BAHIR DAR UNIVERSITY

BAHIR DAR INSTITUTE OF TECHNOLOGY

FACULTY OF COMPUTING

OPERATING SYSTEM AND SYSTEM PROGRAMMING

INDIVIDUAL ASSIGNMENT

XUBUNTU OS

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Introduction

Xubuntu is a Linux distribution which means it is community- maintained that is based on Ubuntu, one of the most popular Linux-based operating systems. It is designed to provide a lightweight and efficient desktop experience, making it an excellent choice for older hardware or systems with limited resources. Xubuntu uses the Xfce desktop environment, known for its speed, low resource usage, and user-friendly interface.

Xubuntu 24.10, also known as **"Oracular Oriole,"** is a community-developed Linux distribution that belongs to the Unix-like operating system family. It is currently in a stable state and operates under an open-source model. The project was initially released on **June 23, 2006,** marking 18 years of continuous development. The latest version, 24.10, was released on October 10, 2024, just six months ago.

Xubuntu supports multiple languages and utilizes the APT package management system for software updates, accessible through the Software Updater and Ubuntu Software Center. The distribution uses the **dpkg package** manager and features a monolithic Linux kernel. Its user land is based on GNU, and the default user interface is Xfce, known for its lightweight and customizable design. Xubuntu is released under various free software licenses, primarily the GPL.

The primary motivation behind Xubuntu's development is to offer a robust alternative to Ubuntu that maintains the core functionalities while being more resource-efficient. We can mention some key motivations here. To provide:

- ✓ Lightweight Performance
- ✓ User-Friendly Interface
- ✓ Community-Driven Development
- ✓ Accessibility
- ✓ Compatibility with Ubuntu Ecosystem

Xubuntu serves as a valuable option within the Linux ecosystem, particularly for those looking for a lightweight and customizable operating system. Its strong community, combined with its efficient design, makes it an appealing choice for a diverse range of users, from beginners to experienced Linux enthusiasts.

Objectives

- To install Xubuntu in a virtual environment

- To familiarize with virtualization tools and their configuration

- To document the installation process, including common issues and solutions

- To explore the features and applications available in Xubuntu

- To understand the benefits of using a lightweight operating system in resource constrained environments

- To learn about system customization and performance optimization within Xubuntu

- To assess the user experience compared to other operating systems

Requirements

Hardware requirements: To install and use Xubuntu, you need:

- ✓ Intel or AMD 64-bit processor

- ✓ At least 1GB of memory (RAM)

- ✓ At least 8.6GB of free space on hard disk for installation

But, for smoother experience. The recommended is:

- ✓ 1.5Ghz Dual Core processor

- ✓ 2GB memory

- ✓ 20GB of free space on your hard disk

Software requirements:

- ✓ Bootloader
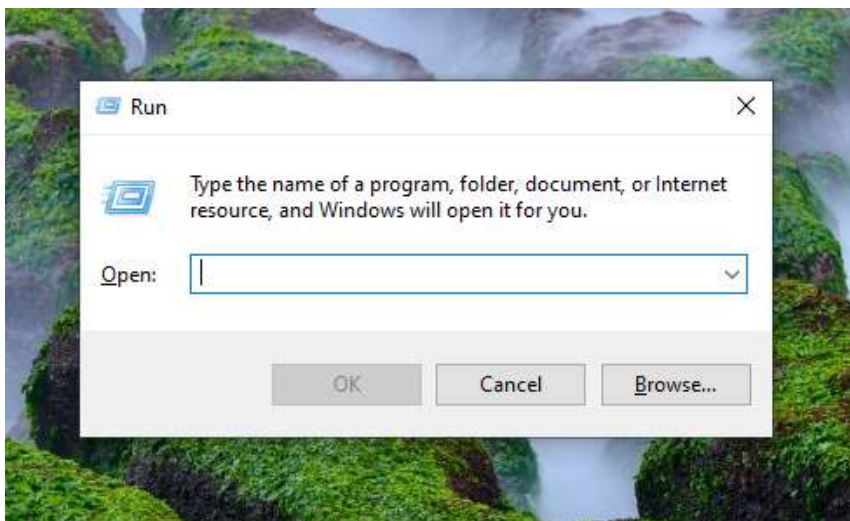
- ✓ File system

- ✓ Internet

If we are going to download it virtually then we need:

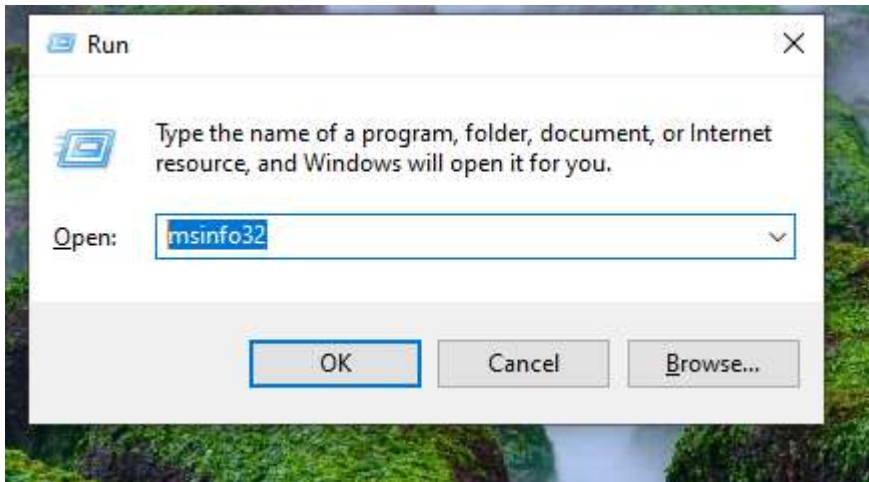- ➤ Hypervisor like VMware, KVM or VirtualBox

Installation Steps

Step 1: first check if your computer has the necessary requirements to download Xubuntu OS
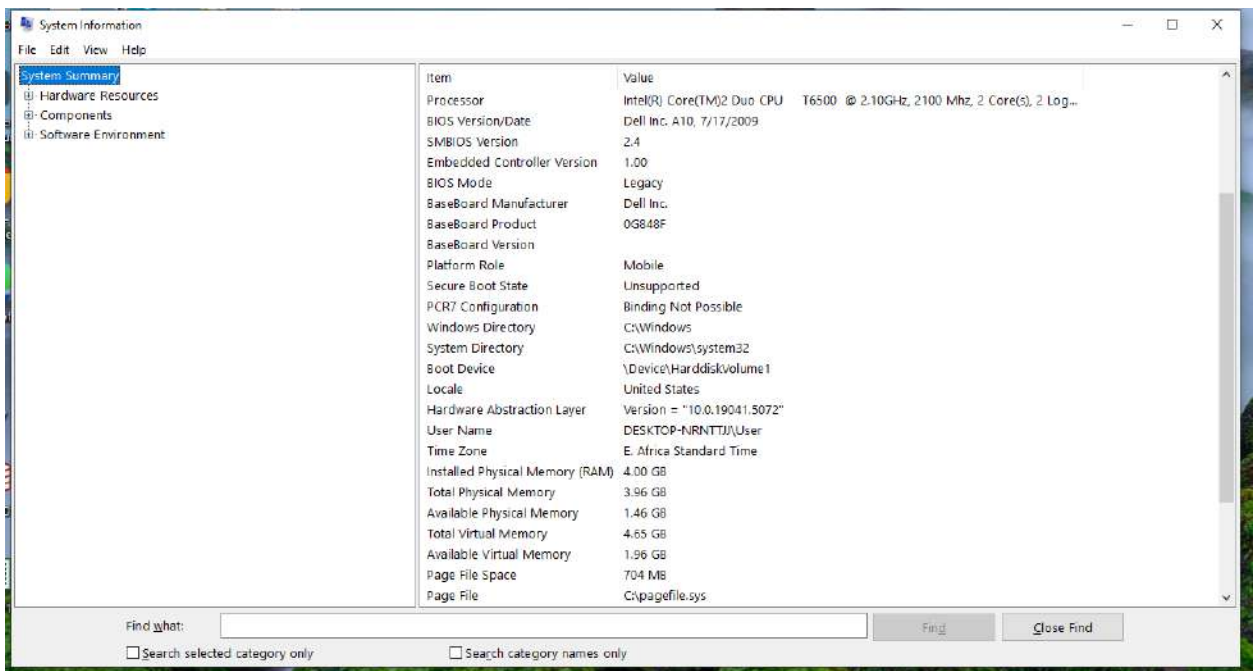
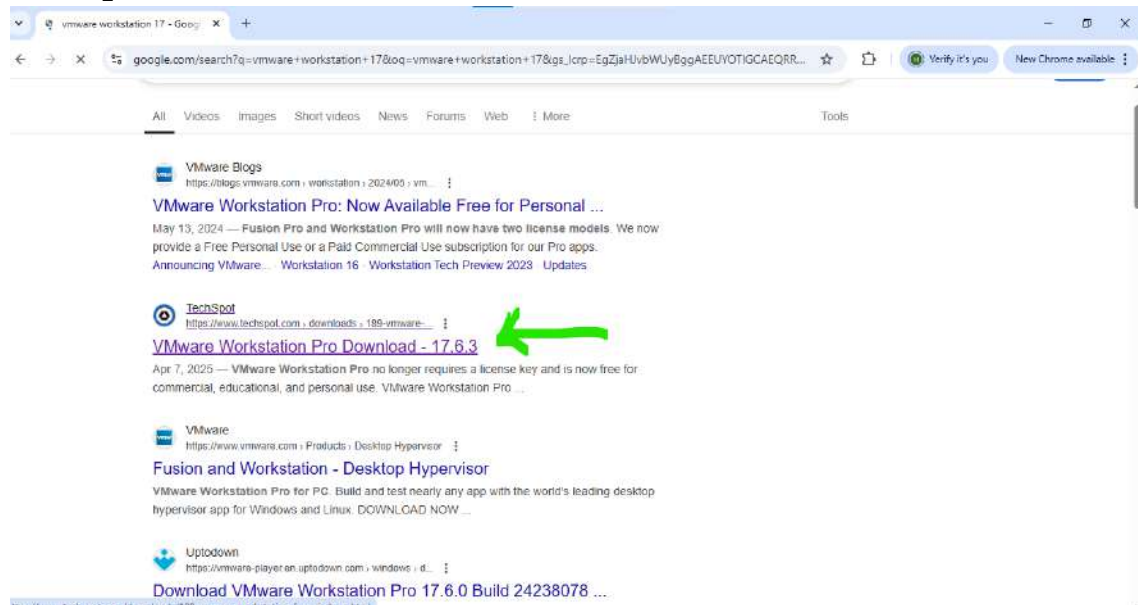- ➤ Press **Windows** + **R** to open a Run dialog

- ➤ Type **msinfo32** and press Enter

➢ After that this page will come and now you can see the system specifications
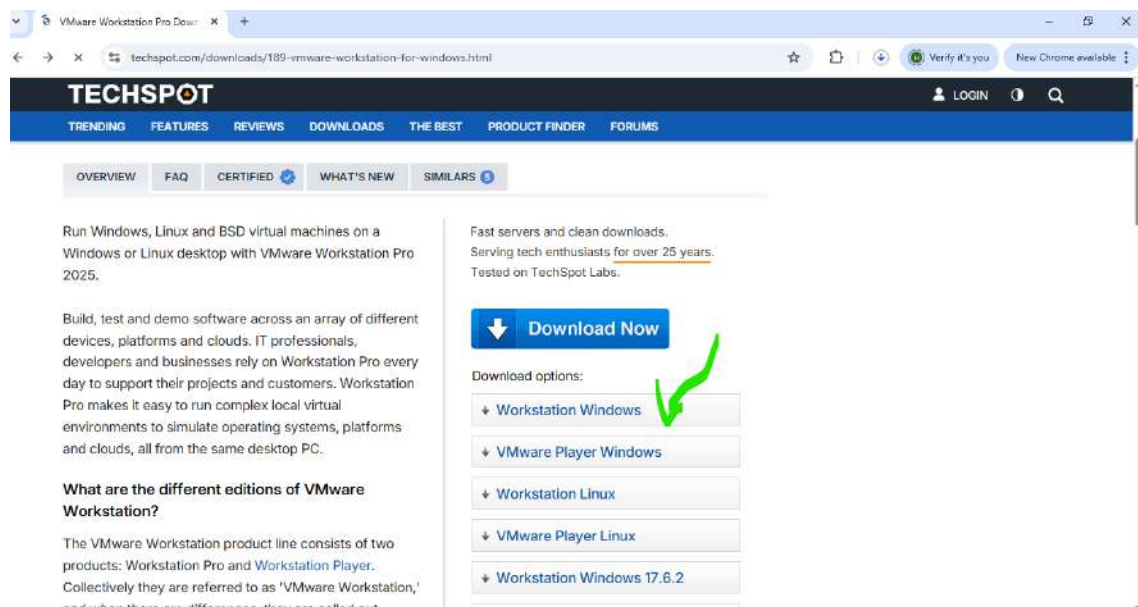

As we can see the computer has an Intel processor and has 4GB RAM and 1.96GB virtual memory , Now to the next step
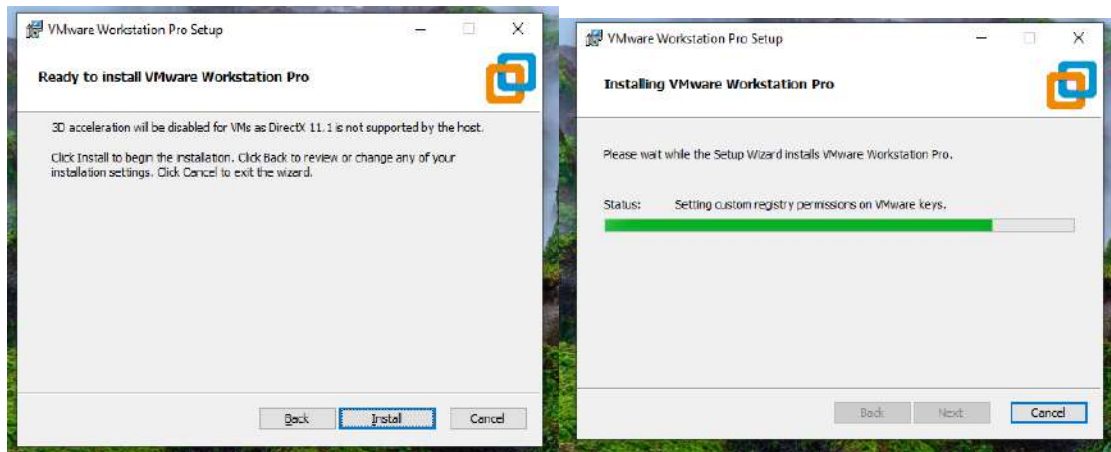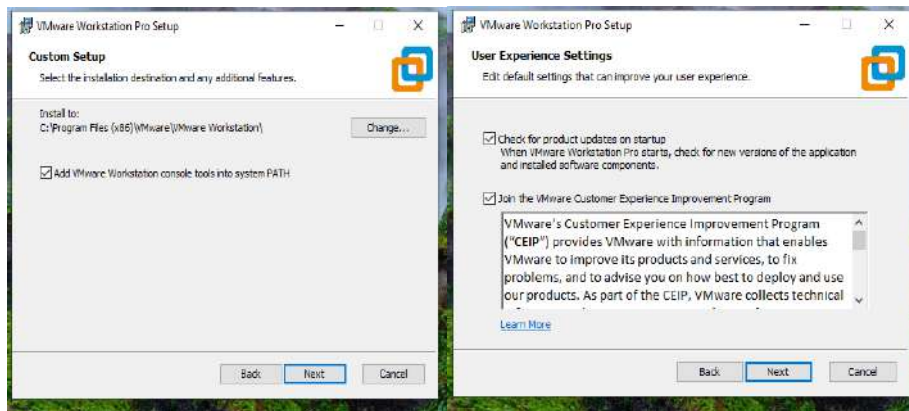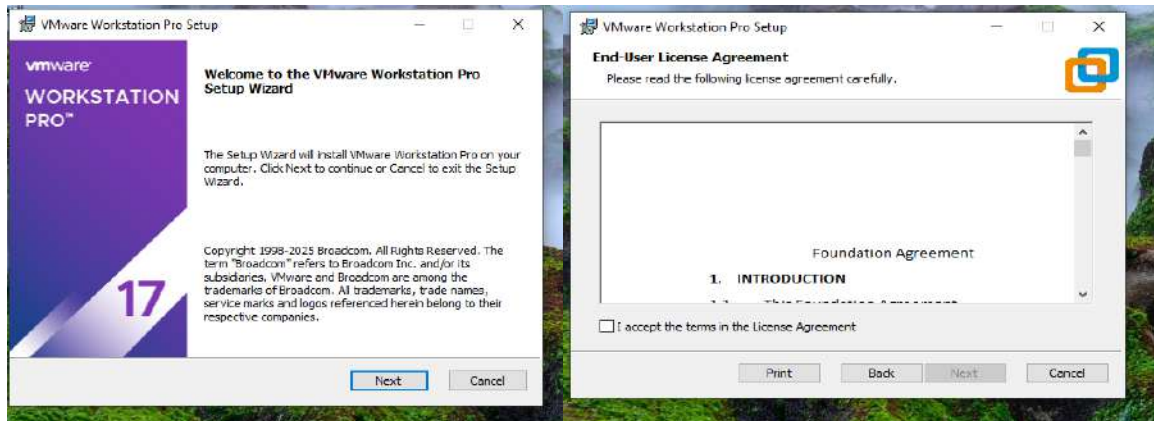
Step 2: Download VMware workstation 17

➢ Type in the search bar 'VMware workstation' and click on the

➢ Then after that we choose for what to download whether it is windows or macOs then we download
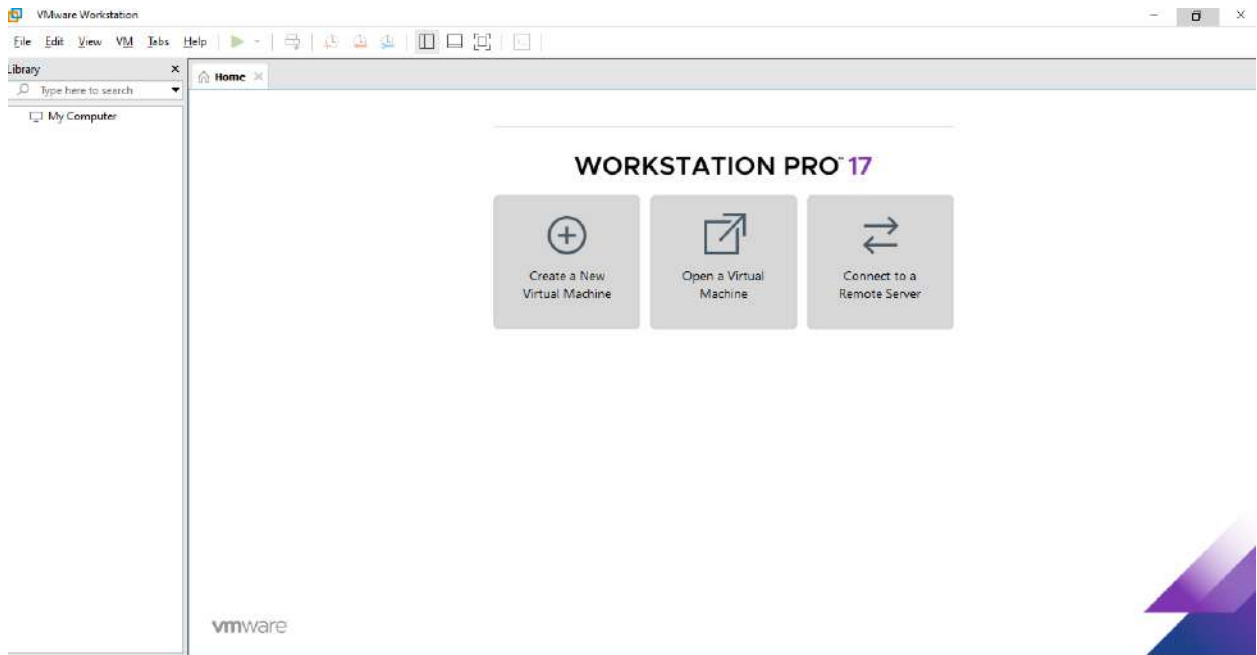

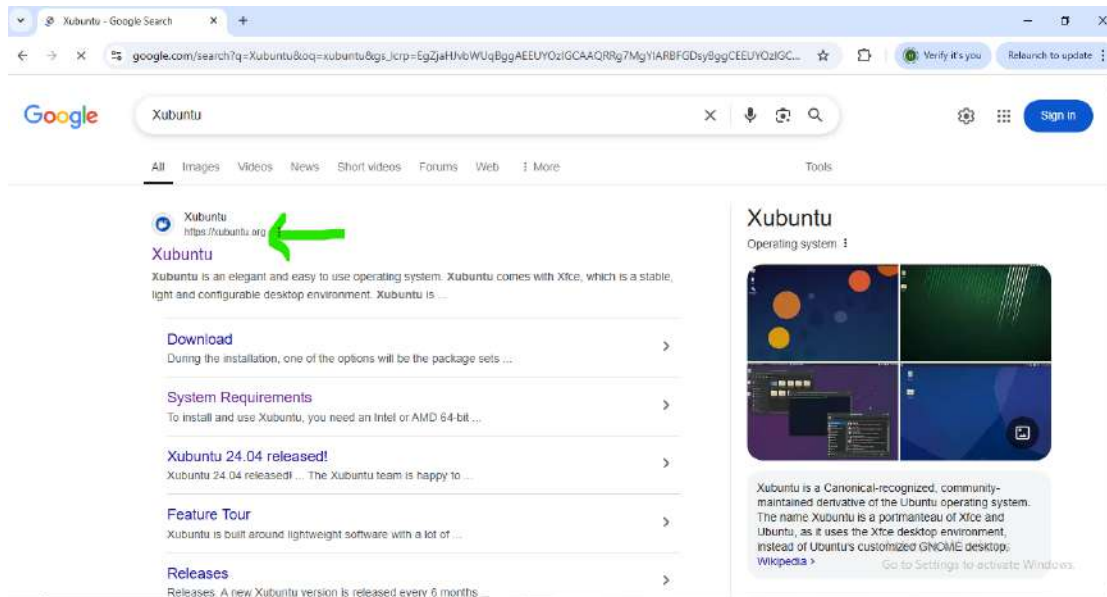➢ Then we install the VMware workstation following this steps

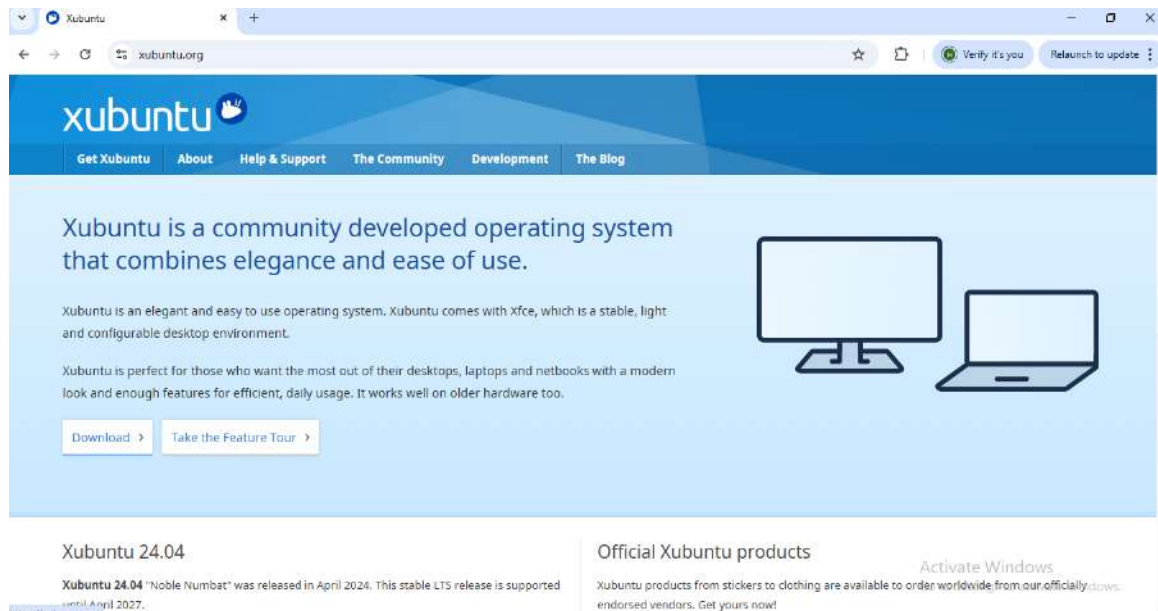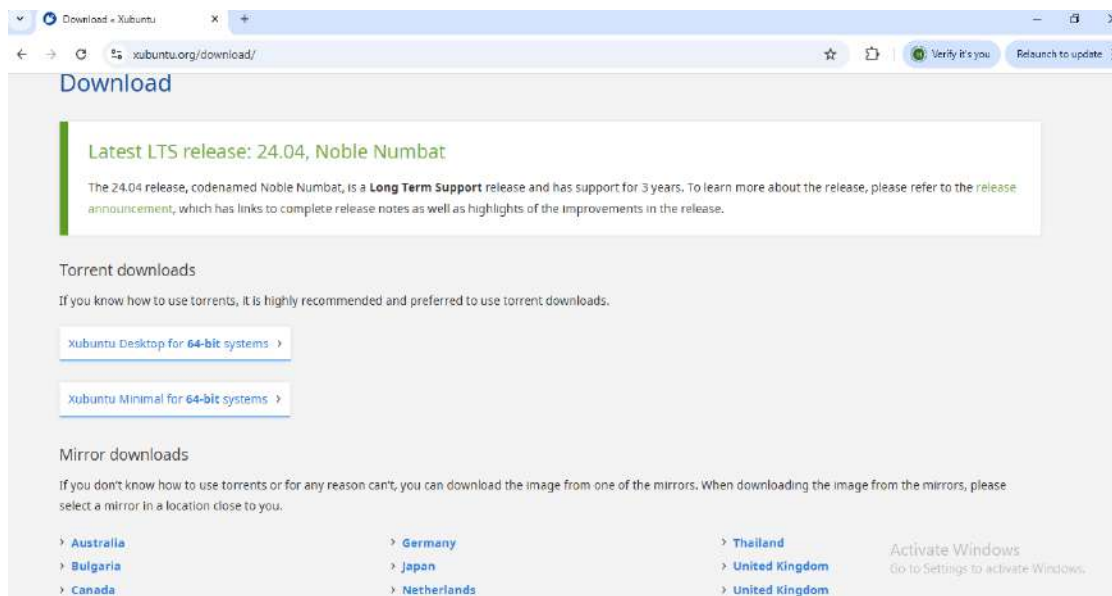➢ After we install it then when we open it. It should look like this:

Step 3: Download Xubuntu OS

➢ Type in 'Xubuntu os' in the search bar and visit the first website that comes which Xubuntu.org

➢ Then we click 'Download' then this page should come
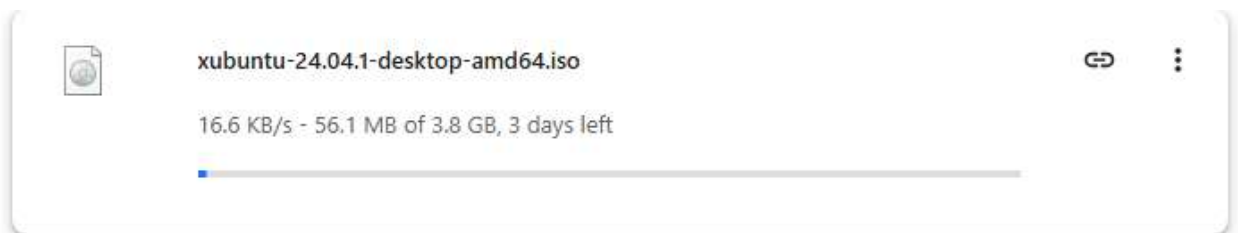

➢ Then we go to the mirror downloads and click on 'Canada'

> Then we download the '**xubuntu-24.04.1-desktop-amd64.iso**'

Step 4: Install Xubuntu on VMware workstation 17

- Open VMware and click on **create a new virtual machine**
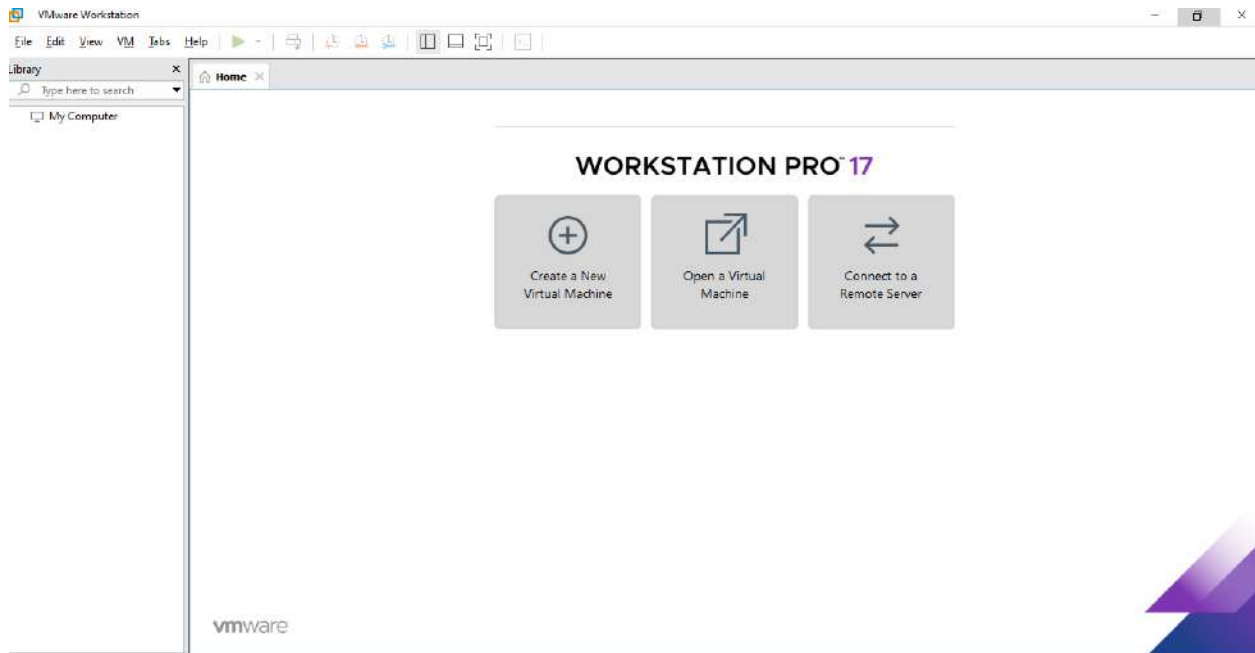
- Then this page will come and then choose "Typical"
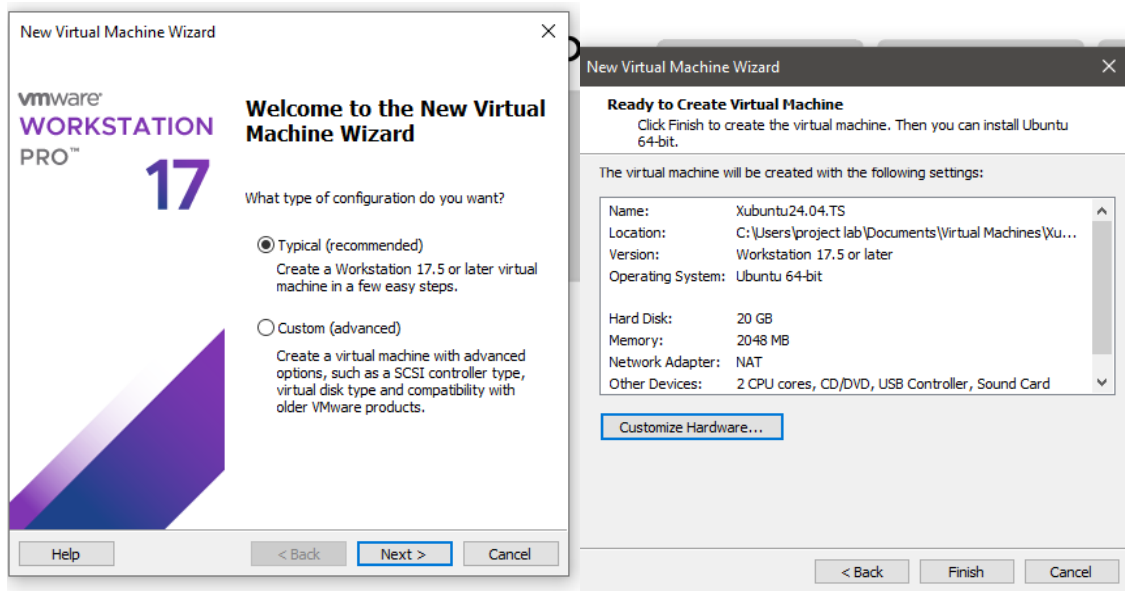
- When we click on "customize hardware" we can customize and remove the usb and sound then we will turn off the accelerate

3D graphics then we close it
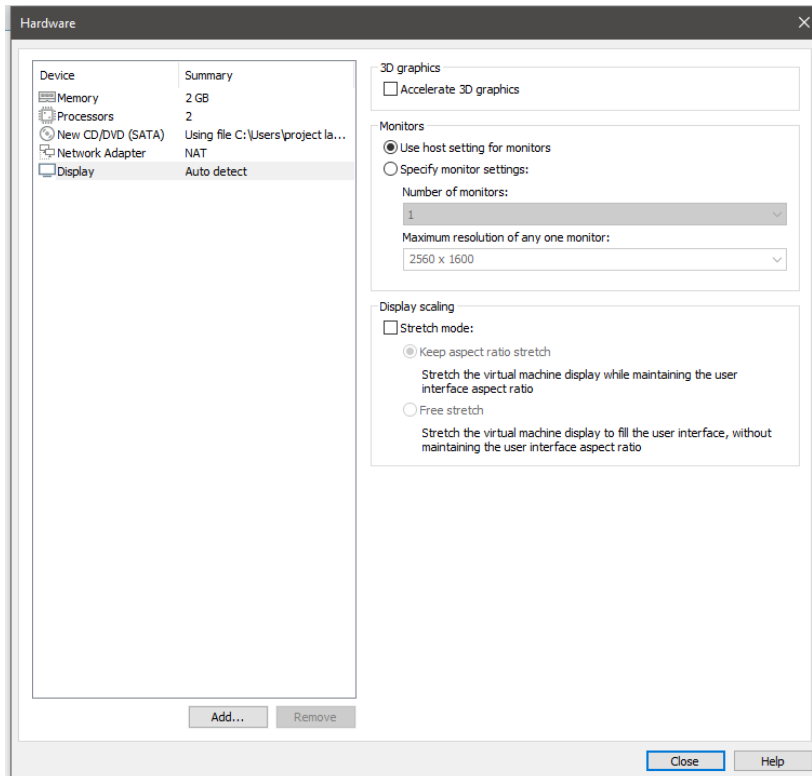
- Then we click finish then now our Xubuntu will be played on the virtual machine in our case which is VMware workstation 17
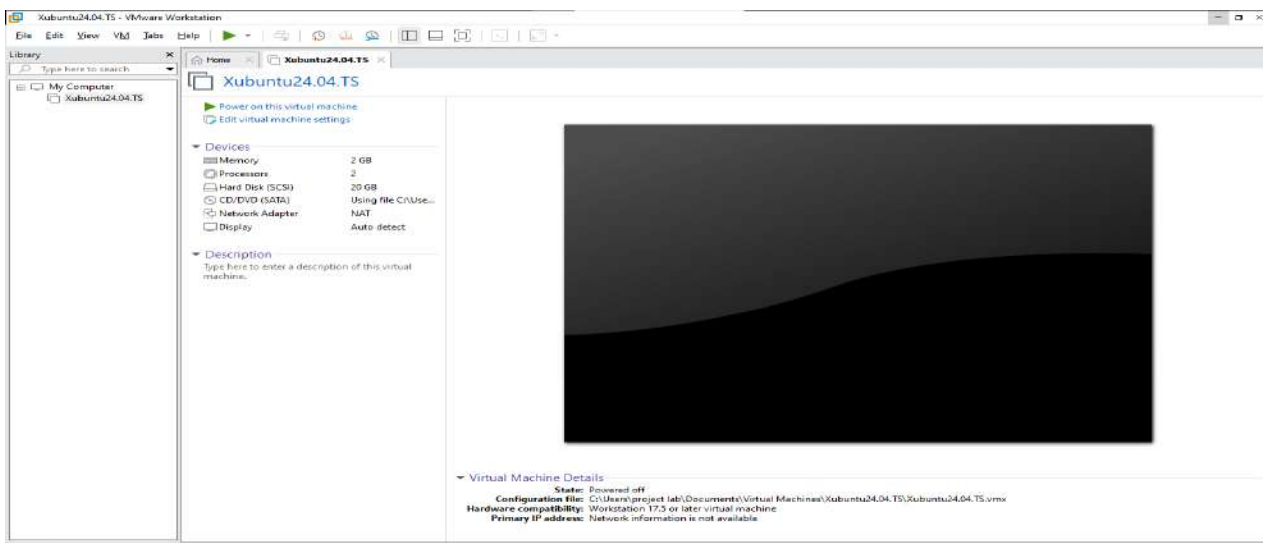
- We will then click on the green triangle above then display it
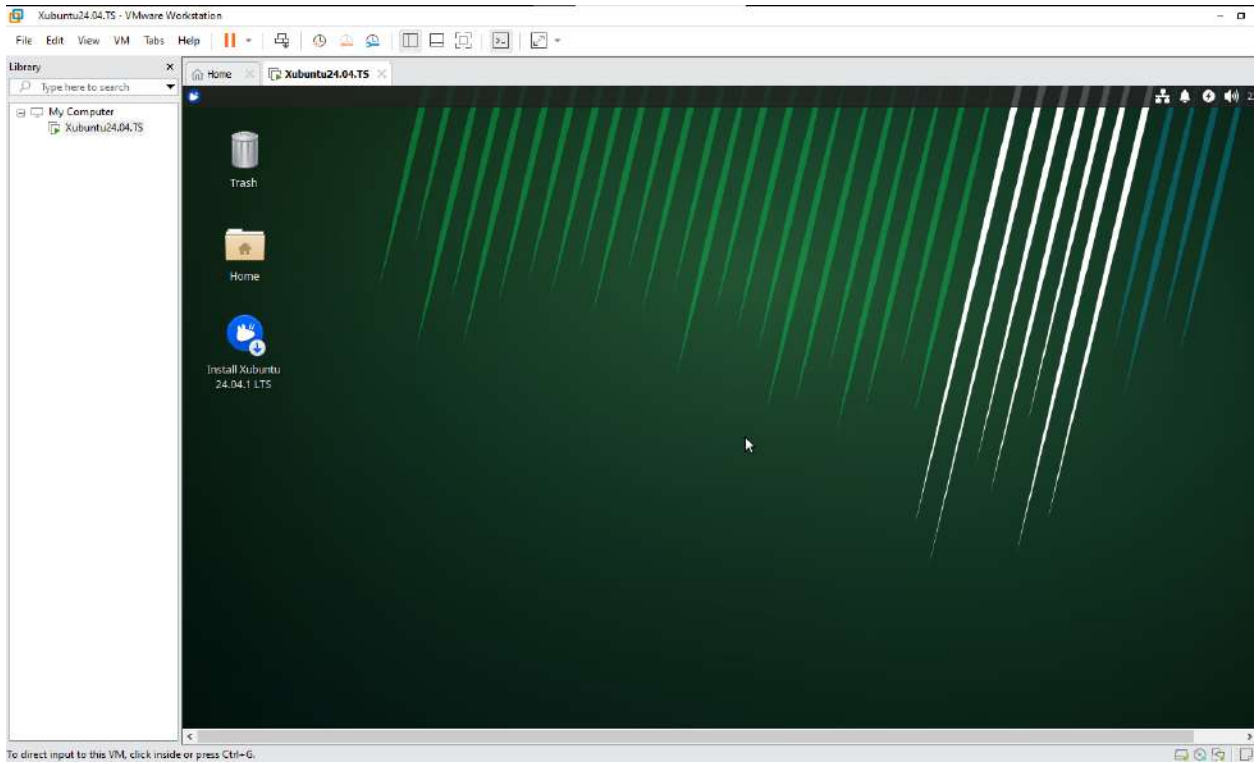
- Then we will install it. First it will make us choose what language then we will choose English
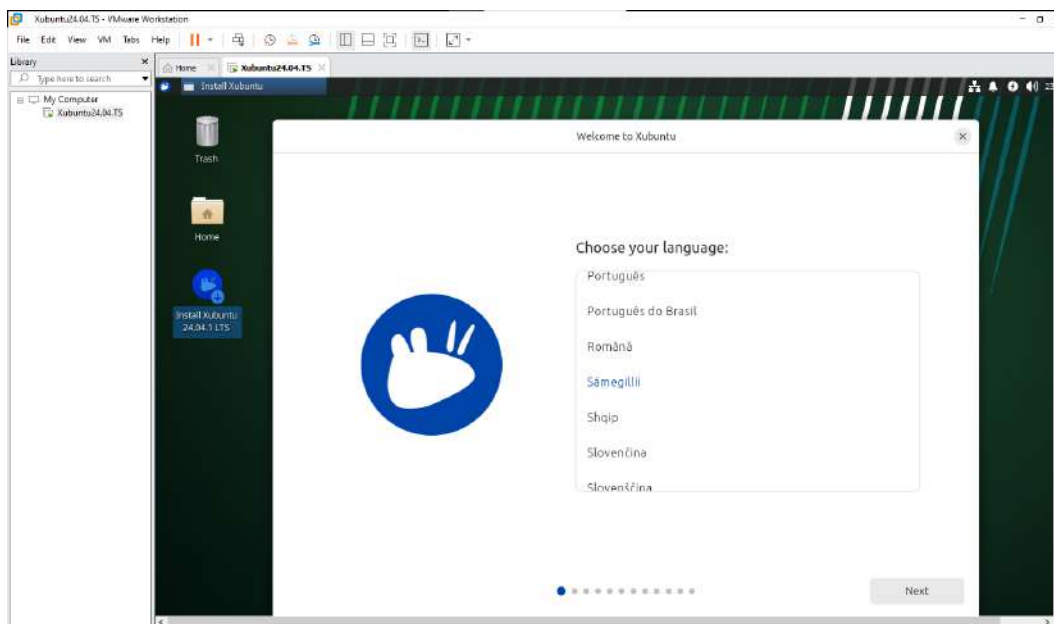
- We will follow these steps in the picture below and choosing

whatever suits us the most
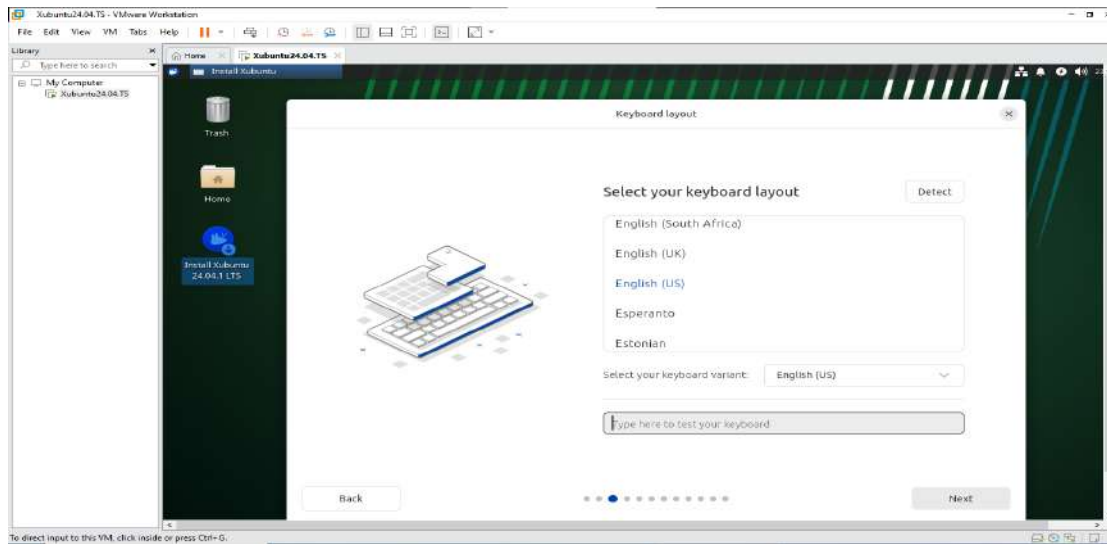
- We want it to be interactive so we will choose that
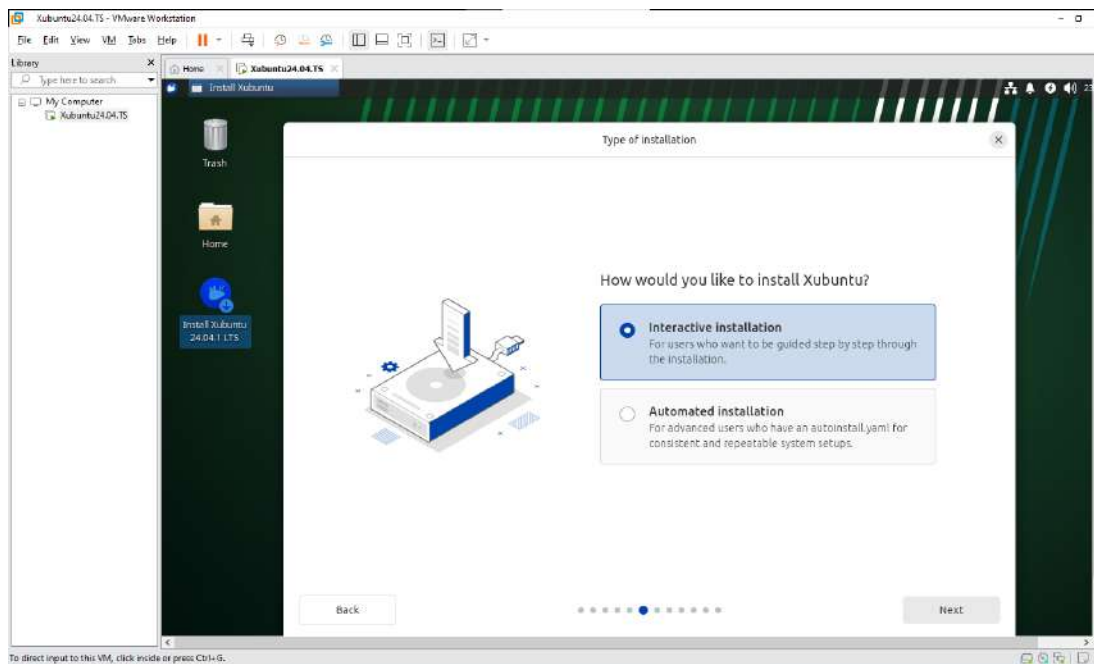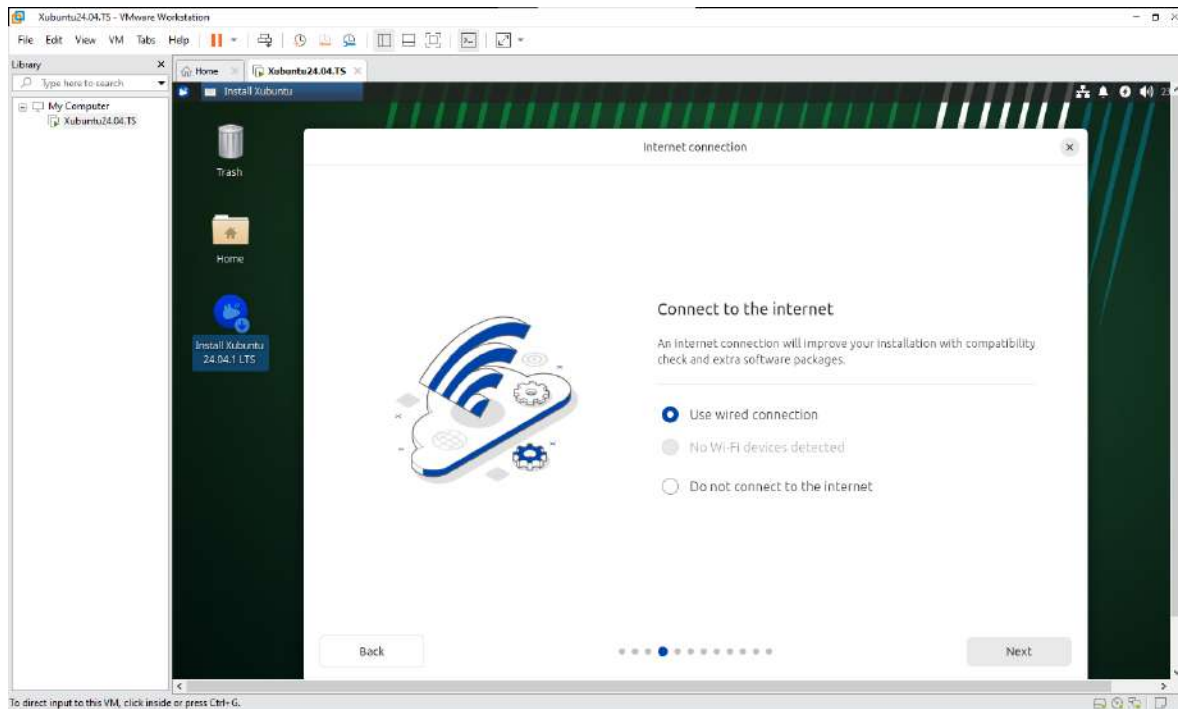
- We will choose the desktop one
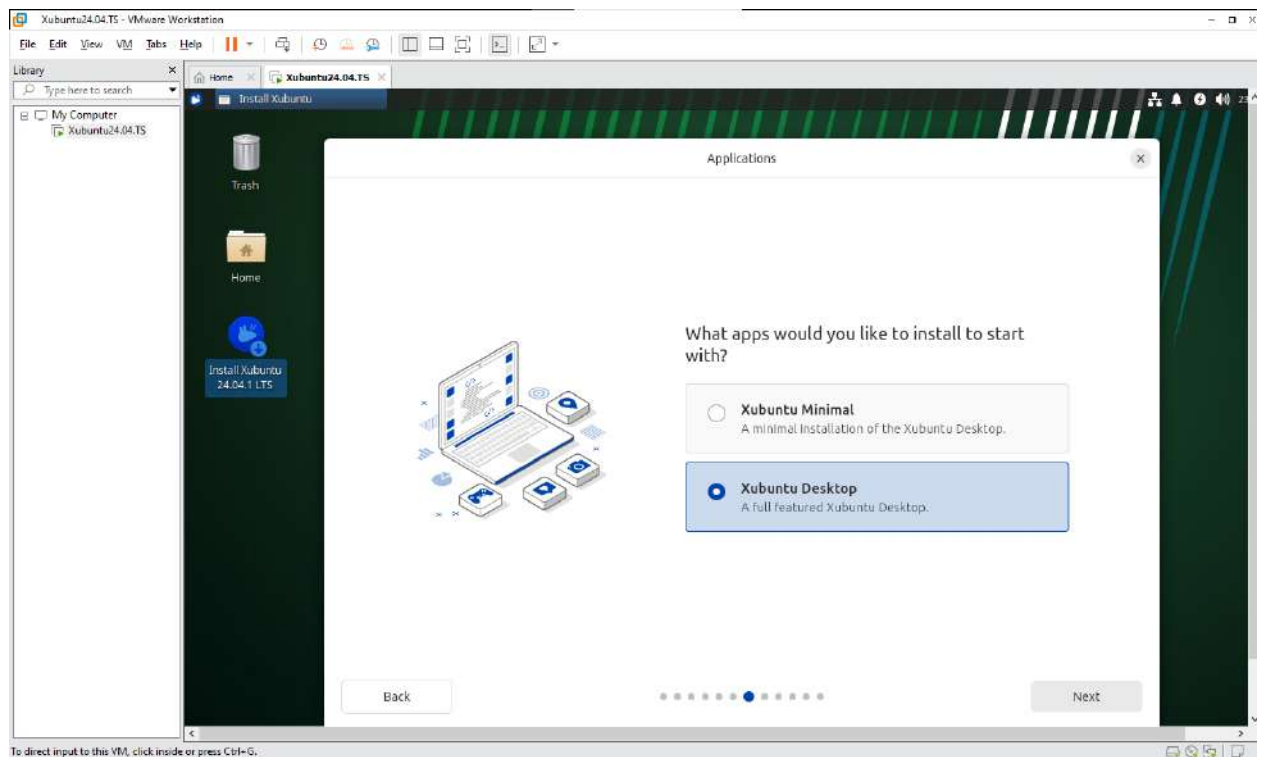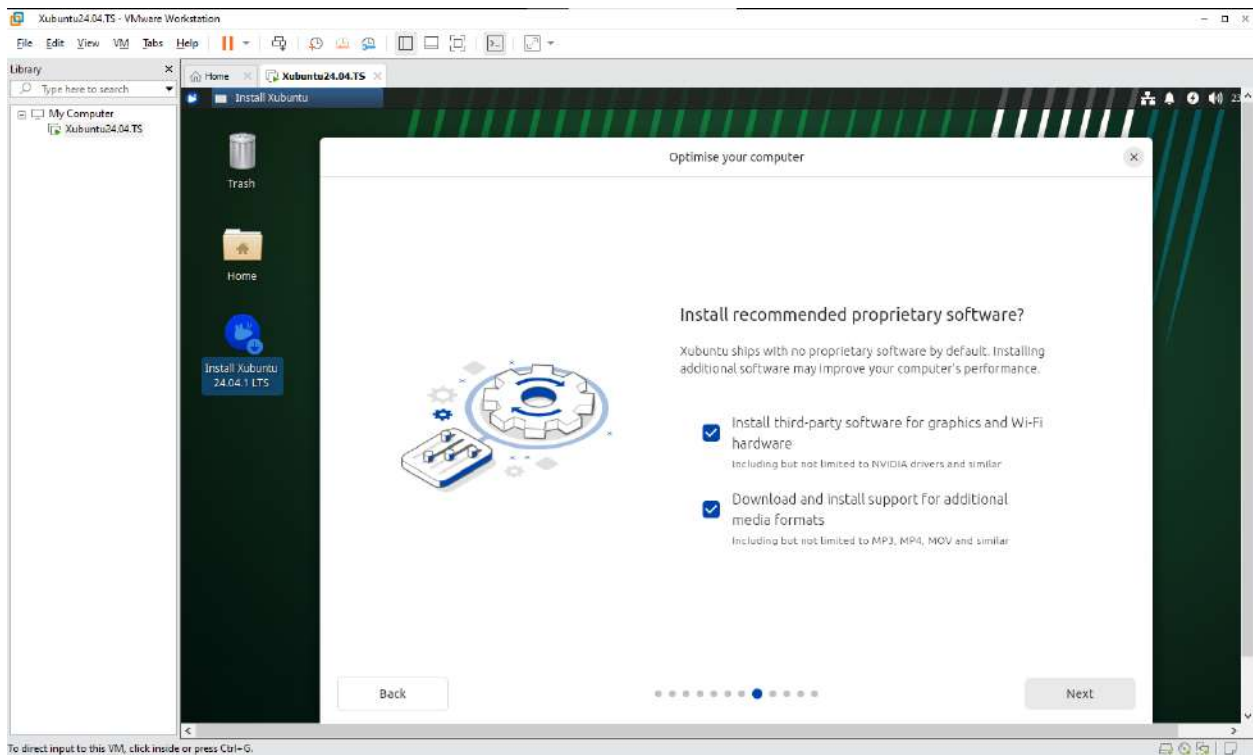
- Here we will choose to erase cause we didn't have anything to lose but if there is another operating system in the virtaul machine then erasing it will cause data loss so be careful
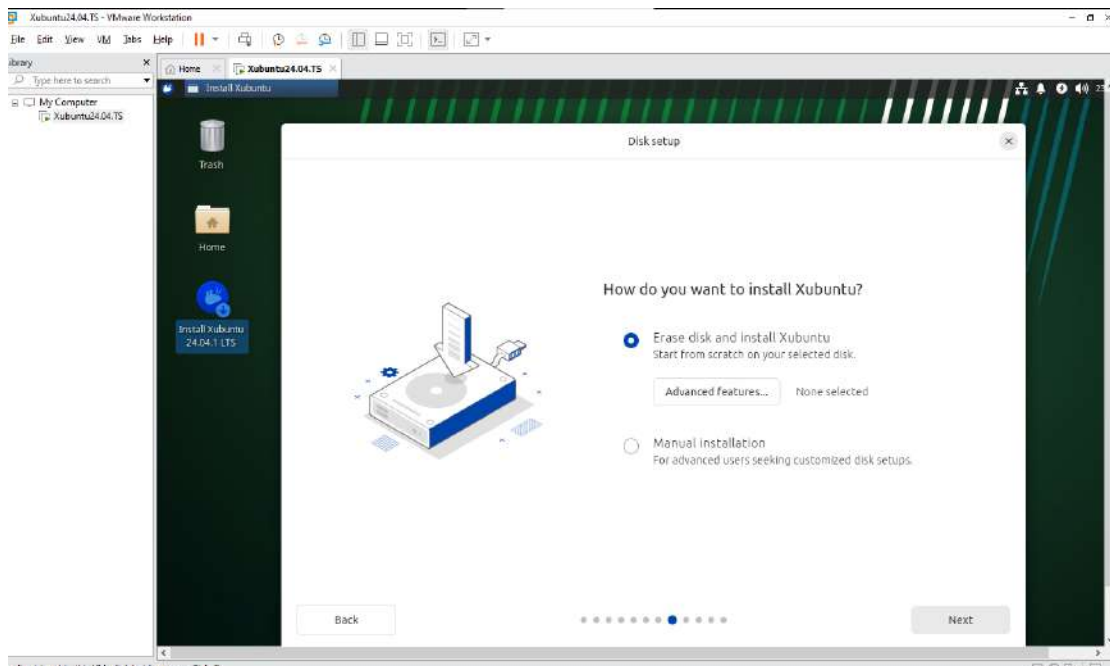
- Then we will create **our account and password** so that when we login after we will have a username and a password in order to view this and it protects the user from unauthorized person to enter
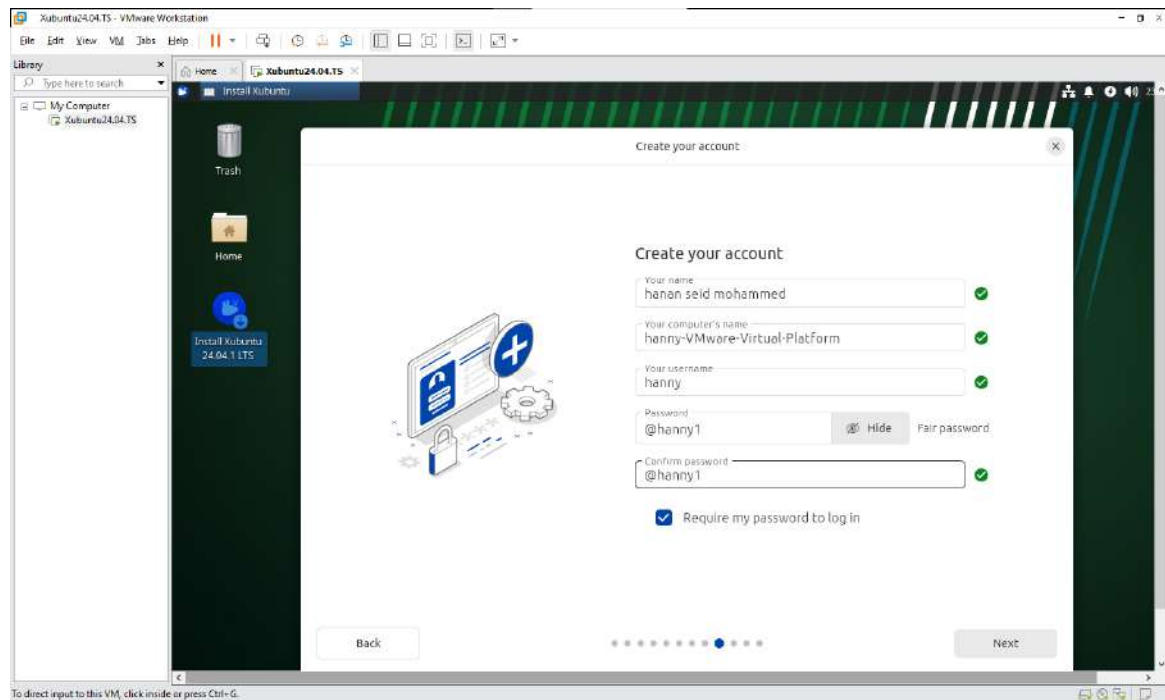
- Here it will show us the location where it is detected you logged in from
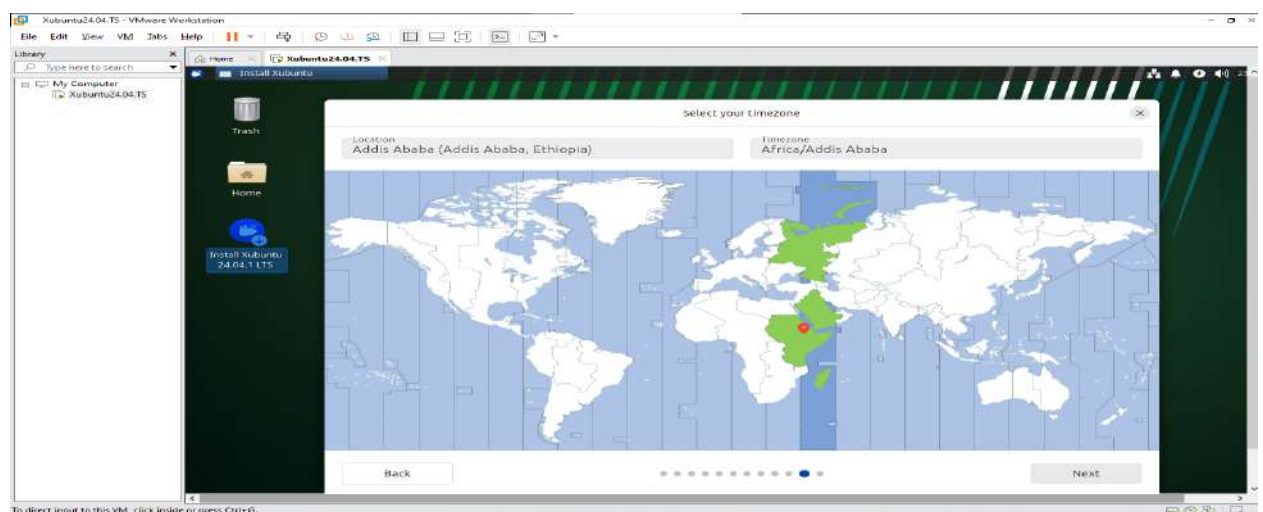
- Then we install
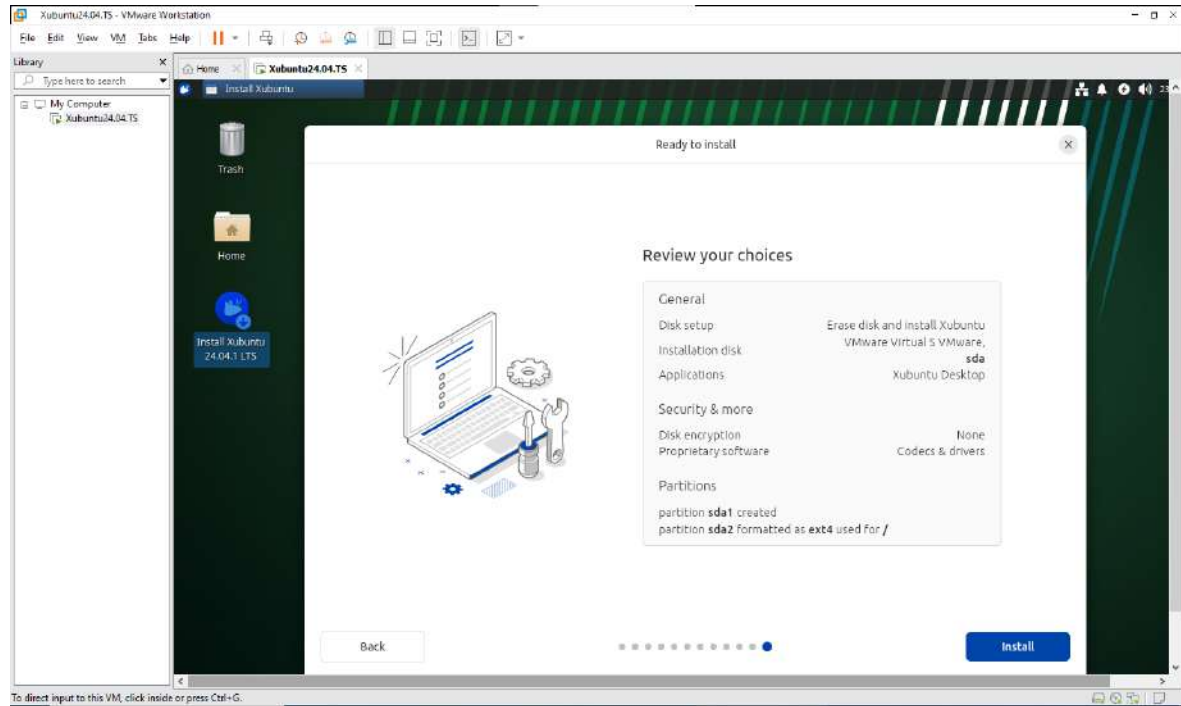
- It might take a few minutes and it should be ready
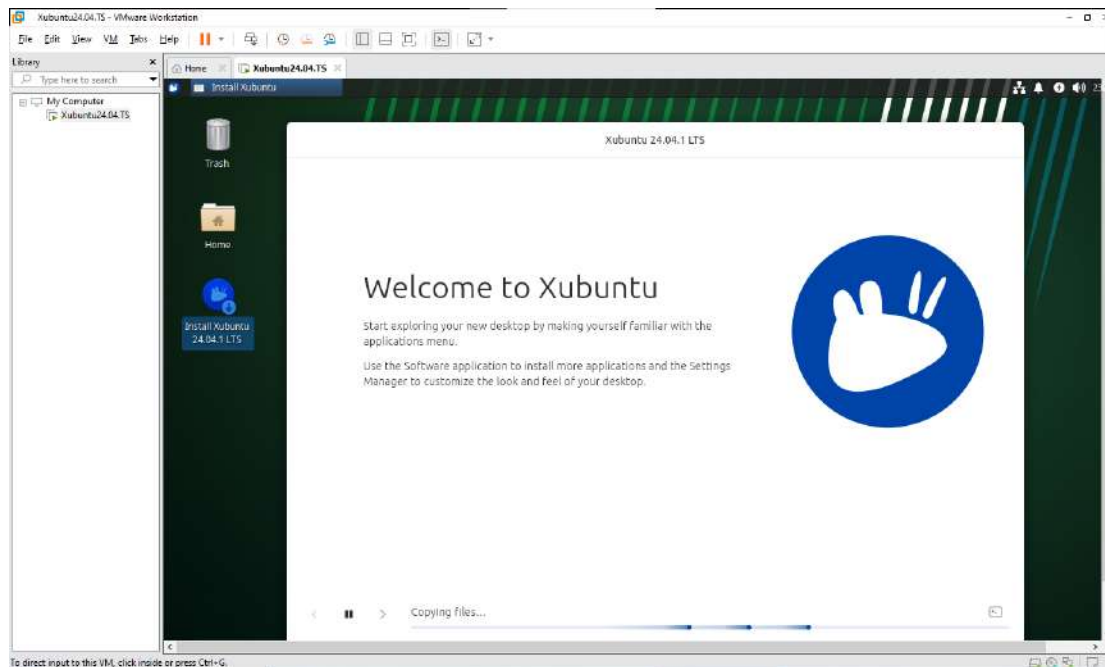
- Now we officially installed Xubuntu on VMware workstation
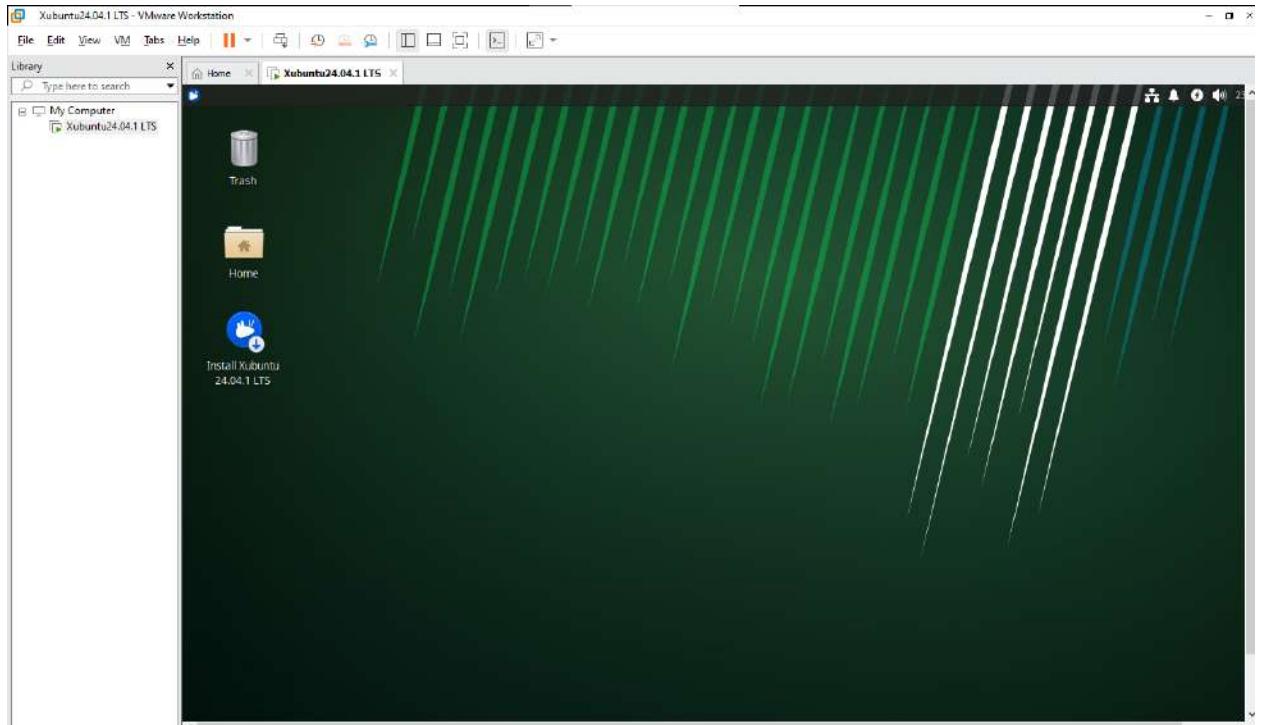
Issues

Whatever we do we will always face some issues and installing Xubuntu OS I have faced 2 problems and I have solved them quickly

1. The internet connection was a bit slow and couldn't download it faster

2. My PC didn't support virtualization cause it was kind of old
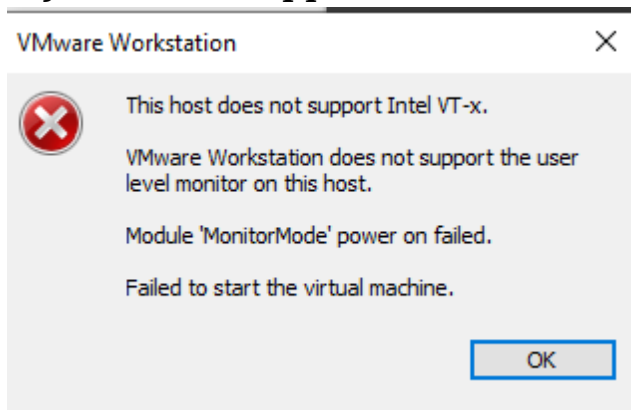
Solution

1. I changed the network I was using and I even turned on hotspot from my phone and by using the internet when everyone was sleeping that way I can have access to it and it was faster that way.

2. I changed a PC and went to the lab and installed it there

File system support

File system support is the ability of an operating system to recognize ,read,write and manage data stored in various file systems. It organizes how data is stored and retrieved on storage devices.

There are file systems that we can use with Xubuntu OS and I primarily chose **Ext4** (Fourth Extended File System)

Ext4 is widely used file system in Linux. It has a lot of features that makes it unique from the others

Key features of Ext4:

- ➢ Journaling feature that helps protect against data corruption which means It logs changes before they are made which made possible recovery in case of system crashes

- ➢ Improved performance over Ext2 and Ext3 in handling large files

- ➢ Uses extents instead of the traditional block mapping which help I.prove performance and reduces fragmentation

- ➢ It can allocate multiple blocks at once

Ext4 is suitable for general purpose computing, servers workstations and media storage.

Why choose Ext4?

Ext4 is a popular choice for Linux users for:

- ➢ Improved performance
- ➢ Reliability
- ➢ Larger file and volume sizes
- ➢ Backward compatibility
- ➢ Advanced Features like online defragmentation
- ➢ Flexibility

Advantages of Xubuntu OS

There are several advantages of having Xubuntu as your operating system. It is:

➢ Lightweight and fast which leads to resource efficiency and it is primarily designed to run efficiently on older hardware with limited resources

➢ User friendly interface that has an intuitive design. The Xfce desktop is very straightforward making it easy for beginners

➢ Flexible desktop environment that can change based on the preference of the user

➢ Stable and reliable because it is based on Ubuntu so it inherits Ubuntu's stability and reliability

➢ Users can access to Ubuntu packages because it has vast unbuntu repositories

➢ Suitable for all users

Disadvantages of Xubuntu OS

There may be a lot of advantages but there are also a few disadvantages.

➢ Limited features compared to heavier desktop environments meaning there are fewer built in applications

➢ Less modern look and feel. It is functional but it offers simplicity over aesthetics

➢ Customization complexity. Difficult for new users sometimes

➢ Some software may not be avaliable

Conclusion

In summary, Xubuntu OS stands out as a lightweight and efficient Linux distribution ideal for users looking for a responsive and customizable environment. While it may not offer the same level of visual appeal and built in features as more resource intensive distributions , it's strengths on stability and usability make it a valuable choice for new and experienced users. While Xubuntu is a strong choice for many users ,it does have some limitations that may affect certain users. It is essential to weigh the advantages and disadvantages and then choosing what suits your needs and preferences best.

Future outlook/recommendations

Xubuntu is set for bright future. As more people look for lightweight alternatives to heavy operating systems , it's speed and simplicity will attract users with older computers like myself. With the ongoing support from the Ubuntu community it will continue to relieve updates and new features I am excited to try.

Nonetheless I would highly recommend it for someone who has an older computer and wants that simplicity then Xubuntu is the perfect choice.

Even though Xubuntu is great now but I would recommend somethings to improve and I will list below a few I would like to see an improvement on:

➤ User interface enhancement like updating the default theme and icons to give more of a modern look which is appealing. A fresh design can attract new users

➤ Simplify the installation process , it was easy to install not gonna

lie but if there is new comer who doesn't know ow anything about operating system it could be difficult so simplifying the process means a lot of new users who doesn't have any background on operating system

➢ Better documentation and tutorials I advice them to have their own YouTube channel where they show us how to install it and update it and all of that stuff from installation to advanced customization

➢ Foster a more active community by hosting regular online events from all of the world, webinars and Q&A sessions where users interact with developers and other members so that they know what the user really wants and to provide for their need.

Virtualization in modern operating system

What is virtualization in modern operating system?

Virtualization is a technology that allows multiple operating systems (OS) to run on a single physical machine, sharing resources and acting as if they each had their own dedicated hardware. It uses software that simulates hardware functionality to create a virtual system. This is achieved by creating virtual environments called virtual machines (VMs), using a software called a hypervisor.

Why is virtualization important?

Virtualization offers numerous benefits that are vital for modern operating system:

➢ **Resource Efficiency**: Virtualization maximizes hardware utilization by allowing multiple VMs to operate on a single physical machine. This significantly reduces the amount of idle computing resources, leading to better overall performance and cost-effectiveness.

- ➢ **Cost Savings**: By minimizing the need for multiple physical servers, virtualization reduces hardware acquisition and maintenance costs. Organizations can also lower energy consumption, leading to additional savings on operational expenses. This financial efficiency makes virtualization an attractive option for businesses of all sizes.
- ➢ **Isolation and Security**: Each VM operates in its own isolated environment, which enhances security and stability. Issues in one VM do not impact others, providing a safeguard against potential threats. For instance, if one VM is compromised, the others remain secure, protecting sensitive data and applications from breaches.
- ➢ **Flexibility and Scalability**: Virtualization facilitates rapid deployment of services and applications, allowing organizations to respond quickly to changing business needs. The ability to easily scale resources up or down means that companies can efficiently manage workloads during peak times and optimize resource allocation during quieter periods.
- ➢ **Disaster Recovery and Business Continuity**: Virtualization simplifies disaster recovery processes. VMs can be easily backed up and replicated to off-site locations, ensuring that critical systems can be quickly restored in the event of a failure. This capability enhances business continuity and minimizes downtime, which is crucial for maintaining operational integrity.

How Does Virtualization Work?

Virtualization involves several key components that work together to create and manage virtual environments:

1. **Hypervisor**:
   The hypervisor is a crucial software layer that facilitates the creation and management of virtual machines (VMs). It exists in two forms:
   a. **Type 1 (Bare-metal)**: Runs directly on the physical hardware, optimizing resource management and performance (e.g., VMware ESXi, Microsoft Hyper-V).
   b. **Type 2 (Hosted)**: Operates on top of an existing operating