

Linux Operating System Selection

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Abstract

Operating System (OS) selection plays a vital role in determining the usability of a computer or microcomputer. This application note will discuss the differences between the different flavors of the Linux OS's and the different mediums of installing the software. There will be comparisons of differences between the software, as well as which operating system will best suit the user's needs.

Keywords

Some of the keywords that will be used throughout this application note are OS (Operating System), GUI (Graphical User Interface), and SD (Secure Digital).

Introduction

Operating Systems are overwhelmingly present in everyday life. Any time a computer is booted on, the OS is implemented. The OS controls all aspects of the GUI and lets the user interact with their files and data. A user can determine which type of OS they would like to use on their machine. For example, if an Apple computer is bought at a store, the preloaded OS will be whatever the current version of iOS is. Likewise, if for example, a Dell or Asus is purchased, the OS will likely be a variation of the Windows OS. However, a user has the ability to change the OS to their liking. There are different options available to a user, such as dual-booting, or replacing the existing OS entirely with a different one.

The focus of this application report is based on the Linux operating system and its variations. Linux is an open-source OS that can be installed on any computer that is currently running a modern OS. An additional option is to change computer settings to load multiple operating systems by using dual-booting. The idea behind a dual-boot is a user choice at computer start-up that allows for a selection of the various installed OS's. For example, on boot, a user could have an option of selecting between Ubuntu and Windows 7. Selecting either choice will cause the computer to boot up the respective OS through a partition on the hard drive.

Operating Systems can also be installed on different mediums of storage devices, allowing for more freedom of choice. For example, Ubuntu can be installed on a CD-ROM, a flash drive, or an SD card. The installation process for each of these processes will be explained, as well as what the differences between these mediums are.

Objective

The objective of this application note is to give a detailed description of the various forms of Linux, as well as the different mediums of which it can be installed. A user will have a better understanding of the different flavors of Linux, such as Ubuntu, Debian, and Android. These different flavors have various pros and cons that will be explained in order to help the user decide which OS can be best utilized for their applications.

Ubuntu

Ubuntu is the first variation of Linux that will be covered in this application report. There are two main versions of Ubuntu, 12.04 LTS, and 13.10. The version 13.10 is the most up-to-date version at this time, with the most recent libraries and features. However, Ubuntu 12.04 LTS is the most stable version, with long-term support that is set to last until April 2017. The user has the freedom of choice of which version to download. Once a version is decided, the installation process is the same for each.

How to install Ubuntu on Windows using a DVD:

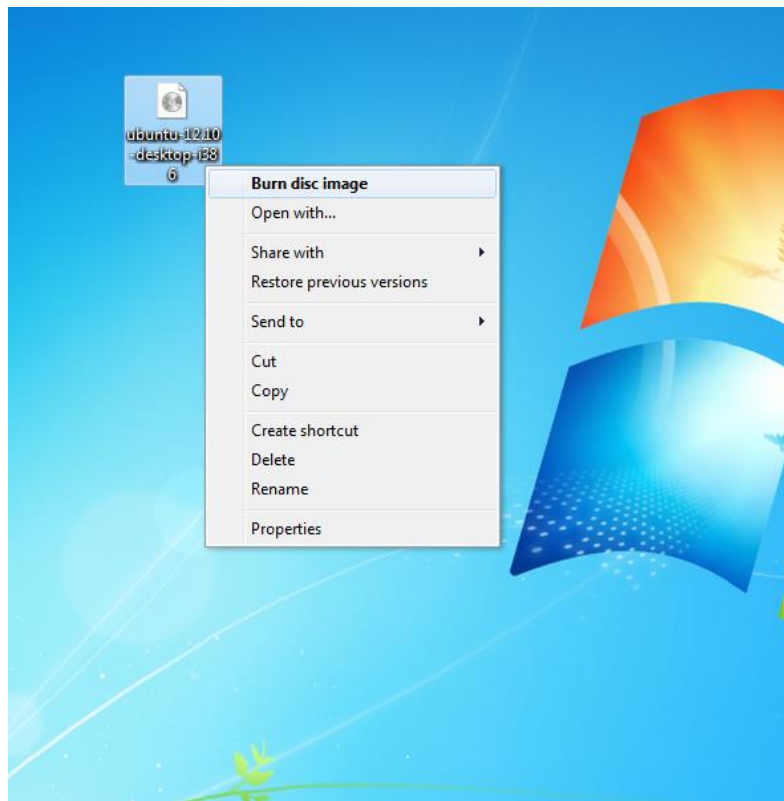


Figure 1

Install the image (.img) file from the download section on the website www.ubuntu.com. Once the file is downloaded, right-click on the file and select “Burn disk image” (Figure 1).

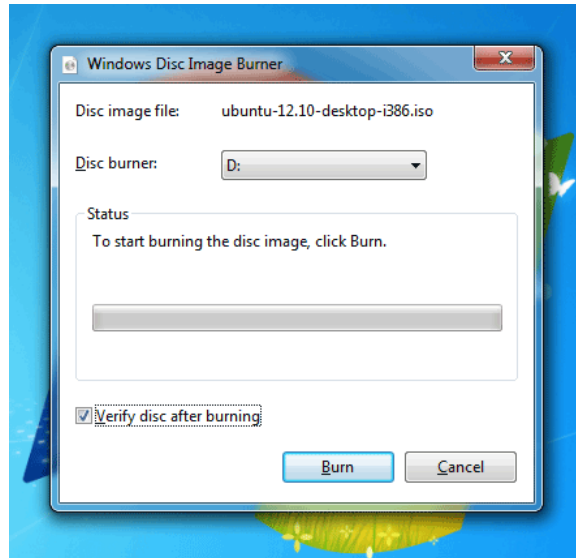


Figure 2

The next step is to choose the computer drive that the DVD is located at. Figure 2 shows the location of the DVD to be in the DVD drive D:/. When ready, click on the button “Burn”, and wait for the burning process to finish. Once finished, the DVD can be taken out and placed in the CD-ROM drive. Ubuntu allows users to test the OS before fully installing it on the system.

How to install Ubuntu using a flash drive:

Ubuntu can be installed from a bootable USB stick, with the stipulation that the amount of free memory available is a minimum of 2GB. To start, the user should download a GUI program called “USB Installer” from www.pendrivelinux.com. This easy-to-use GUI is shown in Figure 3, and allows the user to select the version of Ubuntu that they desire from the drop-down list.

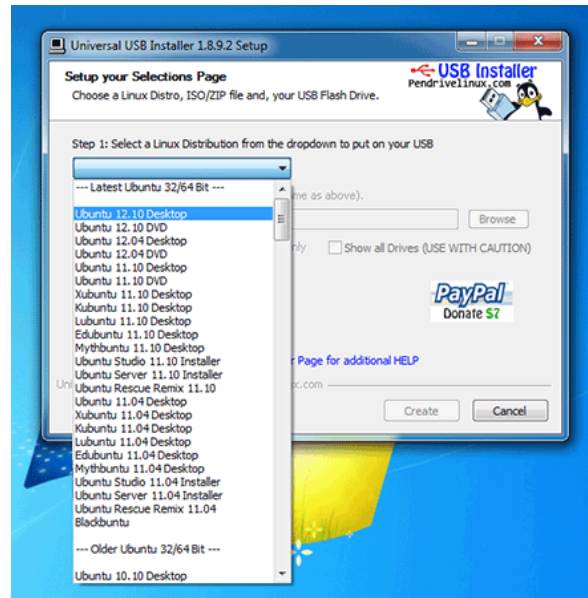


Figure 3

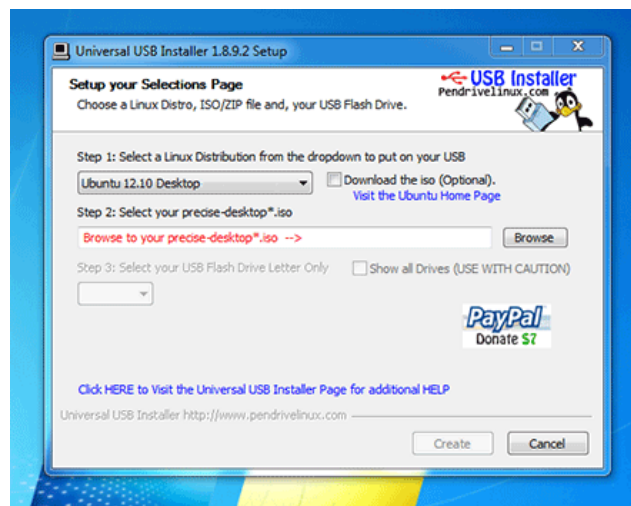


Figure 4

The next step is the browse to the location of the computer that the image file is located (Figure 4).

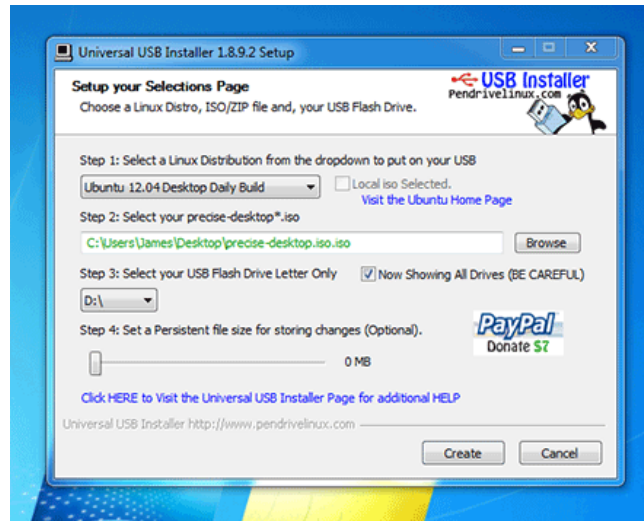


Figure 5

Finally, the last step is to select the drive that the USB stick is located at. In Figure 5, the location of the USB stick is at drive D:\, and all that is left to do is select “Create”.

How to install Ubuntu using a microSD card:

In many cases, a user may want to use Linux for development on a microcomputer or similar device that uses an SD card to boot from, such as a Raspberry Pi or an ODROID. In order to accomplish this task, the SD card will need to be communicating to the host computer through a SD-to-USB device. Once the computer recognizes the SD card as a storage device, the SD card will need to be wiped of all data and converted into a FAT file format.

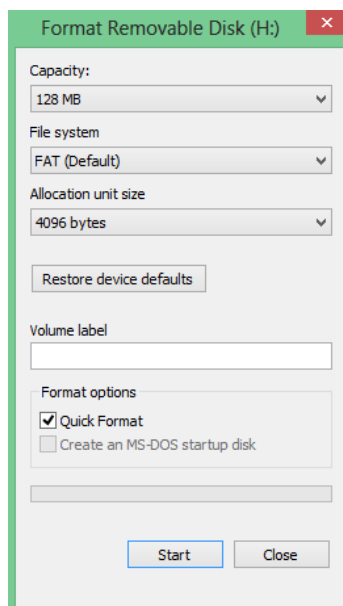


Figure 6

Right clicking on the drive location of the SD card allows the user to select the option of formatting the drive. After selecting the format option, Figure 6 will appear and allow for a dropdown menu of the different file format choices. Select FAT and click “Start”. This will wipe all the data that is on the SD card and prepare the card for image writing. To load the image onto the card, a program called “Win32DiskImager” will need to be installed. There is no official website for the disk imager, but there are several websites that host and mirror the program. Once installed, the Win32DiskImager will appear as shown in Figure 7.

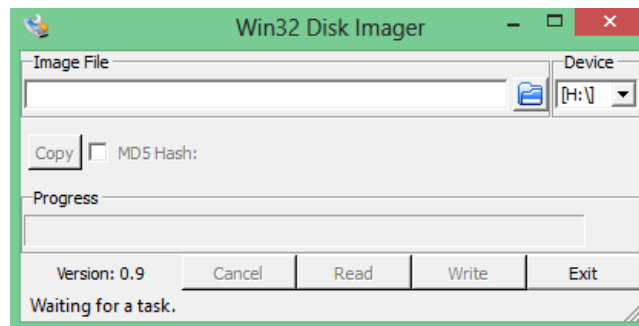


Figure 7

Click on the blue folder button and search for the Ubuntu image file. Once the image is selected, click on the “Write” button and wait for the progress bar to reach 100%. Read and write speed is determined by the class type of the SD card. The class ranges from 2-10, with 10 being the fastest. Once the writing is complete, the card is bootable and can be used as the OS for the microcomputer.

Overview:

These are three methods of installing Ubuntu through various mediums. Ubuntu can now be used on the respective machine as an OS. What makes Ubuntu unique is that it is free, fast, and user-friendly. The software is open-source and is supported by a community of thousands of people who constantly improve the software. One of the reasons people choose to use Ubuntu is because it has the most up-to-date libraries as opposed to an OS such as Debian. Ubuntu focuses heavily on the usability aspect, and comes packed with software and libraries. However, a reason why a person may choose Debian over Ubuntu is due to stability and graphical considerations.

Debian

Overview:

Debian Linux follows the same installation process as Ubuntu. All of the installation steps, including DVD, flash drive, and SD card, are the same. The only difference is the image file that is used. An image for Debian can be downloaded from the website www.debian.org. After following the installation instructions that were listed above, Debian can then be installed on the computer of choice.

There are many similarities between Debian and Ubuntu, such as the GNOME desktop environment. Ubuntu's version of GNOME is highly customized to make the users experience more aesthetically pleasing. However, Debian's GNOME reflects a stable and easy-to-use version. One of Debian's main features is its stability. If installed as an OS on a machine, there are instances where the machine can run for over a year without the need to reboot. Installing updates is as easy as typing "apt-get update" from a terminal command and the update will begin to install.

However, some of the downsides to installing Debian are that there are many outdated drivers and libraries. This means that not all hardware is supported. If there is really new or really old hardware, there are chances that the drivers may not install correctly on the OS. Additionally, Debian is hard to configure in some cases. For example, to configure certain pieces of hardware such as printers, there may not be a step-by-step configuration process. This means that the user may have to search the internet for specific drivers and manually adjust certain user settings.

Android

Overview:

Android is an OS that was made popular by software giant, Google. Google made Android the standard OS for their phone and tablet markets. Primarily, Android is based on the Linux kernel and is primarily focused for touch screen devices. Android shines in the areas of open-source development related to phones, tablets, and other touch screen devices. However, the Android OS can be installed on additional devices that are not touchscreen, such as televisions, cameras, and microcomputers such as the ODROID. Installation of the OS to a device such as the ODROID is the same as the previous OS installation processes. The Android OS uses a different image file in the installation process, similar to how Debian is installed.

There are multiple benefits to running an Android OS, such as memory management and ease of use. Since Android devices are primarily battery-powered, there is a large consideration for conservation of RAM in order to reduce power consumption. Android is composed of various applications that are utilized by a user. When an application is no longer running, it is placed in a suspended state in order to conserve resources. Another idea behind Android is the use of touch inputs to easily control objects on the screen. However, the touch screen feature is not necessary to run the Android OS. For example, Android can be the primary OS installed on an ODROID, which has no touch screen interface.

One of the downsides to Android is that a program needs to be converted into an application in order to be used on the platform. This limits what can be performed on the device, as well as the possibility of not having a specific application for what the user is trying to achieve. Additionally, if Android is loaded on a non-touch screen device, the user interface can be difficult to navigate. This is because the user interface was designed to be controlled by touch gestures, and not external peripherals such as a mouse.

Conclusion

Operation System selection boils down to what the user is looking to accomplish for their tasks. Ubuntu provides the tools to allow for a user-friendly, community driven open-source OS that can perform a variety of tasks. Debian revolves around simplicity, giving a bare-bones OS that is fast, easy, and stable. Android is committed to conserving RAM and providing a user interface that is touch input driven. These are three examples of Linux based Operating Systems, with each OS having similar installation procedures. Being presented with these three operating system options, it is up to the user to determine whether they need to focus on memory consumption, touch inputs, stability, as well as other deciding factors.

References

Ubuntu Operating System

<http://www.ubuntu.com/>

Debian Operating System

www.debian.org

Android Operating System

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Debian vs. Ubuntu: Contrasting Philosophies by Bruce Byfield

<http://www.datamation.com/article.php/3890111>

USB Installer

www.pendrivelinux.com