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# **INTERNET CONNECTION**

## **Linux for Academics, Part I**

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Linux, or GNU/Linux, as it is also known, is an open-source operating system based upon the Unix operating system. It is very popular on Web servers, but there is also a subculture of users who run it on desktops and laptops, as an alternative to more popular operating systems like Windows and Mac OS X. As it is an open-source project, users all over the world are able to contribute code to Linux. Linux is also free to download and install, compared to Windows and Mac OS X, which require some sort of purchase and/or licensing to be installed.

Desktop Linux exists very much outside of the technological mainstream, although the popular Android mobile operating system is based upon it. However, the rise of cloud-based services, like the various Google and Microsoft products, has made desktop Linux a more viable option for users interested in exploring Linux.

Users turn to Linux for many reasons. Some are interested in a more customized desktop experience, which Linux allows for, given its open code base. Some users are interested in Linux for economic reasons, in that it is cost-free and provides easy access to a wide variety of software that is also usually cost-free. And some users are interested in Linux for political reasons, wishing to support the free and open software movement and/or to avoid supporting large corporate entities like Microsoft and Apple. Sullivan framed the free and open source software issue as one of social justice: “From its roots in the rise of microcomputing in the 1970s and 1980s, the free software movement has identified a set of core ideological beliefs and discourse about the basic freedoms of computer software. This social movement, initially conceptualized by Richard Stallman and a small group of like-minded hacker enthusiasts, has grown substantially since that time and is now supported by a full-fledged operating system (GNU/Linux)” (2011, 237).

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Software has often been a barrier for people wishing to use Linux, since many people, especially academics, depend upon proprietary software, like Microsoft Word. However, cloud-based word processors, like Google Drive, have allowed many users to bypass locally installed software like Word. This workaround makes Linux viable for academics, in that they're depending upon software run from a browser and the operating system powering the browser does not really matter. It is for this reason that the Google Chromebooks have become so popular. The Chromebooks, which run on Linux, are essentially low-cost netbooks with only a Web browser and not much locally run software to speak of. Instead, successful use of the computer hinges on accessing cloud-based services via the browser. Despite these limitations, the Chromebooks are reported to be selling well, with more retailers offering them (Seitz 2013).

Users interested in experimenting with Linux first need to consider which distribution they'd like to try. Distributions represent versions of Linux. While they are all Linux, different distributions have different interfaces, different ways to install software, and different levels of ease-of-use. Ubuntu ([www.ubuntu.com](http://www.ubuntu.com)) and Linux Mint ([www.linuxmint.com](http://www.linuxmint.com)) are considered two of the more user-friendly distributions, although ease of use is a subjective concept. The website Distrowatch ([distrowatch.com](http://distrowatch.com)) maintains a list of popular distributions, with popularity based upon visits to a given distribution's Distrowatch page. It's an imperfect metric, but as good a place as any to start. Because Linux is open source, distributions are often built from other distributions. For instance, Ubuntu is derived from a distribution called Debian, so the two distributions share common commands and interface elements. Linux Mint, in turn, is derived from Ubuntu, so those two distributions also share common commands and interface elements, as do Linux Mint and Debian.

Once a user has chosen a distribution, the next step would be to use it. Here, too, the user has choices. A committed user can install the distribution on an existing computer, either overwriting the existing operating system, or creating a separate area of the hard drive (called a partition) that will allow the user to boot into multiple operating systems. Most user-friendly distributions have protocols to help new users do this kind of thing by answering questions as they install the distribution. Most user-friendly distributions also have documentation to help new users get up and running, as well as some kind of community support mechanism to address issues that inevitably come up. An easier way to try a distribution would be to run it off of a CD or DVD by burning the distribution image to a CD or DVD. The user can then boot from the optical drive and use the distribution without permanently changing the hard drive, a process called a live session. This leaves the existing operating system untouched and intact and allows a user to get a sense of what it's like to use a particular distribution on particular hardware. Not all distributions support live sessions, but most do. Changes

made to the distribution during a live session won't be carried over to a new session, but it's a quick and easy way to play with a distribution without committing to it. Most live sessions give users the option to permanently install the distribution to the hard drive of the computer running it, so if a user finds a distribution she likes, she can then install it locally and boot into it as she booted into Mac OS X or Windows.

Another option for users looking to play with Linux without making any permanent change to existing hardware is to use virtualization software, like VirtualBox (<https://www.virtualbox.org>), which allows a user to install an operating system within an existing one, like a live session, without impacting the underlying operating system. VirtualBox is available for Windows, Mac OS X, and Linux.

Once a distribution is selected, there are still choices that can be made. One of the things that separates Linux from Windows and Mac OS X is the concept of desktop managers. Desktop managers control the desktop session experience, from the presence and appearance of menus, to the look, feel, and behavior of software. It is something that has no comparable in Mac OS X and Windows, which each have a standard interface than can be customized to a limited degree. The two most popular Linux desktop environments are probably GNOME and KDE. Most distributions allow users to install multiple desktop environments, choosing their desktop when they login to their computer. Software works between environments, so KDE-specific programs can be run in GNOME.

The GNOME interface could be considered sparse, with a dock of icons on the left side of the screen and a status bar at the top with some system information, like time, date, and Internet connectivity status. Applications can be launched via the dock, or by typing the name of an application. There is also a menu available from the application launch area. GNOME also has native integration with Web services like Google and Twitter. In general, it could feel unfamiliar to Windows users, who might be used to more menu-driven navigation.

KDE is renowned for, and in some quarters derided for, its customizability. The interface is very much like Windows XP or Windows 7, with a taskbar and menu at the bottom of the screen. KDE has a workspace concept, though, which allows users to create virtual desktops around activities, so a research desktop might involve a web browser and word processor, while a relaxation one might involve a music player. The idea is that applications are grouped conveniently for specific tasks, rather than having one generic desktop for all activities. Also, most native KDE applications begin with a K, making for some interesting program names, like Konqueror, the default KDE file and web browser. As mentioned previously, a KDE application like Konqueror could also be used in GNOME or any other desktop environment.

In addition to GNOME and KDE, there are other desktop environments like Xfce and LXDE, which are usually less system-intensive than GNOME

and KDE. As a result, they are often used on less powerful and/or older machines. They also have more familiar interfaces that fall within the Windows XP paradigm of design. There are also a number of other desktop environments and window managers to be explored within Linux.

Most desktop environments are available on most distributions. Ubuntu's default desktop environment is Unity, which was created by Ubuntu developers for Ubuntu. It works over GNOME and should feel somewhat familiar to GNOME users. Ubuntu also has non-Unity variants, like Kubuntu, which has the KDE desktop installed by default, and Xubuntu, which comes with Xfce as the default. Distributions like Linux Mint, Fedora, and OpenSUSE all allow users to select their desktop environments. Some distributions allow this at the installation level, while others have variants pre-configured with a particular desktop environment. There is nothing, other than hard disk space, preventing users from installing as many environments as they wish. It will not impact the ability to access files or applications.

Many librarians have advocated for the use of Linux in libraries and by librarians. Nielsen and Park explored its use on public workstations (2010, 11). Coyle wrote about it as a way to extend the life of older hardware (2008, 72). Dougherty and Schadt wrote about it as a potential way to show integrated library system (ILS) vendors that libraries are prepared to explore free and open source options rather than pay for proprietary tools (2010, 175). While that is an admirable aspiration, anyone looking to explore Linux in a library work environment should be aware that many ILS clients are not available for Linux, so getting things working would fall upon the shoulders of the library, not the vendor. While there are widely varied cloud-based tools for academic work, like writing and file storage, there are fewer options for ILS tools. There are some potential options for getting certain ILS clients running in desktop Linux environments, but anyone interested in using Linux for something like that probably wants to do a fair amount of testing before committing to Linux. Or, at the very least, consider keeping a Windows partition for client-based ILS work.

Despite the challenges and limitations, Linux is an interesting environment for academic users looking for more choice and control over their operating system. There are certainly political reasons for choosing Linux, but there are also technical ones, including getting new life out of older hardware. Part 2 of this series will outline specific Linux software academic users might find useful, as well as the software installation process within a Linux environment.

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