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## Compile in linux

One of the most difficult fixes for users who go from Windows to Linux is the idea that not every bit of software you want to install is ready for you. Unlike Windows users who (in most cases) receive software prepacked in an EXE installer or ZIP file, Linux users often have to compile their own software packages. If you want to know how to compile software packages on Linux, you'll need to follow a few steps. You will need to download the source code, run the configuration command, install all the required dependency packages, and then run the Do command to start compiling your package. Here's how to do all this on a Linux-based operating system. Download source files Before you start building your new software packages, you need the source code. This may be from a package that you have developed, in which case you should have access to the source code already. However, you are more likely to try to compile a Linux software package from another developer. Popular code-sharing sites like GitHub let you view and download the source code for packages that you can then compile. You can use GIT, the popular version control system, to download source files to your computer. You can also download source code from open source projects such as VLC directly. Usually they come in a compressed file format like TAR, GZ, which you can extract to the terminal using the tar command. For example, running the tar -xvzf source-command.tar.gz extract a tarball file named source.tar.gz. Once you have source code available and retrieved on your Linux PC, you can go to the next stage of preparation before you start compiling your package. Installing Build Essential On Linux The tools and software contained in the basic build package are necessary for any kind of software compiling Linux operating systems, regardless of the programming language of your source code. As the primary package, a basic package (or similar packages) must be available in your Linux distribution store. The equivalent of building arch linux distributions is called basic decomposition, which includes many of the same tools. The installation instructions for basic construction will also vary depending on your Linux distribution. For example, in Ubuntu and Debian-based operating systems, you can install basic building systems by opening a terminal window and typing sudo apt install-essential. Installing a primary item will also install its dependencies, such as the g++ package. Once this process is complete, you can move on to configuring your Linux source package before you Compile. Run the Configure Code command for large packages usually contains a configuration script. Running this script will check your Linux distribution for the basic packages that your source code should be able to compilation correctly. To run the configuration script, enter the source code extract folder using the cd command. From there, type ./configure in the terminal by pressing Enter to start it. If the configuration script detects a missing package or feature, it will inform you what to do at the end of the script. For example, before you compile the VLC Media Player, a configuration script shown above has found that the lua programming language is not installed. In some cases, you can still compile and configure software packages even if the configuration script has detected a missing package or feature. Configuring a VLC script (shown above) offers a solution to the missing lua language packs by offering to run it again with the -disable-lua flag to bypass it. You will need to install missing packages that the configuration script has detected or use the suggested disabled flags to work around these errors before you can continue. If the configuration script has ended with no (or only minor) errors, the configured makefile for your package will be created. This creates instructions for compiling your package, allowing you to go to the final stage of compiling software. Installing missing dependency packages configuration script useful identifies all packages that your Linux distribution requires to compile and install your new software package correctly. They can be clearly identified by the configuration script error message or further through the process of running this script. If the error message has not been cleared, scroll back to the terminal history to try to identify the missing package. Once you know what the missing package is, use the package installer for your Linux distribution to install it. For example, in Ubuntu and Debian-based operating systems running sudo apt installation package name, they will install a package. Installing all missing dependencies is the last stage you need to complete before you start compiling and installing your new software package. Once you're done with this process, you're ready to start compiling. How to compile the Linux Build Essential package contains a make, automatic tool used to start compiling your source code into software that you can work on your COMPUTER. It uses the makefile file configured and created by the earlier configuration command that contains specific instructions needed to compile your package. To start compiling your source code, open a terminal and use the cd command to enter the correct folder. When you're done, type do to start composing your package. It will take a little time to complete, in package size and your available system resources. If no errors occur after compiling your software package, you can install the package. To do this, write sudo make an installation in the terminal. 1. I will be installed on your Linux PC, ready to open and use like any other software. Installing new Software on Linux, knowing how to compile software packages on Linux can help you install less well-known software. Basic operating systems like Ubuntu and Devian have large software repositories available to users, so if you don't want to compile your software, try finding and installing new software using Package Manager instead. If you're moving from Windows, you can also install Windows software on Linux to continue using your favorite Windows-only apps. In the computer system, the kernel is low-level software that supports communication with hardware and general system coordination. Besides some initial firmware built into your computer's motherboard when you start your computer, the kernel is what provides awareness that there is a hard drive and a screen and keyboard and network card. It's also a kernel task to ensure the same time (more or less) of each component so that your graphics and audio and file system and network run smoothly even though they simultaneously. However, the search for hardware support continues because the more hardware that is released, the more things that the kernel needs to accept in its code to make the hardware work normally. It's hard to get exact numbers, but the Linux kernel is certainly among the best nuts for hardware compatibility. Linux works with countless computers and mobile phones, built-in chip system (SOC) boards for hobbit and industrial purposes, RAID cards, sewing machines and much more. Back in the 20th century (and even in the early 21st), it was not unreasonable for a Linux user to expect that when they purchased a very new piece of hardware, they would need to download the latest kernel source, compile it and install it so that they could get support for the device. Lately, though, you'll be hard pressed to find a Linux user collecting their own kernel except for fun or profit through highly specialized user hardware. Usually it is not required these days to collect the Linux kernel on their own. Therefore, as well as a quick tutorial on how to collect a core when you need to. Whether you have a brand new laptop that includes a new graphics card or a WiFi chipset, or you've just brought a new printer, your operating system (called either GNU+ Linux or just Linux, which is also the kernel name) needs a driver to open communication channels to this new component (graphics card, WiFi chip, printer or whatever). Sometimes it can be deceptive when you turn on a new device and the computer seems to confirm it. But don't let that fool you. Sometimes this is all you need, but in other cases your operating simply uses common protocols to check a device that is attached. For example, the computer may be to identify your new network printer, but sometimes it's only because the network adapter in the printer is programmed to be identified on a network so that it can get a DHCP address. This does not necessarily mean that your computer knows what instructions to send to the printer to create a page with printed text. In fact, it can be argued that the computer does not even know that the device is a printer; it can only indicate that there is a device on the network at a specific address and the device is identified by a series of p-r-i-n-t-e-r characters. Conventions of human language are meaningless to the computer; what he needs is a driver. Kernel developers, hardware manufacturers, maintenance technicians, and hobbyists know that new hardware is constantly being released. Many of them contribute to drivers submitted directly to the Kernel Development Team for linux inclusion. For example, Nvidia graphics card drivers are often written in the Nouveau kernel module and, since Nvidia cards are common, code is usually included in any kernel distributed for general use (such as the kernel you receive when downloading Fedora or Ubuntu. : Printers take advantage of Foomatic and CUPS, wireless cards have b43, ath9k, WL modules, etc. Distributions tend to include as much as possible in their Linux kernel because they want you to be able to attach a device and start using it immediately without the need to install drivers. For the most part, this happens, especially now that many device providers are already funding linux driver development for the hardware they sell and submit these drivers directly to the kernel team for general distribution. Sometimes, however, you've released a kernel that you installed six months ago with an exciting new device that just hit stores a week ago. In this scenario, the kernel may not have a driver for this device. The good news is that very often, a driver for this device can exist in a very recent kernel release, which means all you have to do is update what you're running. This is usually done through a package manager. For example, the RHEL, CentOS and Fedora: \$sudo dnf kernel update of Debian and Ubuntu, first get the current kernel version: Search for newer versions: \$sudo apt update \$sudo apt search linux-image Install the latest version you find. In this example, the latest available is 5.2.4: \$sudo apt install linux-image-5.2.4 After kernel upgrade, you need to restart (unless you use kpatch or kgrat). Then, if the device driver you need is in the latest kernel, will work as expected. Installing a kernel module Sometimes it is not expected that its users often use a device (or at least not device driver must be in the Linux kernel). Linux uses a modular approach to drivers, so distributions can deliver individual driver packages that can be loaded from the kernel, even though the driver is not composed in the kernel itself. This is useful, although it can be put when a driver is not included in the kernel, but is required during boot, or when the kernel is updated by the modular driver. The first problem is solved with initrd (the original RAM drive) and is outside the scope of this article, and the second is solved by a system called kmod. The kmod system ensures that when the kernel is updated, all modular drivers installed with it are also updated. If you install a driver manually, you skip the automation that kmod provides, so you must select a kmod package when available. For example, while Nvidia drivers are built into the kernel as nouveau driver, official Nvidia drivers are distributed only by Nvidia. You can manually install Nvidia-branded drivers by going to the website, downloading the .run file and running the shell script that it provides, but you need to repeat the same process after installing a new kernel because nothing tells package manager that you have manually installed a kernel driver. Because Nvidia drives your graphics, updating the Nvidia driver manually usually means that you need to perform the update from a terminal because you don't have graphics without a functional graphics driver. However, if you install Nvidia drivers as a kmod package, kernel update also updates your Nvidia driver. On Fedora and related: \$Sudo dnf install Debian's kmod-nvidia and related: \$Sudo apt update \$sudo apt install nvidia-core-common nvidia-core-dkms nvidia-glx nvidia-xconfig nvidia-nvidia-settings nvidia-vgpu-driver vdpau-driver This is just one example, but if you install Nvidia drivers in real life, you should also blacklist the nouveau driver. See distribution documentation for the best steps. Download and install driver Not everything is included in the kernel, and not everything else is available as a kernel module. In some cases, you need to download a special driver written in a kit by the hardware manufacturer, and in other cases, you have a driver, but not a frontend, to configure driver options. Two common examples are Wacom's HP printers and illustration tablets. If you get an HP printer, you probably have common drivers that can communicate with your printer. You may even be able to print. But the generic driver may not be able to provide specialized options specific to your model, such as duplex printing, collation, selection of paper trays, etc. HPLIP (HP Linux image and print system) provides job management options, for printing, selecting paper trays, where applicable, etc. HPLIP is usually packaged in package managers; managers; hplip search. Similarly, Wacom tablet drivers, the leading illustration tablet for digital artists, are usually included in your core, but fine-tuning options, such as pressure sensitivity and button functionality, are only available through the graphics control panel included by default with GNOME, but installed as an additional KDE-config tablet package. There are probably some extreme cases that don't have kernel drivers, but offer kmod versions of driver modules like rpm or DEB file that you can download and install through your package manager. Patching and compiling its own core Dory in a futuristic utopia that is the 21st century, there are suppliers who don't understand open enough code to provide drivers to install. Sometimes, such companies provide source code for a driver, but expect to download the code, connect a kernel, compile, and install manually. This kind of distribution model has the same drawbacks as installing packaged drivers outside the kmod system: your kernel update breaks down on the driver because it needs to be re-integrated into the kernel manually every time the kernel is changed for a new one. This has become rare, happily, because the Linux kernel team has done an excellent job of praying loudly for companies to communicate with them, and because companies are finally accepting that open source isn't disappearing anytime soon. But there is still novelty or hyper-specialized devices out there that provide only the kernel patches. Officially, there are distribution-specific preferences for how you need to compile a kernel to keep your package manager involved in upgrading such a vital part of your system. There are too many package managers to cover everyone. As an example, here's what happens behind the scenes when you use tools like Fedora's rpmdev or Debian's basic and descripts. First, as usual, find out which version of the kernel you are running: \$uname -r In most cases, it's safe to upgrade your kernel if you haven't already. After all, your problem may be solved in the latest version. If you have tried this and it does not work, you must download the source code of the kernel you are using. Most distributions provide a special command for this, but to do so manually, you can find the source code of kernel.org. You also need to download whatever patch you need for your kernel. Sometimes these patches are specific to kernel release, so choose carefully. It's traditional, or at least it's been reversed when people regularly compile their own nuts to put source code and patches in/usr/src/linux. Unzip kernel source and patch files if necessary: \$CD/Y/uesr/SRC/Linux\$bz2p2 --decompress linux-5.2.4.tar.bz2\$cd Linux-5.2.4 \$-d -./patch\*bz2 The patch may have instructions on how to make the correction, but often they are designed designed to be executed from the highest level of your tree: \$patch -p1 &t; patch@example.patch Once the kernel code is patched, you can use your old configuration to prepare a patch kernel trustee: \$ make oldconfig oldconfig command serve two purposes; it inherits the current kernel configuration, and it allows you to configure new options entered by the patch. You may need to run the Make menuconfig command, which launches a list of possible options for the new curses-based kernel that can be used by the menus. The menu can be huge, but since it starts with your old trustee as a basis, you can look at the menu and disable hardware modules that you know you don't need and aren't expected to have. Alternatively, if you know that you have some part of the hardware and see that it is not included in the current configuration, you can choose to build it as a module or directly in the kernel. In theory, this is not necessary because probably your current core treated you well, but for the missing patch, and probably the patch you applied, it activated all the necessary options required by any device that prompted you to patch your core in the first place. Then compile the kernel and its modules: \$ make bzImage \$ make modules That leaves you with a file called vmlinuz, which is a compressed version of the bootable kernel. Save your old version and put the new one in your /boot directory: \$Sudo MV/boot/vmlinuz/boot/vmlinuz.nopatch\$Sudo cat arch/x86\_64/boot/bzImage &t; /boot/vmlinuz\$Sudo/boot/System.map/Boot/System.map You've filled up and built a core and its modules, you've installed the core but you haven't installed modules. This is the last step to build: \$ sudo made modules, install The new core is in place and its modules are installed. The last step is to update the bootloader so that the part of the computer that loads before the kernel knows where to find Linux. Bootloader GRUB makes this process relatively simple: \$Sudo grub2-mkconf Real-world compilation Of course, no one runs these manual commands now. Instead, see your distribution for kernel modification instructions using a set of developer tools that use support for your distribution. This toolkit is likely to create a new installation package with all the patches included, warns the upgrade package manager, and update your bootloader for you. Nuts and nuts are mysterious things, but it doesn't take much to understand what components are built. Next time you get a piece of technical that doesn't seem to work on Linux, take a deep breath, investigate the presence of a driver and go with the path of least resistance. 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Unzip kernel source and patch files if necessary: \$CD/Y/uesr/SRC/Linux\$bz2p2 --decompress linux-5.2.4.tar.bz2\$cd Linux-5.2.4 \$bz2p2 -d -./patch\*bz2 The patch file may have instructions on how to make the patch, but often they are designed to be executed from the top level of your tree: \$patch -p1 &t; patch@example.patch Once the kernel code is patched, you can use your old configuration to prepare the patch kernel config: \$ make oldconfig oldconfig command serve two purposes; it inherits the current kernel configuration and allows you to configure new options entered by patch. You may need to run the Make menuconfig command, which launches a list of possible options for the new curses-based kernel that can be used by the menus. Menu be huge, but since it starts with your old trustee as a base, you can look at the menu and disable hardware modules you know that you do not need and does not provide for need. Alternatively, if you know that you have some part of the hardware

and see that it is not included in the current configuration, you can choose to build it as a module or directly in the kernel. In theory, this is not necessary because probably your current core treated you well, but for the missing patch, and probably the patch you applied, it activated all the necessary options required by any device that prompted you to patch your core in the first place. Then compile the kernel and its modules: \$ make bzImage \$ make \$ modules That leaves you with a file called vmlinuz, which is a compressed version of the bootable kernel. Save your old version and put the new one in your /boot directory: \$Sudo MV/boot/vmlinuz/boot/vmlinuz.nopatch\$Sudo cat arch/x86\_64/boot/bzImage &gt; /boot/vmlinuz\$sudo/boot/System.map/Boot/System.map You've filled up and built a core and its modules, you've installed the core but you haven't installed modules. This is the last step to build: \$ sudo make modules\_install The new core is in place and its modules are installed. The last step is to update the boot loader so that the part of the computer that loads before the kernel knows where to find Linux. Boot loader GRUB makes this process relatively simple: \$sudo grub2-mkconfig Real-world compilation Of course, no one runs these manual commands now. Instead, see your distribution for kernel modification instructions using a set of developer tools that use support for your distribution. This toolkit is likely to create a new installation package with all the patches included, warns the upgrade package manager, and update your boot loader for you. Nuts and nuts are mysterious things, but it doesn't take much to understand what components are built. Next time you get a piece of technical that doesn't seem to work on Linux, take a deep breath, investigate the presence of a driver and go with the path of least resistance. Linux is easier than ever – and that includes the kernel. Kernel.

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