Photo: rwcitek (Flickr.com)

# TAME YOUR GRUB MENU
## GIVE YOUR BOOT MENU A MAKE OVER
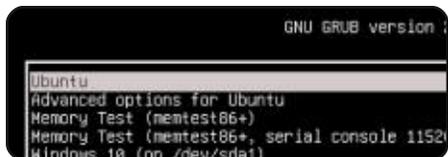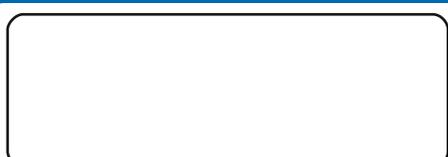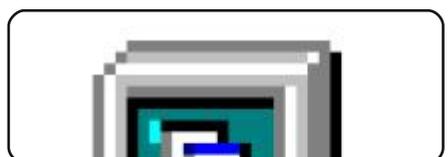
# Full Circle

THE INDEPENDENT MAGAZINE FOR THE UBUNTU LINUX COMMUNITY

# EDITORIAL

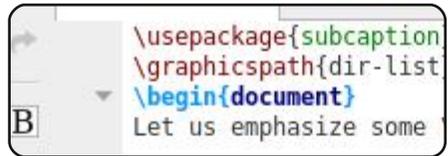## WELCOME TO THE LATEST ISSUE OF FULL CIRCLE

For this issue, we have the usual suspects; Python, Latex, Inkscape, LMMS, MTMT (Micro This Micro That), and an interesting piece on getting to grips with that pesky GRUB menu. You know, that boring black screen with the white box that lets you pick which OS to boot from. Well, you can make it look all fancy. True story. Even if you only see it for about ten seconds every six months.

We continue the reviews of 21.04 this month with Lubuntu and Xubuntu. We have an opinion piece about booting Ubuntu. As in, can the vanilla user understand what's happening when Ubuntu is starting up? I certainly don't!

In the real world: I hope you're all keeping safe and well. I hope we're getting to the end of this pandemic nonsense. One expert says we're in a third wave (here in the UK) while another says we're past the worst of it. By the time you've read this I'll have had both my jags (as we call them here in Scotland) and feel safer. I'm not as young as I used to be! Which is probably a good thing...

Don't forget: if you're looking for some help, advice, or just a chit chat: remember, we have a **Telegram** group. I mention this as I've been giving out the wrong link in a couple of emails. The link is: https://t.me/joinchat/PujkVH1HopRKvfd3. I hope to see you there. Come and say hello.

**Anyway, stay safe, and all the best for 2021!**
*Ronnie*
ronnie@fullcirclemagazine.org

**This magazine was created using :**

SCRIBUS

gimp

LibreOffice
The Document Foundation

creative commons
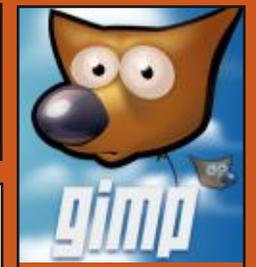
## Find Full Circle on:

facebook.com/fullcirclemagazine

twitter.com/#!/fullcirclemag

http://issuu.com/fullcirclemagazine

https://mastodon.social/@fullcirclemagazine

## Weekly News:

http://fullcirclemagazine.org/feed/podcast

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

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

**FCM PATREON :** https://www.patreon.com/fullcirclemagazine

## APACHE NETBEANS 12.4 RELEASED:

05/30/2021

Apache Software Foundation Organization introduced an integrated development environment for Apache NetBeans 12.4, which provides support for the Java SE programming languages, Java EE, PHP, C / C++, JavaScript and Groovy. This is the seventh release made by the Apache Foundation since Oracle donated the NetBeans code.

https://blogs.apache.org/netbeans/entry/announce-apache-netbeans-12-4

## ELECTRON 13.0.0:

05/31/2021

Electron 13.0.0, which provides a self-contained framework for developing multi-platform user applications, using the Chromium, V8 and Node.js components. The major change to the version number is due to the upgrade to the Chromium 91 codebase, the Node.js 14.16 platform, and the V8 9.1 JavaScript engine .

https://www.electronjs.org/blog/electron-13-0

## NGINX UNIT 1.24.0 RELEASED:

05/31/2021

NGINX Unit 1.24 application server was released. A solution is being developed to ensure the launch of web applications in various programming languages (Python, PHP, Perl, Ruby, Go, JavaScript / Node.js and Java). Several applications in different programming languages can run simultaneously under the control of NGINX Unit, the launch parameters can be changed dynamically without the need to edit configuration files and restart. The code is written in C and is distributed under the Apache 2.0 license. You can get acquainted with the features of NGINX Unit in the announcement of the first release.

https://mailman.nginx.org/pipermail/unit/2021-May/000265.html

## OPENRGB 0.6, RGB DEVICE CONTROL TOOLKIT:

06/01/2021

A new release of OpenRGB 0.6, a free toolkit for controlling RGB lighting devices, is out. The package supports ASUS, Gigabyte, ASRock and MSI motherboards with RGB lighting subsystem, backlit memory modules from ASUS, Patriot, Corsair and HyperX, ASUS Aura / ROG, MSI GeForce, Sapphire Nitro and Gigabyte Aorus graphics cards, various controllers LED strips (ThermalTake, Corsair, NZXT Hue +), glowing coolers, mice, keyboards, Razer backlit headphones and accessories. Information about the protocol of interaction with devices is mainly obtained through reverse engineering of proprietary drivers and applications. The code is written in C / C++ and is distributed under the GPLv2 license.

https://gitlab.com/CalcProgrammer1/OpenRGB/-/releases/release_0.6

## PEERTUBE 3.2 RELEASED:

06/01/2021

The decentralized platform for organizing video hosting and video broadcasting PeerTube 3.2 was announced. PeerTube offers a vendor-independent alternative to YouTube, Dailymotion and Vimeo, using a content distribution network based on P2P communications and linking visitors' browsers. The project is distributed under the AGPLv3 license.

https://joinpeertube.org/news#release-3.2

## JINGOS 0.9 AVAILABLE:

06/01/2021

JingOS 0.9 distribution is out, providing an environment specifically optimized for installation on touchscreen tablets and laptops. The project is being

developed by the Chinese company Jingling Tech, which has a representative office in California. The development team includes employees previously employed by Lenovo, Alibaba, Samsung, Canonical / Ubuntu, and Trolltech. The installation image size is 3 GB (x86_64). The project is distributed under the GPLv3 license.

For JingOS tests, developers use Surface pro6 and Huawei Matebook 14 tablets, but in theory, the distro can run on any tablets supported in Ubuntu 20.04. OTA updates are supported to keep the software up to date. To install programs, in addition to the regular Ubuntu repositories and the Snap catalog, a separate application store is offered.

https://forum.jingos.com/t/jingos-v0-9-release-and-super-early-birds-program/1572

## Util-linux 2.37 released:
06/02/2021

A new version of the Util-linux 2.37 system utilities package is out. It includes both utilities closely related to the Linux kernel and general-purpose utilities. For example, the package contains utilities mount / umount, fdisk, hwclock, cal, blkid, fsck / cfdisk / sfdisk, blockdev, chrt, mkfs, ionice, more, renice, su, kill, setsid, login, shutdown, dmesg, lscpu, logger, losetup, setterm, mkswap, swapon, taskset, etc.

https://www.spinics.net/lists/util-linux-ng/msg16733.html

## Cinnamon 5.0 released:
06/02/2021

A fter six months of development, the Cinnamon 5.0 user environment is released. The Linux Mint community is developing a fork of the GNOME Shell, the Nautilus file manager and the Mutter window manager, aimed at providing a classic GNOME 2-style environment with support for GNOME Shell interactions. Cinnamon is based on GNOME components, but those components are shipped as a periodically synced fork with no external dependencies on GNOME. The change of the version number to 5.0 is not associated with any particularly important changes, but only continues the tradition of using even decimal digits for numbering stable versions (4.6, 4.8, 5.0, etc.). The new Cinnamon release will be offered with Linux Mint 20.2, which is slated for a mid-June release.

https://github.com/linuxmint/Cinnamon/releases/tag/5.0.0

## OBS Studio 27.0 Released:
06/02/2021

O BS Studio 27.0 for streaming, compositing and video recording is out. The code is written in C / C++ and is distributed under the GPLv2 license. It provides support for compositing with scene building based on arbitrary video streams, data from web cameras, video capture cards, images, text, content of application windows, or the entire screen. During broadcasting, it allows you to switch between several predefined scene options (for example, to switch views with an emphasis on the screen content and the image from a web camera). The program also provides tools for sound mixing, filtering with VST plugins, volume leveling and noise suppression.

https://obsproject.com/blog/obs-studio-27-released

## OpenSUSE Leap 15.3 Released:
06/02/2021

A fter almost a year of development, openSUSE Leap 15.3 has been released. The release builds on the core set of packages from the SUSE Linux Enterprise distribution with some custom applications from the openSUSE Tumbleweed repository. A 4.4 GB universal DVD build is available for download (x86_64, aarch64, ppc64les, 390x), a stripped-down image for network installation (146 MB) and Live builds with KDE, GNOME and Xfce. A key feature of openSUSE Leap 15.3 is the use of the same set of binary packages with SUSE Linux Enterprise 15 SP 3, instead of the rebuilding of SUSE Linux Enterprise src packages that was the norm in previous releases. It is assumed that using the same binary packages in SUSE and openSUSE will simplify migration from one distribution to another, save resources on building packages, distributing updates and testing, unify differences in spec files and allow you to move away

from diagnosing different package assemblies when parsing messages about errors.

https://www.opensuse.org/

## NixOS 21.05 using Nix package manager:

06/02/2021

NixOS 21.05, based on the Nix package manager and providing a number of proprietary developments that simplify system configuration and maintenance. For example, NixOS uses a single system configuration file (configuration.nix), provides the ability to quickly rollback updates, supports switching between different system states, supports the installation of individual packages by individual users (the package is placed in the home directory), it is possible to simultaneously install several versions of the same program , reproducible builds are provided. The full installation image with KDE is 1.4 GB, GNOME is 1.8 GB, and the shorthand console image is 660 MB.

https://discourse.nixos.org/t/21-05-has-been-released/13407

## Tor Browser 10.0.17 and Tails 4.19 distribution:

06/02/2021

Tails 4.19 (The Amnesic Incognito Live System), based on Debian and designed to provide anonymous access to the internet, is out. All connections, except for traffic through the Tor network, are blocked by the packet filter by default. Encryption is used to store user data in the save user data mode between runs. A 1 GB iso image has been prepared for downloading, capable of working in Live mode.

At the same time, a new version of the Tor Browser 10.0.17 was released, focused on ensuring anonymity, security and privacy. The release is synchronized with the Firefox 78.11.0 ESR codebase, which has fixed 6 vulnerabilities. Updated versions of NoScript 11.2.8, HTTPS Everywhere 2021.4.15 and Tor 0.4.5.8. The release of Tor Browser for Android is delayed until next week.

https://tails.boum.org/news/version_4.19/

## Clonezilla Live 2.7.2:

06/03/2021

Clonezilla Live 2.7.2 is available. It is designed for fast disk cloning (only used blocks are copied). The tasks performed by the distribution are similar to those of the proprietary Norton Ghost product. The size of the iso-image is 308 MB (i686, amd64).

The distribution is based on Debian GNU / Linux and uses the code of projects such as DRBL, Partition Image, ntfsclone, partclone, udpcast. It is bootable from CD / DVD, USB Flash and network (PXE). It supports LVM2 and FS ext2, ext3, ext4, reiserfs, reiser4, xfs, jfs, btrfs, f2fs, nilfs2, FAT12, FAT16, FAT32, NTFS, HFS+, UFS, minix, VMFS3 and VMFS5 (VMWare ESX). There is a mode for mass cloning over the network, including the transmission of traffic in multicast mode, which makes it possible to simultaneously clone the source disk to a large number of client machines. Cloning from one disk to another is possible, as well as creating backups by saving a disk image to a file. Disk-level cloning or individual partition cloning is possible.

https://sourceforge.net/p/clonezilla/news/2021/06/-stable-clonezilla-live-272-38-released-/

## Kali Linux 2021.2 Released:

06/03/2021

Kali Linux 2021.2, designed to test systems for vulnerabilities, conduct audits, analyze residual information and identify the consequences of attacks by cybercriminals was announced. All code created by the distribution is distributed under the GPL license and is available through their public Git repository. There are several options for iso-images for download. It is available for x86, x86_64, ARM architectures (armhf and armel, Raspberry Pi, Banana Pi, ARM Chromebook, Odroid). The Xfce desktop is offered by default, but KDE, GNOME, MATE, LXDE and Enlightenment e17 are optionally supported.

https://www.kali.org/blog/kali-linux-2021-2-release/

## CentOS Linux 8.4 (2105) Released:

06/04/2021

CentOS 2105, incorporating changes from Red Hat Enterprise Linux 8.4 is out. The distribution is fully binary compatible with RHEL 8.4. CentOS 2105 builds prepared (8 GB DVD and 605 MB netboot) for x86_64, Aarch64 (ARM64) and ppc64le architectures. The SRPMS packages that the binaries are based on and debuginfo are available through vault.centos.org. In the rolling release edition of CentOS Stream, which will replace the classic CentOS 8 at the end of the year, there is the ability to rollback to previous versions of a package using the "dnf downgrade" command - if there are several versions of the same application in the repository.

https://www.mail-archive.com/centos-announce@centos.org/msg11936.html

## Free Heroes of Might and Magic II - 0.9.4 released:

06/04/2021

A release of project "fheroes2 0.9.4" is available. It is trying to recreate the Heroes of Might and Magic II game. The project code is written in C++ and is distributed under the GPLv2 license. To start the game, you need files with game resources, which can be obtained, for example, from the demo version of Heroes of Might and Magic II.

https://github.com/ihhub/fheroes2/releases/tag/0.9.4

## Jami "Maloya" is available:

06/04/2021

A new release of the Jami decentralized communications platform is available, codenamed "Maloya". The project is aimed at creating a communication system that works in P2P mode and allows both communication between large groups and making individual calls with a high level of confidentiality and security. Jami, formerly known as Ring and SFLphone, is a GNU project and is distributed under the GPLv3 license. Binaries are prepared for GNU / Linux (Debian, Ubuntu, Fedora, SUSE, RHEL, etc.), Windows, macOS, iOS, Android and Android TV.

Unlike traditional communication clients, Jami is able to transfer messages without contacting external servers through establishing a direct connection between users using end-to-end encryption (keys are present only on the client side) and authentication based on X.509 certificates. In addition to secure messaging, the program allows you to make voice and video calls, create teleconferences, exchange files, organize sharing of files and screen content.

https://jami.net/maloya-a-new-version-of-jami/

## Rescuezilla 2.2 Backup Distribution Released:

06/05/2021

Rescuezilla 2.2 is available, designed for backup, system crash recovery and diagnostics of various hardware problems. The distribution is built on Ubuntu and continues the development of the "Redo Backup & Rescue" project, which was discontinued in 2012. Rescuezilla supports backup and recovery of accidentally deleted files on Linux, macOS and Windows partitions. It automatically searches for and connects to network partitions that can be used to host backups. The graphical interface is based on the LXDE shell. The backup format is fully compatible with Clonezilla. Recovery supports Clonezilla, Redo Rescue, Foxclone and FSArchiver images.

https://github.com/rescuezilla/rescuezilla/releases/tag/2.2

## Lakka 3.1, a distribution for creating game consoles:

06/05/2021

After more than a year of development, Lakka 3.1 is out. It allows you to turn computers, set-top boxes or single-board computers into a full-fledged game consoles for running retro games. The project is a modification of LibreELEC, which was originally designed for creating home theaters. Lakka builds are generated for i386, x86_64

platforms (Intel, NVIDIA or AMD GPUs), Raspberry Pi 1-4, Orange Pi, Cubieboard, Cubieboard2, Cubietruck, Banana Pi, Hummingboard, Cubox-i, Odroid C1 / C1 + / XU3 / XU4 and etc. To install, just write the distribution to an SD card or USB drive, connect a gamepad and boot the system.

Lakka's emulation is based on the RetroArch game console emulator, which provides emulation of a wide range of devices and supports advanced features such as multiplayer games, save state, enhancing the image of old games with shaders, rewinding games, hot plugging gamepads and video streaming.

http://www.lakka.tv/articles/2021/06/05/lakka-3.1/

## BLENDER 2.93 LTS RELEASED:

06/05/2021

Blender 2.93 LTS 3D modeling package has been released, which will be the last release in the 2.9x branch. The release received Extended Lifetime Support (LTS) release status and will be supported for two more years in parallel with the next seven releases. The next release, according to the development plan, will be 3.0, on which work has already begun.

Blender 2.93 continues with the node-based geometric object management system, first proposed in the previous version. Major improvements have been made to tools for static and animated 2D graphics, 3D line art (Grease Pencil), sculpting,

rendering. A number of interface improvements have also been made to improve the usability. In particular, a special tabular editor has been implemented, which allows you to conveniently control the parameters assigned to objects.

https://www.blender.org/news/blender-2-93-release/

## REGOLITH DESKTOP 1.6 RELEASED:

06/07/2021

Regolith 1.6 desktop is available, developed by the developers of the Linux distribution of the same name . Regolith is based on GNOME session management technologies and the i3 window manager. The project code is distributed under the GPLv3 license. Download the PPA-repositories for Ubuntu 18.04, 20.04 and 21.04.

The project is positioned as a modern desktop environment, developed for faster execution of typical actions by optimizing workflows and eliminating unnecessary clutter. The goal is to provide a functional yet minimalistic interface that can be customized and expanded based on user preferences.

https://github.com/regolith-linux/regolith-desktop/releases/tag/R1.6

## PHP 8.1 ALPHA TESTING HAS BEGUN:

06/13/2021

The first alpha release of a new branch of the PHP 8.1 programming language was announced. The release is scheduled for November 25th. The main innovations already available for testing or planned for implementation in PHP 8.1. The next release will be Alpha 2, planned for 24 Jun 2021.

https://www.php.net/index.php#id2021-06-10-1

## RQLITE 6.0, A DISTRIBUTED FAULT-TOLERANT SQLITE-BASED DATABASE MANAGEMENT SYSTEM:

06/14/2021

Rqlite 6.0 DBMS is out. It uses SQLite as a storage engine and allows organizing a cluster of storages synchronized with each other. Features include, the ease of installation, deployment and maintenance of distributed fault-tolerant storage, something similar to etcd and Consul, but using a relational data model instead of a key / value format. The project code is written in the Go language and is distributed under the MIT license.

The Raft consensus algorithm is used to keep all nodes in sync. Rqlite uses the original SQLite library and go-sqlite3 driver, on top of which runs a layer that processes client requests, replicates to other nodes, and monitors the consensus reached on the choice of the lead node.

https://www.philipotoole.com/rqlite-6-0-0-building-for-the-future/

## NEW STABLE TOR 0.4.6 BRANCH:

06/15/2021

Tor 0.4.6.5 is considered the first stable release of the 0.4.6 branch, which has evolved over the past five months. Branch 0.4.6 will be maintained as part of a regular maintenance cycle - the release of updates will be discontinued 9 months or 3 months after the release of branch 0.4.7.x. Long Support Cycle (LTS) is provided for branch 0.3.5, updates for which will be released until February 1, 2022. At the same time, Tor releases 0.3.5.15, 0.4.4.9 and 0.4.5.9 were announced, which fixed DoS vulnerabilities that could cause denial of service to clients of onion services and relays.

https://blog.torproject.org/node/2041

## GNU NANO TEXT EDITOR 5.8:

06/15/2021

The GNU nano 5.8 console text editor has been released, it is offered as the default editor in many custom distributions whose developers find it easier to use than vim.

https://nano-editor.org/

## SME SERVER 10.0 LINUX SERVER:

06/15/2021

SME Server 10.0, built on the CentOS package base and intended for use in the server infrastructure of small and medium-sized businesses, is out. A feature of the distribution, is the presence in the composition of pre-configured standard components, completely ready for use and configurable via its web interface. These components include a spam-filtered mail server, web server, print server, file archive, directory service, firewall, and so on. The size of the iso images are 1.5 GB and 635 MB. The new release is notable for the upgrade to the CentOS 7 package base (the previous SME Server 9.x branch was based on CentOS 6).

https://lists.contribs.org/pipermail/updatesannounce/2021-June/000477.html

## DEBIAN'S CINNAMON MAINTAINER SWITCHES TO KDE:

06/16/2021

Norbert Preining announced the withdrawal of its authority to create packages with new versions of Cinnamon Desktop for Debian due to the fact that he stopped using Cinnamon on his system and switched to KDE. Since Norbert no longer uses Cinnamon all the time, he cannot provide quality testing of packages under real-world conditions.

At one time, Norbert switched from GNOME3 to Cinnamon due to usability issues for advanced users in GNOME3. For a while, Norbert was happy with the combination of the conservative Cinnamon interface with modern GNOME technologies, but experiments with KDE showed that this environment better suited his needs. KDE Plasma is characterized by Norbert as a lighter, faster, more responsive and customizable environment. He has already started building fresh KDE builds for Debian, prepared in the OBS service, and intends to soon upload packages from KDE Plasma 5.22 to the Debian Unstable branch.

Norbert has expressed his willingness to continue maintaining existing Cinnamon 4.x packages for Debian 11 "Bullseye" on a leftover basis, but does not intend to package Cinnamon 5 or do any major Cinnamon related work. To continue the development of Cinnamon packages for Debian, new maintainers have already been found - Joshua Peisach, the author of the Ubuntu Cinnamon Remix and Fabio Fantoni, who is involved in the development of Cinnamon, who, together will provide quality support for Cinnamon packages for Debian.

https://www.preining.info/blog/2021/06/future-of-cinnamon-in-debian/

## ALPINE LINUX 3.14

### RELEASED:
06/16/2021

Alpine Linux 3.14, a minimalistic distribution, built on the Musl system library and BusyBox set of utilities was announced. The distribution has increased security requirements and is built with SSP (Stack Smashing Protection). OpenRC is used as init system, its own apk package manager is used for package management. Alpine is used to build official Docker container images. Bootable iso images (x86_64, x86, armhf, aarch64, armv7, ppc64le, s390x, mips64) are prepared in five versions: standard (143 MB), with a kernel without patches (155 MB), extended (615 MB) and for virtual machines (45 MB).

The new release contains updated package versions, including HAProxy 2.4.0, KDE Apps 21.04.2, nginx 1.20.0, njs 0.5.3 Node.js 14.17.0, KDE Plasma 5.22.0, PostgreSQL 13.3, Python 3.9 .5, R 4.1.0, QEMU 6.0.0, Zabbix 5.4.1 and Lua 5.4.3.

https://alpinelinux.org/posts/Alpine-3.14.0-released.html

## GLIBC DEVELOPERS CONSIDER STOPPING CODE TRANSFER TO FREE SOFTWARE FOUNDATION:
16.06.2021

Key developers of the GNU C Library (glibc) system have put up a proposal to end the mandatory transfer of property rights of the code to the Open Source Foundation. By analogy with the changes in the GCC project, Glibc proposes to make the signing of the CLA agreement with the Free Software Foundation optional and provide developers with the opportunity to confirm the right to transfer the code to the project using the Developer Certificate of Origin (DCO) mechanism.

According to the DCO, author tracking is done by attaching a "Signed-off-by: developer's name and email" line to each change. By attaching this signature to the patch, the developer confirms his authorship over the transferred code and agrees to its distribution as part of the project or as part of the code under a free license. Unlike the actions of the GCC project, the decision was not released by the governing council from above, but was first put up for discussion with all representatives of the community.

https://sourceware.org/pipermail/libc-alpha/2021-June/127581.html

## NETWORKMANAGER 1.32.0

### RELEASED:
06/17/2021

A stable release of the interface is available to simplify the configuration of network parameters - NetworkManager 1.32.0 . Plugins to support VPN, OpenConnect, PPTP, OpenVPN and OpenSWAN are evolving via their own development cycles.

https://mail.gnome.org/archives/networkmanager-list/2021-June/msg00044.html

## CLOUDFLARE PUBLISHES WARP FOR LINUX:
06/17/2021

Cloudflare today announced a Linux variant of its WARP application that combines a DNS resolver using DNS 1.1.1.1, a VPN, and a proxy in a single application to redirect traffic through the Cloudflare content delivery network infrastructure. To encrypt traffic in VPN, the WireGuard protocol is used in the BoringTun implementation , written in the Rust language and working entirely in user space.

A distinctive feature of WARP is its tight integration with the content delivery network. Cloudflare provides a content delivery network for 25 million Internet resources and serves traffic for 17% of the 1000 largest sites. If a resource is served on Cloudflare, accessing it through WARP will result in faster content transfer than accessing it through the provider's network.

In addition to VPN, there are several operating modes that allow one to encrypt only DNS requests (enable DNS-over-HTTPS) or run WARP in proxy mode, which can be accessed via HTTPS or SOCKS5, for example. You can also optionally activate filters to block access to resources that have detected malicious activity or adult content.

Linux WARP packages are prepared for Ubuntu (16.04, 20.04), Debian (9, 10, 11), Red Hat Enterprise Linux (7, 8) and CentOS. In the future, they promise to expand the number of supported distributions. The program is designed as a console utility warp-cli. To use the VPN using the Cloudflare network, in the simplest case, it is enough to authenticate in the network with the "warp-cli register" command and the "warp-cli connect" command to create a tunnel for transmitting traffic from your system.

https://blog.cloudflare.com/announcing-warp-for-linux-and-proxy-mode/

## RUST 1.53 RELEASED:
06/18/2021

Rust 1.53, founded by the Mozilla project, but now being developed under the auspices of the independent non-profit organization Rust Foundation, is out. The language focuses on safe memory management, provides automatic memory management, and provides the means to achieve high parallelism of job execution, while dispensing with the use of a garbage collector and runtime (runtime is reduced to basic initialization and maintenance of the standard library).

Automatic memory management in Rust relieves the developer from mistakes when manipulating pointers and protects against problems arising from low-level memory handling, such as accessing a memory area after it is freed, dereferencing null pointers, overrunning buffer boundaries, etc.

The Cargo package manager is being developed to distribute libraries, provide builds, and manage project dependencies . The crates.io repository is supported for hosting the libraries.

https://blog.rust-lang.org/2021/06/17/Rust-1.53.0.html

**The VirtualBox Networking Primer**
Connecting and Configuring Virtual Machines

*The VirtualBox Networking Primer is a no-nonsense guide for the VirtualBox user taking their next steps into virtual networks.*

*While Oracle VM VirtualBox is a great free tool, the real power of virtualisation comes when you start connecting virtual machines to each other and to the wider world. Software development, sales, education and training are just some of the areas in which network access to virtual machines offers endless opportunities. But the world of computer networks is filled with complex technical jargon.*

*Complete with principles, practice, examples and glossary, The VirtualBox Networking Primer takes the frustration and confusion out of connecting real-world projects.*

Author: **Robin Catling**
Publisher: Proactivity Press
ISBN13 : 9781916119482

Amazon US link:
https://www.amazon.com/dp/1916119484?ref_=pe_3052080_397514860

Amazon UK link:
https://www.amazon.co.uk/VirtualBox-Networking-Primer-Connecting-Configuring/dp/1916119484/ref=sr_1_1?dchild=1&keywords=virtualbox+networking+primer&qid=1600253699&s=books&sr=1-1
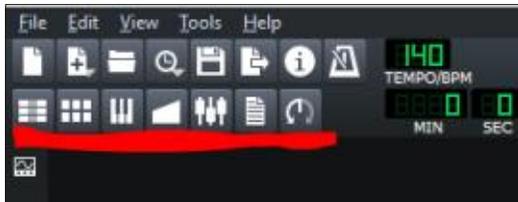
Kobo:
https://www.kobo.com/us/en/ebook/the-virtualbox-networking-primer

We have taken a quick start approach to using LMMS, now let's look a little deeper.

Target audience is still n00bs.

Open LMMS and you should see these buttons (lots of images to follow).



These buttons will open and close your working windows. It is a good idea to visualize them as F5-F11. F10 is the project notes, a sort of minimal notepad, that will ship with your tune. It is also the only one I never use.



Now, if you click on "File", you will notice a few extra import and

export commands below the usual suspects. Importing will allow you to import midi projects and hydrogen sequences. You can cheat a bit and go to ultimate guitar tabs and see if you can get the midi file for the song you want to remix. So far, we have used all the other menu items in this series. If you missed any of the previous entries in this series, feel free to grab a back issue and be in the know.

So now that we have covered all of these, what else is there? Well, there is one very important plug-in we have not touched. That is

ZynAddSubFX. Just to avoid ANY confusion right from the start, I would like to point out that I am talking about the plug-in inside your instrument plug-ins, and not the one in the software centre.

If you see the image shown below? You are in the wrong one.

When you add ZynAddSubFX to your song editor and you click it, you should see a familiar small window open.





This issue is a "Show and Tell" article, rather than a full blown tutorial, as I need you to recognize the windows – in the next issue, I am going to refer to them only as it would be too many images. I will just be opening the sequence we will be using, though there are more and you should have a click around, so to speak. You can always close LMMS without saving anything – in case you get lost or you could not undo some change.

"Show GUI" is a grey button in the middle of the ZynAddSubFX

window. I realize this does not look like a button, but push it anyway. You should get a dialogue that asks if you are a beginner or advanced. This just affects what you see. Since we are beginners, press beginner, and have a look at the layout. You are welcome to press the advanced button, as this is where we will be working. You can swap at any time, by pressing the "misc" button at the end of the menu. If you are an advanced user, what are you doing here, go make some tunes!! So, please use the "misc" menu item to swap to advanced if you clicked the beginner button. The difference here is "advanced" allows you to add up to 16 instruments per instance of ZynAddSubFX! (powerful stuff indeed.)

Shall we make an instrument? Good! In the advanced view, click on "Edit Instrument".
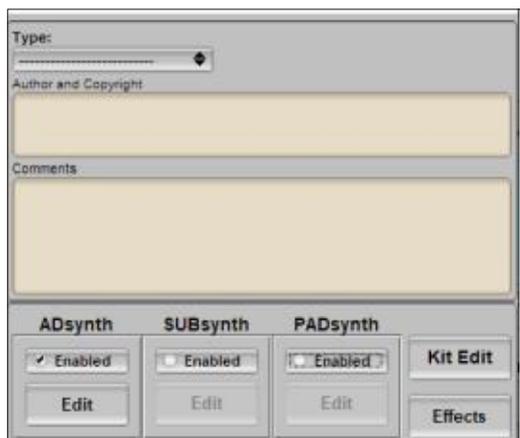


Then please click "Edit" under "Adsynth". This will open yet another window. Don't worry, it may look like inception with all the windows open, but there is only one more I want to show you in this lesson.



Click show voice parameters, to get to the final window I want you to go to. (Though they all look the same, try to remember who's who in the zoo.)
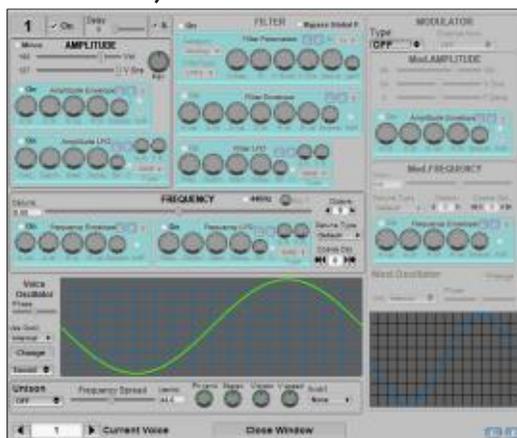


Okay, this is the last image, promise.

The part that sets ZynAddSubFX apart from the triple oscillator is here we can add up to eight voices! Think of these "voices" as the three parts inside the triple oscillator. This is basically for when you need just that something 'extra' that the triple oscillator cannot give you. We will do a deeper dive into how this works in the next issue, so stay tuned!

When editing sounds in ZynAddSubFX, remember that they are quieter than the triple ocillator, for some reason, so feel free to crank the volume.

So, let us go back a window or two to where you clicked "Show voice parameters". The window layout is a bit clunky, but each cyan block does exactly what it says. Please hover over everything and read the tool tips. Familiarize yourself with what is in front of you. Actually please feel free to click around and twist knobs, etc. You can't break anything. Now that you know the basic layout, please refer to this issue if, in the next, you don't know how I got to a specific

window.

If you get stuck or have any questions, please direct them to: misc@fullcirclemagazine.org

(Remember, your feedback is important, if a series goes forward or not.)

**Erik** has been in IT for 30+ years. He has seen technology come and go. From repairing washing machine sized hard drives with multimeters and oscilloscopes, laying cable, to scaling 3G towers, he's done it.

As many of you know, I work fairly closely with Don Rozenberg who is the author of PAGE. For over 10 years, he and I have communicated strictly via email. Until the last 30 days or so. Now we are enjoying Discord video chat (voice only (my choice)) and screen sharing. It makes our communications and collaboration tremendously productive. The immediate back-and-forth is awesome, and we get a tonne of things done, talked through, and most importantly, because it's live, understanding is immediate. I can't tell you how many email threads that we've gone through where one or the other of us doesn't quite understand an issue without 5 or more emails back-and-forth. Given the time-zone issue, there are many times that it takes 3 or 4 days to hash out a problem or thought. Now he can see what I'm doing and I can see what he is doing. If you haven't tried Discord and the screen share/voice session before, you owe it to yourself to find someone to try it with. It's not the most intuitive thing in the world, but with a bit of patience, it's easy to get up to speed quickly.

Now the reason I am mentioning this is because, on today's update session, he asked if I had ever used PtPython. I honestly said no, and he proceeded to demo it for me and I was immediately impressed. (Note that I'm fairly easy to impress, so that's not a big thing.) While he was showing me what it can do, I grabbed my smartphone and looked it up. I decided right then and there to use it as my article for this month.

You can find the home page for PtPython at https://github.com/prompt-toolkit/ptpython.

I have to admit that I REALLY hate the "normal" Python Interactive Shell or REPL. While it's very useful many times to test code before I try to make it work in my IDE, I find it very clumsy especially when I'm trying to prototype a function or complex loop. More times than not, I'll just work it up in VS Code and if it doesn't work, I'll set a breakpoint and step through my code until I find where I have messed up.

One of the reasons that I was so excited about PtPython is that it allows you to use history to dump an entire loop or function back into active code and make a quick edit due to a typo.

Let's take a look at using PtPython. First, we need to install it. You can use pip to do this...

```
pip install ptpython
```

However, when I did this, I received a number of dependency errors. So, I uninstalled it, downloaded the repository as a zip file, unpacked it and then did an "old-fashioned" python install from the repository folder...

```
python setup.py install
```

Then I installed it again via pip and everything seemed to work.

The first thing you might notice is that, unlike the "normal" Python REPL, it doesn't start with the version number. That, you can find in the bottom right of the window.

Now this is where I started to kind of "choke up". I couldn't for the life of me, come up with anything to try. So, I did a simple test purposefully making a mistake...

```
>>> a = 3
>>> b = 2
>>> for cntr in range(a):
...     for cntr2 in range(b):
...         print(f'{a} – {b}')
3 – 2
3 – 2
3 – 2
3 – 2
3 – 2
3 – 2
>>>
```

Instead of printing the values of cntr and cntr2, I told it to print a and b. To fix the error, I simply pressed the up arrow key. It then put in my entire loop.

I then used the left arrow and replaced the "a" with "cntr" and the "b" with "cntr2".

I then pressed {enter} twice and the output is as I wanted it.





Much better. AND MUCH easier than dealing with the standard REPL.

As I got ready to do the next section below, I remembered that there is autocomplete already built into ptpython. For example...



Just one more checkmark for ptpython!

Now that I'd gotten all that done, I started thinking to myself, "Self, what else can I do to show the goodies that ptpython has to offer?" And I answered myself, "Well, Self, how about showing off the PyWebIO library at the same time you show off the ptpython?". Who am I to argue with myself, right? So, here we go.

## PyWebIO

According to their website https://github.com/wang0618/PyWebIO,

"*PyWebIO provides a series of imperative functions to obtain user input and output on the browser, turning the browser into a "rich text terminal", and can be used to build simple web applications or browser-based GUI applications without the need to have knowledge of HTML and JS.*"

I stumbled across this library while trying to keep up with the news about Python while trying to deal with other things. I wasn't really sure when I was going to be able to show it to you, but as they used to say, "There's no present like the time". Well, THEY say it differently, but I like to be different.

So, to install it, simply use pip...

```
pip3 install pywebio
```
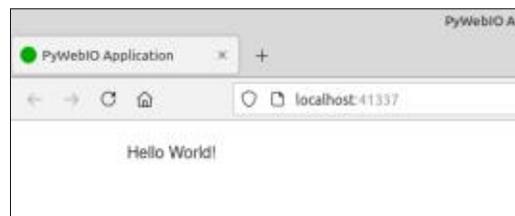
And you are ready to go.

Now in ptpython, do an import of the package...

```
>>> from pywebio.output import *
```

Now, I'm going to try to recreate the terminal animation that they have on their website.

```
>>> put_text("Hello World!");
```

When you do this, your default web browser should pop open and show you...



Easy enough, right? Now, let's do something a bit fancier...

```
>>> put_table([
...     ['Product', 'Price'],
...     ['Apple', '$5.5'],
...     ['Banner', '$7'],
... ]);
>>>
```

And your browser window will update to show...



Those are some expensive apples, but it gets the point across. Tables are REALLY easy. Notice that it automatically made the headers bold.

We can even, easily, put a logo onto the web page...

```
>>>
put_image(open('FullCircleLogo.jpg','rb').read());
```

You can even put interactive buttons on your web page...

```
>>> def on_click(btn):
...         put_markdown("You clicked '%s' button" % btn)
>>>
>>> put_buttons(['A', 'B','C'], onclick=on_click);
>>>
```

Which shows three buttons, just like we asked.  When you click each, this is what it will look like...

There is so much more that can be done with these two packages, that really, your imagination is your only limitation.

This month's article will really stress Ronnie getting everything to line up, so I think it might be a good idea that I end up. (*I'd rather line up images than try and line up all those usual code snippets!* - Ronnie)

You clicked 'A' button

You clicked 'B' button

You clicked 'C' button

Until next time, as always; stay safe, healthy, positive and creative!

**Greg Walters** is a retired programmer living in Central Texas, USA.  He has been a programmer since 1972 and in his spare time, he is an author, amateur photographer, luthier, fair musician and a pretty darn good cook. He still is the owner of RainyDaySolutions a consulting company and he spends most of his time writing articles for FCM and tutorials. His website is www.thedesignatedgeek.xyz .

In our last issue, we looked at adding some basic images to a document. Just like in sections and subsections, we can have sub images, (or tables or diagrams), such as figure 1 followed by figure 1.1, and be able to reference that. These also require the graphicx pre-processor as well as a new one, subcaption.

Let us start by adding that to our file from last time. Just below: \usepackage{graphicx} add another line: \usepackage{subcaption}

Since we have told the computer which package we wish to use, we can now go ahead and use it. The catch with this subcaption is that you need to specify the space you want to take up, beforehand. You also need to remember that it is a nested command. This means that the new image / subfigure is encapsulated by a figure. What does this look like? My file is named "you.png" in my "Figures" folder (code shown top right).

Now build and view. What went wrong? In our last bout, we added square brackets after \begin{figure} [p], to specify placement, but, in subfigures, we use curly braces to specify the size.

Change that first line to:

```
\begin{subfigure}
{0.25\textwidth}
```

Build and view.

```
\begin{figure}
    \begin{subfigure}
        \includegraphics{Figures/you}
        \caption{It's a U!}
        \label{fig:you}...
    \end{subfigure}
\end{figure}
```

Hey! Look at you, already going at it like a pro! (F5)

Again, you have to remember that if you have no text, using textwidth or textheight will net you a big fat zero on a contract and your image will not scale. Let's see how that works?

OK, before we do that, I want to introduce you to a package called lipsum. All it does is create lorem ipsum dummy text. It just saves me from typing it all out to demonstrate something that is related to text. Nothing funny. See: https://blog.chapagain.com.np/latex-generate-dummy-text-lorem-ipsum-in-your-document/
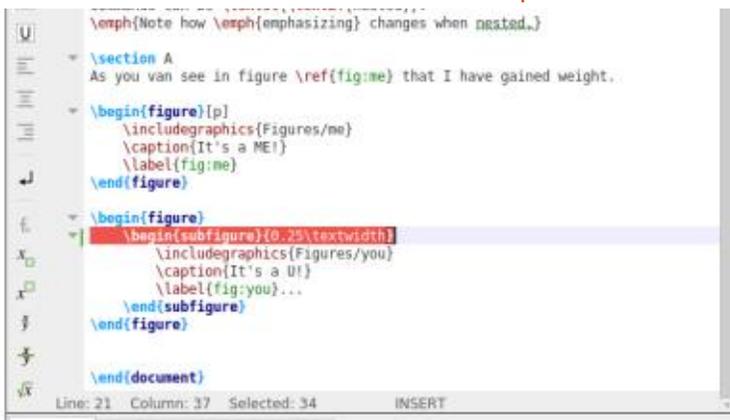
As this is becoming a lot of code, clear it all up to the pre-processor part (this is for simplicity's sake, nothing else).

```
\documentclass[a4paper, twocolumn]{article}
\usepackage{graphicx}
\usepackage{subcaption}
\graphicspath{dir-list}
\usepackage{lipsum}
\begin{document}

    \section{Forword}
    \lipsum[1-4]

        \section{Afterword}
    \lipsum[1-4]

\end{document}
```

So our code will look like that shown on the previous page, bottom right.

You will notice I added the lipsum package and added my dummy text. Press F5 and your output should look like this:



Now we can demonstrate figures that relate to the size of the text.

Now for your challenge: add a figure after the last /lipsum.

Did you manage? Great! If you didn't, go back to the previous issue and redo the lesson, practise makes perfect!

Now, let's wrangle our image down to size. How do we do that? The dropdown in TeXstudio gives you this: \includegraphics[keyvals]{imagefile}

Your attention should be on those "keyvals" key values. Clear it out and type a "w" and width will be one of the options, choose that. To make your image nestle in perfectly, set your width to your line width. (It should pop up in the IDE)

Now compile it and look at your output. Here is mine:



Does your line match mine?

```
\includegraphics[width=\linewidth]{Figures/you}
```

Well Done! At any time, hover your mouse over different words in that line, if you use TeXstudio, you should see a tooltip. In the case of the image file, you should see the image. As you can see, my image aligns perfectly with my column.

Sometimes, you don't need all that, or your space may be limited. You can specify the width and height as per issue 3 of our tutorial, last month. Try it now. This whole series is a hands-on affair. If you don't do it, you will not remember it by the time the next issue hits your inbox.

No seriously, I want you to try, as there is nothing as good as understanding, because then you don't have to learn anything. Do something fun. Stretch the image vertically and have a laugh at how terrible it looks. If your image is a rectangle, change it to a square and vice-versa. Ever wonder how those angled warning signs are put down in some technical books? Wonder no more! You can specify the angle at which your image is presented on the paper. With the keyword, "angle". Try angle=25 or angle=-75 and see what you have created. Again, the little modifier after \begin{figure} is valid. Do you remember what it was? No, read part three again. I kept the parts short for just this reference purpose. Remember, you can add labels and captions in this layout as well. So what happens if we need our figure to span both columns? Simply add a '*' after the word figure. Then it will look like

this:

```
\begin{figure*}

\includegraphics[width=\linewidth]{Figures/you}

\end{figure*}
```

Baby steps, this is not the easiest thing to learn, but now you know a little more and every bit counts! Did you notice that I slipped something else into this tutorial, without explaining it (it is self-explanatory). See if you can find it.

So now you know something more about graphics and their placement. Next issue we will touch on other types of graphics before moving on.

Did I make a mistake? Do you have any questions? E-mail us at: misc@fullcirclemagazine.org



**Erik** has been in IT for 30+ years. He has seen technology come and go. From repairing washing machine sized hard drives with multimeters and oscilloscopes, laying cable, to scaling 3G towers, he's done it.

One of the many great features of Ubuntu is its ability to be installed alongside other operating systems like Windows, or different versions of Linux. The GRUB boot menu that is displayed allows you to pick the OS to boot from, and, although it is certainly functional, it is not very aesthetically appealing. (Note: It is not possible to capture the boot screen since no OS is running, so I have created these screens to look like the real thing; however, there may be small differences).

I decided to spruce up the boot screen by adding a background image. This article describes my experiences while doing so and chronicles the various problems I encountered and solutions that I found along the way.

The GRUB manual gives details about this procedure but there are fundamentally 3 steps:

1. Get an image to use – it must be 256 color non-indexed RGB, and preferably in PNG format. There are lots of places to download free background images, I got mine from https://newevolutiondesigns.com/75-free-hd-abstract-backgrounds. You also need to make sure it is the correct size for your screen, I used 1366 x 768 as this is the preferred resolution of my laptop. If you want to use an image of your own that is not the correct size, it can easily be resized with GIMP. Call this image Back.png (or some other suitable name), and put it in the /boot/grub folder. You will need administrator privileges to do this, so right-click and select Open as Administrator before you try to Paste. If your Ubuntu version does not have this feature, just run your file manager with sudo which will give you the access you need.

2. Edit (as Administrator) the file /etc/default/grub, and add the following lines at the end of the file:

```
GRUB_BACKGROUND="Back.png"

GRUB_GFXMODE="1366x768x32"
```

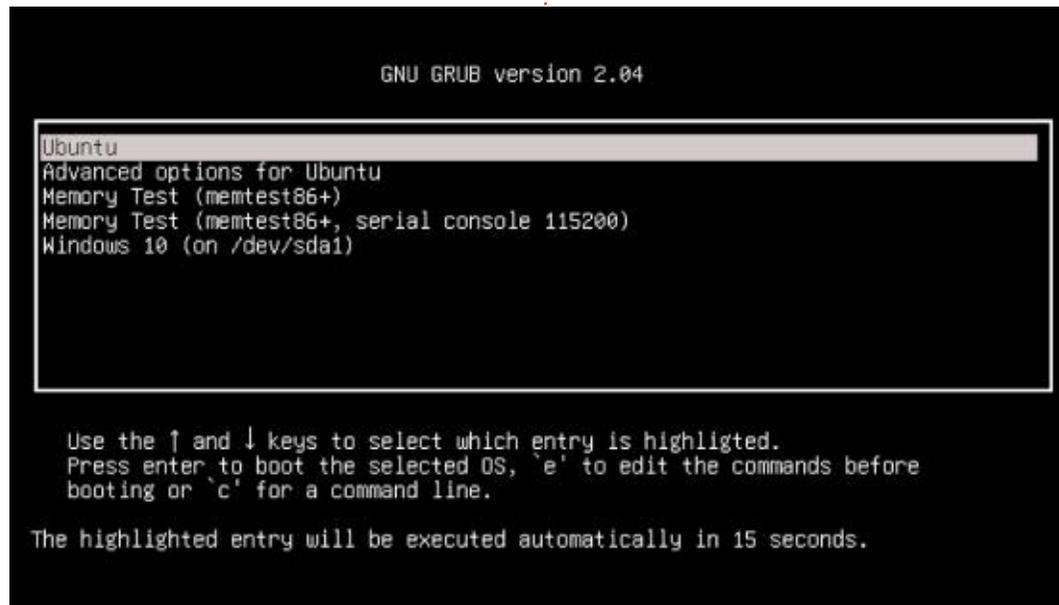If there is another GRUB_GFXMODE command already in the file, just add a # at the beginning of that line to comment it out. This last command sets the graphics mode of your screen; it must be one of the modes that it will support, otherwise it will be ignored. (If you are unsure about your monitor, boot the system to the GRUB menu and then press the "c" key quickly to get a grub > prompt. Typing videoinfo will list all the available video modes. Then press the ESC key to return to the boot menu and proceed).

3. Open a terminal and type:

```
sudo update-grub
```

to create a new GRUB configuration file that reflects this change. You should see that the update finds the background image and ends without error. Reboot!

Well, the background certainly shows up (next page, top), but the font is rather small; and, on a 1920 x 1080 screen, this effect is even more pronounced. The reason is simple enough: GRUB uses a default resolution of 640 x 480 (text mode), and employs a bitmap font that is appropriate for that resolution. When you change the

```
GNU GRUB version 2.04

┌──────────────────────────────────────────────────────────────────┐
│Ubuntu                                                              │
│Advanced options for Ubuntu                                         │
│Memory Test (memtest86+)                                            │
│Memory Test (memtest86+, serial console 115200)                     │
│Windows 10 (on /dev/sda1)                                           │
│                                                                    │
│                                                                    │
│                                                                    │
│                                                                    │
└──────────────────────────────────────────────────────────────────┘

     Use the ↑ and ↓ keys to select which entry is highligted.
     Press enter to boot the selected OS, `e' to edit the commands before
     booting or `c' for a command line.

The highlighted entry will be executed automatically in 15 seconds.
```

resolution to 1366 x 768, the pixels are smaller and so the displayed font is also reduced in size. GRUB provides only one font for its use (you will see it as unifont.pf2 in the grub folder), so if you want something larger it is necessary to use a different font entirely that can be scaled appropriately.

Fortunately GRUB provides a handy utility for just this purpose, so we can use any monospaced font and convert it to the .pf2 format that GRUB requires. There are lots of fonts on your system already, so let's use one. Copy the font file:

```
/usr/share/fonts/truetype/
Ubuntu/UbuntuMono-R.ttf
```

to your Desktop, so that the font is conveniently located for the next



steps. Now open a Terminal and type:

```
grub-mkfont -s 24 -o
UbuntuMono.pf2 UbuntuMono-
R.ttf
```

The -s 24 option sets the size and the -o option is followed by the name of the output file. This

command provides a bitmap file for GRUB to use that is bigger, and so should display better. Copy the file UbuntuMono.pf2 from your Desktop into the /boot/grub/fonts folder. Finally, edit (as Administrator) the file /etc/default/grub again and add the following line at the end:

```
GRUB_FONT="/boot/grub/fonts/
UbuntuMono.pf2"
```

Save the file, open a Terminal and type:

```
sudo update-grub
```

and reboot to see the effect that this has on the GRUB boot menu (shown bottom left).

The font is Ubuntu Mono and it is a good size; but, the box is not drawn correctly.

Let's try a different font to establish if the problem is the particular Ubuntu font that we used, or the method itself. This time copy the font

```
/usr/share/fonts/truetype/
dejavu/DejaVuSansMono.ttf
```

to the Desktop, and repeat the sequence of steps above, changing file names as appropriate. Reboot and check the display (shown below). This result is close to what we want, but the box has gaps in it so there is still something that is not quite right.

Let's try one last font to see what happens. This time I am going to use a font called Terminus, available for download from http://terminus-font.sourceforge.net/. Click on All files toward the bottom of the page and download: terminus-font-4.49.1.tar.gz

Extract the resulting archive into your Download folder and open the folder terminus-font-4.49 to see the font files contained inside. You will note that the folder contains a number of different font sizes in regular and bold weights, which makes it a very flexible bitmap font to use. Copy the file ter-u24b.bdf

to the Desktop, this is the 24-point bold version of the font. The reason why I have chosen this font will be clear in a moment; for the time being, follow the sequence of steps above, changing file names as appropriate, to get GRUB to use this font and reboot to see the final product (bottom left).

Exactly what we wanted! A clear, easy to read font with a properly drawn box and an attractive background. This progression of steps and the problems that arose are helpful in understanding what is going on here and making sense of what we have done. Firstly, GRUB only understands pf2 font files, a special bitmap format created specifically for GRUB. The

utility grub-mkfont takes Truetype fonts (which are defined by outlines), resizes them and converts the original Truetype font to the pf2 bitmap format. Imagine that you have a 12 x 24 grid and you draw a letter outline on the grid. Some of the pixels on the border will be partially inside the letter and partly outside so the computer has to decide to include or exclude those pixels. It does a pretty good job; but, the process does introduce some inaccuracies so you might end up with extra pixels where you don't want them or missing pixels where you do want them.

This is exactly the reason the DejaVu font displayed the box with gaps: the vertical box drawing character has missing pixels after the conversion to bitmap format. The Terminus font, designed by Dimitar Zhekov, is a bitmap font to start with (BDF format) and the one we used was already 24 pixels in size so grub-mkfont does not need to resize it or convert it to bitmap format. Consequently, it passed through the conversion process without any distortions and the final result is perfect. The Ubuntu font is a different story. The font as installed does not have characters for drawing a thick box so it

substitutes the question mark character for the missing glyphs.

On the one hand, this could be the end of the story as we have a nice GRUB screen which was, after all, the point of the exercise; and, because Terminus is available in a variety of sizes, it is possible to pick a size that suits your personal tastes. And, because they are all designed from scratch rather than being resized, they all look terrific. However, if you really would prefer another font style, there is a rather straightforward answer to the problem of fonts being distorted by grub-mkfont. The solution is to use a program called gbdfed to do the conversion from a Truetype font to an editable BDF font file. After
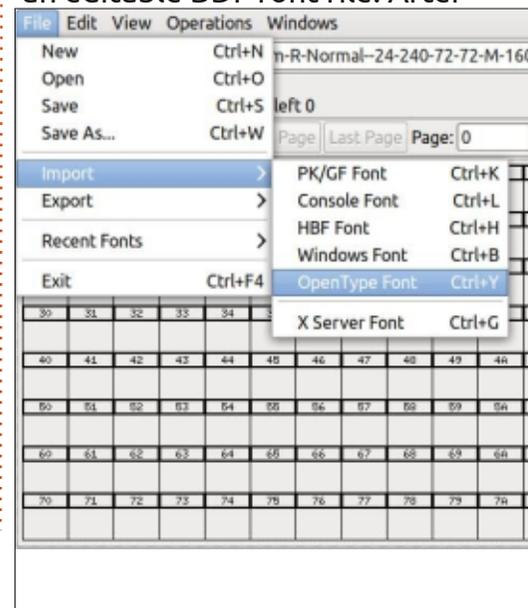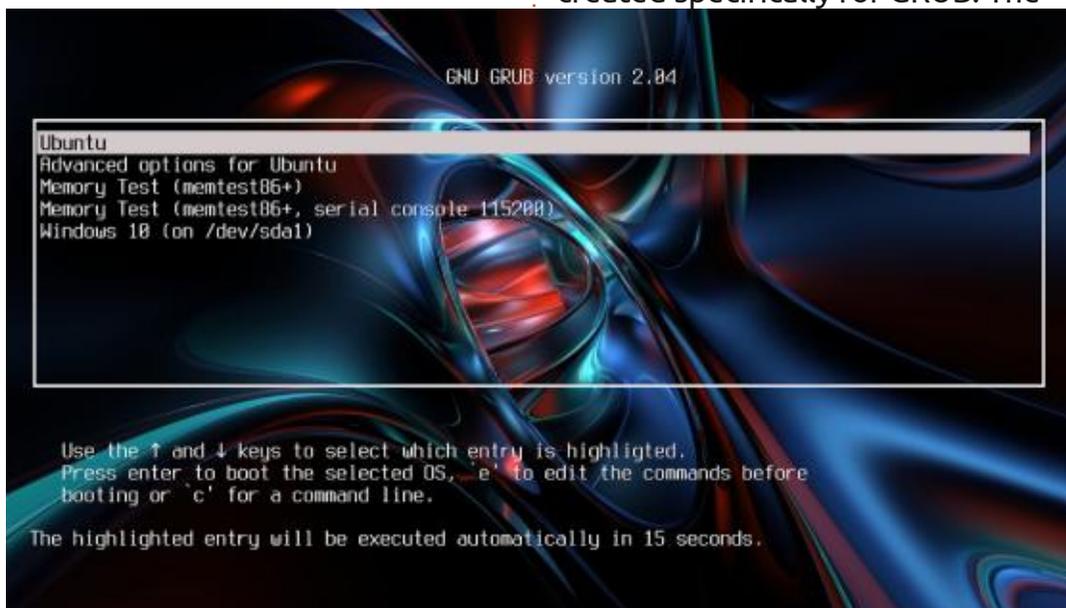
# HOWTO - TAME YOUR GRUB MENU

fixing any problems introduced by the conversion to bitmap format, grub-mkfont can be used on this tweaked BDF font to produce a pf2 font that works as it should. You can install gbdfed with Synaptic, through the Software Center or using apt-get, whichever you prefer. You can create a launcher on the Desktop or press Alt-F2 to run it if it does not appear in your menu or dash.

If you select File > Import > OpenType Font and then navigate to /usr/share/fonts/truetype/dejavu/DejaVuSansMono.ttf, and select this file, the font will be converted into bitmap format as it is imported. Choose 24 as the point size and 72 as the horizontal and vertical resolution.
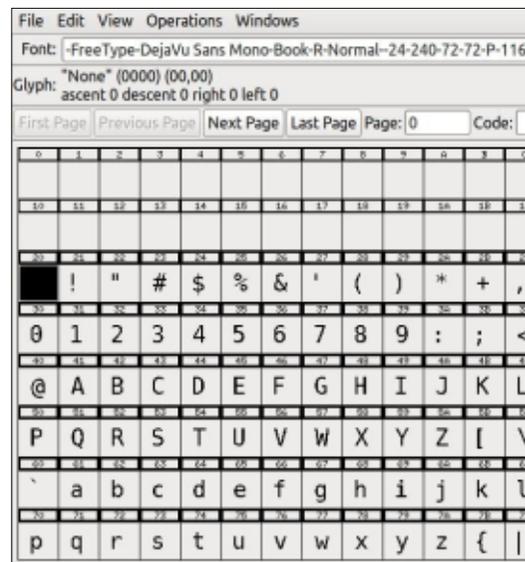


As you see, the program does a pretty good job, but I like to double-click on the zero character and just page through each character, upper and lower case, using the arrows at the top right of the window to see if anything untoward appears to your eye. You will likely find the odd extra pixel or unbalanced character that can be fixed by adding a pixel or two. For example, a number of the capital letters appear to have one side of the letter thicker than the other (E, H, P, and U) , and the lowercase "i" seems thicker than the other characters. Double clicking on it will open an editing window where you can left-click to add pixels and right-click to remove them. In this case the red area shows the pixels that
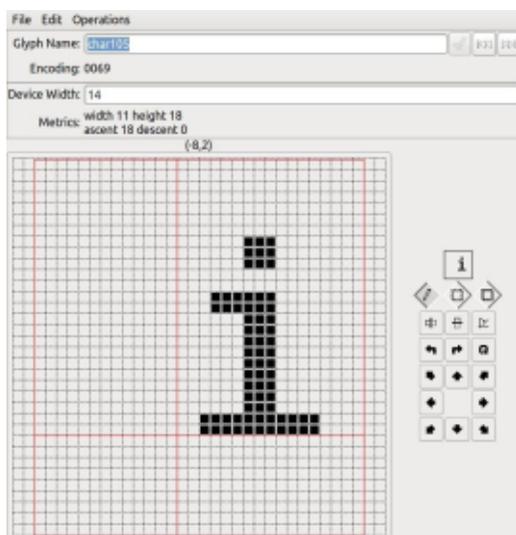


need to be removed. You might also choose to remove 2 pixels on the base line so it is balanced. When the letter is to your liking, select File    Update so that your changes will be written to the font file. When you are satisfied, select File    Save As, and save the file on your Desktop with a BDF extension. Personal taste is the final judge; if you like it, it's correct.
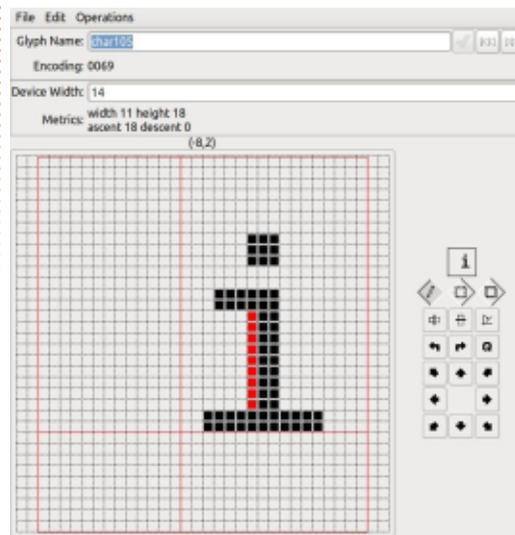


Now it's time to fix the box-drawing characters. Type 74 in the Page box or 2500 in the Code box and press enter. You will see that, as well as the four corners, are designated 2501, 2503, 250F, 2513, 2517 and 251B.

Each of these characters has missing pixels which is why the box that was drawn on the GRUB boot

menu had gaps in it. All that is required is to fill in the missing pixels so that the characters reach all the way to the edge(s) of the bounding box. The red squares show where pixels need to be added. Similarly, the corners need to be adjusted so that they reach both horizontal and vertical boundaries.Repeat the process for the other 3 characters. Once all 6 characters have been adjusted, save the file again and you now have a "repaired" bitmap font that can be converted with grub-mkfont for use with GRUB.
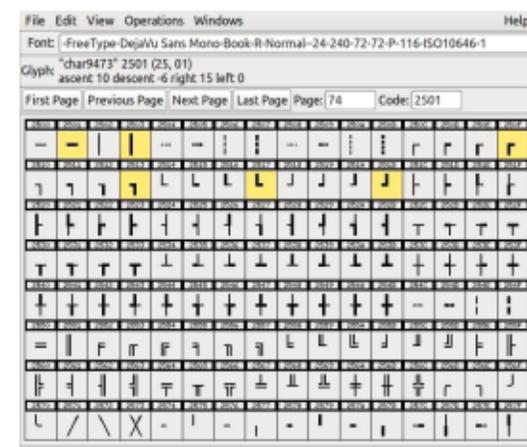


The problem with the Ubuntu Font was that the characters for the bounding box were missing entirely so if you wanted to use this font you would need to draw your own characters in the appropriate character boxes. Not difficult, just make sure that everything lines up

with the corners and the horizontal and vertical bars. In addition, the characters for up (2191) and down (2193) arrows are often missing so these might need to be added also.
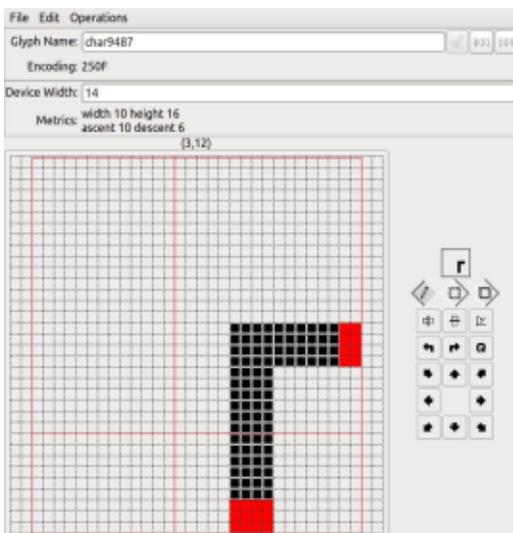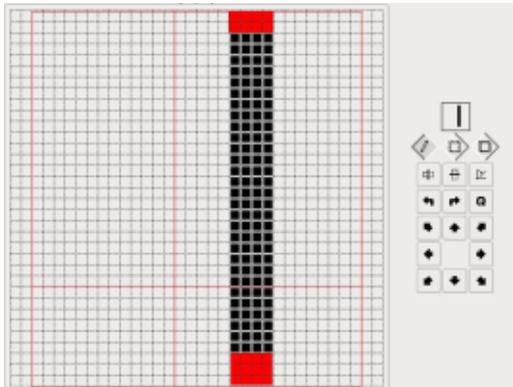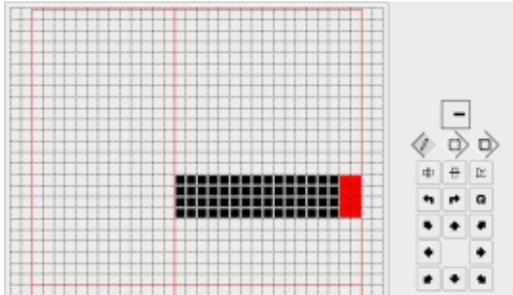
Since we have come this far, it is worth looking at how to modify the colors of the text. There are many ways of doing this, but, in my view, the easiest is to create a small text file in the /boot/grub folder from which GRUB can read your color choices. Type the following lines into this file:

```
set color_normal="yellow/
black"
```

```
set menu_color_normal="white/
black"
```

```
set
menu_color_highlight="black/
light-gray"
```

and save it as custom.cfg. The available colors are:
green
cyan
red
magenta
brown
light-gray
dark-gray
light-blue
light-green
light-cyan
light-red
light-magenta
yellow
white

This scheme will produce yellow text outside of the menu box with your image visible behind it; white text inside the menu box with the image visible behind it; and, black text with a light gray background for the highlighted entry. You can see that the colors are given as foreground (text)/background, but, if black is used as a background color, it actually means a transparent background so you can still see your image. Finally, there is no need to update grub after creating or modifying this file as it will get picked up automatically on boot.

For those of you who prefer a "works right out of the box experience", I have prepared a package of fonts of different sizes (GrubFont24.pf2 and GrubFont28.pf2), and enhanced line-spacing (GrubFont24s.pf2 and GrubFont28s.pf2). Although they are optimal for 1366x768 (24 px size) and 1920×1080 (28 px size) screen resolutions, they will work well with resolutions on either side of these benchmarks. They were created by modifying freely distributable fonts from GNU Intlfonts, with the addition of the box drawing characters, up and down arrows, and correct single quotation marks. The 28 px font was resized from a smaller 7×14 font, and then hand smoothed to produce a very crisp display on high resolution screens. They contain only the Latin alphabet and other characters as noted above, which is all that GRUB requires, so the files are extremely small. If you are interested, drop me an email and I will send you the set of 4 fonts, in pf2 format, so no conversion is required to use them in GRUB.

As is often the case in computing, trying to do one simple thing often leads you to learn about other things that you had no idea about. This is a case in point, but a successful outcome is always its own reward.
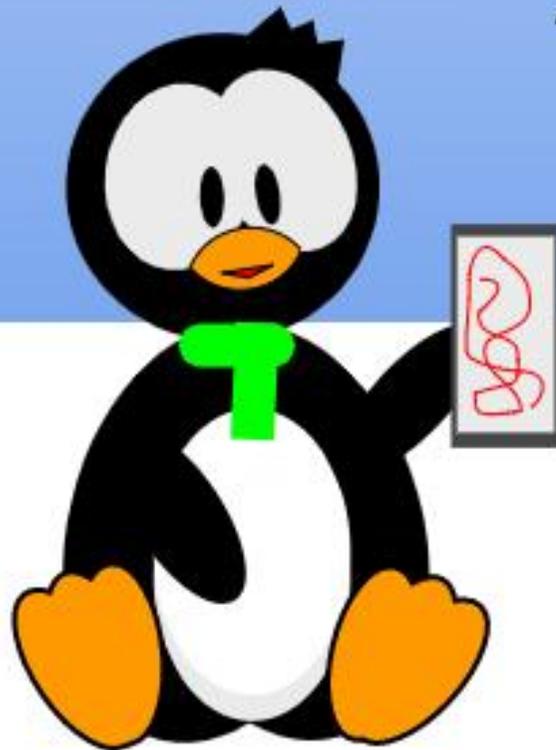
I'm starting to think that the Inkscape developers have deliberately synchronised their calendar with the Full Circle Magazine article deadlines to ensure that they announce new releases just a few days after I've submitted this column, leaving the News pages to break the story. As you may have noticed in last month's issue, Inkscape 1.1 has been released, and is now available for download from the Inkscape website. For Linux users there are versions in AppImage and snap format, as well as an official PPA repository, which may be preferable to Ubuntu users in particular.

The 1.1 release does bring a few welcome additions; however, I'm still working my way through the changes introduced with 1.0.x in this column, so the very latest changes will have to wait. This month will be all about the improved UI in the Trace Bitmap dialog.

## TRACE BITMAP DIALOG

This dialog has seen some substantial changes in the layout of its options, partly to avoid some confusion that could easily happen with the previous UI, and partly to integrate some tracing modes, one of which I'll describe later in this article, with the others being held over until next month. Let's deal with the placement of the long-standing features first of all, by taking a look at how the dialog appeared when I first introduced this feature, back in part 19 of this series:
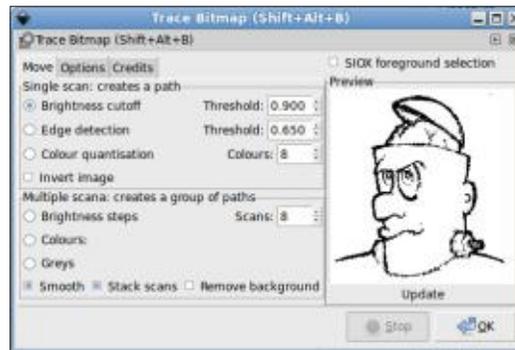


Here we can see the mis-titled "Move" tab (later versions corrected this to "Mode"), showing the two main operating modes, "Single scan" and "Multiple scana" (which was probably intended to be "Multiple scans").

Each mode then offers different approaches to tracing, as a set of radio buttons that actually encompasses both parts of the dialog. The result is that only a single tracing method can be selected at a time, even if the design of the dialog makes it initially appear as though each mode can have a different method selected.

Within each mode area there are also various other parameters that affect the tracing algorithm. The layout makes it somewhat unclear whether these parameters all apply to every tracing method, or whether some are tied to particular algorithms (answer: it's the latter). Finally there are options that affect all methods and modes, in the "Options" tab, plus a lone "SIOX foreground selection" option that I described in part 20 of this series, but which I summarised with "you would be better off separating out the foreground using The GIMP (which has its own, more interactive, implementation of the SIOX algorithm) and then tracing the result.", here's what I

had to say about this dialog in part 19: "This is one dialog in Inkscape that could really do with a little UI love. It's cramped, unintuitive, contains typos, and the spinboxes don't have the nice context pop-ups of most similar controls in Inkscape." Although the spinboxes still don't have any context-sensitive pop-ups, I'm pleased to say that all my other concerns have finally been addressed, with this much cleaner dialog in 1.0.
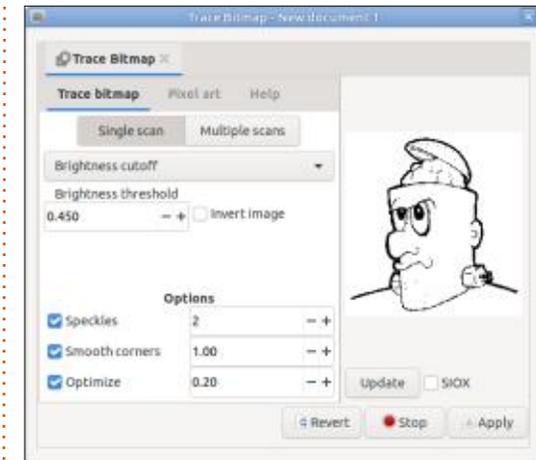


I will start with a small complaint. It's a general Inkscape issue, but is particularly obvious in this dialog. As I prefer floating dialogs in windows over docked dialogs at the side of the canvas, I

often have several windows, each of which contains only a single dialog inside it – as in this image. In that situation, I think it would be nicer for Inkscape to collapse the tab bar down to a smaller "grab handle" that could be used to re-dock the dialog, rather than showing a lone tab in a bar that stretches across the whole dialog, wasting quite a bit of space. The window title already tells me this is the Trace Bitmap dialog; I don't think I need that information on a tab as well. And with this particular dialog, the first tab within the dialog also bears the same name, making the dialog tab seem doubly redundant, and potentially confusing.

Moving on to the real content of the dialog, you can see that the tabs along the top have been completely replaced. The old "Mode" tab is now "Trace bitmap", and within that section are two large buttons for switching between the Single scan and Multiple scans modes. Gone are the radio buttons for selecting the tracing method, replaced instead with a single pop-up which greatly reduces the visual clutter. The parameters below change according to the selection in this

pop-up, avoiding any confusion about which fields apply to which methods.

Finally, the global parameters that formerly lived in the "Options" tab have been moved to a common section at the bottom of this dialog, making them far more obvious. This move also makes it clear that these options apply to the "Trace bitmap" modes, but not to the "Pixel art" mode, which has its own tab entirely.

Aside from the UI changes, the operation of this part of the dialog remains unchanged from previous versions – apart from the addition of some new tracing modes that I will look at next month. For details on how to use the older modes, therefore, parts 19 and 20 of this series still apply.

## TRACE PIXEL ART

The "Pixel art" mode isn't actually a new thing – it first appeared in version 0.91 – but I haven't covered it in this series before. Back in the 0.9x days, it had its own dialog, opened via an entry in the Path menu.
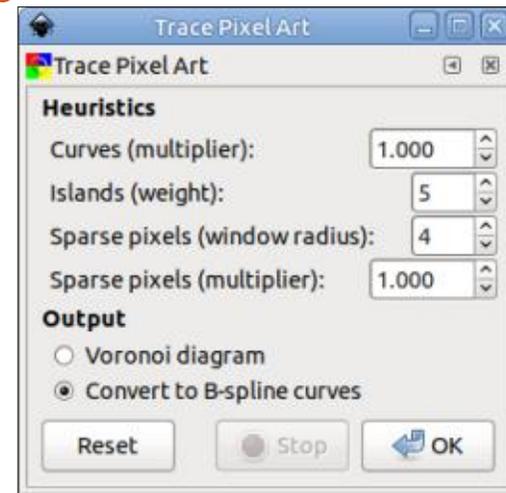


In 1.0, the UI is essentially unchanged, save for an additional checkbox labelled "Optimise". But it's now accessed via the "Pixel art" tab of the Trace Bitmap dialog, rather than being a wholly separate dialog of its own. This means it also shares the image preview pane of the Trace Bitmap dialog, although it's largely useless here, showing only a black-and-white picture which bears little resemblance to the traced image you'll probably end up with.

As the name suggests, this mode is intended for tracing pixel-based graphics, such as icons, emojis, or other small bitmap images. When scaling up a small image, you will often find that the interpolation algorithms that are commonly used can result in a

blurry appearance, as intermediate colors are used for the new pixels that need to be created, losing any crisp transitions that are an essential part of the design. The Pixel Art tracer attempts to produce vector elements that will reproduce the original image, but which can be scaled without introducing a blurred or softened result. How effective it is at this will depend largely on the source image, and the result you're looking for.

As an example, I decided to trace the 16px × 16px image used as a "favicon" on the Full Circle Magazine website. It's a tiny representation of the orange circle with white swirls that forms the logo of this magazine. Let's see what the preview pane in the dialog makes of it.
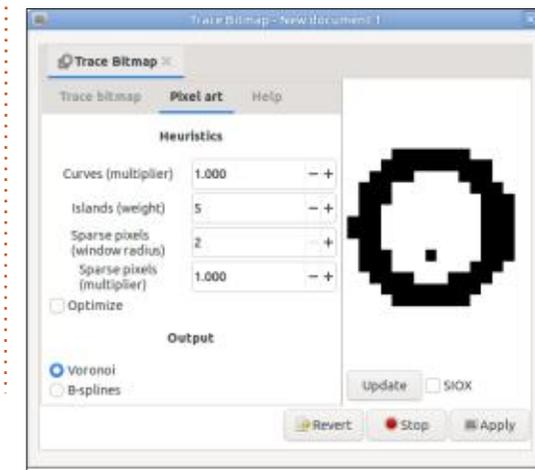
The various spinboxes in the Heuristics section are a mystery to me. They each have tooltips… which do nothing to clarify their purpose. They refer to parameters in the tracing algorithm, but the original research paper that is linked from the Inkscape 0.91 release notes is no longer available, nor have I been able to find it elsewhere. When faced with this situation, I resort to a tried-and-trusted technique to try to work out what effect they have: I first traced images using the defaults, then I cranked the values up to their maximum levels (10, 20, 8 and 10), and traced the same images. The results, in every case that I tried, were so close as to be irrelevant.

The "optimize" checkbox at least has an understandable tooltip. It claims that enabling it will try to optimize paths by joining adjacent Bézier curve segments. With my test images, however, it served to only cut off the corners of some paths, resulting in holes within the design.

In the Output section, you can decide between producing shapes that have entirely straight edges

(Voronoi), or which may include curves (B-splines). When tracing very small images, this is a matter of personal taste. With larger images – even those of only a few hundred pixels – the Voronoi output can take a lot longer, and may not produce the result you expect.

Let's look at the result of playing with some of these options. In this screenshot, the original 16px
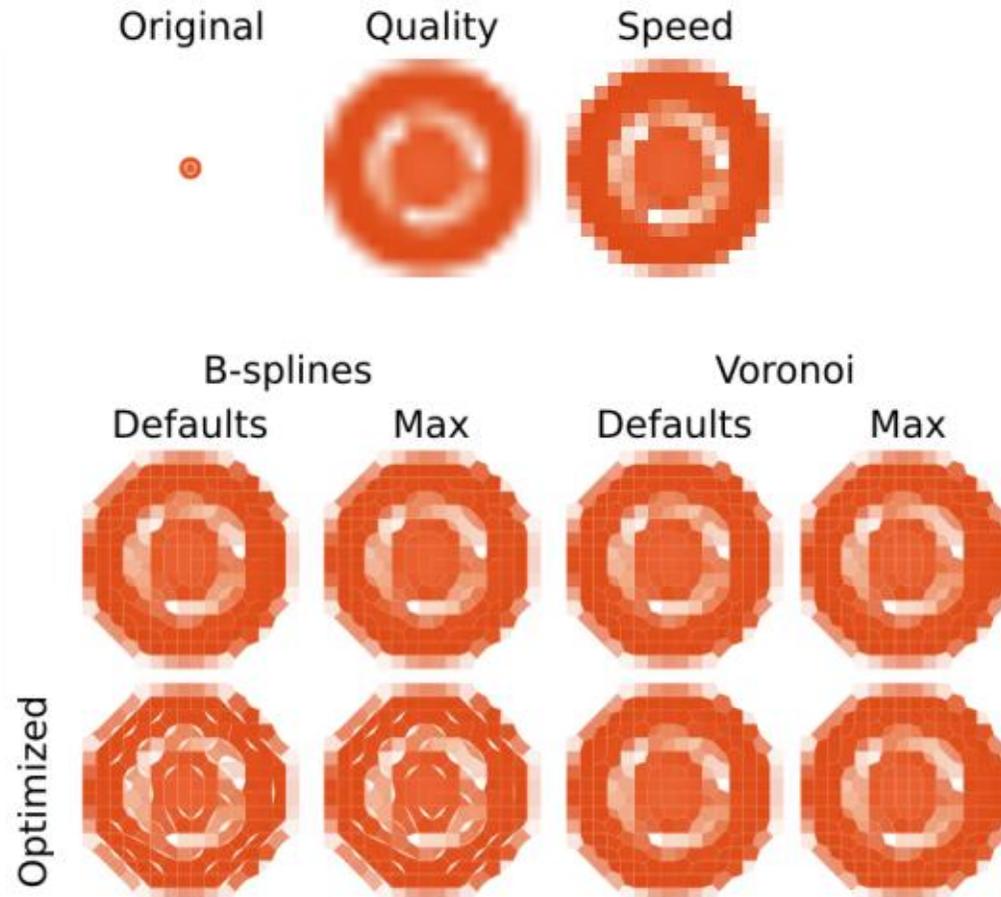
square favicon is at the top-left. To the right of it you can see how it looks when scaled directly in Inkscape – first using the "optimize for quality" mode, and secondly with the "optimize for speed" mode (remember, the selected mode can be changed in the Object Properties dialog). In both cases, however, the end result is still a bitmap image, so its individual parts can't be manipulated as vectors.



The lower part of the image shows the result of the tracing algorithm, with the B-spline versions on the left, and the Voronoi versions on the right. In each case, there's a column showing the results when the parameters are left at their defaults, and one showing the results when all the parameters are set to their maximum values. The bottom row shows the result of enabling the Optimize checkbox. In most cases I suspect that creating an un-optimized B-spline using the default values will be good enough.

The close similarity between all the results may simply be because my choice of test images doesn't really do justice to the algorithm, but it was actually rather difficult to find genuinely small pixel images. Many examples of "pixel art" that you might find online have the appearance of being pixellated, while actually being made up of a much larger collection of pixels. For example, here's one I tried from Wikimedia Commons:

A count of the obvious "pixels" in the computer image on the left suggests that part is only 31px wide. Except that it's actually 248 pixels, with each apparent pixel in the image actually consisting of an 8×8 square of pixels. Nevertheless, we should be able to trace that with Inkscape, right? Here's the original image on the left, followed by B-spline and Voronoi versions after tracing.

In both cases, the tracing took a lot longer than with the favicon, with the Voronoi version taking the longest by a clear margin. And why does it look so faint? A close-up view of the result, with some paths selected, shows us a bit more of what's happening.
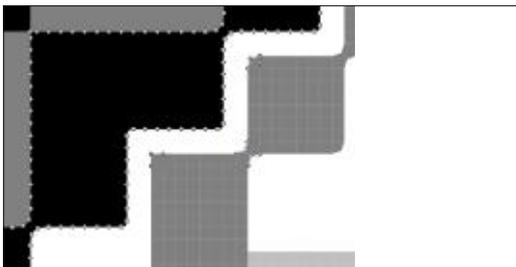
The top-left shows shapes from the B-spline tracing. The black pixels that form a diagonal edge in the original image have been turned into a single path, with far more nodes than necessary, as a result of the 8×8 pixel blocks. The resultant trace consists of a group of 69 individual objects, each of them an overly defined path.

The Voronoi mode fares even worse. Here the individual pixels of the 8×8 blocks have been converted into separate paths, resulting in a group of 63,000 objects! That's quite a result from what was clearly designed as a 32px × 32px icon (1,024 pixels in total). It also explains why it looks faint: the large number of closely spaced objects plays havoc with Inkscape's anti-aliasing algorithm, as it tries to resolve the individual edges of the shapes.

Trying to convert something as small as an icon into a vector graphic will always be a trade-off that will work better for some images than others. The lesson from this is that the pixel art mode is not really designed for "pixel-style art", but specifically for very low resolution pixel images. If your source material is more than about 48px in either dimension, you probably need to consider scaling it down in a bitmap editor before throwing it at this algorithm.

As great as it is to have advanced algorithms in Inkscape, what I would really like to see in terms of tracing pixel art is a mode that simply takes each individual pixel and converts it to an Inkscape square, with an option to merge adjacent squares of the same color into a path. You can kind-of achieve this with the Tiled Clones dialog, if you know what you're doing, but adding that as an option to the Trace Bitmap dialog would likely cover most people's pixel tracing requirements, without the need for opaque parameters and complex results.

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

For the last two months, we installed BibleTime, downloaded a set of books to use in it, and configured the application's preferences. We also began looking at the basic functionality. This month, we'll wrap up by looking at more of the basic functionality.

## BIBLETIME AND HYPERLINK

### FUNCTIONALITY

One of the valuable functions we have for Bible study in BibleTime is the ability to do cross-referencing by use of hyperlinks. Just for fun, let's open the book Pilgrim's Progress by John Bunyan, but in French (Hi, Elizabeth!), by clicking the arrow next to Books in the left-hand pane, then the arrow

next to French. Double-click the book icon that says FrePilgrim, and the book will open in the right-hand reading pane (bottom left)

Now, let's click the hyperlink in blue for Luc 14:33 (bottom right).

As you can see, in the lower left pane, called the Mag Viewer, the passage will come up in the default

Bible translation we set earlier in Configuration (see Everyday Ubuntu in Full Circle Magazine issue #169, page 50). Even though we pulled up the book in French, the application does as should be expected and pulls up the link in our preferred translation, which in this case is in English (New English Translation, to be specific).
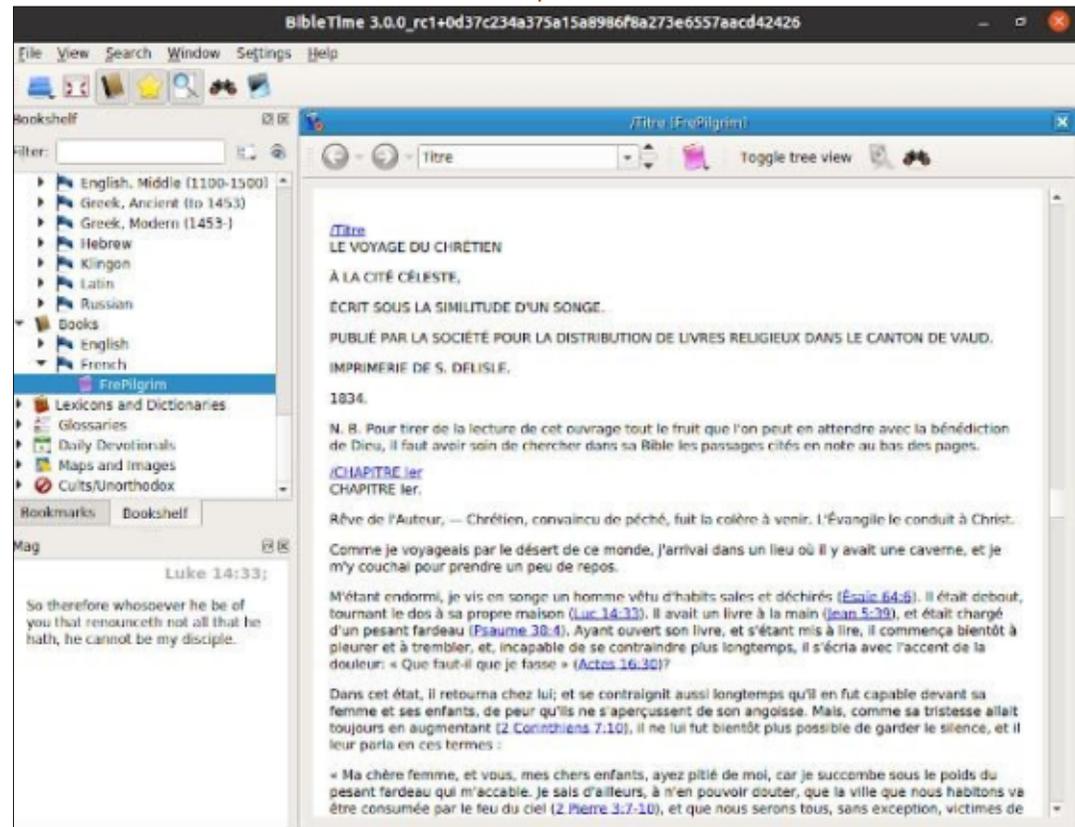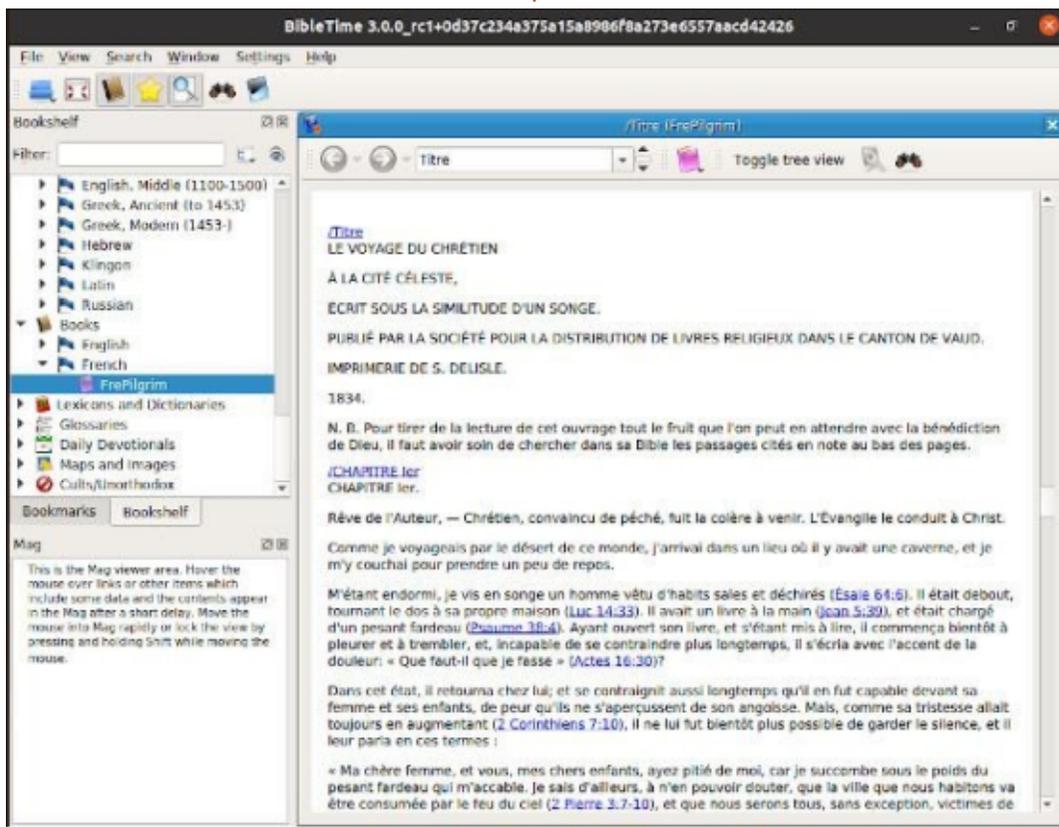
## OTHER BOOK TYPES: MAPS AND ATLASES

Now, back to the BibleTime main interface screen.

Let's click the arrow next to Maps and Images, then English in the left-hand navigation pane. Now, double-click on Smith's Bible Atlas (bottom left).

Now, let's scroll down to Egyptian Empire, 1450 BC, and click (bottom right).

So, as you see, we get a beautiful color map of the Egyptian Empire as of 1450 BC.

## OTHER BOOK TYPES: MORE TO SEE

In the left-hand selection pane, you will also see lists of many other types of books and material according to what you have installed. There are Bibles, lexicons, dictionaries, glossaries, theological books, Christian fiction like the aforementioned Pilgrim's Progress, daily devotionals, and many other works available to aid you in your Bible studies. You can build quite an impressive library of books that are free to download. Just double-click them and read away!

**Richard 'Flash' Adams** spent about 20 years in corporate IT. He lives in rural northwest Georgia, USA, with his adopted 'son', a cockatiel named Baby who now has a little brother, a dusky-headed conure named Skittles. Feedback welcome at: acer11kubuntu@gmail.com
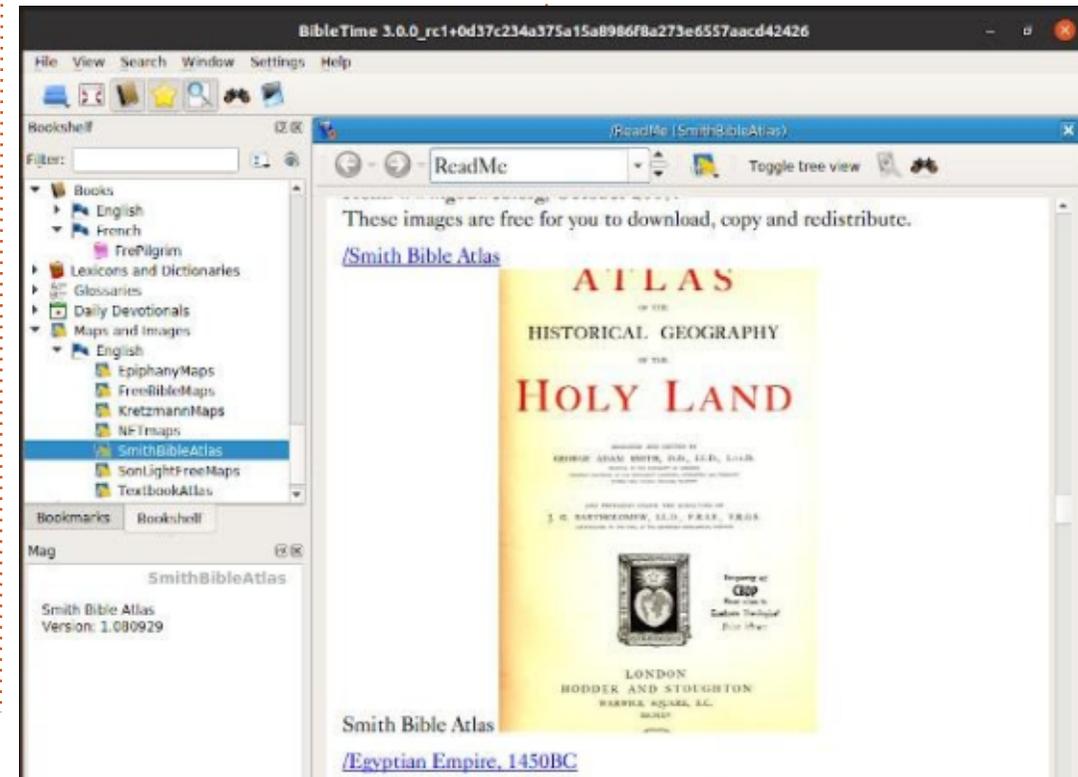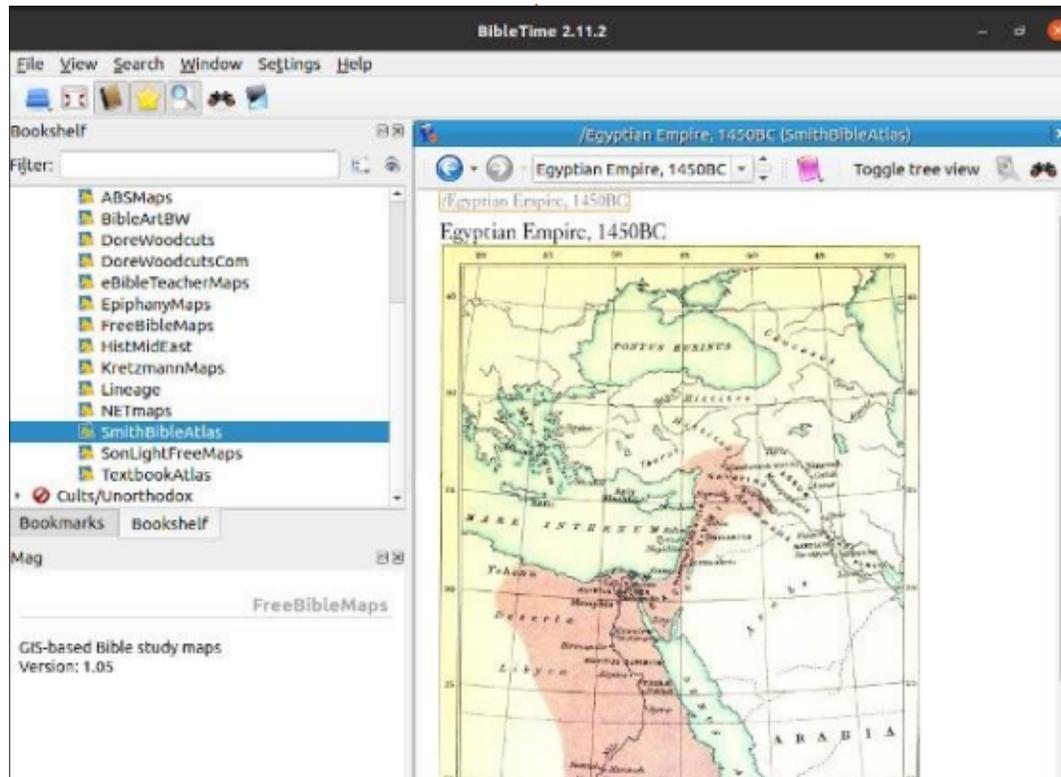
I want to apologize if this month's article seems a bit dis-jointed. I've been having multiple medical issues the last few weeks, and I REALLY wanted to get this article out to you.

Last month, I told you that we will be looking at the SparkFun Thing Plus ESP-32 WROOM (https://www.sparkfun.com/products/15663) and we will. However, I do want to bring some news of the RP2040 world and the Raspberry Pi Pico first.

Arduino has finally released their Nano RP2040 Connect which costs about $26 USD. It supports Wi-Fi, Bluetooth, and Bluetooth Low-Energy (v4.2), a built-in microphone for sound or voice activation, an RGB LED, and a six-axis motion sensor.

Seeed Studio has released the Wio RP2040 mini development board which includes 2.4 GHz 802.11b/g/n WiFi 4 supporting AP & station modes, but no Bluetooth support. The estimated price will be about $13 USD and is available only for pre-order at this point. It's still unclear when the board will start shipping.

Finally, there is really big news from Adafruit. I'll quote the headline from Tom's Hardware site…"CircuitPython Libraries Slither Into MicroPython on the Raspberry Pi Pico". That's right. This is a big thing for the RPi Pico, since eventually the entire CircuitPython library should be available to MicroPython users. Currently, there are many drivers that don't work, but it's early days yet. Congratulations to Adafruit for making this move! You can find more about it at https://learn.adafruit.com/circuitpython-libraries-on-micropython-using-the-raspberry-pi-pico .

## SPARKFUN THING PLUS 32 WROOM

On to the real subject of my article for this month. The SparkFun Thing Plus 32 Wroom is an awesome little microcontroller and easily runs MicroPython. The price of the board is a bit steep, about $21 USD. If the cost is too high for your budget, you can find a similar generic board with the Wroom WiFi chip on the web. I found an Aokin ESP32 Development board from Amazon in a three-pack for just under $17 USD. The pinout and form factor between the two are different, but the same MicroPython firmware works on both. Just be sure to find a pinout for whichever board you choose. In addition, the generic ESP32 Development board might not fit properly on your breadboard.

For the Generic board, you can get the pinout at https://circuits4you.com/2018/12/31/esp32-devkit-esp32-wroom-gpio-pinout/, as well as other places. For the Sparkfun Thing Plus, see the link at the top of this article.

Both boards support 2.4 Ghz WiFi and Bluetooth as well as capacitive touch sensors, Hall sensor (magnetic sensor) and other things.

Below is the pinout for the Sparkfun Thing Plus 32 WROOM…


SparkFun ESP32 Thing Plus (WRL-15663)

# MICRO THIS MICRO THAT



Above is the ESP32 Generic Dev board...

Now, let's get into our projects for this month...

## PROJECT PROGRAM #1 - TOUCHPAD

Both the SparkFun Thing Plus and the generic ESP32 development board come with multiple touchpad sensor inputs. For the Thing Plus, there are 8 that are broken out to the external pins. For the Generic that I am using, there are 9 broken out and one that is set to GPIO 0. Just which pins are which input, will be shown on the

pinout diagram for your board. When you specify the pin number, be sure to use the GPIO pin number, not the touch number or the physical pin. In this case, we will simply use a male-to-male jumper connected to GPIO pin #27 as our input "pad" denoted as Touch7. The import and setup will be as follows...

```
import machine

import utime

touch7 =
machine.TouchPad(machine.Pin(
27))
```

Now (top right), we'll create a variable called lowvalue and initialize it to 1000. When running,

```
lowvalue = 1000
while True:
    touchvalue = touch7.read()
    # print(touchvalue)
    if touchvalue < lowvalue:
        lowvalue=touchvalue
        print('LowValue = {0}'.format(lowvalue))
    utime.sleep_ms(100)
```

the touch pad actually floats between 700 and 600. Then we start a "forever loop". We'll read the value of the touch pin and compare that with the last recorded lowvalue figure. If the current touchvalue is lower than the last lowvalue, we set lowvalue to the touchvalue. We also print the lowvalue at this point. Finally we sleep for 100 milliseconds and loop again. We can use the {Stop} button in Thonny to quit the program.

Here is what the printout looks like. It takes about 1 ½ to 2 seconds to get to the lowest value.

```
LowValue = 677
LowValue = 671
LowValue = 667
LowValue = 658
LowValue = 616
LowValue = 456
LowValue = 390
LowValue = 347
LowValue = 227
LowValue = 128
LowValue = 107
LowValue = 100
LowValue = 94
LowValue = 92
LowValue = 88
LowValue = 87
```

Now (below), we can modify the program a little bit to allow the program to self terminate...

```
import machine
import utime
touch7 = machine.TouchPad(machine.Pin(27))
lowvalue = 1000
loopit = True
while loopit:
    touchvalue = touch7.read()
    if touchvalue < lowvalue:
        lowvalue=touchvalue
        print('LowValue = {0}'.format(lowvalue))
        if lowvalue < 90:
            loopit = False
    utime.sleep_ms(100)
```

Notice that we haven't changed it that much. We just added an assignment to a variable called loopit, changed the while statement to "while loopit:" instead of "while True:", and then check to see if the lowvalue is less than 90 as a "trigger". If it is, then we set the loopit value to False to make the loop fail.

I have to hold and gently squeeze the male jumper to get the value to go low enough to trigger the exit.

## PROJECT PROGRAM #2 - NETWORK PROGRAMMING

This is a simple example of how to connect to your local router. All it really does is to connect to the router with your password, obtain an IP address, and print it. We'll cover a more complete example in a future article.

First, we need to import the network library and set up the essid and password. Be sure to change these to your real values.

```
import network

essid = 'YourNetworkRouter'
```

```
passwd = 'YourNetworkPassword'
```

Now (top right) we'll create the function to do the actual communications with the router (essid). We set the network object (wlan) to station mode, which is like a "normal" computer on the network. You could also set it up as an access point. Next, we set the network object to active and then try to connect. Once we have connected, we print out the network information (ip address, etc). The final line calls the connection function.

As I said, this is a very simple example that really does nothing other than connect to the local router and return an IP address. Using sockets will be covered in a future article.

## PROJECT PROGRAM #3 - WEB SERVER AND DHT-11/22

Our final project for this month involves using the ESP32/Sparkfun 32 Thing Plus as a web server as well as DHT-11/22 Temperature/Humidity sensor reader, and a

```
def do_connect():
    wlan = network.WLAN(network.STA_IF)
    wlan.active(True)
    if not wlan.isconnected():
        print('connecting to network...')
        wlan.connect(essid, password)
        while not wlan.isconnected():
            pass
    print('network config:', wlan.ifconfig())
do_connect()
```

touchpad and button display program. Below is what it looks like when it's running…

The entire project is described in detail at: https://itywik.org/2018/10/30/eight-micropython-python-experiments-for-the-esp32/.

This project uses the PicoWeb library which can be found at https://github.com/pfalcon/picoweb.

Of course you need to add Picoweb and the dependencies. You can try to follow the instructions in
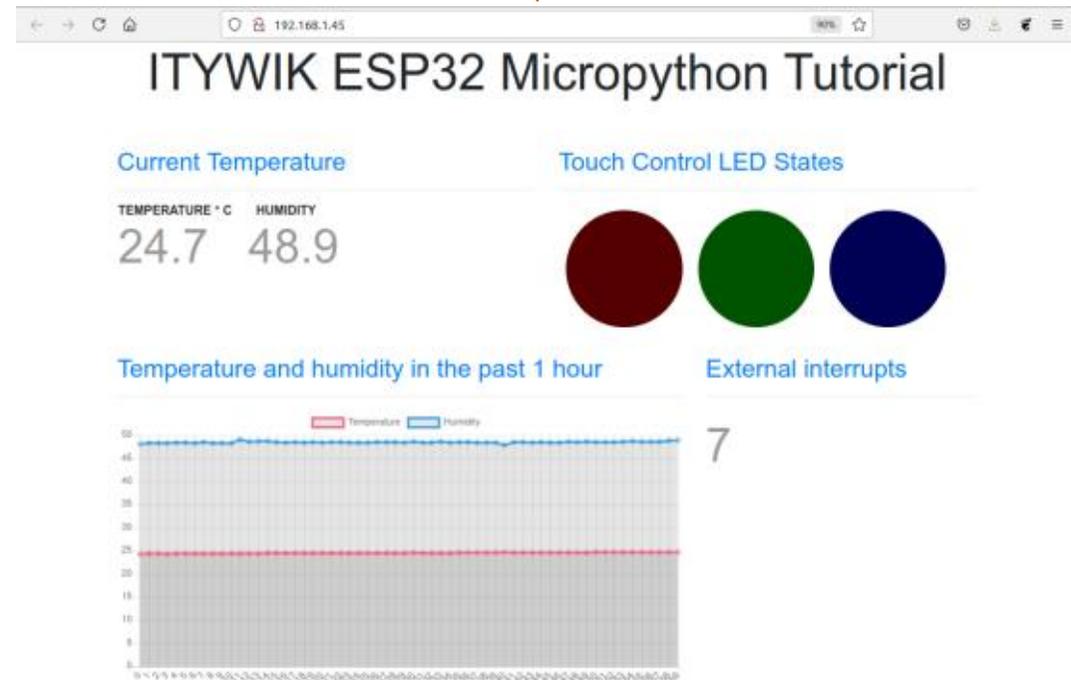
# MICRO THIS MICRO THAT

the link for the project itself, or you can use upip within the Thonny REPL. You will need to install micropython-pkg_resources, ulogging, uasyncio and picoweb. You will need to do an import upip at the REPL command line to be able to use it.

```
import upip

upip.install('micropython-
pkg_resources')

upip.install('micropython-
ulogging')

upip.install('micropython-
uasyncio')

upip.install('picoweb')
```

You can find out more about upip at: https://docs.micropython.org/en/latest/reference/packages.html

There is the code, diagrams and step-by-step projects leading up to the full webserver project. The code for the webserver project is pretty long and includes both the python file and the index.html file that displays the web information. I won't duplicate it here, but I will point out a few changes that I had to make to get the project to work the way that I wanted it to.

I saved the main code to a file named ESP32-DHT-Touch-Picoweb.py

Lines 18, 19 and 20 define the pins for the LEDs. I decided to use only the onboard LED on the ESP32 Dev board which is on pin 2. I changed line 18 to:
```
r_led = machine.Pin(2,
machine.Pin.OUT)
```

And I left lines 19 and 20 the same.

Line 33 (in my code) needs to be modified to support your network.
```
sta_if.connect('YourNetworkES
SID', 'YourPasswordHere')
```

Line 58 defines the callback for the touchpad timer interrupt handler. I modified lines 62, 70 and 78. They each are an if statement testing the touchpad.read() value to be less than 100. Since I'm just using just wires, not true copper pads, the earlier tests showed that I can achieve a value of under 100, but it takes a number of seconds for it to get that low. So, I changed the test value to less than 200 for all three values. It still takes around 2 ½ seconds to 3 seconds and a fairly tight squeeze to get it to trigger, but it does. So line 62 was changed to:

```
if t7 < 200:
```

Line 70 was changed to:
```
If t8 < 200:
```

And line 78 was changed to:
```
If t9 < 200:
```

Lines 87, 89 and 90 (my code) reference the DHT11 sensor. Since I'm using a DHT22, I had to change the three instances from DHT11 to DHT22.

```
d =
dht.DHT22(machine.Pin(23))

dht22_timer =
machine.Timer(0)

dht22_timer.init(period=1000,
mode=machine.Timer.PERIODIC,
callback=timerIntHandler_temp
erature)
```

Also, in the index.html file I made a change to make the temperature and humidity display text smaller. Around line 45, you will find the code:

```
.table-value {
    font-size: 160px;
    color: #999;
}
```

I found that the font size was way too big for me. I changed it to:

```
.table-value {
    font-size: 60px;
    color: #999;
}
```

Which worked much better, at least for me. You can make this change if you wish.

My code can be found on my github repository at https://github.com/gregwa1953/FCM170_MicroThisAndThat The webserver project code on the repository has my changes in it.

Next time, we'll take a look at NeoPixel devices and how to program them using the ESP-32 and the RPI Pico.

Until then, as always; stay safe, healthy, positive and creative!

**Greg Walters** is a retired programmer living in Central Texas, USA. He has been a programmer since 1972 and in his spare time, he is an author, amateur photographer, luthier, fair musician and a pretty darn good cook. He still is the owner of RainyDaySolutions a consulting company and he spends most of his time writing articles for FCM and tutorials. His website is www.thedesignatedgeek.xyz .

# Linux on Your iPad

For as low as $4.95, you can have your own personal Linux cloud computer in minutes on any device.
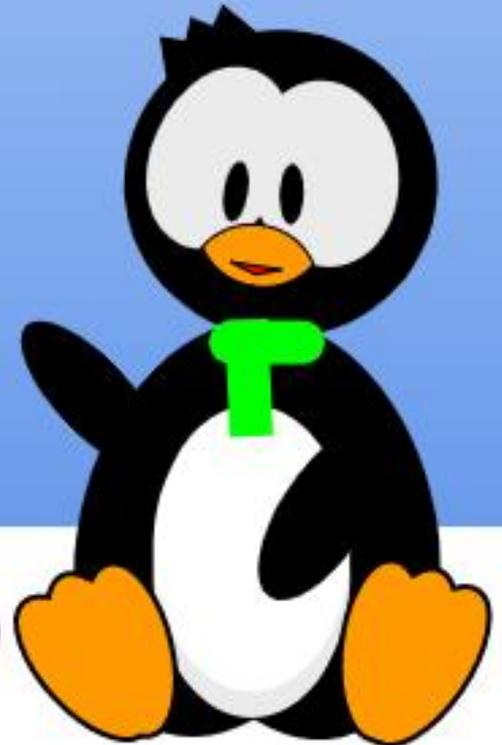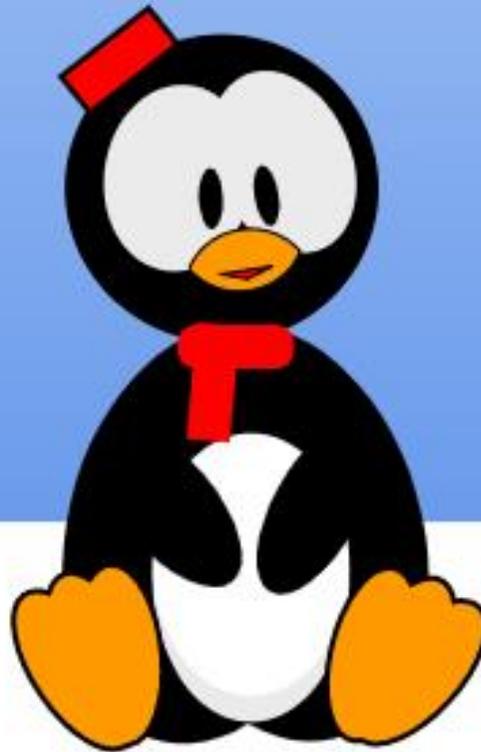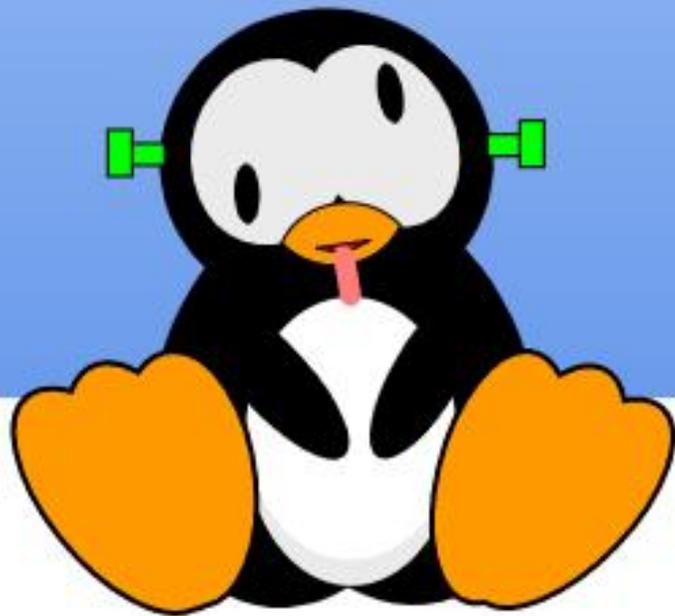
**Q** **Can a desktop user follow the Ubuntu 20.04 boot process through to Log In?**

The reason I posed the above question was due to a speed problem with both WiFi & Bluetooth. The problem showed up when opening a web page, but would then time out, whereas the transfer of a file using Bluetooth would state that a small file would take over ten minutes or more to load.

After looking on the web, I found that I could use 'speedtest-cli' to check the network speed. It can be seen that the download speed is non-existent (below).

```
Following obtained using "speedtest-cli >> Dell3581-wifi.txt"

Retrieving speedtest.net configuration...
Retrieving speedtest.net configuration...
Testing from BT (··············!)...
Retrieving speedtest.net server list...
Selecting best server based on ping...
Hosted by Zzoomm (Henley-on-Thames) [49.58 km]: 438.462 ms
Testing download speed.........................................
Download: 0.00 Mbit/s
Testing upload
speed......................................
Upload: 1.31 Mbit/s
```

While writing these notes, I wanted to check the above 'Hosted by ....' timing when the WiFi was working correctly but, unfortunately, 'speedtest-cli' which is written in Python, is now not working and gives runtime errors.

Also from the web, use 'lspci -v' to find the WiFi / Bluetooth device and driver being used, i.e. Qualcomm QCA9377 Adapter and ath10k_pci driver (bottom right).

But, looking under 'Settings / About / Software Updates / Additional Drivers' (see top right), the QCA9377 Adapter we are told is using the 'Disable WiFi ASPM L0s'
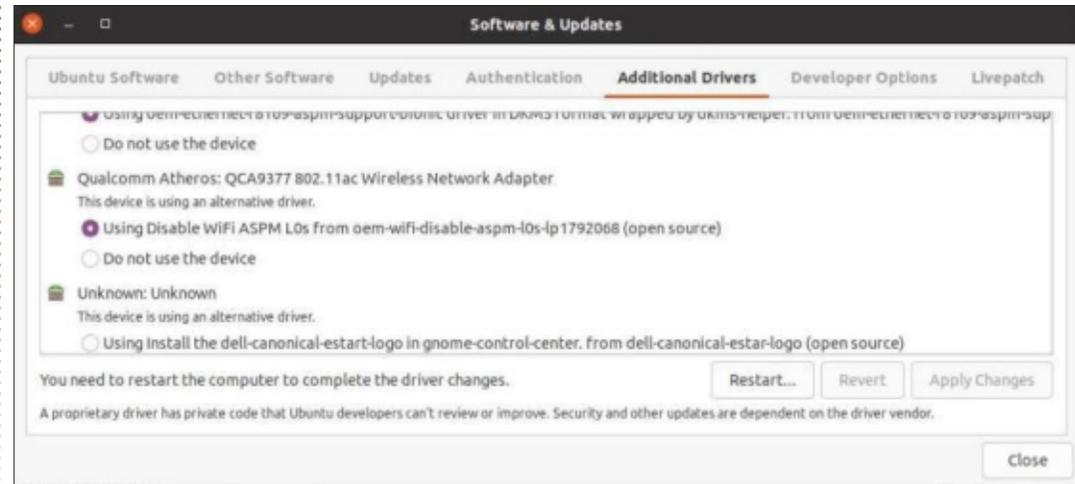


driver??

So can we use the boot process to find where the driver for the Network Adapter gets loaded?

## BOOTING UBUNTU

The following is my understanding of what happens when a computer starts Ubuntu. Please email ronnie@fullcirclemagazine.org with any comments, corrections, or observations; your help is appreciated, as I am unable to find a definitive explanation.

I wanted to try and understand the boot process, and find any files that link through from power up, to a prompt for me to log in. There have been many hours reading books, and looking on many, many

```
165
166 02:00.0 Network controller: Qualcomm Atheros QCA9377 802.11ac Wireless Network Adapter (rev 31)
167         Subsystem: Dell QCA9377 802.11ac Wireless Network Adapter
168         Flags: bus master, fast devsel, latency 0, IRQ 130
169         Memory at d1000000 (64-bit, non-prefetchable) [size=2M]
170         Capabilities: [40] Power Management version 3
171         Capabilities: [50] MSI: Enable+ Count=1/8 Maskable+ 64bit-
172         Capabilities: [70] Express Endpoint, MSI 00
173         Capabilities: [100] Advanced Error Reporting
174         Capabilities: [148] Virtual Channel
175         Capabilities: [168] Device Serial Number 00-00-00-00-00-00-00-00
176         Capabilities: [178] Latency Tolerance Reporting
177         Capabilities: [180] L1 PM Substates
178         Kernel driver in use: ath10k_pci
179         Kernel modules: ath10k_pci
```

web pages to get the information listed below.

There are a number of distinct steps before an operating system asks you to log in to a username. The main steps for computers before 2011 are:
• Power On Self Test (POST)
• Basic Input/Output System (BIOS)
• Master Boot Record (MBR)
• GRand Unified Bootloader (GRUB{this has three sub-stages}, GRUB2)
• Linux Kernel
• Initial (init)
• Runlevel Programs...

In 2011 the combined BIOS + MBR was updated, and now uses EFI or Unified EFI, so the main steps are:
• Power On Self Test (POST)
• Extensible Firmware Interface (EFI) or Unified EFI (UEFI)
• GRand Unified Bootloader (GRUB{this has three sub-stages}, GRUB2)
• Linux Kernel
• Initial (systemd)..

The first steps are the same for any computer and are hardware specific.

POST, as the name implies, is a self-test of direct memory access and other hardware, initializing it to a known operational, working state, i.e. the power supply, memory, cpu, etc.

The order that the computer looks for a boot loader can be adjusted using the BIOS, e.g. CD-ROM, USB, Hard Disk, etc. The main use of the original BIOS was to read the MBR (Master Boot Record) which pointed to the one and only operating system stored in the boot sector.

Computer manufacturers' EFI (firmware interface) varies greatly but is more complex than the older BIOS. Instead of relying on code in the boot sector on the hard disk, EFI relies on boot loaders stored as files in a disk partition known as the EFI System Partition (ESP). Thus EFI manages the storage of separate boot loaders for each OS that you install on the computer, e.g. Ubuntu, Mint, Windows, etc.

GRUB is the program which makes the computer smart enough to find the operating system kernel and start loading it into memory. The original GRUB has been superseded by GRUB2, but most systems use the name of 'GRUB' for GRUB2, and 'GRUB Legacy' for the original GRUB. The main difference is that GRUB Legacy was used with BIOS, whereas GRUB (GRUB2) is designed to work with EFI.

Linux Kernel is at the heart of every Linux system, and is made up of kernel drivers, many of which come in the form of Kernel Modules which handle the hardware in Linux.

Initial (or the initialization process) starts all the programs based on the desired features that the user wants to run in the Linux system. For example, on a laptop computer, the Linux system does not need to start a web server service, and a Linux server used by a company does not need to start a graphical desktop environment.

Runlevel Programs. The initialization process determines what services to start based on the runlevel of the system. There are seven levels numbered 0 to 6, and each one is assigned a set of services that should be active for that runlevel.

## BACKGROUND OF GNU/ LINUX

We need an understanding of where Linux (as we call it) comes from, so that we can understand why Ubuntu uses the above steps in the way it does.

It was both Richard M Stallman & Linus Torvalds who originally started GNU/Linux. All systems that we call Linux today are, in fact, built on the work of this collaboration. Linux is a Unix-like operating system that conforms closely to conventions & standards associated with Unix, but does not contain any of the original Unix code.

Unix and GNU/Linux use runlevels, which are numbered from zero to 6, and S is sometimes used as a synonym for one of the levels. Folder 'etc/' (in Ubuntu 20.04) has sub-folders of rc0.d to rc6.d, as well as rcS.d – which look like runlevels.

Ubuntu is what is called a distribution of GNU/Linux – a distro for short. There are many Linux distros, Mint, SUSE, Fedora Red Hat, etc, including Ubuntu, that all use the Linux Kernel but then build their own user interface and other software on top.

## Ubuntu 20.04

The computer used to view the boot process was a Dell Inspiron 3000 model 3581, with a disk partitioned into three - i.e. dev/sda1, dev/sda2 and dev/sda3.

The grand unified boot loader that Ubuntu 20.04 uses is GRUB (GRUB2, not GRUB Legacy). Linux uses GRUB to enable the user to boot different operating systems on the one computer system, albeit at different times.

The GRUB file that the computer runs is named grub.cfg, and is in the directory folder /boot/grub/grub.cfg. The contents of the grub.cfg file are automatically generated by 'grub-mkconfig' using templates from /etc/grub.d and settings from /etc/default/grub.

As mentioned above, the Linux Kernel is at the heart of all the distros.

The part of the grub.cfg file shown top right can be seen to set root to 'hd0,gpt3' which points to partition dev/sba3. The grub.cfg file also uses 'initrd' which is an initial RAM disk bound to the kernel and loaded as part of the kernel boot procedure. The 'initrd' contains a minimum set of directories & exe's to get to the real root file system including the 'insmod' tool which installs kernel modules into the kernel.

There is also 'vmlinuz-5...' which is the statically linked executable file that contains the Linux kernel, and gets loaded from the GRUB file. This can be checked by opening a terminal window and running 'uname -srm' and 'hostnamectl status' (shown bottom right).

```
161        set root='hd0,gpt3'
162        if [ x$feature_platform_search_hint = xy ]; then
163          search --no-floppy --fs-uuid --set=root --hint-bios=hd0,gpt3 --hint-efi=hd0,gpt3 --
      hint-baremetal=ahci0,gpt3  e4e5183c-6076-49dd-9792-272ca5a25e93
164        else
165          search --no-floppy --fs-uuid --set=root e4e5183c-6076-49dd-9792-272ca5a25e93
166        fi
167        linux    /boot/vmlinuz-5.4.0-70-generic root=UUID=e4e5183c-6076-49dd-9792-272ca5a25e93
      ro mem_sleep_default=deep quiet splash $vt_handoff
168        initrd   /boot/initrd.img-5.4.0-70-generic
```

This is where I get confused, as the earlier Ubuntu distros have used 'init', 'SystemV' and 'run levels' to load other files, drivers, etc, to get to a usable operating system. As mentioned earlier, Ubuntu 20.04 has sub-folders that look just like the 'run levels'.

We are told that Ubuntu 20.04 uses 'systemd'. 'systemd' looks in the etc/systemd/system folder for the default.target file. When you find this file, it's only a link to the file lib/systemd/system/graphical.target.

I was hoping to see 'systemd' being called from GRUB, but all I could find there was the 'initrd' ram file and the 'insmod' tool. So I do not know how 'systemd' gets started. It may be that the last thing that the kernel does is to start 'systemd', but I can not find anywhere to confirm this.

'systemd' uses 'target' files which are the Linux current or desired run state, and they define the services that must be present, running and active for the system to run in that desired state. A desired state could be the 'rescue.target', just a basic system, or the 'graphical.target' which has all services running with a graphical user interface.
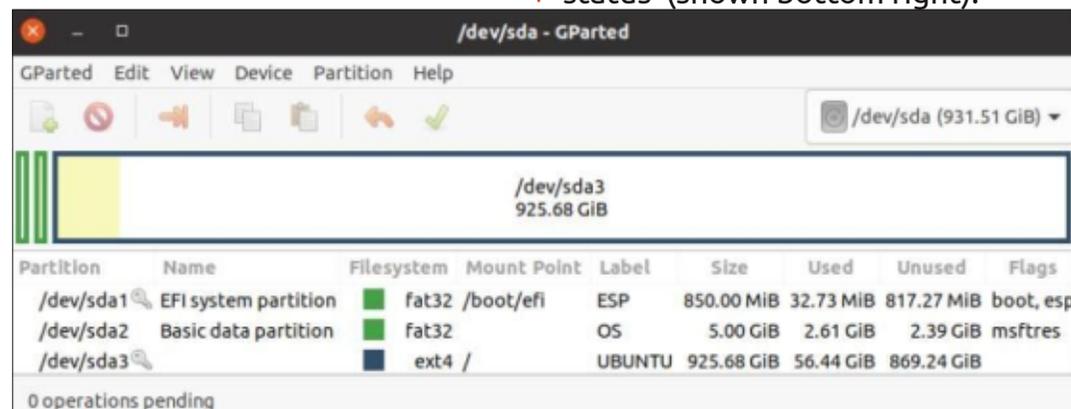
```
admin-sys@Dell-Inspiron-2019:/home/stnd-user$ uname -srm
Linux 5.4.0-70-generic x86_64
admin-sys@Dell-Inspiron-2019:/home/stnd-user$ hostnamectl status
      Static hostname: Dell-Inspiron-2019
            Icon name: computer-laptop
              Chassis: laptop
           Machine ID: b4197d352175463eb724fb0e09f9a631
              Boot ID: 96ffd455d66243cda6f2e013bf79ebff
     Operating System: Ubuntu 20.04.2 LTS
               Kernel: Linux 5.4.0-70-generic
         Architecture: x86-64
admin-sys@Dell-Inspiron-2019:/home/stnd-user$
```

# MY OPINION

The diagram bottom left is a copy from the boot man page, and shows the general sequence of events during the systemd startup.

(near the heading Network File System in the list) and find a reference to either of the WiFi network drivers that we have found earlier? (see bottom right).

Opening the files only shows that the contents of these files point to more general target files.

## SUMMING UP

The question we posed was "Can a desktop user follow the Ubuntu 20.04 boot process through to Log In?"

For this user the answer would be a resounding "NO".

The amount of files that are loaded, points towards backwards compatibility to earlier GNU/Linux boot-up procedures.

As the laptop was still in warranty, Dell was approached a number of times for technical advice as to why the WiFI was running slow, but I was told that as the operating system was Ubuntu they could not help.

During investigations of why the WiFi & Bluetooth was so slow, Dell's

Ubuntu test procedure web pages were used to record test results in preparation of another discussion with Dell. No files were changed, but for no reason I can find, the system just started working at full capacity again.

**Wil Lake** is a retired time served mechanical engineer who retrained as an IT engineer when Microprocessors entered the mainstream. He has worked in the IT industry for over 30 years and lives in the Cotswolds, England, UK and has spent years renovating a cowshed.
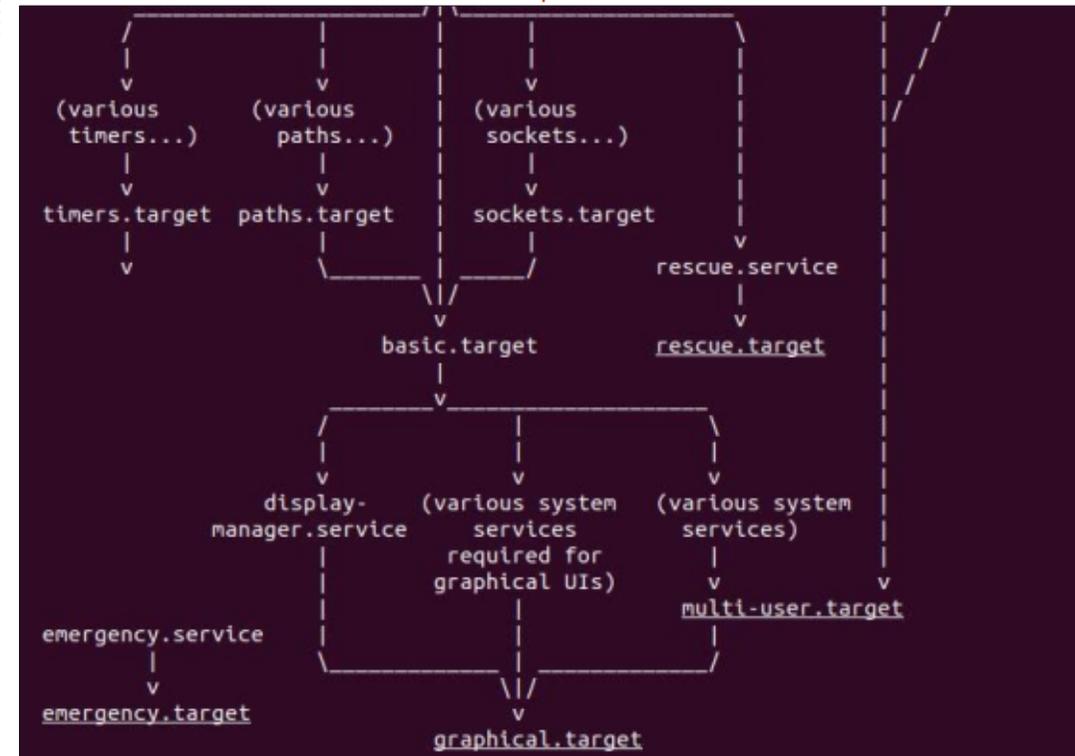
## GUIDELINES

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://bit.ly/fcmwriting

• 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 <u>not</u> use tables or any type of **bold** or *italic* formatting.

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

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

## TRANSLATIONS

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

## REVIEWS

### GAMES/APPLICATIONS
**When reviewing games/applications please state clearly:**

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

### HARDWARE
**When reviewing hardware please state clearly:**

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

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

Lubuntu 21.04 arrived on schedule, along with the other Ubuntu flavors, on 22 April, 2021. This is the middle release of three "standard" releases that will result in the next long term support version, Lubuntu 22.04, which is due out in April, 2022.

This is Lubuntu's 23rd release and the sixth with the LXQt desktop, so it has reached a fair degree of stability and maturity.

As this is a standard release, it has only nine months of support, until January, 2022.

## SYSTEM REQUIREMENTS

Lubuntu no longer lists any system requirements since the introduction of LXQt in Lubuntu 18.10, but I can report that in testing, Lubuntu 21.04 ran quite well on my 2011 vintage System76 Pangolin Performance laptop with a 2.3 GHz quad-core processor and 4 GiB of RAM.

## BOOTING IT UP

After downloading the ISO file via bittorrent, I did an SHA256 sum check on it to make sure the download was good and then used UNetbootin to write it to a USB stick for testing.

Booting up Lubuntu 21.04 from the stick is now a lot faster than past versions, as it seems that the file checker program that checks for a good USB stick write now works invisibly in the background. I am presuming it will inform you if it finds any errors.



## NEW

Lubuntu 21.04 introduces only a few small, incremental changes. It uses LXQt 0.16.0 which is based upon the Qt 5.15.2 toolkit. This does result in some minor changes to the "look and feel" of Lubuntu themes.

Also new is the LXQt Archiver application which replaces Ark, the default archive manager since LXQt arrived in Lubuntu. LXQt Archiver is actually not all-new, though, as it is based upon the MATE desktop's Engrampa, which is based on the Gnome File Roller.

The Lubuntu Update Notifier has been updated again to provide a better tree view and thus more information on updates.

The MPV video player has been removed. It was always a supplement to the default VLC media player and was probably never really needed or employed by most users anyway. If you need it, it can still be installed from the repositories, though.

The default wallpaper is also new. It was the winner of a wallpaper competition held specifically for Lubuntu 21.04. The past 23 wallpapers have been generally elegant and minimal, whereas I found this one an assault on the eyes. Fortunately there are ten alternative wallpapers provided or you can use your own wallpaper instead.

## SETTINGS

Nothing has changed in settings
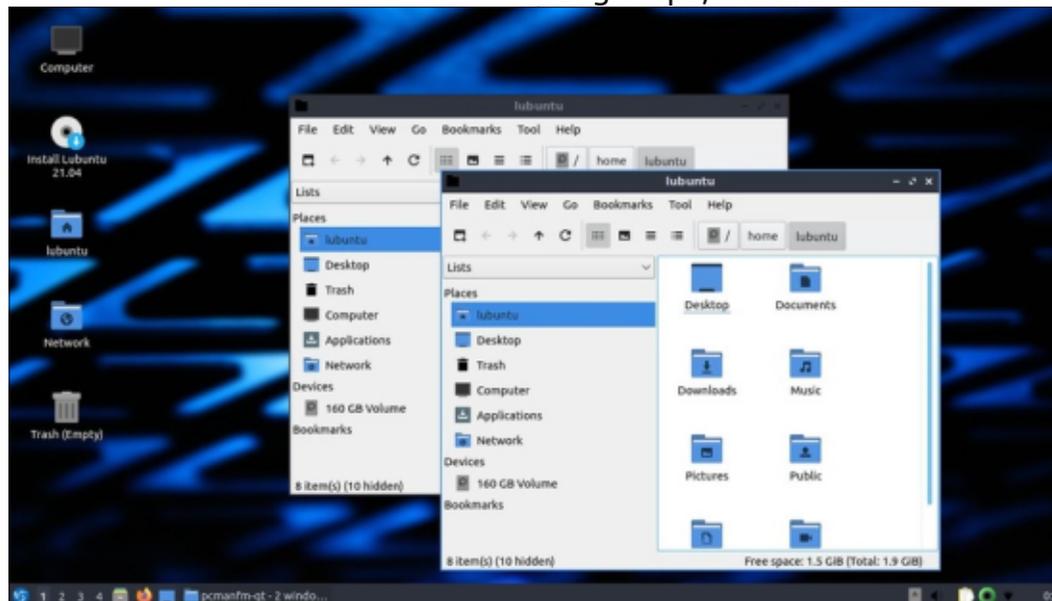
for Lubuntu 21.04. Settings still work well and the desktop is relatively easy to customize with a choice of 19 window themes and 13 icon sets. Unlike Ubuntu, in Lubuntu the setting menus are spread out a bit. They can all be found in the main menu, though, within Preferences-LXQt Settings.

The default window and bottom panel theme remains the rather dark Lubuntu Arc theme, although there are lighter choices available.

## APPLICATIONS

Some of the applications included with Lubuntu 21.04 are:
• 2048-qt 0.1.6 simple lightweight game*
• Bluedevil 5.21.4 bluetooth connector
• Discover Software Center 5.21.4 package management system
• FeatherPad 0.17.1 text editor

• Firefox 87.0 web browser
• K3b 20.12.3 CD/DVD burner
• Kcalc 20.12.3 calculator
• KDE partition manager 20.12.3 partition manager
• LibreOffice 7.1.2 office suite, Qt interface version
• Lubuntu Update Notifier 0.4 software update notifier
• LXimage-Qt 0.16.0 image viewer*
• LXQt Archiver 0.3.0 archive manager
• Muon 5.8.0 package manager*

• Noblenote 1.2.0 note taker*
• PCManFM-Qt 0.16.0 file manager*
• Qlipper 5.1.2 clipboard manager*
• qPDFview 0.4.18 PDF viewer*
• PulseAudio 14.2 audio controller
• Qtransmission 3.00 bittorrent client, Qt interface version*
• Quassel 0.13.1 IRC client*
• ScreenGrab 2.1.0 screenshot tool
• Skanlite 2.2.0 scanning utility*
• Startup Disk Creator 0.3.9 (usb-creator-kde) USB boot disk maker
• Trojitá 0.7 email client*
• VLC 3.0.12 media player
• Wget 1.21 command line webpage downloader
• XScreenSaver 5.42 screensaver and screen locker*

* Indicates the same version as used in Lubuntu 20.10 LTS

As can be seen, Lubuntu 21.04 comes with a decent assortment of productivity applications including Firefox, LibreOffice, and, my favorite, the FeatherPad text editor. FeatherPad even got an update to 0.17.1 which includes choices of syntax highlighting colors. Version 0.17.1 was not the most recent version at release, that was 0.18.0, but at least it was only two versions out of date.
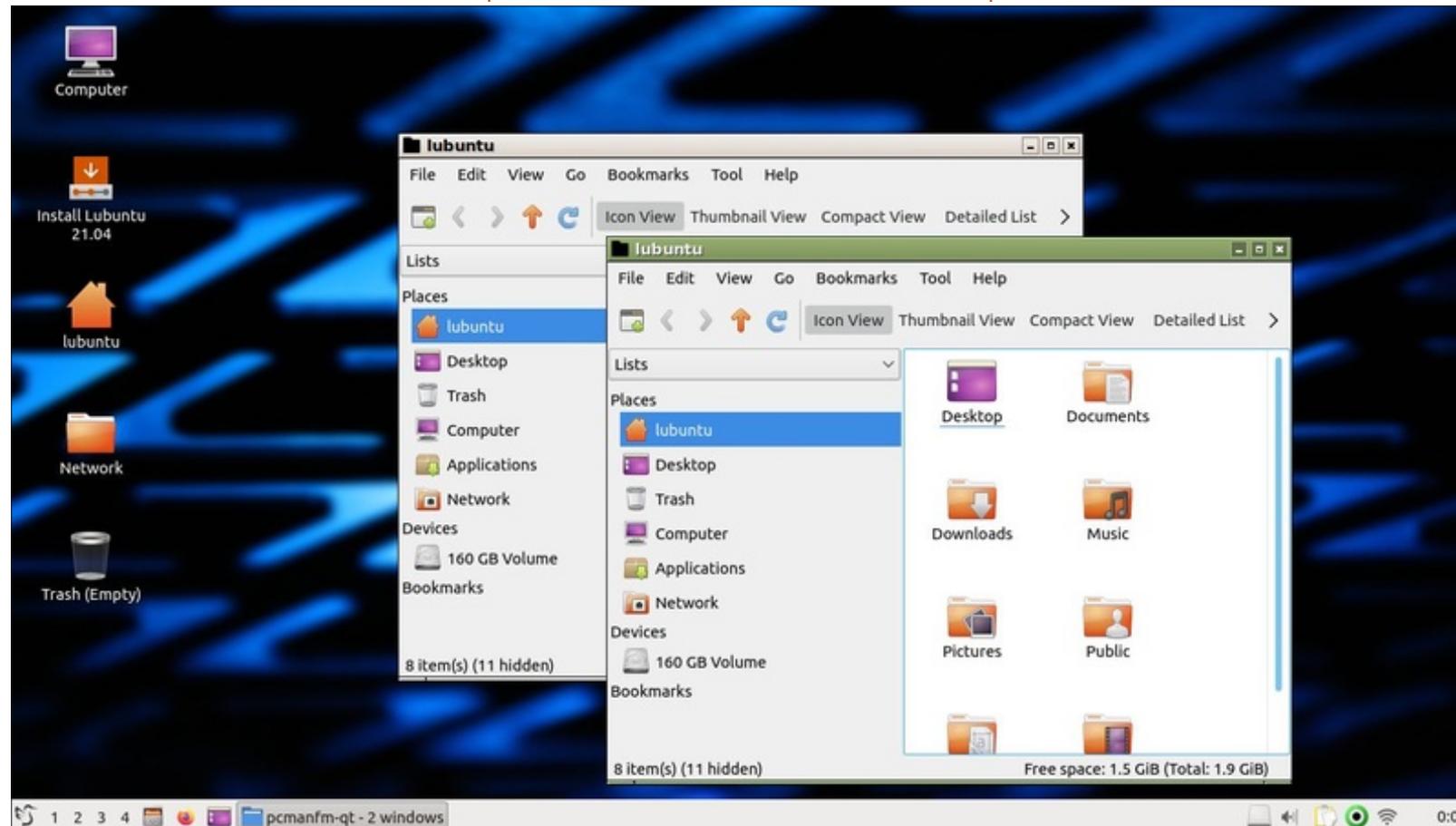
As in the previous LXQt releases, no default image editor, video editor or webcam application are provided, although an assortment of these can easily be added from the repositories if needed.

## CONCLUSIONS

This second standard release in the development cycle leading to the next LTS includes just small, cautious changes. This is really how operating system development should be approached, particularly when you have a loyal user base who are happy with how everything works and are generally not demanding big changes.

It will be interesting to see what turns up in the next release, Lubuntu 21.10, due out on 14 October, 2021, as that is the last chance to introduce anything new before the next LTS release the following spring. If the pattern set by Lubuntu 20.10 and 21.04 continues, we can expect only a few further small tweaks in Lubuntu 21.10.
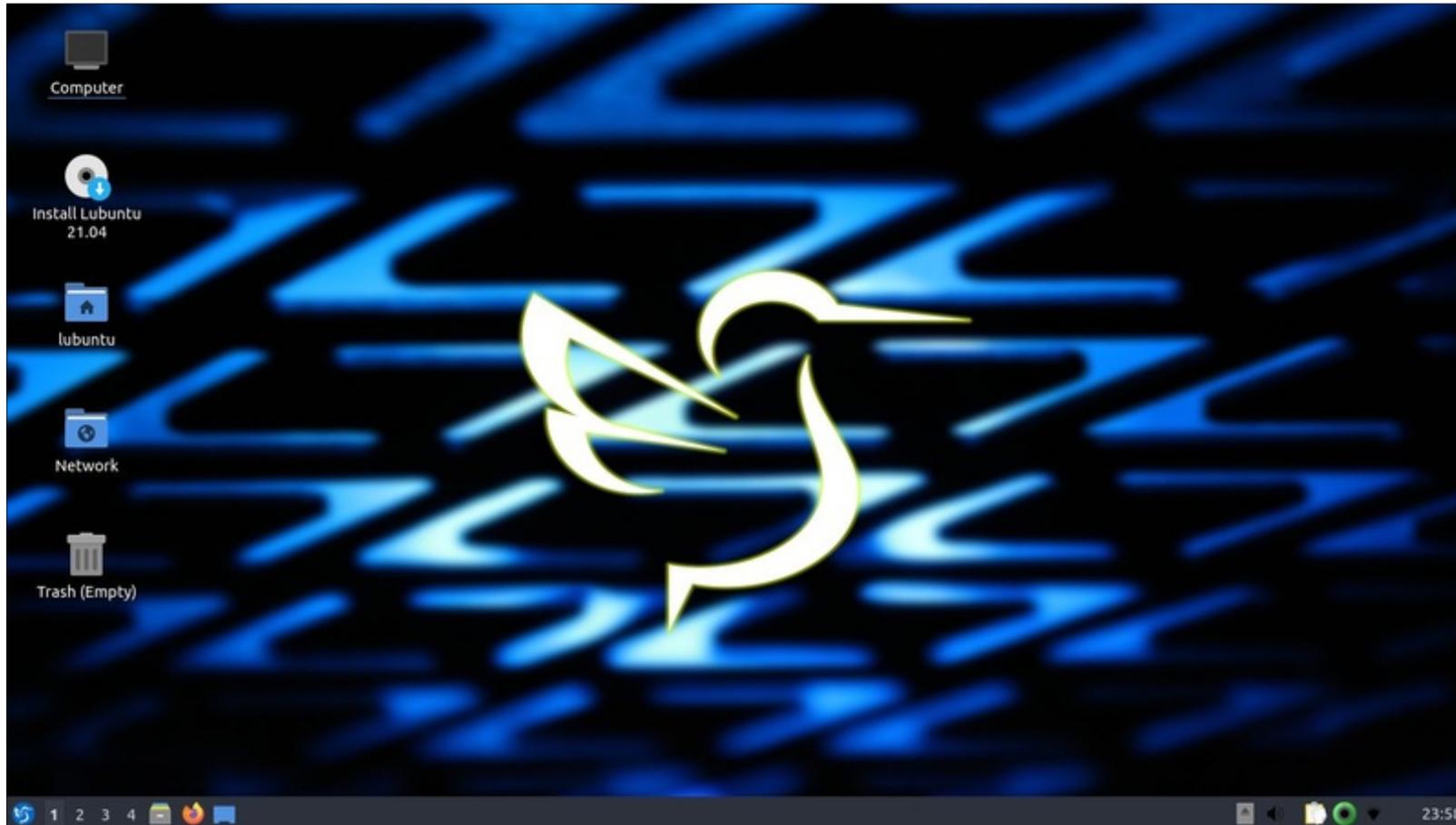


**Adam Hunt** started using Ubuntu in 2007 and has used Lubuntu since 2010. He lives in Ottawa, Ontario, Canada, in a house with no Windows.

I have been anticipating the release of Xubuntu 21.04, ever since 20.10 came out.

Readers of my review of that release in Full Circle 163 will recall that it was put out with no changes. At the time, the Xubuntu developers explained this as being due to migrating the Xubuntu codebase from Launchpad to GitHub. I was quite interested to see if they would make any changes in the 21.04 release or just maintain the status quo throughout the entire development cycle through to Xubuntu 22.04 LTS, due out in April 2022. With Xubuntu 21.04 released on 22 April, 2021, now we know; changes have been incorporated!

Xubuntu 21.04 is the 31st Xubuntu release. This really is a very mature project, so large changes would be unexpected.

As a standard release, Xubuntu 21.04 has only nine months of support, until January, 2022.
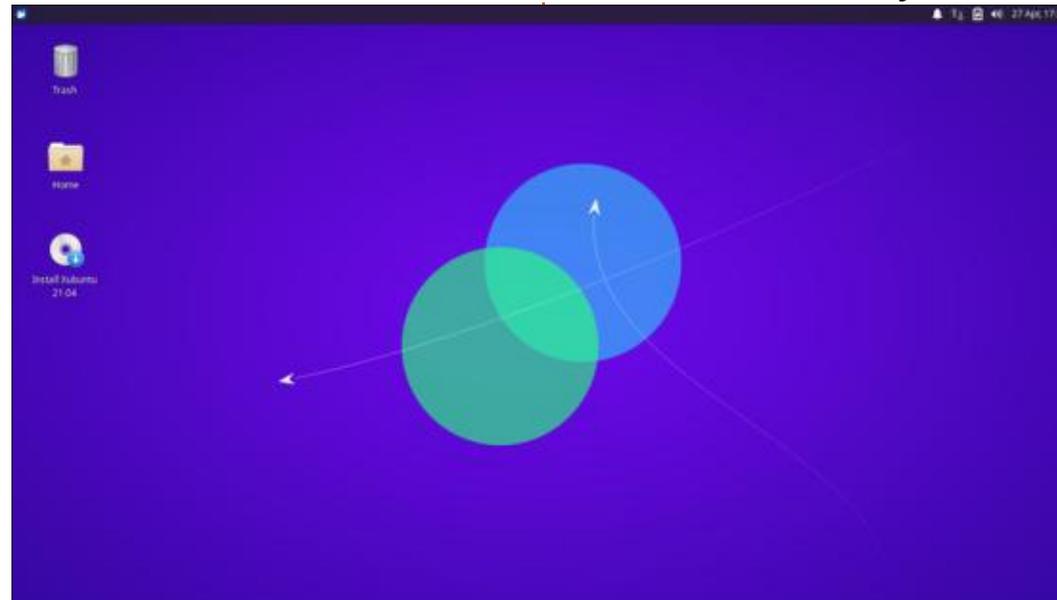
## SYSTEM

## REQUIREMENTS

The developers have increased the recommended system requirements from the last release. These are now:
- 1.5 GHz Dual-Core processor
- 2 GiB RAM
- 20 GB of hard-drive space

These specs are probably more realistic than the last ones and represent a computer about ten years old.

## BOOTING IT UP



After downloading the ISO file via bittorrent, I did an SHA256 sum check to make sure the download was done without errors and then used UNetbootin to write it to a USB stick.

When booting up Xubuntu 21.04, it no longer runs an overt file system checker, unlike previous versions. Rik Mills, a Kubuntu and Ubuntu developer, says that "it now runs silently in the background so it does not delay the boot." I have to assume that the files were all good, because I did not see any notification to the contrary!

## NEW

Xubuntu 21.04 introduces a new version of the Xfce desktop, 4.16, which replaces 4.14. This version exclusively uses the GTK3 toolkit, bringing it up to the most current GTK standard. Xfce 4.16 brings some small changes to the menus, the desktop, and the Thunar file manager as well.

The Linux kernel 5.11 is also new, along with the raft of new hardware that it supports.

If you are going to install Xubuntu 21.04, you now have a choice of a full or a minimal installation.

Some of the default applications have been changed as well. This release adds the Synaptic package manager, a fairly technical application. The existing Gnome Software "software store" is retained, although, for some reason, it does not show up on any

individual entry on the Whisker menu – just under "all applications". I suspect this was just an oversight.

The Hexcat IRC client is also new, and is in addition to the IRC client included for many years, Pidgin. The developer release notes indicate that they recommend Hexchat as highly configurable and, by default, it is "preconfigured to connect to the #xubuntu channel on Freenode". I imagine Pidgin will be deleted from the ISO file by the time the LTS release occurs.

Not mentioned in the release notes, but gone anyway, is the Startup Disk Creator; the small program that allows writing ISO files to a USB stick for booting.

There are probably better choices these days available anyway. I use UNetbootin, but there are other good ones, too.

This release has new default wallpaper, a rather simple, modernist design, that harkens back to similar wallpapers in Xubuntu's past, like from 19.10. If it is not to your taste, there are 19 others provided, or you can use your own.

Overall, it looks like the developers are making up for the time lost in the previous release, by introducing a host of small changes now.
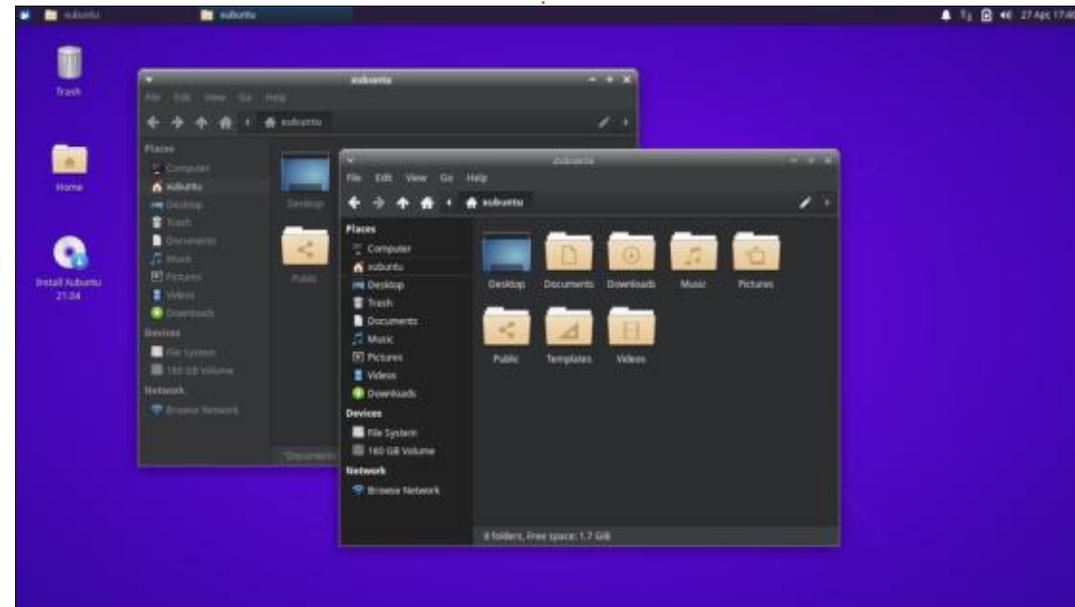
## APPLICATIONS

Some of the applications included with Xubuntu 21.04 are:
• Atril 1.24.1 PDF viewer
• CUPS 2.3.3 printing system*
• Catfish 4.16.0 desktop search
• Firefox 87.0 web browser
• GIMP 2.10.22 graphics editor
• Gnome Software 3.38.1 package management system
• Gparted 1.1.0 partition editor*
• Hexchat 2.14.3 IRC client
• LibreOffice 7.1.2 office suite
• Mousepad 0.5.3 text editor
• Parole 4.16.0 media player
• Pidgin 2.14.1 IRC client
• PulseAudio 14.2 audio controller
• Ristretto 0.10.0 image viewer*
• Simple Scan 3.38.1 scanning utility

(re-badged by Gnome as "Document Scanner")
• Software Updater 21.04.8 (update-manager) software update manager
• Synaptic 0.90.2 package management system
• Thunar 4.16.6 file manager
• Thunderbird 78.8.1 email client
• Transmission 3.00 bittorrent client*
• Wget 1.21 command line webpage downloader
• Xfburn 0.6.2 CD/DVD burner*
• Xfce4 Panel 4.16.2 desktop panel
• Xfce4 Power Manager 4.16.0 system power manager

* indicates the same application version as used in Xubuntu 20.10 LTS.
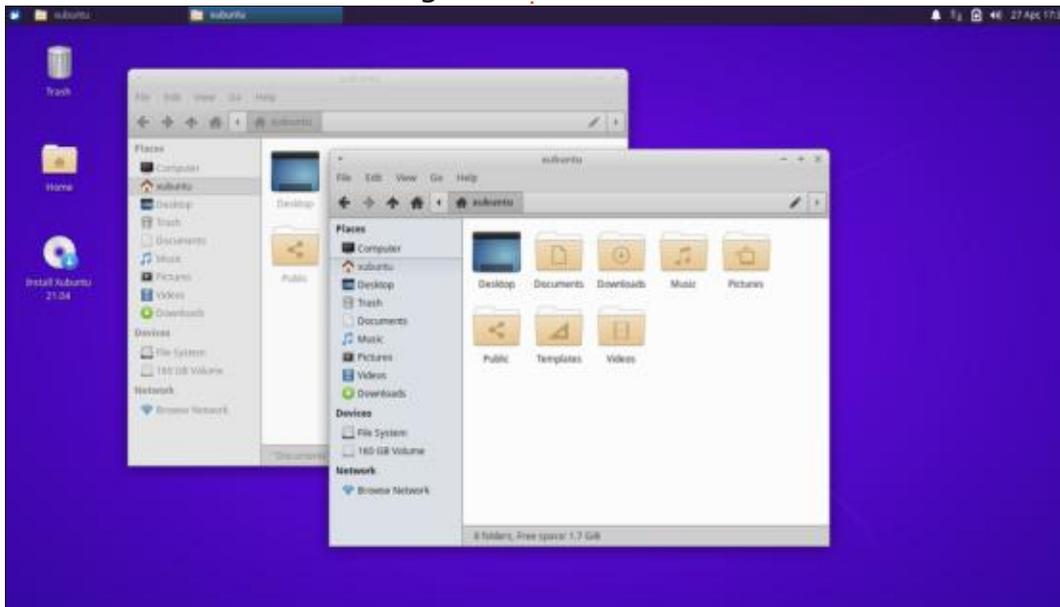
The LibreOffice 7.1.2 office suite included is complete, except for the database application, LibreOffice Base. These days, very few users work on databases and it can always be installed from the repositories if needed.

As with recent Xubuntu releases, there is no default webcam or video editing application although there are several in the repositories that can be installed.

## SETTINGS

Like recent releases, Xubuntu 21.04 still has Greybird as its default window theme. There are five alternate schemes included, one of which is the dark theme Greybird-dark. Numix is probably the best one installed, but I still find that none of these themes allow for easy differentiation of active versus inactive windows. This makes it too easy to close the wrong window, especially when using keyboard shortcuts.

Otherwise, the settings for user customization of the desktop are nicely arranged on one sub-menu and are easy to find and use.

## CONCLUSIONS

After making no changes in Xubuntu 20.10, it seems that the Xubuntu developers are not going to sit out this entire development cycle. Starting with 21.04, they have introduced some minor refinements. When you have a loyal user following, you need to proceed cautiously. Most Xubuntu users I know love the OS and don't want to see big changes. The result here, in Xubuntu 21.04, is a good solid release that will keep users happy on the road to the next LTS version.
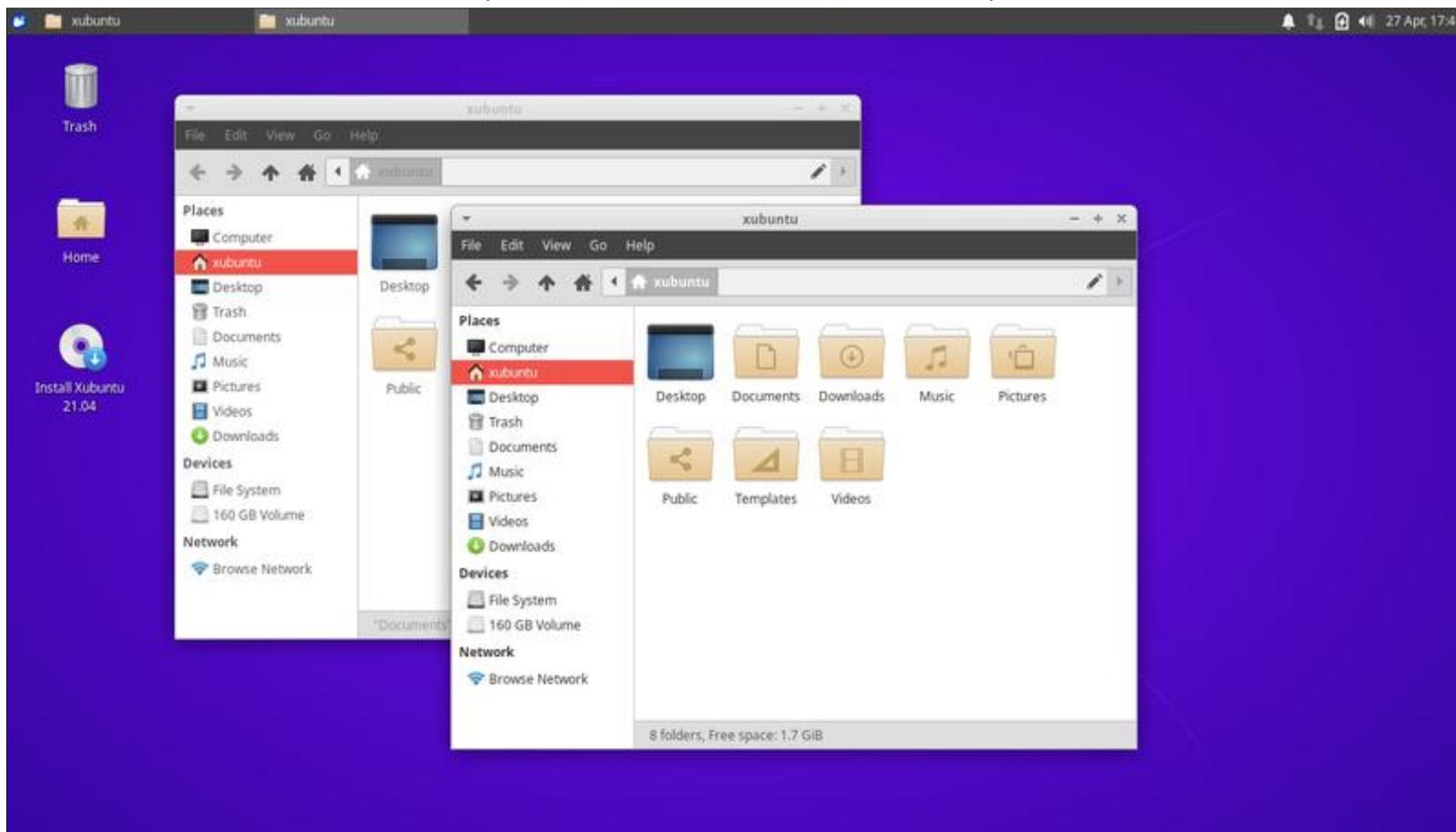
**Adam Hunt** started using Ubuntu in 2007 and has used Lubuntu since 2010. He lives in Ottawa, Ontario, Canada, in a house with no Windows.

# LETTERS

## Join us on:

facebook.com/
fullcirclemagazine

twitter.com/#!/fullcirclemag

linkedin.com/company/full-
circle-magazine

ubuntuforums.org/
forumdisplay.php?f=270

## FULL CIRCLE NEEDS YOU!

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

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

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

# Q&A

Compiled by EriktheUnready

Welcome back to another edition of Questions and Answers! In this section, we will endeavour to answer your Ubuntu questions. Be sure to add details of the version of your operating system and your hardware. I will try to remove any personally identifiable strings from questions, but it is best not to include things like serial numbers, UUIDs or IP addresses. If your question does not appear immediately, it is just because there is such a lot, and I do them, first-come-first-served.

**NOTE**: Guys, with the latest Google hack, my Gmail accounts are all in limbo, if you sent me any messages there, I will get to those only when it unfreezes again.

Today we accept media formats the way they are, but it was never really that way. Computers were just not as fast, and ripping your music to Fraunhoffer's MP3 format was great on space (compared to wav-files). That was the other thing; space was at a premium. If your computer was underpowered in CPU cycles, memory or drive read/write speed, your MP3 files sounded terrible. Couple that with crappy sound cards, and bad encoders, and low default bit rates, and one can understand why a lot of people thought it was crappy. One very tech-savvy lady I knew, had got a machine with premium parts and Windows 2000 (I think), brand new. By this time I was familiar with Microsoft policy of doing sneaky stuff to force you to use their stuff, so when she told me that the music she had been converting just sounds so much better than her old MP3s. I tried to warn her, but she knew better, so it went until she had a huge collection of her own and her friends' stuff. Her original music was given to goodwill – she was now digital and had a backup. I did not want to interfere as she was cocky, and, sure she and M$ had a one-up on the world. Until the motherboard died and needed replacing. Nothing wanted to play as it was all encrypted to a UUID from her old board and installation of XP? She lost everything. Did not learn a thing from it. A few years later, she asked me to tell her 18 year old son to stop fooling with Ubuntu 6.06 he got via shipit, as he needed the "real thing" or something like that. If I prefer to fill my car with Shell and you have only ever filled your car with anything but BP, and on top of that BP has ceased your car's engine, tell me to stay away from Shell and use BP as it is the only real petrol? - The kicker... That son specialized in Linux security and got a job abroad, owns his own house and boat (as in paid off), while his peers still have 20 years to pay off their houses.

———————————————

**Q** : Hi, I installed Ubuntu 18.04 and Windows 10 side-by-side on my old Lenovo laptop. It seems that the battery charges only when the computer is off or very, VERY, VERY slowly when it is on. How can I fix this?

**A** : I would start with checking your charger's output as I suspect it may be a bad charger. Otherwise the circuitry within the battery may be faulty.

I just went back to Windows 8.1 as Windows 10 will start doing weird things that look like it is running out of memory, but I have 4GB.

**Q** : I have a Dell Latitude E6420 that is rather slow. Which version of Ubuntu do you recommend that I install on it? It has 4GB DDR3 and 320GB hard drive.

**A** : Those are only slow because the drive is lame in that model. Replace it with an SSD and it should fly. I would suggest Ubuntu 20.04, that way all your software will be current and you will get long term support.

**Q** : I have an Acer machine with an Atom processor. I know it is crap, but lately my Ubuntu is taking a lot longer to boot than usual, I am talking like 10 minutes here. The issue is analyze-blame tells me nothing, just that everything is

# Q&A

slow. What can I do or check?

**A**: There are numerous articles on how to speed up Ubuntu, I won't repeat that here. I can tell you to fsck your drive and maybe check the smart status to see if you do not have any bad blocks. Slow response at boot is mostly a drive bottleneck, even if your CPU is underpowered.

**Q**: I have installed Kubuntu on my black box special PC, but when I try to install it on my Dell Optiplex, I just get a black screen. It is the same USB drive, so I tried with a new Lexar USB drive and the same is happening. Where am I going wrong?

**A**: If there is no splash, it probably means that either it is not booting from the USB, or that you have the BIOS in the wrong mode, EFI or legacy. Dell sometimes hides settings in other places, check under "security", "secure boot", "advanced boot options". Grab an EFI and a legacy (sometimes called bios too) ISO and try both, if you are unsure of how to set the BIOS.

**Q**: Gawd, if I see -- 'getting windows ready, don't turn off your computer' once more, I will commit hara-kiri. I have switched to Ubuntu, but how do I get my Adobe to work? Also I need outlook.

**A**: If you mean Adobe reader, you can install that quite easily, but if you mean Adobe photoshop, I have bad news for you. You can try crossover or wine, but people have had limited success. If you meant Photoshop, why not give some open source software a try? https://opensource.com/life/12/6/design-without-debt-five-tools-for-designers

As for outlook, you can use the web interface, log on to portal.office.com or maybe try an open source alternative?

**Q**: Can I use Cisco webex in Ubuntu 18? I have not tried, but I have a webex next week and wanted to be prepared.

**A**: Webex is browser based, so the OS should not matter.

**Q**: The only thing I miss from my days on Windows is the free download manager. What is the Ubuntu equivalent?

**A**: You can try uget. See: https://itsfoss.com/install-latest-uget-ubuntu-linux-mint/

**Q**: I have Xubuntu installed on my dual-core PC. I am fed up with Parole; every time I skip forward or backwards more than once, it crashes. I don't really like VLC; is there another option other than mplayer/smplayer? I'm tired of the same old, same old.

**A**: Not sure what you want here, but it seems like you want something "new". Here is one I have not heard of before: https://github.com/g-fb/haruna. Let us know how it went.

**Q**: I have two Wifi cards in my Ubuntu Budgie PC. I broke the antenna off the internal one, so I am using a USB one. Ubuntu seems to switch to the one without the antenna quite often, resulting in a bad quality connection. Why would it switch to a worse one?

**A**: I am not sure; it could be that the broken one has a higher transfer rate than the other one. I suggest just removing the broken one and be done with it.

**Q**: Ever since I installed Ubuntu 14.04 with WUBI in Windows 10, it seems that everything is just janky in Windows. I have tried uninstalling it, but it is still weird, giving me blue screens when I try to print.

**A**: That is definitely a Windows update bug. KB5000808. I think there was another, KB5000802. Ubuntu just had bad timing. Correlation does not equal causality.

**Q**: Explain to me what is the difference between & and && when running commands?

**A**: When you append the ampersand to the end of a command, you send it to the background and when you use two, you are chaining commands – the second command will run only if the first exits with a return code of 0.

**Q**: I'm currently watching bash scripting videos on youtube. I

do not have a server to ssh to. My machine is Ubuntu 18.04. Memory is only 2 GB. How can I simulate working on a server without the desktop distracting?

A : You can try to create a minimal VM with a virtual box, but if distractions are your biggest worry, simply press CTRL+ALT+f6 and feel like you are on a server.

Q : Here is my current papercut. I have my terminal open. When I launch a program via the terminal like visual studio code, it always pops over the terminal. I still need to do things in the terminal. Launching a GUI program with & at the end does not work. All of the advice I have gotten so far doesn't seem to work.

A : Open the menu of your terminal, by clicking on its icon in the bar, and choose: "Always on top". Now go ahead and launch your program.

Q : My issue is this: https://unix.stackexchange.com/questions/642880/is-disk-encryption-without-requiring-a-password-at-boot-possible but

instead of typing it all out again. I have no preference for the encryption, Zulucrypt, LUKS or whatever.

A : Meh, the simple answer is don't. Instead of FDE (Full disk encryption), encrypt only the part where the data is stored, that way, the computer can start, and you can put the password in remotely. Your data is safe if the physical unit gets feet.

Q : What does it mean "UNMET DEPENDENCIES"

A : A simple example: Imagine you need node 14 to run an application, but you have only node 9, you would need to upgrade to node 14; but, let's say your version of Ubuntu is too old to run Node 14, that would be an unmet dependency. A program DEPENDS on another that is not available.

Q : My Ubuntu is 18.04. I get errors: E: The repository 'https://download.docker.com/linux/debian focal Release' does not have a Release file.

A : Updating from such a repository can't be done securely, and is therefore disabled by default.

Q : I am on Vanilla Ubuntu with a generic kernel, I have Opera 76.0. When I highlight inside Opera, I get a copy option on the webpage. I mostly work in Web v 3.22.7. I want to copy it like that, without having to press keyboard shortcuts, so I can paste to mousepad. Lots of my work is in the browser and I need to get comfortable with this Linux thing. How can I tweak the Web to work faster like opera?

A : A quick tip, if you highlight text anywhere and press the middle mouse button, or mouse wheel, it will copy and when you press it on an open space like inside your text editor it will paste. No tweaking or keyboard required. Ubuntu has you covered.

Q : Help, I am so confused as to when I should use pip to install modules and when I need to use apt to install modules for Python.

A : I am not sure either, I would say, if the package exists in

your standard Ubuntu repository, then maybe get that, if it does not, use pip. Maybe one of our readers can give more insight here. misc@fullcirclemagazine.org

Q : I'm connected through SSH with Putty to a machine running Ubuntu, as a normal user. I would like to somehow restart the machine there, because I'm having trouble with that machine, hopefully that is all it needs. Is it possible?

A : You need elevated privileges to reboot a machine. No sudo, no restart.

Q : Is there some ncurses based desktop I can use remotely?

A : Not that I know of, but just use the shell with lots of ncurses based applications.

**Erik** has been in IT for 30+ years. He has seen technology come and go. From repairing washing machine sized hard drives with multimeters and oscilloscopes, laying cable, to scaling 3G towers, he's done it.

Defold game engine website:
https://defold.com/

Price: Free!

Blurb: "*Defold is a completely free-to-use game engine for development of console, desktop, mobile and web games. There are no up-front costs, no licensing fees, and no royalties. The source code is made available on GitHub with a developer-friendly license. The Defold editor runs on Windows, Linux and macOS, and includes a code editor, debugger, profiler, and advanced scene and UI editors. Game logic is written in Lua, with the option to use native code to extend the engine with additional functionality. Defold is used by a growing number of developers to create commercial hits, as well as games for game jams, and in schools to teach game development. Defold is known for its ease-of-use and it is praised for its technical documentation and friendly community of developers.*"

I am using the Steam version. This way, I don't have to worry about updating the package. (At the moment, the steam version is one version behind though.) If you don't like Steam, you don't have to use it; simply grab the package from the downloads page. Defold is a game engine that used to belong to KING, a mobile games developer and publisher, until they gave the engine to the Defold Foundation, to make it open-source and free-of-charge. We have reviewed a game made in Defold, Fates of Ort, in issue 161. There are some impressive examples in their showcase section, so be sure to have a look.

## FIRST IMPRESSIONS:

It is slow. The application seems to be Java. If, like me, you have a potato laptop, I don't recommend it. A frustrating experience waiting for things to respond, leaves a bitter taste in one's mouth. When switching from "From Template" to "From Tutorial" and back, you can go and make a cuppa in between. If you are or were in the armed forces, you may be familiar with "Hurry up and wait". You may even have been in and out of the DMV queues by the time the "Platformer game" template loads.

The IDE layout is a lot like that of Godot. I do not want to compare these two game engines, but it may be helpful to point out similarities. You have basically three vertical panes, with the main one in the middle. Each one of these is divided in two, horizontally.

## LAYOUT:

The first pane on your top-left, is your file-system hierarchy. Below that is the changed files pane. Top-centre, where you can see the readme.md file displayed, is your editor. Below that (bottom-centre) is a control pane with different tabs, like your console output. Top-right is marked outline, which is basically your inspector. The last pane, bottom-right is just properties, as marked.

# UBUNTU GAMES
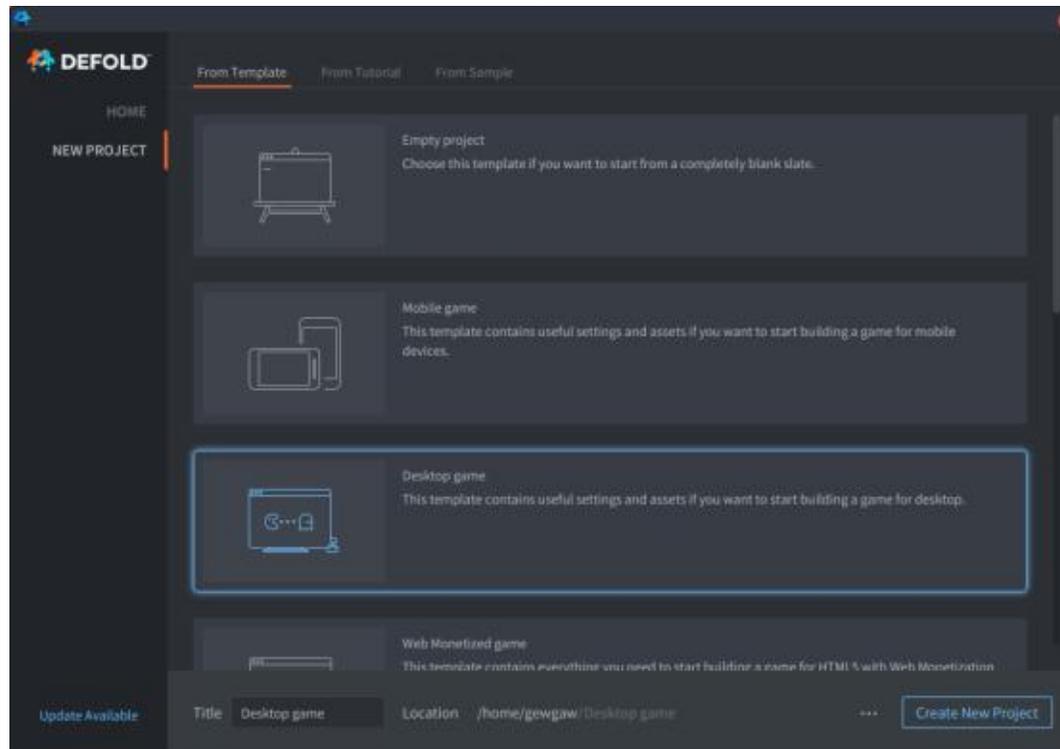
Defold is based on the Lua language for programming your game. Lua is an easy-to-learn language with a simple syntax. If you have been following along with the Python tutorial in the magazine, you will find that you pick up Lua very easily. The templates can actually run, and if you "compile" a game it compiles and runs. Try this on one of the templates provided, like the "platformer" template.

If you have done that, click on one of the scripts, a file ending in '.script' and you should see the source code for the game template.

The engine is not as well known as say Unity or Godot or Game Maker Studio, but it is getting there (maybe on par with Gdevelop?). In my opinion, the only thing holding it back is the lack of variety of tutorials. The website does cover some aspects and a few Youtube tutorials are available. If you are a game maker, why not post some video tutorials? You could be in on the ground floor, so-to-speak.

Let's quickly talk about Lua tutorials to get you going. LinuxLinks has some: https://www.linuxlinks.com/excellent-free-tutorials-learn-lua/. Then there's: https://www.youtube.com/watch?v=4NKMtazVNe8 and references: https://www.tutorialspoint.com/lua/index.htm

## RUNNING YOUR PROJECT:

As slow as the Engine is, your game projects run fast and super smooth. This may be because it was originally intended to be for low-powered android platforms, like tablets. Yes, this is where the engine shines, where it counts the most. The second place I'd like to draw your attention to is how quick it is to get off the ground. If you paint tiles on screen, immediately the collision shapes and physics are taken care of for you. This kind of bonus means you can whip up a prototype of your game in a few hours, instead of a few days. This balances out any slowness you may experience getting started. If you

have a beefy machine, this can probably be a no-brainer when it comes to picking an engine for your next game.

Did I make a mistake? Was I unfair? Let us know: misc@fullcirlemagazine.org

**Erik** has been in IT for 30+ years. He has seen technology come and go. From repairing washing machine sized hard drives with multimeters and oscilloscopes, laying cable, to scaling 3G towers, he's done it.

# PATRONS

## Monthly Patrons

Alex Crabtree
Alex Popescu
Andy Garay
Bill Berninghausen
Bob C
Brian Bogdan
CBinMV
Darren
Dennis Mack
Devin McPherson
Doug Bruce
Elizabeth K. Joseph
Eric Meddleton
Gary Campbell
George Smith
Henry D Mills
Hugo Sutherland
Jack
Joao Cantinho Lopes
John Andrews
John Malon
John Prigge
Jonathan Pienaar
JT
Kevin O'Brien
Lee Allen
Leo Paesen
Linda P
Mark Shuttleworth
Norman Phillips

Oscar Rivera
Paul Anderson
Paul Readovin
Rino Ragucci
Rob Fitzgerald
Roy Milner
Scott Mack
Sony Varghese
Taylor Conroy
Tom Bell
Tony
Vincent Jobard
Volker Bradley
William von Hagen
Jason D. Moss

## Single Donations

**2021**:
Floyd Smith
Dale Reisfield
Jan Ågren
Linda Prinsen
melvyn smith
Frits van Leeuwen
Raymond Mccarthy
Robert Kaspar
Frank Dinger
Ken Maunder
Brian Kelly
János Horváth
Ronald Eike

John Porubek

https://www.patreon.com/fullcirclemagazine



https://paypal.me/ronnietucker



https://donorbox.org/recurring-monthly-donation

# HOW TO CONTRIBUTE

## FULL CIRCLE NEEDS YOU!

A magazine isn't a magazine without articles and Full Circle is no exception. We need your opinions, desktops, stories, how-to's, reviews, and anything else you want to tell your fellow *buntu users. Send your articles to: articles@fullcirclemagazine.org

We are always looking for new articles to include in Full Circle. For help and advice please see the **Official Full Circle Style Guide**: http://bit.ly/fcmwriting

Send your **comments** or Linux experiences to: letters@fullcirclemagazine.org
Hardware/software **reviews** should be sent to: reviews@fullcirclemagazine.org
**Questions** for Q&A should go to: questions@fullcirclemagazine.org
**Desktop** screens should be emailed to: misc@fullcirclemagazine.org
... or you can visit our **site** via: fullcirclemagazine.org

## For the Full Circle Weekly News:

You can keep up to date with the Weekly News using the RSS feed: http://fullcirclemagazine.org/feed/podcast

Or, if you're out and about, you can get the Weekly News via Stitcher Radio (Android/iOS/web):
 http://www.stitcher.com/s?fid=85347&refid=stpr

and via TuneIn at: http://tunein.com/radio/Full-Circle-Weekly-News-p855064/

## Getting Full Circle Magazine:

**EPUB Format** - Most editions have a link to the epub file on that issue's download page. If you have any problems with the epub file, email: mobile@fullcirclemagazine.org

**Issuu** - You can read Full Circle online via Issuu: http://issuu.com/fullcirclemagazine. Please share and rate FCM as it helps to spread the word about FCM and Ubuntu.

**FCM PATREON :** https://www.patreon.com/fullcirclemagazine