



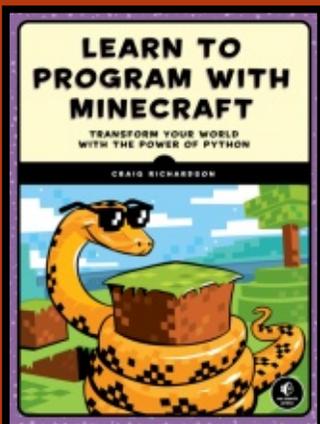
Full Circle

THE INDEPENDENT MAGAZINE FOR THE UBUNTU LINUX COMMUNITY

ISSUE #110 - June 2016



BOOK REVIEW



INSTALLING UBUNTU USING CLONEZILLA AND VIRTUALBOX

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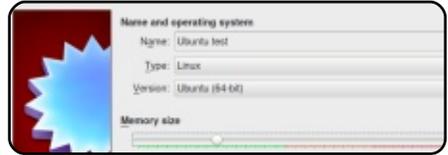
Photo: ucdaviscoe (Flickr.com)



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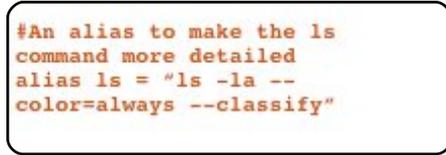


Graphics

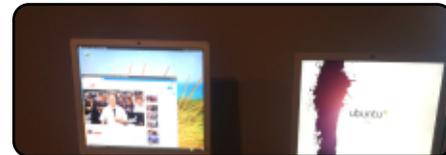


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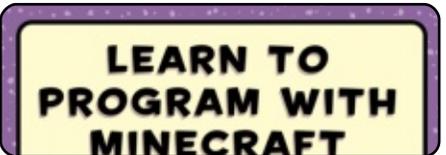
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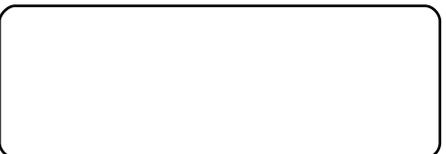
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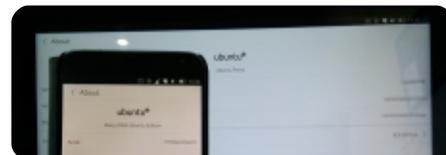
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WELCOME TO ANOTHER ISSUE OF FULL CIRCLE.

For the last time, possibly in years, we have a full house. Elmer left us last month (for pastures new) and this month marks the end of the VAX series. So, that means we definitely need new articles from you, the readers. I only have a few one-off articles in my unused pile, and we could do with a new series to replace LibreOffice. Send your articles (as an ODT attachment, or link to a Google Docs file) to: ronnie@fullcirclemagazine.org. Articles must be your own work, and you must be willing to have them released under the CC-SA license.

With that PSA out of the way, let's see what we have in store for you this month. Well, Alan has an interesting article on installing Ubuntu using Clonezilla and VirtualBox. SJ is showing you how to DIY a Chromebook in this month's Chrome Cult piece, I take a quick look at what's new in Ubuntu Touch OTA-11, Greg reviews a programming book (Python, of course) which seems to use Minecraft, and in games Oscar looks at Dota2 and I look at Vassal. Of course, there's still Greg's regular Python article and Mark's Inkscape article.

A few words on Touch OTA-11; if you have a Meizu Pro 5 then you should definitely update to get the Miracast feature which is exclusive to the Pro 5 at the moment, but coming to pretty much all Ubuntu devices in a future OTA. This let's you 'cast' your phone to a screen which has a Miracast dongle. It's another step towards convergence. OTA-11 also brings speed improvements to the BQ M10 tablet which should be even better when it gets the Miracast update.

All the best, and keep in touch!

Ronnie

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



IT'S EASY TO PACKAGE ANY SOFTWARE AS A SNAP FOR UBUNTU LINUX, SAYS CANONICAL

Canonical developer Michael Hall has published a short update on Snap packaging for the Ubuntu Linux operating system, showing us how easy it is to package any software in the new Snap format.

The example presented by Martin Wimpress in his announcement (about Ubuntu MATE 16.10 adopting Snap packages to offer users the latest MATE version as soon as it's out) was a simple calculator utility called Galculator. However, Canonical's Michael Hall has given us today a much bigger example of Snap packaging, for the Krita 3.0 digital painting software.

"Snap packages aren't just for calculators," said Michael Hall. "Today, I snapped up the pre-release version of Krita 3.0 direct from upstream. It wasn't nearly as

difficult as I expected either, it took longer to find the right dependencies and to compile than it took me to create the snapcraft package configs."

Source:

<http://news.softpedia.com/news/its-easy-to-package-any-software-as-a-snap-for-ubuntu-linux-says-canonical-504539.shtml>

KERNEL LIVE PATCHING FOR 64-BIT IBM POWER8 MACHINES COMING IN LINUX 4.7

Michael Ellerman, a Linux kernel developer working for IBM, has recently reported that a group of engineers from IBM and SUSE managed to enable kernel live patching support for the PPC64le hardware architecture.

The PPC64le instruction set architecture is a pure little-endian mode of the PPC64 (PowerPC 64-

bit) platform, and it has been introduced along with the POWER8 family of superscalar symmetric multiprocessors, as a prime target for the technologies produced by OpenPOWER.

During the development cycle of the recently released Linux 4.6 kernel, the skilled IBM and SUSE developers put all the puzzle pieces together and managed to get the kernel live patching feature to work for this architecture, but it looks like it didn't officially make it into the stable Linux kernel 4.6 release.

Source:

<http://news.softpedia.com/news/kernel-live-patching-for-64-bit-ibm-power8-machines-coming-in-linux-4-7-504541.shtml>

HYUNDAI ANNOUNCES ANDROID AUTO SUPPORT FOR SOME 2015-2017 VEHICLES VIA A DIY UPDATE

You usually have to get a car with Android Auto pre-installed if you want the feature to ever be available to you, but Hyundai has embraced Google's car platform more so than others. It just announced an update is available for some of its 2015, 2016, and 2017 models that adds Android Auto and CarPlay. You can install them yourself or go to a dealership and pay them to do it.

You'll have to log into the My Hyundai site to see if your particular model and variant is included. Versions of the Sonata, Santa Fe, Genesis, Elantra GT, and Tucson have updates available today, but compatibility depends on the infotainment package you got in the first place. The 2016 Sonata Hybrid, Sonata Plug-In Hybrid, Azera, and Veloster are supposed to have updates available soon as well.

Installing should be doable if

you're reasonably tech savvy, but this is a car we're talking about. If you break something, you'll have to go to the dealership and pay them to install the software and fix whatever you did wrong.

Source:

<http://www.androidpolice.com/2016/05/27/hyundai-announces-android-auto-support-for-some-2015-2017-vehicles-via-a-diy-update/>

UBUNTU TOUCH'S WEB BROWSER TO IMPROVE THE GOOGLE HANGOUTS EXPERIENCE IN OTA-11

The long-anticipated OTA-11 update for Ubuntu Phone and Ubuntu Tablet devices is just around the corner, and today we'll have a quick look at what's coming in the Web Browser app.

Today, May 30, 2016, Canonical's technical lead in the product strategy division, apps team, Mr. Olivier Tilloy, has published details about some of the features included in the Web

Browser app of the Ubuntu Touch mobile operating system, which will be added as part of the soon-to-be-released OTA-11 update.

Therefore, the updated Web Browser app has promised to improve the Google Hangouts experience for all form factors, including Canonical's new Ubuntu Tablet, the BQ Aquaris M10 Ubuntu Edition, and it looks like the media permission request dialog has been redesigned to be more user-friendly.

Continuing, the Web Browser app will now visually identify the list of items that are being used for opening new pages in the Ubuntu Settings app with a progression symbol, it will also properly handle window-level keyboard shortcuts, and further polish the memory-pressure handler used for unloading tabs running in the background.

Source:

<http://news.softpedia.com/news/ubuntu-touch-s-web-browser-to-improve-the-google-hangouts-experience-in-ota-11-504658.shtml>

GOOGLE DEVELOPS ARTIFICIAL INTELLIGENCE WITH HUMAN-LEVEL SPEECH CAPABILITY

Google's artificial intelligence is reported to be developed under the supervision of Ray Kurzweil, a computer scientist and futurist. According to reports, he was hired by the company in 2012 to work on the natural language recognition.

Kurzweil, the man reported to be behind the Google artificial intelligence, showed it at the recent Singularity conference through a telepresence robot. In the same event, he announced that together with his team, he has been working on chatbox. He also revealed that the chatbox will be released later this year.

The announcement was brought up when his opinion was asked regarding the possibility of people having a meaningful conversation with an artificial intelligence, one that is not easily distinguished from a regular human conversation. Kurzweil admitted that it is important to

what he is doing at Google, and that his team is working on chatbots. He also added that they are expecting to release a few chatbots that people can talk to later this year.

Source:

<http://www.scienceworldreport.com/articles/40990/20160531/google-develops-artificial-intelligence-with-human-level-speech-capability.htm>

NETHSERVER 6.8 LINUX SERVER FIGHTS SPAM WITH DNS-BASED BLACKHOLE LIST (DNSBL)

Based on the recently released CentOS 6.8 operating system, which, in turn, builds on the freely distributed sources of the commercial Red Hat Enterprise Linux 6.8 distro, NethServer 6.8 is now in development as the newest long-term support release.

The first Beta has arrived today with numerous new features and improvements, among which we can mention a much easier way to perform Multi-WAN

configurations, better spam filtering by using the DNS-based Blackhole List (DNSBL), IPsec site-to-site support, as well as support for configuring policy routing in the firewall.

There are also a new button for cleaning the YUM transactions for freeing up disk space, support for using IP and CIDR (Classless Inter-Domain Routing) ranges as the source and destination for the proxy bypass settings, and a new Bonding mode on the Network page, allowing sysadmins to choose from multiple bond modes.

Source:

<http://news.softpedia.com/news/nethserver-6-8-linux-server-fights-spam-with-dns-based-blackhole-list-dnsbl-504679.shtml>

ALPINE LINUX 3.4 RELEASED WITH IMPROVED SUPPORT FOR THE RASPBERRY PI ECOSYSTEM

Alpine Linux 3.4 is the first in the 3.4 stable series, offering users the most advanced GNU/Linux technologies. Among

them, we can mention the long-term supported Linux 4.4 kernel (version 4.4.11 is included in the base ISO images), the OpenRC init system, DNS search domain support in the `/etc/resolv.conf` file.

The new Alpine Linux 3.4 series brings good news for those who want to run the server-oriented operating system in virtual machines, such as VirtualBox, QEMU, or VMware, as they can now download a specially crafted ISO image called `alpine-virt`, which you can download from the official website of the distribution.

New software technologies included in Alpine Linux 3.4 are the Ruby 2.3 programming language, PostgreSQL 9.5 open-source database, Qt 5.6 GUI toolkit, as well as desktop applications like the LibreOffice 5.1 office suite and Evince 3.20 document viewer. The MATE 1.14 desktop environment is available as well.

Source:

<http://news.softpedia.com/news/alpine-linux-3-4-released-with-improved-support-for-the-raspberry-pi-ecosystem-504747.shtml>

UBUNTU 16.10 SWITCHES TO A UNIVERSAL LOCAL DNS RESOLVER SERVICE

One of the latest technologies implemented in Ubuntu 16.10 is a new, universal local DNS resolver service for all Ubuntu Linux flavors, including Ubuntu Desktop, Ubuntu Server, and Ubuntu Touch.

Canonical's Martin Pitt has made the big announcement on one of Ubuntu's mailing lists, informing the community and Ubuntu developers that he pushed a new local DNS resolver service to the upcoming operating system, replacing the old one.

The good news is that the new local DNS resolver is universal, based on `systemd-resolved`, which means that not only is it small and lightweight, but it is already available as part of the `systemd` init system.

Additionally, `systemd-resolved` supports all the latest networking technologies, such as DNSSEC, enabled by default in `systemd` 230 and later, doesn't rely on D-Bus as

the previous dnsmasq-based solution did on Ubuntu desktops and mobile.

Source:

<http://news.softpedia.com/news/ubuntu-16-10-yakkety-yak-switches-to-a-universal-local-dns-resolver-service-504770.shtml>

IT WILL SOON BE POSSIBLE TO DELIVER MANY POPULAR GAMES AS SNAPS FOR UBUNTU 16.04

Canonical doesn't give up on its new technologies, and Snaps might just become popular sooner than you might think. We've already told you that packaging your application as a Snap is not difficult and that anyone can create Snaps on Ubuntu 16.04 LTS, which comes with Snap integration by default.

So to further advance the adoption of Snaps on the Ubuntu Desktop and Server, Canonical has recently changed the release cycle of the snapd daemon to get a new maintenance build every week. "You can expect a steady stream of fresh snappy goodness in both

snapd and in the store," says Zygmunt Krynicki, Canonical Hardware Certification team.

In the same manner, Canonical also plans on changing the version scheme for future snapd releases, from the current 2.0.x release name to a date-based one, such as 2016W22 or 2016W23. And it looks like not only the version number will change but also snapd's capabilities.

Among these, we can mention multiple OpenGL improvements, which should allow developers to deliver their games as Snaps to the Ubuntu 16.04 LTS or later operating system, as well as better PulseAudio sound server integration, allowing apps to play sound and music.

Source:

<http://news.softpedia.com/news/it-will-soon-be-possible-to-deliver-many-popular-games-as-snaps-for-ubuntu-16-04-504812.shtml>

AMD PUBLISHED AMD GPU-PRO BETA DRIVER (FOR LINUX)

On Windows, we really have only one graphics driver per GPU. On Linux, however, there is a choice between open drivers and closed, binary-only blobs. Open drivers allow users to perpetuate support, for either really old hardware or pre-release software, without needing the GPU vendor to step in. It can also be better for security, because open-source software can be audited, which is better (albeit how much better is up for debate) than having just a few eyes on it... if any at all.

AMD has been shifting their structure; rather than two completely different code-bases, AMDGPU is an open-source driver, officially supported by AMD, that communicates with the Linux kernel. This chunk is compliant with the GPL, so it can be bundled with the operating system. AMD calls this plug-in component AMD GPU-PRO.

This component has now been released for Ubuntu 16.04, which includes OpenGL 4.5, OpenCL 1.2, and Vulkan 1.0.

Open-source developers can create their own components,

using the same AMDGPU hooks that AMD uses, and release those on their own.

Source:

<https://www.pcper.com/news/Graphics-Cards/AMD-Published-AMD-GPU-PRO-Beta-Driver-Linux>

OPENSUSE TUMBLEWEED GETTING LINUX KERNEL 4.6.1, LIBREOFFICE 5.2, AND GCC 6 SOON

OpenSUSE Project's Dominique Leuenberger wrote on the openSUSE Tumbleweed's mailing list a quick review of the major software updates that had landed in the week that had just passed for the rolling release distribution.

The most important part of Mr. Leuenberger's review was the reveal of some of the major features and core components coming to the openSUSE Tumbleweed rolling OS via the next snapshots. Among these, there will be the recently announced Linux 4.6.1 kernel, QEMU 2.6.0 virtualization software, and the upcoming

LibreOffice 5.2.0 office suite, which currently is in Beta stages of development.

In the meantime, the massive GCC 6 migration is still in progress for the openSUSE Tumbleweed operating system, and, according to Dominique Leuenberger, it is getting closer to reality.

Source:

<http://news.softpedia.com/news/openSUSE-tumbleweed-getting-linux-kernel-4-6-1-libreoffice-5-2-and-gcc-6-soon-504941.shtml>

UBUNTU-BASED CHALETOS 16.04.1 OUT NOW FOR THOSE WHO WANT TO MIGRATE FROM WINDOWS

Dejan Petrovic, the creator of the Ubuntu-based ChaletOS computer operating system, is currently uploading the new ISO images for the soon-to-be-officially-announced ChaletOS 16.04.1.

The ChaletOS 16.04.1 ISOs are currently being uploaded to the project's SourceForge page, and

you can even download the 64-bit image, so far. The 32-bit version of ChaletOS 16.04.1 should be available soon as well, and there might also be an official announcement with the new changes.

Most probably, the ChaletOS 16.04.1 release includes small bug fixes to some of the major issues reported by users since last month, which existing users can get by making sure all the available updates released on the software repositories have been installed.

Under the hood, ChaletOS is pretty much identical to Xubuntu, but its attractive design was targeted specifically at Windows 7 and Vista users.

Source:

<http://news.softpedia.com/news/ubuntu-based-chaletos-16-04-1-released-for-those-who-want-to-migrate-from-window-504934.shtml>

ECO DMS AVAILABLE FOR UBUNTU 16.04 LTS AND RASPBERRY PI 3

The platform-independent archiving software ecoDMS version 14.08 (krusty) now also supports Ubuntu 16.04 LTS. Moreover, the ecoDMS server can be installed on a Raspberry Pi 3 "Model B". ecoDMS GmbH has published the necessary apt sources for these installations in the official installation manual at www.ecodms.de. The exact system requirements can also be found on the website.

The archive offers all relevant functions: a programme for incoming email processing of scanned paper documents, an archiving interface with clear document administration, plugins and add-ons for Microsoft Office, LibreOffice, OpenOffice, Thunderbird and Outlook, a PDF/A printer for archiving from any application that can print, numerous search functions, integrated and fully automatic OCR full-text indexing, version management, comprehensive settings, user and group management, connections to Active Directory and LDAP, a browser-based web interface, mobile apps for smartphone and tablet, and much more.

Anyone interested in the software can test it in the demo version for 30 days. The full version is available at 49 Euro gross per licence.

Source:

<http://www.openpr.com/news/343828/ecoDMS-Now-Also-Available-for-Ubuntu-16-04-LTS-and-Raspberry-Pi-3.html>

LINUX MINT 18 CINNAMON, MATE BETAS RELEASED

Last week, Clem Lefebvre took to the Linux Mint blog to announce that the beta releases of the upcoming Linux Mint 18 release were "just around the corner." Just under a week after that announcement, Lefebvre has made good on his promise, publishing download links to the Mint 18 beta.

The Cinnamon release comes in at 1.6 GB while the MATE release is an even larger 1.7 GB, which is strange considering MATE is supposed to be the more conservative, lighter-weight version of the two. In the

Cinnamon edition, the desktop has been upgraded to version 3.0; . Meanwhile, MATE was bumped to version 1.14.

Source:

<http://www.neowin.net/news/linux-mint-18-cinnamon-mate-betas-released>

MOZILLA FIREFOX 47.0 LANDS IN ALL SUPPORTED UBUNTU OSES, ARCH LINUX, AND SOLUS

Officially released on June 7, 2016, the Mozilla Firefox 47.0 web browser is not a major release, but it does bring various interesting new features, among which we can mention support for playing embedded YouTube videos using the HTML5 technology when Adobe Flash Player is not detected.

Also, the VP9 video codec is now automatically enabled on powerful computers, providing users with top-notch video playback performance. There are also many security fixes and various other improvements, as well as some new tools for web

developers, so please check the Firefox 47.0 release notes for more details.

It took a couple of days, but the Mozilla Firefox 47.0 web browser is now available and ready to be installed from the main, stable repositories of the Ubuntu 16.04 LTS (Xenial Xerus), Ubuntu 15.10 (Wily Werewolf), Ubuntu 14.04 LTS (Trusty Tahr), Ubuntu 12.04 LTS (Precise Pangolin), Solus, and Arch Linux.

Source:

<http://news.softpedia.com/news/mozilla-firefox-47-0-lands-in-all-supported-ubuntu-oses-and-arch-linux-505066.shtml>

LINUS TORVALDS RELEASES LINUX KERNEL 4.7 RC3 WITH A FIX FOR AN NFS ISSUE

Linux 4.7-rc3 is the third Release Candidate version in the development cycle of Linux kernel 4.7, the next major kernel branch, which should see the light of day sometime in mid-July. And, according to Mr. Torvalds, Linux

kernel 4.7 RC3 appears to be a fairly quiet release whose only major change is a fix for a pending NFS issue.

Looking at the appended shortlog, we can notice the addition of some new tests for the Btrfs file systems, many updated drivers, in particular GPU, networking, I2C, and RDMA ones, various architecture improvements, and an updated networking stack.

Next Sunday, the development cycle of Linux kernel 4.7 will continue with the fourth Release Candidate (RC) build, which should bring more changes and improvements to the upcoming kernel series that many GNU/Linux operating system will adopt and use as the default kernel.

Source:

<http://news.softpedia.com/news/linux-torvalds-releases-linux-kernel-4-7-rc3-with-a-fix-for-a-nfs-issue-505145.shtml>

GOOGLE TO REMOVE WEAK "CRYPTO" PROVIDER IN ANDROID N

This week, Google announced plans to remove the Crypto provider from Android N, expected to be launched this fall.

The Java Cryptography Architecture (JCA) is a major piece of the Java platform that can work with various types of algorithms, different based on their algorithm principles and purpose.

When a developer wants to run operations that work with encryption, they call on one of these algorithms by loading their Provider, which you can think of as a category, and then select the desired encryption algorithm.

Android supports most of the JCA providers, such as OpenSSL, BC, HarmonyJSSE, DRLCertFactory, and more.

Prior to Android N, one of these providers was Crypto, and it included support for algorithms such as SHA1PRNG, SHA1withDSA, DSA, and SHA-1. As you can see, most of these algorithms are considered weak and insecure in today's encryption scene.

The Android team has put

together a series of recommendations to help developers migrate their apps away from the Crypto provider and its SHA1PRNG algorithm.

Source:

<http://news.softpedia.com/news/google-to-remove-weak-crypto-provider-in-android-n-505139.shtml>

APT 1.3 DEVELOPMENT ADVANCES, APT 1.2.13 NOW AVAILABLE FOR DEBIAN AND UBUNTU

On June 11, Julian Andres Klode announced the release of the second experimental milestone, bringing even more goodies to the upcoming APT 1.3 release. According to the internal changelog, which is a must-read for any tech-savvy Linux user who wants to know what exactly has been changed, there are a total of 43 improvements.

And it looks like most of the work was done to add various new features to the EDSP (External Dependency Solver Protocol)

protocol specification. Still, there are many other changes that promise to make APT 1.3 one of the most advanced versions of the package manager used in Debian and its derivatives, including the popular Ubuntu.

Also on June 11, APT and Debian developer Julian Andres Klode released a new maintenance version for the APT 1.2 series, APT 1.2.13, a small update to the command-line package manager that promises to provide a full apt bash completion implementation, improve a couple of translations, and fix a few bugs.

Source:

<http://news.softpedia.com/news/apt-1-3-development-advances-apt-1-2-13-now-available-for-debian-and-ubuntu-505157.shtml>

UBUNTU'S SNAP APPS ARE COMING TO DISTROS EVERYWHERE

Ubuntu's "snappy" new way of packaging applications is no longer exclusive to Ubuntu. Canonical today is announcing that snapd, the tool that allows snap packages to be installed on

Ubuntu, has been ported to other Linux distributions including Debian, Arch, Fedora, and Gentoo, among others.

But snaps—initially created for Ubuntu phones and then Internet of Things devices—could only be installed on Ubuntu. That's what's changing this week. Developers who package applications as snaps can now expect them to run on a bunch of Linux-based operating systems without creating multiple types of packages. Developers can use a tool called Snapcraft to build and package their snaps. Shuttleworth said snaps bring real security benefits. Snaps by default don't have the same access to the filesystem that Linux applications typically have, he said. For example, a browser delivered in a snap package would be unable to read a user's SSH keys, because snap-based applications are given their own private space and can only read and write in that area.

Source:

<http://arstechnica.com/information-technology/2016/06/goodbye-apt-and-yum-ubuntus-snap-apps-are-coming-to-distros-everywhere/>

BARUWAOS 6.8 SUPPORTS LET'S ENCRYPT, IT'S BASED ON RED HAT ENTERPRISE LINUX 6.8

The team of developers behind the Red Hat Enterprise Linux-based Baruwa Enterprise Edition commercial operating system, popularly known as BaruwaOS, has announced the general availability of BaruwaOS 6.8.

Based on the freely distributed source code of the Red Hat Enterprise Linux 6.8 release, BaruwaOS 6.8 arrives today, June 13, 2016, with support for the popular Let's Encrypt free and open certificate authority to protect your domains with an HTTPS (Secure HTTP) address, thanks to the implementation of the ACME client protocol.

Also new in BaruwaOS 6.8 is support for DMARC (Domain Message Authentication Reporting & Conformance) reporting, allowing customers to send both aggregate and forensic reports. Then, there are the ability to set up delivery servers, which are also known as fallback servers, and

support for configuring dedicated IP addresses for fallback and delivery servers, as well as domains.

Source:

<http://news.softpedia.com/news/b-aruwaos-6-8-supports-let-s-encrypt-it-s-based-on-red-hat-enterprise-linux-6-8-505204.shtml>

LOGIC SUPPLY LAUNCHES CL100 ULTRA-COMPACT MINI-PC POWERED BY UBUNTU OR WINDOWS

The CL100 was supposed to be unveiled at the Digital Signage Expo 2016 at the end of March, and now it is finally available for purchase from the company's website for the mere price of \$302 (€270) without a primary storage device or \$347 (€310) with a 32GB mSATA SSD.

Commercialized by Logic Supply as a 4K media player, CL100 is being delivered in a familiar, small form factor, offering users the possibility of installing either the popular Ubuntu 16.04 LTS (Xenial

Xerus) or Ubuntu 14.04 LTS (Trusty Tahr). Designed as a ventless and fanless industrial computer, CL100 doesn't have any moving parts, and it's mainly targeted at digital signage applications.

Don't let the size of CL100 fool you, as it's proving to be quite a powerful computer. It boasts a 6th generation Intel Quad-Core Braswell Celeron N3150 processor running at 1.6 GHz or 2.08 GHz thanks to max turbo frequency, up to 16GB non-ECC DDR3L RAM running at 1600 MHz, and on-board Intel HD graphics. It also features Realtek RT8111G Gigabit LAN controller, mSATA storage support up to 512GB, as well as a PCIe mini card (half-height) expansion slot.

Source:

<http://news.softpedia.com/news/logic-supply-launches-cl100-ultra-compact-mini-pc-powered-by-ubuntu-or-windows-505250.shtml>

THE XPS 13 DE: DELL CONTINUES TO BUILD A RELIABLE LINUX LINEAGE

Dell's Project Sputnik has been dedicating resources to creating a "just works" experience for Dell Ultrabooks running Ubuntu for nearly four years now. Lead developer Barton George, who leads the effort, and other developers have been writing code where necessary (and contributing that code back upstream) and refining the user experience to a point where everything does indeed just work.

The original Dell XPS 13 Developer Edition had a few rough edges. Since that first device, I sat on the sidelines watching as George and Dell polished off those rough edges and tweaked the hardware options to better meet the needs of developers. Over time, the team expanded the available RAM to 16GB, added a matte screen option (albeit only on the low-end model), and slimmed the dimensions down considerably.

These changes all converge within the sixth iteration of the XPS 13 Developer Edition. Today, this might be the best supported Linux ultrabook on the market. Actually, it might still be one of the only officially supported Linux

ultrabooks on the market.

Source:

<http://arstechnica.com/gadgets/2016/06/the-xps-13-de-dell-continues-to-build-a-reliable-linux-lineage/>

ENTROWARE RELEASES POWERFUL LINUX GAMING LAPTOP WITH UBUNTU OR UBUNTU MATE 16.04

Athena, Entroware's first 17-inch Linux gaming laptop that comes with either the Ubuntu 16.04 LTS (Xenial Xerus) with the modern Unity interface or Ubuntu MATE 16.04 LTS for those who want a more customizable and lightweight desktop environment on their already high-performance workstation.

Entroware Athena is a high-performance gaming laptop. Why? Because it ships with either a Nvidia GTX 970M graphics card with 6GB RAM or an Nvidia GTX 980M GPU with no less than 8GB RAM, but you'll have to pay an extra 250 pounds (€316) for that.

Taking a look under the hood of Entroware Athena, you can notice that the laptop can be powered by either an Intel Core i7-6700HQ or Intel Core i7-6820HK processor, up to 64GB DDR4 2133MHz RAM, up to 2TB Samsung EVO SSD, up to four internal storage drives, Intel AC-8260 Wi-Fi and Bluetooth, as well as Gigabit Ethernet. The price starts from £1,099.00 (€1390 or \$1560) and it can go up to £3,078.92.

Source:

<http://news.softpedia.com/news/entroware-releases-powerful-linux-gaming-laptop-with-ubuntu-or-ubuntu-mate-16-04-505339.shtml>

ANDROID APPS AND GAMES HAVE LANDED ON THE FIRST CHROME OS DEVICE

As promised by Google last month, Android apps and games have begun to arrive on Chrome OS. The first device to get them is the Asus Chromebook Flip, and according to Google's François Beaufort "more devices will follow very soon."

Flip owners who want to access Android apps will have to update the device to run the developer channel of Chrome OS, with the latest version delivering the Play Store to the desktop. The Acer Chromebook R11, C738T, and the 2015 Chromebook Pixel are also scheduled to get access to the Play Store this month.

In our early hands-on with Android apps on a Chromebook we thought the software's integration was impressive. The apps run natively, appear as regular windowed programs, and as most Android applications are designed with smartphones in mind, they should run well on even low-end Chromebooks.

Source:

<http://www.theverge.com/circuitbreaker/2016/6/17/11962472/android-apps-chromebook-compatible-devices>

ANDROID N WILL MAKE LIFE HARDER FOR MOBILE RANSOMWARE AND BANKING TROJANS

Google debuted Android N last month at the Google I/O conference, but there were so many new things announced at the event that some of Android's security enhancements fell through the cracks. Almost a month later, let's take a look at what Google introduced in terms of new security features for Android N.

First and foremost, Verified Boot is now strictly enforced. While on Android Marshmallow your phone only warned you when something tampered with the boot code, on Android N your phone will refuse to start, and that's that.

Hardware-backed keystores will be mandatory as well. Google previously allowed developers the option to store encryption keys in TrustZone, a secure area of the Android kernel. Starting with Android N, the TrustZone will be the only area where you can store encryption keys.

To prevent developers from using weak encryption that can be easily brute-forced, Android devs deprecated the Crypto provider as well.

Source:

<http://news.softpedia.com/news/android-n-will-make-life-harder-for-mobile-ransomware-and-banking-trojans-505404.shtml>

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The last few weeks of my life have been dedicated to studying for exams, and because of this, I felt it may be a good time to write an article on free programming resources. These are links and websites I use frequently for checking syntaxes, or searching for commonly used workarounds.

WEB DESIGN

I decided to keep this section separate from Flexbox, since the following links apply to any web design you may do - even if you're still working with floats and clearfixes. If you're looking for sites to do with Flexbox, jump to the next section.

• <http://caniuse.com/> - This is a website dedicated to displaying the support for various properties used in web design (CSS, HTML, SVG, JS, etc). It indicates which browsers support which features, as well as giving notes on workarounds needed in certain browser versions. This can be a handy tool to decide whether or not a feature should be used in a

project.

- <https://github.com/AllThingsSmitty/css-protips> - A GitHub repository dedicated to tips and tricks for CSS, typically dedicated to using little-known features, or new implementations in CSS3.
- <http://codepen.io/> - A sandbox environment website where you can test out ideas, or browse other user's "pens". A terrific resource for being inspired, or for seeing how people have applied creativity to "standard" features. Think of it as being a bit like JSBin, but with showcasing support.

FLEXBOX WORKAROUNDS & BUGS

Since Flexbox is now pretty well supported, it has started being used to avoid the messy float/clearfix systems of older web frameworks. However, because it's pretty young, there can be some bugs that occur in various browsers, or some use cases that may seem difficult to implement. The following two links are my go-

to resource for Flexbox documentation:

- <https://github.com/philipwalton/flexbugs> - the Flexbugs repository on Github is a good collection of known bugs, and possible workarounds. The issues section is very active, and users use it to discuss new bugs, or to document workarounds.
- <https://philipwalton.github.io/solved-by-flexbox/> - Written by the same user as Flexbugs, it is a very nice showcase website, indicating some ways to use Flexbox.

DESIGN (IN GENERAL)

These links are geared towards anyone who creates anything graphical. As colors can be a big factor in any design (and certain considerations must sometimes be taken into account), I frequently use the sites below to test possible color schemes before finalising a design.

- <http://www.colourlovers.com/>,
- <https://www.coleure.com/>,
- <http://www.colorion.co/> - These

are three websites that offer color palette creation. If you're just looking for various shades of a particular color, or more information about a particular shade, I would use the following links.

- <http://www.color-hex.com/>,
- <http://www.colorhexa.com/> - Both these sites aren't intended to create a palette, but do offer vast amounts of information for any shade. Useful for converting to hex from rgb (or vice-versa), as well as for anyone who wishes to take color blindness into account.

PROGRAMMING (IN GENERAL)

For anyone who is a programmer, and is looking for accessible documentation, or resources for learning, this is the section for you!

- <http://devdocs.io/> - A terrific web app offering documentation for a huge selection of languages. It offers an offline mode, where you can save your documentation for viewing, even if you don't have

web access. It is a terrific way to have documentation with you when on the go.

- <http://news.softpedia.com/news/ubuntu-touch-s-web-browser-to-improve-the-google-hangouts-experience-in-ota-11-504658.shtml>

- PacktPub is a publishing house for technical books. I highly recommend their newsletter for finding out about deals. However, for anyone looking for free resources, they also offer one free ebook per day. It's a curated list (so no picking your own), but some months they'll choose a theme (i.e. Python web development), and release books on that topic. All you require is an account (which is free). After that, you can view and read your books on practically any device I know of.

CHEATSHEETS

These are links to single pages of documentation, intended to be an "at a glance" representation of the most frequently used commands.

- <https://github.com/wsargent/docker-cheat-sheet> - A cheat sheet for Docker. If you can't quite

remember the exact name of the command, this may be a good spot to look.

- <http://docs.emmet.io/cheat-sheet/> - For anyone who uses Emmet to make their web programming life easier, this is the official cheat sheet.

LEARNING & PRACTICING

These links are for online courses or tools to practice (and learn) programming languages. If a site offers only some free courses, it will be noted in the description.

- <https://www.codecademy.com/> - This site offers some free courses (sometimes just intro lessons, sometimes an entire path). They have a terrific in-browser IDE for working through the courses. Also, once or twice a year, they will open up all courses for 48 hours, giving you an opportunity to learn whatever you'd like.

- <http://exercism.io/> - A free website/CLI tool that offers a series of programming challenges in various languages. They supply the tests that your code must pass in order to "succeed" at the given task. It also offers peer review. A terrific way to get comfortable in a new language. I'm not sure if you

could approach this without any knowledge of the language you want to learn, but even rudimentary experience should be sufficient to get started.

- <http://ureddit.com/> - University of Reddit. Offers a wide variety of courses.

- <https://www.coursebuffet.com/> - Course Buffet offers a catalog of free courses found across the web (offered by universities).

Depending on what it is you want to learn, you may have some luck here.

- <https://www.skillshare.com/> - This site offers small bite-sized lessons on a variety of topics. Free users have a smaller catalog to choose from, and have no teacher support or offline access.

- <https://www.khanacademy.org/> - Khan Academy offers a wide variety of what I would class as "typical" subjects - math, computer sciences, and so forth. While not necessarily as focused as some courses on this list, it's still a great resource depending on what you'd like to learn. It's completely free, and the courses I've tried have been quite well done.

- <https://www.udacity.com> - Udacity works in partnership with large companies (such as Google and Facebook) to offer what they

call Nanodegrees. These Nanodegrees are paid courses. However, they do have free courses available as well (filter the catalog by Free Courses). These do not result in certificates or degrees. Overall, the website works well, and I have completed a few free courses created by Google. For a little more info on the Nanodegrees, jump to the next section.

BONUS SECTION

This section contains a few paid course sites, and some free courses geared towards language learning.

- <http://www.memrise.com/> - (Language) This is a website geared towards learning a language by repetition. They have a large assortment of options.

- <https://www.duolingo.com/> - (Language) A free site for learning a limited selection of languages (things like Spanish, French, Italian, etc). I don't know how frequently new languages are added (if at all), but it may be worth a browse.

- <https://www.udacity.com> - (Courses) If you're looking for a paid courses for specific skills, you may have success finding one here.



They also offer a Nanodegree Plus option (job guarantee within 6 months, or 100% refund on the course costs). I'm not sure about the availability of those offerings internationally.

- <https://www.udemy.com> - (Courses) A massive catalog of courses ranging from hacking to instrumental master classes. They currently offer some free courses as well. However, they frequently discount the paid courses down to \$10-20. As of April this year, all courses have been reduced in price to sit between \$20 and \$50 (standard pricing), so I'm not sure if the discounts will be as frequent as previously.

I hope this list of resources will benefit at least a few readers. If you think I've missed something, feel free to let me know via email! I'm also happy to hear about any success stories (or issues) you've had with any of the items on this list. As always, I can be reached at lswest34+fc@gmail.com.



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



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

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

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

podcast.ubuntu-uk.org



EXTRA! EXTRA! READ ALL ABOUT IT!

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

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

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

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



HOW-TO

Written by Greg D. Walters

Python In The Real World - Pt 67

This month, we will be using my current favorite temperature sensor; the Dallas Semiconductor DS18B20 One Wire sensor. It looks like a 'normal' transistor, but is a very accurate sensor, much more so than the DHT11 that we used last month. It doesn't do humidity, but for temperature readings, it's a very good and inexpensive device. All data requests and output are sent on a single pin. It has an operating range from -55°C to 125°C (-67°F to 257°F) and should be able to run about 3 metres (9.8 feet). It also has a parasitic mode that allows power to be derived from the data line.

The data sheet can be found at <https://datasheets.maximintegrated.com/en/ds/DS18B20.pdf>. Here is what one sort of looks like...

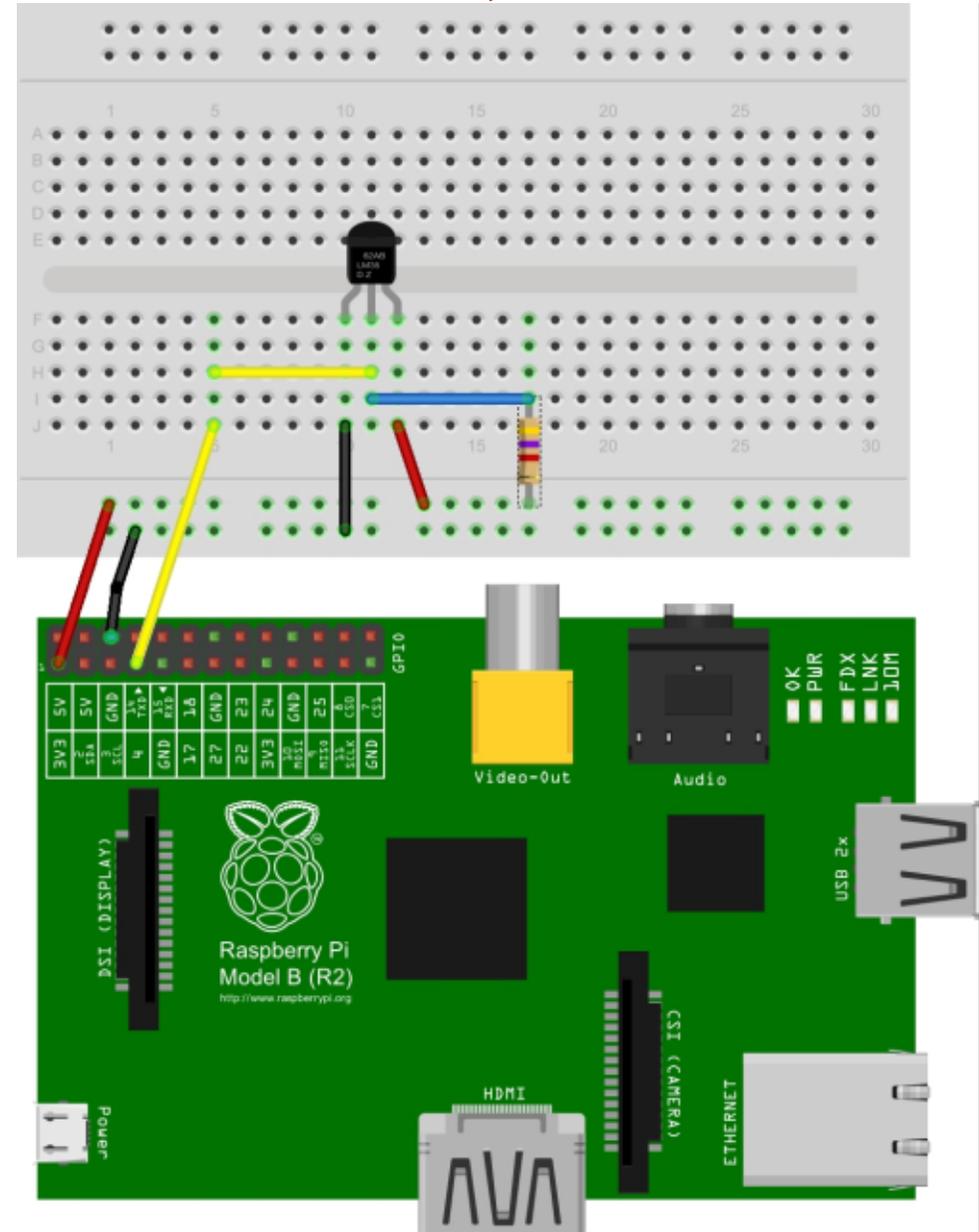


Wiring a single sensor is very easy. Shown right is the diagram.

There are only three connections to the RPi. Ground (sensor pin 1) to RPi pin 6, 3.3v (sensor pin 3) to RPi pin 1, and data (sensor pin 2) to RPi pin 7 (GPIO 4). You need to put a 4.7k resistor between sensor pins 2 and 3 (data and +Voltage). That's it. If you wish to add more sensors to the project, simply connect them ground to ground, +voltage to +voltage and pin 2 to pin 2 of the "main" sensor. No additional resistors should be needed for a reasonable line length. Next page, right-hand side, is an example of a three sensor project.

THE CODE

One thing you have to do is tell the operating system you want to use kernel support for one-wire devices. If you are using Raspbian Jessie, this is done in raspi-config. If you are using another OS, then you must add the following line to the /boot/config.txt file.



fritzing

```
dtoverlay=w1-gpio
```

The following two commands load the 1-Wire and thermometer drivers on GPIO 4.

```
sudo modprobe w1-gpio
```

```
sudo modprobe w1-therm
```

We then need to change directory `cd` to our 1-Wire device folder and list `ls` the devices in order to ensure that our thermometer has loaded correctly.

```
cd /sys/bus/w1/devices/
```

```
ls
```

In the device drivers, your sensor should be listed as a series of numbers and letters. In this case, the device is registered as `28-000005e2fdc3`. You then need to access the sensor with the `cd` command, replacing our serial number with your own.

```
cd 28-000005e2fdc3
```

The sensor periodically writes to the `w1_slave` file, so we simply use the `cat` command to read it.

```
cat w1_slave
```

This yields the following two

lines of text, with the output `t=` showing the temperature in degrees Celsius. A decimal point should be placed before the ending three digits, e.g. the temperature reading we've received is 23.125 degrees Celsius.

```
72 01 4b 46 7f ff 0e 10 57 :  
crc=57 YES
```

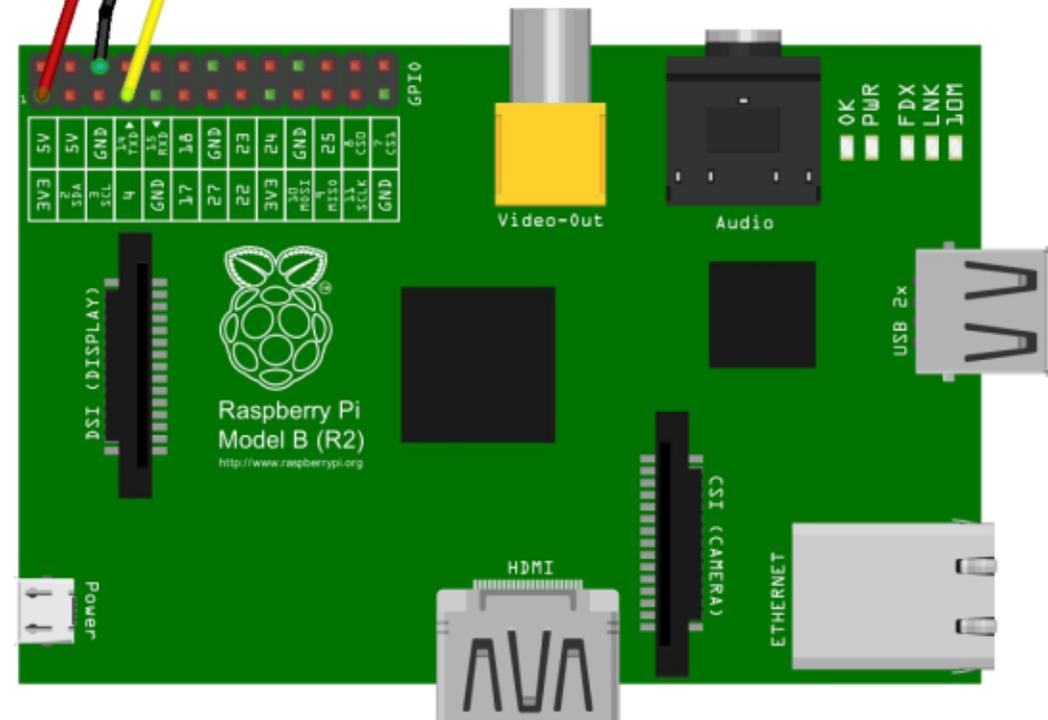
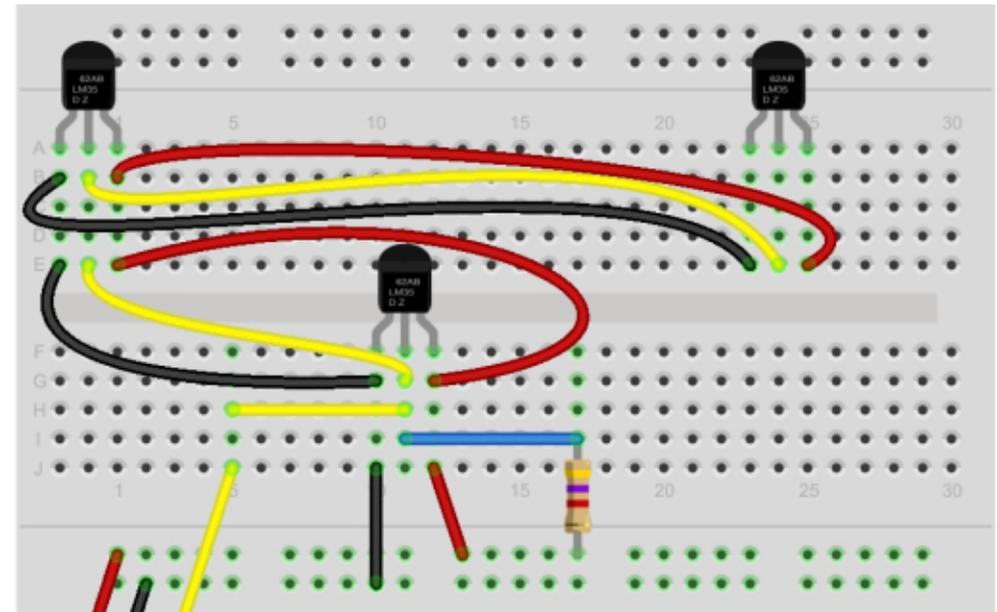
```
72 01 4b 46 7f ff 0e 10 57  
t=23125
```

Next page, top right, is how we had to do it in the "old days", the library that we will actually use.

Timo Furrer has provided a wonderful library for us to use on the RPi written in pure Python. You can get it at <https://github.com/timofurrer/w1thermsensor>. The current version is 0.3.1 and is also available through `pypi`.

The beauty of this library is that it takes almost all the work out of dealing with the sensors and allows you to just concentrate on your code.

Next page, bottom right, is the "current day" code using Timo's library...



There are actually only 7 lines of code needed here. Those lines that are commented out are so you can see the other ways to get and print the data in various temperature units (celsius and kelvin).

As I mentioned above, you can have more than one sensor on the same data line. So here is the code to make a single call to get the temp readings from all sensors in the system...

```
from w1thermsensor import
W1ThermSensor

for sensor in
W1ThermSensor.get_available_s
ensors():

    print("Sensor %s has
temperature %.2f" %
(sensor.id,
sensor.get_temperature()))
```

Of course, you'll want to do more than one data pull, so use the code above to modify it the way you want.

If you would like to make a call to a particular sensor, you can use this code as a baseline.

```
from w1thermsensor import
W1ThermSensor

sensor =
```

```
W1ThermSensor(W1ThermSensor.T
HERM_SENSOR_DS18B20, "28-
000007444532")

temperature_in_celsius =
sensor.get_temperature()
```

So, you can see, by using Timo's library, we can basically go from 27 lines of code to 3 (for a single call). That's wonderful.

I wanted to show you how to use a 16x2 LCD display with this, but I think I'll leave room for the other authors and we'll push that part out to next month. Don't lose your project hardware, we'll use it next month.

Until then, enjoy checking out the temperatures around your office/abode.

```
from w1thermsensor import W1ThermSensor
from time import sleep
sensor = W1ThermSensor()
while 1:
    # temp_in_celsius = sensor.get_temperature()
    temp_in_fahrenheit = sensor.get_temperature(W1ThermSensor.DEGREES_F)
    # temp_in_all_units = sensor.get_temperatures([W1ThermSensor.DEGREES_C, _
W1ThermSensor.DEGREES_F, W1ThermSensor.KELVIN])
    print temp_in_fahrenheit
    # print temp_in_celsius
    # print temp_in_all_units
    sleep(3)
```

```
import os
import glob
import time
os.system('modprobe w1-gpio')
os.system('modprobe w1-therm')
base_dir = '/sys/bus/w1/devices/'
device_folder = glob.glob(base_dir + '28*')[0]
device_file = device_folder + '/w1_slave'

def read_temp_raw():
    f = open(device_file, 'r')
    lines = f.readlines()
    f.close()
    return lines

def read_temp():
    lines = read_temp_raw()
    while lines[0].strip()[-3:] != 'YES':
        time.sleep(0.2)
        lines = read_temp_raw()
    equals_pos = lines[1].find('t=')
    if equals_pos != -1:
        temp_string = lines[1][equals_pos+2:]
        temp_c = float(temp_string) / 1000.0
        temp_f = temp_c * 9.0 / 5.0 + 32.0
        return temp_c, temp_f

while True:
    print(read_temp())
    time.sleep(1)
```



HOW-TO

Written by Alan Ward

Install Ubuntu With Clonezilla & VirtualBox

Virtual execution environments such as Virtualbox, VMWare and others have long been a boon for users who wish to try out a new GNU/Linux distribution. Not everybody has a spare machine lying around that can be used as a testbed. Even for those who do, the test computer may already be taken up by another project. One possible strategy could be the creation of various partitions that share a single computer's hard drive. But this approach also has its dangers, especially when testing distributions that one does not know well yet: not all installers

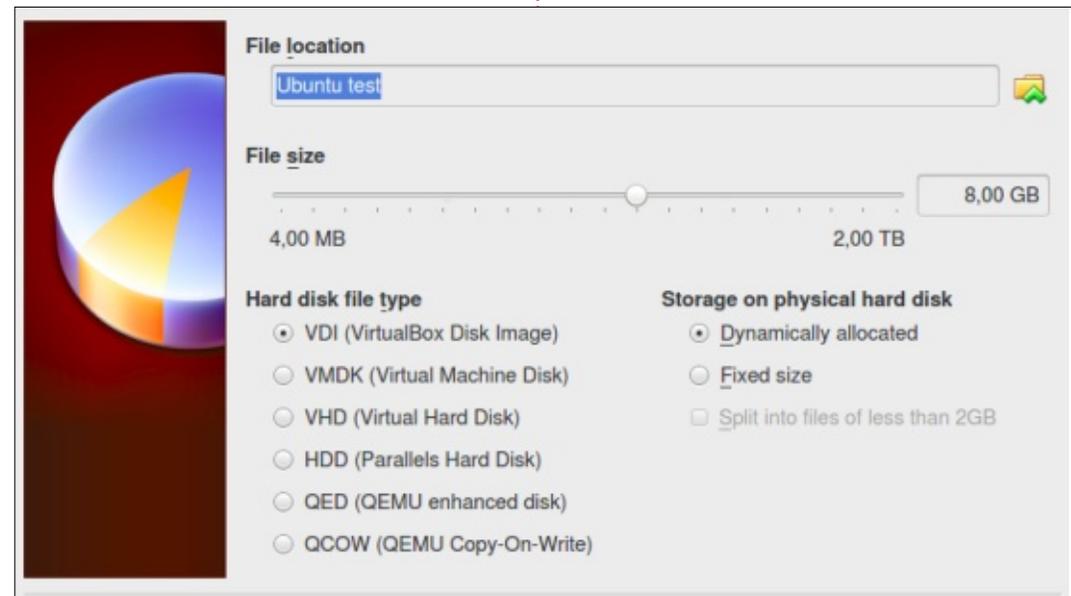
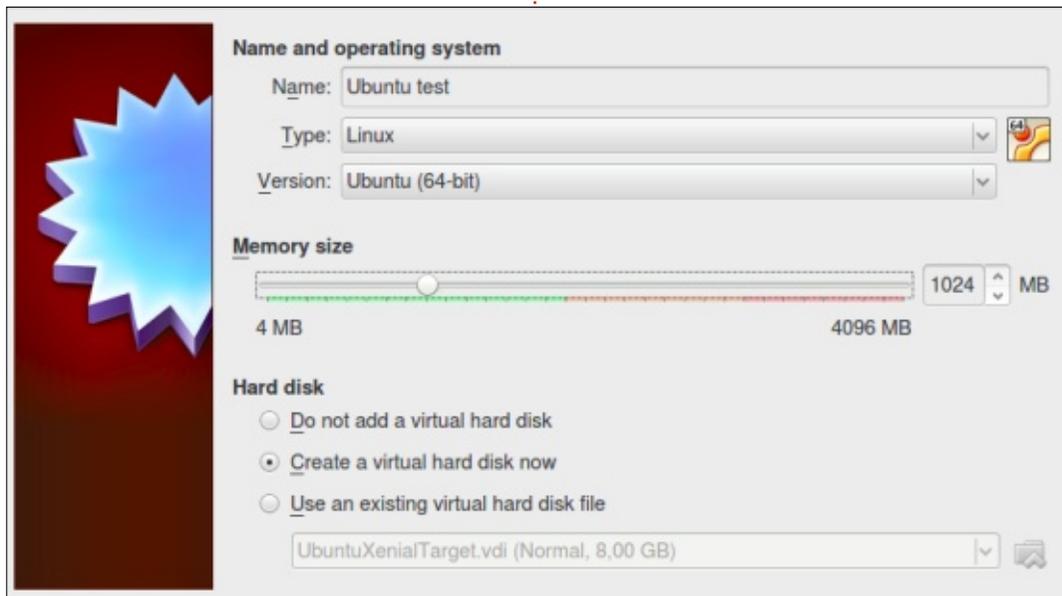
work in the same way, and accidents do happen. When they do, partitions may be deleted, reformatted, or the system rendered inoperative due to a borked boot-loader. In a virtual environment, on the other hand, an installation that goes wrong will have no effect on the computer's host operating system. At worst, the virtual machine is deleted along with all its files, and the cost in terms of the owner's time and effort is minimal.

However, once a distribution has been successfully installed and

we find that we actually like it, it begs the question of how to transfer the resulting system to an actual computer. Going once more through the complete installation process on the physical hardware seems a waste of time, and perhaps also of bandwidth – if new software packages have already been downloaded once to update the virtual machine. It would perhaps be more logical to somehow transfer the contents of the virtual machine's hard drive to the actual computer. This article explores one way of doing this - a way that does not require a degree

in computer systems administration to carry out.

I will be using Virtualbox as a virtual machine, both because it is already in the Ubuntu repositories and because it actually works quite well. On the client side, I will be using Ubuntu 16.04 for the amd64 architecture. Since most computers sold in the last several years now have 64-bit architectures, to my mind there remain few reasons to choose the 32-bit ("i386") versions of Ubuntu - although there will be a caveat on this aspect later on. For now, let us



HOWTO - CLONEZILLA & VIRTUALBOX

set up a new 64-bit virtual machine within Virtualbox. 1 GByte of RAM is about as low as one can go to install Xenial, so that is the amount we will specify for the virtual machine. Needless to say, our host computer will need to have at the very least 2 GBytes of physical RAM, one to give to the virtual machine, and another for its own needs.

As for the hard drive, Virtualbox suggests creating an 8 GByte volume, based on the name of the distribution to be installed. This virtual hard drive will, in fact, be contained within a single file on the host system. Since the file is a sparse hard drive, only sectors that actually contain data will be recorded, so the file itself will take up rather less space than the full 8

GBytes given. As a reference, a recent Ubuntu freshly installed should use between 4 and 5 GBytes.

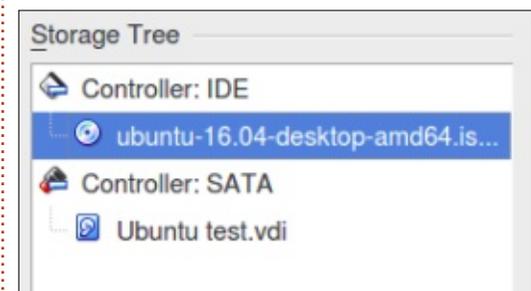
Now, for the caveat on 64-bit versus 32-bit systems. I am executing this virtual machine on a physical computer with a processor that has the VT-x technology included in its CPU (an Intel Core i5). This is needed in order to execute a 64-bit virtual computer. On a physical computer with just about any of the current low-cost CPUs - such as the Atom or Centrino - the required technology is not available within the processor, and 64-bit virtual machines cannot be executed. In this case, simulating a 32-bit system may be a viable alternative, especially if the end target is to set

up a lower-end computer. Simply specify an Ubuntu 32-bit system when setting up Virtualbox, and use an ISO image with the i386 architecture suffix.

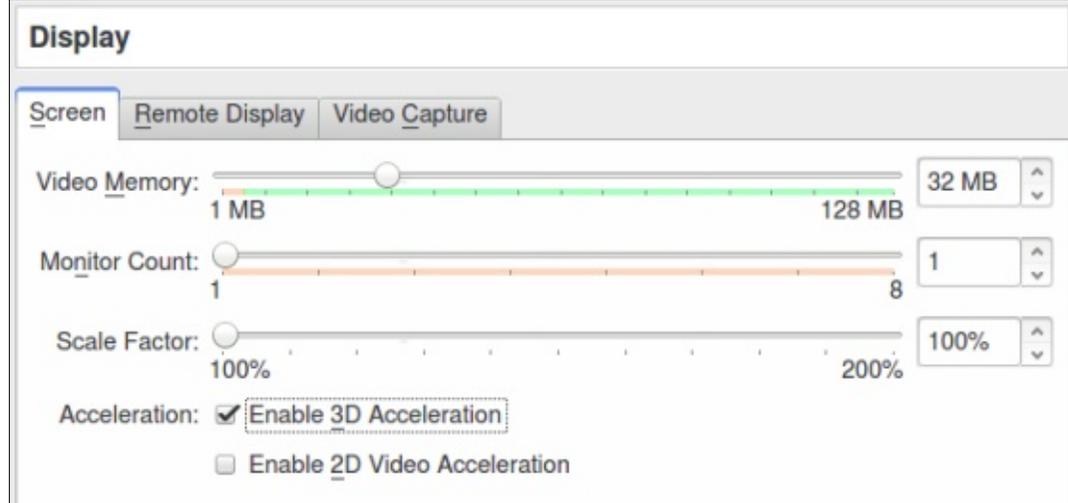
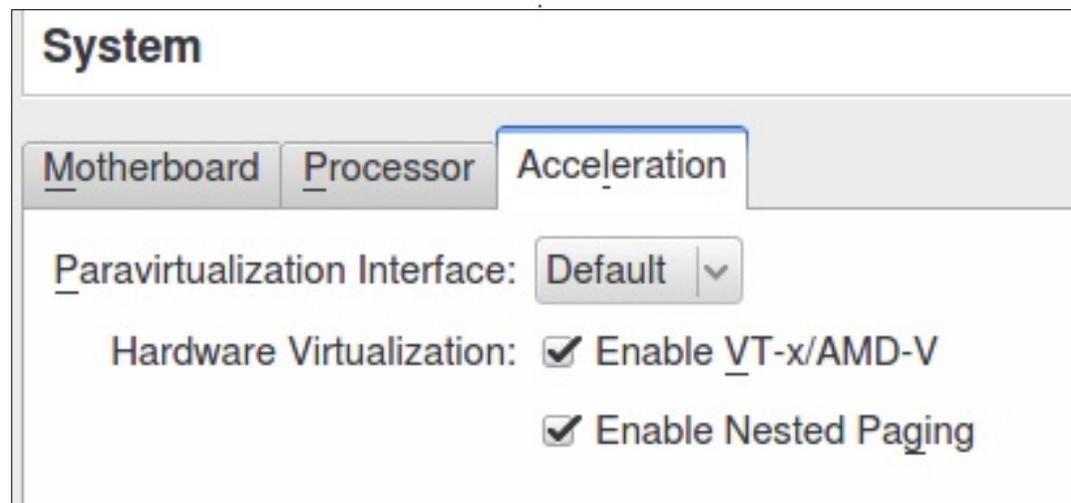
Another point that may be useful when setting up the virtual machine is to tell Virtualbox to use 3D acceleration techniques; in essence, we are telling it to emulate a relatively modern GPU, instead of a basic model. This is because I am setting up a desktop system. If, on the other hand, one was to set up a server system that will not need a graphical interface, this step can be omitted.

At this point, we have a working virtual machine set up. To install Ubuntu, we will just need to connect the boot ISO image as a

virtual CD-ROM unit. I tend to use the default settings - which is to emulate an IDE unit. Setting the CD reader up as a SATA unit is certainly possible, but gives no benefit in terms of speed - since this is all a virtual environment that depends only on the speed of the underlying host computer.



We can now boot the virtual machine, and if all goes well, we should get the Live CD running within a new window. It can be useful to observe the status bar at

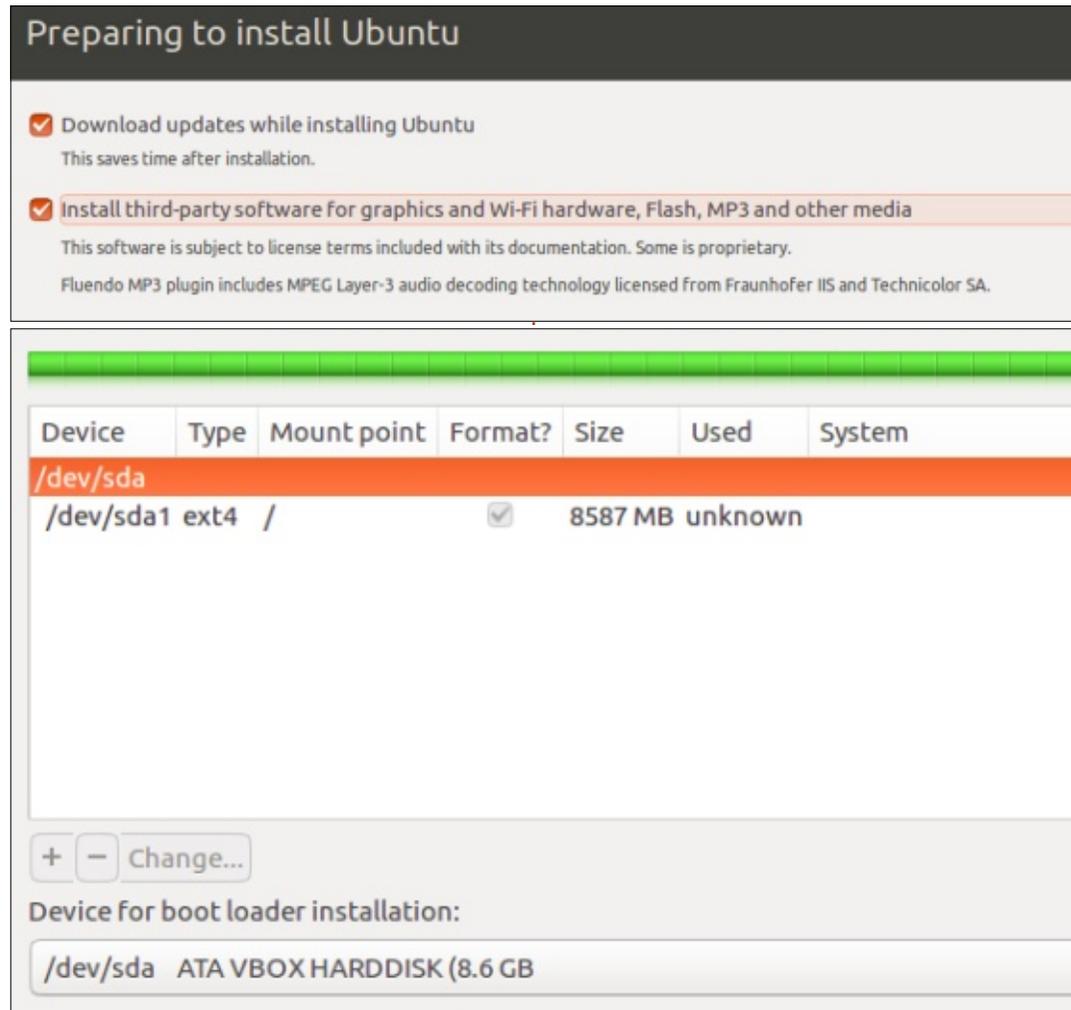
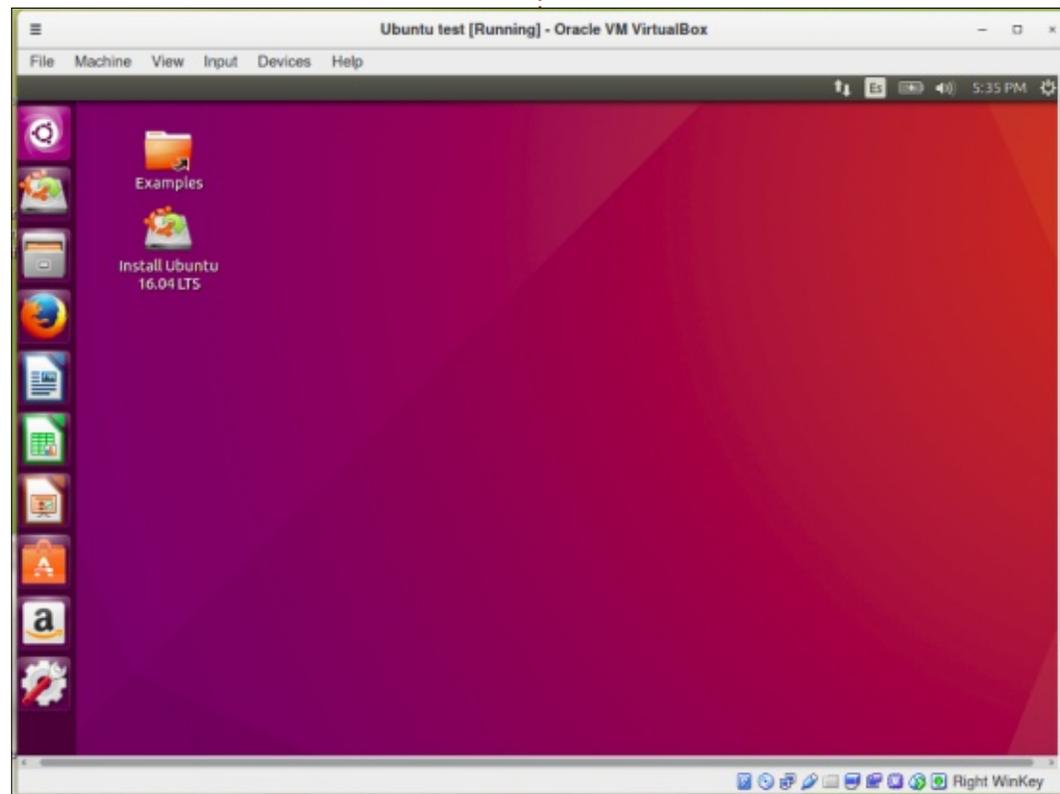


HOWTO - CLONEZILLA & VIRTUALBOX

the bottom, which allows us to monitor the presence of disk and network activity.

Testing the new distribution, and installation on to the virtual hard drive, take place as usual. In this case, we will be installing it onto the virtual drive. The Installer application works as usual, within the virtual machine's window. We will tell the installer to update the new system during installation, so we end up with an up-to-date state that can then be replicated on the target system.

The 8 GByte hard drive will be sufficient for our needs. A single ext4 partition will be used for this example, though more complex layouts with separate /home and swap partitions may certainly be envisioned. The virtual drive is detected by the Ubuntu installer as "VBOX HARDDISK", with the correct size. The small discrepancy is due to the use of 8 GBytes on the Virtualbox size (8 times 2^{30} bytes), while the Ubuntu installer sees the same amount of bytes as 8.6 GBytes (8.6 times 10^9 bytes).



The installation process is identical to that seen on a physical machine. We will see some network activity while the updated packages are pulled down from the repositories. The virtual machine is seamlessly using the host computer's network connection, through a small virtual router set up within Virtualbox.

Once installed, the new system can be rebooted, and configured to taste. We will be going for a colder look, and less icons cluttering up the Unity dock. Though I do like to set up multiple desktops.

We now have a useful system populating our virtual machine.

HOWTO - CLONEZILLA & VIRTUALBOX

This is what we try out and tweak to our tastes. Once we are satisfied with the result, we need to find a way to clone it into our target computer. Several options are available to do this. For instance, we can take the VDI file of our virtual hard drive, and decompress it into a directory. The files would then need to be transferred to the target computer over some type of network connection. But, since we will need to do the network connection in any case, it may be less complex to



directly use a network-oriented tool to make a copy of the virtual system. This is where Clonezilla comes in.

Clonezilla is a Live CD build upon either a version of Debian or of Ubuntu, by the National Center for High Performance Computing in Taiwan. It allows us to boot up the system to be cloned and then make a copy or image of its hard drive. In this case, we will be working on our virtual machine, but a clone of a physical computer can also easily be made. Once the image has been made and stored on a network server, the target computer can also be booted up from Clonezilla, and the image “restored” to the target hard drive, in essence making an identical clone of one computer onto the other. I downloaded the “alternative stable” version of Clonezilla, based on Ubuntu Wily, from the project web page <http://clonezilla.org/downloads.php>. This is a relatively small (235 MByte) download, since it contains

only the base system and the actual Clonezilla software that works without a need for a graphical environment.

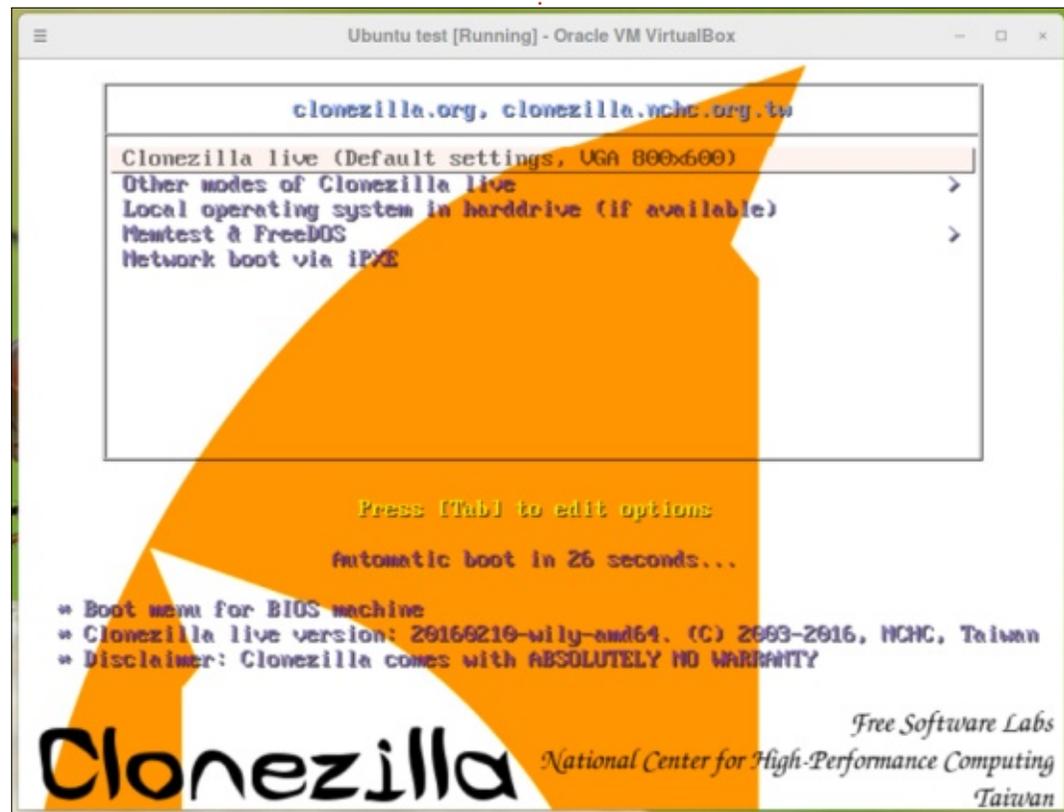
We will now halt our new virtual machine, connect the Clonezilla ISO file as the CD unit, and reboot. The GRUB interface is perhaps not as polished as Ubuntu’s, but it is functional.

We will be storing our cloned image file on a network server. Perhaps the easiest option is to set up SSH on one of our computers, for example on the very same physical host on which the virtual machine is running. This SSH service allows one not only to access the computer from within a terminal across the network, but also to transfer files to and from our hard drive. If there is not yet an SSH server running on our host machine, OpenSSH can easily be installed from the repositories using a single command:

```
sudo apt-get install openssh-server
```

The server will be installed and started up immediately.

We can now get back to



HOWTO - CLONEZILLA & VIRTUALBOX

Clonezilla, and configure our host's SSH service as the location of our cloned images. As you can see, if you prefer another type of disk-sharing service, this is also available. For instance, an existing Windows share can be accessed through SAMBA.

The virtual machine is connected to its host using a NAT virtual connection. The host computer is seen from the virtual machine through private IP address 10.0.2.2, while the virtual machine uses address 10.0.2.15. Clonezilla has seen this and

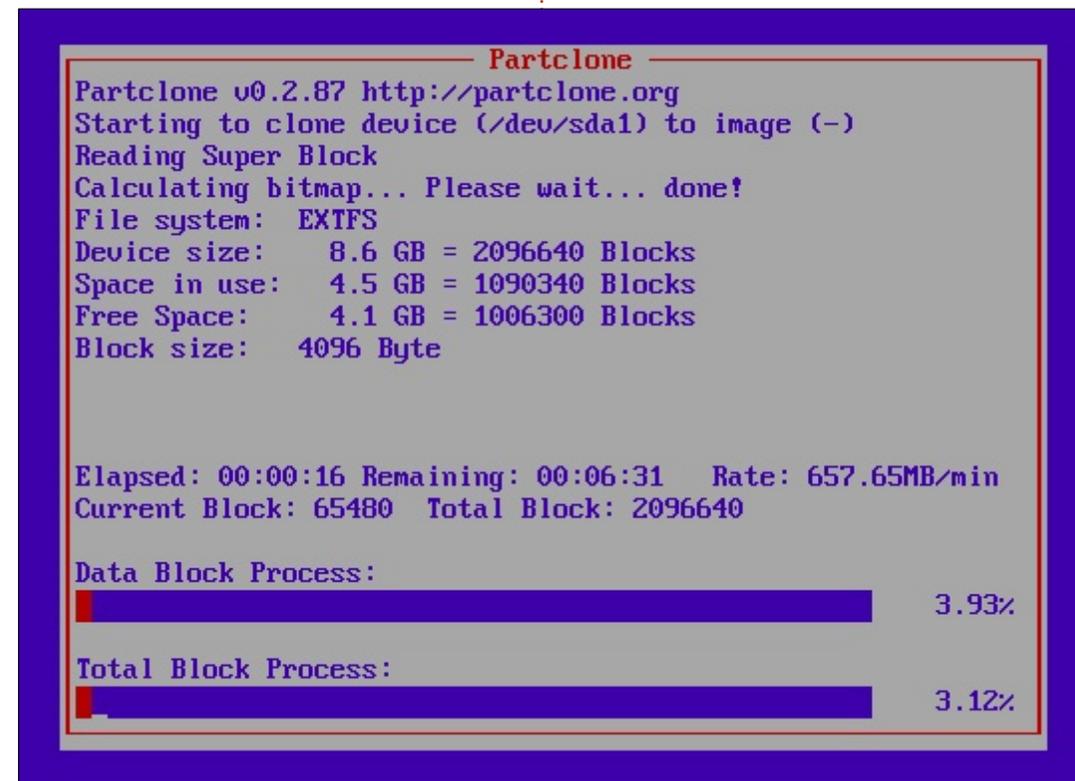
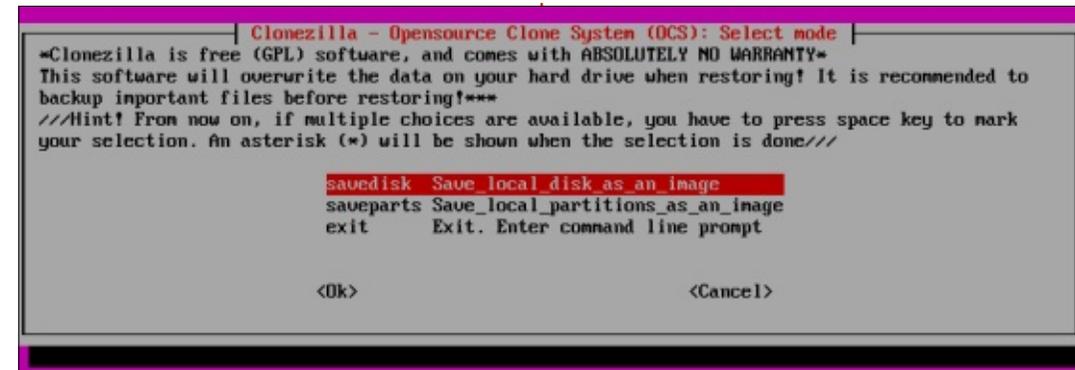
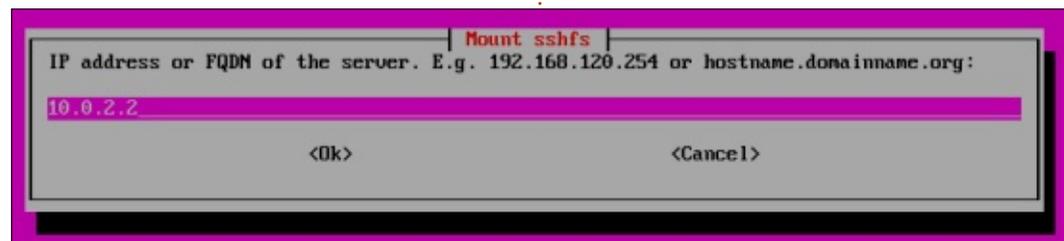
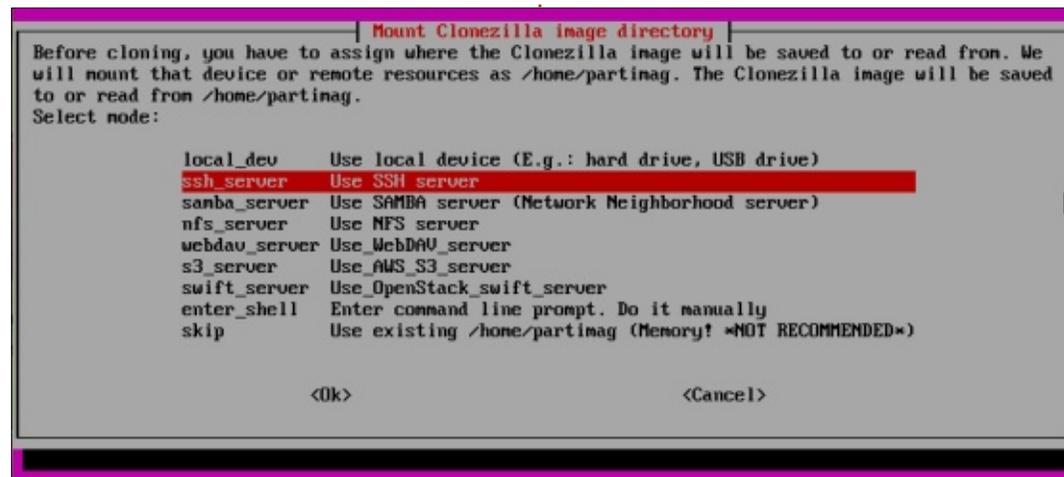
proposes the host's address as default for the SSH server.

When creating the SSH connection, a normal user on the SSH server can be used. A directory that exists and that the user can write to must be specified, for example a subdirectory within their home directory.

We now get to the business part of Clonezilla. We choose to create a new image from our virtualbox hard drive. The easiest option is to choose the complete unit as a basis for the copy. If

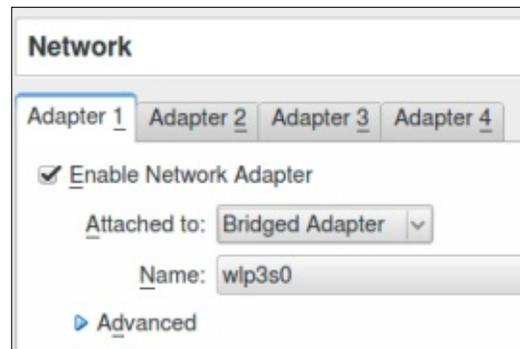
desired, each individual partition can be cloned, although the process is more difficult and should be reserved for more complex installation layouts.

This is about it. Now Clonezilla accesses the host drive through SSH, and creates and verifies the disk image. It may not really be necessary to verify the image; if the verification stage is omitted,



quite some time can be saved.

As a side-note, the cloning process may be found to be rather slow. This is mostly due to the virtual network connection from Virtualbox. One way of making the cloning process a tad faster is by configuring our virtual machine to use a "Bridged Adapter" connection, instead of the default "NAT" connection. However, in this case the user must determine the host (server's) IP address, for instance with the `ifconfig` command.



Making a clone from a physical computer is generally much faster, as is restoring to our target (physical) computer. This is the next - and final - phase of the process. The target computer must be booted from Clonezilla, so a physical CD must be prepared, or the ISO file written to a USB stick

in the usual manner. Once the target computer is up and running Clonezilla, the steps are the very same used to create the image. The only differences are:

Configure Clonezilla to use the local network IP address of the SSH server, which will usually be something similar to 192.168.0.102 or 192.168.1.103.

Instead of running the `savdisk` command, we will use `restoredisk`.

Clonezilla will connect to the SSH server specified, and show a list of the saved images found on that server. We will simply choose the image required, and then the local hard drive to write it to.

Once the image has been copied over, Clonezilla knows that a bootloader is required to make the new system bootable. It knows about GRUB 2 used in Ubuntu systems, and can detect and install

```
Running: ocs-install-grub -p "sda1" auto
Found grub partition: /dev/sda1
Found grub partition "/dev/sda1", which is on the restored partitions list (sda1). Will run grub-ins
tall later.
Found boot loader grub in the MBR of disk /dev/sda.
Found grub 2 installed in the restored OS.
Test if we can chroot the restored OS partition /dev/sda1...
Yes, we are able to chroot the restored OS partition /dev/sda1.
Trying to use the grub2 in the restored OS...
Running: run_grub2_from_restored_os "/dev/sda1" "/dev/sda1" "/dev/sda"
Re-installing grub2 on disk/partition /dev/sda with grub2 dir in partition /dev/sda1 and root partit
ion /dev/sda1...
Installing for i386-pc platform.
Installation finished. No error reported.
```

the bootloader without any further ado.

The new computer can then be stopped, the Clonezilla medium removed, and the computer rebooted. If all goes well, the system should come up and be indistinguishable from the way the virtual machine was set up.

Now, for some final notes.

In this article, I made a clone of a single partition that took up the complete virtual hard drive. Since most physical computers will have a hard drive with more than 8 GBytes of capacity, the clone will end up with a first partition (`/dev/sda1`) of this size, leaving a large part of the hard drive free for other uses.

This space can be reclaimed through several strategies. One could extend `/dev/sda1` to take up more space. It would, in fact, be

preferable if more or larger programs will need to be installed in our new system. This can be done using the `gnome-disks` - though the partition will need to be unmounted before resizing, which means the target computer must be booted from a Live CD or similar to perform this task. Alternatively, command-line tools such as `resize2fs` can also do the job, but do require familiarity with command-line system administration and may be outside of many users' comfort zone.

If a larger root partition is not required for the new system itself, an alternative approach would be to use the free space to set up a second partition and configure that for the `/home` directory. This will be the subject of a further article at a later time.



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In the early days of computers, a company called Digital Equipment Corporation (DEC) created its 32-bit VAX computer using openVMS as its operating system. Because a VAX/VMS computer is so reliable, there are today - after more than 25 years - still a large number of them in use. But, in the end, even these reliable computers will have to be replaced. As described in part 1, you could migrate from VAX/VMS to Linux, as the way Linux works is largely compatible with VAX/VMS. If you use Pascal as your programming language, you will find that Lazarus/Free Pascal is a good replacement. But there are technical functions used in VMS with no apparent replacement in Linux. In this article, I will describe the migration of the network-type database DBMS32.

NETWORK VS RELATIONAL DATABASE

Today you have a choice of different databases, varying from a free MySQL database to the very

expensive Oracle database. But they all have one thing in common: they are relational databases. Relational databases have a lot of advantages, but also a big disadvantage: accessing a large database can take quite some time and it can be unpredictable how long it will take. When you are creating some kind of report, this is acceptable. But in a real-time environment this might lead to disruptions.

Digital Equipment Corporation (today a part of Hewlett-Packard) created on their VAX/VMS computers a different kind of database: a network database called DBMS32. In this case, the word "network" does not refer to a LAN or the Internet, but to the internal organization of the data. The different types of data (records) are not linked to each other through a relation but by a double linked list. Finding the first/next/last member of a set is lightning fast, because you only have to follow the link, instead of reading all records in the database to see if the relation is satisfied.

This is, of course, only true if a set (relation) is defined at database design time. Searching through the database as you would do in a relational database is still possible, but that must be implemented within the application. The advantage of implementation within the application is the control of the flow. If the result of a query is unexpectedly large, there might be problems with allocating memory or with the time it takes when using a relational database. In your application you could specify a limit on the results and abort the action, instead of freezing up or crashing.

Another advantage of the use of linked lists in comparison to relations, is the order of the items in the linked list. This can be organized and changed, just as you wish, whereas, with a relation, you need to define some attribute to specify the order. When you insert or remove an item somewhere in the middle, the order attribute of ALL following items has to be changed, which is time consuming. In DBMS32 you can also use more

than one list with the same set definition, so an item can be assigned to one or the other list or to none at all (but not to two or more lists).

To create a network database, you must create a database definition and run a database generation program. This database definition cannot be changed at run time as with a relational database (define table as...). This makes a network database inflexible, but when you create a set of programs with a dedicated task (for example, to control a manufacturing machine), speed is more important than flexibility.

Another advantage of using a database definition is the possibility of recreating the database in case of corruption (do you remember every change you made to your relational database before it became unusable?). Making a backup of your database will help, but I have witnessed an attempt to restore a backup, only to find the backup was incomplete or the result also was corrupted.

No fun there.

And what about a planned change to the database? At execution time, the changes must be implemented manually - which takes time - and what if you make a mistake? What if the entire change has to be rolled back? Using DBMS32 you can already change the database definition, create a new database, and at execution time unload the old and load the new database. The same mechanism can be used to go back to the old database definition in case the entire change must be rolled back. This gives you complete version control.

Drawback is that you have to recompile and link all of the programs using the database, as they all have to get aware of the changed layout. But that can be done (and tested!) before the change is executed.

When unloading the database, you get the contents of the database in readable form, in a text file. If your database is very large, this text file is also very large and the unload process will take some time. This may be unacceptable, in which case a

network database is not suited for your task.

Because the unload file is plain text, you can modify the contents of your database using a simple text editor. You can cut a large amount of records connected to one record, and paste it to a different record, in one move. This saved my ass last Christmas!

For the communication with the application, DBMS32 uses shared memory called the User Work Area (UWA). The application fills a part of the UWA with data, and then calls a database request, specifying what is to be done. A program called DATABASE_MANAGER handles the request, taking the data from the UWA, accessing the physical database, and puts the result back in the UWA. In the UWA there is space for exactly one record of every type, so each request to read the database can have only one result.

MY IMPLEMENTATION

DBMS32 was created in the 1980's. Memory and hard-disks were expensive and therefore limited. When you designed a

database using DBMS32, you had to think carefully about the distribution of the data over the available hard-disks. Nowadays, we don't care anymore because disk space is cheap and abundant. Some of the specifications in the original database definition file are therefore obsolete. When you are migrating from a VAX/VMS system to Linux, you do not have to remove these items, because in my implementation they will simply be ignored. No changes to the definition file necessary!

Modern relational databases use TCPIP for the communication between an application and the database. Besides decoupling of application and database, this also makes it possible to put the database on a different server somewhere on the network. Multiple computers could connect at the same time to such a database. For the use of DBMS32 it was not necessary that TCPIP was installed, and only local hard-disks could be used. In my implementation, I decided to keep it so. In DBMS32, you were assigning groups of records to "AREA"s (files) and, for each "AREA", specifying on what disk and directory it resides. In my

implementation, every record gets its own file, and all files reside in the same disk and directory. There is no DATABASE_MANAGER, and every application accesses the record files itself by mapping them into shared memory ("memory mapped files"). Synchronization and locking are handled through the same shared memory. The use of shared memory makes it possible that the operating system controls the assignment of physical memory and how much of the record files are in fact read and loaded in memory. This allows for the use of very large record files without the use of a huge amount of memory and large access times.

Changes to the database are also written to the journal file with a timestamp. When you create a full backup at regular intervals, and incremental backups on a smaller interval (a new journal file is created every time a backup is created), you can restore the database to any point in time on another computer. You would simply copy a set of connected files (full + incremental backup + journal file) to this computer, and restore the database up to time X. This allows for analyzing the data in the database at exactly (within a

HOWTO - MIGRATE FROM VAX/VMS

millisecond) the time a “bad thing happened”.

My clone of DBMS32 consists of four programs. The first is the database generator. It reads the database description and creates all type definitions and database access routines for the applications, plus routines for use by the other programs. The second program is a GUI type of replacement for DBQ, the database query program of DBMS32. It can be used to read - and navigate through - the database without intervening with the production applications and to manage the database. Managing the database includes the creation of the record files for a new (empty) database, (un)loading the database, making a full or incremental backup and restoring a backup. The last two actions are executed using the remaining two programs. Because these programs are run separately, they can also be started from the terminal or by a script, allowing for the aforementioned creation of backups at a regular interval.

CONCLUSION

This is the last part of my series about the migration of VAX/VMS to Linux. Although I talk about the VAX, this article is in fact valid for all computers using OpenVMS, so also for the Alpha. The most important requirement is that your programs are created with Pascal. Because I am going into early retirement, I have a lot of time to assist you if you still have one or more of these “old girls”. Migration to Linux is not only less expensive, the most important advantage is that the result is predictable. No functionality “lost in translation”, no production loss, no hidden bugs (unless already present...) that will hit you at the worst possible moment, and no intrusion from hackers or viruses to stop your production.

I hope you enjoyed reading my series. If you want to know more about VMS, Pascal or DBMS32 (or network databases in general), you can always send me an email: info@theovanoosten.nl.

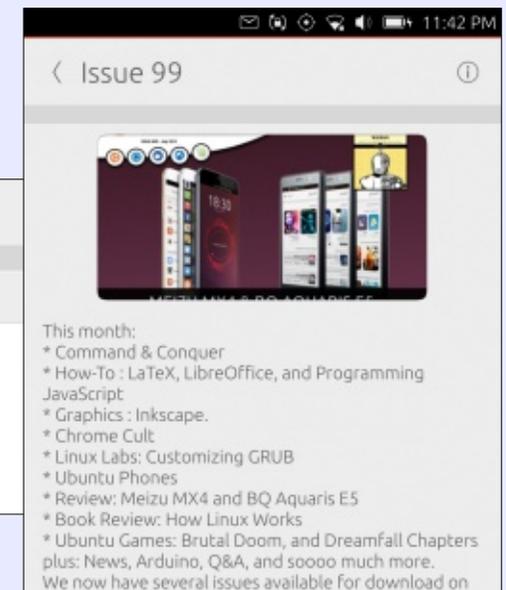
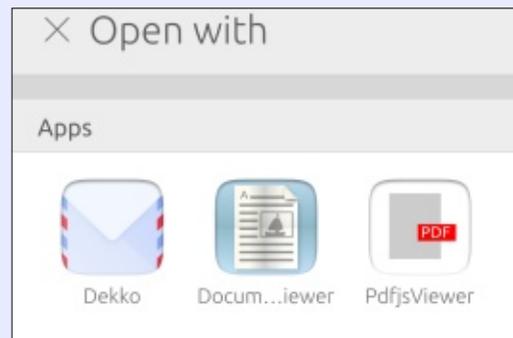
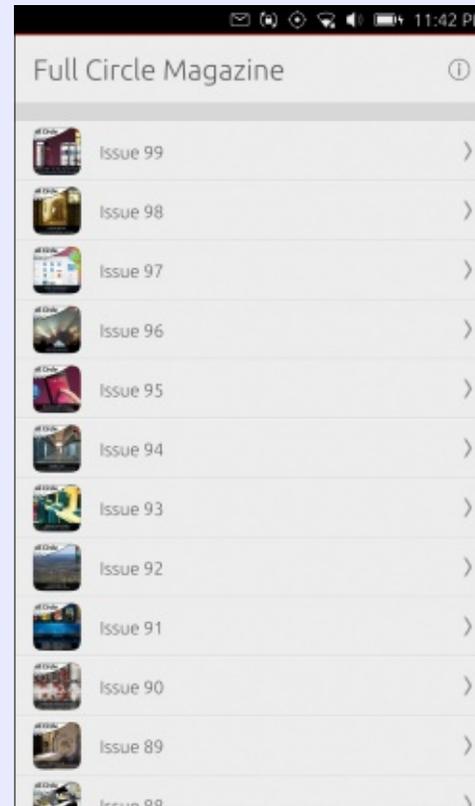
THE OFFICIAL FULL CIRCLE APP FOR UBUNTU TOUCH

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

INSTALL

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

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



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HOW-TO

Written by Mark Crutch

Inkscape - Part 49

First, an apology. Last month I suggested you could get color from a black shadow by using the Fixed Offset column of the Color Matrix filter, and demonstrated using the Source Alpha input. Unfortunately a change was introduced into Inkscape 0.91 which prevents fixed offsets of the color components working on a Source Alpha input (<https://bugs.launchpad.net/inkscape/+bug/897236>). It does work in version 0.48, as well as in Firefox and other SVG renderers. Apologies to anyone who wasted their time trying to follow my instructions on 0.91, and thanks to Moini in the Inkscape Forum for bringing this issue to my attention. Now, on with the show...

Another type of drop shadow effect that you'll see from time to time is the "stacked shadow". This is created by stacking several hard-edged copies of your original object on top of each other, with each of them having a different fill color.

The easy way to create this

effect is just to duplicate your original objects, move them a little, change their fill color, and re-stack them into the correct order. With three objects, the middle one having a white fill and no stroke, it was a matter of moments to produce this:

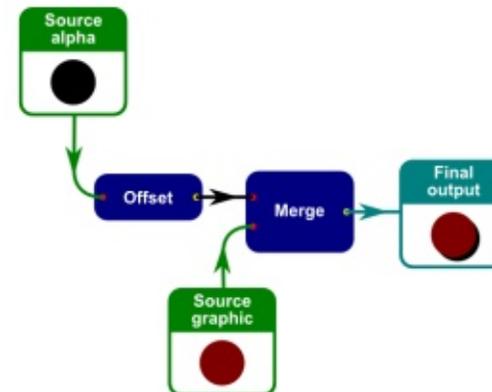
STACKED SHADOW

Not a bad start, but what happens when you need to change the text? You would have to alter it for all three objects which triples your chances of making a mistake. Better to use unset fills with clones (see part 30), which can get you to the same result but with only the parent object to edit in order for your changes to propagate through the whole stack.

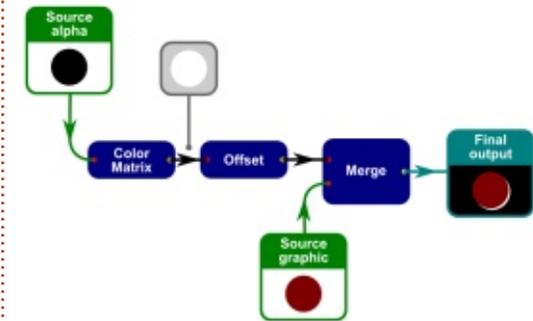
Even with clones, however, you're still working with three objects. Grouping them lets you move or transform them all as one,

but you then have the extra burden of having to enter the group and track down the original object in order to change the text. As you might imagine, filters offer a solution to all these problems.

With the few filter primitives you've learnt in the previous two instalments, you already know enough to create a stacked shadow effect using the fill color at the top, a white copy of the source image below that, and a black copy right at the bottom. It's really just the same as a simple hard-edged drop shadow (from part 48) with a re-colored drop shadow (part 49) sandwiched in the middle. Let's look at it in graph form first, starting with a basic hard-edged black drop shadow:



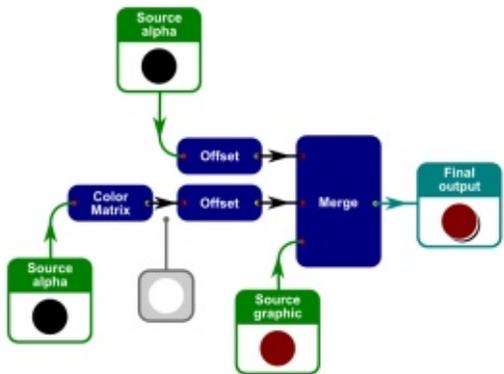
Pretty simple, right? Now let's look at our hard-edged white drop shadow. You'll notice it's essentially the same graph, but with the addition of a Color Matrix primitive to convert the black shadow to a white one (I've used a black background for the final output box, so that the white shadow is visible):



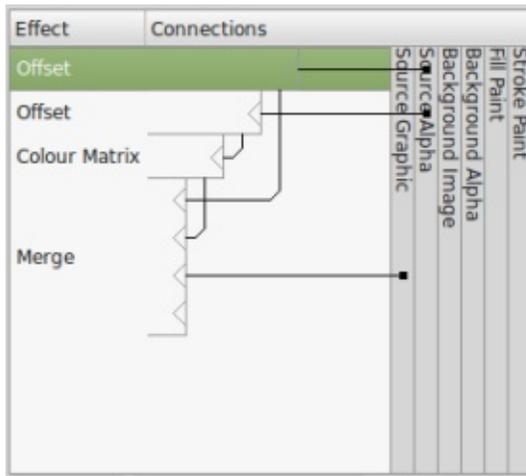
In order to get a white output from the color matrix, each R, G and B row must evaluate to at least 1.0 (which is mapped to 255 in RGB). Our input values are all zero, so no amount of multiplication will get the result we want. Instead we have to put a value of 1.0, or greater, into the fixed offset column for the first three rows:

| | | | | |
|------|------|------|------|------|
| 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |

Now that we know how to create the constituent parts of our filter, we just need to combine them into one. In this case, it's a simple matter of merging them in the right order – black shadow first, then white, then the source graphic. The final graph looks like this:



As you can see, our final filter requires four filter primitives – two Offsets, one Color Matrix and a Merge. It also has two connections to the Source Alpha input, and one to the Source Graphic input. Let's take a look at the final filter design in Inkscape:



If you follow each line in the image you'll see that it's the same connected set of objects as in the graph view. Unfortunately, Inkscape's UI manages to make it seem more complex, largely due to the need for lines to cross in order for each "branch" of the filter to come together at the Merge primitive. Now imagine the same filter design, but with even more shadows being stacked: despite

each shadow being a separate linear graph feeding into a common Merge, Inkscape's UI quickly becomes filled with a confusing spaghetti of crossing lines. Whenever you're faced with such a complex mess, try sketching out the filter primitives and their connections in graph form to see if it becomes more understandable.

There's a bit of a problem with our stacked shadows filter: it looks distinctly different when placed on a white background compared with a colored background. In the former case, the white shadow vanishes into the background, giving the appearance of a disconnected black shadow, but as soon as you put it on any other background, the white layer stands out.

In some cases you may want the white layer to be visible, but for others you would want that part of the output to be transparent. If you were building the stacked shadows from normal SVG objects, you could use a clipping path to achieve this effect (see part 13), but clipping paths aren't available as filter primitives. Instead there is a primitive called "Composite" which allows you to combine two inputs in myriad ways, including a couple that have a similar effect to a clipping path.

The Composite primitive uses the alpha values of the pixels in the input images to determine what the output pixel should be, using the methods described by Thomas Porter and Tom Duff back in the 1980s, collectively referred to as the Porter-Duff blending modes. These blending modes are selected from the Operator pop-up in the filter editor:

Default – This omits the operator from the filter primitive in the underlying XML file. Per the SVG Filter Effects spec, this causes Inkscape to behave as though a value of "over" had been supplied. For the sake of clarity, I recommend never using this option, and always explicitly

STACKED SHADOW

HOWTO - INKSCAPE

selecting the “Over” option, if that's what you want.

Over – The two images are laid on top of each other, with the top input appearing above the lower input. This is exactly the same as using the Merge primitive with two inputs, except that the order of the inputs is reversed.

In – Only those parts of the top image that are “inside” the lower image will appear in the output. This has a similar effect to a clipping path.

Out – Only those parts of the top image that are “outside” the lower image will appear in the output. This has a similar effect to an “inverse” clipping path.

Atop – The output consists of the lower input image, plus all the parts of the upper input image that are inside the lower image.

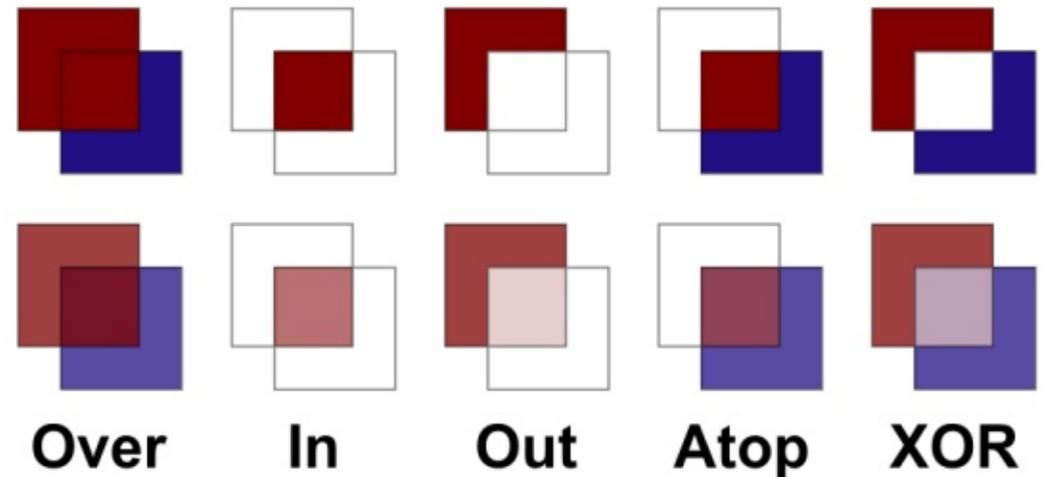
XOR – Performs an eXclusive OR operation between the RGB values of each of the pixels in the two input images. The effect is for the output image to include any non-overlapping parts of the input images.

Arithmetic – This is not one of the Porter-Duff blending modes, but rather is an additional mode that is present in the SVG spec. It will be described in a little more detail later.

Note that the filter UI provides four sliders, but even though these are only used for the Arithmetic operator, they nevertheless remain visible, though disabled, when any of the other operators is used.

The descriptions above are broadly correct, but some subtleties slip in when the input images contain alpha values other than 0 and 255. If you want to use this primitive for clipping, it's therefore advisable to ensure that your input images don't contain intermediate values. The best way to do this is with the Component Transfer primitive, which gained a UI in Inkscape 0.91 and will be described in a future article. Sticking with the filters I've already covered, you can also use the Color Matrix primitive to stretch and offset the range of possible values to achieve a similar result. For example, this matrix will clamp alpha values such that those below 128 are converted to 0, and those above or equal are converted to 255.

| | | | | |
|------|------|------|--------|---------|
| 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 1.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 512.00 | -256.00 |



As with so many things in SVG, that's a lot of words to describe something that's better shown as an image. Here are the 5 Porter-Duff blending modes when applied to a couple of squares, first with no transparency, then with the opacity reduced to 75%. Note that the black outlines have been added afterwards to clarify which parts of the images remain – they're not present in the pure filtered output.

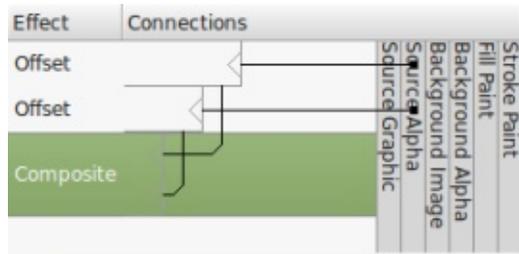


We need to keep the black part that's visible, but remove all the white content, leaving it transparent. In other words, we want to keep the part of the black layer that is outside the white layer. Clearly this is a job for the Composite primitive's “Out” blending mode. Because the Composite filter cares about only the opacity of the input sources, not their color, we can omit the

Let's get back to our stacked shadow and take a look at how this filter can help to cut away the white layer. Consider just a small part of the output – a single letter. I've removed the Source Graphic so we're just seeing the two offset shadows:

HOWTO - INKSCAPE

Color Matrix primitive, giving us this filter chain and result:



All we need to do now is to add a final block to the chain to merge this output with our original source graphic once more, giving us the final result we were looking for – a stacked shadow with a transparent intermediate layer that works on any background (see top middle).

There's one last thing to describe before concluding this month's article: that "Arithmetic" mode of the Composite filter, and



its four sliders (K1 to K4). With this mode, each channel (R, G, B, A) of each pixel of the output image is calculated from the corresponding pixel channel of the input images (i1 and i2), weighted by the K1 to K4 values using the following formula:

$$\text{result} = (K1 \times i1 \times i2) + (K2 \times i1) + (K3 \times i2) + K4$$

Breaking this down, you can see that K4 isn't multiplied by anything, so it just represents a fixed offset. K2 and K3 are multiplied by i1 and i2 respectively, so they adjust the amount of each

input that goes into the output. K1 is multiplied by both i1 and i2, so acts to stretch the range of the output values.

This mode can be used to combine the output from two other filter primitives, allowing you to control the proportions of each input. The SVG spec suggests it might be useful for overlaying the output from some lighting effect primitives (not yet covered in this series) with texture data from another primitive or image source, but it can be useful whenever you want to mix two images together with some control over the strength of each one.

INKSCAPE FORUM

The Inkscape Board is forming a committee to organise the creation of an official Inkscape forum. The main existing community forum (inkscapeforum.com) has become a target for spammers, and the owner of the domain has not been responsive to any emails or messages. The chair of the committee will be Brynn, a long standing contributor to the old site, who maintains a separate forum at www.inkscapecommunity.com. The major contributors to the forum are moving to her site, at least as an interim measure. Until a final decision is made about a new forum, it is strongly recommended that support posts or requests are made at Brynn's site, rather than at the old forum.



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



HAVE YOU EVER THOUGHT WHAT WOULD HAPPEN IF YOU MAKE ALL YOUR DEVELOPMENT PROCESSES RUN 10 OR 20 TIMES FASTER?

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Geoteric



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I came across a free computer at work. It was being trashed since it had a slow and corrupt HDD, and the computer is 5 plus years old. The computer is a Lenovo SL500. It is heavy and would function well as a new project. I will call this project the Brickbook. The goal is to develop a cheap cloud laptop that mirrors a Chromebook experience.

The Brickbook is powered by 2GB RAM and Intel Centrino. The Brickbook processor operates at 2.0 GHz. The Acer C720 Chromebook is powered by 2GB RAM and Intel Celeron. The Celeron operates at 1.4 Ghz. Now let's ignore the size and weight differences between the Acer and Lenovo. The Acer is nicer and a bit more mobile, and with a better battery. The Brickbook battery life is 45 minutes. I did order another 2GB RAM to ramp the machine up to 4GB RAM.

Many of the cloud distros I reviewed previously were based on Ubuntu. I could install Peppermint OS; however it uses Ubuntu 14.04 Software Center. I am not a fan of

Ubuntu's Software Center since it is unmaintained. I am positive when Peppermint OS releases its next LTS, I might reinstall it onto the Brickbook.

Consequently, I loaded Ubuntu MATE 16.04 onto the Brickbook. I like App Grid and Software

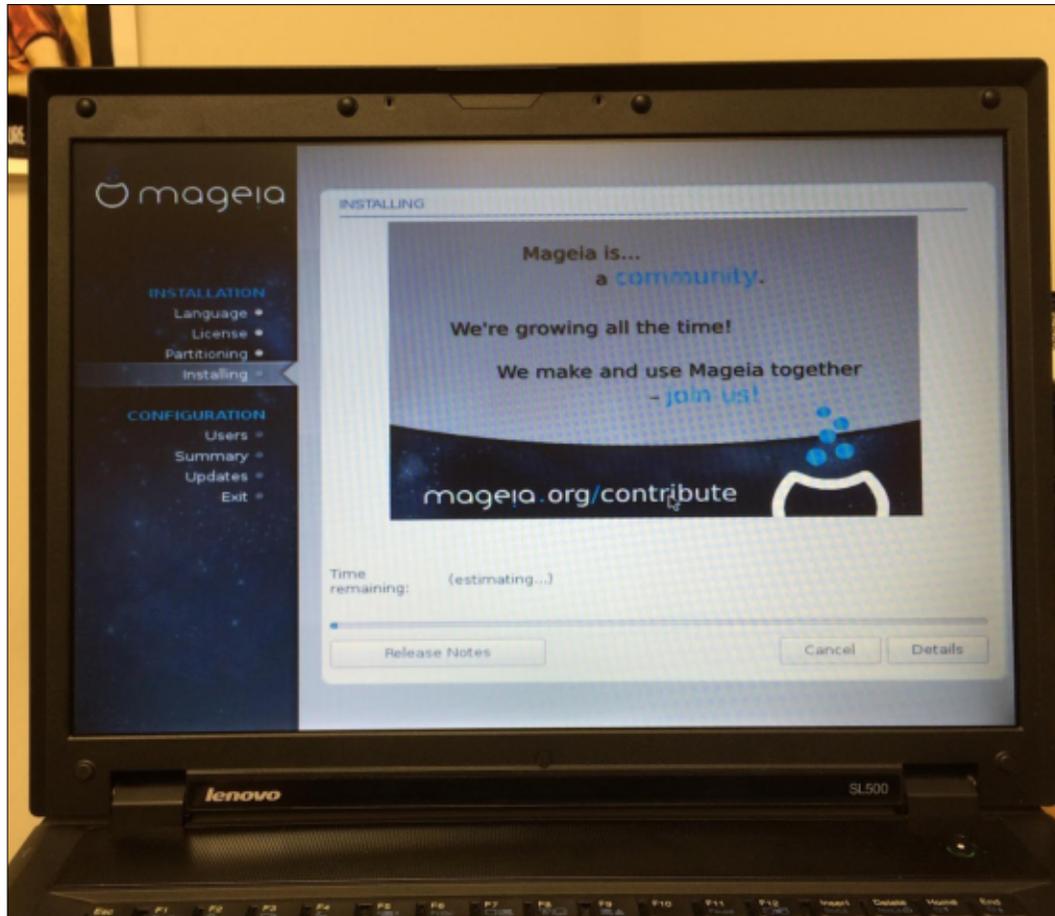
Boutique offered by Ubuntu MATE, so I can access my favorite programs like Openshot and LibreOffice. Ubuntu MATE did a nice job of resolving the Software Center Fiasco with App Grid.

The machine ran well and it was quick after booting, but it did not

feel like a cloud distro. I decided to try Mageia and meld it into a hybrid cloud OS. Mageia allows the user to choose which packages and DE to install. In this case I chose LXDE and internet station. I did a network install, so it will have all of the updates. I really wished there was an Ubuntu derivative that allows a person to choose which packages they wanted installed onto their laptop during setup.

After the LXDE display manager, I saw Firefox as my default web browser. I was able to install Syncthing directly from their site. I enabled the Zenmate VPN, Ghostery and Pushbullet Extensions into Firefox. However, Peppermint's ICE or another SSB were not options for Mageia. I use Google Docs and Google Drive for my office suite. If I wanted other office suite software, I could use the Mageia Control Center to enable new repos and download the needed software.

By using Firefox I minimize my interaction with Google's tracking. I also created a Lycos email



CHROME CULT

account. I am quite happy with the performance of the Brickbook, except for booting. The BIOS takes a long time. I have created a laptop that follows the lightware

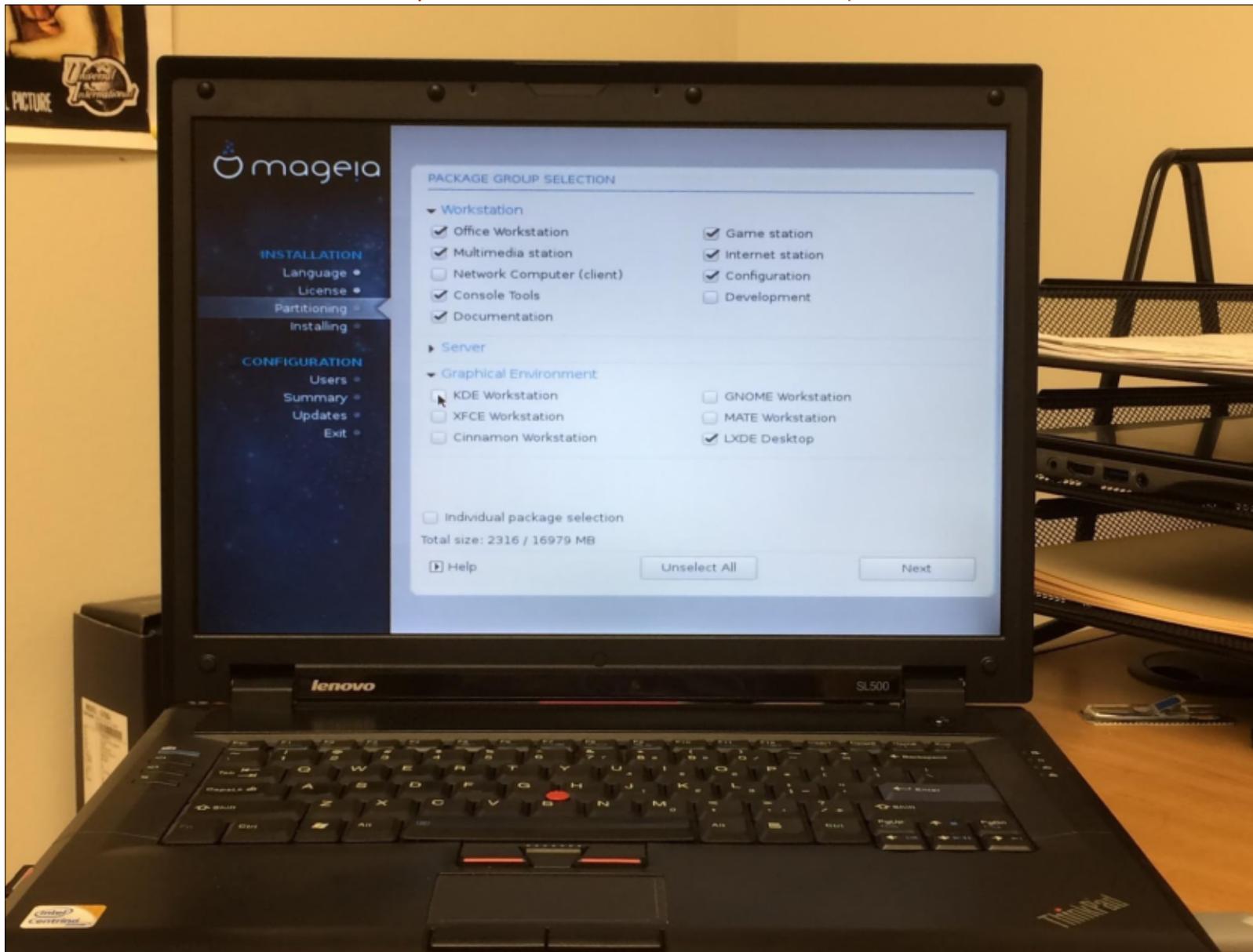
software philosophy of the Chrome OS via Mageia LXDE. If I still owned my old netbook, the Mageia LXDE would be a great OS to emulate a Chromebook. Now I

digress on the Brickbook hardware not being a feather-lite laptop. The Brickbook weighs a bit, but I have 4 USB 2.0 slots, SD Card Slot, HDMI port, and a disk drive. The Acer

C720 has one SD Card and 2 USB slots.

Additionally, this Brickbook is a great option for the current Chromebook Ecosphere. However this upcoming fall, the Chrome OS will have access to the Google Play Store. This event will shift the Chrome OS focus to have more native apps instead being cloud based. The Google Play Store will allow Android Apps become a part of the Chrome OS. If you have not heard, Chromebooks are now outselling Macs.

Next month, I will review SSH and Network Attached Storage using a Chromebook.



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



GUIDELINES

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

RULES

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

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

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

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

document.

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

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

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

When you are ready to submit your article please email it to: articles@fullcirclemagazine.org

TRANSLATIONS

If you would like to translate Full Circle into your native language please send an email to 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.





My wife is a shopper so I spend a lot of time in coffee shops and other places where they have the Internet. Now I got tired of carrying my Ubuntu laptop around with me all the time so I went... light. Ubuntu light that is. Let me explain.

Years ago, I got my wife a nice little Chromebook, and she loves it. And I did too – except it didn't have my Ubuntu on it. Well, that's all changed now. I have my own 11.6" Samsung Chromebook now

because there is a way to put Ubuntu on it. The best thing is you can run both the Chrome OS and Ubuntu at the same time. Yes, you can switch back and forth without rebooting. It works the same way as when you run Ubuntu inside Windows. It's an easy install, just follow the instruction at Crouton. Here is the link.

<https://www.linux.com/learn/tutorials/795730-how-to-easily-install-ubuntu-on-chromebook-with-cROUTON>

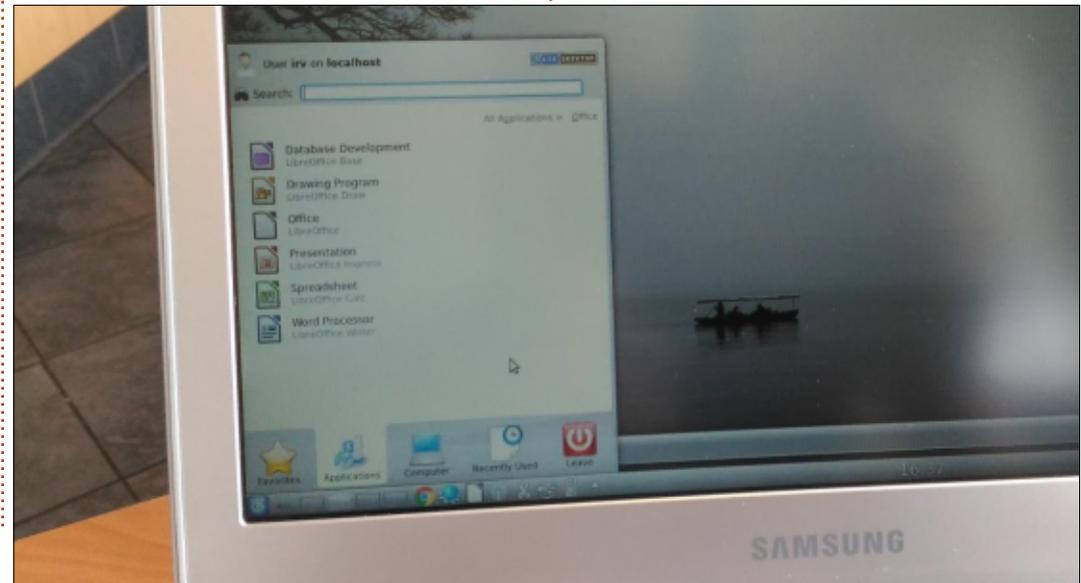
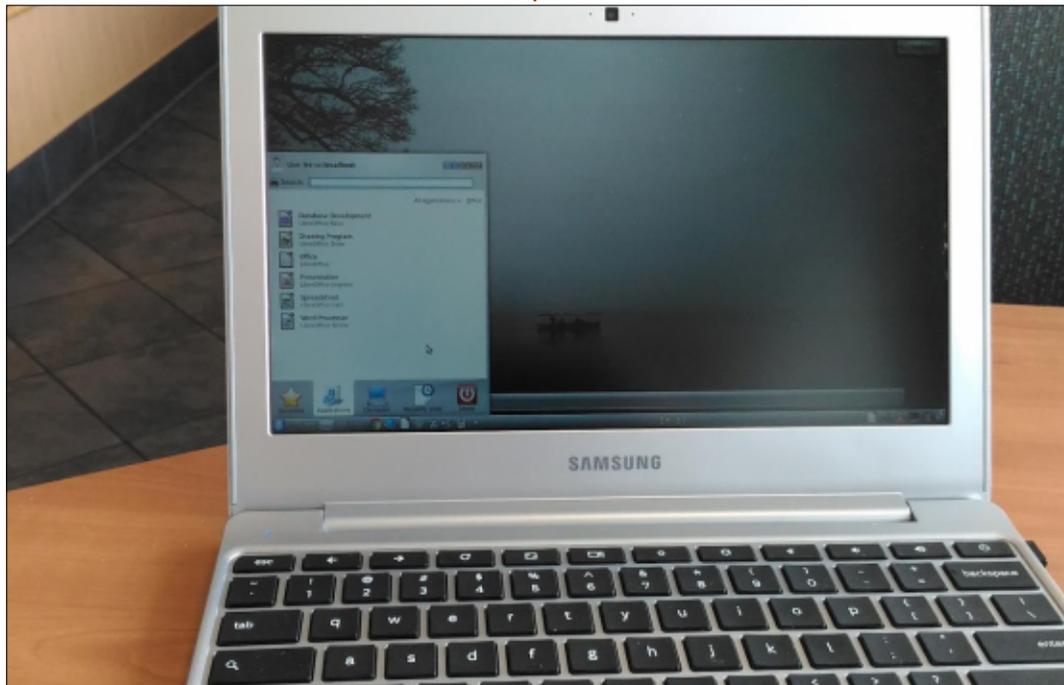
Once you have it installed, it is so simple to run Ubuntu right from the Chrome OS. You open a terminal, Alt/Ctrl "T". Type the word shell, then one of the following:

```
sudo startkde
sudo startxfce
sudo startunity
```

depending on which desktop you installed. Then, to jump back to Chrome OS when you are running Ubuntu, you just hold down the Shift/Ctrl/Alt and press the arrow keys at the top of the keyboard.

Seeing as I do not have a touchscreen on the Chromebook, I went with installing the KDE desktop. I tried Unity, but with the smaller screen KDE seemed a better choice.

Overall, this worked out for me. Now I have a used Chromebook for \$115, running Kubuntu on a 2.5 pound lightweight computer to carry around from coffee shop to coffee shop.





Last month, I wrote about the Linux Terminal Server Project (LTSP) installation I did for the Nuer Community Center here in Kitchener, Ontario, Canada. The center had just acquired space, but wanted some computers for members to play and do research on. LTSP seemed like a perfect fit for their needs: a low-cost (in this case donated) centrally managed system that you could hook up just about any other computer to and get the same experience. When I wrote last month's article, the community center didn't have an Internet connection yet. The center also had not officially opened yet, so there was no chance for feedback about what was working and what wasn't.

When I left last month, we'd set up 2 workstations, the server, a switch, and a router (that only connected to the switch). Members could play games, write documents, edit photographs, but because they didn't have an Internet connection, there were a lot of things they couldn't do. I knew that, when they added the

Internet connection, it wouldn't be a matter of just plugging it into the switch or router because the router I was using would conflict with the router built into whatever modem/router they got, and the server wouldn't be set up with the correct range of I.P. addresses (in the `/etc/dnsmasq.d/ltsp.conf` file).

In fact, the center ran into a problem even more simple than switching out the router, children hiding the username and password stickers I made. Here I was thinking about what problems I might run into when configuring the server for the new modem/router, when

the real problems were much simpler: access to the machine. I printed off more stickers, and this time we stuck them to the bottom of the keyboards instead of at the base of the monitors. I could have set autologin for the clients, but at some point, if they add more clients, we might make each login a unique login (guest01, guest02). Because there are only a couple of machines, and the server has 8GB of RAM, one guest account is enough.

Setting up the clients to work with the Internet connection wasn't as difficult as I expected. The most difficult part was actually physically moving the workstations from one area to another. The Internet connection was set up in an area about 15 feet away from the workstations. We actually didn't need to move the workstations closer because the ethernet cable I initially used to connect the server to the 10/100/1000 switch was about 25 feet long. I used the 25-foot ethernet cable to connect the Internet modem/switch to the



gigabit switch, and all computers, including the server, also connected to the gigabit switch. The old router was set aside (no need for a second router since their modem had a built-in router).

When I set up the network initially, I didn't want it conflicting with any routers we had at work. I chose the 192.168.80.x range. The new router defaulted to 192.168.1.x, so I needed to change this range in the `/etc/dnsmasq.d/ltsp.conf` file on the server (shown middle top).

After changing the I.P. address it was necessary to update the ssh-keys and the image that gets deployed to the clients:

```
sudo ltsp-update-sshkeys
sudo ltsp-update-image

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

I made all these changes while the old router was still hooked up (under the 192.168.80.x address), so I worried that it might not work, but when I disconnected the old router and plugged the new modem/router into the switch,

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

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

#
# DHCP
#
dhcp-range=192.168.1.0,proxy
```

everything worked smoothly. I shut down the server and clients, but only because we had to move computers and furniture around. This likely would have worked without a reboot.

One important point to note is if the server gets rebooted/switched off, clients should be switched off/rebooted. The server should be the first to boot, otherwise your clients won't be connected (they actually use



the server resources).

At this point, there still hasn't been enough time and testing to say how well the installation works, but the community center seems determined to stay the course with LTSP and Ubuntu MATE. Special thanks to Peter, James, Chul and all the Nuer Community center members who were very welcoming and helpful with this and the last LTSP article.

LTSP RESOURCES:

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

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



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



UBUNTU DEVICES

Written by Ronnie Tucker

OTA-11

OTA-11 has introduced wireless capabilities to the Meizu Pro 5, which gives users the full Ubuntu PC experience running from a smartphone. All the services running from the phone are available on a desktop through just a wireless dongle and no cables – giving you the full Ubuntu convergence experience! And the best bit is we'll be rolling this out across all Ubuntu smartphones and tablets for future OTAs.

In addition to this feature, there are overall performance improvements to the M10 tablet that include speed, bluetooth connectivity, and smoother scrolling. Here's a more detailed summary of all the updates below:

- Pro 5 users have full Ubuntu convergence using the wireless display feature – the same feature will be available for all future Ubuntu smartphones and tablets.
- Smoother scrolling for the dash and apps giving a more seamless user experience.
- Better mouse responsiveness

using bluetooth when the desktop interface is displayed.

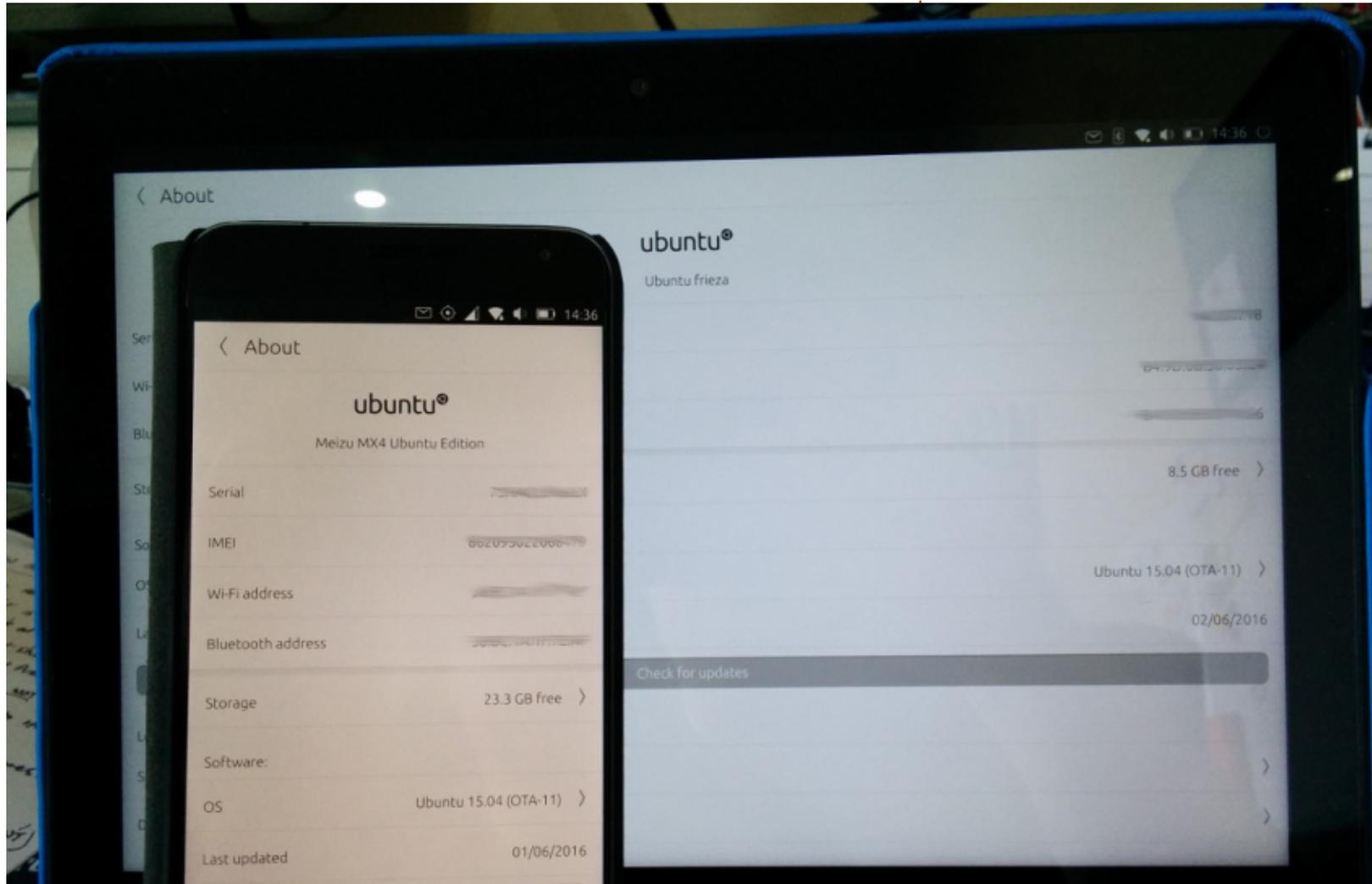
- Faster smoother graphics which improve the way content is delivered to the device.
- Automatic scaling for external

monitors so the desktop display and application automatically scale to the resolution used on the external monitor.

To learn more about all the

updates see here:

<https://wiki.ubuntu.com/Touch/ReleaseNotes/OTA-11>

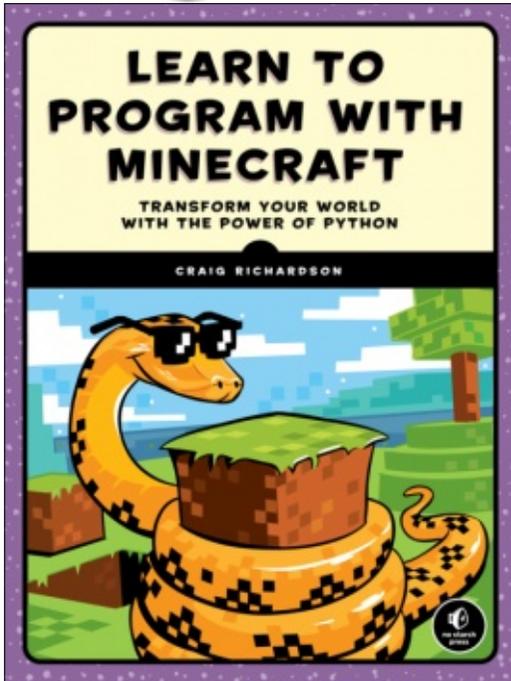




BOOK REVIEW

Written by Greg Walters

Learn To Program With Minecraft



Learn to Program With Minecraft: transform your world with the power of Python

Craig Richardson

No Starch Pres:s ISBN:978-1-59327-607-6

Learn to Program With Minecraft is designed to teach kids (and/or parents) how to program using Python to do some really tedious things within the game Minecraft. I must admit, I've heard about Minecraft for years, but have never tried it. Many

friends have kids who play Minecraft, and this book would be an excellent choice for those who want to not only learn to program OR (and here's the kicker) want to automate many tasks in Minecraft.

This book is for Windows or OS X as well as the Raspberry Pi, and makes the assumption that the reader already knows how to play Minecraft. As I said above, I've never played the game, so the only version I had was on the Raspberry Pi. I was totally lost from the "git-go". So I went to raspberrypi.org, typed 'Minecraft' into the search box, and eventually found the "Minecraft for Newbies" tutorial. That got me going, so now the book started to make sense to me. Just between you, me, and the wall, it was fun trying the various projects and tasks. I'm not a gamer, but I can see the attraction and understand why so many kids play the game.

I don't remember ever seeing a note that you need to be familiar with Minecraft; however, there is a short statement on the back of the

book that (and I paraphrase here) even if you are a newbie, you will "see Minecraft in a whole new light...", which is very true, but I feel the author should have pointed this out from the start.

All in all, the book does what it promises in a clear and proper manner. If you take a look at the Table of Contents (right), you will quickly see that most all of the major Python programming concepts for beginners are covered with creative introductions. My favourite is 'Chapter 9: Hitting things with Lists and Dictionaries'.



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Chapter 7: Dance Parties and Flower Parades with while Loops

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Afterward

Block ID Cheat Sheet

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LETTERS

If you would like to submit a letter for publication, compliment or complaint, please email it to: letters@fullcirclemagazine.org. PLEASE NOTE: some letters may be edited for space.



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ubuntuforums.org/forumdisplay.php?f=270

REASON WHY I LIKE LINUX

Originally, I started using Ubuntu on my netbook in 2013. It was running Windows XP and it became so slow that it would take about seven minutes before it really booted. I tried Ubuntu 13.04 and the very same netbook booted in about 40 seconds. From that time, I was sold. Wow, this old thing is usable again. So I started experimenting with the various Ubuntu versions, and for me, both Xubuntu and Ubuntu became my favorite distributions. I used Linux Mint briefly, but this installation crashed after a while.

Then, my father (at that time, 85), who was still running Windows XP on his computer, had the Nth virus or malware. I installed Ubuntu. In the beginning he moaned and groaned but, after a short while, he got used to it. And since then he has been happily sitting at his computer. No more viruses. He can just do simple computer tasks like browse, register for events, send and

receive emails, and play his favorite game. He is 88 now. Updating is so easy; no separate programs to download and install. It is really ideal – especially for people who are not that computer literate, but still need a computer.

I installed Ubuntu on several other computers of several of his friends and they are also happy. They can just sit behind the computer without worrying about viruses, updating AV software, running antispyware, etc.

Also, for me, when I go on business travel or holiday, I can take the older netbook with me and use it to save holiday photos and movies and also back up these on memory sticks. Why get rid of a perfectly good computer? The nice thing about these old netbooks is that they are quite sturdy and reliable. My netbook survived (in a backpack) an accidental drop of nearly two meters.

Jan Holtman

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, and Gord will answer them in a future issue. Please include as much information as you can about your query.

Q I have a Samsung ARM Chromebook with Ubuntu 16.04 armhf. Is it possible to run virtualization software, specifically for running an x86 OS?

A What you need is **emulation**, not virtualization.

Q I tried to run Lubuntu 16.04 on a Compaq d530 computer to no avail. The live version will not work. The installer will run, but it will not boot once installed. Is there any hope?

Here is the hardware:
Pentium 4 cpu 2.60 GHz
2573 MB RAM
Integrated graphics

A Go to the Community Docs and figure out how to use nomodeset. (Thanks to *ajgreeny* in the Ubuntu Forums). Also install xserver-xorg-video-intel.

Q Having an issue with Xubuntu 16.04. When I insert a Video DVD, they will not auto-mount. I

can force the system to mount the DVD by going to VLC and pointing the program to /dev/sr0 and then everything works.

What makes this strange is that Data DVDs and CDs both automount with no issues.

A (Thanks to *kansasnoob* in the Ubuntu Forums) It's a bug: <https://bugs.launchpad.net/ubuntu/+source/gvfs/+bug/1577768>

The fix will land in Yakkety very soon, then we'll have to do a SRU to get it fixed in Xenial. <https://git.kernel.org/cgit/utils/util-linux/util-linux.git/commit/?id=55ad13c26fe5d0e606be5a83937f31b8cf576588>

Q I have an external USB hard drive which I use with my laptops (running Ubuntu or Linux Mint), but also with other computers running Windows. It is currently NTFS formatted, although reformatting it would not be an issue. I wish to protect its content by encrypting it.

A (Thanks to *atl45* in the Ubuntu Forums) You could encrypt the drive with VeraCrypt; create a VeraCrypt file container on the drive, or create a Veracrypt partition on the drive. VeraCrypt works just fine in Linux and Windows.

Q I have an Intel Skylake i5 NUC on which I have Ubuntu 16.04 LTS installed. I use two monitors, both of which have a DVI connection. I plug one monitor into the HDMI port using a DVI cable and an HDMI to DVI adapter, and another into the DisplayPort using a DVI cable and DisplayPort to DVI adapter. After installing the latest updates, the system hard freezes seconds after logging in.

A Installing the 4.6 kernel fixes the problem. The instructions are on the Ubuntu Handbook web site.

Q Can I run Corel Video Studio x5 on Ubuntu?

A It would appear not. There are alternatives in Linux. My preference is Cinelerra, mostly because of the tutorials available at the Cinelerra for Grandma website and on youtube.

TOP QUESTIONS AT ASKUBUNTU

* network-manager crashes <http://goo.gl/VHZbBx>

* Is there a "don't disturb" option to temporarily hide notifications, like on macbooks? <http://goo.gl/rEq4Aq>

* How do I use C++11 with g++? <http://goo.gl/zyc5GP>

* What is an "ApplImage"? How do I install it? <http://goo.gl/j0OGpE>

* Why Does Ubuntu Require us to Register an Account on Ubuntu website to be able to install a Snap Package?

<http://goo.gl/6jq6lv>

* How to use grep on all files non-recursively in a directory?

<http://goo.gl/71vHmZ>

* How to share a folder on Ubuntu to Raspberry Pi 3 over local WiFi network?

<http://goo.gl/nU1z2u>

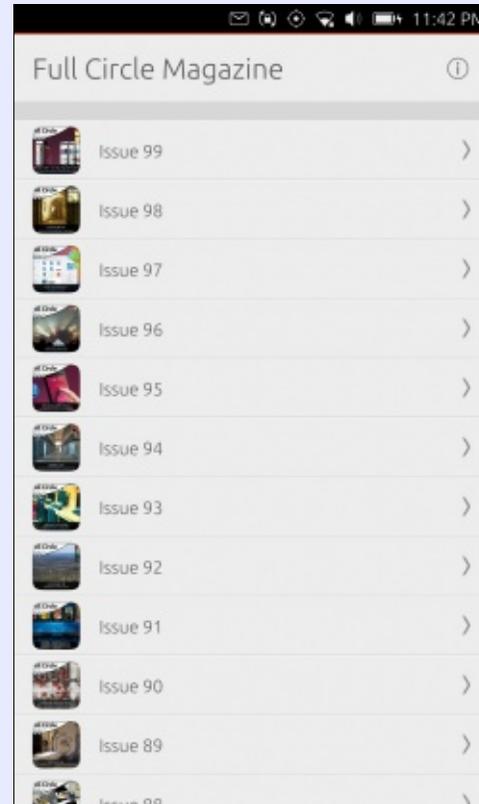
* Why isn't python 3 the default python binary in Xenial?

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

* How do I highlight my mouse pointer while screen recording?

<http://goo.gl/ORDkSt>

THE OFFICIAL FULL CIRCLE APP FOR UBUNTU TOUCH

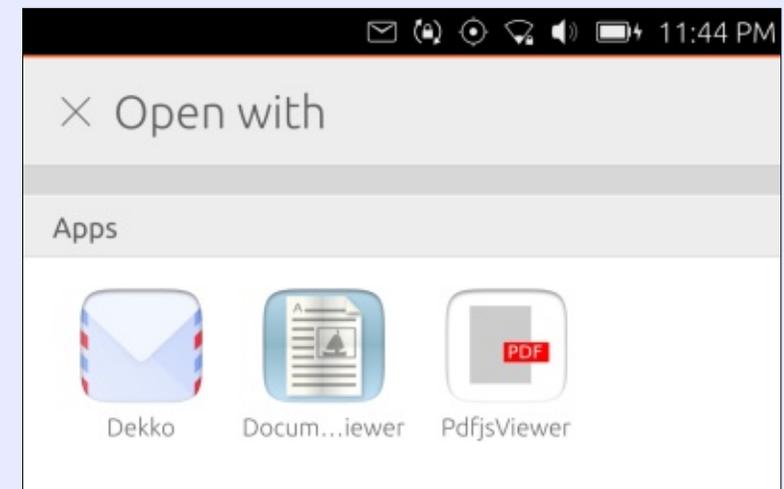
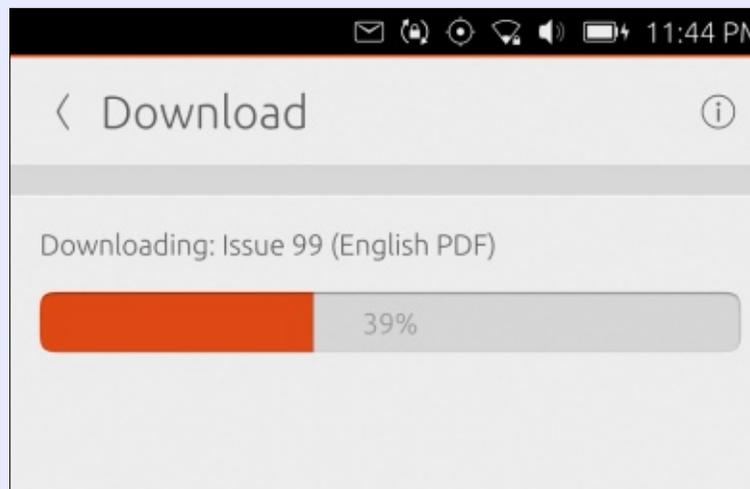


Brian Douglass has created a fantastic app for Ubuntu Touch devices that will allow you to view current issues, and back issues, and to download and view them on your Ubuntu Touch phone/tablet.

INSTALL

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

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



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

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Life at your fingertips

Ubuntu reinvents the way you interact with your smartphone.
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AVAILABLE WORLDWIDE



One of the perks of writing a monthly game review for Full Circle Magazine is that I get to try out different games so that you, the reader, can be informed as to what games are playable on Linux, entertaining, and worth your time and hard earned money. Back in December 2013, I reviewed Dota 2 here on Full Circle Magazine. That was then, this is now – I'm still thoroughly enjoying the game although it's gone through some major overhauls since then. When I wrote the original review three years ago, Dota 2 had just come out of beta and had become an official release. Only a few months ago, Dota 2 Reborn came out of beta, and it is now the new official Dota 2 but with many changes.

For those of you who don't know anything about it, Dota 2 is a free-to-play game developed and distributed by Valve, thus it can officially be downloaded and played through Valve's Steam. Currently, Dota 2 is in version 6.87, and was just released in May 2016 – the new Dota Reborn was introduced late summer 2015 as a

beta and a few months later became the official release. If you've never played Dota 2, this is as good a time as any to give it a try. The International, which is Dota 2's most successful and popular event, is about to take place this summer. It's now a well established fact that eSports are slowly going mainstream, and Dota 2 is one of the big players leading the way. Over the last three years, The International has broken record after record in the eSports world. More on that later, but first let's talk a bit about the game

itself.

Dota 2 is originally based on a mod that came out of Warcraft III well over ten years ago. The mod became so popular and different from the game itself that, in time, it became its own game, Defense of the Ancients (DotA). Valve saw the value in Defense of the Ancients and eventually hired the main developer responsible for the mod... and the rest is history. Due to multiple copyright and other legal issues, Valve re-branded the game as Dota 2 to separate it from

its history with Blizzard's Warcraft III. Dota 2 has since been one of Valve's most successful titles, even though it's a free-to-play game. Dota 2 was quite possibly one of the first MOBAs (Massively-multiplayer Online Battle Arena), and it is currently one of the most popular – along with League of Legends.

The object of the game is to defend your ancient. To understand what this means you have to take a look at a map of the game. The game consists of two teams of five players each. The team on the bottom-left is called the Radiant, the team on the top-right is called the Dire. At the beginning of the game, you select a hero from a selection of 111 possible heroes (at the time of this writing). With five heroes on your team, you must then work together to keep the other team from invading your territory and destroying your ancient, while at the same time infiltrating their stronghold and destroying their ancient. A typical game can range anywhere from 15 minutes to as



much as 2 hours, the average game is about 45 minutes. New heroes are constantly being added at the rate of 2-4 per year. Each hero has a unique set of abilities and, as you battle against the other team as well as against neutral creeps, you gain experience, abilities, and gold for new items.

As a direct result of the number of possible heroes available, there is a very steep learning curve to playing the game well. It is actually not too hard to learn the basics of the game; however, it's very hard to learn how to play it well. Rather than spend more time on the core Dota 2 game which you can read about in our December 2013 issue, let's find out what's new with Dota 2 Reborn and why it's called Reborn.

When Dota 2 Reborn came out, it brought with it a lot of changes, some noticeable and others not so easily noticeable. Perhaps the main change with this new official release is the new Source 2 game engine. Valve's new game engine has completely renovated the game, so much that some people are calling it Dota 3.0 and, in a way, I kind of agree. The graphics are colorful and vibrant, especially when the terrain has some sort of

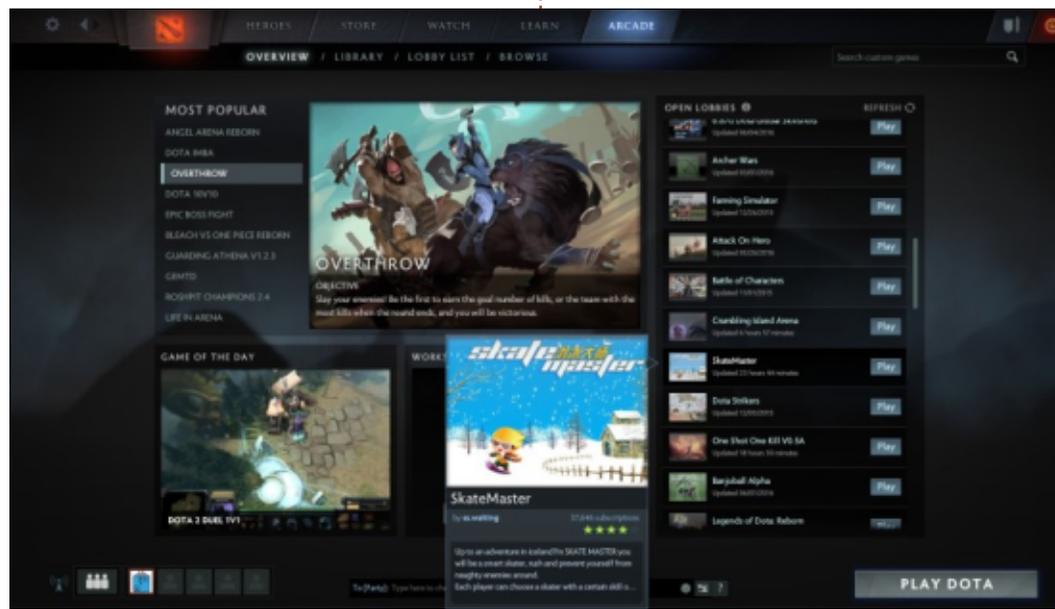
weather effect such as weather rain, weather moonbeam, weather aura, or others. Speaking of terrains, Dota Reborn also brought with it additional alternative terrains such as desert terrain, immortal gardens terrain, and some seasonal spring/winter terrains. The winter terrain, for example, is covered with snow, and as a consequence has some unique colors and hues that you only get to see with this terrain. The map layout is not altered at all when you equip alternate terrains or weather effects. A neat feature about these cosmetic items is that some of these can be shared with other players which means that

you could be involved in an online battle, and, if one of your teammates equips the winter terrain but you don't have it, you still get to see it for the duration of the battle if the other player equips it as a shared item. Another change is the entire user interface. By redoing the whole UI, the game looks completely new. For those who haven't played the game since the Reborn patch, the UI may be drastically different but shouldn't take too long to get used to.

A very welcome addition is the option to demo heroes. With this new option, you can select any hero you want to try out and sample the hero – without having

to play an entire game. It's just your hero & your creeps fighting against the other creeps – so you can get used to the mechanics of the hero you're trying out. You're also given the option to spawn an enemy hero to make it more realistic. There are options to level up your hero one level at a time, or all at once, so you can get to know your hero's abilities to their full extent. You're also allowed to use any items you want since you have an infinite amount of money at your disposal. If you need to try out new heroes, this is the best way to do it. There are now 111 total heroes available.

Last, but most definitely not least: what makes Dota 2 Reborn feel so much like a new game is the addition of the "Arcade" section – which is basically what the name says, an arcade where you can play lots (and I do mean lots) of other games. The custom games available through the arcade tab are primarily made by other players and voted on by the community – with new games being added regularly. Just about anyone can design a new game through the use of the Dota 2 Custom Workshop Tools. At the moment, the Workshop is available



only for Windows, but the games designed with it can also be played on other platforms, such as Linux. Some of the available games are very similar to Dota 2, such as Dota 10v10 custom game, and Overthrow – which were both originally developed by Valve to get the ball rolling so to speak. Other games are completely different from the core game, such as Dota Strikers – which is a sort of football-based game in which the goal (pun definitely intended) is to get the ball into the opposing team's goal. If you play a custom game that you really enjoy, you can up-vote it so that it remains available on the Arcade. If, on the other hand, you play a game that you feel has nothing to offer, you can down-vote and make your voice heard if you feel it should be taken down. Since the custom games were added, I've played only about 3-5% of all games available due to the gargantuan amount of games available. I wouldn't be surprised if some of these games eventually blossomed into games that could stand completely on their own instead of only being a mod for Dota 2. If the hostile Dota 2 gaming community has deterred you from actively playing this game, maybe the

custom games would be an alternative; everyone there is more or less on equal footing and that community seems to be much more friendly than the infamous core Dota 2 community.

Being a free-to-play game, Dota 2 still manages to be one of Valve's main moneymakers via the sale of cosmetic items and other things. At the moment and until July 2016, you can purchase the 2016 Battle Pass which complements this year's The International event (takes place in July in Seattle Washington) and the Manila Major (currently being held in Manila). The Battle Pass includes this year's Compendium for The International event, but it also has much more, which includes the Manila Major event. The Battle Pass can be purchased for \$9.99 for the basic package, or \$24.99 for a Battle Pass leveled up to level 50. Why would someone want to purchase this Battle Pass if Dota 2 is a free-to-play game? Basic answer is, you don't need to buy anything; however, this year's Battle Pass includes a lot of enticing prizes. You get tons of cosmetic items which make your heroes look different from their default style. Included are also lots of alternate

loading screens, alternate HUD (heads-up-display), alternate music, alternate icons & emoticons, alternate terrains, alternate weather effects. This year's Battle Pass gives you the option to recalibrate your matchmaking rating (MMR), which affects who you're paired up with and against. If you play over 40 games with the Battle Pass by the end of The International season, you'll have the option to replace your old MMR with your new Battle Pass MMR which is a feature many Battle Pass owners are very excited about. For me, the main reasons I like to purchase a Battle Pass are that it contributes to The International prize pool but also because, due to the Daily Hero challenges, it forces me to get to know other heroes better – which in the long run helps me get to know the game better and be a more competitive player. Recently, while working out, on one of the numerous TV screens at my gym, I saw a match of Dota 2 from the Manila Major on ESPN. This is how popular the game has become.

Whether you purchase the Battle Pass or not, whether you watch some of the tournament battles or not, I strongly

recommend playing the new Dota 2 Reborn. The new features are worth checking out, and the core game itself is too fun to not try. Besides the sometimes hostile Dota 2 community, and the fact that the game is very addictive, I don't see any other defects with the game. It's no wonder it has come to rival other MMOs like World of Warcraft.



Minimum Requirements:

OS: Ubuntu 12.04 or newer.
Processor: Dual core from Intel or AMD at 2.8 GHz.
Memory: 4 GB RAM.
Graphics: nVidia GeForce 8600/9600GT, ATI/AMD Radeon HD2600/3600.
Network: Broadband Internet connection.
Storage: 15 GB free space.



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



Recently, I've become interested in single player board games. Particularly WWII themed games. Some games are ludicrously expensive (£100+), while some are more moderately priced (£40+). Another difficulty is that some of the best games are quite hard to get.

Enter Vassal. Vassal is a Java-based piece of software which, when teamed with a module, can let you play board games on your machine. Even better is that Vassal has features to allow exchanging log files (think of that as being like the old play-by-email systems) and even online play.

INSTALLING

Vassal doesn't even need

installing. You download the archive file from the sites download page (<http://www.vassalengine.org/download.php>), and save the TAR.GZ file to your PC. Unarchive the TAR.GZ file (either using your desktop's archive manager, or in the terminal), and you'll have a folder called VASSAL-3.2.16, the latest version as I write this. In there, you'll see a file called VASSAL.sh. Double click that and Vassal will load.

MODULES

Let's grab a module (aka: game) from the Vassal site.

The Vassal modules page (<http://www.vassalengine.org/wiki/Category:Modules>) has a ton of

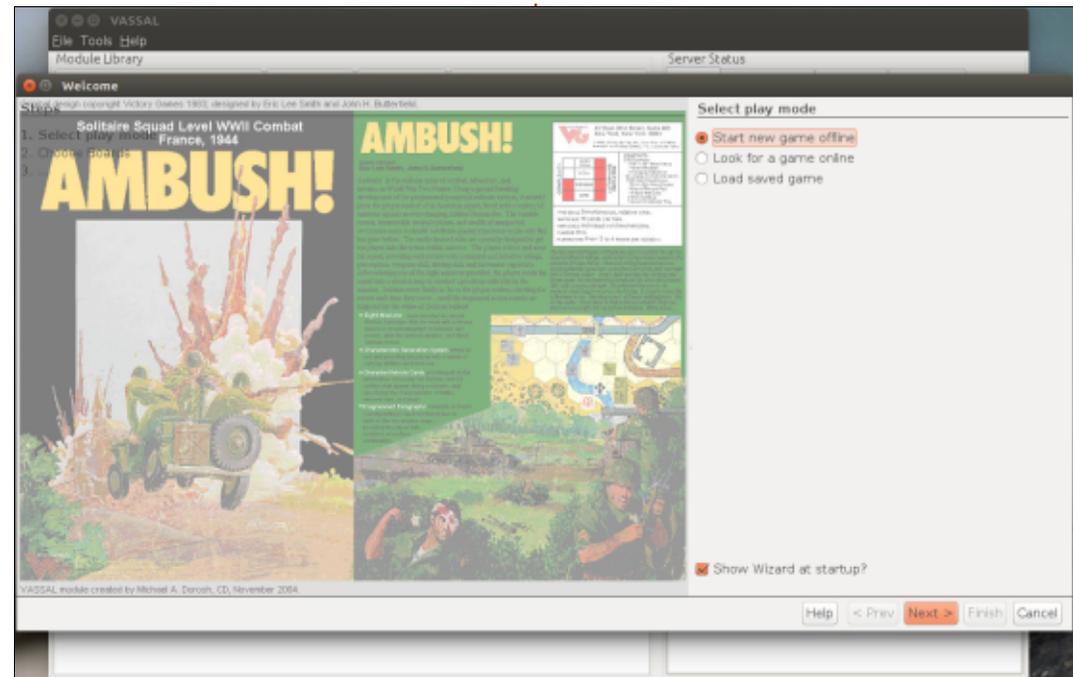
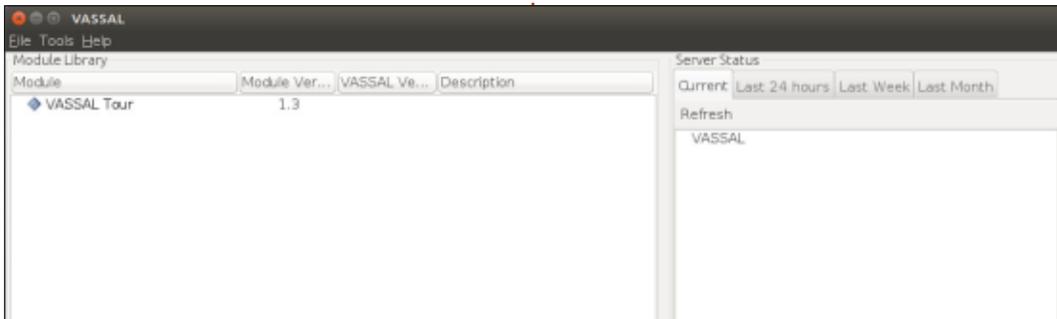
games that you'll be able to load into Vassal. They're not all war games, either. I already own the game **Ambush!** so I'm going to grab that. I don't have **D-day At Omaha Beach**, but do own **D-day At Peleliu** (which isn't on the list of modules), so I'll try out Omaha Beach too.

Simply click the game title and download it to your PC.

FIRST RUN

On first loading Vassal, it won't look very exciting. On the left of the screen is the 'Module Library' with only the Vassal Tour listed in it. On the right is the 'Server Status'. If you don't see this then you need to click and drag from the right edge into the center of the window to reveal it.

In the Vassal window menu, go to File > Open Module and choose one of the modules you downloaded. I'll use Ambush! in



this example. After a few moments, you'll either see the module listed in the 'Modules Library' or a welcome wizard will appear.

Most wizards will ask if you want to do offline play, search for a game online, or load a saved (ie: log) file. Choose which you'd rather have, step through the wizard options, and click Finish.

You'll now have a new Vassal window with the game board loaded up. And, just like in the real world, it's empty. It's up to you to set things up.

LAYOUT

The layout of Vassal can change slightly depending on the module loaded, and what the game requires, but we'll look at some of the most used items.

Along the top of the screen (below the menu) are some icons. They are for things like

Pieces: show/hide the game pieces (which show in a tabbed section above the map)
Dice: any dice needed for the game (click the die and a result will appear in the log window above

the board)

Notes: a popup window will let you create/view game notes

Charts: a popup window will display any game charts that are required

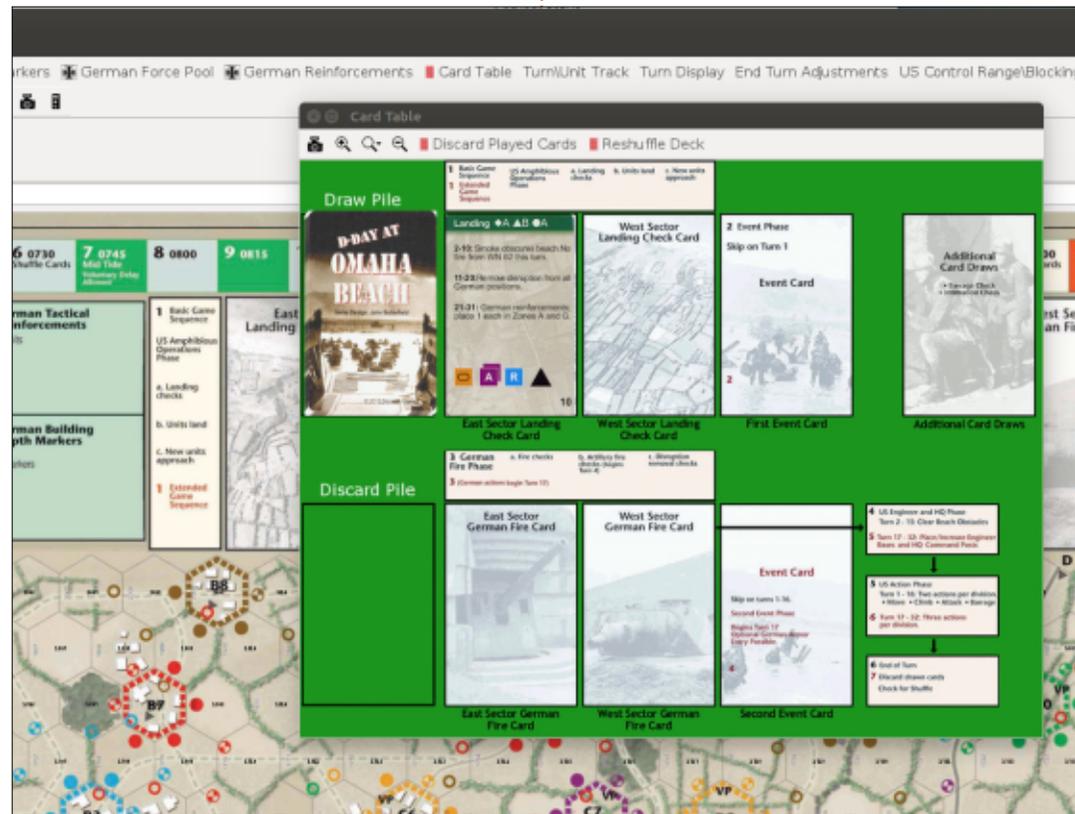
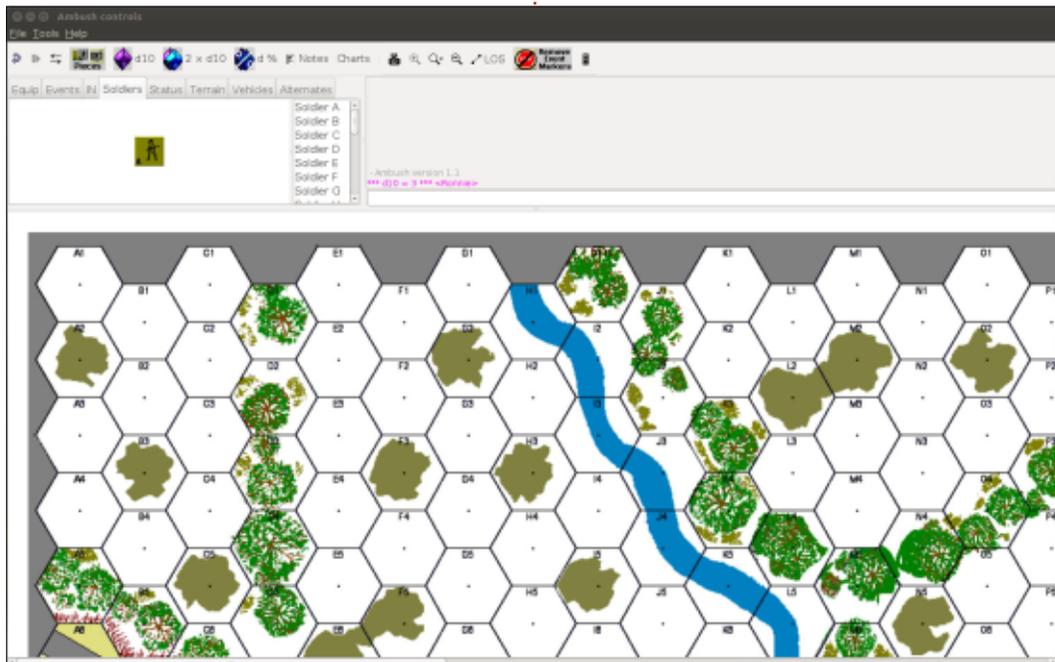
... and then there are icons for screenshots, zooming, etc.

D-day At Omaha Beach uses only cards and even has a 'Card Table' option to let you randomly choose a card for the various phases it has.

USING

Using Vassal is all very much like the real world. Grab, drag, and drop. Again, like the real world, it's up to you to be the rule book. Vassal will let you do anything you want. It's up to you to stay within the rules of the game.

The modules are very versatile and change the available options depending on the game. In



UBUNTU GAMES

Ambush! you can right-click a soldier and choose to make them 'prone' or change their stance. In Omaha Beach you can right-click to have a unit 'step down' or mark it as having taken a turn.

File > Save Game will create a VSAV file which is a Vassal file that you can use to reload a game, or email to a friend to play their turn, save, and send their file.

CONCLUSION

I know that some of you will be thinking that downloading modules may verge on piracy, but note that many of the modules have the blessing of the creators and any creators who ask to have their game removed are respected.

Vassal is an excellent engine and the perfect way to see if you like a game before paying hard cash for it. It's also a great way to try out those older games that you just can't get these days (unless you're a rich collector).

There's so much more to Vassal. I haven't even touched on the online aspect of it. If you have a remote interest in board games,

then I can heartily recommend it.

Vassal:

<http://www.vassalengine.org/>

Modules:

<http://www.vassalengine.org/wiki/Category:Modules>

The screenshot displays the Vassal engine interface for a game titled "Ambush". The top window shows a unit list with columns for "Equip", "Events", "IN", "Soldiers", "Status", "Terrain", "Vehicles", and "Alternates". A unit "A" is selected, showing its status as "Soldier A".

The main window shows a hexagonal board game map with various terrain types and units. Units are represented by icons and labels like "A1", "B1", "C1", etc. Some units have status indicators like "PRONE" or "INCAP".

The bottom window shows a detailed weapon table with columns for "JAM A/S", "WEAPON", "Same Adjont hex", "Assault", "SHORT 5", "MED 4", "LONG 3", "DAMAGE DIE ROLL", "AMMO EXPEND", and "Location".

| JAM A/S | WEAPON | Same Adjont hex | Assault | SHORT 5 | MED 4 | LONG 3 | DAMAGE DIE ROLL | | | | | | | | | | AMMO EXPEND | Location |
|---------|------------------------------|-----------------|---------|---------|-------|--------|-----------------|---|---|---|---|---|---|---|---|---|-------------|--|
| | | | | | | | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | |
| 05/05 | Pistol | | | 2-3 | 4-5 | 6-20 | K | 1 | W | W | W | W | W | P | P | P | 25 | Clear, Stream, Bridge, Road, or Ford (or "Open") |
| 05/05 | Carbine | | | 2-5 | 6-11 | 12+ | K | 1 | 1 | W | W | W | W | P | P | P | 25 | Cover (or Open with vehicle in it) |
| 05/05 | Bolt Rifle | | | 2-6 | 7-14 | 15+ | K | 1 | 1 | 1 | W | W | W | P | P | P | 25 | Brush |
| 05/05 | Semi-Auto Rifle ¹ | | | 2-6 | 7-14 | 15+ | K | 1 | 1 | 1 | W | W | W | P | P | P | 25 | Rough |
| 05/05 | Bolt Rifle, Scope | | | 2-8 | 9-18 | 19+ | K | K | 1 | 1 | 1 | W | W | P | P | P | 25 | Rubble/Crater |
| 05/10s | Submachinegun | | | 2-4 | 5-9 | 10+ | K | K | 1 | 1 | 1 | W | W | P | P | P | 50 | Woods |
| 05/10s | Machine Pistol | | | 2-4 | 5-9 | 10+ | K | 1 | 1 | 1 | W | W | W | P | P | P | 50 | Interior: aperture not adjacent to firer |
| 05/10s | Automatic Rifle | | | 2-9 | 10-16 | 17+ | K | K | K | 1 | 1 | 1 | W | W | P | P | 50 | Interior: aperture adjacent to firer or not aperture |
| 05/10s | LMG Crew Weapon | | | 2-10 | 11-22 | 23+ | K | K | K | K | 1 | 1 | 1 | W | W | P | 50 | Additional Modifiers: -2 Snap Fire +1 Automatic Fire (p) |
| 05/10s | MMG Crew Weapon | | | 2-10 | 11-22 | 23+ | K | K | K | K | K | 1 | 1 | W | W | P | 50 | |
| 05/10s | HMG Crew Weapon | | | 2-15 | 16-29 | 30+ | K | K | K | K | K | K | 1 | 1 | W | P | 50 | |
| 05 Dud | Bazooka | | | 2-4 | 5-8 | 9-14 | K | K | K | K | K | K | 1 | 1 | 1 | A | | |
| 05 Dud | PIAT | | | 2-3 | 4-6 | 7-12 | K | K | K | K | K | K | 1 | 1 | 1 | A | | |
| 05 Dud | Tank Main Gun | | | 2+ | * | * | K | K | K | K | K | K | 1 | 1 | 1 | A | | |
| 05 Dud | Grenade Inside ² | | | 2 | 3-4 | 5-6 | K | 1 | 1 | W | X | X | P | P | P | A | | |
| 05 Dud | Grenade Outside | | | 2 | 3-4 | 5-6 | K | 1 | W | X | X | P | P | P | P | A | | |
| 05 Dud | Satchel Charge Inside | | | * | 2 | 3 | K | K | K | 1 | 1 | 1 | W | W | X | A | | |
| 05 Dud | Satchel Charge Outside | | | * | 2 | 3 | K | 1 | 1 | W | W | W | X | X | P | A | | |
| | Assault to Capture | | | - | - | - | 1 | C | C | C | C | Z | Z | P | P | * | | |
| | Assault to Kill | | | - | - | - | K | 1 | 1 | W | W | W | P | P | P | * | | |

Legend for symbols:

- K = Kill
- W = Wounded
- C = Captured
- P = Panic
- X = If prone, then Panic, otherwise Wounded
- Z = If panicked or wounded already, then captured, otherwise wounded
- PRONE
- Light
- Medium
- Heavy
- 1 = Grenade
- 2 = Grenade

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



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CHA CHA CHA CHANGES

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

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

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

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

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

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



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