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Using the Linux operating system full-time

Tips and experiences from a subject liaison librarian

About a year ago, I requested and received a university libraries issued Ubuntu Linux computer.[1] Ubuntu is a popular open-source GNU/Linux operating system.[2] Since then, I have used Linux every day for all of my liaison librarianship duties, professional service, and scholarship.

Before switching to Linux, I mainly used Microsoft Windows. I occasionally tried Linux, but never thought I could use Linux as my main operating system, especially for all of my academic work. I always thought that there were too many software packages I needed that were not available on Linux or that being on a different operating system than most students and faculty would cause compatibility issues. Well, I was wrong. And, in fact, I quickly discovered it was not only possible for me to use Linux for my liaison duties, but that I preferred using Linux.

Why even use Linux?

Several previous reports have provided an overview of Linux and argued for its use by librarians, libraries, and academics more generally. Some of the reasons reported for using Linux are that it is available at no cost, can be customized, runs well on older hardware, and offers an opportunity to support free and open-source communities, which may be more in-line with personal or institutional motivations and philosophies.[3]

My own reasons for switching to Linux were:

1. I wanted to support, promote, and contribute to more open-source projects. If I wanted to promote open source, open science, and open scholarship to the campus community, I felt that a move to the Linux environment may help my efforts.

2. I wanted to learn something new, in particular, how to use the command line for system management and data analysis.

3. I had recently started using the Python programming language and exploring new open source software libraries. During some testing, I found that I preferred to install, manage, and use these software tools in a Linux environment.

Making the switch to Linux

Switching to Linux as your main operating system is a big decision, and it requires considerable thought. Below I have outlined the steps I took over the course of several months preceding my switch to Linux, which should be helpful for those considering a similar move.

1. *List the software you use and support.* The first step is to list all the software you regularly use and determine if the software is available on Linux or if there is a suitable alternative. To complete this exercise, I created two categories: a list of required and frequently used software and a list of software that I like, but would be fine with an alternative.

Several observations from this exercise were immediately apparent. The first observation was that for the majority of my time, I was working in a standard web browser or basic text editor. The bulk of my work includes using various library databases, editing research guides, and creating tutorial material using online platforms like Google Slides and GitHub. As Steven Ovadia notes, using cloud-based tools within a web browser "makes

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Linux viable for academics."[4] Web-based work is well supported in Linux as both Chrome and Firefox are available.

For locally installed office productivity software, LibreOffice is a popular open-source desktop office suite on the Linux platform that can read/write Microsoft Office formats. However, having access to the Microsoft Office suite was still important to me for collaborating with colleagues, but again, I could work in the web-based versions of Word, Excel, PowerPoint, and Outlook, available through Microsoft Office 365. A basic version of Office 365 is currently free for eligible academic faculty and staff.

Moving on from web-based tools and office productivity requirements, my second observation was that if I excluded open-source tools like Jupyter Lab and Python libraries, which I used and knew were available on Linux already, there were only a handful of software applications outside of a web browser that I actually needed. For example, MATLAB and other commercial/academic scientific software I needed were available for Linux, while other software I used for image editing and reference management was not available on Linux, but I was easily able to find many suitable alternatives.

In summary, take inventory of the software you use for librarianship duties. You will probably find that much of your work is web-browser based. In addition, many software applications you use may be available for Linux, and if the software is not available, there are likely suitable alternatives.

2. *List the devices you use and support.* With Ubuntu Linux and other popular Linux distributions, you can generally expect devices like USB drives, wireless mice, external monitors, and wired headphones to work without any user setup. However, if there are unique devices that you are required to support or use like specialty document scanners, see if they are supported on Linux.

3. *Consider remote work.* Even as we move into the vaccination and reopening phases of the COVID-19 pandemic, it is critical to consider what kind of virtual meeting software you will need, as well as any network connections you need to establish from Linux while working virtually. Many popular virtual conference meeting software platforms such as Zoom and Microsoft Teams currently have dedicated Linux desktop applications, while others such as Google Meet and GoToMeeting support Linux through web browser-based connectivity.

Next is to consider what kind of network connections you may need to make to university resources off-site. For example, if your university uses a VPN to authenticate for library and other resources when off-campus, be sure there is a Linux-supported client. In my case, The University of Alabama (UA) supports VPN connections from Linux using the OpenConnect VPN client.

4. *Create a data backup plan and workflow.* Consider the approved options for where your university-related files need to be stored and how you will connect to them from Linux. There are a variety of methods to connect to shared network drives in Linux either directly from the file manager window or with a command line utility. This is one of those items that is best to ask your information technology staff. They will have an understanding of the network drive protocols and if you should expect any challenges connecting from a Linux computer.

Cloud storage options like Google Drive, DropBox, Microsoft OneDrive, and Box, are readily accessible from any standard web browser. However, if you rely on syncing files and accessing files from cloud storage directly from your file manager, options in Linux will vary depending upon the cloud storage service. For Google Drive, Ubuntu Linux has a built-in online accounts option which allows you to connect and access Google Drive files directly from the file manager window. Dropbox has its own Linux desktop application, while Microsoft OneDrive and Box do not.

At UA, Box is our approved cloud storage provider. I do not often work on more than one local file a day, therefore the easiest workflow for me was to simply upload any local files to Box via a web browser at the end of each workday.

5. *Create an operating system and software maintenance plan.* Unless your information technology staff already manage Linux desktop computers, you are probably going to be responsible for your own Linux system maintenance, software

installations, and technical support. For the operating system, create a plan for checking and applying updates (particularly security updates) frequently. You should expect that some Linux software can only be installed through a terminal window using command line package manager tools. However, most user-friendly distributions like Ubuntu have graphical interfaces for system updates and common software package installations.

Check the documentation of your chosen Linux distribution for more details and to determine your level of comfort with maintaining and installing software in Linux.

As far as technical support, there are commercial Linux support services available. Otherwise, there are many community-driven support wikis and forums for most Linux distributions where you can post and find answers about Linux openly from the community. The latter option was acceptable to me as I have always enjoyed maintaining and troubleshooting software issues on my own computers.

Finally, consider how you will recover your operating system and software installations in the event of damage, theft, or hardware failure. There are drive cloning tools available in Linux where you can create a copy of the drive and restore your Linux operating systems and software from a known point in time. The alternative would be to reinstall Linux and any local software, which was my preferred plan.

6. *Try Linux and test your workflows.* The next step is to try Linux. Popular and beginner-friendly distributions are often discussed or recommended.[5] One of my own considerations when picking a Linux distribution was to choose a distribution that was also available pre-installed on computers from manufacturers. This way, if I liked the Linux distribution, I had the option of buying a computer in the future with the distribution I was already familiar with using. As an example, currently Dell sells computers with Ubuntu or Red Hat Enterprise Linux pre-installed, System76 sells computers with Ubuntu and Pop! OS, and Lenovo sells computers with Ubuntu or Fedora.

Ovadia discusses a variety of ways to try Linux without affecting your current operating system. During my own testing, I installed Ubuntu on my university Windows 10 computer in a virtual machine created with VirtualBox. This method allowed me to test Ubuntu, install software, and try my workflows over the course of months, without changing anything permanently.

7. *Write a proposal.* If you decide that switching to Linux is the right decision for you, I recommend writing a one-to-two page proposal, including your own justifications for using Linux, your findings from Steps 1-6, and how a move to Linux can advance your library services. If your university purchases computers from a particular manufacturer, see if they have Linux computers available as these workstations are generally configured and tested to work with Linux. Alternatively, you could also propose installing Linux on your current PC as the main operating system. In my own case, providing a written proposal to my administrators was an ideal way to start the conversation and show that I had thoroughly considered my request for a Linux computer.

Experiences and conclusions

With careful planning and testing, I found that the transition to Linux full-time was a smooth experience. Around month two of using Linux every day, I decided to force a partial update (despite Ubuntu warning me not to) and ended up breaking many dependencies. Ultimately, I decided to reinstall the operating system and start over. Thankfully, I had kept a log of how to install the local software I needed using terminal commands, so it only took me a couple hours to get back up and running on a new setup. Even with that minor setback, I have enjoyed every minute of using Linux, and each day feels like I am learning something new.

There have been a handful of times that I needed access to a Windows or Mac computer over the past year to help a student with a piece of software or run a specific program not available on Linux, but overall, I have found that my library liaison workflows in Linux are highly compatible with colleagues and patrons.

What I have enjoyed most about using Linux is learning how to use the terminal window (e.g., Bash Shell) and various GNU command-line utilities for my daily work. I am no longer dependent on spreadsheet applications for data manipulation

and basic data analysis tasks.[6] I have also taught workshops with the terminal, showing users how to do reproducible basic data analysis with the GNU utilities, as well as search PubMed from a Linux terminal,[7] which is a lot of fun.

Switching to Linux has increased my skill set exponentially and has been one of the best decisions I have made for my career. In the years to come, I look forward to learning more about Linux and contributing to the Linux community.

Acknowledgments

Notes

1. Canonical Ubuntu, https://ubuntu.com/.

2. Richard Stallman, "Linux and the GNU System," https://www.gnu.org/gnu/linux-and-gnu.en.html.

3. William C. Dougherty, Audrey Schadt, "Linux Is for Everyone; Librarians Included!" *The Journal of Academic Librarianship* 36, no. 2 (2010): 173–175, https://doi.org/10.1016/j.acalib.2010.01.009. Karen Coyle, "Learning to Love Linux," *The Journal of Academic Librarianship* 34, no. 1 (2008): 72–73, https://doi.org/10.1016/j.acalib.2007.11.002. Steven Ovadia, "Linux for Academics, Part I," *Behavioral & Social Sciences Librarian* 32, no. 4(2013): 252–256, https://doi.org/10.1080/01639269.2013.837800. Steven Ovadia, "Linux for Academics, Part II: The Advantages of Free and Open-Source Software," *Behavioral & Social Sciences Librarian* 33, no.1(2014): 47–51, https://doi.org/10.1080/01639269.2014.866024.

4. Ovadia, "Linux for Academics, Part I."

5. "Linux Distribution," Wikipedia, https://en.wikipedia.org/wiki/Linux_distribution.

6. See, for example, the Software Carpentry lessons on Unix Shell, https://software-carpentry.org/lessons/.

7. Jonathan Kans, *Entrez Direct: E-Utilities on the Unix Command Line*; National Center for Biotechnology Information (US): Bethesda (MD) 2020. ℘