**LAB ASSIGNMENT – 1**

**1.INTRODUCTION**

**Introduction to Linux**

Linux is an open-source, Unix-like operating system kernel first created by Linus Torvalds in 1991. Unlike proprietary operating systems such as Windows or macOS, Linux is free to use, modify, and distribute. It forms the foundation of various operating systems, collectively known as Linux distributions (or distros), which can be tailored for different types of hardware and user needs.

**History of Linux:**

* **1991:** Linus Torvalds, a Finnish student, announced the creation of a new operating system kernel called "Linux." Initially, it was based on the MINIX kernel (a Unix-like OS).
* **1992:** The Linux kernel was released under the GNU General Public License (GPL), making it free for anyone to use, modify, and distribute.
* **1994:** Linux 1.0, the first stable version, was released, and it began to gain traction as a free alternative to other operating systems.
* **Late 1990s - 2000s:** Linux distros like Red Hat, Debian, and SuSE became widely popular, and Linux began being used on servers and desktop PCs.

**Linux Versions:** Linux doesn’t have a single version but rather multiple distributions (distros) built on the Linux kernel. Some well-known distributions include:

* **Ubuntu:** A user-friendly distro popular for desktop use.
* **Debian:** Known for stability and robustness.
* **Red Hat Enterprise Linux (RHEL):** A commercial version aimed at businesses.
* **Fedora:** A cutting-edge distro often used by developers.
* **CentOS:** A free version of RHEL, designed for servers.
* **Arch Linux:** A minimalist, rolling-release distro popular among advanced users.

Each Linux version is updated regularly, with stable releases coming every few years. For example, the latest long-term support (LTS) version of Ubuntu as of 2025 is **Ubuntu 22.04 LTS**.

Linux has played a pivotal role in powering everything from web servers and supercomputers to smartphones (via Android).

**Introduction to Ubuntu**

Ubuntu is a popular, user-friendly Linux distribution based on Debian. It was designed to be easy to use and accessible for both beginners and advanced users. Ubuntu is free and open-source, and it has become one of the most widely used Linux distributions for desktops, servers, and cloud computing environments.

Ubuntu is developed and maintained by **Canonical Ltd.**, a UK-based company. It offers a polished and consistent user experience, making it a great choice for those new to Linux while still being powerful enough for experienced users.

**History of Ubuntu:**

* **2004:** Ubuntu was first released in October 2004 by **Mark Shuttleworth** and his company Canonical. It was created with the goal of making Linux more user-friendly and accessible to a broader audience. Ubuntu was based on Debian but with a focus on ease of use, regular releases, and strong community support.
* **2005-2007:** Ubuntu gained rapid adoption, particularly in the desktop space, due to its ease of installation and use. It introduced features such as the **Ubuntu Software Center** and the **GNOME desktop environment**.
* **2006-2009:** Ubuntu began offering **Long Term Support (LTS)** releases. These LTS versions provided five years of security updates and bug fixes, making Ubuntu a stable choice for businesses and enterprise environments.
* **2010 and beyond:** Ubuntu expanded into new areas, such as mobile devices and cloud computing. In 2013, Canonical introduced **Unity**, a new desktop environment designed to work on desktops, tablets, and smartphones.
* **2017:** Ubuntu switched from Unity back to the \*\*GNOME

**2.Features of Ubuntu**

Ubuntu is packed with features that make it one of the most popular Linux distributions. Here are some key features:

**1. User-Friendly Interface**

* **GNOME Desktop Environment (since 2017):** The default desktop environment is sleek, modern, and simple to navigate. It emphasizes ease of use and efficiency, offering a streamlined experience for both beginners and advanced users.
* **Customization:** Ubuntu allows users to customize the look and feel of the desktop environment, including themes, icons, and layouts.

**2. Free and Open Source**

* Ubuntu is entirely free to download, use, and modify. Its source code is open, which means anyone can view, edit, and distribute it under the **GNU General Public License (GPL)**.

**3. Software Center**

* The **Ubuntu Software Center** provides a user-friendly interface to easily search, install, and manage software applications. It supports both free and paid software, and it integrates with the **Snap Store** for additional packages.

**4. Security**

* **Frequent Security Updates:** Ubuntu provides regular security updates, ensuring the system remains protected from vulnerabilities.
* **AppArmor:** A security module that protects applications from accessing sensitive resources or performing unauthorized actions.
* **Firewall and Encryption:** Ubuntu comes with built-in tools for managing firewalls and encrypting files or entire disks, helping safeguard your data.

**5. Long-Term Support (LTS)**

* Ubuntu offers **LTS releases** (Long-Term Support), which are supported for **5 years** with security patches, software updates, and bug fixes. These releases are particularly useful for business or server environments where stability is important.

**6. Hardware Support**

* Ubuntu provides excellent hardware compatibility out-of-the-box, including support for most laptops, desktops, printers, and other devices. It includes a wide range of drivers, reducing the need for additional installation.
* **Ubuntu also has a dedicated "hardware enablement" program** to ensure the latest hardware is supported in newer releases.

**7. Package Management**

* **APT (Advanced Package Tool):** Ubuntu uses APT for package management, making it easy to install, update, and manage software via the command line or GUI.
* **Snap Packages:** Ubuntu supports **Snap**, a universal package format that simplifies software distribution, ensuring that software works across different Linux distributions.

**8. Pre-installed Software**

* Ubuntu comes with essential pre-installed software like **Firefox** (web browser), **LibreOffice** (office suite), **Thunderbird** (email client), and **GIMP** (image editor). These applications cover most everyday tasks right out of the box.

**9. Ubuntu for Cloud & Server Use**

* Ubuntu is widely used in cloud environments and data centers, with easy integration with cloud platforms like **Amazon Web Services (AWS)** and **Microsoft Azure**.
* It also supports **containers** (with Docker and Kubernetes), which is ideal for cloud-native applications.

**10. Multilingual Support**

* Ubuntu supports multiple languages, allowing users to switch between languages easily, making it accessible to people around the world.

**11. Community Support**

* Ubuntu has a large, active community. There are numerous online forums, tutorials, and documentation available to help users. Canonical also provides professional support services.

**12. Cross-Platform Compatibility**

* Ubuntu can run alongside other operating systems in a **dual-boot** setup, allowing users to use both Ubuntu and another OS like Windows.
* **Windows Subsystem for Linux (WSL)** allows Ubuntu to run on Windows, making it easy to run Linux software on Windows.

**13. Software Development Environment**

* Ubuntu is a popular choice among developers due to its robust development tools, including access to compilers, version control systems (e.g., Git), and IDEs (e.g., Visual Studio Code, PyCharm).
* **Snapcraft** and **Flatpak** support for creating and packaging cross-platform applications.

**14. Lightweight and Fast**

* While Ubuntu provides a rich graphical interface, it's optimized to run well on both older and modern hardware. Lighter versions like **Ubuntu MATE**, **Xubuntu**, and **Lubuntu** offer alternative desktop environments for less resource-intensive needs.

**3.Difference Between Ubuntu and Windows OS**

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