**Windows OS: The Backbone of Your Computer**

**What is Windows OS?**

Windows OS (Operating System) is like the conductor of an orchestra, but for your computer. It manages and coordinates all the hardware and software, ensuring they work together smoothly. Developed by Microsoft, Windows OS is the software that lets you interact with your computer efficiently.

**Key Features:**

* **User Interface**: The Start Menu, taskbar, and desktop make it easy to navigate and use.
* **File Management**: Helps you organize and access your files and folders.
* **Hardware Control**: Manages all the physical components of your computer, like the CPU, RAM, and storage devices.
* **Software Management**: Runs applications and ensures they operate properly.

**Latest Version of Windows**

**Windows 11, Version 24H2**

**Release Date:** The latest version of Windows, known as Windows 11, version 24H2, was released recently. This update is part of Microsoft's ongoing efforts to enhance the Windows experience.

**Key Features:**

1. **Live Captions:** Windows 11 now includes live captions for all audio content, making it more accessible for users who are hard of hearing or prefer to read along.
2. **Enhanced Wi-Fi Connectivity:** Improvements in Wi-Fi connectivity have been made to ensure more stable and faster internet connections, enhancing overall network performance.
3. **Streamlined File Explorer:** The File Explorer has been redesigned to be more intuitive and user-friendly, making it easier for users to navigate and manage their files.
4. **System Tray Enhancements:** The system tray has been improved for better organization and easier access to icons and notifications.
5. **Taskbar Improvements:** Various enhancements have been made to the taskbar, including increased customization options and better functionality.

**HARDWARE REQUIREMENT OF W10**

1. **Minimum System Requirements:**

To install Windows 10, the following minimum hardware specifications are required:

* **Processor (CPU):**
  + 1 GHz or faster processor or SoC (System on a Chip).
* **Memory (RAM):**
  + 1 GB for the 32-bit version.
  + 2 GB for the 64-bit version.
* **Storage:**
  + 16 GB for the 32-bit version.
  + 20 GB for the 64-bit version.
* **Graphics (GPU):**
  + DirectX 9 or later with a WDDM 1.0 driver.
* **Display:**
  + Minimum resolution of 800x600.

**2. Recommended System Requirements:**

For optimal performance and smoother operation of Windows 10, the following hardware specifications are recommended:

* **Processor (CPU):**
  + 2 GHz or faster, dual-core or better processor.
* **Memory (RAM):**
  + 4 GB or more.
* **Storage:**
  + 64 GB or more of free storage space for better system responsiveness and to accommodate updates.
* **Graphics (GPU):**
  + DirectX 12 compatible graphics or a WDDM 2.x driver.
* **Display:**
  + Full HD (1080p) resolution or higher for enhanced visual experience

**STEP TO INSTALL W10 OS**

**1. Preparation**

* **Backup your data** to avoid losing important files.
* **Verify system compatibility** with Windows 10 requirements.
* **Create a bootable USB drive** using the Windows 10 Media Creation Tool.

**2. Boot from USB Drive**

1. **Insert the USB drive** and restart the computer.
2. Enter the **BIOS/UEFI** settings (usually by pressing **F2**, **F10**, or **DEL**).
3. Set the boot order to USB first and save changes.

**3. Installation Process**

1. **Select language and region**, then click **Next**.
2. Click **Install Now** and enter your **product key** (or skip if reinstalling).
3. Choose **Custom** installation for a clean install and select the installation partition.

**4. Setup Configuration**

1. Windows will install and restart multiple times.
2. Once installed, configure **region, keyboard layout**, and **Microsoft account**.
3. Select **privacy settings** and proceed.

**5. Finalizing Installation**

1. After installation, **log in** to your account.
2. Install any **drivers** (graphics, network, etc.).
3. Run **Windows Update** to ensure your system is up to date.

**WHAT IS VIRTUALIZATION**

Linux is an open-source operating system (OS) based on Unix. It is known for its robustness, security, and flexibility, making it a popular choice for servers, desktops, and embedded systems. One of the key features of Linux is that its source code is freely available, allowing anyone to view, modify, and distribute it.

**Key Features of Linux**

* **Open Source**: The source code is freely available for modification and distribution.
* **Security**: Known for its strong security features, making it less vulnerable to malware and viruses.
* **Stability**: Highly stable and reliable, suitable for running critical applications.
* **Flexibility**: Can be customized for different uses, from desktops to servers to embedded systems.
* **Community Support**: Strong support from a global community of developers and users.

**Popular Linux Distributions**

Linux distributions (often called "distros") are variations of the Linux OS that come with different sets of software and features. Here are some of the most popular ones:

1. **Ubuntu**
   * **Description**: One of the most user-friendly and widely used Linux distributions, especially popular for desktops and beginners.
   * **Features**: Regular updates, strong community support, extensive software repositories.
   * **Use Cases**: Desktops, laptops, servers.
2. **Fedora**
   * **Description**: Known for its cutting-edge features and strong backing from Red Hat.
   * **Features**: Up-to-date software, emphasis on open-source technologies.
   * **Use Cases**: Desktops, developers, and those who prefer the latest features.
3. **Debian**
   * **Description**: A highly stable and versatile distribution, serving as the base for many other distros, including Ubuntu.
   * **Features**: Extensive package repository, strong emphasis on free software.
   * **Use Cases**: Desktops, servers, and development environments.
4. **CentOS**
   * **Description**: Community-driven, free alternative to Red Hat Enterprise Linux (RHEL).
   * **Features**: High stability, enterprise-grade features, long-term support.
   * **Use Cases**: Servers, enterprise environments.
5. **Arch Linux**
   * **Description**: Known for its simplicity and customization, targeting advanced users.
   * **Features**: Rolling release model, minimalistic approach, user-centric customization.
   * **Use Cases**: Desktops, advanced users who prefer to build their systems from scratch.
6. **Mint**
   * **Description**: Aimed at providing a comfortable and user-friendly experience for beginners.
   * **Features**: Easy installation, pre-installed software, based on Ubuntu.
   * **Use Cases**: Desktops, new Linux users.
7. **openSUSE**
   * **Description**: Known for its powerful tools and strong community support.
   * **Features**: YaST (Yet another Setup Tool) for easy system configuration, strong emphasis on stability.
   * **Use Cases**: Desktops, servers, development environments.

**Minimum Hardware Requirements**

**Ubuntu**

For **Ubuntu Desktop Edition**:

* **Processor**: 2 GHz dual-core
* **RAM**: 4 GB (2 GB for virtualized installs)
* **Storage**: 25 GB (8.6 GB for minimal install)
* **Display**: 1024x768 resolution
* **Other**: CD/DVD drive or USB port for installer media, internet access is helpful

**Kali Linux**

For **Kali Linux**:

* **Processor**: 1 GHz (2 GHz or faster recommended)
* **RAM**: 2 GB (512 MB for basic SSH server setup)
* **Storage**: 20 GB (8 GB for basic installation)
* **Display**: 1024x768 resolution

**1. Preparation**

* **Download Virtualization Software**:  
  Install a virtualization program like **Oracle VM VirtualBox** or **VMware Workstation** on your computer.
* **Download Linux ISO**:  
  Download the ISO file for your preferred Linux distribution (e.g., **Ubuntu**, **Fedora**, **Debian**).

**2. Install Virtualization Software**

1. **Install VirtualBox** (or VMware) on your system by following the software’s installation prompts.

**3. Create a New Virtual Machine**

1. **Launch VirtualBox** and click **New** to create a new virtual machine.
2. **Enter VM details**:
   * **Name**: Choose a name for the virtual machine.
   * **Type**: Select “Linux” and choose the appropriate version (e.g., Ubuntu 64-bit).
3. **Set Memory (RAM)**:
   * Allocate at least 2 GB of RAM (depending on your system’s resources).
4. **Create a Virtual Hard Disk**:
   * Choose **Create a virtual hard disk now**.
   * Set the size (10 GB or more is recommended).

**4. Mount the Linux ISO**

1. After creating the VM, select it and click **Settings**.
2. Go to **Storage** > **Empty** > Click the **disk icon** and choose the Linux ISO file you downloaded.

**5. Start the Virtual Machine**

1. Click **Start** to boot the VM.
2. The VM will boot from the ISO file, and you’ll see the Linux installation screen.

**6. Install Linux**

1. **Follow the installation prompts** to install Linux, such as:
   * Select the language.
   * Choose the installation type (usually **Install Ubuntu**).
   * Set up the partitioning (select **Erase disk and install Ubuntu** if you want a simple setup).
2. **Set Up User Information**:
   * Enter your **name**, **username**, **password**, and **timezone**.
3. **Wait for Installation**:
   * The installation will take some time. Once completed, you will be prompted to **reboot**.

**7. Final Configuration**

1. **Reboot** the VM after installation is complete.
2. If prompted, **remove the installation media** (the ISO file) from the VM settings.
3. **Log in** to your newly installed Linux system with the username and password you set up.

**8. Install VirtualBox Guest Additions (Optional)**

* After installation, you can install **VirtualBox Guest Additions** to enhance the VM’s performance, enable better resolution, and improve integration between the host and guest OS.
  + In the VM, go to **Devices** > **Insert Guest Additions CD image** and follow the on-screen instructions.