OPERATING SYSTEM

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INTRODUCTION(LINUX &UBUNTU)

Overveiw Of Linux:-

- Linux refers to a family of operating systems modeled off of Unix
    - Can perform many of the same functions as Windows or OS X
    - Built in a collaborative, open-source environment -
- Anyone may use, modify, or distribute the Linux kernel -
- Anyone can develop software to run on the Linux kernel -
- Many programmers collaborate to develop or improve Linux programs -
- Many Linux operating systems and add-on programs are free

What is Linux Operaring System:-

Linux is a free and open-source family of operating systems that is resilient and flexible. In 1991, an individual by the name as Linus Torvalds constructed it. The system's source code is accessible to everyone for anyone to look at and change, making it cool that anyone can see how the system works. People from all across the world are urged to work together and keep developing Linux due to its openness.

Figure 1:- Logo Of Linux

Developed by Linus Torvalds in 1991, the Linux operating system is a powerful and flexible open-source software platform. It acts as the basis for a variety of devices, such embedded systems, cell phones, servers, and personal computers. Linux, that's well-known for its reliability, safety, and flexibility, allows users to customize and improve their environment to suit specific needs. With an extensive and active community supporting it, Linux is an appealing choice for people as well as companies due to its wealth of resources and constant developments.

History Of Linux:-

Linus Torvalds designed the free and open-source Linux operating system kernel in 1991. Torvalds set out to develop a free and flexible system for personal computers, drawing ideas from the UNIX operating system and the MINIX operating system. Teamwork in development was encouraged with the initial release of the Linux kernel, which attracted developers and enthusiasts globally quickly. Various open-source software packages integrated with the Linux kernel created fully operational operating systems, occasionally referred to as Linux distributions.

Over the years, Linux has become known as a key component of modern computing, powering everything from servers and personal computers to supercomputers and smartphones. Due to its flexibility, durability, and strong community support, developers, businesses, and educational institutions frequently opt for it.

Different Types Of Linux:-

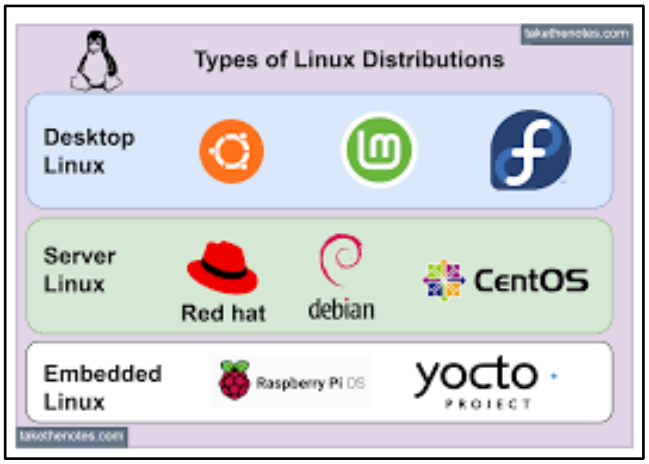
There are many different flavors (OSs) built off the Linux kernel

- **Ubuntu**: Most popular flavor. It is free and isthe most user-friendly.
- **Mint**: A popular variation of Linux

-Red Hat: Designed by a company that developsspecialized flavors for government and big business

- **Fedora:** An open-source, free version of RedHat. Used frequently as a test bed for Red Hat programs.

• These flavors are similar at the basic level,but can have very different interfaces and specialized commands.



Overveiw Of Ubuntu:-

Ubuntu is a Linux-based operating system. It is designed for computers, smartphones, and network servers. The system is developed by a UK based company called Canonical Ltd. All the principles used to develop the Ubuntu software are based on the principles of Open Source software development**.**
Ubuntu is based on Debian Linux. Debian is a large Linux project with active community participation. Ian Murdock, a young computer expert, started the Debian Linux project in 1993. Debian is a popular Linux-based operating system among programmers and system administrators.

Using Debian Linux was not simple for everyday use by ordinary people. Ubuntu has made several changes to the Debian Linux for public utility.
Ubuntu mainly uses the GNU General Public License. Several operating systems were again developed based on Ubuntu. Linux Mint, Zorin OS, Elementary OS, Peppermint OS and many more operating systems built on the Ubuntu platform.

What is Ubuntu Operaring System:-

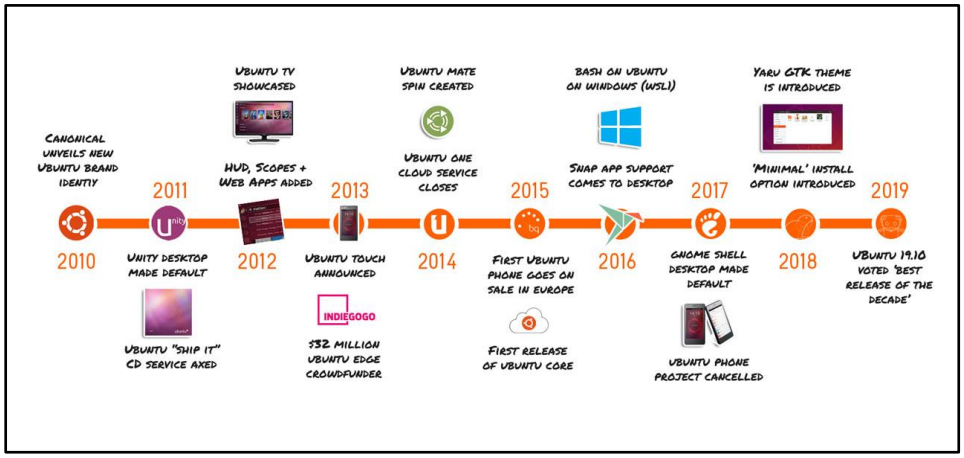
Ubuntu (pronounced oo-BOON-too) is a free, open source operating system (OS) based on Debian Linux. It was first released in 2004 when Mark Shuttleworth and a small team of Debian developers founded Canonical and then launched the Ubuntu project. Canonical released its first official version of the OS -- Ubuntu 4.10 -- in October 2004. The word *ubuntu* comes from the southern African Nguni languages and translates as "humanity to others."

As the manager of Ubuntu, Canonical is responsible for releasing a new Ubuntu version every six months. Canonical also provides hosting servers for Ubuntu Community, allowing people worldwide to contribute to testing software bugs, answer questions, and give technical support for free.

History Of Ubuntu:-

Here's a concise history of Ubuntu in key points:

1. **2004 - Launch**: Ubuntu was launched by Mark Shuttleworth and his company, Canonical Ltd., based on Debian Linux.
2. **Goal**: To create a user-friendly Linux distribution for everyone, focusing on ease of use and accessibility.
3. **First Release (Ubuntu 4.10)**: Released in October 2004 with the codename "Warty Warthog."
4. **Regular Releases**: Ubuntu adopted a regular release cycle, with new versions every six months.
5. **GNOME Desktop**: Initially used the GNOME desktop environment to provide a simple, intuitive user interface.
6. **Canonical's Role**: Canonical Ltd., the company behind Ubuntu, provided support, commercial services, and development.
7. **Ubuntu LTS (Long-Term Support)**: In 2006, Ubuntu introduced LTS versions, offering 5 years of support for stability in enterprise environments.
8. **Popularity**: Ubuntu became one of the most widely used Linux distributions due to its user-friendly nature and extensive community support.
9. **2010 - Unity Interface**: Ubuntu introduced the Unity desktop environment (later replaced by GNOME in 2017).
10. **Cloud & IoT**: Ubuntu grew beyond desktop use, with versions focused on cloud computing, IoT devices, and servers.
11. **Snap Packages**: Ubuntu introduced Snap packages in 2016 for easier software distribution across different Linux distributions.
12. **Current Status**: Ubuntu remains a major Linux distribution with regular updates, widespread use, and a large, active community.



Different Versions Of Ubuntu:-

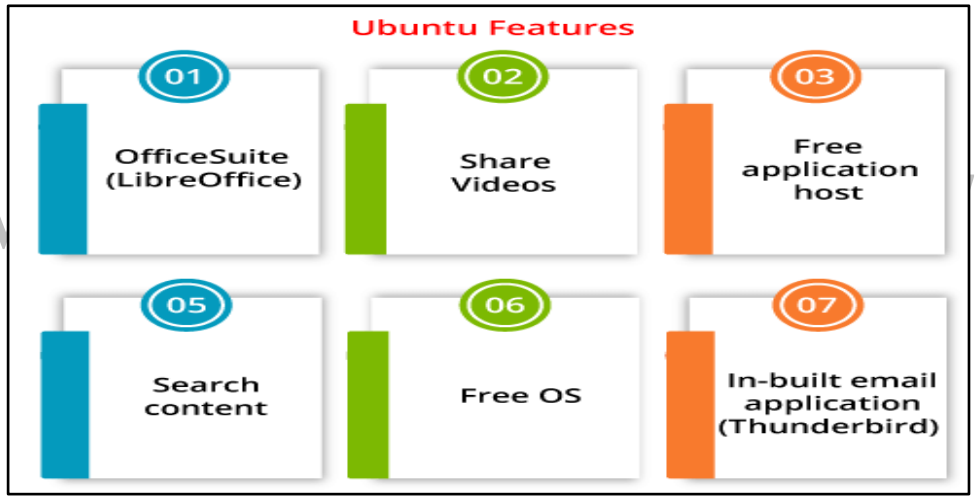
Ubuntu releases a new version every six months, with Long-Term Support (LTS) versions released every two years. LTS releases are supported for **5 years** with security updates and maintenance. These are typically more stable and are preferred for production environments.

Here's a list of the main versions of Ubuntu:

1. **Ubuntu 4.10 ("Warty Warthog")** - October 2004
2. **Ubuntu 6.06 LTS ("Dapper Drake")** - June 2006
3. **Ubuntu 8.04 LTS ("Hardy Heron")** - April 2008
4. **Ubuntu 10.04 LTS ("Lucid Lynx")** - April 2010
5. **Ubuntu 12.04 LTS ("Precise Pangolin")** - April 2012
6. **Ubuntu 14.04 LTS ("Trusty Tahr")** - April 2014
7. **Ubuntu 16.04 LTS ("Xenial Xerus")** - April 2016
8. **Ubuntu 18.04 LTS ("Bionic Beaver")** - April 2018
9. **Ubuntu 20.04 LTS ("Focal Fossa")** - April 2020
10. **Ubuntu 22.04 LTS ("Jammy Jellyfish")** - April 2022

FEATURES OF UBUNTU

- The desktop release of Ubuntu supports every basic software on Windows like VLC, Chrome, Firefox, etc.
- It supports *OfficeSuite* which is known as *LibreOffice*.
- Ubuntu contains an in-built email application which is known as *Thunderbird* which provides the user access to email like Hotmail, Gmail, exchange, etc.Also, there are many applications for managing videos and they permit the users for sharing videos as well.
- The free application's host is also available for users for viewing and editing photos.
- It is easy to search content in Ubuntu using the smart searching feature.
- The best aspect is that it is a free OS and is backed by a large open-source community.



Some More Features of Ubuntu Includes:-

1. **Office software**
2. **An open-source operating system**
3. **Web browsing**
4. **Email**
5. **Photos**
6. **Videos**
7. **Gaming**
8. **A whole world of apps**
9. **Backed by Canonical**
10. **No Antivirus**
11. **Hardware autoconfiguration**
12. **Software Repositories**
13. **Multiple desktops**
14. **ssh client**

1. Office Software

In Ubuntu, we have a software called **LibreOffice,** via which we can create professional documents, spreadsheets, and presentations. **LibreOffice** is an open-source office suite that is compatible with Microsoft Office. That means we can open and modify files such as **Word documents, PowerPoint,** and **Excel spreadsheets** and share them with other people easily and quickly. Google docs can also be used directly from our desktop.

2. An Open-Source Operating System:-

In Ubuntu, our code is openly shared during the development cycle. We're transparent about our plans for future releases, so as a developer, hardware manufacturer, or OEM, we can start developing Ubuntu applications and systems right now.

3. Email

Thunderbird, Mozilla's famous email applications is included with Ubuntu, so we'll have quick access to our email from our desktop. Email works regardless of the email service we use, such as **Microsoft Exchange, Hotmail, Gmail, POP 3,** or **IMAP.**

4. Web Browsing

Ubuntu and **Firefox,** both famed for their speed and security, make browsing the web a pleasure once more. Ubuntu now supports Chrome and other browsers, which we can get via the Ubuntu Software Centre.

5. Photos

Ubuntu has a plethora of free apps to let you enjoy, edit, manage and share the photos-whatever camera you use to take photos. With excellent support for cameras and phones, we won't require any additional drivers to get started.

In Ubuntu, we can easily and quickly import, edit, organize and view our photos using **Shotwell.** We can also share our favourite photos on any of the famous websites and social media platforms.

Tools like **Gimp** and **Krita,** both accessible in the Ubuntu Software centre ad we can use these tools to edit images or create professional illustrations and designs.

6. Videos

On Ubuntu, we can watch HD videos in our browser or with the default Movie Player, **VLC,** and **OpenShot** from the Snap Store. Use **Shotcut** or **kdenlive** to edit our videos, then watch them in Movie Player.

7. Gaming

In Ubuntu, from **Sudoku to first-person shooters,** we have a number of games that will keep us engaged for hours. There are thousands of games, including titles from the Unity and Steam platforms. Choice from critically acclaimed titles like **Dota2, Kerbal Space Program, Counter-Strike: Global Offensive,** and **Borderlands: The Pre-Sequel.**

8. A Whole World of Apps

Thousands of apps are available for download on Ubuntu. Most of them are free to download and install with just a few clicks. For example, **VLC player, Firefox, Chromium, Telegram, PyCharm, Skype, Spotify, Atom, Slack, etc.**

9. Backed by Canonical

Canonical is a multinational software company that offers commercial, design, and engineering support to the project of Ubuntu. Hundreds of laptops and workstations have been pre-installed with Ubuntu by Ubuntu's hardware enablement team throughout the world.

10. No Antivirus

In the Windows environment, security practices are extremely contradictory. Most of the same companies which write Windows software also make millions of dollars providing hogging applications that safeguard Windows apps from security issues. Although Ubuntu is not malware protected, it is as secure as it needs to be for most users right out of the box, even without the addition of any expensive antivirus scanners.

11. Hardware Autoconfiguration

Another feature of Ubuntu is hardware autoconfiguration. Most hardware drivers are already included in Ubuntu. Anybody who has installed a Windows generic version of Windows (i.e., one that has not been pre-configured by a PC vendor to

work with specific hardware) understands how convenient it is not to spend hours looking for drivers after the operating system has been installed.

12. Software Repositories

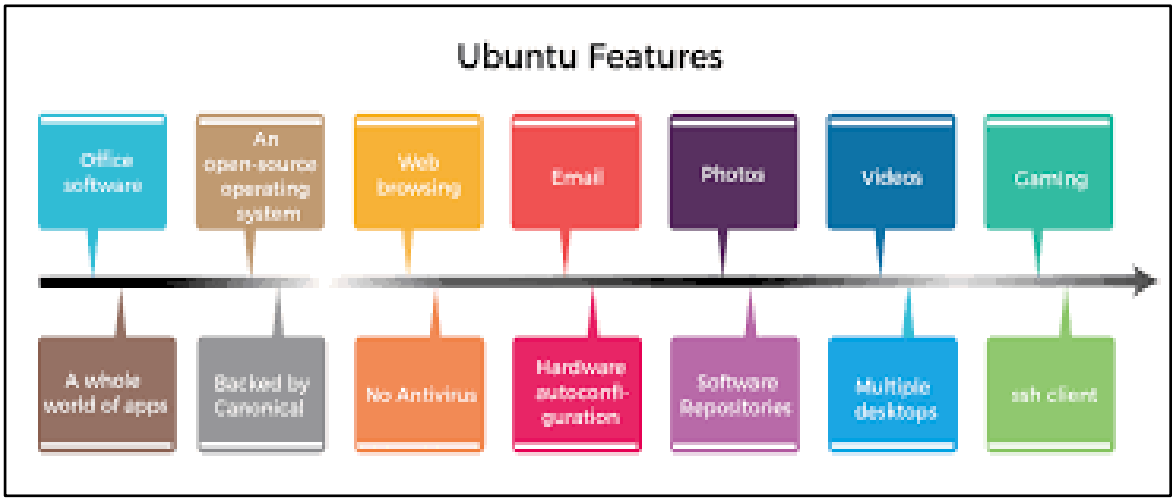
It's a tremendous advantage to install a number of applications from the repositories of Ubuntu in some clicks. Apart from the fact that the software is free and safer than .exe packages, which are downloaded from random websites, installing programs from a centralized location is far more convenient.

13. Multiple Desktops

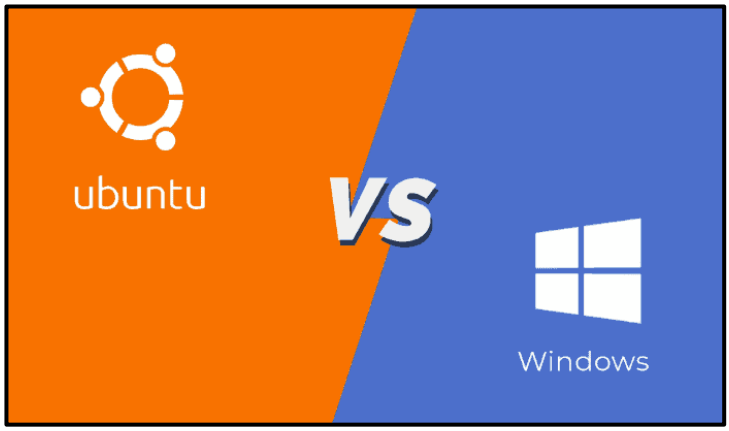
The virtual desktops are similar to tabbed web browsing- we do not understand how beneficial they are until we use them. There are various third-party tools for achieving the same capability on Windows, but few of them perform properly with Vista and higher, in our experience.

14. ssh Client

Having a ssh client embedded into the operating system is a significant advantage for us. There are several ssh clients for Windows, such as Putty, but none of them come pre-installed in Windows, and even the finest of them isn't as functional as gnome-terminal.



UBUNTU v/s WINDOWS OS



Here's a more detailed comparison between **Windows OS** and **Ubuntu**:

1. Licensing and Cost

- **Windows OS**:
  - **Proprietary Software**: Windows is developed by Microsoft and is a proprietary operating system, meaning its source code is not publicly available.
  - **Cost**: Windows requires users to purchase a license for each installation. The cost varies depending on the edition (e.g., Home, Pro, Enterprise).
  - **Updates**: While security updates are generally free, major updates (e.g., new versions of Windows) may also require a separate purchase or subscription (e.g., Windows 10 or Windows 11).
- **Ubuntu**:
  - **Open Source**: Ubuntu is an open-source operating system developed by Canonical Ltd. Its source code is freely available for anyone to view, modify, or distribute.
  - **Cost**: Ubuntu is completely free to download, use, and modify. There are no licensing fees.
  - **Updates**: Security updates and bug fixes are freely available. LTS (Long Term Support) versions receive five years of updates, while regular releases are supported for 9 months
    .

2. User Interface

- **Windows OS**:
  - **Graphical User Interface (GUI)**: Windows is known for its user-friendly GUI, with a well-established taskbar, Start Menu, and window management system. The interface has remained relat consistent, with periodic refinements.

- **Customizability**: While you can personalize certain aspects (e.g., themes, taskbar icons), Windows' core interface remains largely the same and doesn't offer deep customization out-of-the-box.
- **File Explorer**: Windows provides a graphical file management system called File Explorer, which is designed to be easy to use for accessing files, folders, and drives.

- **Ubuntu**:
  - **Graphical User Interface (GUI)**: Ubuntu traditionally used the **GNOME desktop environment** (though other desktop environments like **KDE** or **XFCE** are also available). The interface is more minimalist compared to Windows, and it emphasizes efficiency and simplicity.
  - **Customizability**: Ubuntu is highly customizable. Users can tweak the look and feel, change themes, install different desktop environments, and even design their own interface using tools like **GNOME Tweaks**.
  - **File Manager**: Ubuntu uses the **Nautilus** file manager (in GNOME), which is also easy to use, but it can feel a bit different from Windows' File Explorer in terms of layout and features.

3. Software Compatibility

- **Windows OS**:
  - **Wide Software Support**: Windows is the most widely used operating system and supports a vast number of software applications, including most commercial software like Microsoft Office, Adobe products (Photoshop, Illustrator), and popular games.
  - **Gaming**: Windows is the dominant platform for gaming, with full support for the latest games, DirectX, and high-performance gaming hardware.
  - **Legacy Support**: Many legacy applications are built specifically for Windows, making it a go-to for businesses and users with older software.
- **Ubuntu**:
  - **Open-Source and Third-Party Software**: Ubuntu primarily focuses on open-source software and has a rich collection of apps available via the **Ubuntu Software Center**. Many common applications (e.g., Firefox, LibreOffice, GIMP) are natively supported.
  - **Gaming**: While Ubuntu supports some games via platforms like **Steam** (which has a growing library of Linux games), it doesn't natively support most high-performance games built for Windows. Some games can be played via **Wine** or **Proton**, tools that allow Windows applications to run on Linux.

- **Compatibility Layers**: Many Windows-only programs can be run on Ubuntu through compatibility layers like **Wine** or virtualization tools like **VirtualBox**.

4. System Requirements

- **Windows OS**:
  - **Higher System Demands**: Windows typically has higher system requirements. It needs a more powerful processor, more RAM (typically at least 4GB for Windows 10 or 11), and larger storage. Windows 11, for example, has strict hardware requirements like TPM 2.0.
  - **Performance**: Windows can run slower on older hardware, especially if there's a heavy load due to background processes or updates.
- **Ubuntu**:
  - **Lightweight**: Ubuntu is generally more lightweight than Windows. The minimal system requirements are lower (Ubuntu recommends 2GB RAM and 25GB of storage for a modern system). It can even run on older machines or those with limited resources.
  - **Performance**: Ubuntu tends to perform better on older hardware or lower-spec machines compared to Windows, especially if you opt for lightweight desktop environments like **Xfce** or **LXQt**.

5. Security

- **Windows OS**:
  - **Security Features**: Windows includes a firewall, Windows Defender Antivirus, and security features like BitLocker and Windows Sandbox for isolating potentially harmful software.
  - **Vulnerabilities**: Windows has historically been a target for malware, viruses, and ransomware, primarily due to its widespread use. While Microsoft has significantly improved security over the years, the large user base makes it a prime target.
  - **Frequent Updates**: Security patches are frequent, but users sometimes delay them, leaving systems exposed.
- **Ubuntu**:
  - **Built-in Security**: Ubuntu is known for being a secure system by default. It's less likely to be targeted by malware and viruses because it's not as widely used on desktops (although it's still a target for specific threats).
  - **User Permissions**: Ubuntu uses a **sudo** model for administrative access, ensuring that users must explicitly authenticate for system changes.

- **Regular Updates**: Ubuntu's update process includes security patches that are often delivered faster than Windows. It also has security tools like **AppArmor** for application sandboxing.

6. Updates and Patches

- **Windows OS**:
  - **Automatic Updates**: Windows offers automatic updates, but they are sometimes forced on users, especially with major updates. This can lead to frustration as updates often require system reboots or can affect performance.
  - **Frequent Patches**: Windows receives monthly patches for security vulnerabilities and feature updates.
- **Ubuntu**:
  - **Package Management**: Ubuntu updates its software packages through its package manager (**APT**). Users can also install updates through the Software Center. Updates are easy to manage and are available frequently.
  - **LTS Versions**: Ubuntu releases Long Term Support (LTS) versions that receive updates for five years. These versions are more stable and have fewer major updates compared to regular releases.

7. Support

- **Windows OS**:
  - **Official Support**: Windows provides official support via Microsoft's website, forums, and customer service. Windows users are generally directed to paid support for in-depth issues.
  - **Third-Party Support**: Many hardware and software companies provide specific support for Windows due to its large market share.
- **Ubuntu**:
  - **Community Support**: Ubuntu has a large and active community that provides extensive support through forums, online documentation, and discussion groups. If you face any issue, you can often find a solution through the community.
  - **Commercial Support**: Canonical Ltd. Offers paid support services for businesses using Ubuntu in production environments.

8. Customization

- **Windows OS**:
  - **Limited Customization**: Windows allows some level of customization (themes, taskbar, desktop settings), but it is relatively limited compared to open-source platforms like Linux.

- **Registry Tweaks**: Advanced users can tweak Windows via the registry, but this can be risky and complex.

- **Ubuntu**:
  - **Highly Customizable**: Ubuntu offers extensive customization options. You can switch desktop environments (GNOME, KDE, XFCE), change themes, icons, and even alter system behavior through configuration files.

Table Of Comparision Between UBUNTU and WINDOWS

Feature	Windows	Ubuntu
Operating System	Proprietary, closed-source operating system developed by Microsoft	An open-source operating system based on the Linux kernel.
User Interface	GUI (Graphical User Interface) with a familiar Windows desktop experience	GUI with various desktop environments (e.g., GNOME, Unity)
Software	Large selection of commercial and proprietary software available	Vast collection of free and open-source software available
Compatibility	Widely supported by software developers and hardware manufacturers	Growing support, but some software and hardware may not be compatible
Updates	Regular updates and patches released by Microsoft	Frequent updates and patches through the Ubuntu package manager
Customization	Limited customization options for appearance and functionality	High level of customization through various themes and extensions
Gaming	Extensive support for mainstream games and popular gaming platforms	Growing support, with some popular games and platforms available
System Resources	Typically requires more system resources (RAM, CPU)	Generally lighter and more efficient, suitable for older hardware
Support	Extensive documentation, user forums, and paid technical support options	Active community support, forums, and official documentation
Cost	Commercial licenses with different editions and price points	Free to use and distribute, although commercial support is available

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