**OPERATING SYSTEM**

**LAB ASSIGNMENT – I**

**[4ITRC2]**

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**Assignment 1: Study of Ubuntu OS**

**Aim**: To install and study Ubuntu OS

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

**To Submit**: Study of Ubuntu OS

**Introduction to Linux**

Linux is a family of open-source Unix-like operating systems based on the Linux kernel, which was created by Linus Torvalds in 1991. Unlike proprietary operating systems such as Windows and macOS, Linux is distributed under the GNU General Public License (GPL), allowing users to freely modify and distribute the software.

Linux has gained popularity due to its stability, security, and flexibility. It is widely used in servers, embedded systems, mobile devices (Android is based on Linux), and desktops. There are numerous Linux distributions (distros) tailored for different use cases, including Ubuntu, Fedora, Debian, Arch Linux, and CentOS.

**Introduction to Ubuntu**

Ubuntu is one of the most well-known Linux distributions, developed and maintained by Canonical Ltd. It was first released in 2004 with a mission to make Linux more accessible to everyday users. Ubuntu is based on Debian and is designed for usability, security, and ease of installation.

Ubuntu comes in multiple editions:

* **Ubuntu Desktop:** Designed for general users, featuring a graphical interface and essential applications.
* **Ubuntu Server:** Optimized for enterprise and cloud environments, running without a GUI for performance efficiency.
* **Ubuntu Core:** A lightweight, container-based OS designed for IoT and embedded systems.

**History of Ubuntu**

Ubuntu was initiated by Mark Shuttleworth, a South African entrepreneur, who aimed to create an easy-to-use Linux distribution. The name “Ubuntu” comes from an African philosophy meaning “humanity to others,” reflecting the open-source and community-driven nature of the OS.

Canonical Ltd. ensures that Ubuntu follows a predictable release cycle, with a new version every six months and Long-Term Support (LTS) releases every two years. LTS versions receive updates and support for five years, making them ideal for enterprises and professional users.

**Versions of Ubuntu**

Ubuntu follows a structured release cycle, categorized into:

1. **LTS (Long-Term Support) Versions** - These versions are supported for five years and focus on stability and security. Examples:
   * Ubuntu 20.04 LTS (Focal Fossa) - Released in April 2020, supported until 2025.
   * Ubuntu 22.04 LTS (Jammy Jellyfish) - Released in April 2022, supported until 2027.
2. **Regular (Non-LTS) Releases** - These versions are supported for nine months and include the latest features. Examples:
   * Ubuntu 23.04 (Lunar Lobster) - Released in April 2023.
   * Ubuntu 23.10 (Mantic Minotaur) - Released in October 2023.
3. **Flavors of Ubuntu** - Ubuntu also has official variants optimized for different environments:
   * **Kubuntu:** Uses the KDE Plasma desktop.
   * **Xubuntu:** Uses the lightweight XFCE desktop.
   * **Lubuntu:** Designed for older hardware with the LXQt desktop.
   * **Ubuntu MATE:** Uses the MATE desktop, providing a classic Linux experience.
   * **Ubuntu Studio:** Designed for multimedia production.

**Features of Ubuntu**

Ubuntu is known for its advanced features, which make it a preferred choice for various users, from beginners to IT professionals.

**1. Open-Source and Free**

Ubuntu is completely free to use, modify, and distribute, allowing greater flexibility and innovation.

**2. User-Friendly Interface**

Ubuntu primarily uses the GNOME desktop environment (default since Ubuntu 17.10), offering a clean, modern, and intuitive UI. Other flavors allow users to choose different interfaces based on their preferences.

**3. Regular Updates and Security**

Canonical ensures that Ubuntu receives frequent security patches, updates, and bug fixes. The APT package manager and Snap system enable easy software updates.

**4. Software Availability**

Ubuntu has an extensive repository of software accessible through the APT package manager, Snap, and Flatpak. Users can install development tools, office suites, media applications, and more.

**5. Customization and Flexibility**

Ubuntu allows users to modify the system, install alternative desktop environments, and configure system settings to meet specific needs.

**6. Lightweight and Efficient**

Ubuntu is optimized for performance and resource efficiency, making it a great choice for older hardware as well as high-end machines.

**7. Strong Security**

Ubuntu includes built-in security features such as AppArmor, a firewall, encryption, and secure boot options. It is less prone to malware compared to Windows.

**8. Command-Line Power**

The Linux terminal in Ubuntu allows advanced users to perform system management, automation, and development tasks efficiently.

**9. Multiple Hardware Support**

Ubuntu supports various architectures, including x86, x64, ARM, and PowerPC, making it compatible with a wide range of devices.

**10. Cloud and Server Compatibility**

Ubuntu is widely used in cloud computing, with official support from platforms like AWS, Azure, and Google Cloud. Ubuntu Server is the preferred OS for many enterprises.

**Difference Between Ubuntu and Windows OS**

| **Feature** | **Ubuntu** | **Windows OS** |
| --- | --- | --- |
| **Cost** | Free and open-source | Paid with licensing costs |
| **Source Code Access** | Fully accessible | Proprietary, not accessible |
| **Security** | Highly secure, fewer vulnerabilities | More prone to malware and viruses |
| **Software Installation** | Uses APT and Snap package managers | Uses .exe and Microsoft Store |
| **Customization** | Highly customizable | Limited customization options |
| **Performance** | Lightweight and optimized for efficiency | Requires more system resources |
| **Updates** | Frequent updates with full control | Automatic updates, sometimes intrusive |
| **User Interface** | GNOME (by default), customizable | Standardized UI, less flexible |
| **Compatibility** | Supports most open-source software | Supports most commercial software and hardware |
| **File System** | Ext4 (default), supports others | NTFS, FAT32, exFAT |
| **Command Line** | Terminal (powerful, widely used) | Command Prompt, PowerShell |
| **Gaming Support** | Limited, but improving with Steam Proton | Strong gaming support with DirectX |

**Conclusion**

Ubuntu is a powerful, secure, and versatile operating system that serves as a great alternative to Windows. It is particularly suited for developers, students, and businesses looking for a cost-effective and customizable solution. With its vast ecosystem, user-friendly interface, and strong community support, Ubuntu remains one of the leading Linux distributions worldwide.