



## **Streamlined Linux OS Deployment Featuring Pre-Configured Software and Integrated Chat-bot Functionality**

**A Capstone Project & Research 1**

**Presented to the Faculty of the Engineering, Architecture and Technology**

**RIZAL TECHNOLOGICAL UNIVERSITY**

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In Partial Fulfillment of the Requirements for the  
Degree of Bachelor of Science in Information  
Technology

**Department of Information Technology**

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## Introduction

### Related Articles

Linux is a free open-source operating system originally developed by Linus Torvalds in 1991 (What is Linux, 2007). Linux operating systems can run on a myriad of devices such as desktops, laptops, PDAs, servers, and cell phones (Linux-Friendly Hardware, 2008).

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Even though Linux holds a small part of the market for operating systems, there are about 29 million Linux users in the world (The Linux Counter, 2010).

Linux operating systems are open source. This means users have access to the source code, which allows them to modify the operating system to fit their needs. Flexibility in an operating system is a preferred quality for some consumers. Users enjoy the ability to control Linux (Varian et al., 2003).

Quality is another important asset to operating systems. Some of the things that computer users look for in an operating system include a consistent interface, system updates, simple applications, and tech support. Linux provides these qualities as well as



enterprise-grade software bundles with free anti-virus and anti-spyware tools (Powers, 2008).

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According to Huimin Zhao (2021), there are many kinds of Linux distribution versions. After installation, it still needs more complex configuration on system as well as software installation and update, which brings a lot of inconvenience to administrators and users. According to the actual needs, it is necessary to customize the Linux operating system through reconstruction and optimization, so as to make it easy to operate and meets the teaching needs, and integrate the relevant teaching software. Therefore, a good Linux distribution should satisfy the following requirements.

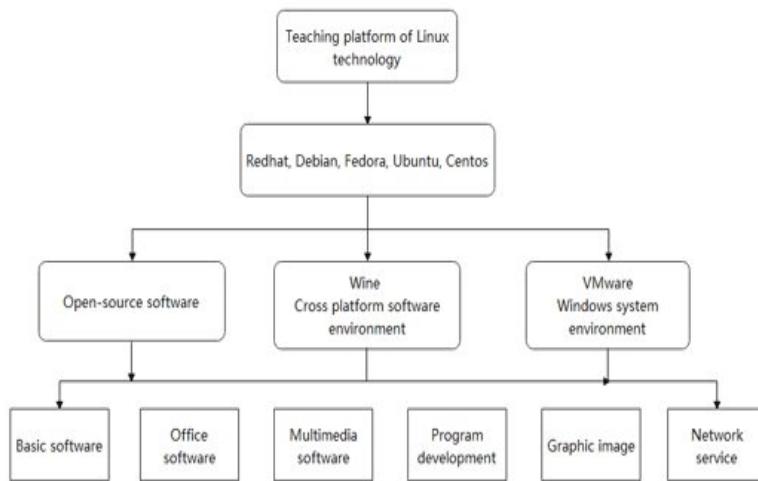
- (i) Automatic installation and recovery of the system. The one-click automatic installation, setting and recovery process is realized through a single CD



media, and the user does not need any intervention. This can reduce the difficulty of installation and deployment.

- (ii) Optimized audio and video decoding and multimedia support. It can support correct decoding and HD playback of various mainstream audio and video formats, improve audio and video input, and deal audio and video format conversion, editing and processing.
- (iii) Optimized hardware device support capabilities. It has functions to carry out driver collection, testing, customization, optimization and integration for the current mainstream computer basic hardware and common peripherals. It can provide a list of hardware compatibility when giving priority to domestic hardware.

The local software environment of Linux needs to be firstly designed, so as to the integration can meet the requirements of various software for daily desktop application, and build a teaching application software environment. Secondly, it provides the mainstream application software for teaching, such as Dreamweaver, flash, Photoshop and other methods that can run on the Linux teaching platform. At present, the computer grade examinations in China are all based on Windows system, so the design must consider the environment to support windows software and integrate Micro office, VB, VC, VF, Delphi etc. [2]. The design idea is shown in Figure1. (Huimin Zhao, 2021).



**Figure 1.** Information teaching platform based on Linux.

Information technology teaching of cross platform refers to the information technology teaching involving multiple system platforms and related software knowledge at the same time in colleges and universities. Although the application software used in windows system has counterpart one under Linux, the author does not adopt alternative methods in view of the actual environment for future vocation of students. Instead, the author sets up these software under the Linux operating system and engages students to use them in the Linux environment, so as to better cooperate with the implementation of the teaching platform. The implementation method is to install Wine software on Linux.

Wine is an open source and free distributed simulator software under Linux platform. By running it under Linux, it can realize the stable operation of application software under windows. It has no special requirements for the underlying hardware. In addition to the basic windows API, it provides support for DirectX, Printing, COM, etc. It



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can also correctly run most programs such as office software, network applications and games.

The configuration for preparing installation is as follows. There are two ways to configure Yum. One is to directly configure the yum.conf file in the /etc directory, and the other is to add the .repo file to the /etc/yum.repos.d directory. The main steps are listed as follows.

- (i) Your computer needs to be able to access the Internet.
- (ii) Switch to root with su from the command line.
- (iii) Run the command: yum install -Y wine.
- (iv) Run the installer of application software, -c.exe.

Wine supports the configuration of relevant parameters and function libraries in the GUI interface. You can configure the application through wine configuration in the system menu. (Huimin Zhao, 2021).

Winkler and Söllner (2018) suggest looking at chatbots in education following the theoretical model of TML that Gupta and Bostrom (2009) described. Overall CML can be seen as a term involving describing the entire learning process with a chatbot and how the different parts of the process affect each other. The focus of CML is to allow the student to be more in control of the learning process, which is according to the constructivistic learning theory one of the main success factors for having effective learning. CML considers



chatbots in education through three different perspectives. The structure (input), the learning process (process), and the learning outcome (outcome).

The input perspective focuses on two parts. Part one of the input perspective is the individual characteristics of the learners. Individual differences in students affect the CML experience and those students who understand the use and value of the chatbot before using the chatbot usually feel more content about the chatbot learning (Söllner et al. 2017). For example individual characteristics like computer experience, selfefficiency, self-regulated, learning styles, and learning motivation are all characteristics that affect the CML process and the outcome (Winkler & Söllner 2018). Likewise did Fryer, Nakao, and Thompson (2019) discuss that the student's primary interest and motivation was something else prior to working with the chatbot. The second part of the first perspective involves the chatbot design and quality which will not be covered in this thesis.

The learning process, which is a phenomenon that through learning methods, individual differences between learners, and other learning scenarios can describe the cognitive process and interactions various students experience with CML. Winkler and Söllner (2018) suggest looking at the learning process in CML, since it is crucial to understand the way technology impacts learning and not only how the individual differences impact it. The process should be synchronous with the student providing them a way to use the chatbot as they fit, with them controlling the learning process and the



teacher guiding them. Their findings suggest that the learning process becomes low when the student does not fully understand the value of the chatbot and thus the embeddedness of the technology needs to be addressed (Winkler & Söllner 2018). To actively control the learning process is something that is essential to effective learning, thus the potential of the chatbots is the way it can provide individual support throughout the learning process. Making it so that the student is more in control.

It is through the individual control of the process that the learning outcomes become improved (Winkler & Söllner 2018). In TML, which CML is based on, the learning outcome is described as being affected by procedural and structural factors. Structural factors refer mainly to the learning method and the procedural factors to the way that students act in the learning process and to fully understand the technology's impact on the outcome the factors need to be fully understood as well. Although research show that in TML the teacher still has one of the most important roles whether the technology is improving the students. (Caporarello et al. 2017).



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## Description of the Study

In every school there are students who are still using outdated hardware or old computers and are struggling to keep up in their subjects because of how slow the laptops/computers are. Additionally, each subject requires the student to download and install a software and language in order to be able to proceed with the lessons making the devices even slower and harder to deal with, the student will also have to spend money for data connectivity in order to download a software. This act alone already reduces time and can be more expensive if the connection fails and the download restarts on its own. It is crucial that the student are able to attend and finish the tasks at hand but, this can be blocked by hardware limitation.

## Target Proponents/User

The researchers in this study is to give better alternatives for students who are struggling in installing and downloading software and languages every time a subject demands it and for them to have a more stable and fast operating system in their computers.

## Objectives of the Study

This study aims to create an operating software that includes better alternatives that can be used for proprietary software that are only available in Windows e.g. Adobe Software, Microsoft Office etc... Of course we will also be using software that are faster



and lighter than what is normally used for that specific task. Although, we will be using other alternative we will make sure that most if not all of the functionality are still preserved in the alternative software. Although this Study heavily target student with old hardware the Operating System that we will be making can be used for normal users or even office users as it can handle most normal task such as Internet Surfing, Photo Editing, Writing (Docx, PPT), Gaming etc....

## Significance of the Study

This study will not only be able to help IT student but also other student of other courses as well because the operating system already have reinstalled software that can help in daily task. Multimedia, Writing, Vitalization, and Programming all this can done in the operating system as it will have the software needed to do the task more. Students who are struggling can now have an easier and more time to do task, for them to already have software pre-installed they will not have to waste time downloading and installing them. This not only cut wasted time but also expenses because they do not need to use more data for download. Linux is the most secure OS out there due it being built different making virus not able to work because a lot of the time viruses are exe files and Linux does not support exe installation however, if the user still manage to install a virus it will not work either way because Linux does not have system 32 which is the most targeted directory in a Windows OS.



## Formal Specification

- Minimum
  - Computer with 64bit or 32bit architecture
  - 20GB of Internal Storage
  - 2core CPU
  - 4GB Ram
- Recommended
  - Computer with 64bit or 32bit architecture
  - 60GB SSD Storage
  - 4core CPU
  - 8GB Ram



## Methodology

### Incremental Model



We will be using Incremental Model since we are only modifying an existing Linux Operating system this seems like the best method to use.

First we will run an Analysis whether the Linux distribution we will be forking into satisfy most of what we want to accomplish and since the whole thing is already designed, we can skip that part for now (will definitely be perform in the future), for the coding part we mostly won't be coding if anything none at all we will be only adding some software modify if we can and then straight to testing so our methodology may seems a little different than what was discussed in the lesson.



The Modify part is also part design because some software like VSCode have built in features that enables us to change the look and feel of it and the white box are the labels of each incremental they are purely labels and not in any way affects the model.

So, the whole project will have 7 phases labeled in the white box that is the sequence on how to will be proceeding with this project.

- First phase will be the MX Linux Installation where we will determine what there is to be removed or to keep.
- Second phase we will be installing Software's and Programming languages that the students are going to use.
- Third phase is the implementation of Chat Bot and other terminal application and since TGPT chat bot is a terminal application it will not consume much processing.
- Forth phase is the implementation of Auto Installer it will be written in shell script for it is also a terminal application. In this part you might notice that it is different than the rest and that the code was first then the design this is because there is almost no front-end design in using the shell script as it run in the terminal.
- Fifth phase is the implementation of WINE for cross platform compatibility and versatility.
- Sixth phase is going to be the website making for people to access and download the OS more easily.
- Seventh phase, now on this phase we would consider this an optional decision because out of the box the OS is already beautifully made and not much to

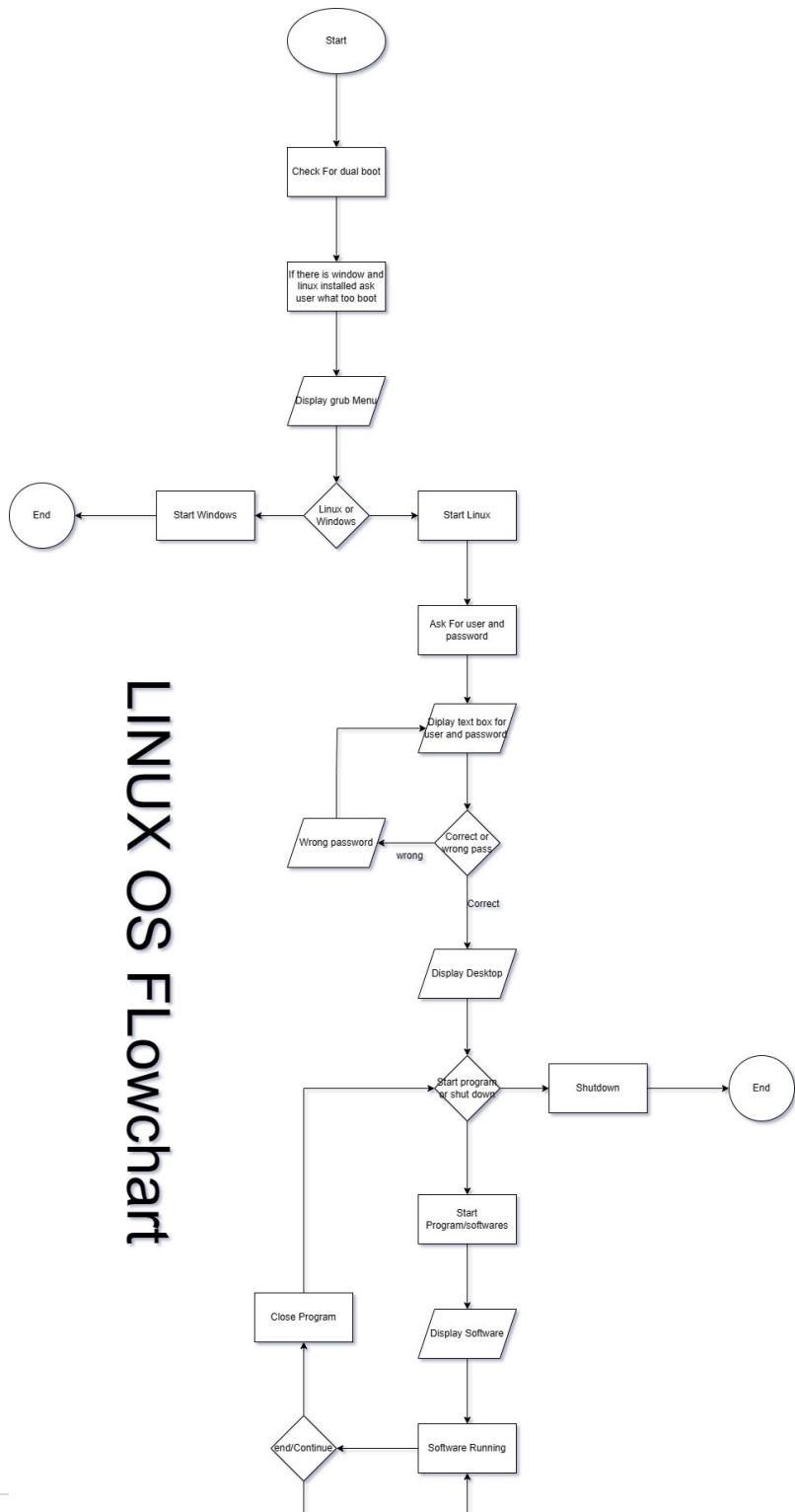


customize and it is not recommended as it might have an impact on the overall performance of the Operating System.

## System Flowchart

Linux OS flowchart is very straight forward, you start up the computer then if GRUB find a windows and Linux install in the drives you will be given choices weather to boot up windows or Linux, if you choose windows boot manager the computer will boot up window but if you choose MX Linux then the computer will Linux Instead, from then you will be asked for password if you have one and if not just click enter and you will be presented with the Desktop Environment of XFCE. From this point on the

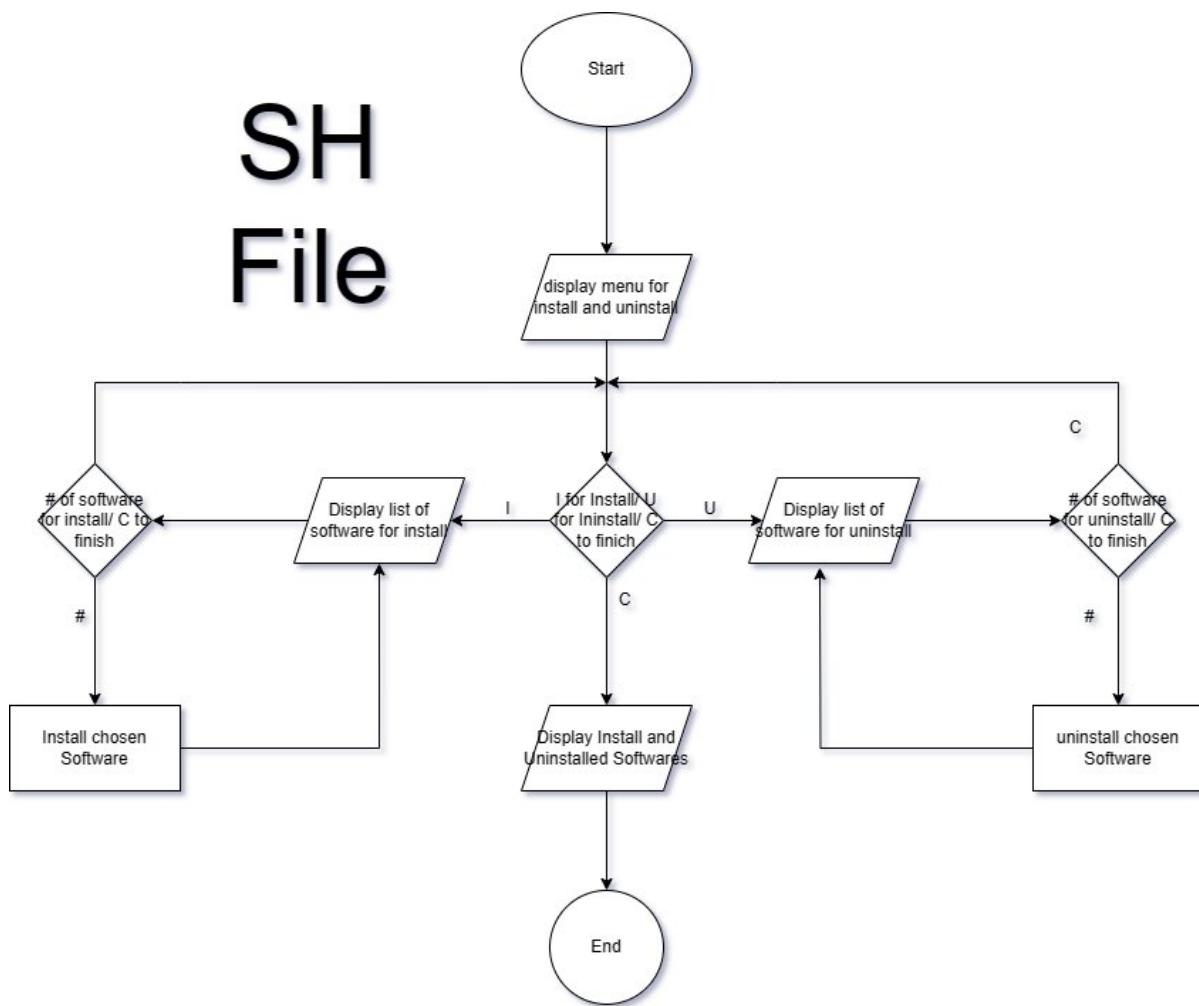
## LINUX OS Flowchart





user can open whatever application or software they want after which they can either open another app or close/shutdown the system by clicking on the shutdown button.

### Program Flowchart



This is the SH file for Installing and Uninstalling Applications or Softwares. It starts by displaying a question whether the user wants to Install or uninstall a software if the User click 'I' for install, 'U' for uninstall and 'C' for cancel or close then the program will proceed to display the list of application/softwares that are available for install or



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uninstall. Now the user will then be asked for another installation/uninstallation by inputting a code that corresponds to the name of the application/software this process will loop until the user inputs 'C'. The program will then go back to the first display where the user will be asked for 'I', 'U' or 'C' now if the user entered 'C' for close the program will display what app/software is Installed and Uninstalled based on the last action taken by the user.

### **Wireframe**



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## Prototype



We change the location of the panels, the first design only had one panel but we added two, located at the top and bottom, we also change the clock on top-right corner to only show time, system monitor and battery percentage. The wallpaper was also change to a more organic look.

The bottom panel consist mainly of thing people often use which are Web Browser, File Manger, Terminal, Text Editor and Multimedia player. This however can be changed by the users preferences.

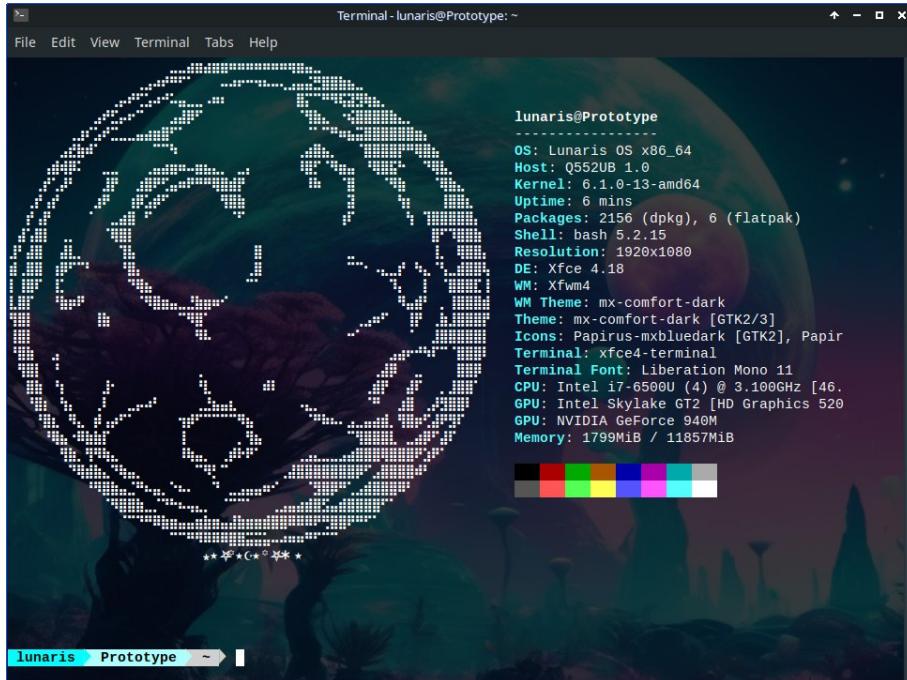
This is how it previously looked like



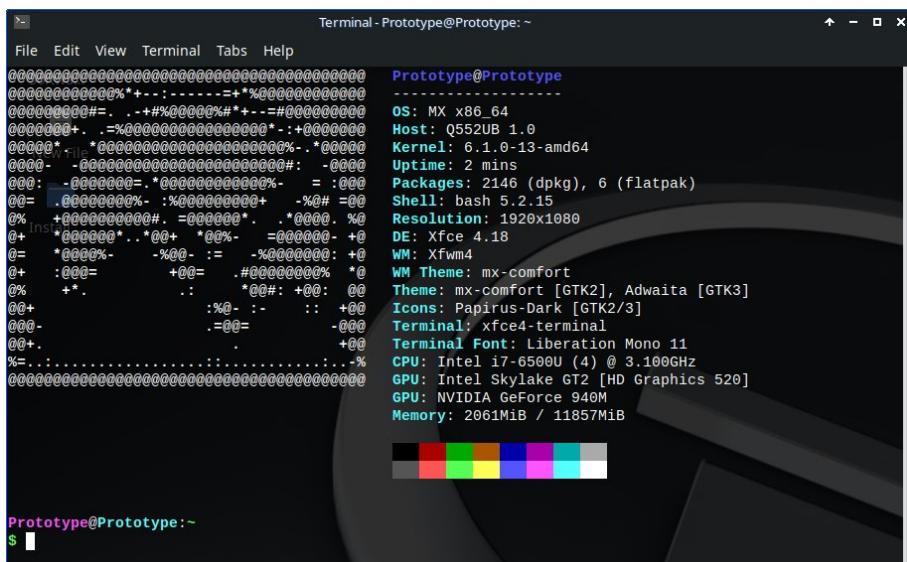
The Terminal also had changes, previously it only show the logo of MX Linux not it shows a moon that represent our System Lunaris which came from Luna in latin meaning moon

The prompt also now have some Design Changes previously it only show text and not color coded like the new one shows.

Actually the original did not show anything at all other than the prompt which is pretty normal for most Linux Distro however, adding neofetch to the terminal show a little uniqueness to the OS



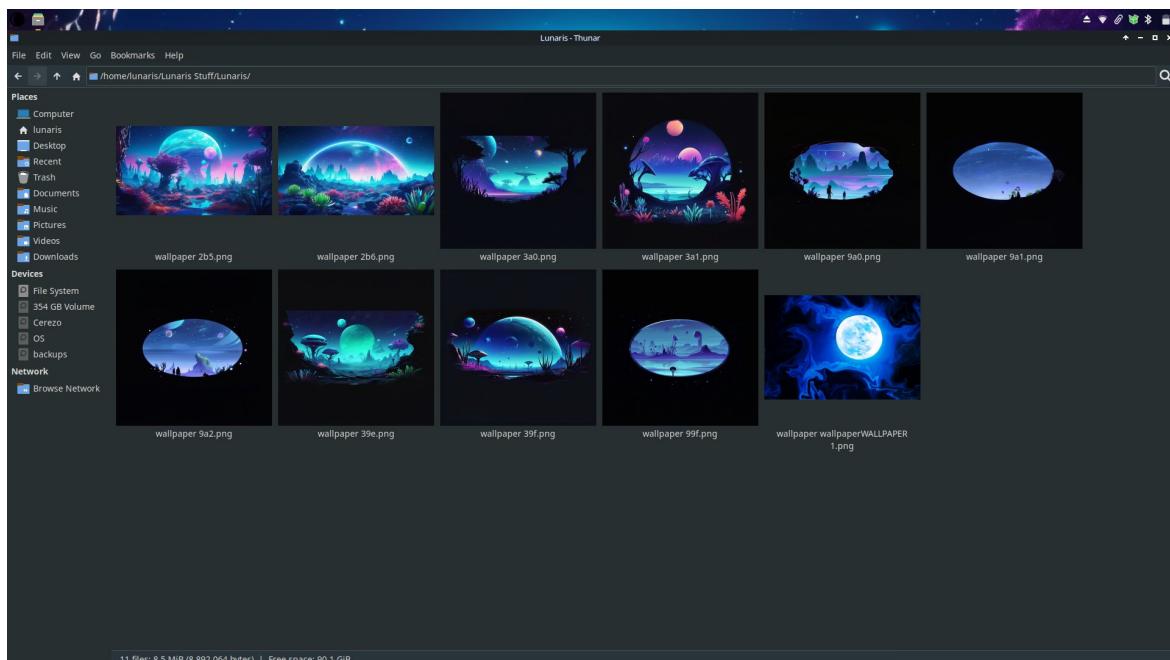
Previously like this



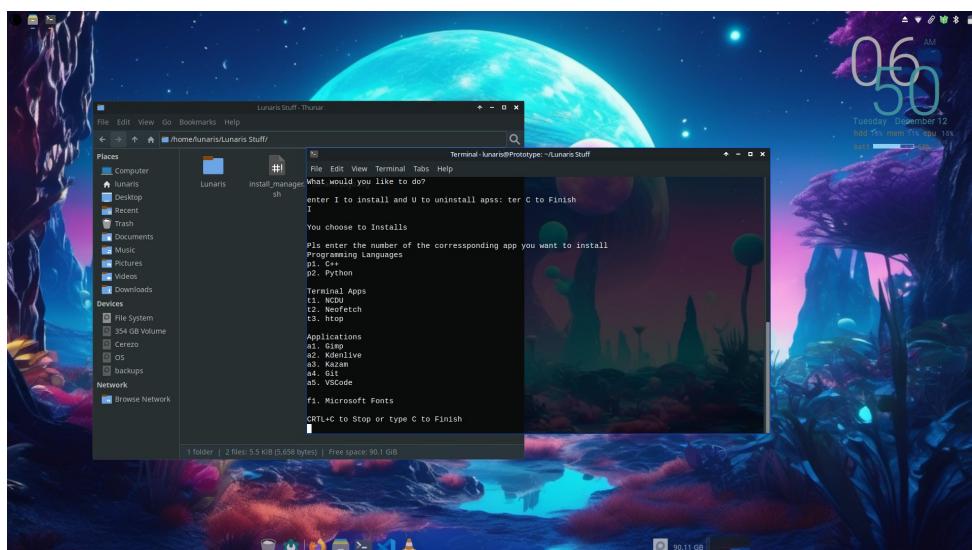
Although little is changed that little thing actually make a difference.



We also created wallpapers using AI generated Images

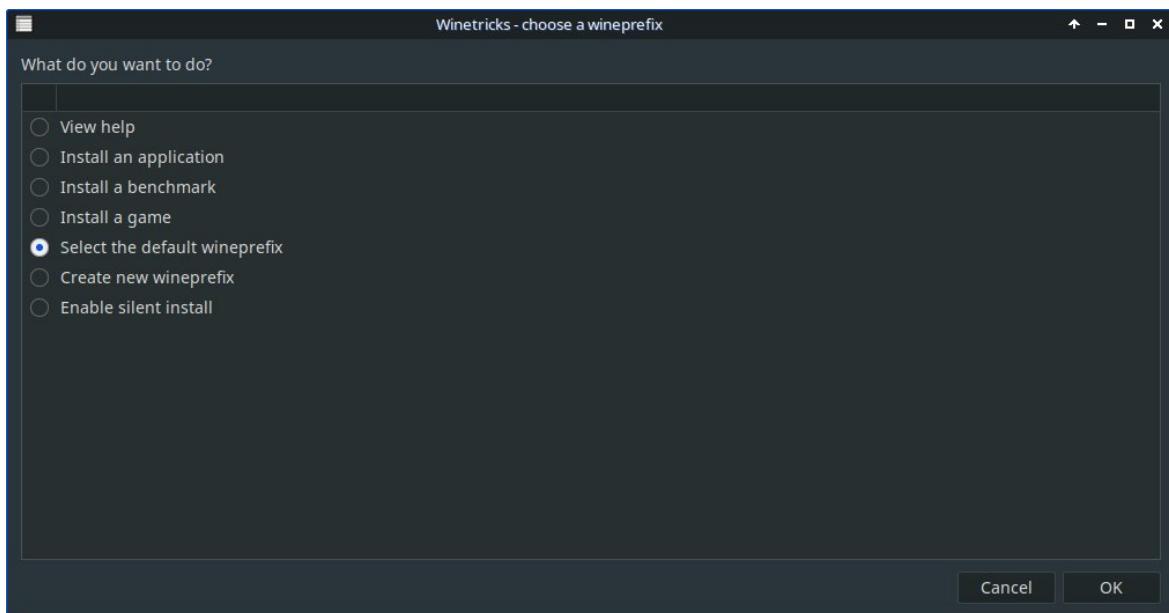


The Shell Script we found a bug that it wont let the user install python, its already fixed

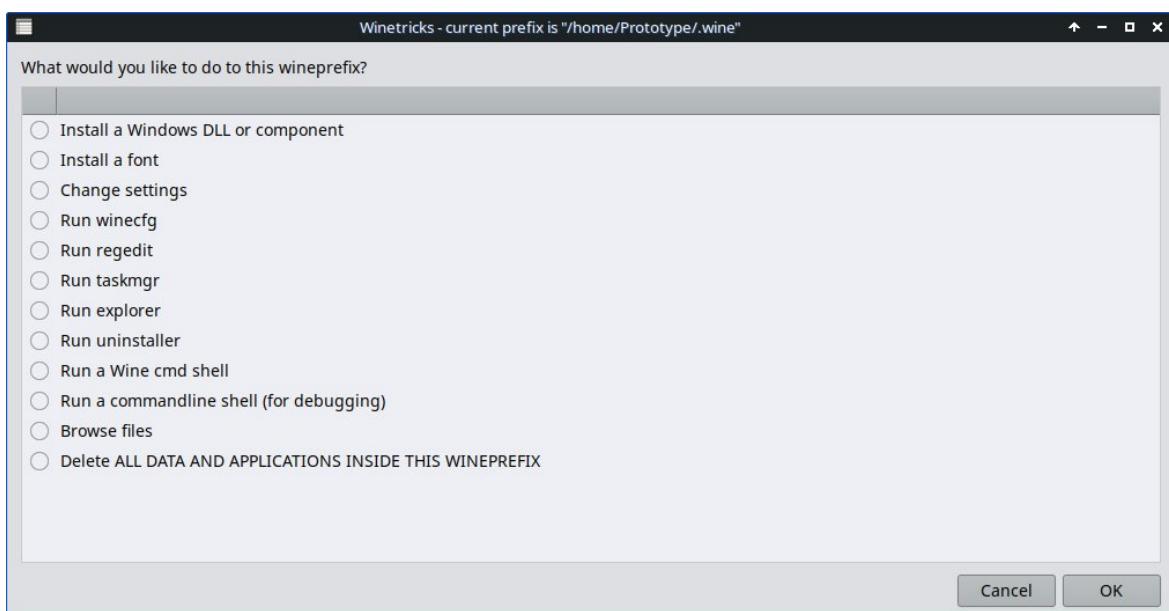




The system is now dark mode on default



Previously Light mode





Now for the Web browser

When Opening Firefox it will automatically re-direct the user to our website as its default screen.



In our Website Click the Download Button will re-direct you to a drive where you can download the Lunaris ISO / images file

My Drive > Lunaris

Name	Owner	Last modified	File size	Actions
LunarisOS.iso	me	4:16 PM	4.34 GB	⋮
LunarisOS.iso.md5	me	4:16 PM	48 bytes	⋮



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Scrolling down will show the features of the OS that it offers

**LUNARIS OS**

What features do we have?

PRE-INSTALLATION SHELL SCRIPT MANAGEMENT QUALITY OS MAKER

**Pre-Installation**

The pre-installation phase of a Linux operating system involves several essential steps to ensure a smooth installation process. Begin by verifying hardware compatibility and create a bootable installation medium, such as a USB drive. Adjust the BIOS or UEFI settings, including secure boot configurations, to facilitate the installation. Additionally, it's advisable to perform a backup of critical data to mitigate potential data loss. By diligently completing these preparatory tasks, users can optimize system compatibility and minimize the risk of issues during the Linux OS installation, fostering a seamless and successful deployment.

<https://oemv123.github.io/lunaris-OS/>

**LUNARIS OS**

What features do we have?

PRE-INSTALLATION SHELL SCRIPT MANAGEMENT QUALITY OS MAKER

**Shell Script Management**

Shell script management in Linux involves creating, executing, and organizing scripts written in languages like Bash. Scripts automate tasks, are saved with a .sh extension, and made executable with chmod +x. Proper organization includes variables, comments, and logical structure. Version control (e.g., Git) aids collaboration, while scheduling tools like cron automate script execution. Monitoring and logging enhance performance assessment and debugging. Regular updates and documentation ensure maintainability in the Linux environment.

**LUNARIS OS**

HOME ABOUT US INSTRUCTIONS CONTACT

PRE-INSTALLATION SHELL SCRIPT MANAGEMENT QUALITY OS MAKER

**Quality OS Maker**

Lunaris OS includes a tool called "MX Snapshot," which is designed to create live-ISO images of your currently installed system. This tool allows users to take a snapshot of their customized MX Linux installation, including installed applications, configurations, and settings. Here's a brief overview of the MX Snapshot tool:

1. **Purpose:** MX Snapshot is used to create a live-ISO image of your running MX Linux system. This image can then be used to reinstall MX Linux with all your customizations on the same or different hardware.
2. **Usage:** Users can access the MX Snapshot tool through the MX Tools menu, typically found in the Xfce desktop environment. The tool provides a user-friendly interface guiding you through the process of creating a snapshot.
3. **Customization:** MX Snapshot allows you to customize the live-ISO image by selecting which user accounts, home directories, and additional data to include. This way, you can tailor the snapshot to your



Scrolling down again you will be meet with Instructions to learn more about the OS

## LUNARIS OS

OUR PRESENTATION IS FOR YOU

**Watch the video to learn more about Lunaris OS**

Lunaris, much more than an operating system, represents a vision of innovation, community, and empowerment. Rooted in the ethos of open-source collaboration, Lunaris is crafted to provide users with a seamless, secure, and customizable computing experience. With a commitment to user-centric design and a robust foundation built on cutting-edge technology, Lunaris opens the doors to a world where technology adapts to your needs.

[WATCH IN YOUTUBE](#)

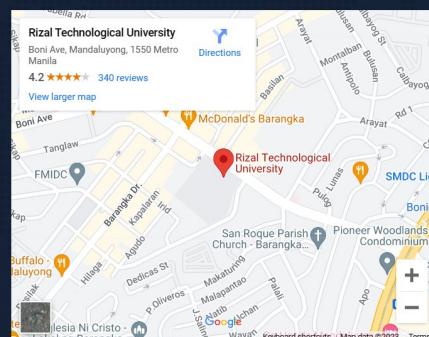


Going Further Down will be contacts

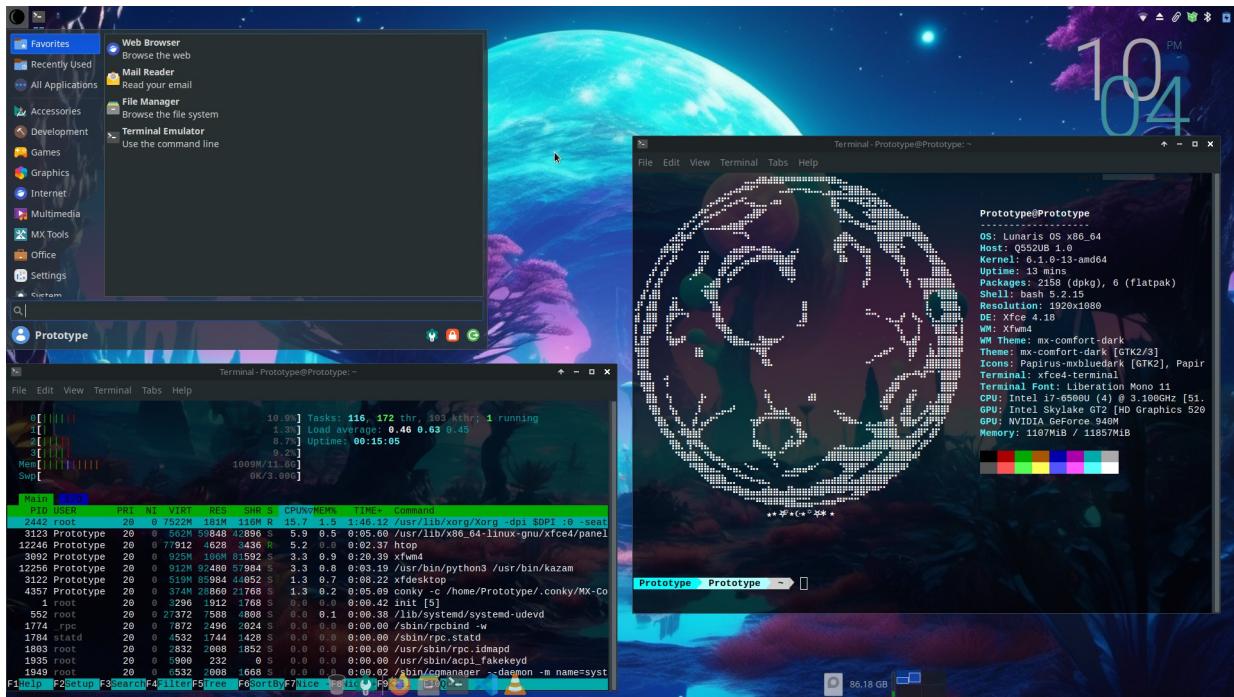
## LUNARIS OS

Let's Keep In Touch

Your Name  Your Email   
Your message...  
[SEND MESSAGE NOW](#)



Although not functional it still a good feature to have in the future.



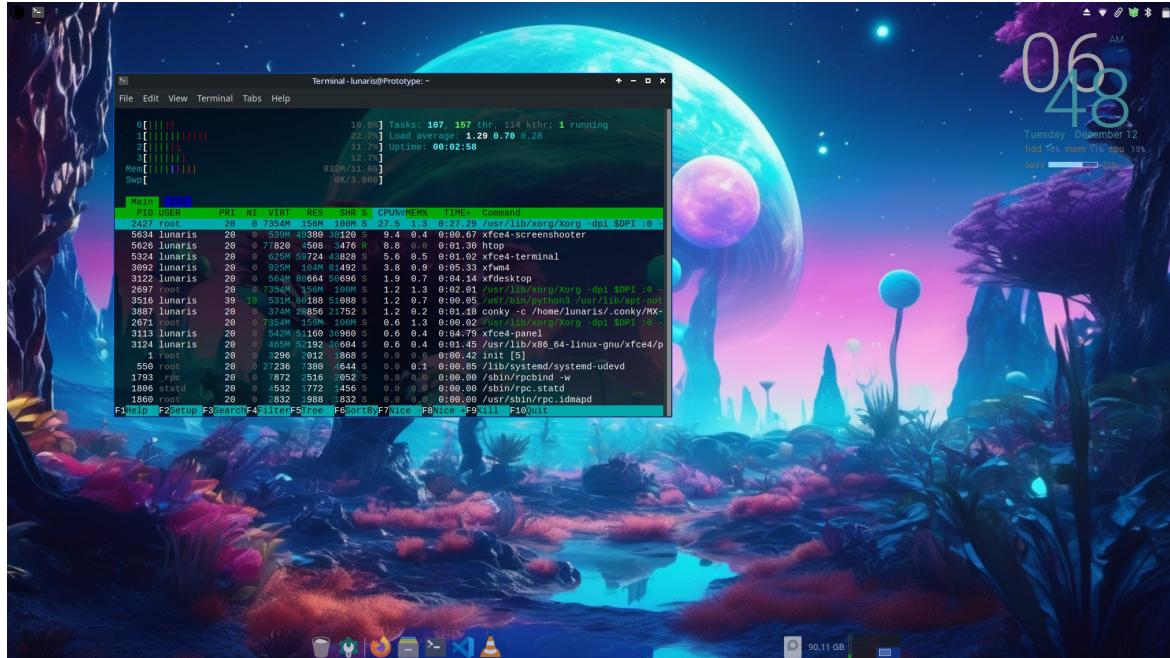
That is all for the system Over View



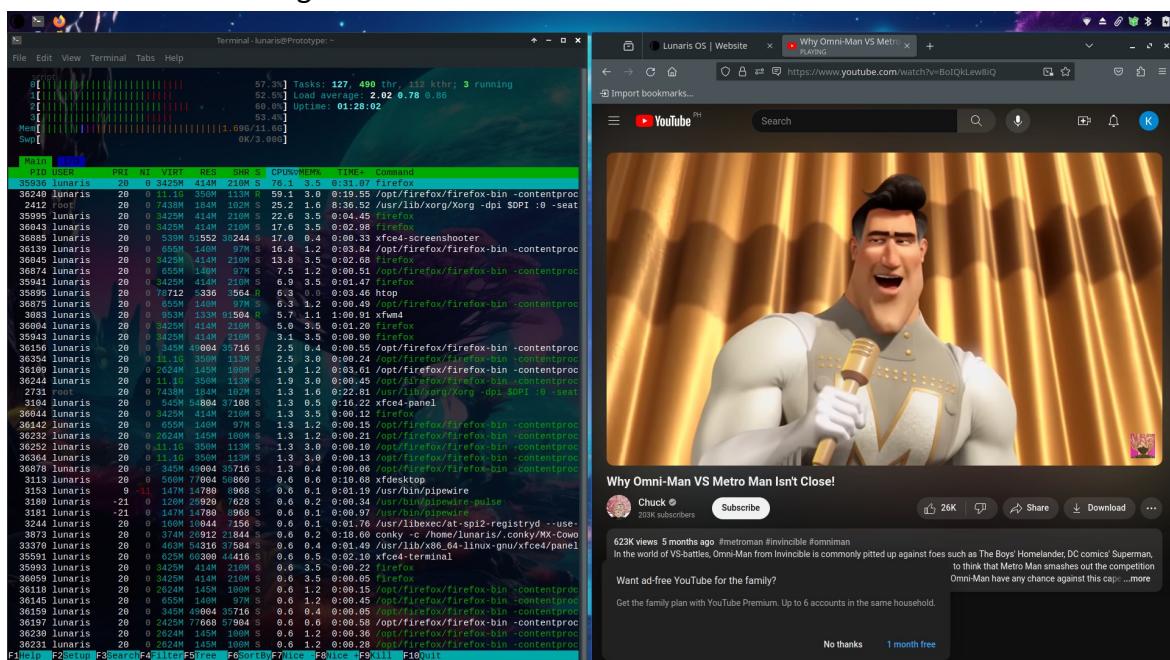
## Testing

### Test Data

The system only use 932MB of ram on Idle

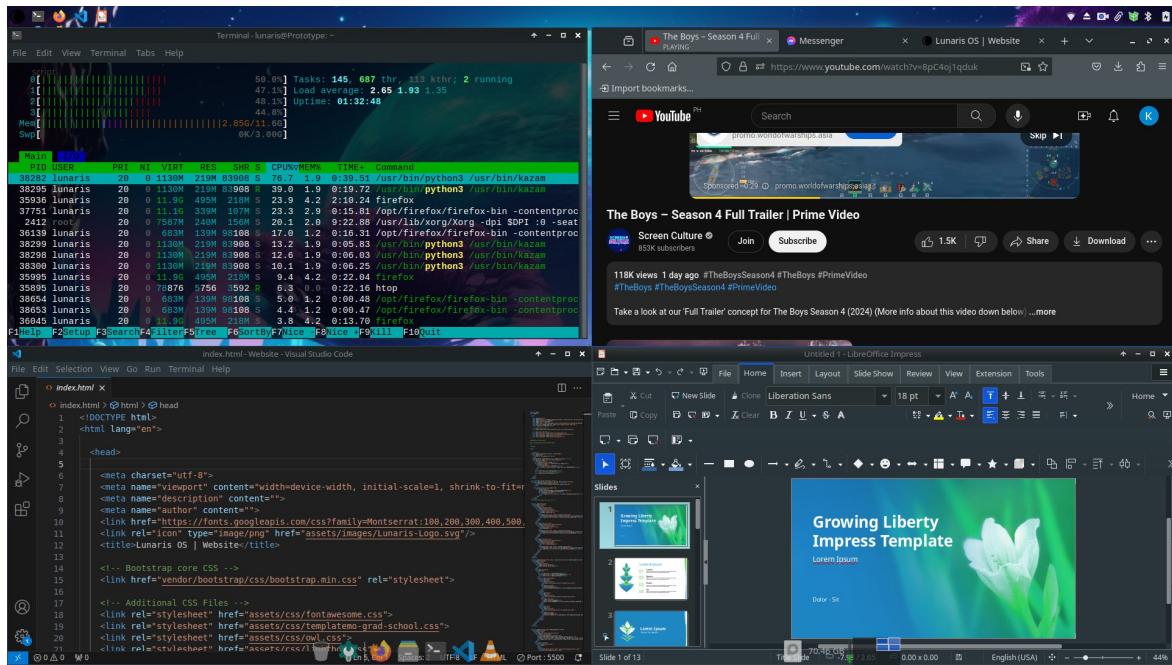


1.7GB ram on watching Youtube





and 2.85GB on multi-tasking



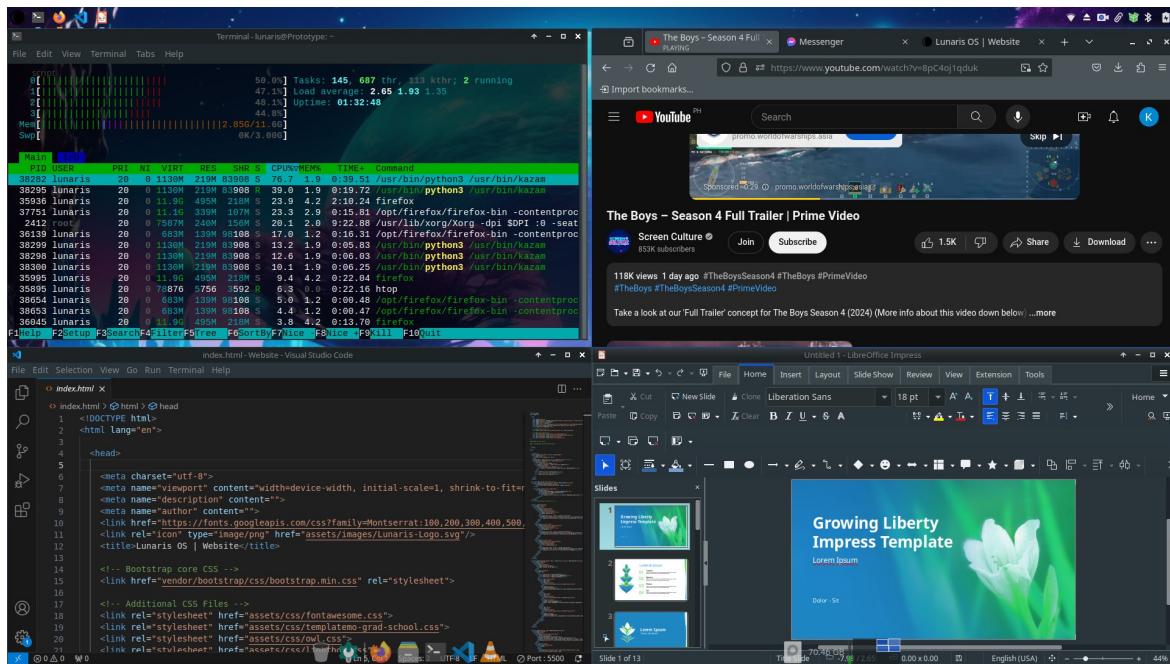
## Test Results

Taking only 2.85GB of ram on Multi-Tasking is a great sign that this OS can run on old hardwares/computers that mostly consist of 4gb ram. And it not like users tend to open 4 windows at the same time anyways, as a student I only tend to open 2 windows VS Code for programming and Web browser for searching with mostly 3-5 tabs. Comparing it to windows 10 which uses 5GB of ram as of making this documentation and only using a Web-Browser with 4 tabs open and Only Office, There is a huge gap between the two.

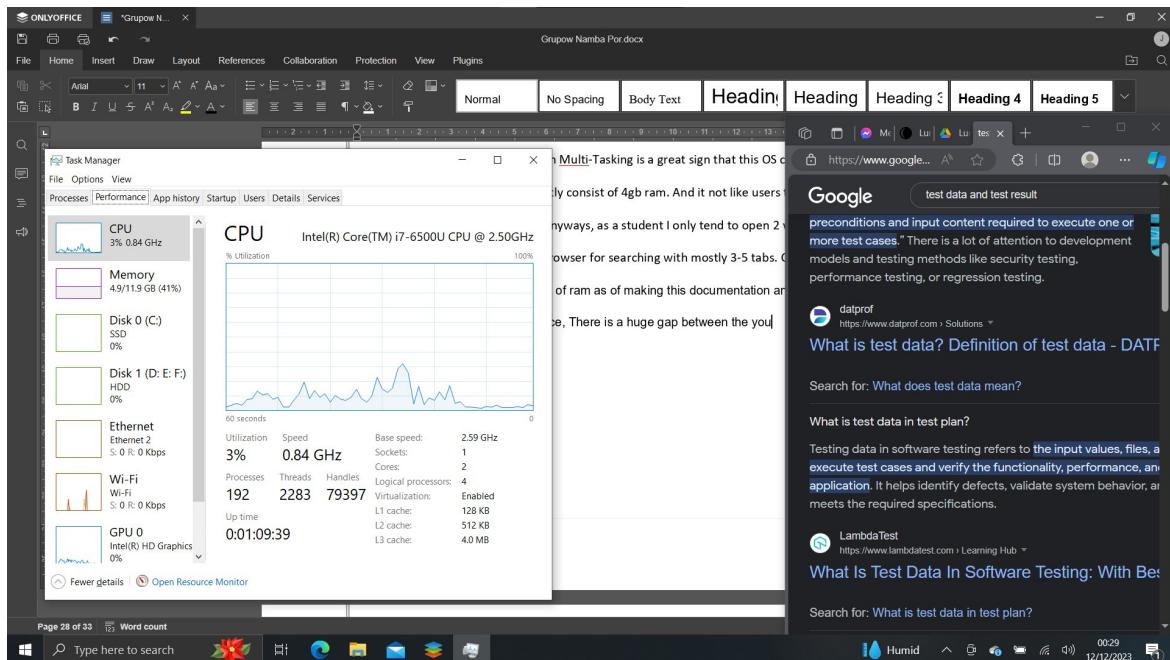
Lunaris OS only consumed 2.85GB of Ram with 4 application running and Windows consumed 5GB of Ram with only 2 application running the gap is huge we can't even exaggerate how big the gap in performance is.



## Lunaris OS



## Windows 10





## Reference

*MX Linux – Midweight simple stable desktop OS.* (2023, December 4).

<https://mxlinux.org/>

*GitHub: Let's build from here.* (n.d.). GitHub.

<https://github.com/>

Aandrew-Me. (n.d.). *GitHub - aandrew-me/tgpt: ChatGPT in terminal without needing API keys.* GitHub. <https://github.com/aandrew-me/tgpt>

Oeny. (n.d.). *GitHub - Oeny123/lazyinstaller.* GitHub.

<https://github.com/Oeny123/lazyinstaller>

*Free Online AI Photo Editor, Image Generator & Design tool.* (n.d.). Pixlr.com - Creative AI Suite. <https://pixlr.com/>

*Welcome to Python.org.* (2023, December 8). Python.org.

<https://www.python.org/>

TechSolutionZ. (2023, July 12). *How to Install MX Linux 23 Libretto with Manual Partitions / Install MX-23 Linux Manual Partitions [Video].* YouTube.

<https://www.youtube.com/watch?v=gMW5L0gW4OA>

*WineHQ - Run Windows applications on Linux, BSD, Solaris and macOS.* (n.d.). WineHQ.

<https://www.winehq.org/>

*Visual Studio Code - Code editing. Redefined.* (2021, November 3).

<https://code.visualstudio.com/>

*XAMPP installers and downloads for Apache Friends.* (n.d.).

<https://www.apachefriends.org/>



NetBeans, A. (n.d.-b). *Welcome to Apache NetBeans*.

<https://netbeans.apache.org/front/main/>

Oracle VM VirtualBox. (n.d.).

<https://www.virtualbox.org/>

GIMP. (n.d.). GIMP.

<https://www.gimp.org/>

VideoLAN. (n.d.). *Official download of VLC media player, the best Open Source player -*

*VideoLAN.* <https://www.videolan.org/vlc/>

*Download the fastest Firefox ever.* (n.d.). Mozilla.

<https://www.mozilla.org/en-US/firefox/new/>

OpenAI. (n.d.).

<https://openai.com/>

Hunsinger, S. (2011, April 1). *Factors influencing people to use Linux.* <https://jisar.org/2011-4/N1/JISARv4n1p30.html>

Zhao, H. (2021). *A design of information teaching platform based on Linux operating system.*

*Journal of Physics, 2138(1), 012018.* <https://doi.org/10.1088/1742-6596/2138/1/012018>

Lidén, A. (2020). *Percieved benefits and limitations of chatbots in higher education.* DIVA.

<https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1442044&dswid=-1855>