



Full Circle

THE INDEPENDENT MAGAZINE FOR THE UBUNTU LINUX COMMUNITY

ISSUE #124 - August 2017



Photo: Peter Miller (Flickr.com)



BACKUP STRATEGY WITH ZFS SNAPSHOTS

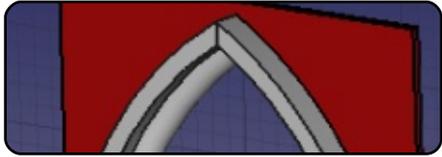
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HowTo



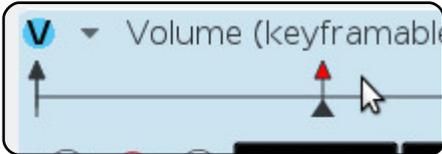
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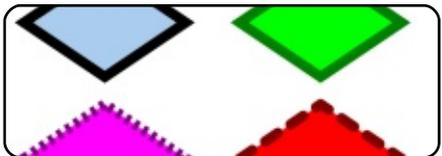
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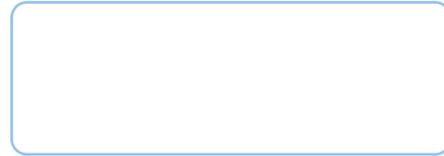


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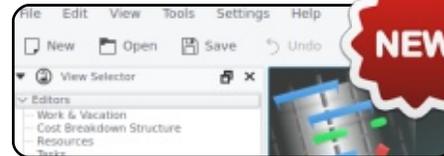
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```
#An alias to make the ls
command more detailed
alias ls = "ls -la --
color=always --classify"
```

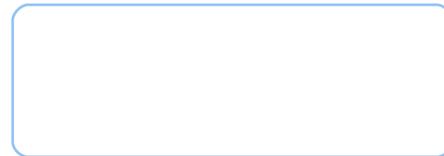
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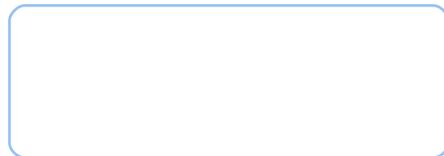
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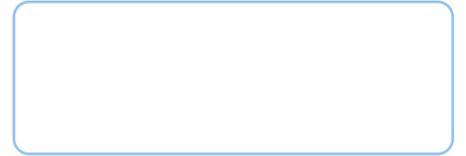
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WELCOME TO THE LATEST ISSUE OF FULL CIRCLE.

As per usual we have some Python, FreeCAD, Inkscape, and Kdenlive for you this month. To give you a third HowTo we have an article on creating a backup with ZFS snapshots. If you don't currently have a backup then remember the old saying: *the most important backup is the one you don't have*. From previous experience I encourage everyone to have a backup of some sort. Even if it's just your essential files.

Charles has begun a small series about his Kodi setup, and SJ continues with his series on how he is using Linux in his research.

You may notice a lot of light blue squares on the contents page. This is because I've no articles on hand to cover those topics. This is probably the thinnest issue of FCM in quite some time. When I say we **need** articles... I mean we **NEED** articles. Remember: you, the readers, write FCM. Without contributions each issue will become less and less.

Anyway, enough doom and gloom from me. Enjoy the issue, and don't forget to write something!

All the best, and keep in touch!

Ronnie

ronnie@fullcirclemagazine.org



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LIBREOFFICE 5.4 OFFICE SUITE DEBUTS WITH NEW FEATURES FOR WRITER, CALC & IMPRESS

Supported until June 11, 2018, with no less than six incremental updates, the LibreOffice 5.4 office suite is here to add an extra layer of improvements to the Writer, Calc, and Impress components. It also introduces a great number of incremental improvements to the Microsoft Office file compatibility and focuses on file simplicity, which is a very important concept for LibreOffice.

The new file simplicity concept implemented in LibreOffice 5.4 translates to the XML description of a new document outputted by LibreOffice being 50% smaller for ODF/ODT files and around 90% smaller for OOXML/DOCX files, compared to the document formats generated by leading proprietary office suites like Microsoft Office.

Here's what's new for Writer, Calc, Impress, and LibreOffice Online

Highlights of LibreOffice 5.4 include a new standard color palette based on the RYB color model, better support for EMF vector images, better rendering of imported PDF documents, along with better support for embedded videos, support for OpenPGP keys for signing ODF documents on Linux, as well as the ability to ensure the authenticity of your signed ODF documents.

Source: <http://news.softpedia.com/news/libreoffice-5-4-office-suite-debuts-with-new-features-for-writer-calc-impress-517185.shtml>

WHY UBUNTU MATE 17.10 COULD BE YOUR NEW FAVORITE LINUX DISTRO?

In late June, the first Alpha release of Ubuntu 17.10 was pushed by the participating flavors,

i.e., Lubuntu, Kubuntu, and Ubuntu Kylin. For Ubuntu 17.10 Alpha 2 has been released and more flavors have participated in this release, including Ubuntu MATE, Ubuntu Budgie. You can find all the download links towards the end of this article.

For those who don't know, Ubuntu's default flavor participates in the final beta release. Powered by Linux kernel 4.11, major highlights in this Ubuntu 17.10 Alpha 2 release could be seen in Ubuntu MATE. So, let's tell you about it:

The Ubuntu MATE developers have called the 17.10 Alpha 2 as their most "Super" alpha ever. The biggest change in this release comes in the form of tons of improvements in panel layouts. With the help of feedback from different sources, the developers have brought a distinctive look and different workflow to each panel.

Please note that Ubuntu MATE 17.10 Alpha 2 is a development release. So, I won't recommend you to install it on your primary home

or work computer. There are some bugs in the OS and it's definitely not recommended for someone who wishes to use a stable system.

Source: <https://fossbytes.com/ubuntu-mate-17-10-linux-distro/>

CANONICAL WORKS ON LINUX 4.13 FOR UBUNTU 17.10, GCC 7 TRANSITION IN EARLY AUGUST

They promised, and they will deliver! Canonical recently announced that they started working on rebasing the upcoming Ubuntu 17.10 (Artful Aardvark) operating system on the Linux 4.13 kernel.

One of the highlights of Ubuntu Kernel Team's latest newsletter is the fact that work started on the building and testing Linux kernel 4.13 for Ubuntu 17.10, and it looks like users can already install the



second Release Candidate (RC) milestone announced by Linus Torvalds last week.

Canonical plans to ship the final release of Ubuntu 17.10 with the Linux 4.13 kernel, but, for now, the current daily builds and the recently released Alpha 2 milestone for opt-in flavors are powered by the Linux 4.11 kernel packages of Ubuntu 17.04 (Zesty Zapus), yet the Linux 4.12 kernel is available in the staging repository.

In the meantime, Canonical engineer Matthias Klose announced that it would start the transition to the GCC (GNU Compiler Collection) 7 as default for Ubuntu 17.10 (Artful Aardvark) as soon as next week, and it also looks like the Perl 5.26 transition has already started in the artful-propose repository.

Moreover, Canonical's Ubuntu developers recently finished the OCaml 4.04 and Python 3.6 transition for Ubuntu 17.10, changed the behavior of "do-release-upgrade -d" command to only upgrade supported Ubuntu releases to the current development version, and addressed reliability issues in

unattended-upgrades.

Source:

<http://news.softpedia.com/news/canonical-works-on-linux-4-13-for-ubuntu-17-10-gcc-7-transition-in-early-august-517223.shtml>

RED HAT ENTERPRISE LINUX 7.4 IS HERE

Red Hat, Inc is a wonderful example of how a company can be successful with open source solutions. There is this misguided stereotype that Linux and open source are just hobbies and that contributors are typically anti-social misfits coding in mom's basement. If you believe such foolishness, I feel bad for you. Actually, Red Hat, Inc has made billions with open source, and its RHEL distribution is an excellent choice for the enterprise.

Today, RHEL (Red Hat Enterprise Linux) reaches version 7.4. It can be had immediately so that IT departments can begin testing. Once everything checks out, they can roll out to company machines. It has many improvements, including NVMe

Over Fabric, a preview of System Roles, and more.

The company further says, "Red Hat remains committed to providing customer choice when it comes to datacenter infrastructure. Red Hat Enterprise Linux 7.4 maintains this commitment with availability across multiple architectures, including IBM Power, IBM z Systems and 64-bit ARM (as a Development Preview). For the IBM Power Little Endian architecture, this release enables support for the High Availability and Resilient Storage Add-Ons as well as the Open Container Initiative (OCI) runtime and image format."

Source:

<https://betanews.com/2017/08/01/red-hat-enterprise-linux-74/>

THE CIA'S AERIS MALWARE CAN EXFILTRATE DATA FROM LINUX SYSTEMS

Even though most technology experts consider Linux to be the most secure operating system, that is not entirely accurate. Over

the past few months, we have seen multiple malware types targeting the Linux OS, either to install cryptocurrency mining software or to exfiltrate important data. Never one to sit on the sidelines, the CIA has built its own set of tools to infiltrate Linux servers around the world. One of these is Aeris, a disruptive type of malware capable of affecting popular Linux distros.

Aeris can infiltrate systems running Debian Linux 7, Red Hat Enterprise Linux 6, Solaris 11, FreeBSD 8 and seniors 5.3 and 5.7. That is a large list, considering that a lot of those Linux flavors are very common. Aeris can successfully infiltrate all of these systems and does its work unabated. Its tools include a way to snoop on encrypted communication, hook into SMTP communication, and exfiltrate files automatically.

It is not the first time we have come across CIA malware, and the Wikileaks team has done an outstanding job of keeping tabs on all of these discoveries. The agency has developed many versions of malware to serve the same purpose. No operating system in the world is safe from CIA infiltration these days, even

though some of its tools are no longer usable by the look of things. It is unclear whether Aeris is still an active threat, but it seems plausible to assume that could be the case.

Source:

<https://themerkle.com/the-cias-aeris-malware-can-exfiltrate-data-from-linux-systems/>

LINUX MINT'S SOFTWARE MANAGER IS GETTING BIG UPDATES FOR LINUX MINT 18.3

In their latest news letter, the Linux Mint team has announced the changes which are part of the development cycle of Linux Mint 18.3. Until now, a considerable number of changes have been made to Software Manager, the inbuilt package management application in Linux Mint. Despite being an early adopter of a GUI-based package management application, not many updates have been made to the Linux Mint's home grown tool called Software Manager. Such tools are a handy replacement for the users

who aren't much comfortable with the command line in Linux distributions.

Linux Mint 18.2 got released recently and the Linux Mint team is eyeing for a major overhaul of the Software Manager as a part of the development cycle for Linux Mint 18.3.

According to the team, efforts have been made to make the application look much cleaner, with its layout inspired by Gnome Software. A shift has been made by porting the entire application to Gtk3 from WebKit. This has enabled support for HiDPI.

The team says around 3x boost in the launch time could be observed for Software Manager. By default, the Software Manager runs in user mode while AptDaemon is in the backend. Also, it would ask you to enter passwords less often. In case you enter the password to install/remove a package, it'll be remembered for a while.

Source:

<https://fossbytes.com/linux-mint-is-updating-software-manager-for-the-modern-world/>

ARCH LINUX 2017.08.01 AND ANTERGOS 17.8 RELEASED — LINUX FOR GEEKS AND BEGINNERS

The Arch Linux developers have released the latest version of their popular rolling Linux distro in the form of Arch Linux 2017.08.01. The Antergos developers too have shipped Antergos 17.8 for the Linux beginners who wish to try out Arch Linux. Both these come with updated packages.

Often called a Linux geek's first love, Arch Linux is not recommended for the light-hearted who wish to install their operating system with just few clicks. It aims to teach you a lot and develop a deeper understanding of Linux. And, with the arrival of August, we are here to share the news of the updated and fresh Arch Linux distribution.

The Arch Linux 2017.08.01 release can be burned to a CD or mounted as an ISO file. You always have the option to write the image to a USB disk and follow the installation instructions.

Please note that this release contains the updated versions of different packages. This release ships with Linux kernel 4.12.3 and occupies just 516 MB on a disk.

Source:

<https://fossbytes.com/arch-linux-2017-08-01-antergos-17-8-released-linux-geeks-beginners/>

AMDGPU-PRO 17.30 LINUX GRAPHICS DRIVER BRINGS SUPPORT FOR UBUNTU 16.04.3 LTS

Ubuntu 16.04.3 LTS was launched about ten days ago as the third and most advanced point release of Canonical's long-term supported Ubuntu 16.04 LTS (Xenial Xerus) operating system series, featuring the kernel and graphics stacks from the most current Ubuntu release, Ubuntu 17.04 (Zesty Zapus).

Of course, this means that Ubuntu 16.04.3 LTS is using the Linux 4.10 kernel, X.Org Server 1.19.3 display server, as well as the Mesa 17.0 3D graphics library. That's a major update from the

kernel and graphics stacks used in Ubuntu 16.04.2 LTS, so AMD had to update its graphics driver, too, to support the new technologies.

Apart from adding support for Ubuntu 16.04.3 LTS, the AMDGPU-PRO 17.30 graphics driver introduces support for the Red Hat Enterprise Linux (RHEL) 6.9 and CentOS 6.9 operating systems, as well as support for the Radeon RX Vega series of graphics cards.

Source:

<http://news.softpedia.com/news/amdgpu-pro-17-30-linux-graphics-driver-brings-support-for-ubuntu-16-04-3-lts-517400.shtml>

KDE FRAMEWORKS 5.37.0 RELEASED FOR KDE PLASMA 5 DESKTOPS WITH 119 CHANGES

KDE Frameworks 5.37.0 appears to be a major update compared to previous releases, and it adds a total of 119 changes across various components and apps for the latest KDE Plasma 5 desktop environments, including

Plasma Framework, KWayland, KTextEditor, KIO, KCoreAddons, KConfig, KActivities, KArchive, KDeclarative, KDesignerPlugin, KHTML, KI18n, as well as Breeze icons.

And the biggest changes included in this release are Scalable Vector Graphics (SVG) for the KHTML engine, support to `ipv*.route-metric` in NetworkManagerQt, updated Akregator system tray icon, Qt5Widgets build support for Sonnet, cross-compilation support for the highlighting indexer, PowerShell highlighting, along with Pug and Jade syntax support.

Besides the KDE components and apps mentioned above, KDE Frameworks 5.37.0 improves the KIdleTime, KInit, KNewStuff, KPackage Framework, KParts, KUnitConversion, KWallet Framework, KWidgetsAddons, KWindowSystem, KXMLGUI, NetworkManagerQt, Sonnet, and ThreadWeaver, as well as syntax highlighting, which received numerous changes, and the extra CMake modules.

Source:

<http://news.softpedia.com/news/kde-frameworks-5-37-0-released-for-kde-plasma-5-desktops-with-119-changes-517390.shtml>

ELON MUSK IS VERY FREAKED OUT BY THIS ARTIFICIAL INTELLIGENCE SYSTEM'S VICTORY OVER HUMANS

With all that's happening in the world, Elon Musk wants to make sure you don't forget about what he thinks is the biggest danger to humanity.

Over the weekend, Musk returned to tweeting about one of his favorite topics of discussion: artificial intelligence. He referenced the threat of nuclear war with North Korea to help make his point.

If you're not concerned about AI safety, you should be. Vastly more risk than North Korea.

[pic.twitter.com/2z0tiid0lc](https://twitter.com/2z0tiid0lc)
-- **Elon Musk** (@elonmusk)
August 12, 2017

Nobody likes being regulated, but everything (cars, planes, food, drugs, etc) that's a danger to the public is regulated. AI should be too.

-- **Elon Musk** (@elonmusk)
August 12, 2017

Musk's tweets came hours after an A.I. system developed by OpenAI defeated some of the world's best players at a military strategy game called Dota 2. According to a blog post by OpenAI, successfully playing the game involves predicting how an opponent will move, improvising in unfamiliar scenarios, and convincing the opponent's allies to help you instead.

OpenAI is the nonprofit artificial intelligence company Musk co-founded along with Peter Thiel and Sam Altman. The company's purpose is to research and develop A.I. and develop best practices to help ensure that the technology is used for good.

Source:

<https://www.inc.com/kevin-j-ryan/elon-musk-says-artificial-intelligence-bigger-threat-than-north-korea.html>

SOLUS 3 LINUX DISTRO RELEASED WITH NEW FEATURES

In late 2015, Solus Linux distro witnessed its first stable release. From then, it has gathered a loyal following, thanks to its beautiful looks, impressive out-of-the-box experience, and beginner-friendly nature. In 2016, Solus project announced that it's turning Solus Linux distro into a rolling release.

Now, Solus developers have announced the release of Solus 3, which is the third iteration of Solus since their adoption of the rolling release model. It should be noted that unlike the previous iterations, Solus 3 is a release and not a snapshot. What does this mean? It means that there are lots of performance improvements and new features.

In its announcement post, developers have outlined their reasoning behind moving away from the regular snapshot model. Instead, they aim to combine the benefits of feature rich releases and rolling model.

A major feature addition to

Solus 3 comes in the form of the support for snaps, which is Canonical-developed package management system for Linux. This makes sure that Solus users gain access to a variety of new software and relieves the developers from doing extra work for a specific Linux distro.

Source:

<https://fossbytes.com/solus-3-linux-distro-released-features-download-torrent/>

UBUNTU BUDGIE DISTRO: SIMPLE, CLEAN AND USER-FRIENDLY

Ubuntu Budgie is one of the few Linux distros to offer integration of a Budgie desktop-only edition, other than Solus OS, whose developers created it.

Ubuntu Budgie is classy and user-friendly. It does not sacrifice performance for reliance on a simple design. It is maintained by a United Kingdom-based developer community. Previously called "Budgie-Remix," it is an Ubuntu-based distribution featuring the Budgie desktop.

Although based on the Ubuntu Linux family, Ubuntu Budgie is not from Canonical, Ubuntu's parent company. The Solus community originally developed Budgie from scratch and tightly integrated the desktop user interface with the GNOME stack.

Designed with the modern user in mind, Budgie is known for its simplicity and elegance. It has a plain and clean style and is easy to use.

The Budgie desktop is not a fork of any other desktop project. Its designers planned for an easy integration into other distros, and it is an open source project in its own right.

The integration of an improved Budgie desktop environment with a solid Ubuntu core makes Ubuntu Budgie an interesting and stable Linux distro.

Source:

<http://www.linuxinsider.com/story/84735.html?rss=1>

RASPBIAN LINUX OS FOR RASPBERRY PI IS NOW BASED ON DEBIAN GNU/LINUX 9 "STRETCH"

About two months ago, Raspberry Pi Foundation's Simon Long reported on a new stable update of the Raspbian operating system for both Raspberry Pi and x86 computers. Those appeared to be the last images based on Debian GNU/Linux 8 "Jessie" as the company announced plans to rebase Raspbian on the latest Stretch series.

Released on June 17, 2017, Debian GNU/Linux 9 "Stretch" is Debian Project's latest and most advanced stable operating system, and now, both Desktop and Lite (Minimal) images of Raspbian Linux OS, dated 2017-08-16, are based on Debian Stretch, running the Linux 4.9 kernel.

The rebasing of the entire OS to Debian GNU/Linux 9 "Stretch" means that many packages and core components have been updated to new versions, and it looks like Raspbian 2017-08-16

comes with Chromium 60 as default web browser, as well as NodeRED 0.17.4, RealVNC 6.1.1, and Sonic Pi 3.0.1.

The Debian Stretch-based Raspbian 2017-08-16 images also come with updated wireless firmware for both Raspberry Pi 3 and Raspberry Pi Zero W single-board computers patching the well-known Broadpwn exploit. Also, PIXEL desktop's LXPanel plugins were moved into separate packages.

Source:

<http://news.softpedia.com/news/raspbian-linux-os-for-raspberry-pi-is-now-based-on-debian-gnu-linux-9-stretch-517422.shtml>

RANCHEROS: A TINY LINUX FOR DOCKER LOVERS

Like the various Linux server and desktop distributions, the container-oriented Linux distributions mix and match various projects and components to construct a complete container infrastructure. These distros generally combine a minimal OS kernel, an orchestration

framework, and an ecosystem of container services. RancherOS not only fits the mold, but takes the minimal kernel and the container paradigm to extremes.

RancherOS is a container infrastructure platform that runs Docker directly on top of a reduced footprint (20MB) Linux kernel. Rancher's take on a minimalist OS is unique in that even the init process is a Dockerized service container. Likewise, traditional system level services, like NTP and DNS, have been replaced with containerized equivalents.

Source:

<http://www.infoworld.com/article/3216524/containers/rancheros-a-tiny-linux-for-docker-lovers.html>

DEBIAN GNU/LINUX RUNNING ON MOBILE DEVICES LIKE POCKETCHIP, SAMSUNG GALAXY, ZEROPHONE, & PYRA

Debian is also called the universal operating system as it is used as a base for hundreds of Linux distributions. So, this claim

also underlines that Debian should run on mobile devices too—right? Well, Debian developers are continuously working to add support for new devices and adapt it as per hardware and GUI capabilities of different devices.

Along the similar lines, during the recent DebConf17, which was held in Montréal, Canada, more than 50 developers met to discuss this issue, as reported by Softpedia.

Debian Project's W. Martin Borgert wrote that a number of mobile devices running Debian GNU/Linux were shown at DebConf17. These devices were:

- PocketCHIP — A small handheld computer with keyboard, USB, WiFi, running Debian 8 or 9.
- Samsung Galaxy S Relay 4G — A Android phone with physical keyboard. It can already run portions of Debian userspace on Android kernel.
- ZeroPhone — An open source, Raspberry Pi Zero-based smartphone with small screen and classic keypad. It ran Debian-based Raspbian OS.
- Pyra — A handheld computer with touchscreen. It'll come with Debian preinstalled.

Source:

<https://fossbytes.com/debian-on-mobile-devices-pocketchip-samsung-galaxy-zero-phone-pyra/>

FEDORA 26 LINUX GETS FIRST SET OF UPDATED LIVE ISOs WITH LINUX KERNEL 4.12.5

Fedora 26 Linux just got several of its official installation images rebuilt, which include a newer kernel and all the latest software and security patches that have been published on the distro's official repositories since its launch last month on July 11, 2017.

Tagged as build version F26-20170815, the new Fedora 26 Linux ISO respins are available for Fedora 26 Workstation, Fedora 26 Xfce, Fedora 26 LXDE, Fedora 26 KDE, Fedora 26 Cinnamon, Fedora 26 LXQt, Fedora 26 MATE, Fedora 26 SoaS (Sugar on a Stick), along with the multi-desktop image mentioned above.

If you're wondering what you can do with these new Fedora 26

Linux ISO respins, let us tell you that they'll come in handy when you want to deploy the operating system on new PCs, as you won't have to download hundreds of updates after install. In fact, these ISO images will save you up to 600 MB of updates.

Updates that you would normally have to download to keep the freshly installed Fedora 26 Linux operating system up-to-date. In addition, you can use these ISO snapshots to create your own Fedora 26 respin, using the same tool that the Fedora Respins-SIG team used to build them, namely Livemedia-creator.

Source:

<http://news.softpedia.com/new/fedora-26-linux-gets-first-set-of-updated-live-isos-with-linux-kernel-4-12-5-517442.shtml>

THESSS (THE SMALLEST SERVER SUITE) 22.2 DEBUTS WITH LINUX 4.9.43, APACHE 2.4.27

Based on 4MLinux Server 22.2, TheSSS (The Smallest Server

Suite) 22.2 is here one month after the 22.1 point release to update various of its core components of the built-in LAMP (Linux, Apache, MariaDB and PHP) server, which is now powered by Linux kernel 4.9.43 LTS, Apache 2.4.27, MariaDB 10.2.7, PHP 7.0.22 and 5.6.31, as well as the BIND 9.11.2 DNS server and Stunnel 5.42 SSL tunnel.

Existing users can update their TheSSS systems if they run the "zk update" command in the terminal emulator. The update process is fully automatic, so you won't have to do anything. But, being a small image, we recommend downloading the TheSSS 22.2 ISO right now from our website and write it on a USB flash drive or CD/DVD disc.

Those unfamiliar with TheSSS (The Smallest Server Suite) will be glad to learn that the project provides them with a live server suite that lets them run a full-featured Linux server without installing any package on their computer, directly from the bootable medium. TheSSS is a lightweight and fast server solution, and it's free.

Being designed with the system

administrator in mind, TheSSS is perfect for webmaster and web designers who need to put together a fast and ready-for-deployment server. Deploying a server was never this easy and TheSSS supports HTTP, HTTPS, MySQL, FTP, SFTP, SSH, DNS, SMTP, and Telnet.

Source:

<http://news.softpedia.com/new/thesss-the-smallest-server-suite-22-2-debuts-with-linux-4-9-43-apache-2-4-27-517440.shtml>

VOYAGER 16.04.3 LINUX DISTRO LAUNCHES OFFICIALLY BASED ON UBUNTU 16.04.3 LTS

A derivative of the recently launched Ubuntu 16.04.3 LTS (Xenial Xerus), Voyager 16.04.3 debuts powered by the Linux 4.10 kernel with support for Intel Kaby Lake CPUs, as well as the Xfce 4.12.3 desktop environment with components like Xfdashboard 0.6.1, Plank Dock 0.11, Screenlets 0.1.6, Covergloobus 1.7.3, LibreOffice 5.4, Mozilla Firefox 55, Mozilla

Thunderbird 52.2, Corebird 1.1.1, and ClamTk 5.2.4.1.

Among other apps pre-installed in Voyager 16.04.3, we can mention Parole Media Player, Conky, Yad, SMTube, Kodi Media Center, MPV, Media, GIMP, Pitivi, Clementine, Gradio, gThumb, Mintstick USB, Xscreensaver, Deja-Dup, Cheese, Impulse, OS-Uninstaller, ClamAV, Terminator, Transmission, Kazam, Grub Customizer, BleachBit, Pidgin, Kupfer, and Synaptic Package Manager.

As mentioned before, Voyager 16.04.3 is based on Xubuntu 16.04.3 LTS (Xenial Xerus), which will receive support for three years, until April 21, 2019. Voyager will also receive support during this period, and existing users can upgrade to the new version as we speak using the APT utility or a graphical package manager.

Source:

<http://news.softpedia.com/new/voyager-16-04-3-linux-distro-launches-officially-based-on-ubuntu-16-04-3-lts-517457.shtml>

RED HAT ADDS MICROSOFT'S .NET CORE 2.0 TO ITS LINUX AND CLOUD OFFERINGS

How things change! Microsoft is porting SQL Server to Red Hat's Red Hat Enterprise Linux (RHEL). And now, Red Hat will support Microsoft's open-source .NET Core 2.0 on RHEL, Red Hat OpenShift Container Platform, and other Red Hat platforms. It's no wonder Bill Gates only owns 1.3 percent of Microsoft these days.

Microsoft's .NET Core is a lightweight and modular platform for creating web applications and micro-services. It enables developers to create .NET applications across platforms and deploy across Red Hat's operating systems and clouds.

This new Microsoft programming framework was released on Aug. 14. .NET Core is the open-source cross-platform implementation of the .NET development platform that runs on Windows, Linux, and macOS.

The latest version of .NET Core

supports .NET Standard 2.0. This provides enhanced platform compatibility and portability across all .NET runtimes and workloads. It also streamlines application packaging with easier access to ASP.NET 2.0 and EF Core 2.0.

Source:

<http://www.zdnet.com/article/red-hat-adds-microsofts-net-core-2-0-to-its-linux-and-cloud-offerings/>

BLACK LAB ENTERPRISE LINUX 11.0.3 UBUNTU-BASED OPERATING SYSTEM NOW AVAILABLE

The perfect Linux distribution doesn't exist. Take it from someone that does a lot of distro-hopping -- you will find yourself searching forever. Instead, it is wise to find a Linux-based operating system that meets your needs and try to stick with it. After all, constantly fiddling with various distributions will just drain your energy and steal your time.

With that said, Black Lab Enterprise Linux 11.0.3 is now available. Should you download it?

Well, if you are not satisfied with your current Linux-based operating system, then maybe. I've got to tell you, this Ubuntu-based distro looks like a winner. It features modern versions of both Google Chrome and the Linux kernel, plus it offers support for many file systems. Despite being designed for organizations, it should serve as a great desktop OS for home users too.

Source:

<https://betanews.com/2017/08/21/black-lab-enterprise-linux-1103/>

LINUS TORVALDS PLANS TO RELEASE THE FINAL LINUX 4.13 KERNEL ON SEPTEMBER 3, 2017

Last week's RC5 release was smaller than the previous fourth Release Candidate, and Linus Torvalds was confident that things would progress normally for this development cycle. And he was right, as RC6 seems to be a normal patch, not to mention that things were quite calm during the past week. It brings only a few updated networking, sound, and

InfiniBand drivers, along with some architecture improvements.

Therefore, it's no-brainer that the seventh and probably last Release Candidate milestone will arrive next week, on August 27, and the final Linux 4.13 kernel release should debut a week later, on September 3, 2017. That, of course, if tomorrow's solar eclipse won't "brings doom and gloom even beyond the expected Oregon trafficalypse," as Linus Torvalds noted at the end of his announcement.

On a more serious note, you're invited to download the source tarball of the Linux kernel 4.13 RC6 release right now from kernel.org and take it for a test drive on your computers. However, please try to keep in mind not to replace your stable kernel with this development snapshot, nor deploy it on production machines. Don't forget to report bugs, if you encounter any.

Source:

<http://news.softpedia.com/news/linux-torvalds-plans-to-release-the-final-linux-4-13-kernel-on-september-3-2017-517443.shtml>

RED HAT SAYS GOODBYE TO BTRFS — IS STRATIS THE FUTURE?

Given the shroud of mystic legalese incantations warding off the union of Linux and ZFS in many commercial products, Btrfs was, and still is, intended by many to fill the void. Btrfs has been slowly catching up to ZFS in features, but there's still a long way to go. Btrfs still lacks some relatively mundane features, such as disk encryption, but this is in many ways due to the complexity, and presumably because implementing such a feature could easily break backward compatibility.

Both Btrfs and ZFS allow for scripting many different operations, backups, replication, and customization among them. Both can be extremely hands off because they verify their consistency at all times, because of this, they are often referred to as 'admin-less'.

But if Btrfs is so great, why does Red Hat want to nix it? Well,

it comes down to a few key problems. The current state of storage management on Linux typically requires several layers of software (volume manager, RAID, filesystem, encryption, etc). While Btrfs combines many of these layers, it is still not yet a complete package. Another problem that is inherent to not only Btrfs, but ZFS as well, is that the command line utilities are designed for use by people. This means that the information returned by these commands cannot be used directly and must be parsed before anything meaningful can be done with it. Additionally, the output can change between versions of the utilities and system configurations making it all the more difficult to parse and use programmatically.

Source:

<https://fossbytes.com/red-hat-deprecate-btrfs-filesystem-stratis/>



Over the last two months, both of my articles have asked users to share their programming experiences, specifically how they got started, and some of their experiences when learning or using a language. This month, I will be compiling the responses I have received. To anyone who took the time to respond, thank you!

Note: All responses are quoted as-is.

"I started programing on a PET at our local high school. When I could afford it, I bought a VIC 20. I devoured every issue of Compute! to laboriously type in the programs, learning as I went. Then on to MS Basic. I loved those languages, so easy to understand. Or perhaps my young brain made it easy. Microsoft's Visual Studio, Visual Basic 6 in my case, made powerful database programming easy so I wrote several programs for financial management, electronic calculations, and hobby data recording. I am now using Python and Tkinter as I have switched to Ubuntu.

I consider myself a dabbler, by no measure an expert. So I concentrate on a few coding aspects at a time, for instance string formatting and using lists, tuples and dictionaries. When I have the use and syntax down, I'll move on to something else. I have some books on python to get me started but the internet is my main goto for help. It is much easier to enter my exact question into a search engine and get a relative answer than to search through the books where information is somewhere in a few hundred pages. I then record the answer in a file as a snippet.

It is a slow process but gives me a lot of satisfaction and I hope keeps my brain learning to delay senility. It is a hobby, one of many, so not a lot of time is available to thoroughly learn a lot. This is why I keep examples in my snippet files, I can cut and paste to speed things up.

When I run out of project ideas, I refer to the complete programs in tutorials, pick one at random, close

the book and write my own version. The topic is not too important, it's the learning and seeing something work when I'm done. I just enjoy it, what else can I say?"

Lee in Ontario, Canada

"I am interested in programming.

I can help myself in BASIC, the first language I learned. I can also help myself to an extent in 6502 assy. However, I find learning 'modern' programming languages to be a PITA.

Taking video courses, I find 'hello world' to grate my ghrekin to no avail. "Introduction" courses teach you what variables, lists, tuples are, yes, but then leave you high and dry.

I have tried taking a Edx/Coursera or similar course in Python, but it is just too stressful. I have very slow internet, and I

usually have the required video's downloaded by the Thursday. Your "answer" has to be in by Friday and you need to mark other student's papers on Saturday, "results" on Sunday (which leaves NO time for you to figure out what is going on). I did try codeschool, when they were free, and found I could do most of the exercises without issue, but again it felt empty.

Udemy I find, teaches you just enough so you purchase the second course to find out you wasted your money and the whole "course" could be broken down into 10 sentences.

I found Harvard's "CS50" online, but the jumps between lessons are too big. (obviously they do not post every lecture, but the 'most entertaining' one from the week). This also does not work for me.

I looked back at how I learned BASIC and 6502 Assembler. Basic came from my old ZX Spectrum. I have BOOKS! filled with grid paper that I made sprites on. Then I learned how to make said sprite

move horizontally and vertically. Thereafter, I learned how to make said sprite move on keypress, and so forth. You get the idea.

You can say I learned visually. (this was only every weekend when I was allowed to use the computer)

Then I came into possession of a BBC micro. The BBC micro had its own monitor, so I did not need permission to use the TV to use the computer. I got a "big book of BBC games" which was one of those 'type in the code and play the game'. Heh, you can imagine how long debugging took. (To be sure, I also had a slightly different BBC micro than the book was intended for.)

When looking for help back then, I could not even get someone at the college to help me as they taught logo and lisp, etc, and had no idea about assembly. (no internet).

I was determined to get my sprites moving, etc. The only way I figured out what things did was by breaking other people's code. (using cryptic three letter acronyms, I had no idea what they did at that stage)

Basic was just too slow, as the CPU's were just too slow.

Today I know JNE is 'jump if not equal' and putting things in the base register adds them for you.

I still have no idea of memory allocation, but I used to write the addresses down in a little book to make due.

So in conclusion, I find 'modern' teaching methods is a factory approach that does not make things easy for students, but easy for the teachers MARKING the work.

There is no "fun" or "exploration" in it and 0 practical use. I don't give two shits about giving a variable the property of "hello world" and printing the variable or calculating the tax on a bill. I would rather watch paint dry.

Yes, I paid a lot of money once to go on a "programming course" that culminated in making a tax calculator for a bill."

Erik

"My first language was IBM 1401 Autocoder. (An assembler language with macros!)

My first "personal computer" was a 1401 at IBM's Toronto downtown branch. If I was bored on a Sunday afternoon, I would go to the office and fool around on the computer. I didn't do it to help my career, but that was one of the effects.

Sheesh, that was 52 years ago."

"Hi Lucas,

Back in the /360 days, there were times when I was a project leader, which took about a third of my time. Several times, I wrote sort exits in Assembler. I have a good friend who wrote and modified a lot more Assembler than I did.

If memory serves, all programs began, BALR 13,14

When I got my PET, I wrote several programs in 6502 assembler, including a patch to the ROMs so interrupt-handling blocked other interrupts for about

105 microseconds instead of 1/600 of a second.

My most popular program could load an Applesoft program from an Apple tape, and leave it in memory. Applesoft and Commodore BASIC were not identical, so the translation was imperfect -- but I never got any complaints."

Gord

To all readers who took the time to respond: I appreciated your comments and stories, and sometimes made me feel relief about the current state of affairs! For anyone reading this article: I hope you find it as inspiring and interesting a read as I did.

If anyone has any comments, questions, or requests for future articles, feel free to email me at lswest34@gmail.com. Similarly, if this article encouraged you to share stories of your own, feel free to contact me with them as well, and I will fit them in as I can. Next month, we shall return to our regularly scheduled programming!



Last month, I gave you some basic information about the GPIOZERO library in preparation for the music box program that uses the RPi, the MCP3008 from last month, three potentiometers and a number of switches to make a simple music player. The core of the project is the Fluidsynth program. Michael Horne was kind enough to let me talk about his project. The original project can be found at <http://www.recantha.co.uk/blog/?p=14818> and his code is at <https://github.com/recantha/musicbox>.

Michael's project includes a case, amplifier and speaker, but I'm not going to deal with those, since this is a discussion on using the RPi. I'll leave those items to you to figure out. I'm using the HDMI audio out and it works just fine, with the exception of being tethered to the monitor by the HDMI cable.

The first thing you need to do is install Fluidsynth from the Add/Remove program on the RPi.

Next, you need to add the pyfluidsynth python library. You can do this using pip in a terminal.

```
pip install pyfluidsynth
```

I'm going to assume that you installed the GPIOZERO library that we used last month.

Hopefully, you still have the MCP3008 Analogue to Digital converter wired up from last month's potentiometer project. If not, all is not lost. You can use the Fritzing diagram below.

PARTS LIST

For this project you will need:

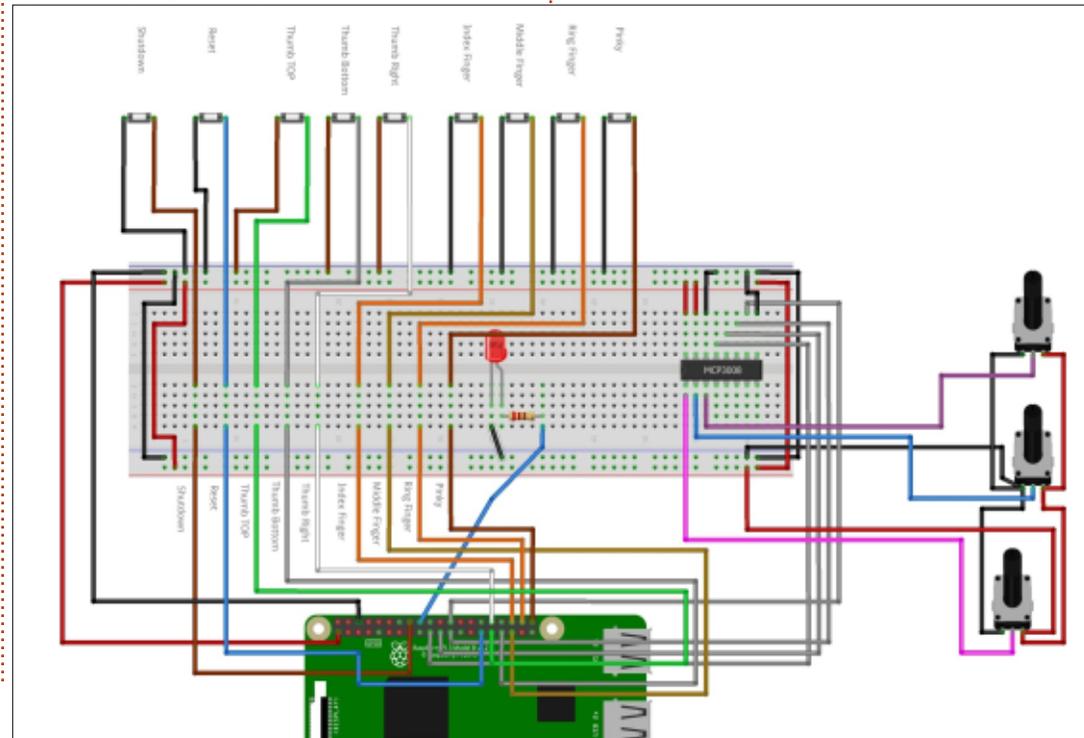
- Raspberry Pi
- Breadboard
- Jumpers
- MCP3008
- 1 LED
- 1 220 Ohm Resistor
- 3 10K potentiometers
- 9 momentary pushbuttons

The potentiometers all have one lead that connects to ground,

one that connects to 3.3vDC and the wiper connects to the MCP3008 pins 1, 2 and 3. The switches all have one lead connecting to ground and the others connect to GPIO pins 5, 23, 13, 6, 12, 16, 19, 20 and 21 (physical pins 29, 16, 33, 31, 32, 36, 35, 38 and 40). The LED cathode connects to ground and the anode connects to one side of the 220 ohm resistor while the other side of the resistor connects to GPIO pin 24 (physical pin 18)

THE CODE

The code is fairly long, so I won't include it all here. I will, however, pull out various snippets to discuss some of the less mundane segments. I also will be bouncing around within the code, to point out various things. I do strongly suggest pulling the full code from Michael's github page. It also includes sound fonts for you to test with.



Of course, the very first thing that Michael does is his imports...

```
from __future__ import
division

from gpiozero import Button,
MCP3008, LED

import glob
import os
import re
import time
import fluidsynth
```

The only library that you might not be familiar with is the 'glob' library. This library allows the matching of filenames to a pattern. It's simple but very powerful.

Next he loads up FluidSynth.

```
# Start up the Synth and load
the sound font

fs = fluidsynth.Synth()
fs.start(driver='alsa')
```

Now, here is the button definition section. Remember, the pin numbers refer to the GPIO pin, not the physical pin number.

```
# Set-up buttons for reset
and shutdown

button_reset = Button(5)
button_shutdown = Button(23)
```

```
fonts = []
font_names = []
def load_soundfonts():
    global fonts, font_names
    BANK = os.path.join(os.path.dirname(__file__), "soundfonts")
    FILETYPES = ['*.SF2', '*.sf2']
    all_files = glob.glob(os.path.join(BANK, "*"))
    print("{} soundfonts have been found".format(len(all_files)))
    font_names = [format(file) for file in all_files]
    fonts = [fs.sffload(file) for file in all_files]
    print(font_names[0])
```

```
# Set-up buttons for keyboard
input
```

```
thumb_bottom = Button(13)
thumb_top = Button(6)
thumb_right = Button(12)
index_finger = Button(16)
middle_finger = Button(19)
ring_finger = Button(20)
pinky_finger = Button(21)
```

Now he defines which potentiometer is on which channel of the MCP3008. (I added the comments in this section.)

```
# Define potentiometers
```

```
pot0 = MCP3008(channel=2) #
Volume Control
```

```
pot1 = MCP3008(channel=1) #
Instrument Select
```

```
pot2 = MCP3008(channel=0) #
Additor
```

The load_soundfonts() routine (top right) will walk through the soundfonts directory, getting the file names of the soundfonts into a

```
instrument = 0
def set_instrument():
    global instrument, font_names

    number_of_instruments = len(fonts)-1
    number_of_pot_steps = 1024
    current_pot_value = pot1.raw_value

    new_instrument = int(round(number_of_instruments*(current_pot_value /
number_of_pot_steps)))
    #print("Number of instruments: {} / Current pot: {} / New instrument: {} / Number
of pot steps: {}".format(number_of_instruments, current_pot_value, new_instrument,
number_of_pot_steps))

    if new_instrument != instrument:
        print("Instrument being set to {}".format(new_instrument))
        print("Instrument is {}".format(font_names[new_instrument]))
        instrument = new_instrument
        fs.program_select(0, fonts[instrument], 0, 0)
```

usable list. Michael includes 15 sample soundfonts in his source files.

This next routine (previous page, bottom right) will set the instrument for the synth based on the value of potentiometer #1 which as we saw above is on channel number 1 of the MCP3008.

Here is where Michael sets up the actions for each of the music buttons. Basically, there is a 'when_pressed' and a 'when_released' action that calls a routine when the action is performed.

```
# Assign actions to
when_pressed for each button
thumb_bottom.when_pressed =
thumb_bottom_start
thumb_bottom.when_released =
thumb_bottom_stop
thumb_right.when_pressed =
thumb_right_start
thumb_right.when_released =
thumb_right_stop
thumb_top.when_pressed =
thumb_top_start
thumb_top.when_released =
thumb_top_stop
index_finger.when_pressed =
index_finger_start
index_finger.when_released =
index_finger_stop
middle_finger.when_pressed =
middle_finger_start
middle_finger.when_released =
middle_finger_stop
ring_finger.when_pressed =
```

```
last_note_index_finger = index_finger_note

def index_finger_start():
    global last_note_index_finger
    last_note_index_finger = index_finger_note+note_additor
    fs.noteon(0, last_note_index_finger, volume)

def index_finger_stop():
    fs.noteoff(0, last_note_index_finger)
```

```
ring_finger_start
ring_finger.when_released =
ring_finger_stop
pinky_finger.when_pressed =
pinky_finger_start
pinky_finger.when_released =
pinky_finger_stop
```

Glancing at index finger button action routine sets we see what's shown top right...

The way things work on a synth is that when a note key is pressed a noteon event is called and when it is released, a noteoff event is then called. (That is why sometimes when playing a midi file on a computer you get notes that seem to be accidentally left on, playing forever. The noteoff event is never read by the soft synth.) By doing this, you could play chords. These are mostly repeated for each of the buttons that control the notes to be played. Also notice that the value of the additor is added to the note itself. This allows you to do various octaves of

the seven notes.

In the following lines, Michael sets the note definitions for each button.

```
thumb_bottom_note = 54
thumb_right_note = 56
thumb_top_note = 58
index_finger_note = 60
middle_finger_note = 62
ring_finger_note = 64
pinky_finger_note = 66
```

I think that this gives you a basic understanding of what the code does, so you can continue on and play with the project.

Once again, a huge thanks to Michael for this project.

Until next time, have fun.



Greg Walters is owner of RainyDay Solutions, LLC, a consulting company in Aurora, Colorado, and has been programming since 1972. He enjoys cooking, hiking, music, and spending time with his family.



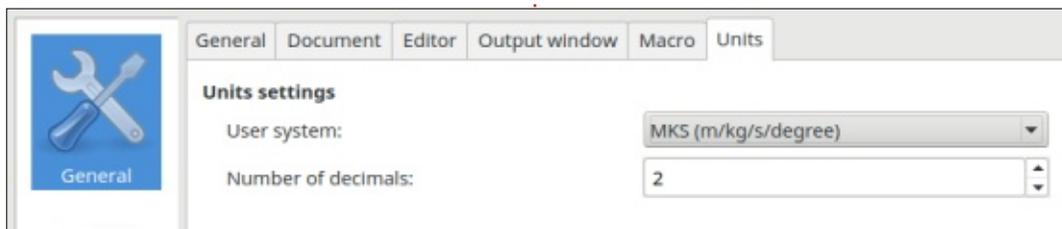
HOW-TO

Written by Alan Ward

In this series, we will be examining the world of FreeCAD, an open-source CAD modelling application that is still in Beta, but has been gaining acceptance in recent years. Naturally, it is readily available in the Ubuntu repositories. In the fourth article on using FreeCAD, we created a Sketch object, to place individual drawing elements such as lines, arcs, and points, in a precise relationship to each other using constraints. We noted the use of Construction mode elements within the Sketch object, to aid construction of the complete diagram while not appearing in the final drawing. In this part of the series, we will change scale altogether and work on an architectural project.

SETTING UP OUR UNITS

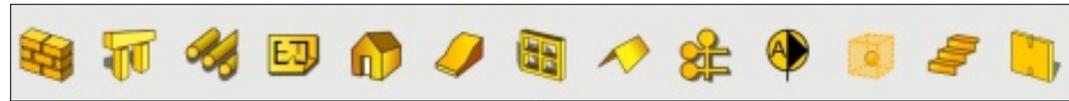
The main difference between



the small technical parts we have drawn up so far and an architectural project lies in the units used. Small parts tend to be easily measured in millimeters. However, in the case of a building it would make sense to use larger units such as meters (in the metric system). To set up the environment, let us begin by starting up FreeCAD, and choose a new Project. Then go to menu option Edit, and choose Preferences. Within the General pane, choose the Units sub-pane and change "User system" settings from millimeters to meters - or the imperial system if that is your preference.

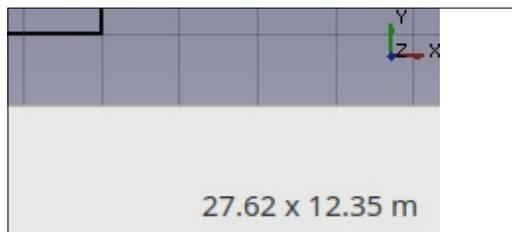
Though we have changed the main units, the auxiliary grid that comes up to help us place elements will still use the former aperture value between grid lines. Having a 1x1 m grid with lines

Intro To FreeCAD - Pt5



every millimeter may not be of much use to build a house. So, continue within the Preferences dialog box, and go to the Draft pane. Here, choose the Grids and Spacing sub-pane, and change the value for "Grid spacing".

As a quirk, it may be necessary to save your project, close FreeCAD and open it once more to actually see the grid with its new size. Remember to use the mouse wheel to zoom out to see a sufficiently large amount of the X-Y plane. Remember the visible area

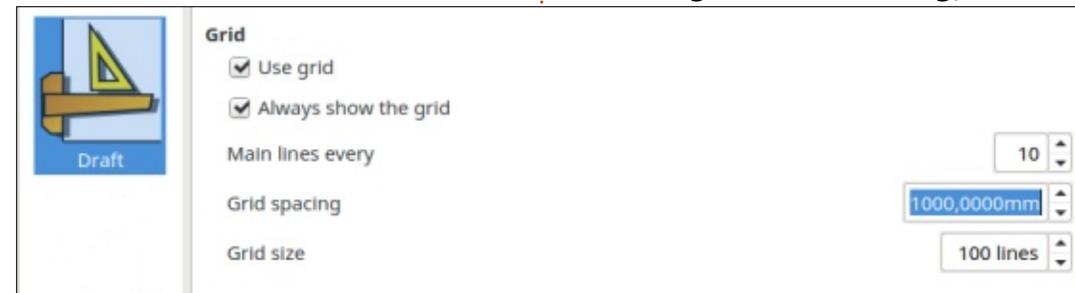


is always indicated in the lower right corner of the display.

USING THE ARCH WORKBENCH

Let us begin actual design by noting the existence of a specific "Arch" workbench. This toolset has been specifically conceived to draw designs of buildings as a Building Integrated Model, or BIM. In this concept, building elements are labelled as such: walls become a Wall object, openings such as windows or doors become Window objects, and objects such as a Support, a Roof or a complete Building object can be specified using the appropriate toolbar.

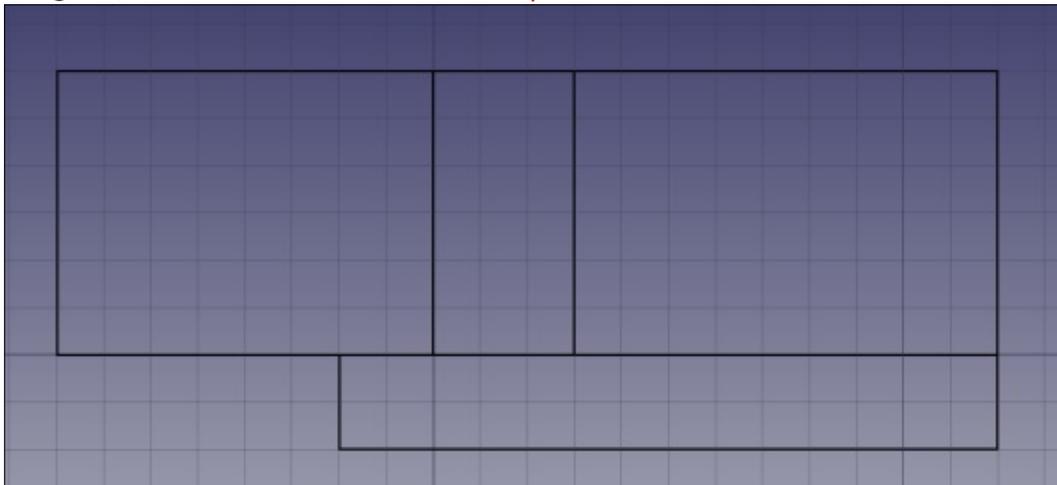
To begin a new building, one



HOWTO - FREECAD

could start in the Draft workbench, by drawing out the general floorplan. Simple lines are sufficient to indicate the position of each wall. For the time being, no mention needs to be made of wall widths and of the placement of openings. For instance, one could draw up the following building, representing a small school module with two classrooms or laboratories, one preparation room between them, and an exterior corridor.

Once the floorplan has been drawn in this fashion, move to the Arch workbench, and select all lines. Then select the Wall tool, and all lines magically become proper Wall objects. A default value of 3m is used for wall heights, and 0.2m for wall

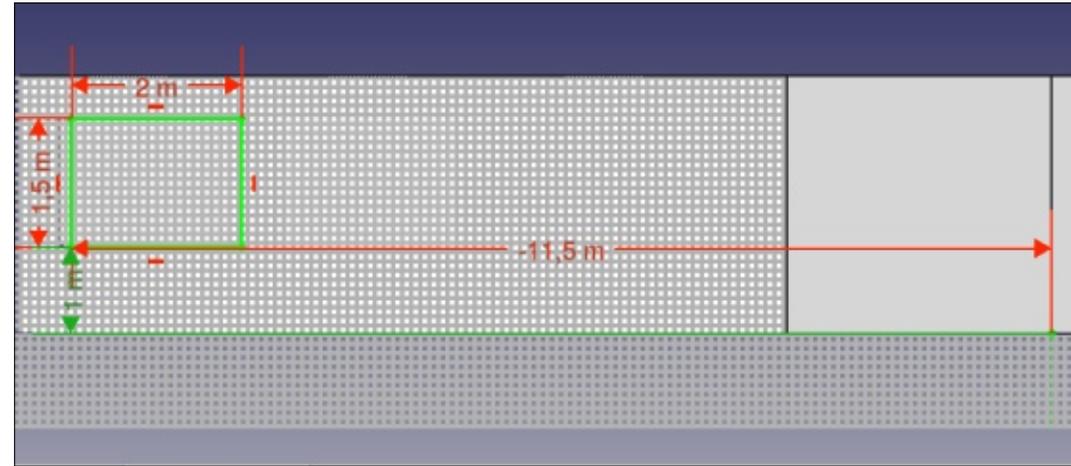


thicknesses.

To continue, one would need to place openings. To do so, start by creating a Sketch object attached to the corresponding wall object. This Sketch object needs to contain a closed form that represents the shape of the opening.

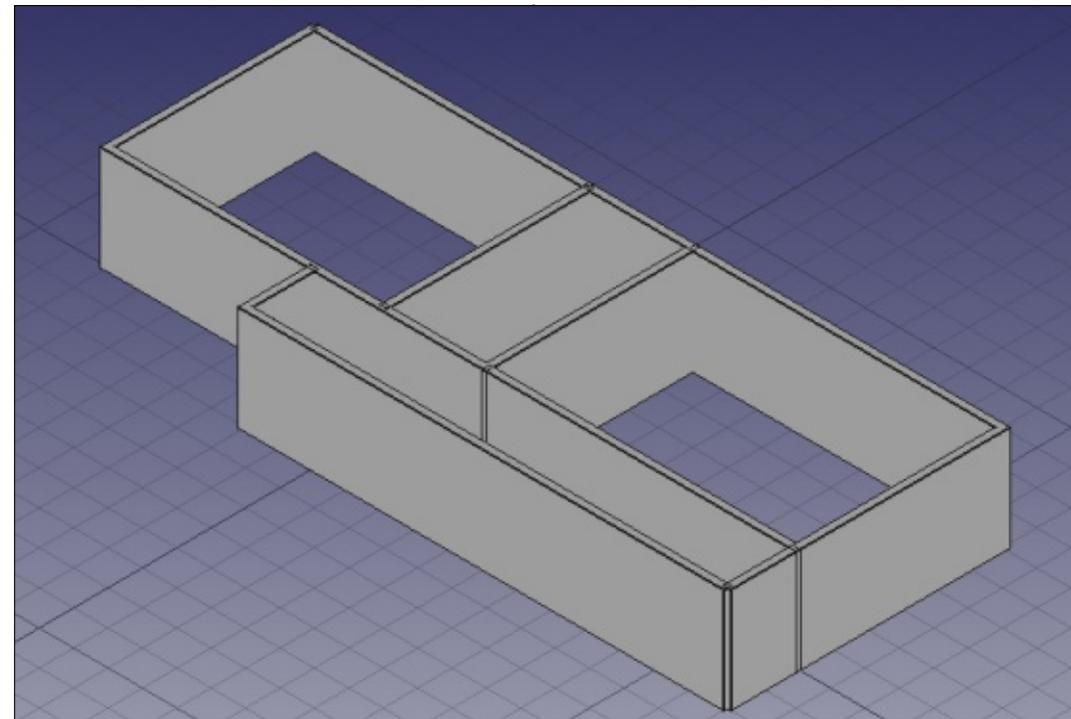
For instance, one could create a simple rectangular window for one of the classrooms. Choose the wall object on which to draw, go to the Sketch workbench, and create a new Sketch object. Using the Sketch constraint system described in the previous part of this series, the four lines that describe the position of the new window can be placed with some precision.

Once finished, close Sketch edition mode, and make sure the

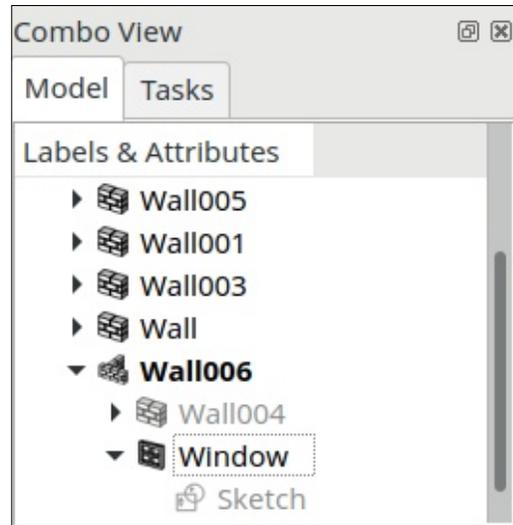


new Sketch object is actually associated to and within the Wall object. Then go to the Arch workbench and transform the Sketch into a Window object. Within the Combo View to our left,

we should see how the original Wall object (Wall004) has been replaced by a new Wall (Wall006), that contains both the original shape and a new Window object. This latter object in turn contains



the Sketch. Each internal object defines the shape of the external one that contains it.



The Arch workbench and the BIM approach to building an architectural project has several advantages. One is ease of use, specially when working with a rapid prototyping approach, under which several models may be tested to explore the possibilities of a new site or construction idea, before settling on a particular solution. Just lay down the lines, and build up your walls. A second advantage is that, once the new building's elements have been defined as such, the information contained within the model can be used to automate calculations, such as surface area or building volume.

On the other hand, this part of the FreeCAD software is possibly the least mature for the time being. As work in progress, developers seem to be exploring the possibilities of the BIM approach, and there are some rough edges. Element placement is still rather fiddly, and much care must be given by the user to place objects correctly within their containing objects. Roof creation is an art by itself. Object conception is made using regular parts that may, or may not, correspond to the real world. For instance, working with a building interior floor that is not completely flat may become a challenge, as may be working with walls that have varying levels of thickness along their length. Solving corner intersections between walls may also become an issue.

For this reason, the choice of using the Arch workbench must be left entirely to each individual user. Some people may hate the limits this approach places on their workflow, while others may revel in the ease of creation of modern-looking buildings. In any case, one of the designers of FreeCAD has created a rather good tutorial on

its features, that may be of interest as further reading: https://www.freecadweb.org/wiki/Arch_tutorial

A MORE TRADITIONAL APPROACH

Users who do not need or do not care for the features of BIM may feel more comfortable using the more standard tools in the

Draft and Sketch workbenches to draw traditional views of our construction. However, we should always bear in mind that FreeCAD is a 3D-oriented computer design program. For this reason, limiting ourselves to the more traditional conception of architectural drawings - planar projections and perspectives - can certainly work, but we would lose out on the capabilities of visualizing the building in the third dimension



Photo credit: Wikipedia user Zarateman (<https://commons.wikimedia.org/wiki/User:Zarateman>). Original link: https://ca.wikipedia.org/wiki/Catedral_de_Tarragona#/media/File:Tarragona_-_Catedral,_claustro_01.JPG

that FreeCAD allows us.

To see how this could work out, let us project something that would be rather difficult to draw up using the Arch workbench: an arcaded cloister. This is typically a square or rectangular space that consists in a covered walkway surrounding a central open area with vegetation, an arrangement that has been used both in a certain type of Islamic garden (e.g. Patio de los Leones, Alhambra Palace in Granada, Spain) and in Christian churches, both in Romanic and Gothic styles. It is this

latter that will inspire us to design the cloister arches, such as those found in Tarragona Cathedral, Catalonia.

Let us begin by drawing a simple Gothic arch. In FreeCAD (bottom left), go to the Draft workbench and set the grid aperture to 500mm. Then go to the Sketcher workbench, and start a new Sketch object. Here, we will probably need to alter the grid aperture a second time, to 0.5 m (same value, different units). We can then begin by drawing the base of our arch, using the grid as a

support. Using simple values, I drew two vertical lines 0.5m high and set 1m apart. I was then able to draw the arched top part of our figure. In its most traditional form, this is the combination of two circular arcs. In the figure below, a construction circle has been drawn in blue: centered on the top of the leftmost vertical segment (green point), it passes through the top of the right post, giving it a radius of 1m. Using this circle, draw an arc of a circle from the rightmost post up towards the centerline of the

figure (snap to the vertical grid line), giving the right part of the arch. Now draw a similar circle centered on the top of the right post, and draw the left part of the arch.

Once we exit editing mode, we obtain a nice outline of our Gothic arch, which would in this case be called an equilateral arch. Since real architectural elements have volume, we now need to find a way of transforming this into a volume, keeping as much in character with



real Gothic building techniques as possible. However, when one studies carefully the stone parts that go into making up real Gothic arches, one almost always finds that the same profile has been cut all along soft pieces of white sandstone. Therefore, if we can create such a profile and somehow sweep it along our arch outline, we should end up with a perfect three dimensional arch frame.

Please do make sure this shape is complete, i.e. that all lines connect well to each other. The penalty for not doing so would be a final arch shape that is built up only in part - with another part missing.

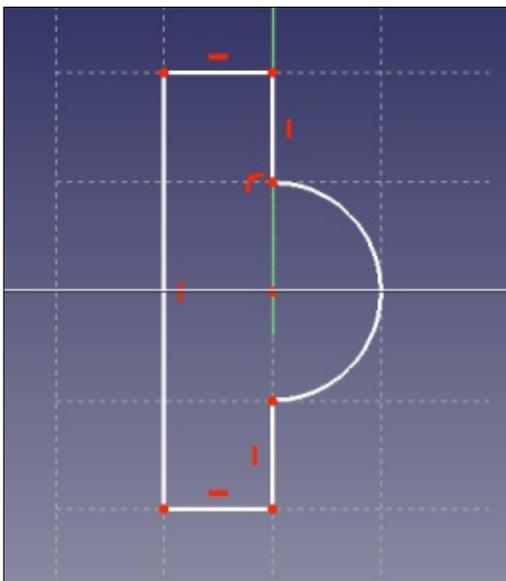
I drew my arch sketch (previous page, bottom right) in the XY plane. I will now create a second Sketch object, but at right angles within the XZ plane: the X-axis is in the left-right direction, Y is top-bottom, and Z goes along the arch depth.

Within this new Sketch

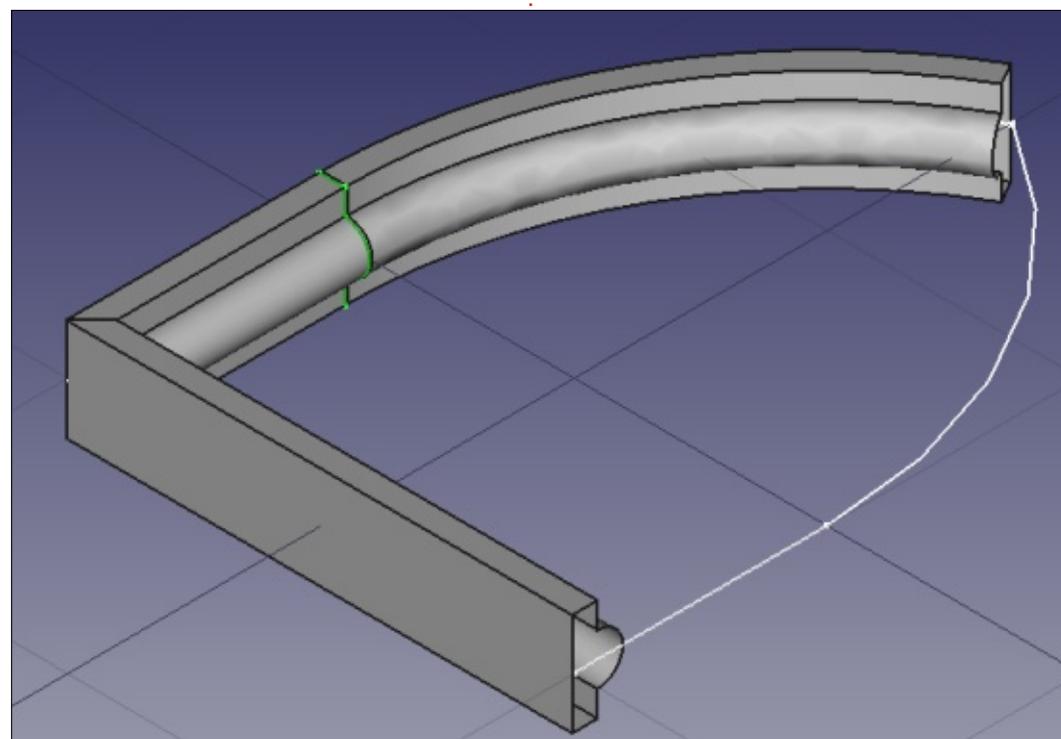
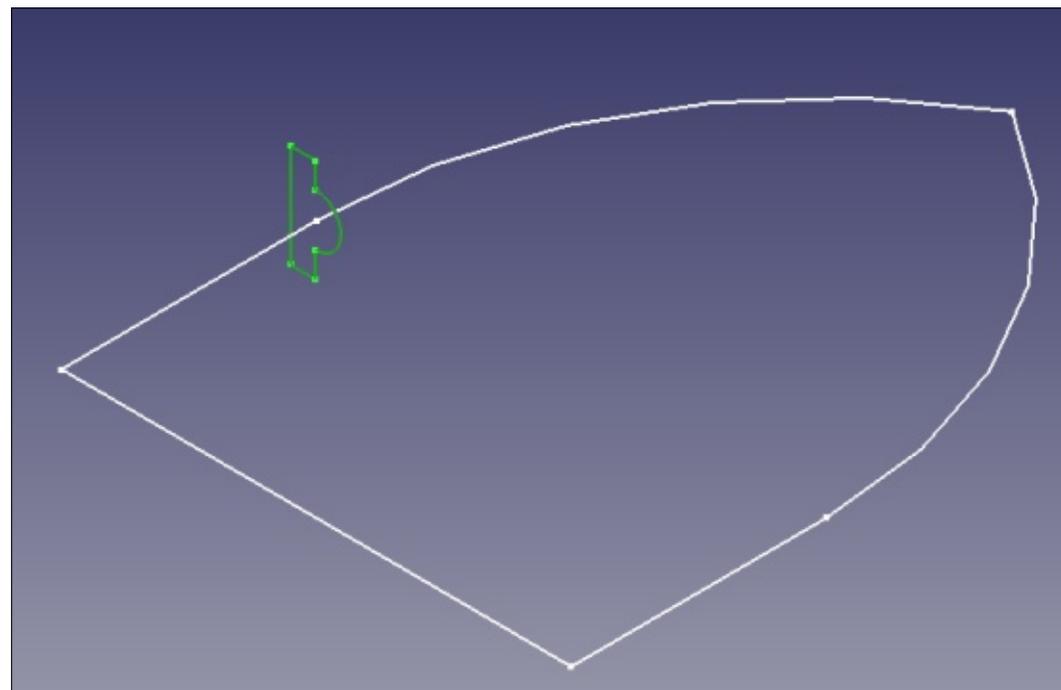
Please note that the grid dimensions have been changed. We are now working with an aperture of 5 cm, giving an

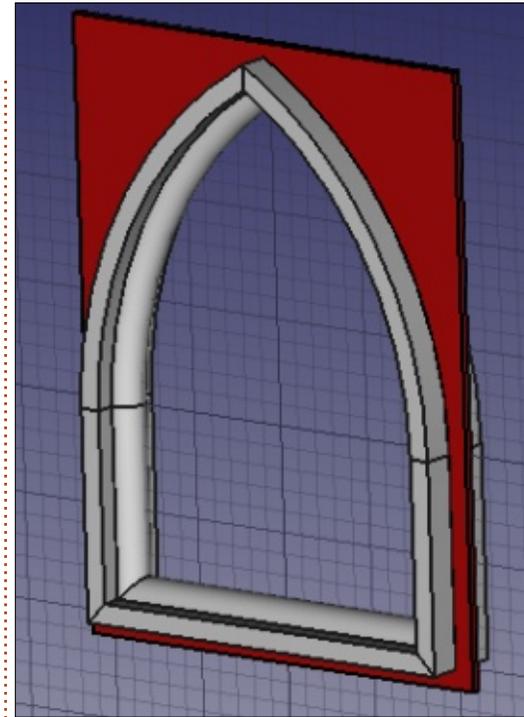
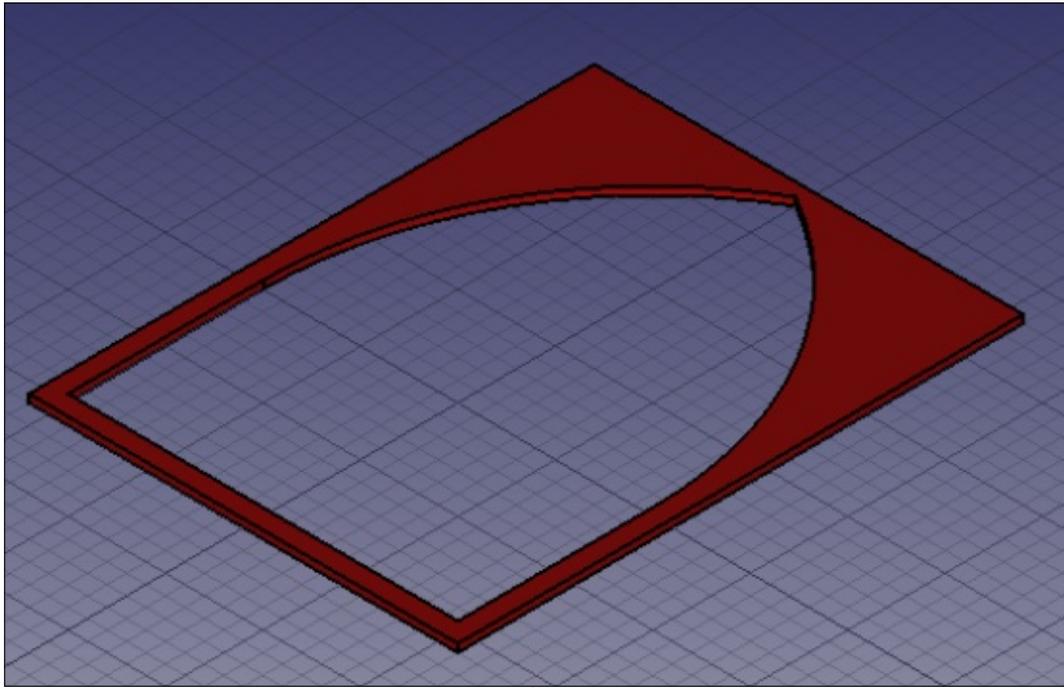
element profile that fits within a 10x20 cm rectangle. Close this second sketch, and we can now proceed to the Part workbench. In this, select the Sweep tool.

In this tool, we select one of the sketches as the



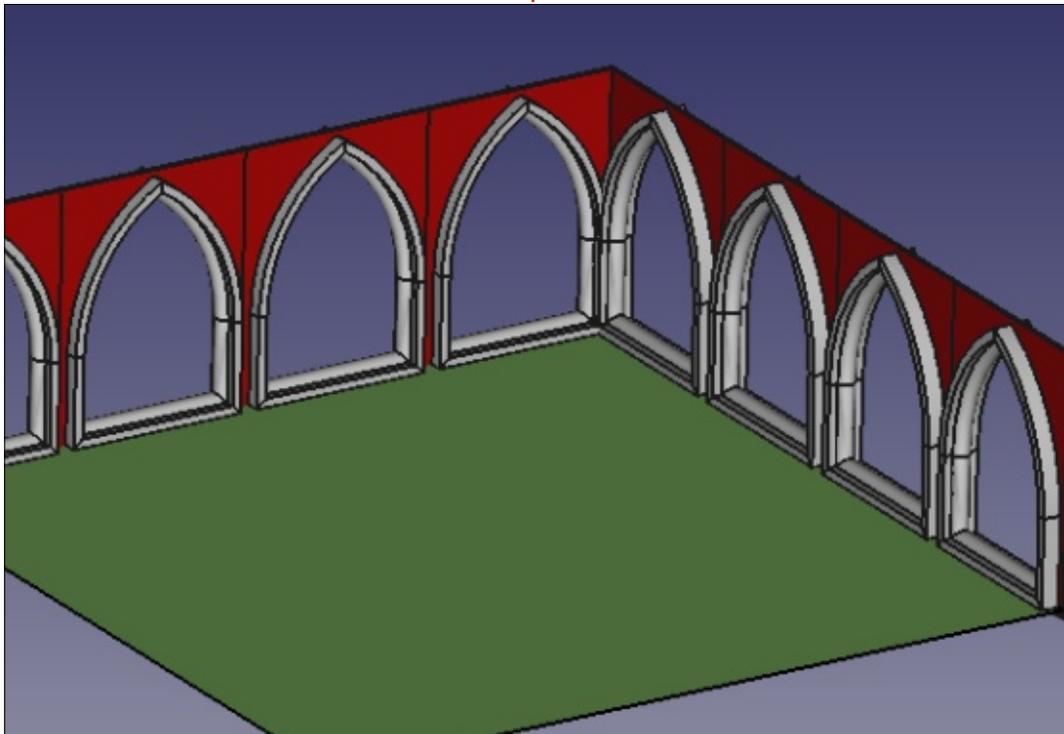
form to be swept, and the other as the path to sweep it along. However, there are some caveats. The main point is the relative placement of each sketch. Their relative positions will be respected when one is swept along the other. It is best to ensure the swept form is actually placed upon the path before proceeding. In my case, I needed to displace it some 0.5 m leftward of the place where it had been created, in the vicinity of the





prepared, what we have actually achieved is a computer model of the elegant carved stone frame of the arch. However, this arch would not work well in architecture by itself, but must be part of a wall or a complete structure.

To create this wall, I draw a simple rectangle 1.1 m wide by 2.1 m high in the XY plane, overlapping the arch by several centimeters on all sides. I then extruded this flat piece as a rectangular volume - as in Part II of this series, which I then dyed red. The final touch is to make a Pocket indentation in this rectangle, to accommodate our arch. This done by selecting one of the outward faces of the rectangle, and creating a Sketch on this face, with the same shape as our original arch. A copy of the arch sketch could also be made, and then attached to the face of the rectangle. Then use the Pocket tool in the Part design workbench to push the sketch form "inwards". If sufficient depth is given to it, it will end up by making a hole straight through our rectangle, in the correct shape to place our arch volume in.



coordinate system's origin. For some reason, I also needed to move the second sketch downward a small amount - some 25 mm, presumably to ensure it was not in the vicinity of a connection point between segments of our arch sketch.

In this partial view, one can see how the wireframe arch sketch is acting as a support for the second, profile, sketch, as it goes around using the first sketch as its path.

Once the final arch tridimensional shape has been

The arch Sweep volume and the

HOWTO - FREECAD

red Pocket can then be selected, and united into a single Component representing a complete architectural module.

This module can then be copied and pasted several times, to form a series of arches. Each element will need to be displaced and perhaps also rotated into its final place, working with the object's Data pane in the lower left toolbox. This series of arches can be further replicated, until a complete architectural ensemble is formed.

WHAT NEXT?

In this article on using FreeCAD, we worked on an architectural project in two different ways. In the first place, we used the Arch workbench to create a modern architectural project, in which supplementary information is given to the computer, so using FreeCAD to create a Building Integrated Model (BIM). Since this approach is in an early stage of development, and is limited to simple forms, we then used a more traditional approach to create volumes in the same way as in previous projects, but on a larger scale. The sweeping technique

allowed us to create an element with the shape of an arch by sweeping one sketch (a profile) around another sketch (the outline of an arch).

In the next part of this series, we will extend FreeCAD's possibilities using a little Python programming, to create a helicoidal surface in the shape of a gear wheel.



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



Backups are fundamental aspects of the IT life: for personal purposes as well as in professional environments. Ranging from personal documents to server configurations and databases, sometimes a backup is life-saving. There is plenty of documentation around the web: documents about backup strategies, how-tos, backup softwares, and so on.

The big drawback of backups is, most of the time, space occupancy. A good software, or a good strategy, can mitigate this by means of incremental backups. But in some cases, learning and implementing a specialized backup software is laborious, tedious, and the learning curve is too high especially when we only need “a simple” copy of the last useful files or database dump. In any case, there isn’t a self-configuring software out there: strategies and policies are up to the system administrator or backup administrator. And last but not least, what about restore? We all hope not to need to restore a

backup, but sometimes disasters can occur: from deletion of an important document to database server crash.

Here, in this article, we will talk about a sort of incremental backup. How difficult is it to retrieve a backup or restore a database from an incremental backup? In a company, sometimes, the System Administrator is also the DBA and even the Backup Administrator at the same time, so testing backups’ restoration is, most times, a zero priority task.

As said before, space occupancy (hard disk or tapes) is a big question to address.

Let’s talk about a disk shared between many users, or the home directories of such users. Let’s say we want to use an affordable and simple solution using well known tools, that must be a reliable solution as well. The choice of the tool, if we work on Linux and Unix, will usually fall on rsync.

We have to take into account that rsync doesn’t delete files on

the destination that are not in the source anymore: but we cannot store files indefinitely, for example documents voluntarily deleted by users or old configuration files, what a lot of garbage; so we can use the delete option ((rsync --delete: delete extraneous files from dest dirs)) offered by rsync, but... who knows if the user didn’t delete a file by mistake?

So, if we use rsync, we must take care of such things: we must avoid garbage and we cannot rely only on one backup, that is the last time rsync has run. So, usually, we end up writing a complex script, or we spend time looking for and testing some script or software found on the Internet, falling again in a pointless learning curve or using a script that doesn’t fit our needs.

Well, a filesystem snapshot can save our bacon. In this article we will talk about ZFS snapshot feature.

WHAT IS ZFS

ZFS is a robust, enterprise grade, filesystem and volume manager developed by Sun in the late 2001; today it is the default file system on Solaris and a bunch of Operating Systems based on the Open Source Illumos kernel, like SmartOS, OpenIndiana, OmniOS, etc. Due to legal issues related to the licence, that prevented the development of a Linux kernel module, in September 2013 a side project was created: OpenZFS. So, nowadays, the powerful features of ZFS can be used also on your preferred Linux distributions. There was a lot of hype before Ubuntu 16.04 LTS came out, when it was announced that the ZFS filesystem module would be included by default, and the OpenZFS-based implementation would have received official support from Canonical: many concerns about license issues come out.

I don’t want to go deep into the advantages, the technical characteristics or the options of ZFS, but I want just to underline the ease-of-use of some features

HOWTO - BACKUP WITH ZFS SNAPSHOTS

that this file system provides, like, exactly, snapshots.

Well, also other filesystems like BtrFS, or Logical Volume managers (LVM) have snapshot functionalities as well; even Windows has something like that, called Shadow Copy, but ZFS, as far as I know, is the most simple and proficient to use.

HOW TO CREATE A ZPOOL

This is only a quick example. Also, in this case I don't want to dig deep into technical details.

So let's install the ZFS stuff.

```
sudo apt-get install  
zfsutils-linux
```

Plug in an USB drive, and use fdisk to create a new empty GPT partition table (g key)

```
sudo fdisk /dev/sdb
```

Exit from fdisk, and let's create the zpool (look at the zpool like a volume). "tank" is the name of the zpool, you can use a name of your choice.

```
sudo zpool create tank  
/dev/sdb
```

Please look at this link, in order to understand why using sdb, instead of the disk UUID, might not be a good thing
<http://zfsonlinux.org/faq.html#WhatDevNamesShouldIUseWhenCreatingMyPool>

Let's create a ZFS filesystem inside the zpool

```
sudo zfs create tank/mybackup
```

Set on-the-fly compression. Yes: this is another feature of ZFS. The LZ4 algorithm has a good balance between performance and compression level.

```
sudo zfs set compression=lz4  
tank/mybackup
```

LET'S TAKE THE FIRST SNAPSHOT

A snapshot is the state of the file system at a particular point in time. The command we need to use in order to take a snapshot is:

```
zfs snapshot filesystem@name
```

So in our case the command could be:

```
sudo zfs snapshot  
tank/mybackup@201707091030
```

Since it doesn't consist of an incremental copy of files, like Mac OS X Time Machine, but it is done at block level, the snapshot operation is immediate.

Initially, the disk space occupied by a snapshot is zero, since the snapshot corresponds exactly to the original file system. As the files on the file system change (new files, deleted ones, updated files), disk space becomes unique to the snapshot, so the space used by the snapshot is strictly related to changes, writes, and deletes, performed on the file system.

Last, the snapshot is read-only: there is no danger to lose your backup or to alter it.

DISPLAYING AND ACCESSING ZFS SNAPSHOTS

Now you can access data "backed up" in the snapshot in two ways: rolling back the snapshot (overwriting the working file system, read this as a complete restore), or accessing it to recover single files or directories.

Rolling back the snapshot is as simple as taking it:

```
zfs rollback filesystem@name
```

But pay attention: as said, rolling back a snapshot will overwrite the working file system!

So a more convenient way to recover files is to go inside the snapshot directory and browse into the frozen directory tree. Inside the mount point of the file system there is a hidden directory called ".zfs" (it is not visible even with ls -la).

```
cd /mountpoint/.zfs/snapshot
```

Here you can find all your snapshots, you will see a directory for every taken snapshot, and you can use usual commands (cp, rsync, scp, etc) to copy a previous file version wherever you need: you can replace or restore a file or a directory directly in the working file system.

That said, the backup policy can be the following: take a snapshot just before the rsync command and you are on your way. So you should not worry about previous versions of backups, incremental backups, huge used space, and so on.

HOWTO - BACKUP WITH ZFS SNAPSHOTS

To delete a snapshot, the command is as simple as

```
zfs destroy filesystem@name
```

Then in our example

```
sudo zfs destroy  
tank/mybackup@201707091030
```

SAMPLE BACKUP SCRIPT

This is a sample and simple script to illustrate the concepts. We use rsync over SSH with key-based authentication (you can find a lot of step-by-step guides around the web on how to set up SSH key-based login).

You can find the script here

<https://gist.github.com/alcir/7cb799edfb677a50fc38741dc706d73f>



Alessio is a sysadmin at FTGM, a specialist cardiopulmonary health foundation in Italy. Linux and FOSS are not his hobby... they are a job. Sometimes he blogs at <http://blogless.blogspot.it>

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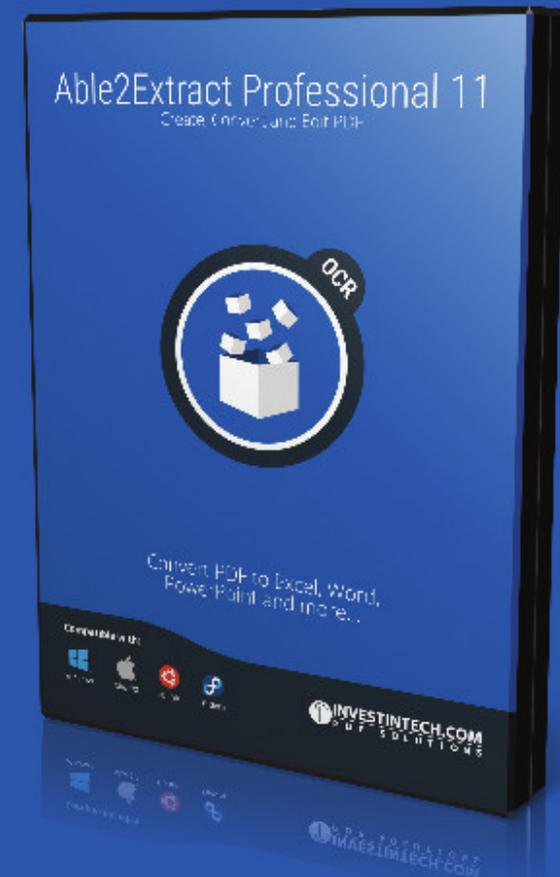
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HOW-TO

Written by Mark Crutch

Inkscape - Part 64

This month, we'll be continuing our look at some of the new features of Inkscape 0.9x by looking at the Symbols dialog. This is a frequently requested addition that allows you to create and maintain collections of related images that can then be inserted into the current document as necessary. Think about the boxes and shapes in a flowchart, the bubbles and word balloons in a cartoon, or the component symbols in an electronic circuit

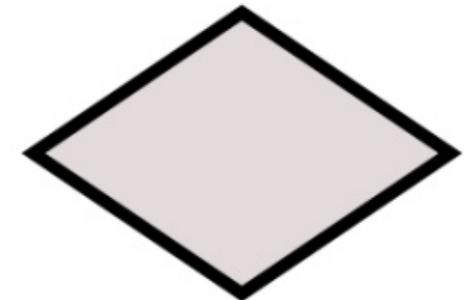
diagram, and you'll be on the right lines.

The SVG format has always allowed for symbols. They are stored in the <defs> section of the XML, where various definitions are held that could be re-used throughout the document. This is where you'll also find gradients and filters, for example. Just having a <symbol> element in this section won't actually render it on the page, however. For that, you

have to include one or more <use> elements which refer back to the symbol. This screenshot of the XML editor shows the basic idea: the <defs> section near the top of the tree holds a single <symbol> element, which itself acts like a group, holding all the various parts of the symbol; meanwhile, at the bottom of the tree you can see three <use> elements, all of which refer to the same symbol via the "xlink:href" attribute you can see in the right-hand panel.

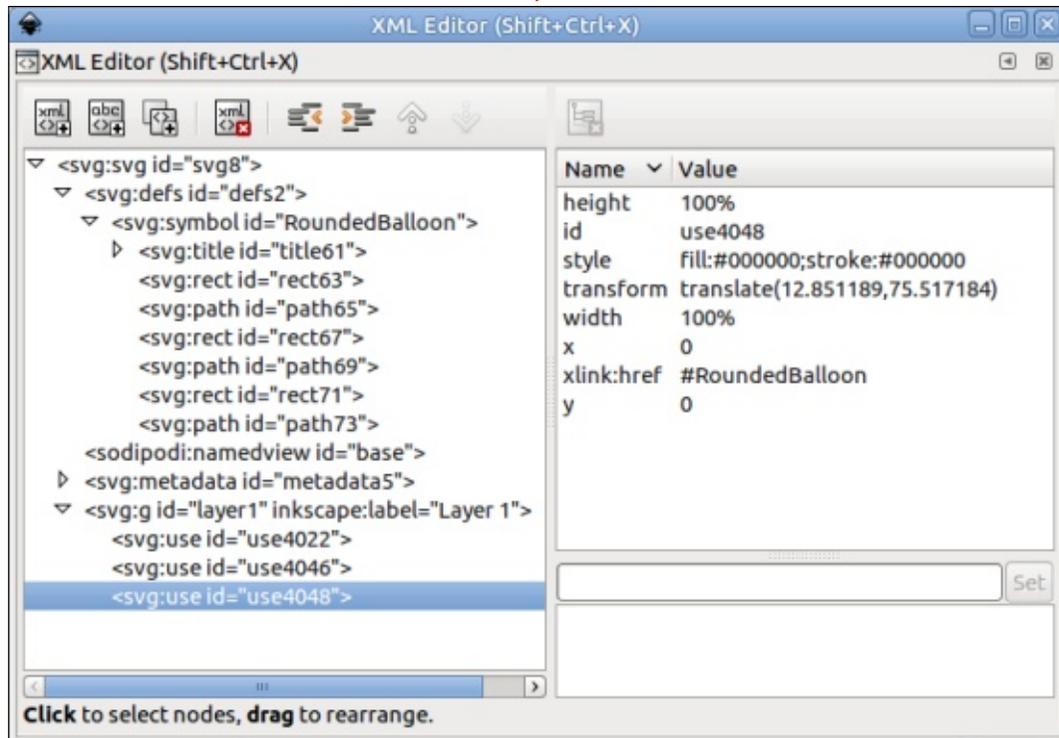
body, not in the defs section. So, in some regards, symbols can be thought of as being clones whose source object isn't visible. If you've ever found yourself hiding the source of a clone behind another object, or outside the bounds of the drawing, you can probably see the advantages. If, however, you're scratching your head as to why you would ever need to hide the source of a clone, read on.

Consider drawing a flowchart, in which you want to use the "decision" block multiple times. The standard shape for a decision block is simply a diamond, so you might draw something like this:

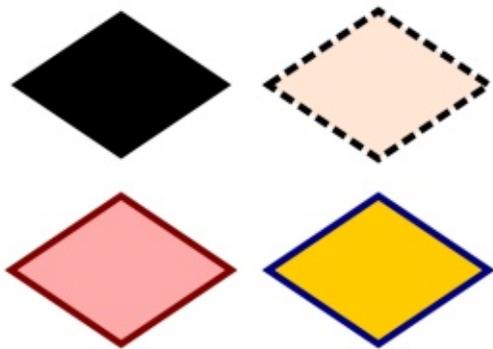


You could use that one for the first block in your chart, then clone it for subsequent blocks, and

There are two advantages to this approach. The first is file size. You can see that repeating all the content of the <symbol> element three times would take up more space than simply referring to it with <use> tags, and the more complex the symbol the greater the savings. The second is that changes to the original symbol will automatically propagate to any instances of it in the document. If that sounds a lot like clones then you'd be right – clones are also implemented as <use> elements, except that the original target is an object within the document



everything is fine... right up to the point where you decide to color-code areas of the chart. Now some of your decision blocks need a different colored background, or a different stroke. A simple clone will no longer do the job. The solution was described in detail in part 30 of this series: you have to unset the fill and stroke on the original, then you can set them individually on the clones.



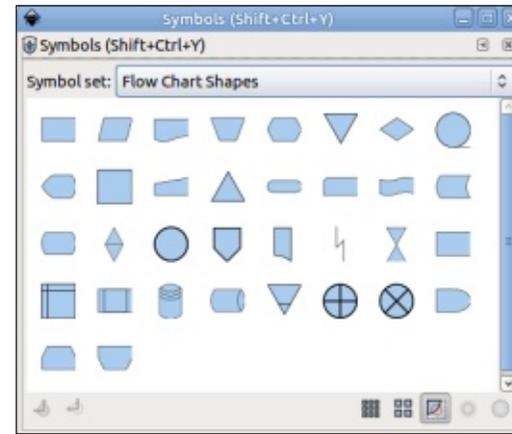
Great! Now you can style each block exactly the way you want to. But you also have the unset original to contend with. The unset fill appears black, and the unset stroke isn't visible at all, so it's unlikely that you can use it as a decision block in your diagram as it stands. If you try to make it invisible, say by reducing its opacity to 0, you'll find all the clones disappear as well. So you have little choice but to hide it in

some way – sneaking it behind another element in the drawing, or placing it outside the bounds of the drawing so that it doesn't appear in a web browser, or if you export the page as a PNG image. Arguably the most sensible approach is to put it onto its own layer, which you can then hide, but it makes it more awkward to use if you have to clone from it again.

In theory, Symbols should avoid all these problems. But, in practice, the Inkscape implementation brings along enough quirks and issues that it's nowhere near as straightforward to use as it should be. Let's begin by opening the Symbols dialog via the Object > Symbols menu (CTRL-SHIFT-Y by default).

You'll probably see a rather empty dialog with a pop-up menu at the top and some buttons at the bottom. Using the pop-up, switch to the pre-defined Flow Chart symbols. You can use the buttons at the bottom-right of the dialog to change the size of the thumbnails, and whether they are individually scaled to fit, or all shown at the same relative size. Note that the latter can result in symbols that are cut off in the

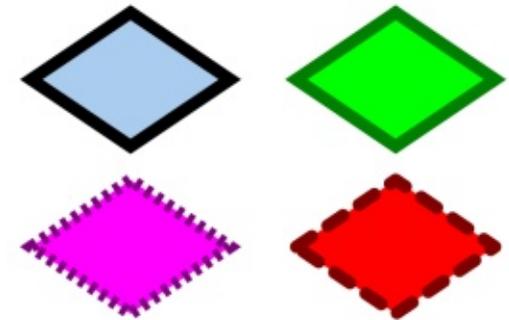
dialog, though they'll be fine when inserted into a document.



Find the Decision symbol – in my screenshot it's the penultimate shape on the top row. Note that each symbol also has a tooltip to help identify it. Select the Decision symbol and then either copy it to the clipboard (CTRL-C) and paste it into your document (CTRL-V), or simply drag it from the dialog onto your page.

With the symbol selected in the document you should see that the status bar specifically identifies the object as a "Symbol called Decision". Duplicating, or copy-pasting it gets you another symbol, as does dragging in an extra one from the dialog. With one of your symbols selected you can change the fill and stroke color, and even

the stroke style.



In other words, it behaves pretty much like a clone with unset fill and stroke, but without the original object being present on the page. But all is not perfect: try changing the stroke width and you'll find it stubbornly stuck at one size, regardless of how thick or thin the UI claims it to be.

In fairness, this is an affliction that can also affect clones. Although most of the stroke properties are unset on the original object, it does have a stroke width defined, and no amount of fiddling with the cloned version will override it. The only solution is to remove the stroke width from the original object, which in this case means modifying the source symbol that's in the <defs> section of your document. There are two ways to do this: the easy way involving the XML editor,

HOWTO - INKSCAPE

or the tricky way via the GUI. Yes, those sentences are the right way round – somehow the Inkscape developers have made GUI editing of symbols so unintuitive that it's often easier to wade into the XML!

After opening the XML editor (Edit > XML Editor, or CTRL-SHIFT-X) and selecting one of the symbols in my document you can see that the relevant line is highlighted in the left-hand panel of the dialog.

The attributes on the right

include "xlink:href", which tells you the ID of the original symbol in the <defs> section, prefixed by a "hash" or "pound" character (#). Looking at the left-hand panel you should be able to see the symbol in question (in this document it's actually the only symbol, which makes finding it even easier). Expanding the symbol using the triangle on the left reveals the elements inside it. Because this is a really simple symbol, it's easy to guess that the element that needs to be edited is the path. The screenshot below shows how the

XML editor looks with the symbol expanded and the path selected:

You can see that I've also selected the "style" attribute in the right-hand panel. Because this only contains the stroke-width property, I could remove the entire attribute by clicking on the "Delete Attribute" button in the toolbar at the top. In other cases, however, there may be additional style properties that you wish to keep. In that case you need to select the attribute, then edit the value in the bottom-right panel before clicking

the "Set" button to apply your change. In this specific case the end result is exactly the same, as removing the entire text has the effect of also removing the attribute, rather than leaving it in place with an empty value. With



that change made, you can now close the dialog, return to your symbols, and change their stroke widths to whatever value you choose.

Of course you'll sometimes want to make changes to a symbol that go beyond just removing or altering an attribute or two, and in that case you have little choice but to use the GUI method for editing it. In order to do that, however, you'll first have to convert it from a hidden object in the <defs> section to a real object in the page. During this feature's early development, this was done through a "Convert to Group" menu option, which seemed to me to be a simple and sensible approach. So, of course, it was removed from the release version.

Instead you have to start with a trip back to the Symbols dialog. Switch the pop-up menu to "Current Document" – the same view that was empty when you first opened the dialog earlier. Assuming you've added some symbols to your document, this view will now contain an image of each of them. You can think of this as being a sneaky view into the normally hidden world of the

<defs>. To edit a symbol, you have to remove it from the <defs> section and insert it into the main document by selecting it in the dialog, then clicking the second button at the bottom left.

Confusingly this has a tooltip that says it's going to remove the symbol from the current document – whereas the actual behaviour is to insert the symbol, as a group, into the document, removing it from the <defs> section and therefore from this view in the dialog.

The editable version that is put into your page has far more in common with a clone parent than you might expect. Because it has an unset fill and stroke, it will appear black, and if you select any of the symbols on the page that were created from it, you'll find that the status bar now declares them to be clones, rather than symbols. If you were to check the XML editor, you'd find that they haven't changed – they are still <use> elements with an xlink:href attribute that links them via an ID – it's just that the object with that ID is now in the page itself, not in the <defs> section. See, a symbol is quite literally just a clone parent that's stored in the <defs> rather

than on the page. This duality also means that, if you do need to convert an individual symbol into a real object, Edit > Clone > Unlink Clone will work.

You can now enter the group and edit as you would normally. You can add extra elements into the group, change the shape of the path, or explicitly set (or unset) the fill and stroke to determine what parts of your symbol can be overridden when it's used in a document. If you examine the Object Properties for the enclosing group, you'll find that it's got a title and ID (as well as some other properties). Leave the ID alone, unless you want to break the link to any existing instances of the symbol in your document, but feel free to change the title to distinguish your newly edited symbol from the original. Finally, with it still selected in your document, use the bottom-left button in the Symbols dialog ("Add symbol from the current document") to insert it back into the <defs> section of the document. It also converts the copy you've been editing into a symbol – so you'll need to manually delete it if you don't need another one on your page. Once again, the

early builds had a simple menu option ("Convert to symbol"), but with the release version we're stuck with confusingly tooltiped buttons in the dialog.

In practice you can turn any group into a symbol. Inkscape automatically creates an ID for your group, but it's probably best to open the object properties and set something more human-readable, as well as giving it a title. Then just select it and use the bottom-left button in the Symbols dialog to convert it. Don't forget to unset fills and strokes if you want to be able to alter them for each instance of the symbol in your document.

Once you have got to grips with creating one or two symbols, you might feel that you need an entire set, whether it be symbols for electronic components, crochet stitches or, in my case, a handy place to keep some cartoon characters. All you need to do is create all the related symbols in a single document, then give it a title in the File > Document Properties dialog (Metadata tab). Save the document to /usr/share/inkscape/symbols (for those you wish to share with other

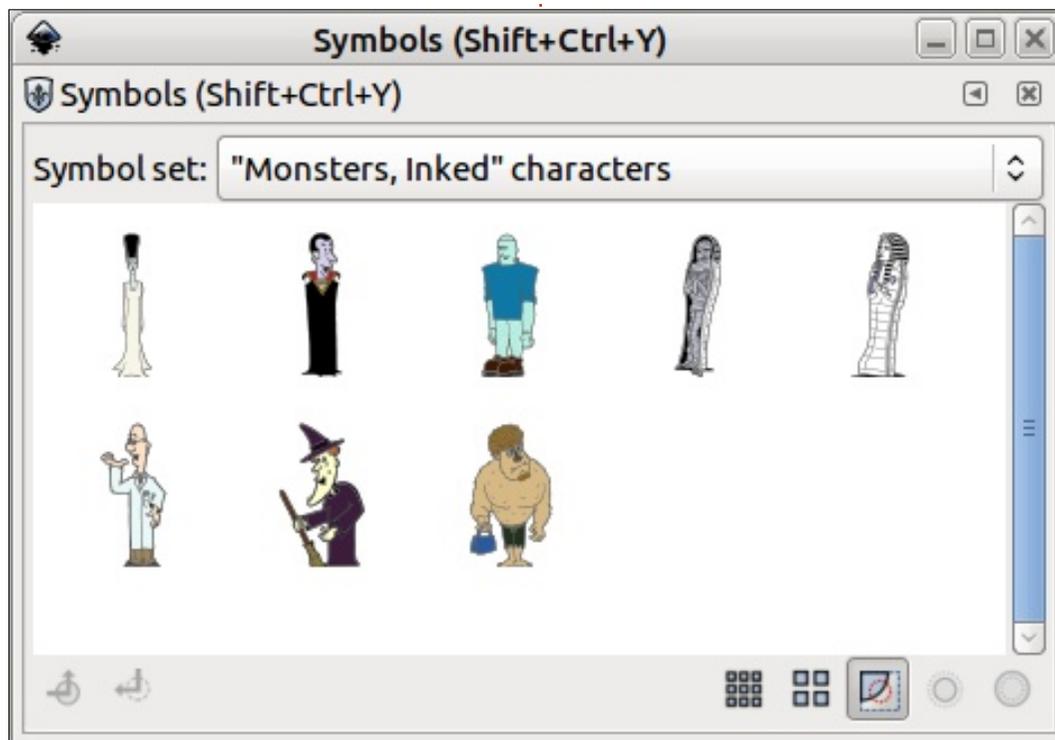
HOWTO - INKSCAPE

users on the machine), or `~/.config/inkscape/symbols` (for use by a single user – though you'll probably have to create the "symbols" directory). The next time you start Inkscape, you'll find a new entry in the Symbols dialog's pop-up, showing the title you gave to your document. Select it to gain access to your own symbols.

As this image shows, symbols aren't restricted to simple shapes or single colors. Here I've got complex groups of paths with a variety of colors in each. It does also show, however, that there are still limitations: the sarcophagus on the right is supposed to be a shimmering gold color, but the repeating gradient of the original failed to make it into the symbol version. In general you may find similar issues with anything that links to a definition in another part of the document – such as gradients, patterns, filters or other symbols.

But the Symbols dialog is really intended for simpler shapes – for domain-specific tags, markers and building blocks that might be needed to annotate or create an informative image, rather than an artistic one. The standard symbols

shipped with Inkscape are okay as a starting point, but somewhat limited in scope. So if you do create any symbol libraries that are generally useful, then please consider sharing them with the wider community – it's a great way that you can give back to the project without having to write any code.



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



HOW-TO

Written by Ronnie Tucker

Kdenlive - Part 8

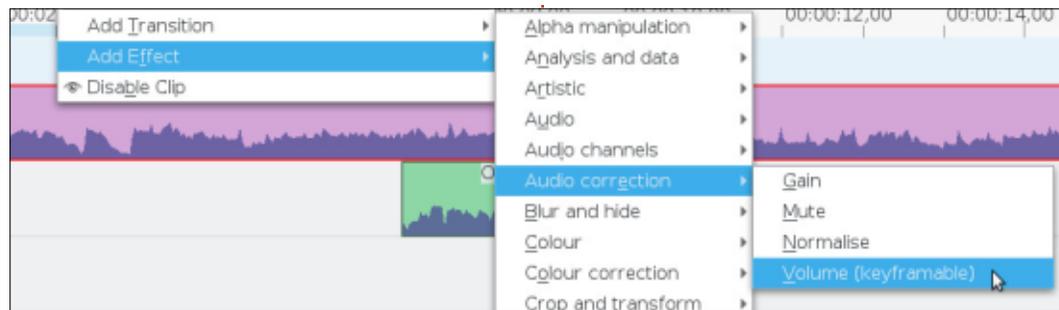
We've all heard voiceovers on the radio where the music quickly lowers in volume to let the announcer speak over the quietly playing audio in the background. That's what we'll look at this month.

AUDIO/VIDEO

Obviously, we'll use a video, playing audio, as our base to work from. I've dragged in a video file to Video 1. Now I add a voiceover file to the project.

Now, with the video audio playing, and the voiceover (shown below), it'll be a mass of noise. We want to right-click on the video and choose Add Effect > Audio correction > Volume (keyframable).

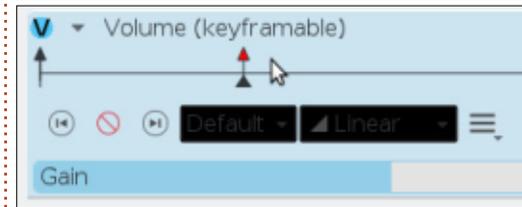
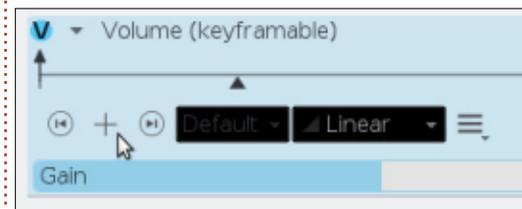
Keyframable is something you may remember from previous FCM



Kdenlive articles. It means that we'll be able to set points to control the level of volume.

Select the video clip in Video 1 (which will give it a red border), and you'll see the 'Volume (keyframable)' (what I'll call Vk from now on) options in the Properties tab.

What we want to do is click (in the timeline) where, in the video, we want the volume to begin fading down, then click the large plus (+) icon in the Vk properties. You'll see a red triangle mark that keyframe.

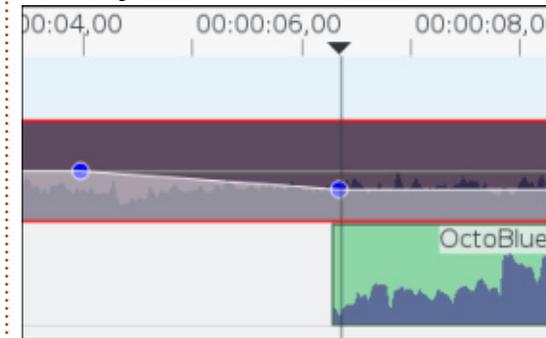


Note that the black triangle in the Vk properties is in the same place as the time slider is in the timeline.

So that's where we want it to start lowering. Do the same again

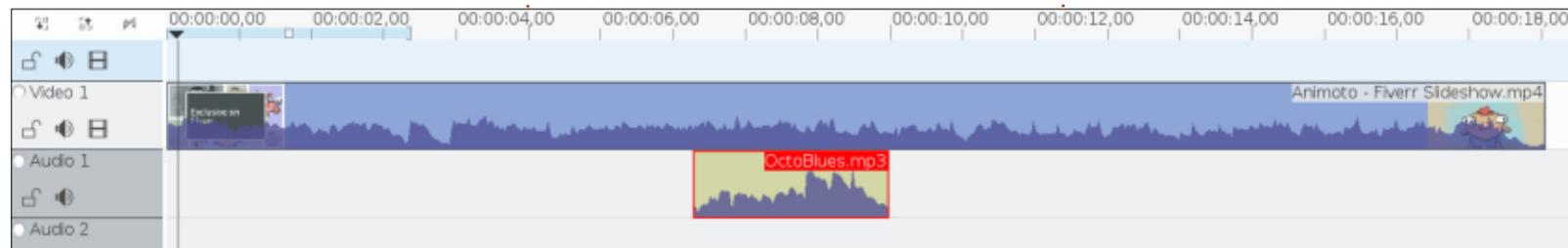
where you'd want it to be at its lowest. This time slide the Gain value down to where you want the volume for the voice over.

I've set the Gain value (cropped off in the screen) to -22dB. You'll notice the white line in the video track has lowered – to show, visually, the volume level.



All that's left is to do the opposite on the other side. A keyframe at the low value (-22dB in my case), and a final one at the 100% (0dB) value.

You can, of course, do a similar thing with your voiceover file to have it fade in as the music fades out. Also, I've made my fade outs two seconds long, just to show you how it looks. Your fadeout may be a second. Maybe even less.





RESEARCHING WITH LINUX

Written by S. J. Webb

Research coordinators would like to believe they are organized. However, after working with a project manager, I quickly realized how poorly organized my research projects are run. Thus my need for a digital project planner. The research activities can be boiled down to three distinct phases: organization, collecting, and post study research. I use Calligra-plan (C-P) in each of these phases. Let's do a quick touch-base on the life cycle of a research

project.

In the organization phase, the investigator develops a plausible research question and will look for grant funding to answer the question. Most of my projects are fully funded by the university. This is called internal funding. Yet I have been assigned to a research project that was funded externally. An external fund is when the government or outside organization offers to pay the cost

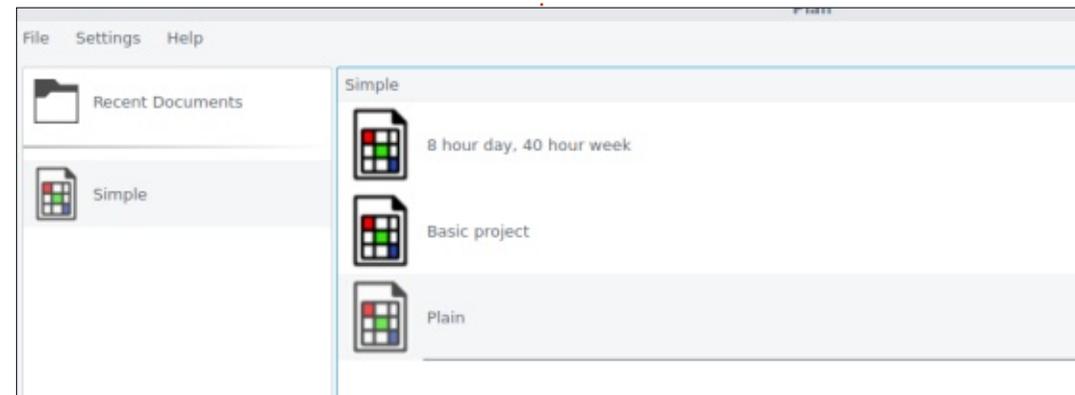
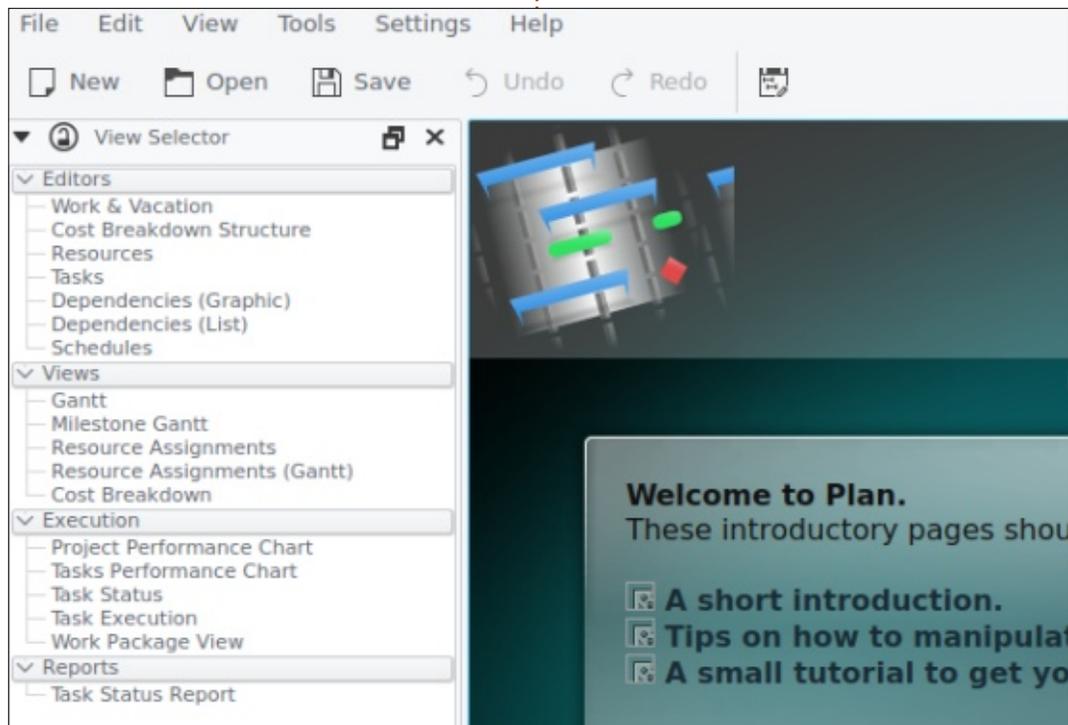
of research. Once the funding is procured, the research study begins. It is extremely important on externally funded research to track all costs incurred on the research project. This is a caveat for external funds. The investigator will contact me and I begin to lay out all of the tasks for the research project's life.

The first step is write the physical documentation: standard of procedures, subject recruitment practices, data management plan, financial tracking, and study closure. I would have a detailed layout of required staff resources at all levels. A true project manager would be able to perform a cost break analysis of each task associated in the study. I use only a

small sliver of the PMBOK principles. PMBOK is the overall code book of project management. I do not have any full projects from start to finish loaded into C-P, but I have a small project listed here. This is simple data-polish task on a project that I have guided for the last 5 years.

I open C-P to get to the main screen. There will be three options for developing a plan. I choose the basic project template for this example.

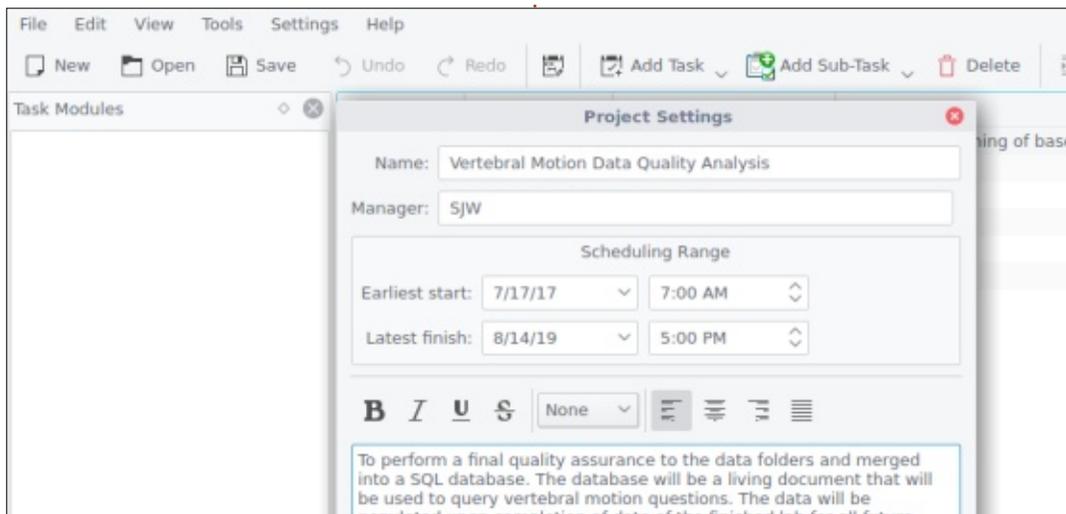
The user will then be taken to the heart of C-P. It's here that all of the interconnected principles of project management become exposed. The options I use the most are tasks and Gantt Charts.



RESEARCHING WITH LINUX

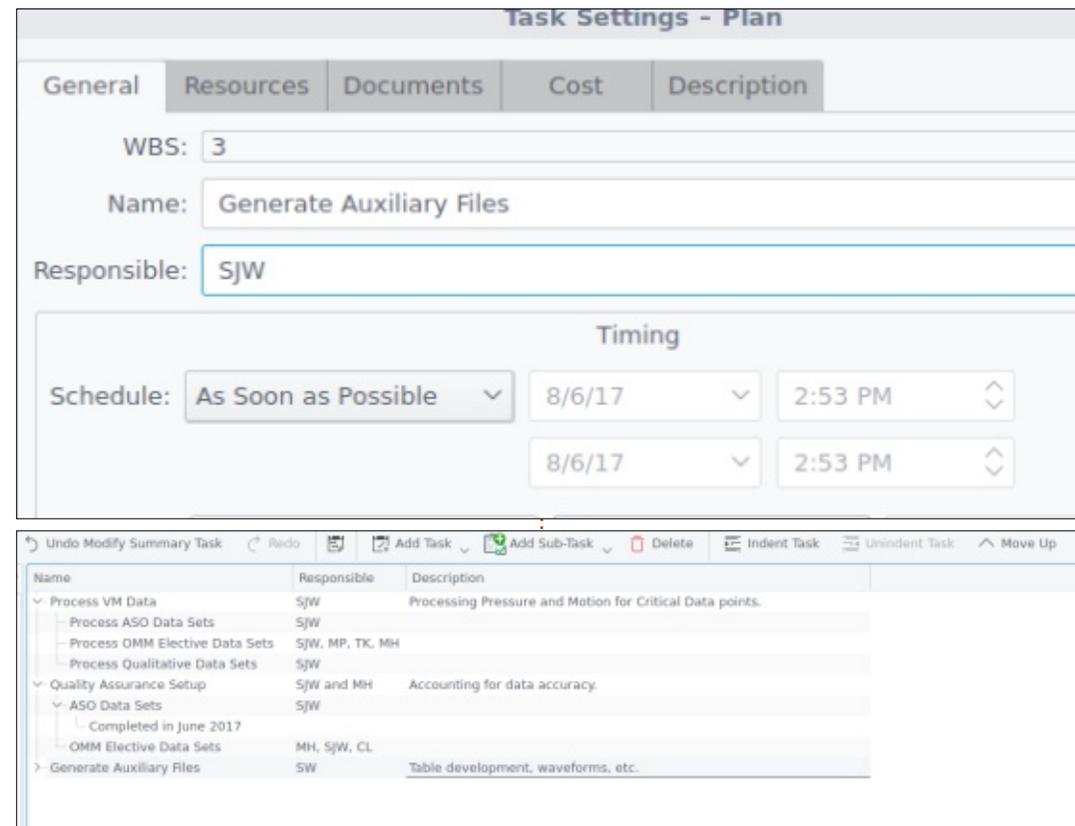
Tasks are simply the detailed breakdown of the research project; you can think of this as your to-do list. In the easiest of terms, Gantt Charts are a simple timeline bar chart. Let's move onto setting up the tasks in C-P. If you choose a more complex project management technique, you will have more options. The basic project template autogenerates the task work functions.

The task ribbon bar becomes enabled. I choose the Project Settings option. This is just left of the Add Task icon. As you can see, to the left I have inserted the required information for the fields. This is what I use to document what the project is aiming to complete, and in what timeframe.



After the project settings, I will enter my hand-collated notes into the tasks. This can also be identified as a work breakdown structure. The purpose of this item is to have a granular overview of each step involved in the project. In an ideal world, a project planner, if fully utilized, will allow any research coordinator to pick up and continue the project if fully documented.

If you right-click on the blank field and click Add Task, this enables a field that can be edited via a right-click. You can then enter the appropriate information that is needed for that task. The resources would be staff. The Documents could be written protocols in that area. The cost would be the staff billing per hour.



Description is the overall detailed information for that task. This is the area where I really notate my work load.

I like to think of the tasks settings as an overly detailed outline. The assigned task can be manipulated to be at "sublevels" or primary. As seen below, the task list is easily manipulated for the desired look and intent. The main purpose of the tasks is to illuminate all the work that I will be doing on a particular segment of a

study. This helps investigators understand why it takes so long to complete so many aspects of data processing or administrative work. When I am finished, I can export the task as a PDF.



SJ Webb is a researcher coordinator. When he is not working, he enjoys time with his wife and kids. 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

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REVIEWS

GAMES/APPLICATIONS

When reviewing games/applications please state clearly:

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

HARDWARE

When reviewing hardware please state clearly:

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

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





Our KODI adventure began many years ago with other software: MythTV. MythTV is open source Digital Video Recorder (DVR) software used for recording cable, satellite and over-the-air television shows. At the time, we didn't have a proper television but we did have a rather large and heavy 22 inch CRT monitor. Our computer at the time was an Athlon XP-based computer, slightly underpowered, but it did the job.

MythTV is great software, but when our provider started talking about switching from analog to digital, we knew it would be an uphill battle to decrypt their new signal. Our cable provider also kept raising prices and lowering service standards. So we looked at our viewing habits and noticed that we mostly watched the weather channel and the odd movie.

About this time, DVDs started coming down a lot in price. We were very close to a source for inexpensive DVDs, so our collection was growing and growing. As a DVR, MythTV is

awesome, but it's not so terrific at storing media... which led us to XBMC (now known as KODI).

Our XBMC/KODI setup started on the same machine we ran MythTV on, an old Athlon XP-based system with a 1TB hard drive. The Athlon desktop worked, but it drew lots of power and

lacked SSE2 CPU instructions. Video playback on systems with SSE2 instructions was much better than on the Athlon, which struggled sometimes even with standard DVD video. We had a solution to solve both the power and playback problems: a Dell Inspiron Mini 10 netbook. The netbook had only a 250GB hard

drive, but adding the 1TB desktop drive was a simple matter of attaching it via an external drive cage. Initially we installed XBMC via XBMCubuntu, a customized Ubuntu install which booted directly to XBMC. We added remote control support using a standard Microsoft-compatible remote control and USB receiver, and the LIRC software package.

The netbook seemed like a good idea at the time and worked well with XBMC versions 10 through 12, but, as our DVD collection grew, so did our storage needs, so we added another external hard drive (2TB). The Inspiron Mini 10 had plenty of USB ports so we could actually connect a third drive plus the USB dongle for the IR remote.

About a year after we set up the netbook as our XBMC server, the first Android boxes started to appear. One of the nicest looking boxes was the Pivos XIOS DS Media Play. The XIOS DS was an Android box that could be flashed with a customized version of Linux that



booted to XBMC. We bought one and discovered you could either run XBMC on Android or run it in Pivos' scaled down Linux distribution. Support for external devices was simpler on Android, but XBMC ran much better on the scaled down Linux distribution. The one really annoying feature of the XIOS DS was the remote controls. We bought the extra "sense" remote in addition to the included remote, and neither were as feature-rich as having a

Windows Media Centre remote attached to our netbook.

Ultimately, we switched back to the netbook because running a full-blown Linux desktop added a lot more flexibility than running Android or Pivos' scaled down Linux distribution.

We're fans of simplicity, but our netbook setup was getting out of control. When we had one external hard drive, the setup wasn't so bad,

but after we added a second and third external hard drive, our media center was starting to look like a web of cabling. Each external hard drive needed both power and a USB connection to the netbook. Sure, cables could be tidied with zip or velcro ties, but the power bricks all still needed to be connected to the wall which meant adding more power strips. Rather than simplifying our setup, running a netbook was actually complicating the setup.

Thus we switched back to a 'full blown PC,' initially a 3.2GHz Pentium D, and later (currently) a Core 2 Quad Q8300 CPU. One of the awesome things we love about Linux is being able to scale.

Dropping in a new CPU doesn't mean having to buy a new license like it does on other operating systems. We've used the same Asus P5K motherboard ever since, and while it's on the old side and the Core 2 Quad CPU consumes more power than a Core i3 processor, it's done a great job. We picked up an open box special on a 1GB NVidia GeForce 210 PCIe fanless card for \$29 from a local computer store. All 3 drives now sit in a single box and the only cables coming out of that box are power, video, ethernet, and the cable for the IR remote.

There are far fewer cables at the back of our television now, and the performance is a lot better



than it was on the netbook. The Q8300 and GeForce 210 are strong enough to handle Bluray content without stuttering, and the P5K's gigabit ethernet delivers Bluray media via SAMBA just fine to other PCs in the house.

I use SAMBA to share all our content, but all our SAMBA shares are read-only to help prevent all that data from possible crypto-infections. So how do I transfer our media? Via SSH. All the ripping is done on a Linux desktop, then transferred via gigabit to our KODI server. Our Windows machines can connect to read the data, but not write to the shares. That said, no one in the house uses Windows to connect to the shares.

In one room we have a Zotac ID81 box running Xubuntu + KODI. The box is a little on the sluggish side, and is prone to sleep issues, but it plays the Bluray content fine (thanks in part to the fact we have it running on an SSD).

In another we have a Zoomtak T8H. The Zoomtak runs Android, but KODI 17 runs really well on it and the box has no issues playing shared Bluray content. Although both small KODI boxes have

wireless, we deliver all content over our wired gigabit connection; wireless is just too unreliable and limiting.

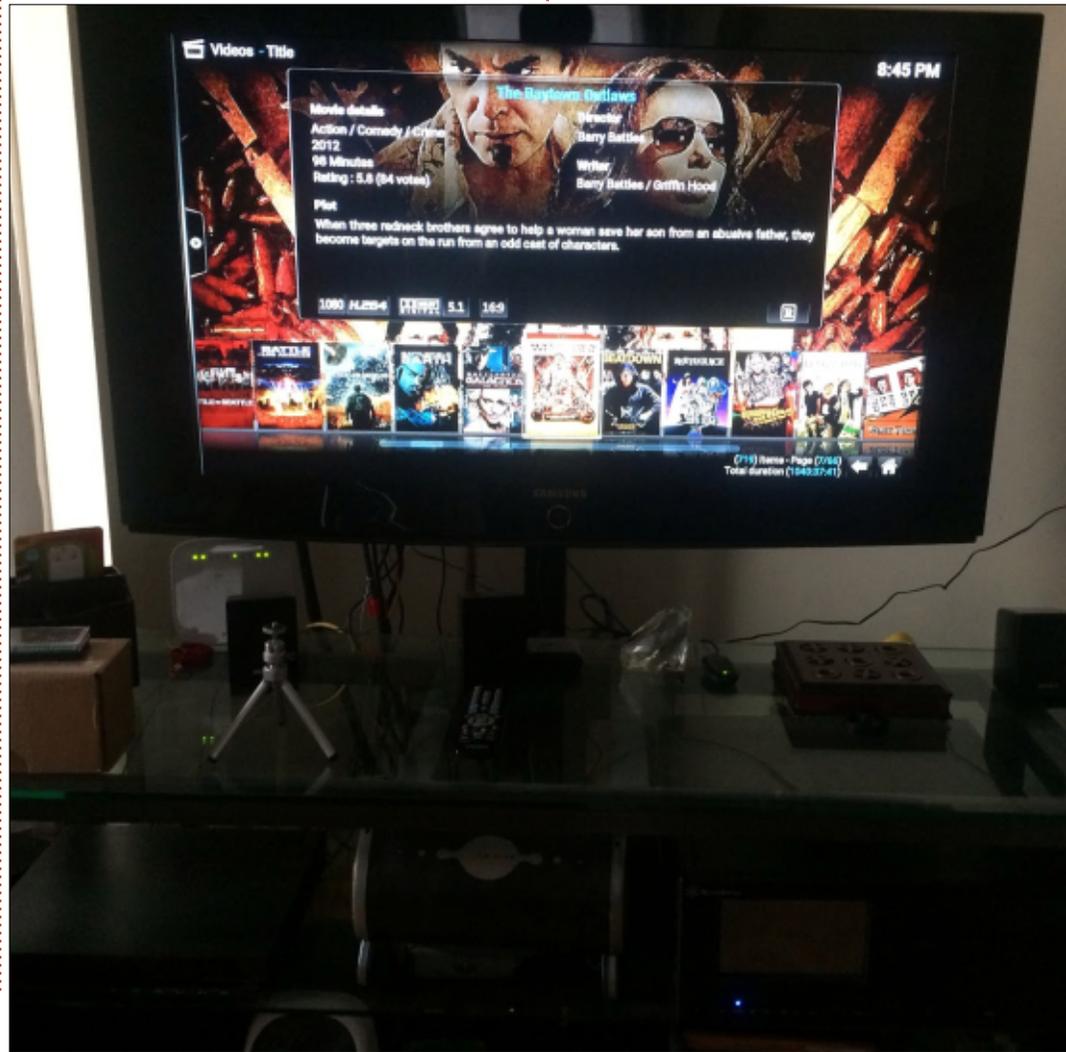
Currently our main KODI server houses 2 x 3TB and a 2TB hard drive. One of the 3TB drives is full only with media we've transferred

from part of our Bluray collection. The other part of the Bluray collection is starting to fill the other 3TB drive (which also houses our OS - Xubuntu). The entirety of our DVD collection is stored on the 2TB drive with room to spare. This includes television shows on DVD. Our DVD collection is larger than

our Bluray collection, but we store all our Bluray content as uncompressed data, so the space requirements are pretty large - with several movies cresting 45GB each.

The other part of our media centre is a Linux desktop where we do all the media ripping. Years ago, when we talked to people about XBMC/KODI, they would look at you with blank stares. Now everyone is talking about XBMC/KODI because of its streaming capabilities, but we tend to use it mostly for its ability to play and scrape our existing media.

DVDs and Blurays are cheaper than they've ever been, especially if you don't mind checking out thrift shops and/or waiting for department store specials. One local chain ran a special at boxing day where almost all of their new DVDs were \$1.00. Granted the titles were not new titles, but they weren't all B movies either. Our collection grew a lot that boxing day. Yes, it takes time to rip and transfer the media, and it requires storage space for the physical media, but the convenience is wonderful.



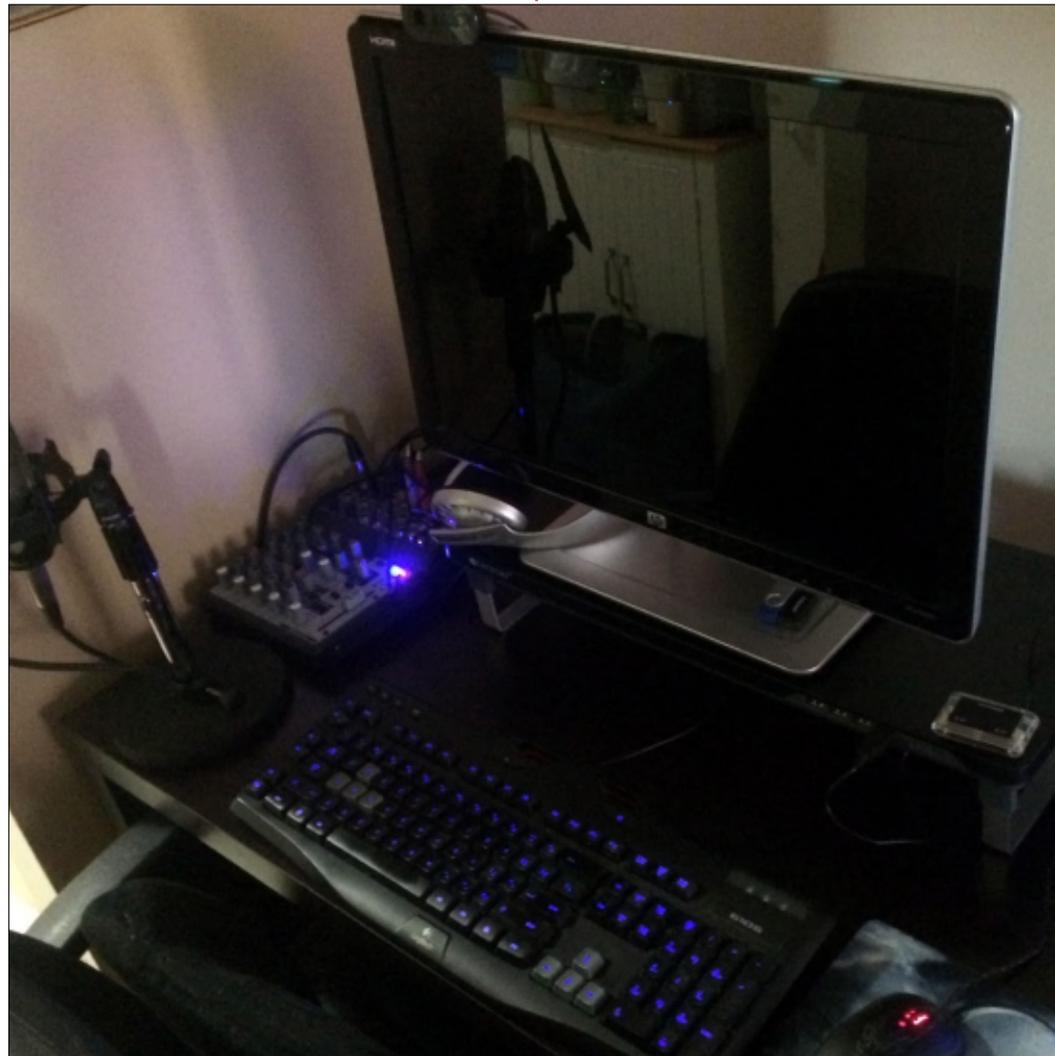
All our DVDs and Blurays are stored in boxes in our storage, and we can sit for hours watching a playlist of movies, television shows, music videos, music, or photographs. KODI has a convenient "Party mode" that takes a random selection of music or music videos and plays them - nice to have when guests are around.

Initially we stored DVDs as they were in their packaging in boxes in our storage, but storing DVDs in their original plastic storage meant more boxes. To save even more space, we threw out the plastic packaging and started storing the DVDs and Blurays in DVD storage sleeves. We stored the paper inserts and covers in a couple of shoe boxes in case we ever wanted to go back to the old plastic storage containers.

Another thing we like to do is start some music playing, then navigate to our photo collection and press play; this starts a slideshow of photographs with music playing in the background. Whenever we have family around, we typically use KODI as a giant picture frame for all the photographs we've taken on

vacation.

At one point, we were using a MyGica ATV 582 where we're currently using the Zoomtak T8H. The MyGica was a nice box (except for the remote, but we tend to not like any of the remotes except the full-blown media center remotes),



but we bricked it while trying to reflash it with an older Android firmware (we reset the box thinking the flash was stuck). MyGica was very responsive in the forums. The ATV 582 was a nice box, but we felt Android 5.0 was simply too sluggish on it. Zoomtak on the other hand was very

unresponsive. Although we love the aluminum chassis of the T8H, and find that it runs the latest KODI just fine, we'd probably look first at a new MyGica box simply because they seemed more supportive.

For the future, we've considered replacing the desktop box with a small NAS box and another Android box, reducing the footprint, but maintaining the large storage, but NAS boxes with space for 4 drives tend to cost as much as a decent PC.

Next month, I'll share our configuration files for our KODI server and describe how the other media centers mount the drives.



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/>.



LETTERS

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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 tried to do a 1:1 copy of a CD to a RW blank CD. Both failures.

A Rip the CD to .wav files, using a program such as asunder. Burn a music CD, selecting the .wav files, using a program such as Brasero or K3b.

Q I run:
`sudo apt update`

and get these error messages:

W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: [http://dl.google.com/linux/rome/deb/stable/Release](http://dl.google.com/linux/chrome/deb/stable/Release): The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 6494C6D6997C215E

W: Failed to fetch <http://dl.google.com/linux/rome/deb/dists/stable/Release.gpg> The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 6494C6D6997C215E

W: Some index files failed to

download. They have been ignored, or old ones used instead.

A (Thanks to *vasa1* in the Ubuntu Forums) To get the public key for Google Chrome, run this command:

```
wget -q -O - https://dl.google.com/linux/linux_signing_key.pub | sudo apt-key add -
```

Q I have a small home network of 5 Windows computers, two Linux computers, one Mac, and one Windows server that I want to be able to authenticate to a Linux-based file and print server. The key for me is synchronizing logins. I don't want individual logins to each computer and server. When I ask questions, I'm not getting any answers.

A I suspect that the reason you aren't getting answers is, 99.99% of people here do not do network authentication. My home network has half a dozen computers running a mix of Linux and Windows. I have a file server

and shared printer. People log on to their own computer, not "the network".

I have set up personal and public shared folders on the file server using Samba.

Assuming you have installed a member of the Ubuntu family, the version of Samba you have is not even close to being the latest and greatest. It meets my needs, but probably not yours.

Have you run across Zentyal? I had a quick look at it more than a year ago, but it didn't solve the problem I was looking at. However, it might be just the thing in your environment.

TOP QUESTIONS AT ASKUBUNTU

* Ubuntu installed on USB stick - are such installations limited to run on the same machine?
<https://goo.gl/f7GJyw>

* Unable to find my files, but they take up space
<https://goo.gl/C4kKMM>

* apt remove vs purge
<https://goo.gl/qtU2bn>

* tlp-stat and power indicator show different battery levels
<https://goo.gl/GqArDj>

* Are LTS codenames specifically intended to imply reliability?
<https://goo.gl/uxt1dx>

* Can I restrict root user from installing or Uninstalling Packages
<https://goo.gl/AtLQAd>

* Where is this environment variable set?
<https://goo.gl/65WpZo>

* One liner to show CPU, RAM and HDD usage
<https://goo.gl/o5iozT>

* How to remove a directory without removing its content?
<https://goo.gl/BK9vbn>



TIPS AND TECHNIQUES

Maybe time to upgrade

If you are running version 16.10 of any of the flavours of Ubuntu, it is time to upgrade.

Those versions experienced "end of life" in July. I'm not a fan of the nine-month life of Ubuntu's "interim" releases. I think it would be much more productive if Canonical had selected a 14-month life. That would let people have a year of the interim release, plus a couple of months for the required upgrade to settle down.

This doesn't affect me directly, since I'm using Xubuntu 17.04 as my daily driver, but in just a few months I will need to upgrade to 17.10.



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.



MY DESKTOP

Written by Larry



The machine is home built, with an older i7 7600k processor, 16 GB of memory, and two 2 TB disks. Motherboard is a Gigabit p8z68 (several years old now, same as cpu) Video card is Nvidia fx3700.



MY DESKTOP

Written by Robert Streater



Operating system: Xubuntu 16.04

Icon Theme: Papyrus

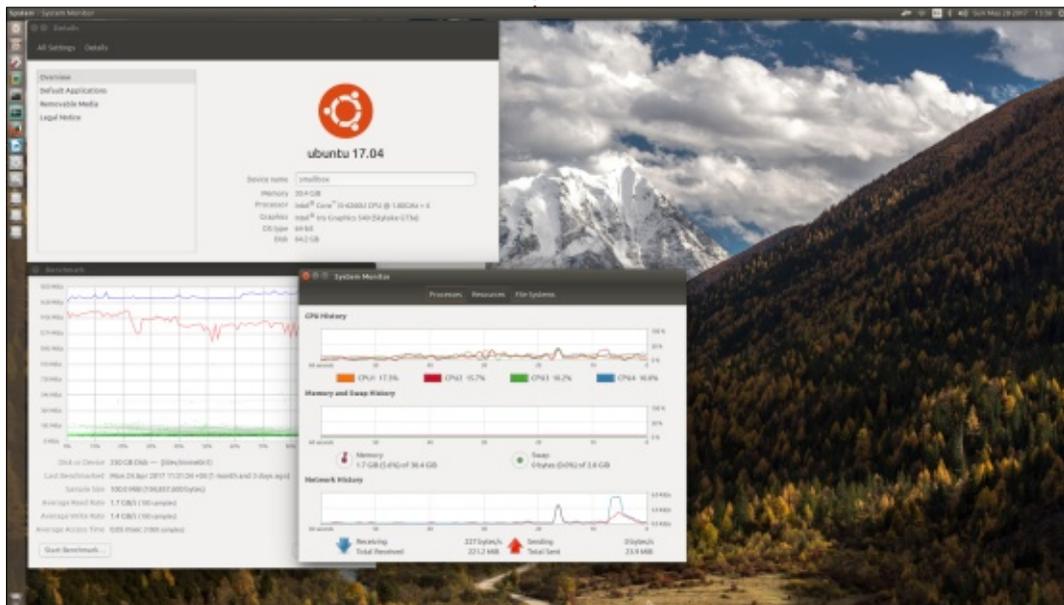
Theme: Arc-Dark

Wallpaper: WallpaperDay Link to wallpaper on DA <http://fav.me/d4lhe0g>



MY DESKTOP

Written by Leo



Recently, I got an Intel NUC6i5SYH barebone system, which came with soldered-in Intel i5 6260U CPU.

As it does not come with any pre-installed OS (NUC is shipped with no RAM and hard drive), I decided to install Ubuntu 17.04 on it. An initial test run from live-USB showed that all NUC's components are recognized and working, including 802.11ac WiFi module.

I threw in two 16GB DDR4 SO-DIMM modules and an 250GB

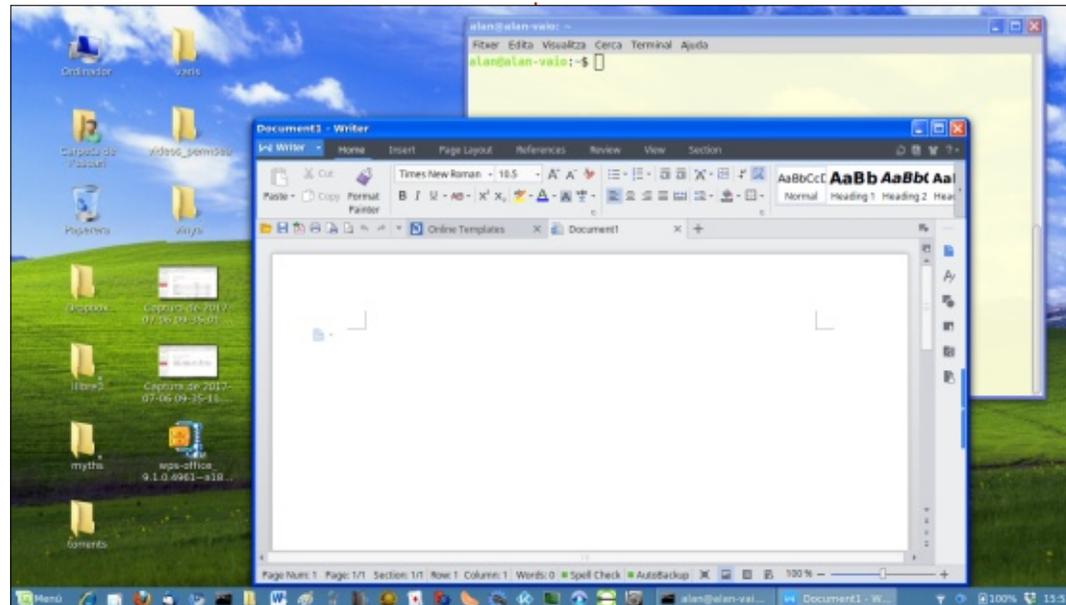
NVMe SSD. NUC also has a SATA port and 9mm space for 2.5" drive, so I can expand storage when I need more.

At the moment, this small yet powerful machine also serves as a home lab for my VMware experiments. Two CPU cores with hyper-threading and 32GB RAM make nested virtualization possible – I run VMware Workstation with several virtual machines with VMware ESXi installed, and each of those has test VMs.



MY DESKTOP

Written by Alan Ward



Memories of times long past = Linuxmint 18.2 Cinnamon + icon files from Noobslab + Railway theme + WPS (Kingsoft) office. Please note all software is updated to its most recent version, and naturally enough compiled using 64-bit instructions (amd64).



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

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

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

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FCM#124

Deadline:
Sunday 10th Sept. 2017.
Release:
Friday 29th Sept. 2017.



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Our thanks go to Canonical, the many translation teams around the world and **Thorsten Wilms** for the FCM logo.

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