Linux Revealed

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Linux is a creation of Linus Torvalds. Hence, the name Linux is a combination of Linus and Unix. (The correct pronunciation of Linux is with a short 'i'. See this short YouTube video[1].) Linux is a complete makeover of the Unix operating system (OS). In its early days, it was only possible to install Linux if you had a deep understanding of the Unix operating system. Linux (first released in 1991) was inspired by Minix (first released in 1987) which is also a Unix-like operating system. To get the same Unix-like functionality for Windows there is Cygwin. Cygwin is free open source software that provides a large set of the Unix commands in its own terminal application. I have Cygwin installed on my Windows machines simply because I have a lot of Unix experience and it is a much better shell than the Windows command line interface (COMMAND). Everything I have done on a Unix computer I have done in Cygwin with virtually the same commands. But that's another story.

Almost all distributions of Linux are free. The exceptions are those that are fully supported by a corporation, such as RedHat. With a paid version of Linux, you do not have to worry about issues like will it work, what if you find a bug, etc. You're paying for customer support.

In 2002, Apple took the Unix operating system and incorporated it into the Mac OS. Virtually all of the Unix commands are also available in the Mac using the Terminal application.

Linux is everywhere. It's actually the base for the Android devices. You'll find it in smart refrigerators, automobile computers, televisions, DVD players, and much, much more. There are more distributions of some flavor of Linux than any other operating system--because it's free and open source. Anyone can roll their own version of Linux (with the exception that they cannot modify the kernel and re-release that modification without the blessing of the Linux keepers).

What's In An Operating System?

Any operating system has at least three basic shells, like an onion. The innermost layer is called the kernel. That's basically the brain. The next layer contains the drivers that access the different parts of the hardware. There are two kinds of drivers. One kind accesses the parts of the computer that are common to any computer, like the ports on the motherboard. These drivers are provided by the operating system vendor. The other kind of drivers are manufacturer specific for the device they are intended for, like a printer. The third layer contains the applications. Applications are forbidden to access the kernel directly, at least where Apple is concerned. In Windows and Linux, developers have free rein to do whatever, and that's what gets some applications in trouble when an OS update happens that changes the kernel. But that happens anyway such as when Microsoft released the Surface RT and when Apple switched to using the Intel processor.

1 https://www.youtube.com/watch?v=qAEsoKiZTvk

What Can I Do With Linux?

Any Linux distribution comes with a collection of free applications and the user can add others or even remove some that come with Linux. The user can also change the desktop shell if one is so inclined to take the risk. The basic applications installed on most Linux distributions include an office suite (LibreOffice), a browser (Firefox), a mail program (Thunderbird), a photo viewer (Shotwell), a video viewer (VLC), games, and system utilities. The only real reason for so many different distributions of Linux is to offer a package with just the applications that you want to use. One distribution is aimed at multimedia. Another has almost nothing. There is always an application manager that gives you thousands of free applications to choose from in virtually every category that you can think of, and that includes Science, Technology, Engineering, Arts, and Math (STEAM). Linux is more than just a tinkerer's pastime.

A by-line for Linux (and Mac OS X) is that it is secure from hackers and viruses. This is not absolutely true. A recent Java virus not only infected Windows, but every other operating system out there. Thankfully, the Java virus has been squashed. Aside from that, hackers are mostly interested in seeing how much money they can get or how much they can harass others, and since the Windows OS comprises nearly 75 percent of the distributed OS's, that's what they go after. However, in the past two years, more than 25,000 installations of unique servers have been compromised (called Operation Windigo[2]), including Mac OS X, Windows, Linux, and others. These activities are not focused on typical end users, but any end user of any OS may have gotten spam resulting from these attacks.

Which Linux Is Best?

Everyone has their favorite Linux distribution, and there are over 100. Mine is Ubuntu. I like Ubuntu because it comes with all the basic apps that I want to use already installed. The desktop shell is also quite user friendly (for me). The desktop is called a shell because that's the part of the OS that you use to access everything else in the computer. The Windows desktop, the Mac desktop, and the Linux desktop are nothing more than a graphical view of a folder which is also given the name Desktop in the user's home folder (that place in the OS where a user's personal files are kept, which contains other folders for documents, pictures, movies, downloads, etc.). The content (icons) and the background image you see in the desktop are user selectable. If you delete all the files and folders in the user's Desktop folder, the desktop will be blank except for the background image and possibly a few icons that the specific OS insists on being there.

The most popular distribution of Linux in 2014 is Mint followed by Ubuntu. This ranking is determined by how many times a particular distribution is downloaded (per day) and does not necessarily reflect how many users of each kind there are. This ranking may change quite often. Ubuntu didn't even show up in the top 100 until 2004 and became #1 in 2005, whereas Mint didn't show up until 2007 and became #1 in 2011 with Ubuntu as #2. Ubuntu was knocked out of the #2 position by Mageia in 2012, but came back as #2 in 2013. These rankings are monitored by DistroWatch[3].

2 http://www.theregister.co.uk/2014/03/18/windigo_unix_botnet/

3 http://distrowatch.com/

Ubuntu

Linux Ubuntu offers two types of release. One is called a long-term support (LTS) release which has always come out in April of each year, and the latest offering for LTS is 12.04. I'm not sure why they aren't now offering a 13.04 release. I'm waiting patiently for 14.04 to come out next month. The other is a minor release that always comes out in October, and the latest one is 13.10. The October release is optional and if you are enjoying the LTS, it may not be worth the hassle to update to the October release. Ubuntu also provides on-going updates for various parts of the OS. These updates are bug fixes and security patches. The main feature of Ubuntu is the Unity interface (which used to be Gnome, and that change upset more than a few people).

The download page[4] for Ubuntu is simple. You choose from a Desktop version, a Server version, a Cloud version (which is really a version of the Server), and now a Chinese language version. The best choice for the everyday English user is the Desktop version. The Server version is for anyone with a need to support multiple users on separate computers from a single source. Next, you choose your "flavor" of Ubuntu from either a 32-bit version or a 64-bit version in either the long-term support or latest release. If your hardware has a 64-bit processor, don't bother with the 32-bit version. Once you've made that choice, you're taken to a page that asks for a donation with $20 already set up for you. You can opt out. The donation doesn't give you any special privileges, but it does help to keep the free stuff coming. Finally, the download starts. And what you get is a file called an ISO (the extension is .iso). You then have to create a bootable DVD using that file. The process is really quite simple and all the instructions you need are available in the same place where you choose which flavor of Ubuntu you want. By the way, those instructions work for any distribution of Linux.

Mint

Linux Mint is based on Ubuntu. So what's the difference? First and foremost, each has its own version of the desktop shell (the user interface) in which certain items are found that make it useful for the user to start using the computer. The initial appearance of each is what is noticeably different. But here is the striking difference: Ubuntu looks and feels more like OS X (Mac) while Mint looks and feels more like Windows (XP or 7). Truth be told, you can find a distribution of Linux that totally emulates the Mac and one that totally emulates one of the Windows versions. But the emulation is only skin deep. Once you get into the administration part of Linux, it is Linux all the way.

The download page[5] for Linux Mint offers the following desktop editions: Cinnamon, Cinnamon without codecs, Cinnamon OEM, MATE, MATE without codecs, MATE OEM, KDE, and Xfce. You can choose between a 32-bit and a 64-bit version (the OEM is only 64-bit). If your hardware has a 64-bit processor, don't bother with the 32-bit version. And then there's the option to use the Linux Mint Debian Edition (LMDE). One advantage of Debian over Mint/Ubuntu is that new releases do not require a re-install of the OS since all releases are pumped directly in as they become available (not automatically; you have to manually accept the updates). One disadvantage of Debian is that it does require a deeper knowledge of the innards of Linux and how to add/update/delete packages. (A package is a compressed file archive containing <almost> everything needed for a particular application. Every Linux

4 http://www.ubuntu.com/download

5 http://www.linuxmint.com/download.php

distribution comes with a Package Manager. A more user-friendly Software Center is available in most distributions for installing complete applications.) Debian is also less user-friendly than Ubuntu. With all these choices, some people are already at a loss as to what to do. But the easy choice is simply Cinnamon.

To 'spice' things up a bit, there is also a "Spearmint Desktop" for Linux Mint. That desktop is based on Gnome (Gnu Object Model Environment). It can be downloaded and installed on top of whatever Linux release you have. There are several different desktop environments to choose from[6].

I had Mint 12 (Lisa) installed with the Gnome desktop in the 64-bit version. What irked me about that release of Linux Mint is that for as long as I had it, it never gave me any notice that a newer release of Mint was available, and when I checked for updates it didn't say there was a newer release. Ubuntu on the other hand will automatically notify you that a new release is available (and you have the choice to take it or not).

I now have Mint 16 (Cinnamon) installed. It was basically the same process as installing any Linux distribution (download the ISO, create a bootable DVD, then boot from the DVD, and choose an install method). The desktop is the same as Mint 12, so no surprises there. I won't know how the updates will be handled until the next one comes along.

For me, it's just as easy to use Mint as it is to use Ubuntu, but that may be because I'm proficient with both Windows and Mac, including all versions. So it's not fair for me to give any recommendations about either except to say I still prefer Ubuntu. The one difference between a fresh install of Mint vs a fresh install of Ubuntu (for me) is that Mint has Gimp installed (a photo editor based on Photoshop CS) and Ubuntu doesn't, so it's necessary to install Gimp in Ubuntu if you want a high-powered image editor. But that's a no-brainer using the Software Center.

An Honest Appraisal

There is a review[7] of the differences between Ubuntu and Mint on the Web which is worth reading. In the summary, the author was surprised because, as a veteran Linux user, he expected his test subjects to prefer one version and they chose the other.

Linux Drivers

Probably the one area that anyone can take issue with regarding Linux is drivers. One Linux user had a Brother Wi-Fi printer which worked without problems on both his Mac and Windows computers. For the Mac, that's understandable because the Mac will either have the driver for all known printers preloaded in the operating system or it will do search for the right driver (if the computer is connected to the Internet) and load it in without any intervention from the user. The user may then download any utilities that the manufacturer offers. For Windows, it's almost the same thing, but finding a driver that is not preloaded requires some user intervention. For Linux, the number of preloaded drivers is quite skimpy, and this is one of the reasons that the size (footprint) of the operating system is so much smaller. In the case of the Brother printer, the user had to find the driver from the Brother website and download it. Then

6 http://www.techrepublic.com/blog/five-apps/five-topnotch-replacements-for-gnome-3-or-ubuntu-unity/1071/

7 http://lifehacker.com/5993297/ubuntu-vs-mint-which-linux-distro-is-better-for-beginners

it was a matter of copying a set of Terminal commands from the Brother website and pasting them into a Terminal to complete the installation process.

Installing Linux

What is common among all distributions of Linux is that you can install it in a dual boot arrangement with your current operating system. Most distributions also provide what is called a Live Boot, and this just means you can run the OS live right off the CD/DVD (but you can't make any changes permanent because you can't write to the CD/DVD). You can optionally get a Live Boot version on a thumb drive, but one user noticed that he couldn't save changes to the thumb drive, which seems contrary to the fact that you can write to a thumb drive.

When you install Linux in dual boot mode, at the time you start up the computer the default OS (if you don't do anything) is going to be Linux. To get to the other OS, before the default OS starts up, you have to be prepared to hit the down arrow key on the keyboard when the selection to choose which OS is displayed (typically, you have two to four seconds, which is configurable in the BIOS for a PC). In a dual boot mode, the Linux side can access the other OS files, but not the other way around.

You also have the option to install Linux over the current OS with the option to retain the current users and all their personal files. This can only be done if there is enough room on the hard drive to temporarily store all the user files along with wiping out the original OS and installing the new one. In any event, installing Linux on any computer as the only OS will also format the partition that it is on, which is going to be different from the format of the existing OS (unless it is also Linux).

The Bottom Line

As far as I'm concerned, the Mac, Windows, and Linux are all rotating around each other so that whatever neat feature shows up in one will eventually show up in the others. Some of the new features in Windows 8 have been in the Mac for some time, and vice-versa. And there's always the pressure to make mobile devices, laptops, and desktops to look and feel all the same to give the users a sense of continuity and 'oneness'. Customers can say, "Gee, this works really nice in XX, why don't they do that in YY?" And then when things change in YY, they then say, "I got used to it, and then they changed it on me." One thing is certain when it comes to computers: change. The one thing that irritates most people is change. "Honey, what did you do with my shaving cream?" Yeah! Why did it have to move from where I always put it?

There are many reasons why people wouldn't want to switch from their current OS. The biggest reason is fear. The excuses given are, but are not limited to, familiarity (their comfort zone), the "cost" of learning, lack of understanding, and lack of people to turn to for help (which probably means they haven't yet learned how to get help on the Internet).

In my opinion, I see no real reason why most people would not want to switch to Linux. Most Windows applications will run in Linux using the Wine application which comes free with Linux. You can also install VirtualBox (free), or Parallels or VMWare (not free), on any computer regardless of what the OS is and then install a full copy of a different (guest) OS under VirtualBox, Parallels or VMWare. That combination lets you run both operating systems in parallel, and that means running literally any Windows application at the same time as

running a Linux application, or vice-versa. In this parallel mode, either side can access the files of the other, but only when the guest OS is running. Using Parallels, I know that it is possible to declare the guest OS user's home folder to be the same as the host OS user's home folder; e.g., johndoe in the host OS (Linux) is also johndoe in the guest OS (Windows). This means the same user in both OSs are sharing the same set of personal files. In that way, the user's files of the guest OS are available to the host OS at all times, even when the guest OS is not running. The advantage is that you do not have to reboot from one OS to the other. The downside is that the guest OS might not run as fast as it would in native mode, and there's a chance that some features of the hardware might not work in the guest OS. If you choose Parallels Desktop for Linux instead, the guest OS will run nearly at maximum speed and efficiency and all hardware features will work in the guest OS. The same might also be true of VMWare.

As for me, I have one of every kind of operating system running on my Mac under Parallels and I'm very happy with how it all works. But, if I stop tutoring, then I'll most likely dump everything except Linux Ubuntu. It may be like starting over from scratch, but I've done that in so many ways already and I'm never too old to do it again.

Additional Reading

Do a search of "linux applications" and get a very large selection of hits on who thinks what Linux apps are the best.