easy, painless and quick.

### CONCLUSION

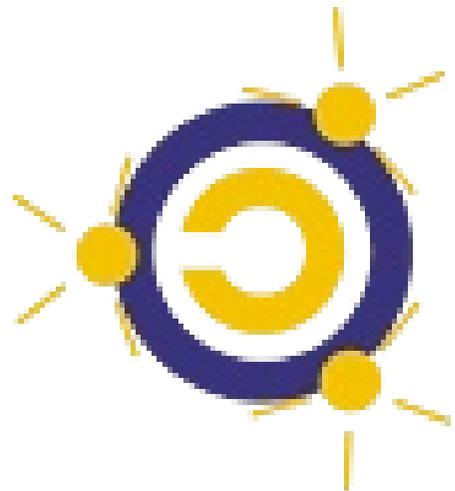
All in all, I would definitely recommend this operating system if you have a not-too-new computer, but it left me a little disappointed with a 15 year old computer. Because restoration of older machines is one of their claims, I need to deduct a whole star in my review of Emmabuntus. Other than this very crucial deal that I encountered connecting to the internet with an older PC, I really liked every other aspect of

Emmabuntus and can see myself using it as my default go-to computer.



### MY MAIN TEST PC

- AMD FX-6100 3.3GHz CPU (overclocked to 3.5GHz)
- Nvidia GeForce GTX 960 graphics card with Nvidia 381 driver
- 16GB of Kingston Hyper X RAM
- Ubuntu 16.04 LTS (64-bit) with Unity desktop



# Emmabuntüs



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



## WINDOWS WHO?

I have to concur with Rob Gurr's letter; Windows for me was XP, and when my motherboard died and I replaced it and found out the old MB was keyed to the Windows XP OS and the new MB would not work with XP, I decided it was time to go to Ubuntu. So I started with Ubuntu 6.06 and I am currently on 16.04.3 LTS and waiting for 18.04 LTS. That is almost 12 years using a Linux OS - and not using a Windows OS of any number for the same 12 years.

**John L. Hart Jr.**

## SLIM USB STICK

I recently bought 3 Kingston Traveller USB3 sticks and they work fine until I want to use both at the same time. The USB3 slots on my machine are too close together or the USB sticks are too wide. I blame the USB sticks, many are made to look fancy without any consideration for practical use. I could buy a USB hub but shouldn't

have to.

Can anyone recommend a slim USB3 stick?

**Michael**

## OUTDATED INFO

I have had several PCs set up with Ubuntu to experiment with over the years. Some years back, I started playing with one as a replacement for my router where I had found very specific directions for a basic configuration using WEBMIN that got me a start. Other responsibilities kept me from completing that experiment. I repurpose the PC that I experiment with often, and that base was lost. I want to rekindle that effort and have a desktop 16.04LTS system set up in a similar configuration to what I had before, but repeated GOOGLE searches return directions for configuration that appear too old to apply, are incomplete, or when listed for 16.04, appear incorrect because the listed directory locations for

.conf files are not even close, nor do the contents of those default files even resemble the examples. It appears that software and OS updates have changed many things. It also appears that the old on-line information on completing this task is not updated, nor are recent on-line sources for help able to keep up.

Do you know of a document that covers these uses that I may not have found? Will Full Circle cover this use at some point?

Rhetorical question: How can one expect any product to achieve wide use and popularity with documentation that doesn't keep up with product changes or is completely non-existent?

**John C. Lehmann**

Gord says: *pfSense is vastly superior, so people have lost interest in trying to use Ubuntu as a router. pfSense is based on BSD, but that is not an issue; installation is simple and configuration is all done from within pfSense.*

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[ubuntuforums.org/forum-display.php?f=270](https://ubuntuforums.org/forum-display.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.



# Q&A

Compiled by Gord Campbell

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

**Q** When I start or stop my PC, I see a lot of messages saying "OK" and "Started something or other". What are they, and what are the commands for them?

**A** (Thanks to **DuckHook** in the Ubuntu Forums) Those are all of the different services that collectively make up what you think of as a simple computing session. The green "OK" means that the services were all started properly or stopped properly.

If you want to see these same service notifications in log format, open a terminal and type: `dmesg`

**Q** I just installed Lubuntu on my old laptop, and I want to install all kinds of apps on this laptop, especially a C compiler.

**A** (Thanks to **Topshiho** in the Ubuntu Forums) Install build-essential.

**Q** Has anyone ever tested a notebook HP250 G5 with

Ubuntu 16.04?

**A** (Thanks again to **DuckHook** in the Ubuntu Forums) The usual method to test for compatibility is to run a LiveUSB on the thing to see. The last time I tried this at Best Buy, the sales staff were very accommodating. After all, would they prefer that you try out a floor model, or buy and then return to them a used and opened product under their 30-day return policy?

**Q** I have cloned my system to another HDD using the Windows program, MiniTool Partition Wizard. It is a double-boot system, Ubuntu/Windows 7. Computer boots directly into Windows 7. If I hit an F2 button to select booting options, there is Ubuntu option but nothing happens if I select it.

**A** The content of the partitions is the same, but their UUIDs have changed. In Ubuntu, the UUIDs of the partitions to be mounted are stored in a file called `fstab`. The Original Poster, petrokh,

reported that fixing the entry for the swap partition allowed Ubuntu to boot.

## TOP QUESTIONS AT ASKUBUNTU

**M**y source for this was The Ubuntu Weekly Newsletter, which has gone on hiatus until it can get more contributors.

Please see: <https://community.ubuntu.com/t/c-all-for-contributors-to-the-ubuntu-weekly-newsletter/1539>

## TIPS AND TECHNIQUES

### BIONIC BEAVER?

**T**hose of us with long memories, from my small corner of the world, remember our very own Bionic Beaver. But not fondly.

Ontario is Canada's most populous province, and it has lots

of schools. About half as many as Texas.

Soon after microcomputers appeared, the Ontario Ministry of Education decided that computer literacy would be an important skill -- and this skill would be best developed using a made-in-Ontario hardware and software combo.

The result was a computer called the Icon, produced locally. IBM was distracted by the IBM PC, so it gave the Ontario effort the amount of attention it deserved.

The Icon had some good points, but it was never adopted by another jurisdiction, and never made it outside the education sandbox.

The local system integrator was eventually taken over by Burroughs, which merged with Univac to form Unisys. The relevant Wikipedia article is "Unisys ICON".

And, oh yes, the nickname for the beast was the Bionic Beaver.





I came across this little gem on the internet. The art was uninspiring and the screenshots really looked boring, however, there was something in the music that attracted me. Somewhere in the ear of 'Game of Thrones' type music. So I decided to install it and give it a whirl.

## DILUVION

Surprisingly, a story-rich game made with Unity.

This is a bit of a swear word, as all the Unity bugs are present in the game, but give it a chance, and you will be surprised at the amount of detail and work that went into this title.

Some things remind me of 'Captain Blood' from many years ago, others from more recent titles like 'FTL' and even 'Elite' and 'Fallout'.

There, now the mood is set.

The game itself is quite large, and requires a slightly beefier than

average display card. I would not recommend the minimum specifications as the lag is noticeable. As the game is written in Unity, the free nouveau drivers just do not cut the mustard.

## GRAPHICS

The characters and locations in the game seem to be hand drawn, giving the game an indie feel. The submarines have a steampunk feel to them, and the whole setting reminds you of another classic "Sunless Sea" (I should say "Sunless Sea Submariner", but I have not

tried that yet.)

The colors are muted, which make screenshots seem boring, but they fit the mood of the game perfectly. (It becomes vivid when your submarine lights fall on objects.) The whole undersea world is beautiful, and with all kinds of eye candy if you look around.

The game also ships with an art book that will whet your appetite for the game.



## SOUND

The game also comes with a 46 track .mp3 and .flac soundtrack. These are crystal clear, and, with some of them, I had visions of the TV series "Firefly" (track46). In the game, the music fits the post-apocalyptic mood and story like a glove. There is not much voice acting, but it does not take away anything from the game.

This may not be game-of-the-year material, but it is worth playing, even if it is just for the story. You will soon be pulled into a fantasy world worthy of Jules Verne. Then you will be on the "just one more go" bandwagon.

## MINIMUM SPEC:

CPU: i5  
RAM: 4GB  
VGA: GTX300

## TEST RIG:

CPU: i5  
RAM: 8GB  
VGA: GT730 (not good enough)



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The current site was created thanks to **Lucas Westermann** (Mr. Command & Conquer) who took on the task of completely rebuilding the site, and scripts, from scratch, in his own time.

The Patreon page is to help pay the domain and hosting fees. The yearly target was quickly reached thanks to those listed on this page. The money also helps with the new mailing list that I set up.

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

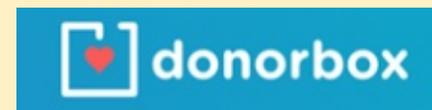
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