Setting up a fresh Linux Install on a Laptop

Anirudh Krishnan

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1 Pre Installation

Pick a distribution. Linux Mint used here due to Ubuntu forcing snap packages. Dual booting alongside Windows requires Windows to be installed first to avoid issues with the GRUB and losing the ability to boot.

The simpler option is to solo-install Linux, which is what this document covers.

1.1 Downloading the Linux Image

Princeton Mathematics is the best mirror in the official list. Download either the long-term support version (released once every 4 years) or the latest stable release (released every 6 months). Look for the file resembling `linuxmint-YY.MM-desktop-amd64.iso`

The ISO file, a USB stick and an existing Windows or Linux machine are required to start creating the Bootble media.

1.2 Bootable Media

Among the many alternatives, (Unetbootin, LinuxLive Usb Creator etc.), Etcher by Balena is a cross platform neatly packaged app that makes bootable USBs. Download the app (AppImage format for Linux so it works across distros) and follow instructions to create a bootable USB. USB stick of size at least 4 GB required.

`https://www.balena.io/etcher/`

2 Installation

2.1 Installation Procedure

All of the standard Ubuntu install options will work, except the **Installation Type** screen. The *Install alongside Windows* option is often unavailable, so the *Erase everything and install Ubuntu* option is the straightforward choice here. After the Install procedure finishes, a reboot is required. A successful reboot leading to the Login splash screen and then the desktop is an indicator of a successful Ubuntu Install.

2.2 Installation problems

- Corrupted Installation media. Check the SHA256 key and verify the integrity of the ISO file after downloading. Then retry creation of bootable USB. Else, switch to a different release or a different distribution.
- Windows installed on top of existing Linux. This is the incorrect order of OS installation for dual booting. Refer to GRUB Recovery help to regain the normal OS selection screen upon booting.

2.3 Picking Username and Password

The Ubuntu Username and the institute email Username can (and should) be different. Also keep the Ubuntu password distinct from the Institute Email password.

3 Software

3.1 Preparation - Software Management

Synaptic Package Manager comes pre-installed for finer control of package installation. The Software Center comes bundled with the default Linux Mint ISO. On newer distributions, this includes flatpak support in addition to the standard Ubuntu repositories.

3.2 Music

Audio editing is not a part of my requirements, and is not mentioned here. Music apps installed using Software Center:

- Rhythmbox pre-packaged
- Spotify through Software Center (Snap app).

3.3 Terminal Customization

Default GNOME Terminal prepackaged.

- Terminal comes with some themes and text color schemes bundled. Further customization available through Synaptic.
- Drop down Quake-style terminals like Yakuake, Guake.
- Terminal transparency slider built into Preferences menu.

3.4 Text Editor and IDE

The following are available through the Software Center.

- Install VSCode for Linux using the downloadable `.deb` file and login using GitHub integration
- Xed is the Linux default text editor
- Sublime Text is a text editor. One time per-user license fee. No limit on number of installs. Indefinite evaluation period. Extensible with Python and C/C++ plugins. A Python interpreter within Sublime Text is also available through `SublimeREPL`.
- Jetbrains Pycharm is a Python IDE.
- Jetbrains CLion is a C/C++ IDE with free (annually renewed) subscription to the Professional edition for students (institutional email required).

3.5 Anaconda

Mathematica is heresy. So is MATLAB.

Install `miniconda` instead of the full `anaconda` distribution. This helps avoid dependency issues when installing `mamba`, the better alternative to the `conda` package manager.

Since `mamba` is a drop-in replacement for `Conda`, the commands to create environments, search for packages and install them is identical. Install anaconda packages as necessary using the `mamba` package manager.

3.6 Typesetting

Between texLive and MikTex distributions for the Latex base files, only texLive is available on the Synaptic package list. On Windows however, MikTex is the better option because of the attached MikTex package manager which helps download and update individual components of the latex base files.

- Install `texlive-full` from Synaptic or fall back to `texlive-base` when constrained by low disk space or bad internet.
- TeXstudio is a latex focused IDE that requires no extra configuration after install and has very good autocomplete tooltips.
- Evince is the built-in PDF viewer to which TeXstudio can be asked to output after compiling a `.tex` file.
- Okular is a full-featured PDF viewer (highlighting and annotations) that requires a KDE environment (extra headache unless on Kubuntu).

3.7 Bibliography Management

Zotero and Mendeley are the only convenient options in terms of browser plugins to import new items easily. Both are unavailable in the Software Center and need to be downloaded from their websites. University Library provides support for these two solutions as well as Endnote and

- Mendeley is proprietary, has a 2GB online storage limit, has a linux standalone client and a built-in PDF viewer.
- Zotero is open source, has a 300MB storage limit, also has a standalone client and is better at incorporating non-PDF sources.
- ZOtero additionally has a built-in PDF reader, notetaker and annotator which works cross-platform.
- With an institutional email account linked, Zotero provides unlimited storage.

3.8 Version Control

GitHub for the online storage of local git repositories is the easiest to set up.

- Github desktop is available as a downloadable package for Linux. This provides a GUI interface for `git` commands.
- Install `git` and the `git-hub` packages for command line access to github.com. There is no stand-alone linux client as of right now (There is a very nice Windows client though).

3.9 Media Player

VLC is the one stop solution to all audio and video media with the correct codecs downloaded.

- the package `ubuntu-restricted-extras` for most of the common codecs.
- VLC from the Software Center

3.10 Web Browser

- Firefox comes pre-packaged. Substitutes for Google Chrome very well.
- Google Chrome Linux installer is only available from their website. Software Center only lists the underlying open source Chromium browser.
- Command line web browser package `lynx`. Useful when GUI access is unavailable.

3.11 Wallpaper rotation

Install `variety` and choose a wallpaper source from a downloaded image folder or an online source.

3.12 Office Suite

The Microsoft Office 365 browser-based software does work. A free MS Office 365 account is available to students with an institutional ID. No standalone Linux client for MS Office currently available.

The prepackaged LibreOffice suite is a good enough substitute. For collaborative work or online sharing, Google Docs or Office 365 Shared Docs can work, especially if the other collaborators are running Windows.

3.13 Remote Access

- Remmina is the remote desktop client prepackaged with Ubuntu.
- install the `ssh` meta-package to connect to remote servers using the SSH protocol.
- Xterm and UXterm are prepackaged with Ubuntu.

- install the `samba`, `smbclient` and `cifs-utils` packages from Synaptic to access the University Fileserver (H: Drive). Instructions at Princeton Knowledge Base KB0010622.

- Departmental file-server mounting instructions available from the department. (require same packages as H: drive above)

3.14 Peripherals

- Wireless Mouse and Keyboard supported out of the box.

- Printer access does not require any new software. Only the printer URL is needed.

- Laptop Webcam works out of the box (`Cheese` software prepackaged with Ubuntu ISO)

- External Monitors are supported via HDMI cables. Maximum resolution is limited when using HDMI. This issue may depend on Laptop HDMI Port Specification and External Monitor Model.

- Laptop Fingerprint Reader does not work. Manufacturer has no Linux drivers in development.

- Wi-Fi works out of the box. No additional software needed.

- Ethernet may require host-registration by the department to work. No software to be downloaded.

3.15 Firmware and BIOS updates

- Install `fwupd` for laptops supported by the BIOS package management system.

- For supported laptop models, `fwupdmgr` enables the downloading and updating of BIOS from within the OS

- Updating the BIOS requires an A/C power cionnection when restarting to flash BIOS.

4 Common Issues with Linux

Issues are specific to a Dell XPS 15 9570 (newest model as of January 2019). Dell XPS 15 and Dell XPS 13 are the most popular Windows Laptop models purchased within the University so these issues should be fairly common.

Issues are observed and solutions tested on Ubuntu Linux (19.04), but are expected to pop up on other Linux distributions as well.

4.1 Login Loop

Entering the correct password on the login splash screen causes a blank screen and a loop back to the same login screen.

Solved by switching to Wayland window manager instead of X11 on the login screen. Many proposed solutions online and mane possible underlying causes of the issue.

4.2 Battery Life

It is unknown how the battery life on Ubuntu compares to Windows on the same Laptop model. This depends on Linux Kernel version.

4.3 External Monitors

HDMI Cable is not able to support high resolution external monitors. May require a DisplayPort cable. HDMI is sufficient on Windows however. This was determined to not be a driver or software issue on Linux. The HDMI display cable is the limiting hardware.

Switching to a USB-C Gen 2 (aka Thunderbolt 3) to DisplayPort cable for the monitor supports 1440p@60Hz as tested. This cable can support up to 4K@60Hz according to the product description. Avoiding HDMI cables to begin with and using a USB-C Dock or a DisplayPort display cable is recommended.