



Beyond Windows and Mac: The Other Operating Systems That Run Our Digital World

You may never have heard of some of them, but chances are you use them every day.

There's More to Computing Than Windows and Mac

When most people think about computer operating systems, two names come to mind: Microsoft Windows and Apple's macOS. Both are familiar to millions of computer users, and both perform essentially the same job—managing the computer's hardware, running applications, organizing files, and providing a convenient way for people to get things done.

But Windows and macOS are only part of the story. Other operating systems quietly manage our smartphones, operate enormous computer networks, run industrial machinery, and even control the electronic systems in our automobiles. Some have been around longer than the personal computer itself, while others were developed specifically for the mobile devices we carry in our pockets.

Let's meet some of these less familiar members of the operating system family.

UNIX: The Grandparent of Modern Computing

Our story begins in 1969 at Bell Laboratories, where computer scientists Ken Thompson and Dennis Ritchie helped develop an operating system called UNIX. At the time, computers were enormous, expensive machines used primarily by universities, corporations, and government agencies. Operating systems were often designed for particular machines, making it difficult to transfer programs between different computers.

UNIX helped change that situation. Its relatively simple design and eventual implementation largely in the C programming language made it easier to adapt to different kinds of computers. It also introduced or popularized important ideas about organizing files, managing multiple users, and running several programs simultaneously.

UNIX became especially popular in universities and research institutions, where generations of computer scientists learned to use it. Over time, it influenced numerous other operating systems, including some that remain important today.

Here's a surprising connection: **Apple's macOS is built on a UNIX foundation.** Beneath the colorful desktop, Dock, and familiar application windows lies an operating system with roots in the same technological tradition that began at Bell Labs more than half a century ago.

Linux: The Operating System That Belongs to Everyone

In 1991, a Finnish university student named Linus Torvalds began developing a new operating system kernel inspired by UNIX. His project eventually became Linux, one of the most influential developments in modern computing.

Unlike proprietary systems such as Windows, Linux is open-source software. Its underlying code is available for people to examine, modify, and distribute under established licensing conditions. Developers around the world contribute improvements, creating a remarkable international collaboration.

Strictly speaking, Linux is the kernel—the central component that manages hardware and system resources. Complete operating systems built around it are called Linux distributions, with names such as Ubuntu, Fedora, and Debian.

Linux is especially important in the world of servers, the computers that deliver websites, process online transactions, and manage information across networks. It also powers supercomputers, scientific research equipment, and countless specialized devices.

You can even install Linux on many ordinary personal computers. Some distributions provide attractive graphical desktops, web browsers, office applications, and other familiar features. For

someone with an older computer that struggles to run modern Windows software, a lightweight Linux distribution may offer a practical alternative.

Linux isn't necessarily the best choice for everyone, however. Some commercial applications and games are unavailable or require special arrangements, and certain hardware devices may need additional configuration. Nevertheless, Linux demonstrates that a capable operating system need not come from one of the world's largest software companies.

Android: Linux in Your Pocket

If you own an Android smartphone, you're already using a relative of Linux. Google's Android operating system is built around the Linux kernel, although its interface and applications are designed specifically for mobile devices.

Android powers smartphones and tablets produced by manufacturers such as Samsung, Google, and Motorola. Its popularity reflects both its flexibility and the enormous variety of devices available at different prices.

Unlike traditional desktop operating systems, Android is designed around touchscreens, mobile communications, cameras, and battery conservation. It manages applications, wireless connections, notifications, and the many background activities that make a smartphone useful.

Android also illustrates how operating systems can share a technological foundation while looking and behaving quite differently. A Linux server in a data center and an Android phone in your pocket may have little in common visually, but both rely on important elements of the same underlying technology.

ChromeOS: A Computer Built Around the Internet

Google took another approach when it introduced ChromeOS, the operating system used primarily in Chromebook computers. Rather than attempting to duplicate every feature of Windows or macOS, ChromeOS originally emphasized web browsing and applications accessed through the Internet.

Chromebooks became particularly popular in schools because they were relatively inexpensive, easy to administer, and well suited to online educational activities. Their straightforward design also appeals to people who primarily use computers for email, web browsing, document preparation, and video communication.

Modern Chromebooks can do considerably more than browse websites. Many support Android applications, and some can run Linux software. They also provide offline capabilities for selected tasks, although cloud services remain an important part of their design.

For someone who spends most of the day using a browser, a Chromebook may provide everything necessary without the expense or complexity of a conventional computer. However,

users who depend on specialized Windows or Mac applications should verify compatibility before making the switch.

iOS and iPadOS: Apple's Smaller Operating Systems

Apple doesn't use macOS on all its devices. The iPhone runs iOS, while the iPad uses iPadOS, a closely related system adapted for tablet computing.

Both share important technological roots with macOS, but they are designed around touchscreens, mobile applications, and efficient battery operation. They also impose different restrictions on how applications are installed and how users interact with system files.

The distinction explains why an application designed for a Mac will not automatically run on an iPhone or iPad. Although Apple's devices increasingly share features and information, their operating systems remain tailored to different kinds of hardware and everyday activities.

The Invisible Operating Systems Around Us

Some of the most interesting operating systems are ones we never see.

Modern automobiles contain numerous electronic controllers responsible for functions such as engine management, braking, and safety systems. Industrial robots, medical instruments, household appliances, and telecommunications equipment also depend on specialized software to perform their assigned tasks.

Many of these devices use embedded operating systems, which are designed for specific equipment rather than general-purpose computing. Others use real-time operating systems, where responding to an event within a predictable time is particularly important.

Consider an automobile's anti-lock braking system. When sensors detect a wheel beginning to lock, the electronic controller must respond immediately. An operating system designed for such a task places greater emphasis on predictable timing than on displaying attractive windows or running office applications.

These specialized systems seldom attract public attention, but they demonstrate how thoroughly computers have become integrated into modern life.

A Quick Comparison

Operating system	Where you'll commonly find it
UNIX	Enterprise systems, research, and specialized computing

Linux	Internet servers, supercomputers, personal computers, and embedded devices
Android	Smartphones, tablets, and other mobile devices
ChromeOS	Chromebooks and education-oriented computers
iOS and iPadOS	Apple's iPhones and iPads
Embedded and real-time systems	Automobiles, appliances, medical equipment, and industrial machinery

Should You Try Another Operating System?

For most home computer users, there's little reason to abandon a familiar operating system simply because alternatives exist. Windows and macOS offer mature software collections, extensive support resources, and familiar ways of accomplishing everyday tasks.

Nevertheless, exploring alternatives can be worthwhile. A Chromebook may be sufficient for someone whose activities revolve around the Internet, while Linux may appeal to people interested in extending the useful life of an older computer or learning more about how computers work.

The important consideration is not which operating system is technically superior, but which one supports the applications, equipment, and activities you actually use.

The Bottom Line: An Invisible World of Computing

The next time you browse a website, use your smartphone, withdraw money from an ATM, or drive a modern automobile, consider the operating systems working behind the scenes. Some are descendants of technologies developed more than fifty years ago, while others were created for devices that their original designers could scarcely have imagined.

Windows and macOS may dominate our conversations about personal computers, but they represent only a small part of the operating system world. Behind the familiar screens lies a remarkable collection of technologies that keep our increasingly computerized society functioning.

And perhaps that's the greatest achievement of a good operating system: **When it does its job properly, most of us never have to think about it.**

Further Reading

For readers interested in learning more about these operating systems:

- [The Open Group — What Is UNIX?](#)

- [Linux Foundation](#)
- [Ubuntu Linux](#)
- [Google Chromebook](#)
- [Android](#)
- [Apple iOS](#)