

# What is Operating systems? Explained 2025

*An operating system is nothing more than the main software or set of programs of a computer system that manages hardware resources.*

By **Robeg** - February 20, 2025

An **Operating System (OS)** is system software that manages computer hardware and software resources. It **acts as an intermediary between users and the computer hardware**, enable applications to run efficiently. Operating systems handle various tasks, such as memory management, process scheduling, device management, and security. It ensures that software applications communicate effectively with hardware components like processors, memory, storage devices, and input/output peripherals. This article explores **what is an Operating System**, how it works, and its types.

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## What is an Operating System?

At its core, an operating system is a software layer that manages computer hardware and software resources, providing common services for computer programs. It acts as an intermediary between the user and the hardware, enable users to interact with the system and run applications. When a user initiates a task, the Operating System (OS) processes the request, allocates resources, and ensures the efficient execution of the task. It manages CPU scheduling, memory allocation, file storage, and security protocols. It also handles input and output operations, enabling smooth interaction between software applications and hardware components.

### Key Functions of an Operating System:



- **Hardware Management:** The OS controls and coordinates hardware components like the CPU, memory, storage devices, and peripherals. It allocates resources, manages data transfer, and ensures smooth operation.
  - **Process Management:** It manages the execution of programs (processes), allocating CPU time, memory, and other resources. It handles process creation, termination, and scheduling.
  - **Memory Management:** The OS allocates and manages computer memory, ensuring that multiple programs can run simultaneously without interfering with each other. It handles virtual memory, allowing programs to use more memory than physically available.
  - **File System Management:** It organizes and manages files and directories, providing a structured way to store and retrieve data. It handles file creation, deletion, renaming, and access control.
  - **Input/Output (I/O) Management:** The OS manages communication between the computer and external devices like keyboards, mice, printers, and displays. It provides device drivers and handles I/O requests.
  - **User Interface (UI):** It provides a user interface that allows users to interact with the computer. This can be a graphical user interface (GUI) or a command-line interface (CLI).
- Security:** The OS implements security mechanisms to protect the system from unauthorized access and malicious software. It manages user accounts, permissions, and firewalls.

## Types of Operating Systems

Operating systems are broadly categorized based on their purpose and design:

- **Desktop Operating System** – Designed for personal and enterprise computing. Examples: Windows, macOS, Linux.
- **Mobile Operating System** – Specifically designed for mobile devices. Examples: Android, iOS.
- **Real-Time Operating System (RTOS)** – Designed for applications that require real-time processing, such as industrial control systems. Example: VxWorks.
- **Distributed Operating System** – Uses multiple interconnected systems to distribute computational tasks. Example: Google's cluster computing.
- **Time-Sharing Operating System** – Allows multiple users to access a computer simultaneously. Examples: UNIX, Windows Server.
- **Batch Operating System** – Executes jobs in batches without direct user interaction. Example: Early IBM mainframes.

Below, we explore some of the most common operating systems in use today.

## Windows Operating System (OS)

Developed by Microsoft, Windows is the most widely used desktop operating system globally.



**Windows OS** was developed by Microsoft and is one of the most widely used desktop operating systems, controls the operation of approximately 76.56% of all existing PCs in the world. It is known for its ease of use, extensive software support, and compatibility with a broad range of hardware devices.

Windows OS is built on a hybrid kernel architecture, combining elements of microkernel and monolithic design. This enables better system stability, performance optimization, and compatibility with various hardware configurations. Windows provides features like DirectX for gaming, Windows Defender for security, and built-in cloud integration with Microsoft OneDrive. The OS supports multiple programming languages, making it a popular choice for software development

**Key Features:**

- User-friendly interface with a Start Menu and Taskbar.
- Compatibility with a vast range of applications and hardware.
- Frequent security updates and improvements.
- Support for gaming, productivity, and enterprise applications.
- Integration with Microsoft services such as OneDrive and Office Suite.

**Popular Versions:**

- **Windows XP** – Known for its stability and user-friendly design.
- **Windows 7** – Introduced enhanced security and a better UI.
- **Windows 10** – Brought Cortana, virtual desktops, and improved security.
- **Windows 11** – Features a modern UI, improved performance, and support for Android apps.

**MAC OS**

Developed by Apple, macOS is the operating system for Mac computers.





**macOS** is Apple's proprietary operating system for Mac computers. It is designed for performance, security, and seamless integration within Apple's ecosystem. macOS is built on a UNIX-based architecture, offering a powerful and stable environment. It supports high-performance applications like Final Cut Pro, Logic Pro, and Xcode, making it popular among video editors, musicians, and software developers. With features like Time Machine for backups, Gatekeeper for security, and Metal for enhanced graphics performance, macOS continues to be a preferred choice for many users.

Apple consistently updates macOS with new enhancements, improved hardware compatibility, and security patches. It also features seamless continuity across Apple devices, allowing users to work efficiently between Macs, iPhones, and iPads using features like Handoff, Universal Clipboard, and AirDrop.

### Key Features:

- Polished and intuitive user interface.
- Strong security and privacy features.
- Optimized for high-performance tasks such as video editing and programming.
- Integration with iCloud and other Apple services.
- Excellent support for high-resolution displays and optimized battery life.



### Popular Versions:

- **macOS Catalina** – Introduced Sidecar and Screen Time.
- **macOS Big Sur** – Major UI overhaul and performance improvements.
- **macOS Monterey** – Focused on continuity and collaboration.
- **macOS Ventura** – Enhanced productivity features like Stage Manager.

## Linux

**Linux** is an open-source operating system based on UNIX.



The penguin we all know as a cute and harmless animal is used as the main symbol for this robust operating system. It is widely used in server environments, personal computing, embedded systems, and cloud computing due to its security, flexibility, and robust performance. Unlike proprietary operating systems, Linux allows users to modify and distribute its source code, making it highly customizable.

Linux is based on a monolithic kernel architecture, which enhances its efficiency and stability. The OS is known for its strong security features, including access control mechanisms and built-in encryption. It supports a wide variety of file systems and networking capabilities, making it an excellent choice for enterprises and developers. Many modern supercomputers and data centers rely on Linux due to its scalability and efficiency. It is widely used in servers, desktops, and

embedded systems due to its security, flexibility, and open-source nature. It is preferred by developers, businesses, and system administrators.

**Key Features:**

- Open-source and customizable.
- Secure and less vulnerable to malware.
- Various distributions (distros) are available, such as Ubuntu, Fedora, and Debian.
- Preferred for server and cloud computing environments.
- Excellent support for networking and programming.

**Popular Distributions:**

- **Ubuntu** – User-friendly and ideal for beginners.
- **Fedora** – Cutting-edge software with enterprise backing.
- **Debian** – Stable and secure, widely used for servers.
- **Arch Linux** – Customizable for advanced users.

**iOS**

Developed by Apple, iOS is the operating system for iPhones and iPads.







**This is the operating system used by Apple-branded smartphones and tablets.** Built on a UNIX-based architecture, iOS provides a stable and secure foundation with a focus on performance and battery optimization. The OS features a streamlined interface and smooth multitasking capabilities. It also includes an advanced App Store ecosystem, offering a vast selection of applications optimized for iOS devices. Security is a priority in iOS, with features like Face ID, Touch ID, and regular software updates to protect against vulnerabilities.

*UNLIKE ANDROID, IOS IS A CLOSED-SOURCE PLATFORM, MEANING ONLY APPLE HAS CONTROL OVER ITS DEVELOPMENT AND DISTRIBUTION.*

#### **Key Features:**

- Optimized for touch-based interactions.
- Regular software updates and security patches.
- Extensive privacy and security features.
- Tight integration with Apple's ecosystem, including Apple Pay and iCloud.
- Advanced AI-powered functionalities such as Siri and machine learning enhancements.





### Popular Versions:

- **iOS 14** – Introduced widgets and App Library.
- **iOS 15** – Improved FaceTime and privacy features.
- **iOS 16** – Lock screen customization and Live Activities.
- **iOS 17** – Enhanced autocorrect and interactive widgets.

## Android

Developed by Google, Android is the dominant mobile operating system worldwide.



Android is one of the most widely used OS for mobile devices, powering millions of smartphones, tablets, and smart TVs worldwide. Unlike iOS, Android is an open-source platform, allowing manufacturers to customize and develop their own versions of the OS.

Android is built on a Linux-based kernel, providing stability, security, and efficient resource management. It supports various app development frameworks, including Java, Kotlin, and Flutter, making it a preferred choice for developers. Android offers deep integration with Google services, such as Google Assistant, Google Drive, and the Play Store, which houses millions of apps. Features like customizable home screens, multi-window support, and extensive hardware compatibility make Android a flexible and user-friendly operating system.



*ANDROID IS THE MOST WIDELY USED MOBILE OS WORLDWIDE  
AND IS KNOWN FOR ITS FLEXIBILITY, CUSTOMIZATION, AND  
OPEN-SOURCE NATURE.*

**Key Features:**

- Open-source with extensive customization options.
- Supports millions of apps via the Google Play Store.
- Regular updates to improve security and performance.
- Works on various devices, from smartphones to tablets and smart TVs.
- Features AI-driven enhancements and Google Assistant.

**Popular Versions:**

- **Android 10** – Introduced system-wide dark mode.
- **Android 11** – Focused on privacy and notifications.
- **Android 12** – Brought Material You design and improved security.
- **Android 13** – Optimized performance and introduced better multitasking.

Whether it's **Windows** for personal computing, **Linux** for servers, **macOS** for professionals, **iOS** for Apple mobile devices, or **Android** for smartphones, each OS has unique features tailored to different user needs.

Also read:

- [List of different types of operating systems! Explained.](#)
- [How to Install Windows 11 on your computer/Laptop](#)
- [Download Windows 11 ISO image from Microsoft server \[FREE\]](#)
- [Windows 11: These nine settings should be changed first](#)
- [What Should Be Considered When Choosing a VPN Service?](#)

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