4ITRC2 Operating System Lab Assignment 1

Study of Ubuntu OS

Introduction

Linux is an open-source operating system kernel developed by **Linus Torvalds** in 1991. It forms the base of many distributions (distros) like Ubuntu, Fedora, Debian, and Arch Linux. Unlike proprietary operating systems like Windows, Linux allows users to modify and distribute the code freely.

What is Ubuntu?

Ubuntu is one of the most popular Linux distributions, developed by **Canonical Ltd.** It is designed for ease of use and is widely used in personal computing, servers, and cloud environments. Ubuntu was first released on **20th October 2004** and follows a predictable release cycle.

Versions of Ubuntu

Ubuntu has two types of releases:

1. **Long-Term Support (LTS) versions** – These are released every **two years** and receive **five years of official support**. Examples:
    - Ubuntu 20.04 LTS (Focal Fossa)
    - Ubuntu 22.04 LTS (Jammy Jellyfish)
2. **Interim (short-term) releases** – These are released **every six months** and receive support for only **nine months**. Example:
    - Ubuntu 23.10 (Mantic Minotaur)

Ubuntu Desktop vs. Ubuntu Server

- **Ubuntu Desktop** is designed for personal computers, featuring a graphical user interface (GUI) and applications like web browsers and office software.
- **Ubuntu Server** is optimized for hosting services, running cloud applications, and managing databases. It typically runs without a GUI to save system resources.

Features of Ubuntu

1. **Free and Open-Source**
    - Ubuntu is free to download, install, and use. Since it's open-source, anyone can modify and share its code.
2. **User-Friendly Interface**
    - Ubuntu uses the **GNOME desktop environment**, which offers a modern, intuitive experience similar to Windows or macOS.
3. **Regular and Predictable Updates**
    - Ubuntu follows a **fixed release schedule**, making it easier for users to plan system upgrades.
4. **Security and Stability**
    - Since Linux-based systems have **built-in user privilege restrictions**, they are less prone to malware and viruses. Ubuntu also provides **automatic security updates**.
5. **Software Management**
    - Ubuntu offers different ways to install software:
        - **APT Package Manager** (via the command line with `apt-get install`)
        - **Ubuntu Software Center** (a graphical app store)
        - **Snap Packages** (self-contained applications that work across different Linux distributions)
6. **System Performance**
    - Ubuntu is **lightweight** compared to Windows, allowing it to run efficiently even on older hardware.
7. **Customization**
    - Users can install different **desktop environments** like KDE, XFCE, and Cinnamon, as well as modify system themes, icons, and functionality.
8. **Support for Developers**
    - Ubuntu is widely used for programming and development, with built-in support for **Python, Java, C++, PHP, and Ruby**.
9. **Cloud and Server Capabilities**
    - Ubuntu Server is one of the most popular operating systems for cloud computing, used in services like **Amazon Web Services (AWS)** and **Google Cloud**.
10. **Compatibility with Multiple Architectures**

- Ubuntu supports **x86, ARM, RISC-V**, and other hardware architectures, making it versatile for different types of devices.

Differences Between Ubuntu and Windows OS

Ubuntu and Windows are two different operating systems, each with unique advantages and limitations.

Feature	Ubuntu (Linux-based)	Windows OS
Cost	Free & Open-Source	Paid (Windows license required)
Customization	Highly customizable with different desktop environments and themes	Limited customization without third-party tools
Security	More secure, fewer viruses and malware	More vulnerable to malware and security threats
Performance	Efficient and lightweight, works well on old hardware	Requires more resources, can slow down over time
Updates	User has full control over updates	Forced updates in Windows 10 and 11
Software Installation	Uses `apt-get` and Snap packages	Uses `.exe` and `.msi` installers
Gaming Support	Limited native support, but can run games via Steam/Proton	Most games are built for Windows
File System	Uses `ext4`, `XFS`, and `Btrfs`	Uses `NTFS` and `FAT32`
Command Line	Uses Bash, which is more powerful than Windows CMD	CMD and PowerShell are less flexible than Bash
Market Share	Mostly used in servers, cloud computing, and development	Dominates consumer and business markets

Which OS Should You Choose?

- If you need an OS for general use, gaming, and compatibility with software like Microsoft Office, **Windows** is a better choice.
- If you need an OS for development, security, or running servers, **Ubuntu** is more suitable.

How to Install Ubuntu on Windows (Using VMware or VirtualBox)

To install Ubuntu over Windows using a virtual machine, follow these steps:

Step 1: Download Required Software

- Download **VMware Workstation Player** or **Oracle VirtualBox**.
- Download **Ubuntu ISO file** from the official Ubuntu website: https://ubuntu.com/download.

Step 2: Create a Virtual Machine

1. Open VMware or VirtualBox and click **"Create New Virtual Machine."**
2. Select the downloaded **Ubuntu ISO file** as the installation source.
3. Allocate RAM (at least **2GB**, recommended **4GB+**) and storage (minimum **20GB**).
4. Complete the setup and start the virtual machine.

Step 3: Install Ubuntu

1. Choose **"Try Ubuntu"** or **"Install Ubuntu."**
2. Select **language and keyboard layout.**
3. Choose installation type (**Normal Installation** or **Minimal Installation**).
4. Set up user details (username, password, and computer name).
5. Wait for the installation to complete and restart the system.

Now, Ubuntu is successfully installed in a virtual machine!