4ITRC2 Operating System Lab

Lab Assignment 1

**Aim**: To install and study Ubuntu OS Name: Rishabharaj Sharma Roll\_no: 23I4059

**To perform**: Install VMware or Virtual Box and Ubuntu over Windows OS

**To Submit**: Study of Ubuntu OS

1. **Introduction (in brief about linux and ubuntu, its versions + some history)**

**Origins of Linux**

Linux, introduced in 1991, is an open-source operating system kernel developed by **Linus Torvalds**. Inspired by the Unix OS, Torvalds aimed to create a free, community-driven alternative to proprietary systems. Linux’s core philosophy revolves around **collaboration, transparency, and customization**, leading to its adoption in servers, embedded systems, and desktop environments. Unlike Windows or macOS, Linux is not a single OS but a family of distributions (*distros*) tailored for diverse needs, such as Fedora (for cutting-edge features), Debian (stability-focused), and Ubuntu (user-friendly).

**Ubuntu: Bridging Accessibility and Open-Source**

**Ubuntu**, derived from the African philosophy meaning *“humanity towards others”*, was launched in 2004 by **Mark Shuttleworth** under Canonical Ltd. It aimed to democratize Linux by offering a polished, beginner-friendly experience. Built atop Debian’s robust foundation, Ubuntu simplified Linux with:

* **Predictable Release Cycles**: A new version every 6 months (April and October).
* **Long-Term Support (LTS)**: Critical for enterprises, LTS versions (e.g., *22.04 Jammy Jellyfish*, *20.04 Focal Fossa*) receive 5 years of security updates.
* **Unique Version Naming**: Adjective + Animal (e.g., *Trusty Tahr*, *Bionic Beaver*), adding a playful touch.

**Historical Milestones**

* **2006**: Introduction of *Edgy Eft* (6.10), marking rapid innovation.
* **2011**: Controversial shift to the **Unity desktop** (later replaced by GNOME in 2017).
* **2016**: Launch of **Snap packages** for universal software distribution.
* **2022**: Emphasis on *WSL* (Windows Subsystem for Linux) integration, boosting developer adoption.

**Uses of Ubuntu**

Ubuntu is widely used in various fields, including:

* **Software Development** – Preferred by developers for coding, testing, and deployment.
* **Cloud Computing** – Major cloud providers, such as AWS and Google Cloud, support Ubuntu.
* **Cybersecurity and Ethical Hacking** – Used by security professionals due to its powerful command-line utilities.
* **Education** – Many educational institutions use Ubuntu for teaching Linux and programming.
* **Enterprise and Servers** – Many companies rely on Ubuntu servers for hosting applications and databases.
* **Embedded Systems** – Used in IoT devices and robotics projects.

Ubuntu's popularity continues to grow due to its **flexibility, security, and strong community support**.

1. **Features of Ubuntu**

Ubuntu comes with a variety of features that make it a strong alternative to other operating systems like Windows and macOS. Some of its notable features are:

* **Open Source and Free:** Ubuntu is completely free to use and modify. The source code is available for developers who wish to contribute or customize it.
* **Security and Stability:** Ubuntu is considered more secure than Windows as it has fewer vulnerabilities. It includes built-in firewall protection and supports regular security updates.
* **User-Friendly Interface:** Ubuntu provides an easy-to-use graphical interface, especially with the **GNOME** desktop environment, which is modern and intuitive.
* **Software Availability:** It has a vast repository of software applications that can be installed via the **APT package manager** or **Snap Store**.
* **Lightweight Performance:** Ubuntu can run smoothly even on old or low-end hardware, making it an efficient OS.
* **Command-Line Power:** The terminal in Ubuntu provides powerful commands for file management, networking, and system operations.
* **Customization:** Ubuntu allows extensive customization, including themes, layouts, and desktop environments such as KDE Plasma, XFCE, and MATE.
* **Better File System Support:** It supports various file systems like **EXT4, XFS,** and **ZFS**, making it versatile for different types of storage.
* **Hardware Compatibility:** Supports most modern GPUs, Wi-Fi cards, and peripherals without additional drivers.
* **Compatibility with Programming Languages:** It supports a wide range of programming languages such as **Python, C, C++, Java, and JavaScript**, making it a favourite among developers.
* **Long-Term Support (LTS):** Ubuntu provides **LTS versions** that receive updates for five years, ensuring long-term stability.

1. **Difference between ubuntu and windows OS.**

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| **Feature** | **Ubuntu OS** | **Windows OS** |
| **License** | Open-source (Free) | Proprietary (Paid) |
| **Security** | More secure, fewer viruses | Prone to malware and viruses |
| **User Interface** | GNOME desktop with dynamic workspaces, extensions, and minimal bloat. | Static interface with Cortana, Start Menu, and ads in free versions. |
| **Customization** | Highly customizable | Limited customization |
| **Target Audience** | Developers, sysadmins, privacy enthusiasts, and Linux hobbyists. | Casual users, gamers, and businesses reliant on Microsoft ecosystems. |
| **Performance** | Lightweight and faster | Resource-intensive |
| **Customization** | Full control over kernels, desktop environments (KDE, Xfce), and themes. | Limited to wallpapers, widgets, and third-party tools (e.g., Rainmeter). |
| **Software** | Open-source apps available | Requires paid software |
| **Gaming** | Limited support | Best for gaming |
| **Updates** | Regular and user-controlled | Automatic and sometimes forced |
| **Command Line** | Strong terminal-based controls | Less emphasis on CLI |
| **File System** | Ext4, XFS, Btrfs | NTFS, FAT32 |
| **Hardware Requirements** | Can run on low-end hardware | Requires high-end specifications |
| **Installation** | Simple and free | Requires license and activation |