



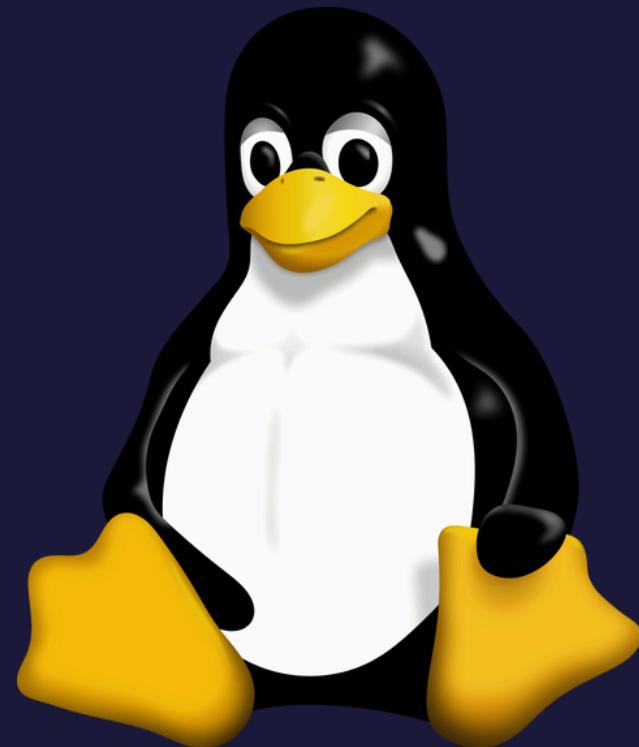
<https://tinyurl.com/lif-pre-workshop-instructions/>





LINUX INSTALLATION FEST

KHARAGPUR OPEN SOURCE SOCIETY



DISTRO INSTALLATION FEST | KOSS



PREREQUISITES!



PREREQUISITES!

An Enthusiastic mind



PREREQUISITES!

An Enthusiastic mind

Craving to play with a new OS



PREREQUISITES!

An Enthusiastic mind

Craving to play with a new OS

Nothing more:) You are good to go!!



LET'S GET STARTED!

Overview

- Intro to GNU/Linux
- Benefits of GNU/Linux
- Families of distros
- Alternatives to Common applications
- Installation
- User mode and Kernel Mode (sudo)
- Funny tools
- File System
- Package manager





SO... WHAT IS GNU/LINUX?



Fun Fact:

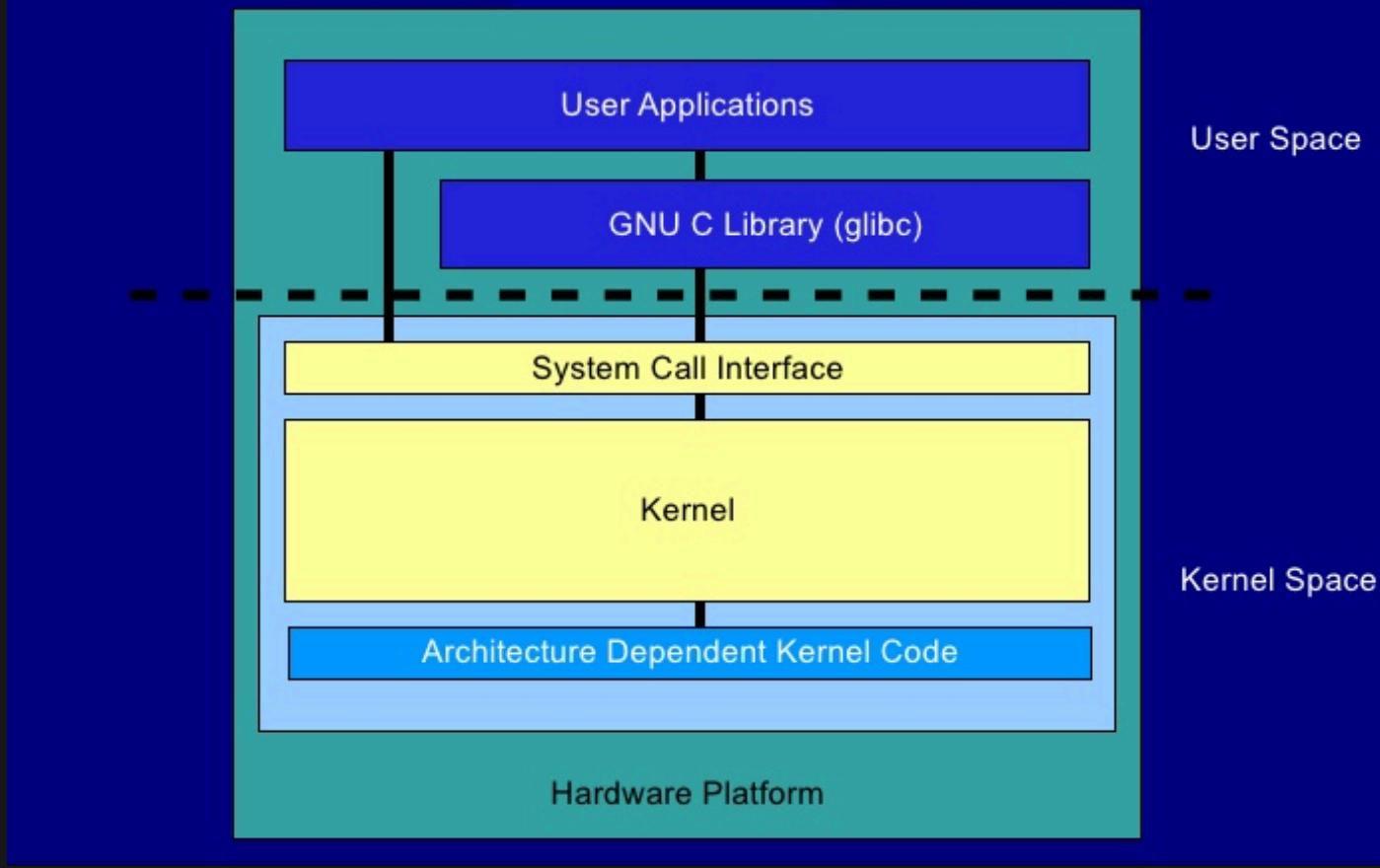
GNU stands for GNU is Not Unix. This is a **Recursive Acronym !!**





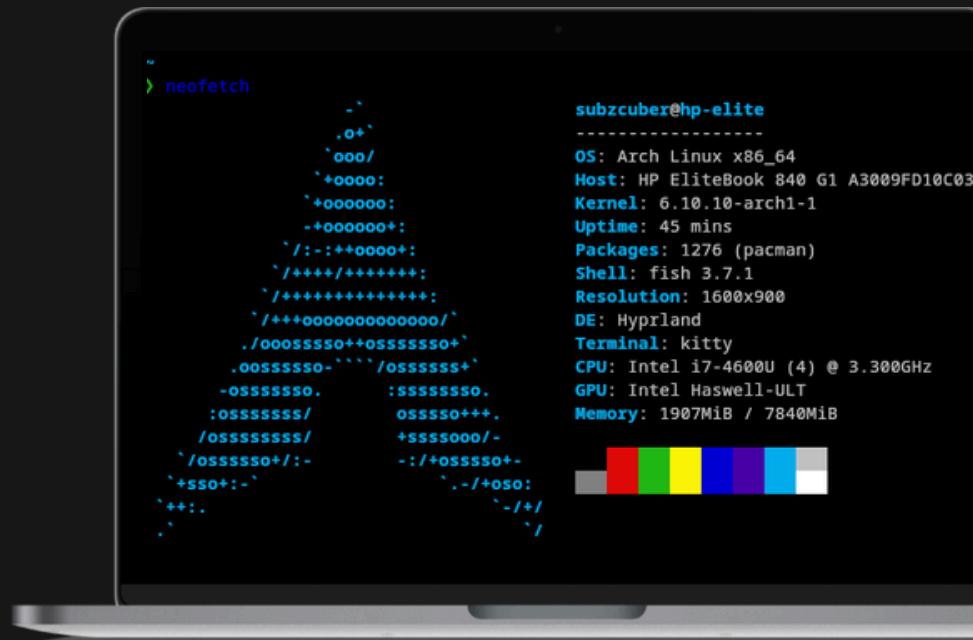


Fundamental Architecture



GNU/Linux is an open-source operating system based on the **Linux** kernel, which was originally created by Linus Torvalds in 1991.

The operating system is a combination of the GNU Project's tools and libraries and the Linux kernel, which is responsible for managing system resources such as memory, CPU, and input/output devices.



BUT... WHY CHOOSE LINUX WHEN WE ALREADY HAVE OTHER OS??



ARE LINUX BASED OPERATING SYSTEMS BETTER THAN OTHER OPERATING
SYSTEMS ?



WHY LINUX ?

Advantages of having a linux based OS

Cost-effective

One of the biggest advantages of GNU/Linux is that it is free and open-source software

Flexibility

GNU/Linux is highly customizable and can be tailored to suit the specific needs of users

Security

GNU/Linux is known for its robust security features, which make it less susceptible to viruses, malware, and other cyber threats

Compatibility

GNU/Linux is compatible with various hardware platforms, including desktops, laptops, servers, and even mobile devices

Stability

It can run for long periods of time without needing to be restarted, making it a popular choice for servers and other mission-critical applications

Support

The GNU/Linux community is large and active, providing users with access to a wealth of resources, including online forums, documentation, and support from other users



Mac os:



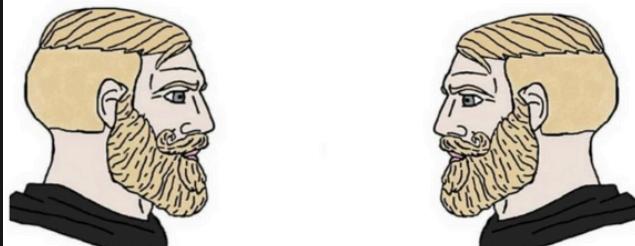
Can you install this
5 year old program? Nooooo, i can't! this
program is too old!

Windows:



Can you install this
25 year old program? Yes, i can!
Installing... done!

Linux



can you install this
25 year old
program it's already
installed



005



MAC OS

While macOS is known for its user-friendly interface and high-end hardware, Linux is more flexible, open-source, and secure. Linux also has a wider range of software options and can run on older hardware, making it a more accessible option for many users.

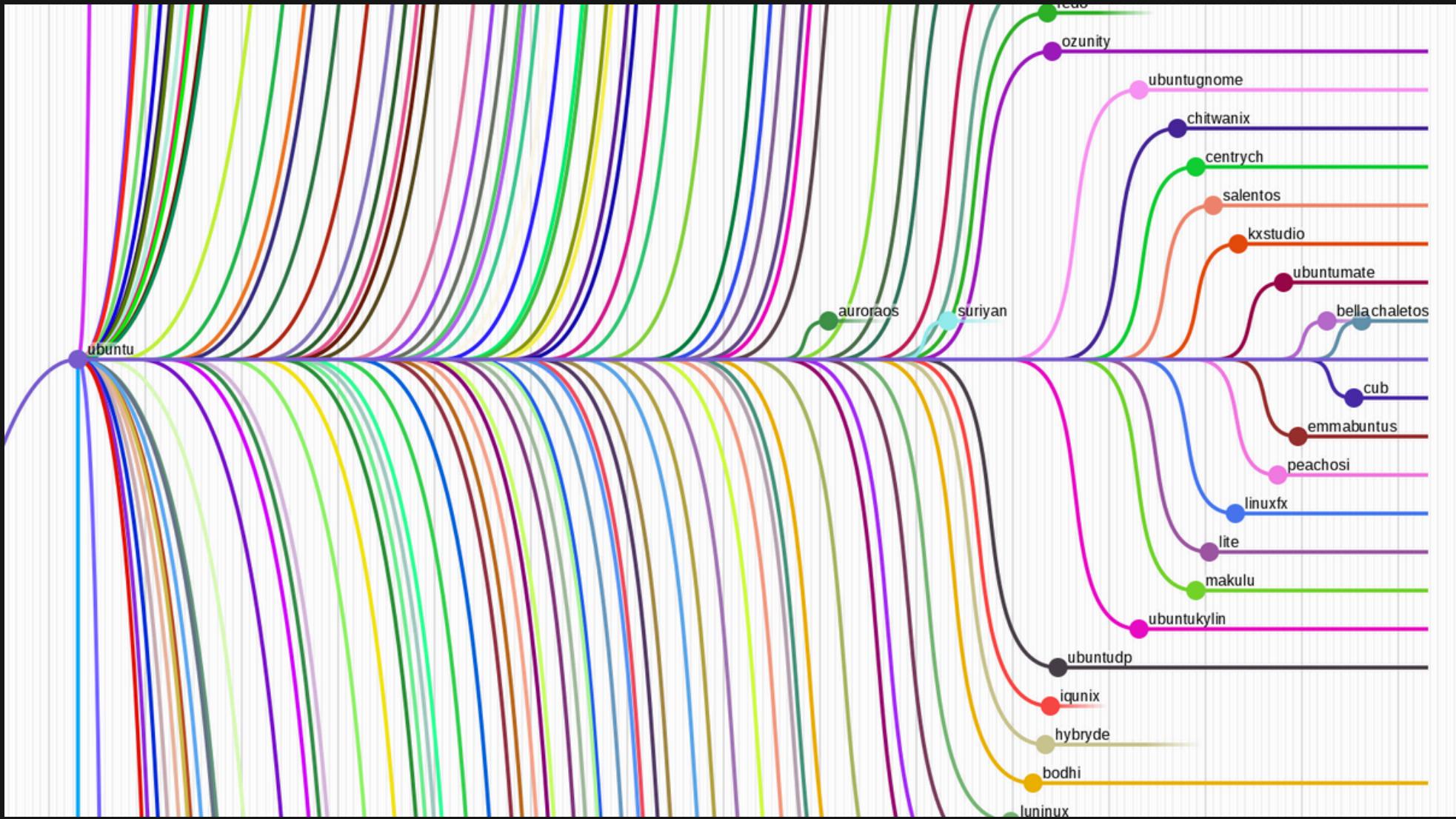
WINDOWS

While Windows is the most popular operating system, Linux is more secure, open-source, and lightweight. Linux is also more customizable and provides greater control over system resources, making it a better option for developers, system administrators, and power users.

UNIX

While UNIX is the precursor to Linux and shares many similarities, Linux is more accessible, customizable, and has a larger community of developers. Linux also has a wider range of software options and is more secure due to its open-source nature, making it a better choice for many users.

the linux family



is very huge

NO ONE: NEW LINUX USERS:



DEBIAN

- Debian is one of the oldest and most popular Linux distributions, and many other distributions are based on it.
- Some of the most well-known Debian-based distributions include **Ubuntu**, **Linux Mint**, and **elementary OS**.
- These distributions tend to be known for their stability, strong community support, and large repositories of software packages.

RED HAT

- Red Hat is a popular enterprise Linux distribution, and many other distributions are based on it, including **CentOS**, **Fedora**, and **Oracle Linux**.
- These distributions are often used in business environments and are known for their strong security features and long-term support.



ARCH

- Arch Linux is a lightweight and highly customizable distribution, and several other distributions are based on it, including **Manjaro** and **EndeavourOS**.
- These distributions are popular among power users who want a minimalistic and highly configurable system.
- *I use Arch BTW*

FAMILIES OF DISTROS





Me: Installing 300th distro
on my Computer



My computer:





GENTOO

- Gentoo is a highly customizable distribution that allows users to compile their software from source code.
- **Sabayon Linux** and **Funtoo Linux** are based on Gentoo and are known for their performance and flexibility.

SLACKWARE

- Slackware is one of the oldest Linux distributions and is known for its simplicity and stability.
- **Zenwalk** and **Salix** are based on Slackware and are known for their lightweight and fast performance.



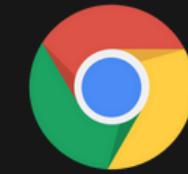
SUSE



- SUSE Linux Enterprise is a popular enterprise distribution, and **openSUSE** is a community-driven distribution based on it.
- These distributions are known for their robustness, security, and ease of use.

CHROME OS

- Chrome OS is a Linux-based operating system developed by Google for use on Chromebooks.
- Several distributions, including **CloudReady** and **Chromixium**, are based on Chrome OS and offer a similar user experience.

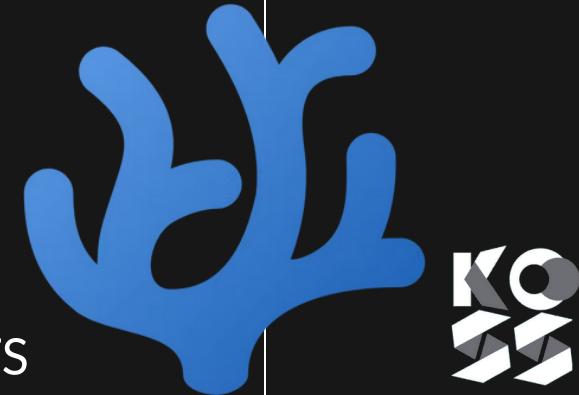


Chrome OS



alternatives to windows software

- PHOTO EDITING AND ADOBE SOFTWARE
 - PHOTOSHOP -> GIMP
 - PREMIER PRO -> KDENLIVE
 - ILLUSTRATOR -> INKSCAPE
- AUDIO THINGS
 - AUDACITY
- MICROSOFT OFFICE THINGS
 - LIBREOFFICE
 - ONLYOFFICE
- TEXT EDITORS
 - NEOVIM
 - VS CODE WORKS BUT VSCODIUM ALSO EXISTS



≡



Watch on  YouTube





ENOUGH OF THE THEORY !! LETS GET STARTED WITH THE INSTALLATION!



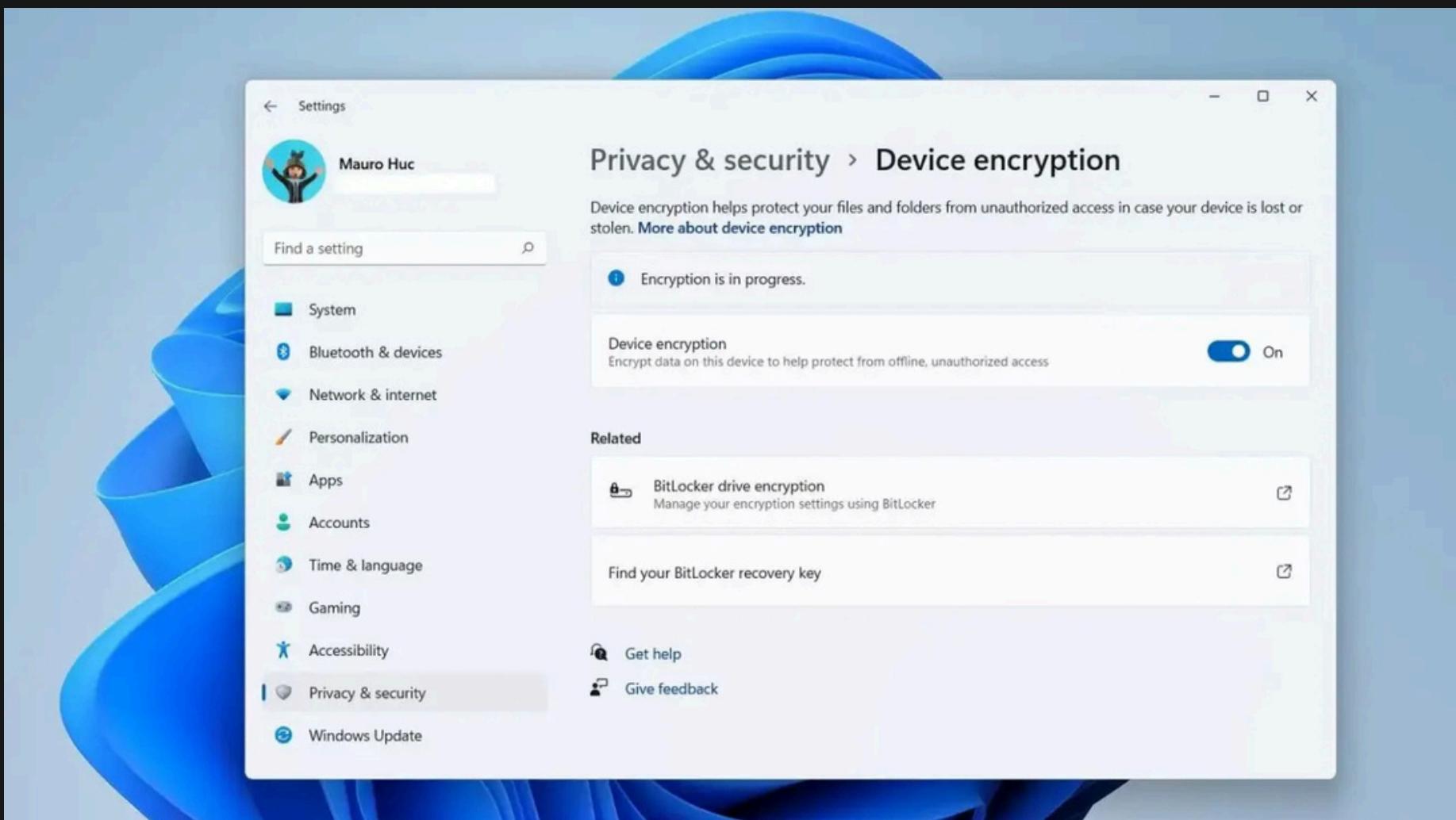


You must have the following files downloaded:

- the latest version of the **Linux distribution** you choose
- **Rufus**

Turn off Device Encryption

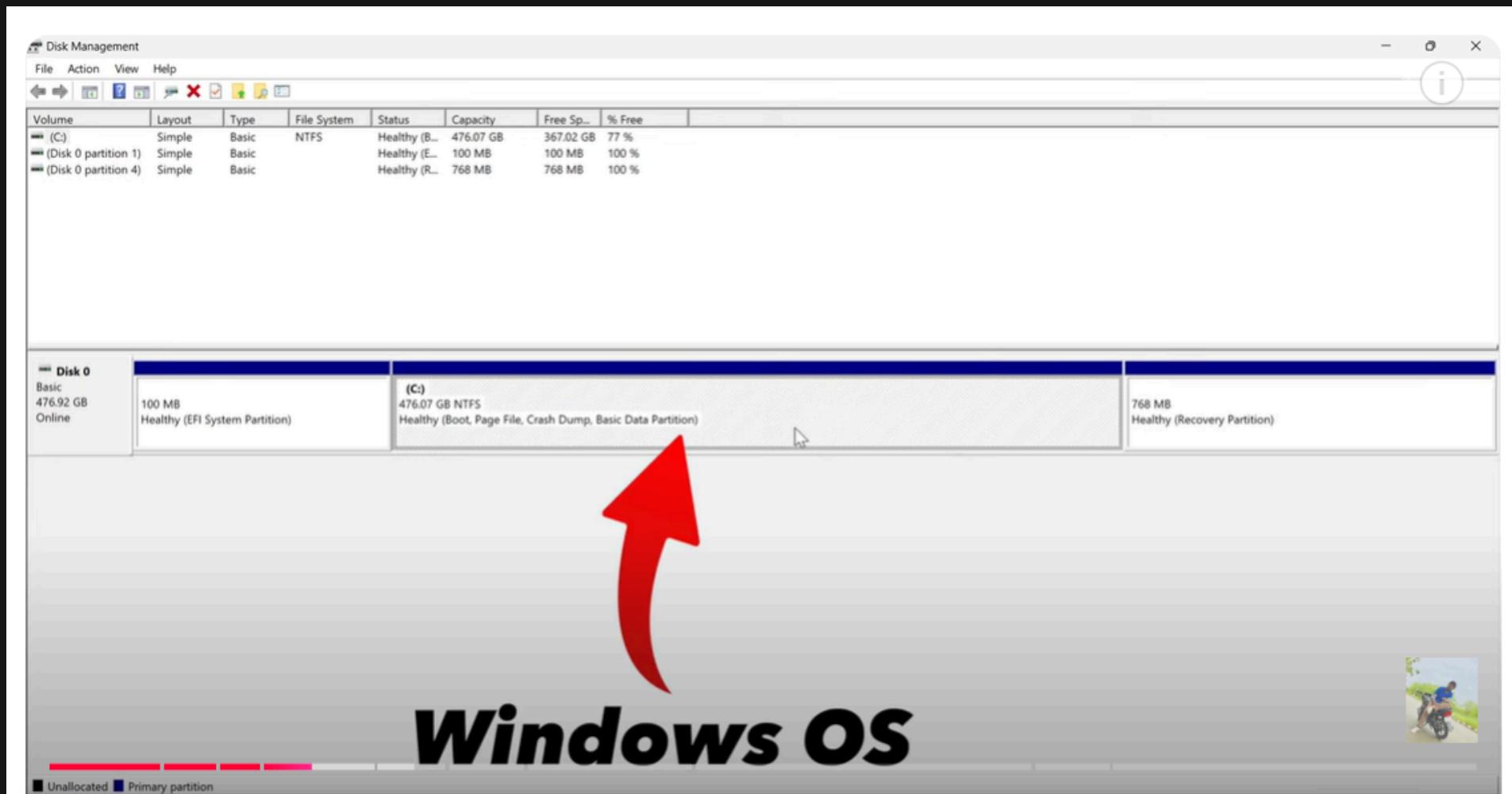
- Go to **Device Encryption** under **Privacy & security** under **Settings**
- Turn off Device Encryption (it will take some time)



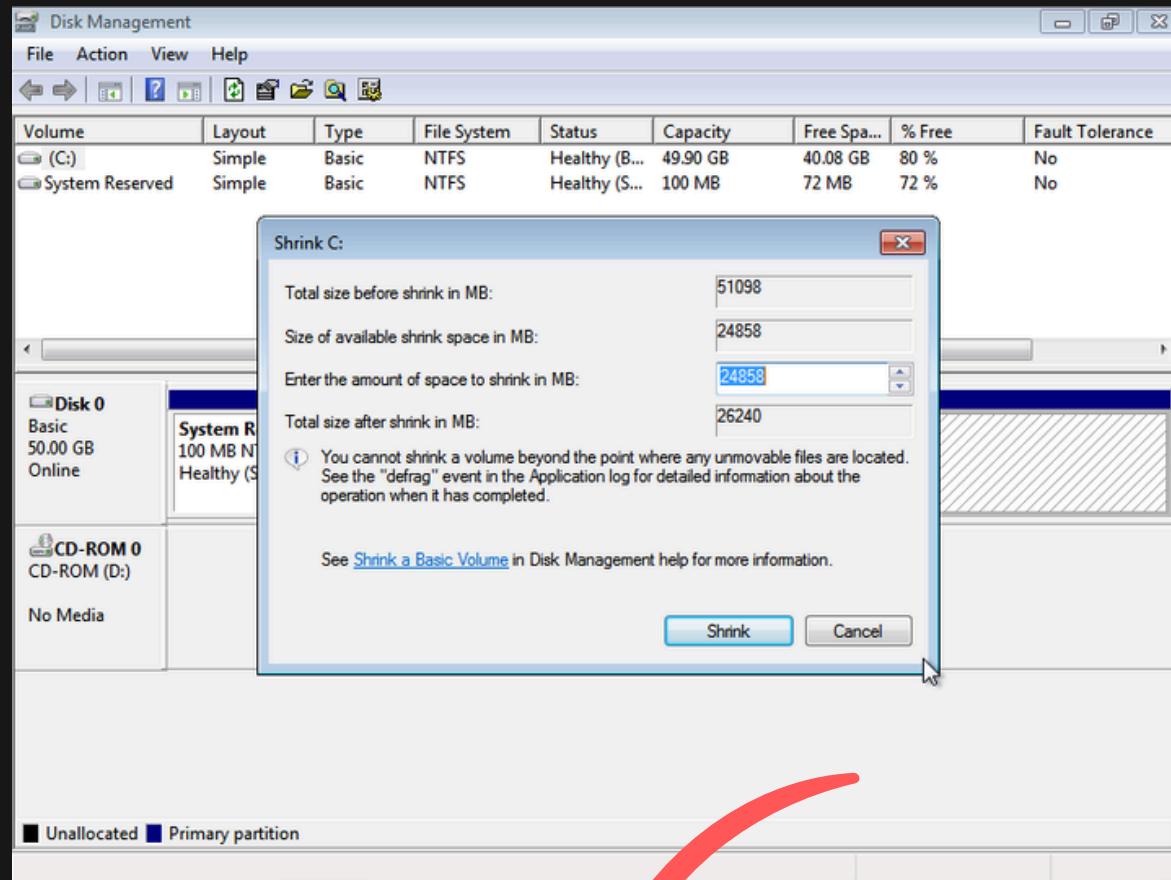
CREATING UNALLOCATED MEMORY

To created unallocated space

- go to Disk Management
- do Shrink volume to Windows OS



- Enter the amount of space to shrink in MB (~50 GB=50x1024 MB)
- Shrink

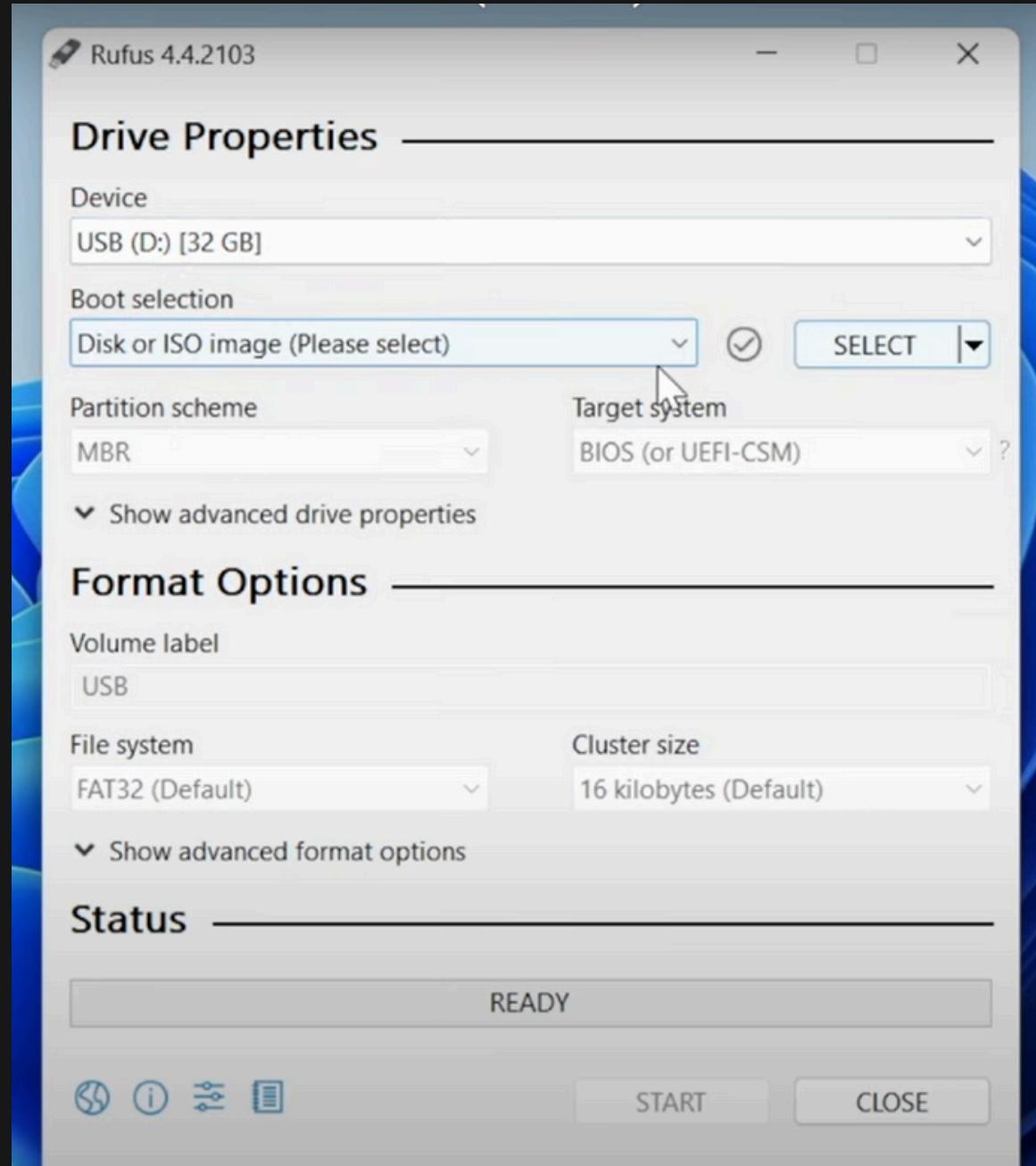


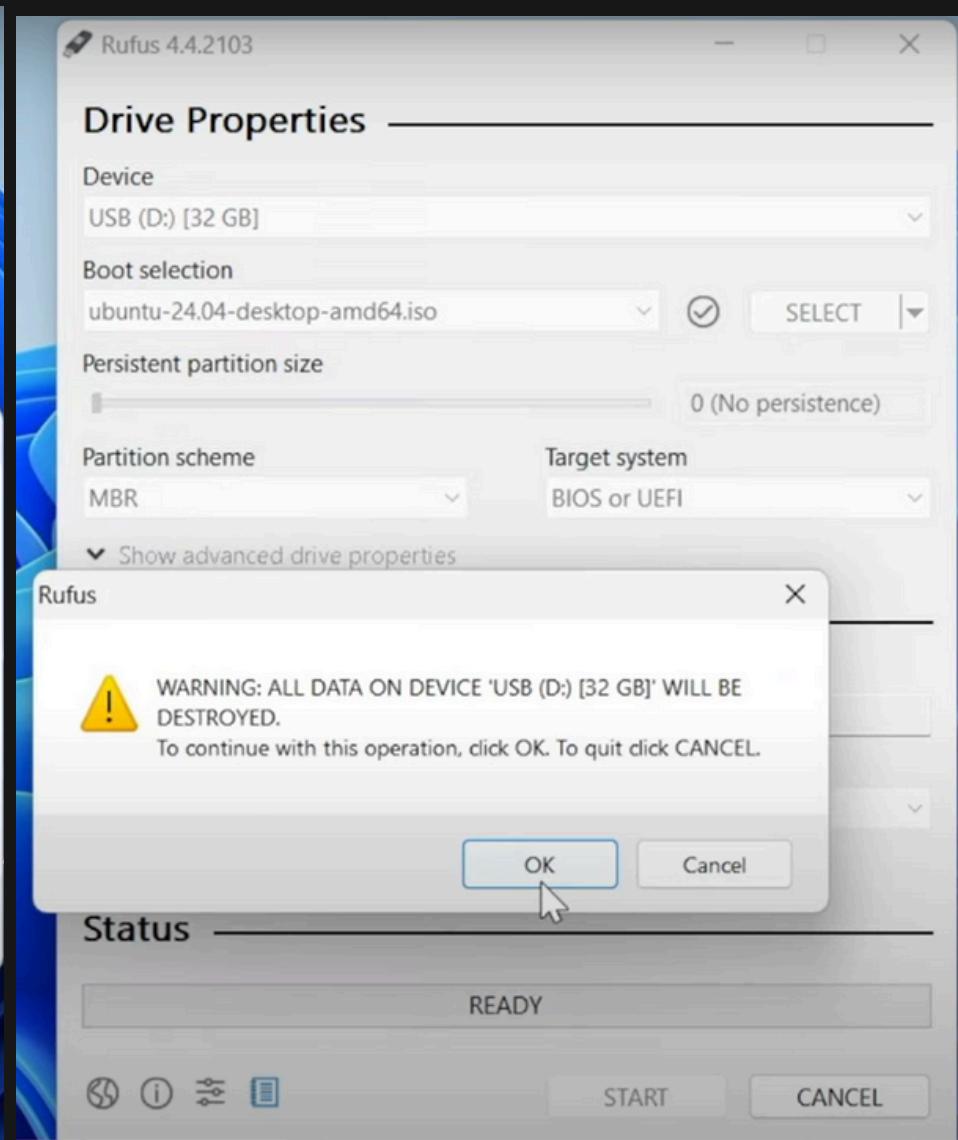
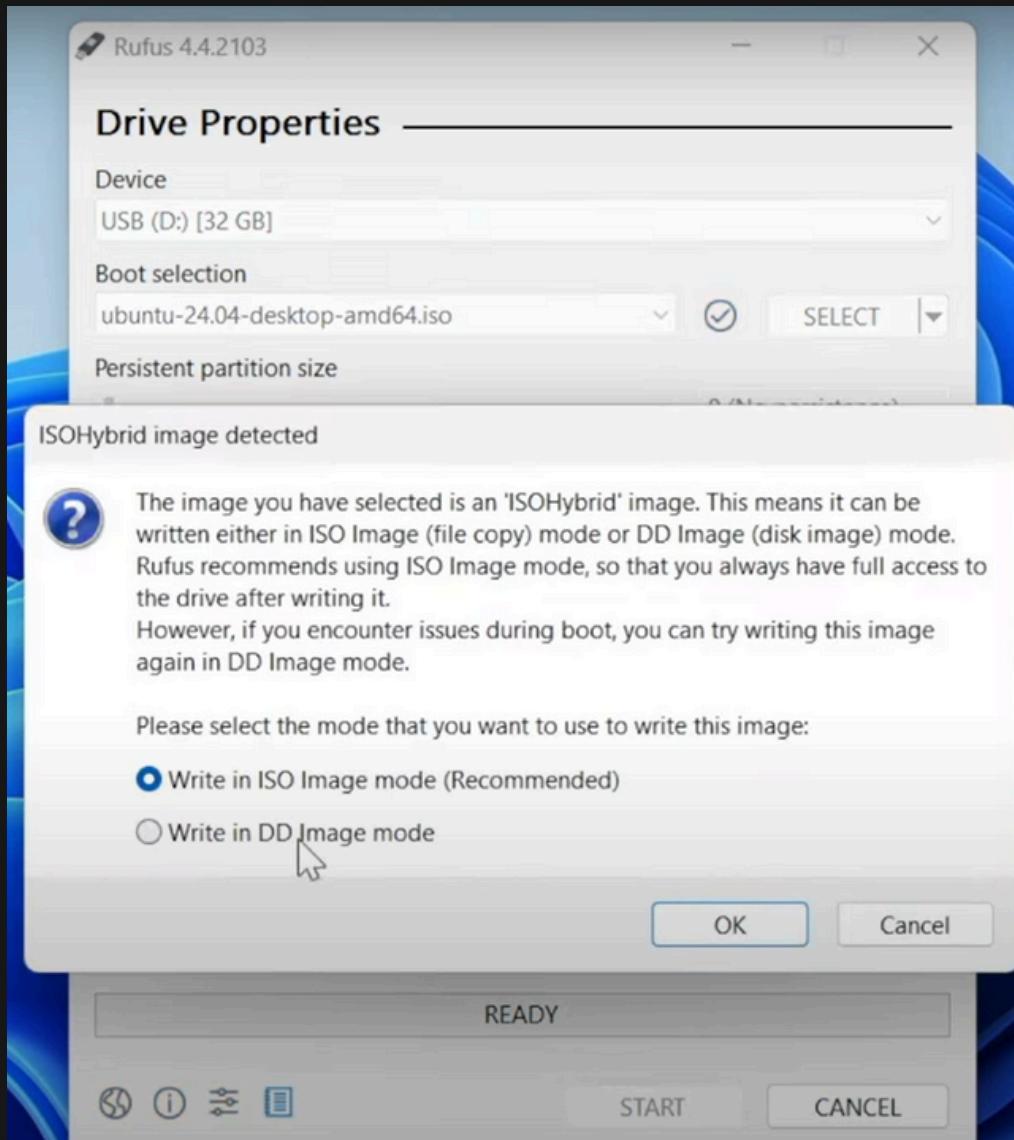
- you can see an unallocated partition has been created



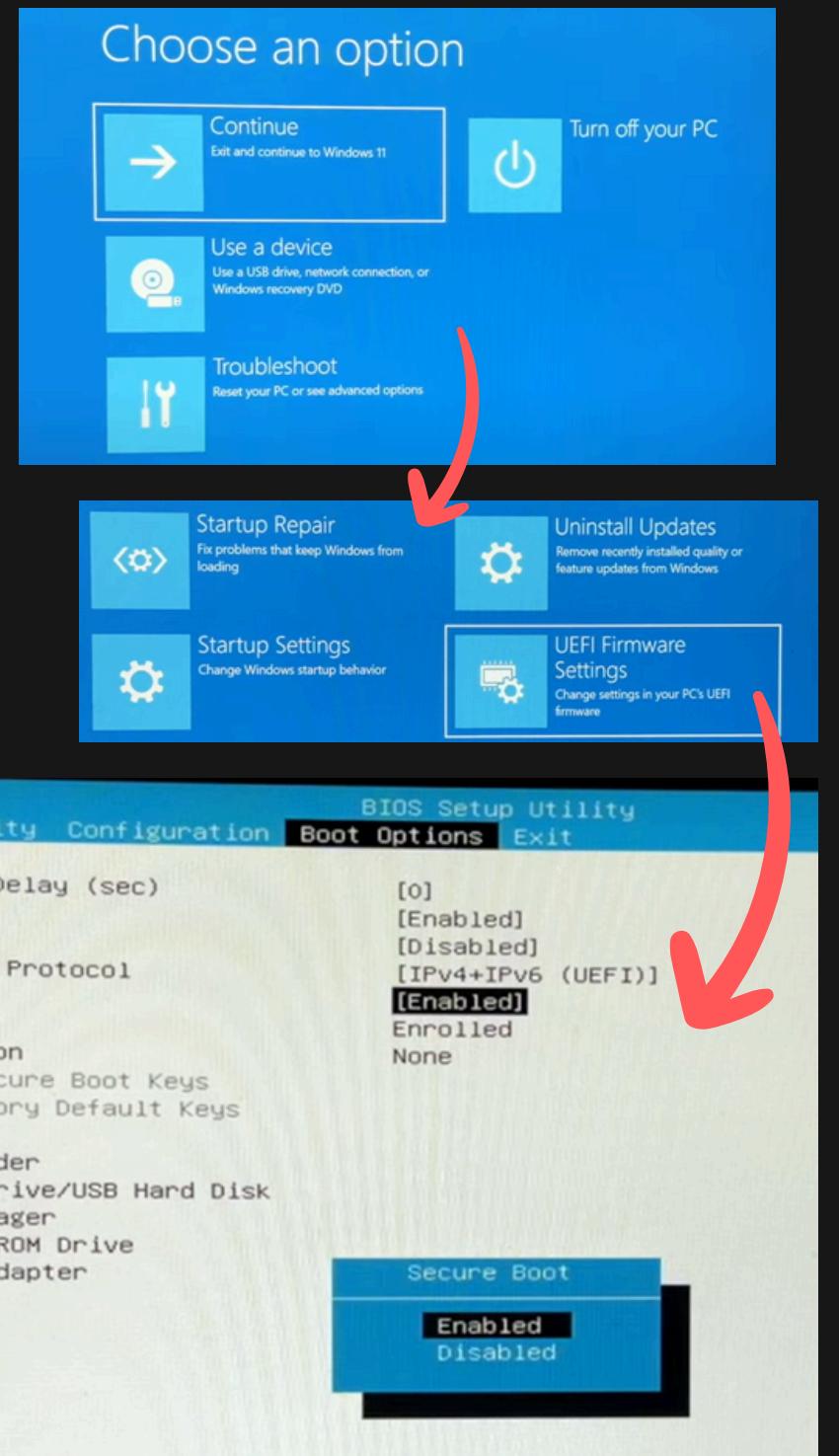
- Connect your **USB**
- open the rufus file
- Device to be selected is the **USB**
- under Boot selection click **SELECT** and select the **Linux file**
- **START**

If your file is showing too large to be copied , reformat your USB from **FAT** to **exFAT**.





- Press Shift+Restart
- select **Troubleshoot**
- select **UEFI Firmware Settings**
- select **Restart**
- select **Bios Setup**
- under Boot options, do the following:
 1. **disable Secure Boot**
 2. **enable USB boot**



GNU GRUB version 2.06

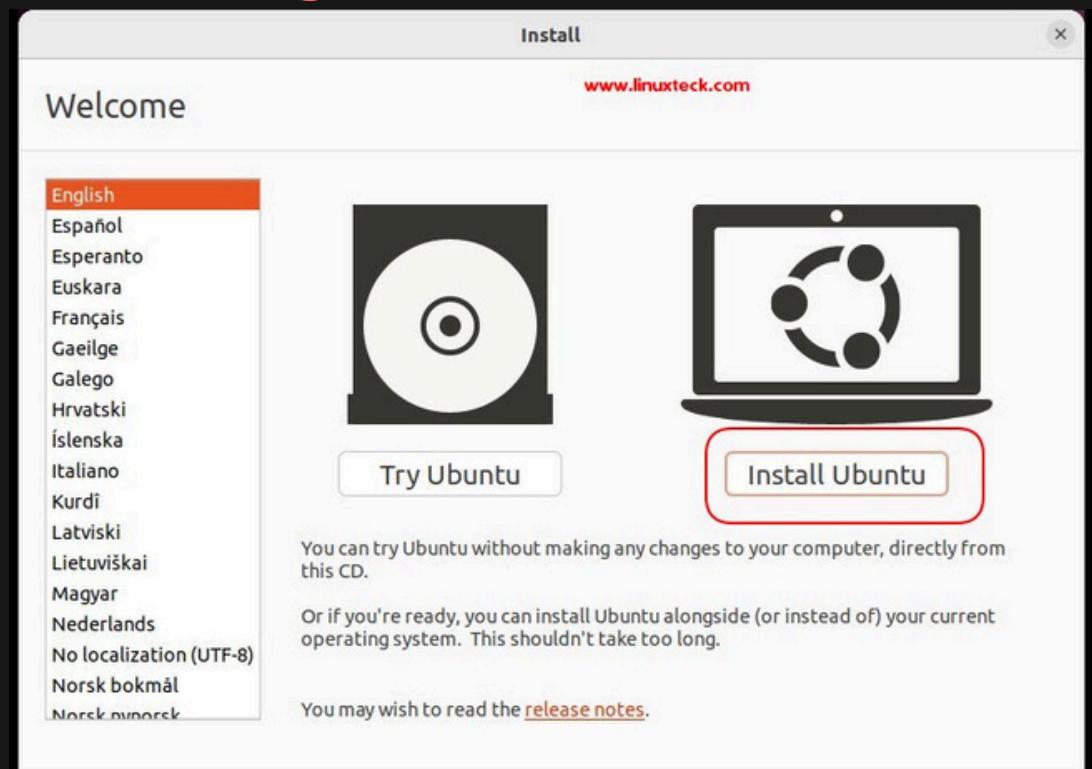
- *Try or Install Ubuntu
- Ubuntu (safe graphics)
- OEM install (for manufacturers)
- Test memory

www.linuxteck.com

Use the ↑ and ↓ keys to select which entry is highlighted.
Press enter to boot the selected OS, 'e' to edit the commands
before booting or 'c' for a command-line.

• Try or Install Ubuntu

• Install Ubuntu



Feb 14 06:26

Install

Updates and other software

What apps would you like to install to start with?

Normal installation

Web browser, utilities, office software, games, and media players.

Minimal installation

Web browser and basic utilities.

Other options

Download updates while installing Ubuntu

This saves time after installation.

Install third-party software for graphics and Wi-Fi hardware and additional media formats

This software is subject to license terms included with its documentation. Some is proprietary.

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Quit

Back

Continue

- select English(US)

select the following:

- Normal Installation
- Download updates while installing Ubuntu
- Install third party software.....

Keyboard layout

Choose your keyboard layout:

English (Australian)
English (Cameroon)
English (Ghana)
English (Nigeria)
English (South Africa)
English (UK)
English (US)
Esperanto
Estonian
Faroese
Filipino
Finnish
French

English (US)
English (US) - Cherokee
English (US) - English (Colemak)
English (US) - English (Colemak-DH ISO)
English (US) - English (Colemak-DH)
English (US) - English (Dvorak)
English (US) - English (Dvorak, alt. intl.)
English (US) - English (Dvorak, intl., with dead keys)
English (US) - English (Dvorak, left-handed)
English (US) - English (Dvorak, right-handed)
English (US) - English (Macintosh)
English (US) - English (Norman)
English (US) - English (US, Symbolic)

Type here to test your keyboard

Detect Keyboard Layout

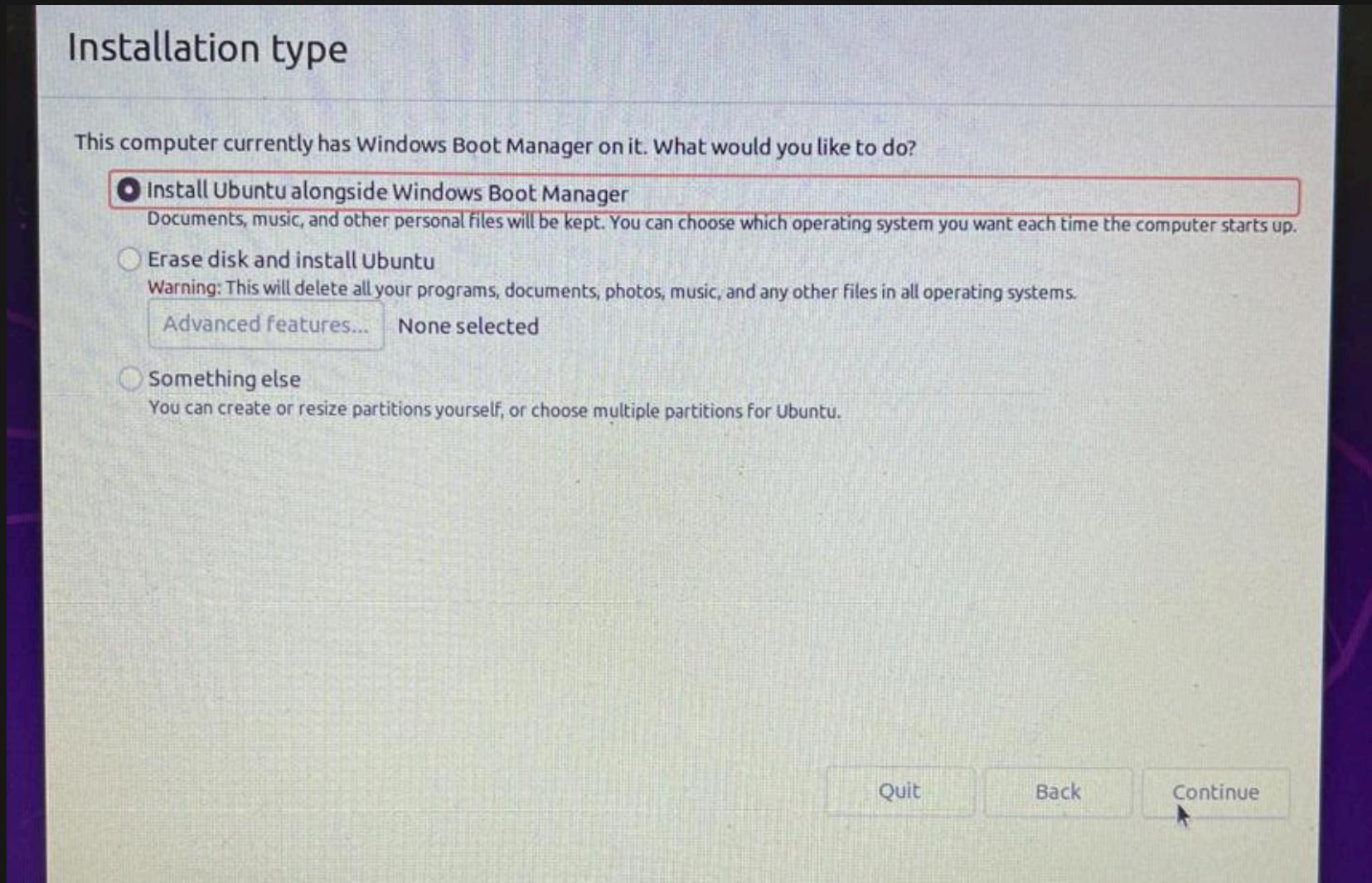
www.linuxteck.com

Quit

Back

Continue

- If the option “**Install Ubuntu alongside Windows Boot Manager**” appears, then select it
- else , follow the next slides.....



- **Something else**



Feb 14 06:27

Install

Installation type

This computer currently has no detected operating systems. What would you like to do?

Erase disk and install Ubuntu
Warning: This will delete all your programs, documents, photos, music, and any other files in all operating systems.

Advanced features... None selected

Something else
You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.

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Install

Installation type

Device Type Mount point Format? Size Used System

/dev/sda

+ - Change... New Partition Table... Revert

Device for boot loader installation:

/dev/sda VMware, VMware Virtual S (32.2 GB)

Quit Back Continue

• • • • • ○ ○

Install

Installation type

Device Type Mount point Format? Size Used System

/dev/sda

+ - Change... New Partition Table... Revert

Device for boot loader installation:

/dev/sda VMware, VMware Virtual S (32.2 GB)

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Quit Back Install Now

• • • • • ○ ○

- **/dev/sda**
- **New Partition Table**

Device Type Mount point Format? Size Used System

/dev/sda

Create new empty partition table on this device?

You have selected an entire device to partition. If you proceed with creating a new partition table on the device, then all current partitions will be removed.

Note that you will be able to undo this operation later if you wish.

Go Back

Continue

Device for boot loader installation:

/dev/sda VMware, VMware Virtual S (32.2 GB)



Installation type

free space
32.2 GB

Device Type Mode
/dev/sda

free space

1

+ - Change...

Device for boot loader i

/dev/sda VMware, VM

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3

Create partition

Size: MB

Type for the new partition: Primary

Logical

Location for the new partition: Beginning of this space

End of this space

Use as:

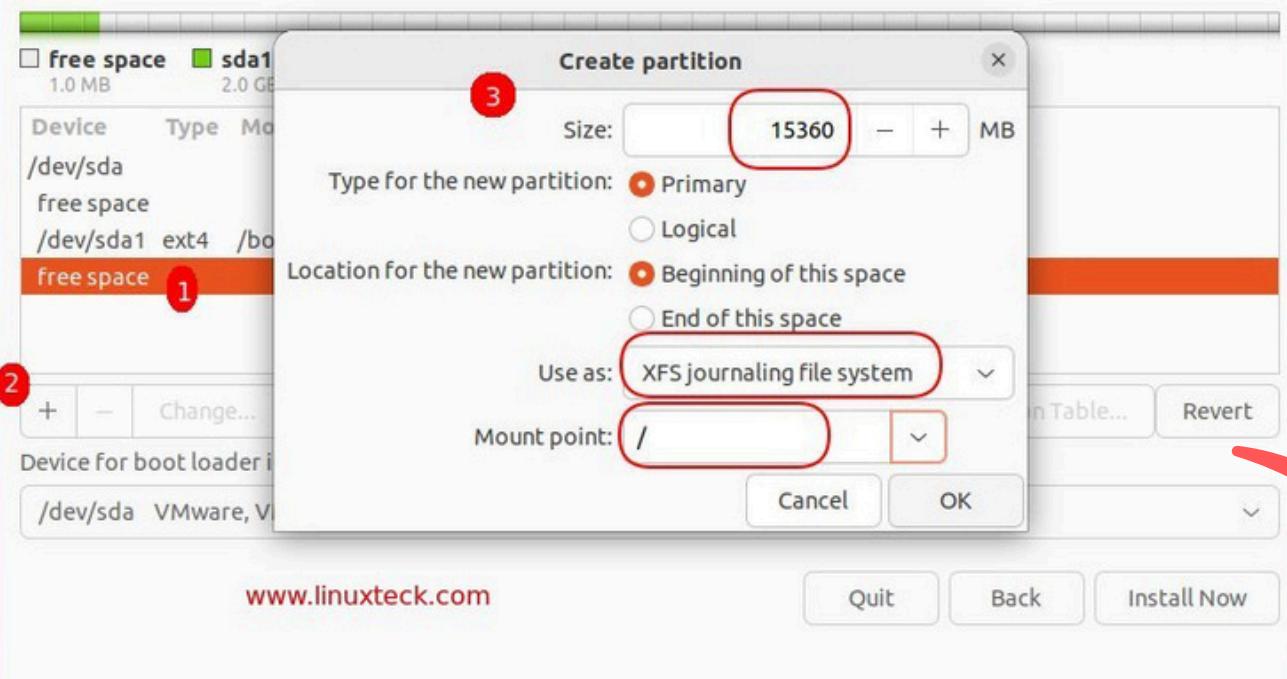
Mount point:

Cancel OK

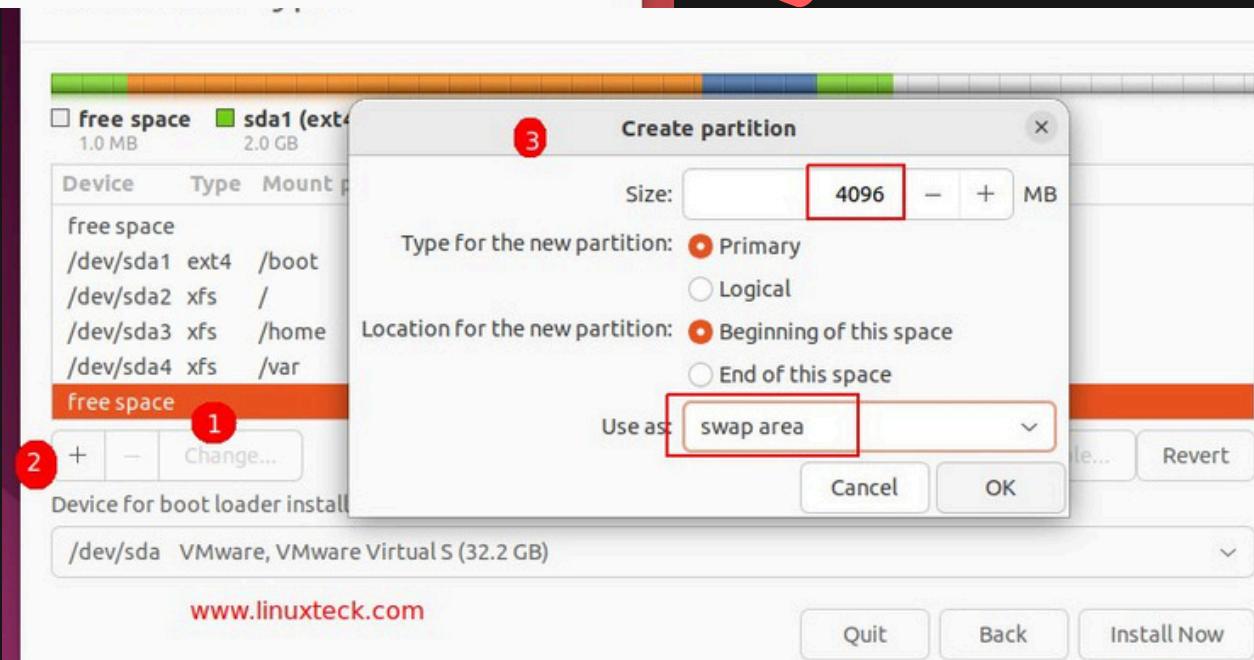
Quit

Back

Install Now



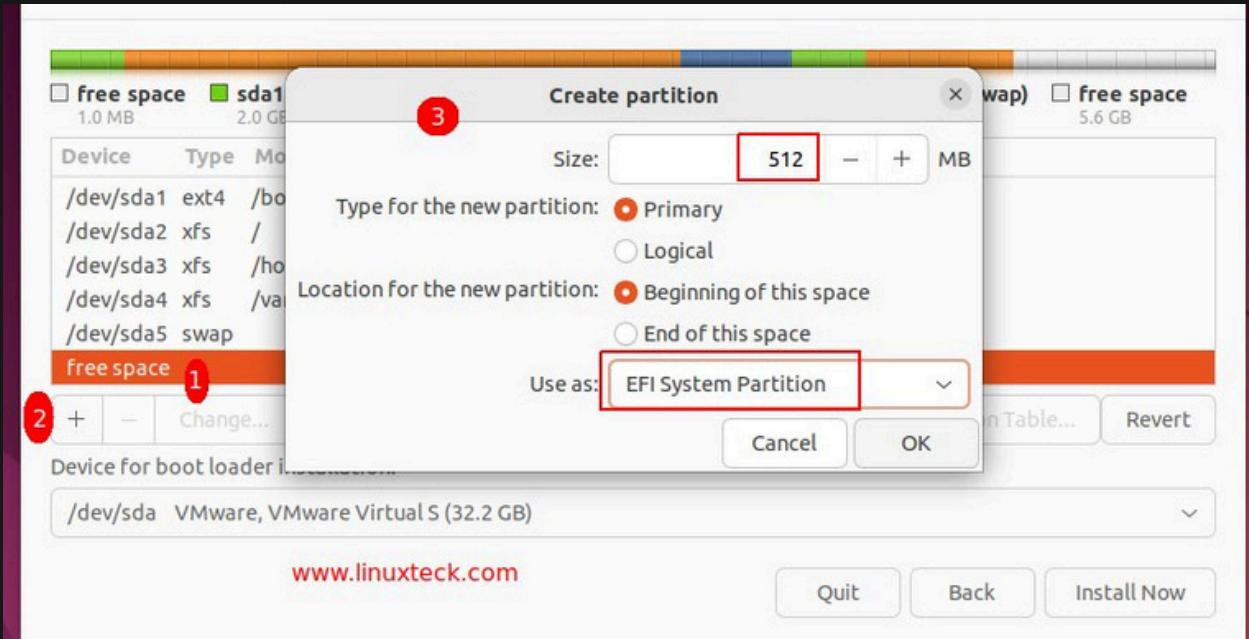
• / (>15360 MB)



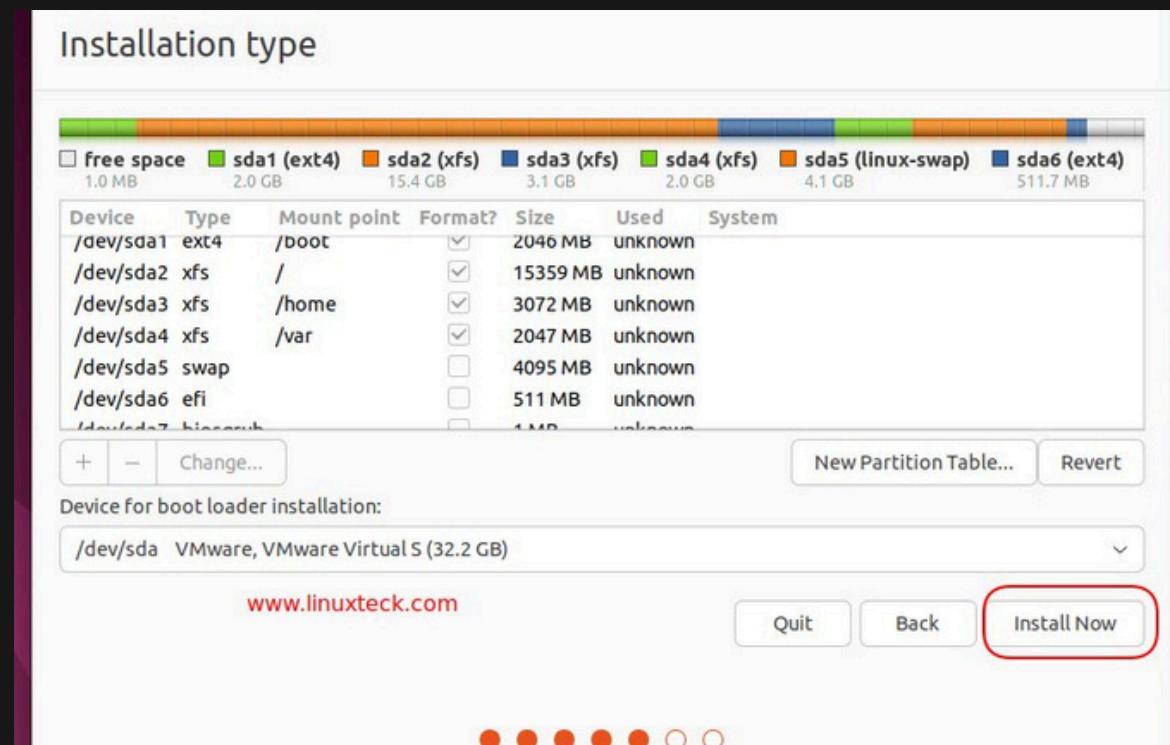
(Optional)

- swap area

• EFI System Partition (Extensible Firmware Interface) Interface



- Install Now
- Continue



Where are you?



- Select your location

Who are you?

Your name: ✓

Your computer's name: ✓
The name it uses when it talks to other computers.

Pick a username: ✓

Choose a password: ⓘ Good password
 ✓

Confirm your password: ✓

Log in automatically
 Require my password to log in

Use Active Directory
You'll enter domain and other details in the next step.

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Back Continue

• • • • •

- Enter the details
- Remember the password :)

Install

Welcome to Ubuntu

Fast and full of new features, the latest version of Ubuntu makes computing easier than ever. Here are just a few cool new things to look out for...



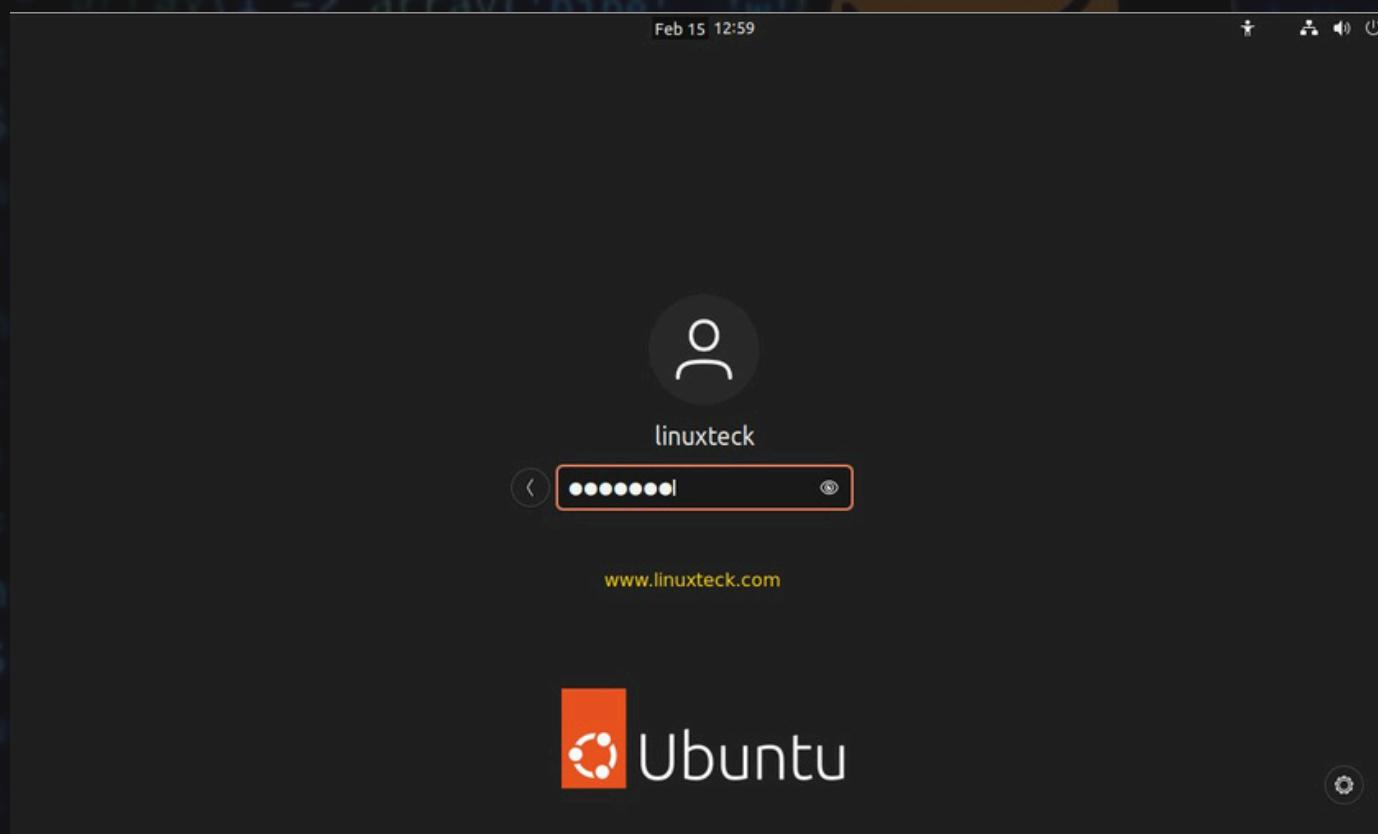
>

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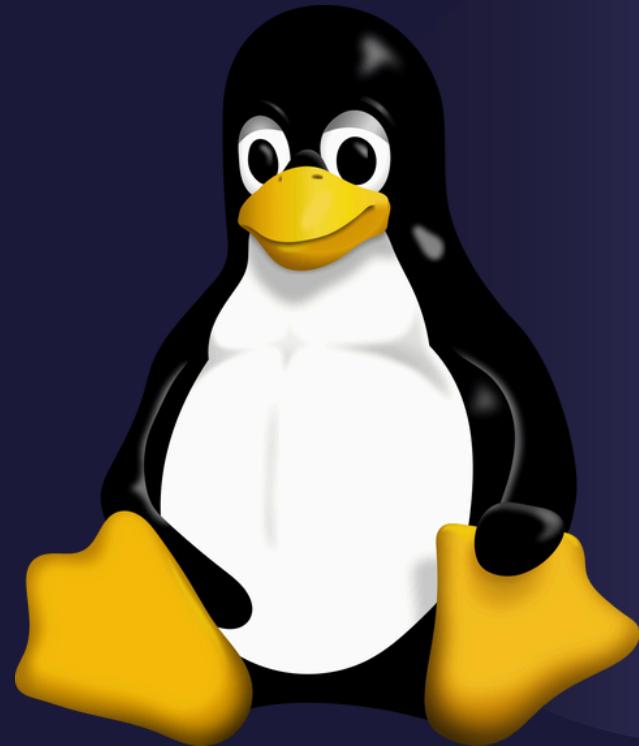
> Retrieving file 75 of 147

Skip

READY TO USE !



USER MODE AND KERNEL MODE



Kernel mode

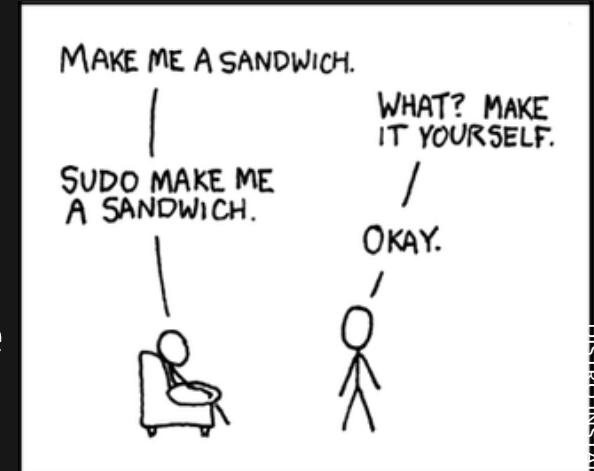
- A **kernel** is a software program which is used to access hardware components of a computer system. Kernel works as a middleware software for hardware and application software/user programs.
- As discussed before, in **kernel mode**, you can access system resources directly.
- It is not possible to run all processes in the kernel mode because if a process fails the entire operating system might fail.
- **Eg:** File management system calls read, write, create, delete, open, and close files.

User mode

- The system is in **user mode** when the operating system is running a user application such as handling a text editor.
- User mode programs are less privileged than user-mode applications and are not allowed to access the system resources directly. If it needs access, it must switch to the kernel mode.
- In user mode, processes get their own address space and cannot access the address space which belongs to the kernel. So the failure of one process will not affect the operating system. If there is an interrupt, it only affects that particular process.

sudo

- By default, most linux distros have the user normally interact as a non privileged user for security reasons.
- This also means that normally a user cannot do things like installing system-wide programs on a system,
- "**sudo**" solves this problem by granting temporary access to run a command as the "**superuser**" or "**root**" user; which has complete control over the system
- Its like "run as administrator" on windows, ***but on steroids***
- One should use this with care and not spam it everywhere





FUN TOOLS



Now that you have a terminal, let's have some fun!

Games:

- Have some fun by running “**worm**”, “**tetris**”, “**rogue**” and more

```
~> sudo apt install bsdgames bsdgames-nonfree|
```

Aesthetic:

- “**cbonsai -li**”
- “**cmatrix -r**”
- “**sl -d**”

```
~> sudo apt install cbonsai cmatrix|
```

Funny:

- “**fortune -s | cowsay -r | pv -qL 500 | lolcat**”
- “**fortune -s | toilet -f fullcyrillic.tlf | pv -qL 100 | lolcat**”

```
~> sudo apt install fortune-mod cowsay toilet pv lolcat|
```

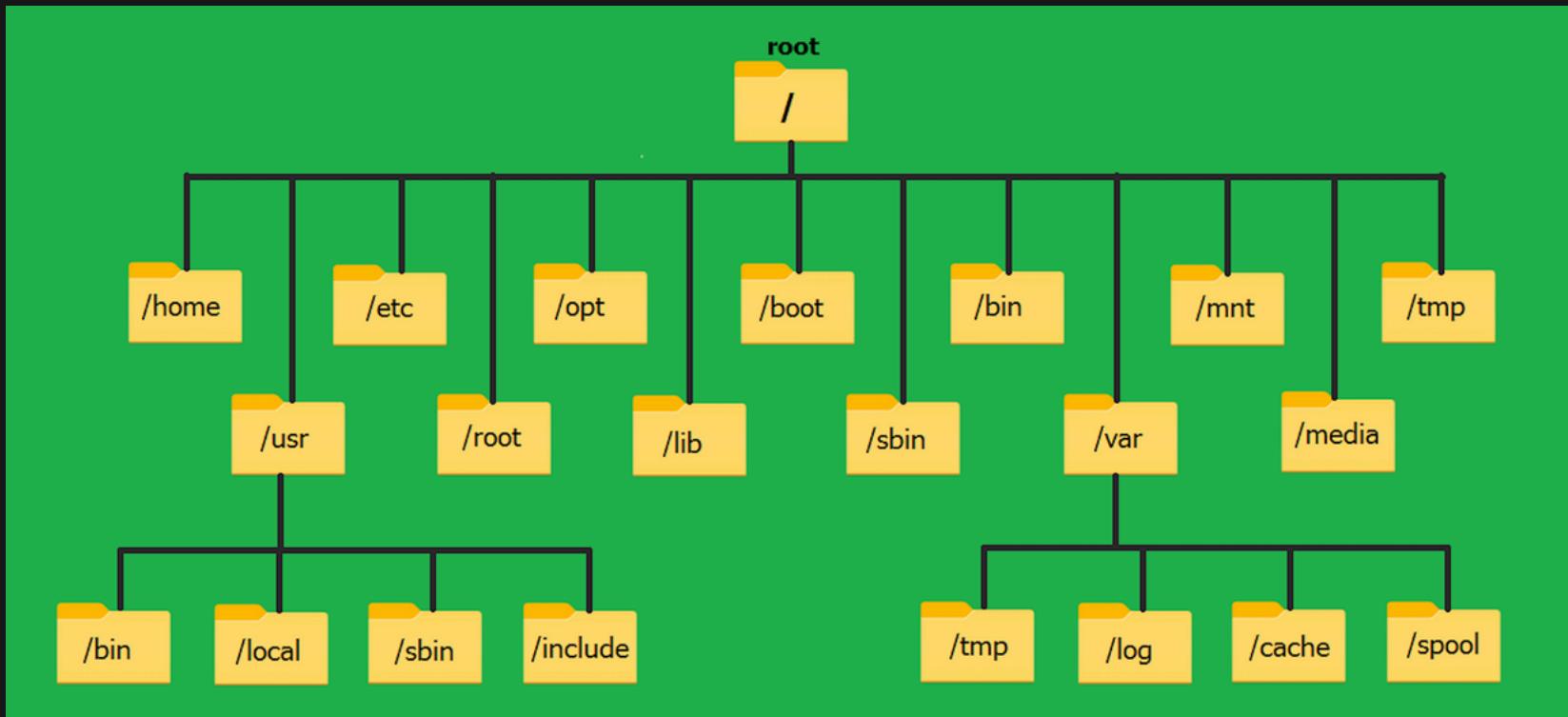
III

LINUX FILE SYSTEM

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File System



File System

- home - Home directories for individual users
- usr - Secondary hierarchy
- etc - Host-specific system configuration
- root - Home directory for the root user
- boot - Static files of the boot loader
- bin - Essential command binaries
- var - Variable data



PACKAGE MANAGERS



First of all, what is a package?

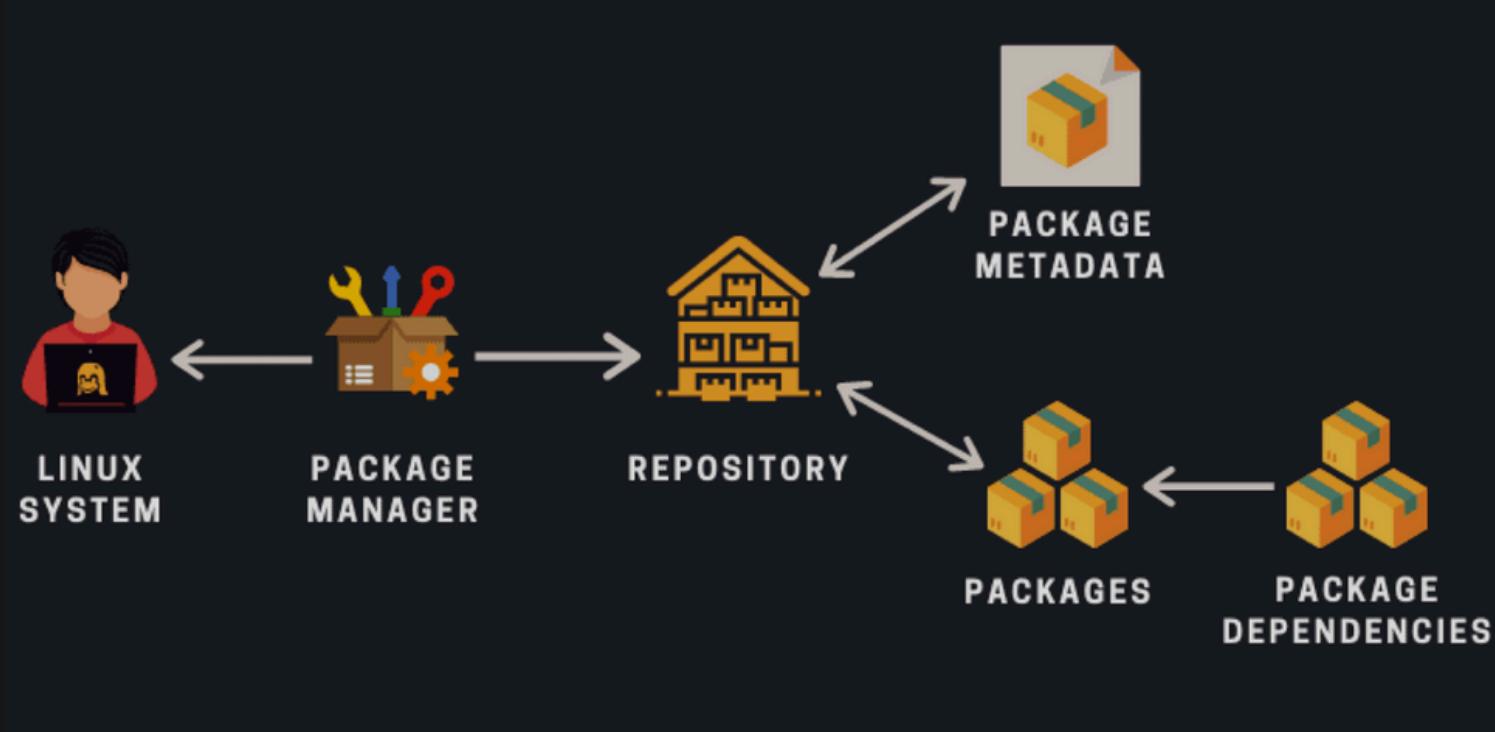
- A package is usually referred to an application but it could be a GUI application, command line tool or even a software library.
- A package is essentially an archive file containing the binary executable, configuration file and sometimes information about the dependencies.
- In older days, software used to installed from its source code. You would refer to a file (readme) and see what software components it needs, location of binaries. You will have to compile the software or on your own along with handling all the dependencies on your own.

First of all, what is a package?

- To get rid of this complexity, Linux distributions created their own packaging format to provide users ready-to-use binary files (precompiled software) for installing software.
- It is like baking a cake versus buying a cake.
- To use the packaging systems, you need a package manager.



Back to Package Managers



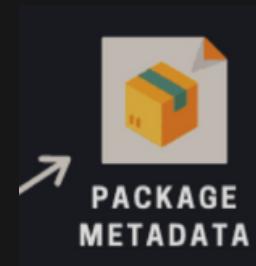


Repository

- Almost all Linux distributions have software **repositories**, which is basically a collection of software packages.

Package Metadata

- Metadata** files contains information like the name of the package, version number, description of package, repository name etc.
- Your system's package manager first interacts with the metadata. The package manager creates a local cache of metadata on your system.



Packages and Package Dependencies

- When you run the installation command of your package, the package manager refers to the cache. If it finds the package information in the cache, it connects to the appropriate repository via internet and downloads the package first before installing on your system.
- A package may have **dependencies**, ie, it requires other packages to be installed. The package manager often takes care of the dependencies and installs it along with the package you are installing.
- Similarly, on removing programs using the package manager, it either removes the dependencies for you or notifies you that there are unused packages that may be cleaned.

Examples of Package Managers

APT

- APT (Advanced Package Tool) is the most popular package manager for Debian-based Linux distributions such as Ubuntu and Mint.
- It is a powerful command-line package management tool which can install, remove, and build packages. It also provides tools for searching, managing, and querying information about packages.
- Packages are taken from online repositories, or they can be installed from local media.

code

Examples of Package Managers

APT

Operation	Command
installing a package	<code>sudo apt install <package name></code>
removing a package	<code>sudo apt autoremove <package name></code>
upgrading all packages	<code>sudo apt update && sudo apt upgrade</code>
upgrading distro	<code>sudo apt update && sudo apt distro-sync</code>
search for a package	<code>sudo apt search <query></code>
clean package caches	<code>sudo apt autoclean</code>

Examples of Package Managers

DNF

Operation	Command
installing a package	<code>sudo dnf install <package name></code>
removing a package	<code>sudo dnf remove <package name></code>
upgrading all packages	<code>sudo dnf check-update && sudo dnf upgrade</code>
upgrading distro	<code>sudo dnf check-update && sudo dnf upgrade</code>
search for a package	<code>sudo dnf search <query></code>
clean package caches	<code>sudo dnf clean all</code>

Examples of Package Managers

PACMAN

Operation	Command
installing a package	<code>sudo pacman -S <package-name></code>
removing a package	<code>sudo pacman -Rns <package name></code>
upgrading all packages	<code>sudo pacman -Syu</code>
upgrading distro	<code>sudo pacman -Syu</code>
search for a package	<code>sudo pacman -Ss <query></code>
clean package caches	<code>sudo pacman -Scc</code>

≡

A GOOD LINUX USER



[Watch video on YouTube](#)

Error 153

Video player configuration error



WHERE TO GO NEXT?

LEARN LINUX BY PLAYING GAMES :

OVERTHEWIRE overthewire.org

LINUX-SURVIVAL linuxsurvival.com

VIM-ADVENTURES vim-adventures.com

HACKERRANK [Hackerrank](https://www.hackerrank.com)

TERMINUS [Terminus](http://terminus-project.org)

BASHCRAWL [Bashcrawl](http://bashcrawl.com)

**COMMAND LINE
MYSTERY** [command line mystery](http://commandline.mystery)

The GNU/Linux Copypasta

I'd just like to interject for a moment. What you're referring to as Linux, is in fact, GNU/Linux, or as I've recently taken to calling it, GNU plus Linux. Linux is not an operating system unto itself, but rather another free component of a fully functioning GNU system made useful by the GNU corelibs, shell utilities and vital system components comprising a full OS as defined by POSIX.

Many computer users run a modified version of the GNU system every day, without realizing it. Through a peculiar turn of events, the version of GNU which is widely used today is often called Linux, and many of its users are not aware that it is basically the GNU system, developed by the GNU Project.

There really is a Linux, and these people are using it, but it is just a part of the system they use. Linux is the kernel: the program in the system that allocates the machine's resources to the other programs that you run. The kernel is an essential part of an operating system, but useless by itself; it can only function in the context of a complete operating system. Linux is normally used in combination with the GNU operating system: the whole system is basically GNU with Linux added, or GNU/Linux. All the so-called Linux distributions are really distributions of GNU/Linux!



**Spam this copy pasta in the
metaKGP slack!**

Sources dump

1. <https://opensource.com/life/16/10/introduction-linux-filesystems>
2. <https://www.differencebetween.com/difference-between-user-mode-and-vs-kernel-mode/>
3. <https://www.linuxfoundation.org/blog/blog/classic-sysadmin-the-linux-filesystem-explained>
4. <https://itsfoss.com/package-manager/>
5. [https://twitter.com/linuxopsys/status/1638572669980274688?
t=yBx0HNwOY9BcxFMnV_mJEA&s=08](https://twitter.com/linuxopsys/status/1638572669980274688?t=yBx0HNwOY9BcxFMnV_mJEA&s=08)
6. <https://wiki.archlinux.org/title/Pacman/Rosetta>