**OPERATING SYSTEM**

**LAB ASSIGNMENT 1**

**Introduction:**

**Linux:**

Linux is a open source, Unix-like operating system that was initially developed by Linux Torvalds in 1991. It is based on the Linux kernel, which acts as the core part of the operating system, responsible for managing hardware, processes and system resources. Linux is popular for its security, stability, flexibility, making it widely used in servers, desktop computers , and embedded systems.

Since it is open–source, Linux allows anyone to modify and distribute its source code. This has led to the creation of numerous Linux distributions tailored to different use cases, from server environments to desktop systems.

**History of Linux:**

* **1991**: Linux Torvalds releases the first version of the Linux kernel. It was initially a personal project, but its open-source nature attracted contributions from developers worldwide.
* **1992**: The Linux kernel is licensed under the GNU General Public License (GPL), making it free for anyone to use and modify.
* **1993**: The first Linux distributions, such as **Slackware** and **Red Hat**, are created, allowing users to install and manage the kernel more easily.
* **2004**: Ubuntu is introduced, aiming to make Linux more accessible to general users and providing a polished, user-friendly experience.
* **2010s**: Linux sees increased adoption in cloud computing, mobile devices (e.g., Android), and even desktops, with Ubuntu becoming one of the most widely used Linux distros.
* **Present**: Linux powers a wide range of systems, from servers and cloud infrastructure to smart phones and IOT devices. Ubuntu continues to be a popular choice, particularly for personal desktops and development environments.

**Ubuntu:**

Ubuntu is one of the most popular Linux distributions. It was created by **Mark Shuttleworth**  and his company **Canonical Ltd.** In 2004, aiming to provide a user friendly Linux environment suitable for both beginners and experienced users. Ubuntu is based on Debian, a well known and stable distribution, but focuses on simplicity and ease of use.

Ubuntu is widely recognized for its polished interface, robust package management system, and active community. It comes with many pre-installed applications , including web browsers , office suites , and multimedia tools ,making it a comprehensive operating system for daily use .

**Ubuntu versions:**

Ubuntu follows a regular cycle of two releases every year, one in april and one in October. Ubuntu releases are divided into two categories:

1. **LTS(long term support):**  These releases receive updates for five years and are ideal for users seeking stability and long term support , such as business or servers.

**2. Non- LTS:** These are regular releases that receive updates for 9 months. They are suitable for users who want the latest features and are okay with upgrading more frequently.

Notable Ubuntu versions include:

* **Ubuntu 4.10 (Warty warthog)-**  First release, October 2004
* **Ubuntu 6.06 LTS (Dapper Drake)-**  The first LTS version , June 2006.
* **Ubuntu 12.04 LTS (Precise Pangolin)-**  Popular LTS release.
* **Ubuntu 18.04 LTS (Bionic Beaver)-** Another widely used LTS version.
* **Ubuntu 20.04 LTS(Focal Fossa)-** A recent stable, and widely used LTS release.
* **Ubuntu 22.04 LTS (JMMY jaguar)** – The latest LTS release as of 2025.

**Features of Ubuntu :**

There are some features of Ubuntu-

**1. User- friendly interface-**

* Ubuntu provides a modern and intuitive graphical user interface(GNOME is the default).
* It’s designed to be accessible to users of all experience levels**.**

**2. Open source and free-**

* Ubuntu is completely free to download ,use, and distribute.
* Its open-source nature fosters a vibrant community and allows for customization.

**3. Long term Support Versions-**

* Ubuntu releases Long-term Support versions every two years, which receive updates and security patches for five years. This makes Ubuntu a reliable choice for users who need a stable system for an extended period.

**4. Security**

* Linux-based systems are generally less susceptible to malware than other operating systems.
* Ubuntu includes built-in security features and regular security updates.

**5. Software availability**

* Ubuntu offers a wide range of software through its software repositories.
* It supports various applications for productivity, multimedia and development

**6. Large community and support-**

* A vast and active community provides ample support and resources .
* Extensive online documentation and forums are available.

**7. Customization-**

* Users can customize the desktop environment and system setting to their preferences.

**Difference between Ubuntu and windows OS –**

**1. Open source vs Proprietary:**

* **Ubuntu-**
* It’s based on the Linux kernel and is open source. This means its source code s freely available, allowing users to modify and distribute it.
* This fosters community-driven development model

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* **Windows-**
* It’s a proprietary operating system developed by Microsoft.
* It’s source code is not publicly available. And users must purchase a license to use it.

**2. Software Availability-**

* **Ubuntu:**
* Relies on open source software and its own software repositories.
  + While a vast array of software is available, some popular commercial applications may not have native Linux versions.
  + **Windows:**
  + Has a much larger library of commercially available software, particularly for gaming and professional applications

**3. Security:**

* **Ubuntu:**
* Generally considered more secure due to its Linux-based architecture and open source nature, which allows for rapid identification and patching of vulnerabilities.
* Less susceptible antivirus software.
* **Windows:**
* Historically more vulnerable to malware due to its widespread use and closed source nature.
* Requires robust antivirus software.

**4. User interface-**

* **Ubuntu:**
* Uses the GNOME desktop environment by default. It is known for its simplicity and customization options, often leaning towards a minimalistic design.
* **Windows:**
* Uses the windows desktop environment (Windows 10,Windows 11) ,which provides a graphical interface with features like the start menu ,taskbar, and window management. It is generally considered more familiar to everyday users.

**5. Hardware Compatibility:**

* **Ubuntu:**
* Generally has good hardware compatibility, but some proprietary hardware may require additional drivers.
* **Windows:**
* Generally has excellent hardware compatibility due to its widespread adoption.

**6. Customization:**

* **Ubuntu:**
* Highly customizable, both in terms of appearance and functionally. Users can change almost everything from the desktop environment to system behaviour.
* **Windows:**
* Offers some degree of customization(e.g., themes ,taskbar settings),but it is much less flexible compared to Ubuntu.

**7. System resources usage**

* **Ubuntu:**
* Linux distributions like Ubuntu tend to use fewer system resources (e.g. memory, CPU) compared to windows, which can make Ubuntu a better choice for older or low-resources hardware.
* **Windows:**
* Windows require more system resources, particularly in recent versions. This can lead to slower performance on older or less powerful machines.