**POSIX**

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Not to be confused with [Unix](https://en.wikipedia.org/wiki/Unix), [Unix-like](https://en.wikipedia.org/wiki/Unix-like), or [Linux](https://en.wikipedia.org/wiki/Linux).

The **Portable Operating System Interface** (**POSIX**)[[1]](https://en.wikipedia.org/wiki/POSIX#cite_note-1) is a family of [standards](https://en.wikipedia.org/wiki/Standardization) specified by the [IEEE Computer Society](https://en.wikipedia.org/wiki/IEEE_Computer_Society) for maintaining compatibility between [operating systems](https://en.wikipedia.org/wiki/Operating_system). POSIX defines the [application programming interface](https://en.wikipedia.org/wiki/Application_programming_interface) (API), along with command line [shells](https://en.wikipedia.org/wiki/Unix_shell) and utility interfaces, for software compatibility with variants of [Unix](https://en.wikipedia.org/wiki/Unix) and other operating systems.[[2]](https://en.wikipedia.org/wiki/POSIX#cite_note-FAQ-2)[[3]](https://en.wikipedia.org/wiki/POSIX#cite_note-IET-3)

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**Name**

Originally, the name "POSIX" referred to IEEE Std 1003.1-1988, released in 1988. The family of POSIX standards is formally designated as **IEEE 1003** and the international standard name is [ISO](https://en.wikipedia.org/wiki/International_Organization_for_Standardization)/[IEC](https://en.wikipedia.org/wiki/International_Electrotechnical_Commission) 9945.

The standards emerged from a project that began circa 1985. [Richard Stallman](https://en.wikipedia.org/wiki/Richard_Stallman) suggested the name *POSIX* to the IEEE instead of former *IEEE-IX*. The committee found it more easily pronounceable and memorable, and thus adopted it.[[2]](https://en.wikipedia.org/wiki/POSIX#cite_note-FAQ-2)[[4]](https://en.wikipedia.org/wiki/POSIX#cite_note-RMS-4)[[*better source needed*](https://en.wikipedia.org/wiki/Wikipedia:NOTRS)]

**Overview**

Unix was selected as the basis for a standard system interface partly because it was "manufacturer-neutral." However, several major versions of Unix existed so there was a need to develop a common denominator system. The POSIX specifications for [Unix-like](https://en.wikipedia.org/wiki/Unix-like) operating systems originally consisted of a single document for the core programming interface, but eventually grew to 19 separate documents (POSIX.1, POSIX.2, etc.).[[5]](https://en.wikipedia.org/wiki/POSIX#cite_note-5) The standardized user [command line](https://en.wikipedia.org/wiki/Command_line_interface) and [scripting interface](https://en.wikipedia.org/wiki/Command_line_interpreter) were based on the [UNIX System V](https://en.wikipedia.org/wiki/UNIX_System_V) shell.[[6]](https://en.wikipedia.org/wiki/POSIX#cite_note-6) Many user-level programs, services, and utilities including [awk](https://en.wikipedia.org/wiki/Awk), [echo](https://en.wikipedia.org/wiki/Echo_%28command%29), [ed](https://en.wikipedia.org/wiki/Ed_%28Unix%29) were also standardized, along with required program-level services including basic [I/O](https://en.wikipedia.org/wiki/Input/output) ([file](https://en.wikipedia.org/wiki/Computer_file), [terminal](https://en.wikipedia.org/wiki/Computer_terminal), and [network](https://en.wikipedia.org/wiki/Computer_network)) services. POSIX also defines a standard [threading](https://en.wikipedia.org/wiki/Thread_%28computer_science%29) library API which is supported by most modern operating systems. Nowadays, most of POSIX parts are combined into a single standard, *IEEE Std 1003.1-2008*, also known as *POSIX.1-2008*.

As of 2014, POSIX documentation is divided in two parts:

* POSIX.1, 2013 Edition: POSIX Base Definitions, System Interfaces, and Commands and Utilities (which include POSIX.1, extensions for POSIX.1, Real-time Services, Threads Interface, Real-time Extensions, Security Interface, Network File Access and Network Process-to-Process Communications, User Portability Extensions, Corrections and Extensions, Protection and Control Utilities and Batch System Utilities. This is POSIX 1003.1-2008 with Technical Corrigendum 1.)
* POSIX Conformance Testing: A test suite for POSIX accompanies the standard: **VSX-PCTS** or the **VSX POSIX Conformance Test Suite**.[[7]](https://en.wikipedia.org/wiki/POSIX#cite_note-VSX-PCTS-7)

The development of the POSIX standard takes place in the [Austin Group](https://en.wikipedia.org/wiki/Austin_Group), a joint [working group](https://en.wikipedia.org/wiki/Working_group) linking the IEEE, The Open Group and the ISO/IEC JTC 1 organizations.

**Versions**

**Parts before 1997**

Before 1997, POSIX comprised several standards:

**POSIX.1**

* POSIX.1, Core Services (incorporates Standard [ANSI C](https://en.wikipedia.org/wiki/ANSI_C)) (IEEE Std 1003.1-1988)
  + [Process](https://en.wikipedia.org/wiki/Process_%28computing%29) Creation and Control
  + [Signals](https://en.wikipedia.org/wiki/Signal_%28computing%29)
  + [Floating Point Exceptions](https://en.wikipedia.org/wiki/SIGFPE)
  + [Segmentation / Memory Violations](https://en.wikipedia.org/wiki/SIGSEGV)
  + [Illegal Instructions](https://en.wikipedia.org/wiki/SIGILL)
  + [Bus Errors](https://en.wikipedia.org/wiki/SIGBUS)
  + [Timers](https://en.wikipedia.org/wiki/SIGALRM)
  + File and Directory Operations
  + [Pipes](https://en.wikipedia.org/wiki/Pipeline_%28Unix%29)
  + [C Library (Standard C)](https://en.wikipedia.org/wiki/C_standard_library)
  + [I/O](https://en.wikipedia.org/wiki/Input/Output) Port Interface and Control
  + Process Triggers

**POSIX.1b**

* POSIX.1b, Real-time extensions (IEEE Std 1003.1b-1993, later appearing as librt - the Realtime Extensions library)[[8]](https://en.wikipedia.org/wiki/POSIX#cite_note-8))
  + Priority [Scheduling](https://en.wikipedia.org/wiki/Scheduling_%28computing%29)
  + [Real-Time Signals](https://en.wikipedia.org/wiki/SIGRTMIN_and_SIGRTMAX)
  + Clocks and Timers
  + [Semaphores](https://en.wikipedia.org/wiki/Semaphore_%28programming%29)
  + [Message Passing](https://en.wikipedia.org/wiki/Message_Passing)
  + [Shared Memory](https://en.wikipedia.org/wiki/Shared_memory_%28interprocess_communication%29)
  + [Asynch](https://en.wikipedia.org/wiki/Asynchronous_I/O) and Synch I/O
  + Memory Locking Interface

**POSIX.1c**

* POSIX.1c, [Threads extensions](https://en.wikipedia.org/wiki/POSIX_Threads) (IEEE Std 1003.1c-1995)
  + Thread Creation, Control, and Cleanup
  + Thread Scheduling
  + Thread Synchronization
  + Signal Handling

**POSIX.2**

* POSIX.2, Shell and Utilities (IEEE Std 1003.2-1992)
  + [Command Interpreter](https://en.wikipedia.org/wiki/Command-line_interpreter)
  + Utility Programs

**Versions after 1997**

After 1997, the [Austin Group](https://en.wikipedia.org/wiki/Austin_Group) developed the POSIX revisions. The specifications are known under the name [Single UNIX Specification](https://en.wikipedia.org/wiki/Single_UNIX_Specification), before they become a POSIX standard when formally approved by the ISO.

**POSIX.1-2001**

*POSIX.1-2001* or IEEE Std 1003.1-2001 equates to the *Single UNIX Specification version 3*[[9]](https://en.wikipedia.org/wiki/POSIX#cite_note-9)

This standard consisted of:

* the Base Definitions, Issue 6,
* the System Interfaces and Headers, Issue 6,
* the Commands and Utilities, Issue 6.

**POSIX.1-2004 (with two TCs)**

IEEE Std 1003.1-2004 involved a minor update of POSIX.1-2001. It incorporated two minor updates or [errata](https://en.wikipedia.org/wiki/Erratum) referred to as *Technical Corrigenda*.[[10]](https://en.wikipedia.org/wiki/POSIX#cite_note-10) Its contents are available on the web.[[11]](https://en.wikipedia.org/wiki/POSIX#cite_note-11)

**POSIX.1-2008 (with one TC)**

As of 2016, *Base Specifications, Issue 7* or *IEEE Std 1003.1*, 2013 edition represents the current version.[[12]](https://en.wikipedia.org/wiki/POSIX#cite_note-12)[[13]](https://en.wikipedia.org/wiki/POSIX#cite_note-13) A free online copy is available.

This standard consists of:

* the Base Definitions, Issue 7,
* the System Interfaces and Headers, Issue 7,
* the Commands and Utilities, Issue 7,
* the Rationale volume.

**Controversies**

**512- vs 1024-byte blocks**

POSIX mandates 512-byte block sizes for the [df](https://en.wikipedia.org/wiki/Df_%28Unix%29) and [du](https://en.wikipedia.org/wiki/Du_%28Unix%29) utilities, reflecting the default size of blocks on disks. When [Richard Stallman](https://en.wikipedia.org/wiki/Richard_M._Stallman) and the [GNU](https://en.wikipedia.org/wiki/GNU) team were implementing POSIX for the [GNU operating system](https://en.wikipedia.org/wiki/GNU_operating_system), they objected to this on the grounds that most people think in terms of 1024 byte (or 1 [KiB](https://en.wikipedia.org/wiki/Kibibyte)) blocks. The environment variable *POSIXLY\_CORRECT* was introduced to allow the user to force the standards-compliant behaviour.[[14]](https://en.wikipedia.org/wiki/POSIX#cite_note-14) The variable name *POSIX\_ME\_HARDER* was also discussed.[[15]](https://en.wikipedia.org/wiki/POSIX#cite_note-15) The variable *POSIXLY\_CORRECT* is now also used for a number of other behaviour quirks, where "POSIX and common sense disagree".[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed" \o "Wikipedia:Citation needed)*]

**POSIX-oriented operating systems**

Depending upon the degree of compliance with the standards, one can classify operating systems as fully or partly POSIX compatible. Certified products can be found at the IEEE's website.[[16]](https://en.wikipedia.org/wiki/POSIX#cite_note-certification-16)

**POSIX-certified**

Some versions of the following operating systems have been certified to conform to one or more of the various POSIX standards. This means that they passed the automated conformance tests.[[17]](https://en.wikipedia.org/wiki/POSIX#cite_note-17)

* [AIX](https://en.wikipedia.org/wiki/IBM_AIX_%28operating_system%29)[[18]](https://en.wikipedia.org/wiki/POSIX#cite_note-18)
* [HP-UX](https://en.wikipedia.org/wiki/HP-UX)[[19]](https://en.wikipedia.org/wiki/POSIX#cite_note-hp-19)
* [IRIX](https://en.wikipedia.org/wiki/IRIX)[[20]](https://en.wikipedia.org/wiki/POSIX#cite_note-20)
* [OS X](https://en.wikipedia.org/wiki/OS_X) (since [10.5 Leopard](https://en.wikipedia.org/wiki/Mac_OS_X_Leopard))[[21]](https://en.wikipedia.org/wiki/POSIX#cite_note-21)[[22]](https://en.wikipedia.org/wiki/POSIX#cite_note-22)[[*discuss*](https://en.wikipedia.org/wiki/Talk:POSIX#Mac_OS_X_and_POSIX)]
* [Solaris](https://en.wikipedia.org/wiki/Solaris_%28operating_system%29)[[23]](https://en.wikipedia.org/wiki/POSIX#cite_note-23)
* [Tru64](https://en.wikipedia.org/wiki/Tru64_UNIX)[[19]](https://en.wikipedia.org/wiki/POSIX#cite_note-hp-19)
* [UnixWare](https://en.wikipedia.org/wiki/UnixWare)[[24]](https://en.wikipedia.org/wiki/POSIX#cite_note-24)
* [QNX Neutrino](https://en.wikipedia.org/wiki/QNX)[[25]](https://en.wikipedia.org/wiki/POSIX#cite_note-25)
* [Inspur K-UX](https://en.wikipedia.org/wiki/Inspur_K-UX)[[26]](https://en.wikipedia.org/wiki/POSIX#cite_note-26)
* [Integrity](https://en.wikipedia.org/wiki/Integrity_%28operating_system%29)[[27]](https://en.wikipedia.org/wiki/POSIX#cite_note-27)

**Mostly POSIX-compliant**

|  |  |
| --- | --- |
| [[icon]](https://en.wikipedia.org/wiki/File:Wiki_letter_w_cropped.svg) | This section requires [expansion](https://en.wikipedia.org/w/index.php?title=POSIX&action=edit). *(January 2007)* |

The following, while not officially certified as POSIX compatible, comply in large part:

* [BeOS](https://en.wikipedia.org/wiki/BeOS) (and subsequently [Haiku](https://en.wikipedia.org/wiki/Haiku_%28operating_system%29))
* [Contiki](https://en.wikipedia.org/wiki/Contiki)
* [Darwin](https://en.wikipedia.org/wiki/Darwin_%28operating_system%29) (core of [OS X](https://en.wikipedia.org/wiki/OS_X) and [iOS](https://en.wikipedia.org/wiki/IOS))
* [FreeBSD](https://en.wikipedia.org/wiki/FreeBSD)[[28]](https://en.wikipedia.org/wiki/POSIX#cite_note-FreeBSD-28)
* [illumos](https://en.wikipedia.org/wiki/Illumos)
* [Linux](https://en.wikipedia.org/wiki/Linux) (most distributions — see [Linux Standard Base](https://en.wikipedia.org/wiki/Linux_Standard_Base))
* [MINIX](https://en.wikipedia.org/wiki/Minix) (now [MINIX3](https://en.wikipedia.org/wiki/MINIX3))
* [NetBSD](https://en.wikipedia.org/wiki/NetBSD)
* [Nucleus RTOS](https://en.wikipedia.org/wiki/Nucleus_RTOS)
* [NuttX](https://en.wikipedia.org/wiki/NuttX)
* [OpenBSD](https://en.wikipedia.org/wiki/OpenBSD)
* [OpenSolaris](https://en.wikipedia.org/wiki/OpenSolaris)[[29]](https://en.wikipedia.org/wiki/POSIX#cite_note-29)
* [PikeOS](https://en.wikipedia.org/wiki/PikeOS) RTOS for embedded systems with optional PSE51 and PSE52 partitions; see [partition (mainframe)](https://en.wikipedia.org/wiki/Partition_%28mainframe%29)
* [RTEMS](https://en.wikipedia.org/wiki/RTEMS) – POSIX API support designed to IEEE Std. 1003.13-2003 PSE52
* [Sanos](https://en.wikipedia.org/w/index.php?title=Sanos&action=edit&redlink=1)
* [SkyOS](https://en.wikipedia.org/wiki/SkyOS)
* [Syllable](https://en.wikipedia.org/wiki/Syllable_%28operating_system%29)
* [VSTa](https://en.wikipedia.org/wiki/VSTa)
* [VxWorks](https://en.wikipedia.org/wiki/VxWorks) (VxWorks is often used as a shell around non-posix Kernels i.e. TiMOS/SROS )
* [Android](https://en.wikipedia.org/wiki/Android_%28operating_system%29) (Available through Android NDK)[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]
* [MPE/iX](https://en.wikipedia.org/wiki/MPE/iX)[[30]](https://en.wikipedia.org/wiki/POSIX#cite_note-30)

**POSIX for Windows**

* [Cygwin](https://en.wikipedia.org/wiki/Cygwin) provides a largely POSIX-compliant development and run-time environment for [Microsoft Windows](https://en.wikipedia.org/wiki/Microsoft_Windows).
* [MinGW](https://en.wikipedia.org/wiki/MinGW), a [fork](https://en.wikipedia.org/wiki/Fork_%28software_development%29) of Cygwin, provides a less POSIX-compliant development environment and supports compatible [C](https://en.wikipedia.org/wiki/C_%28programming_language%29)-programmed applications via [Msvcrt](https://en.wikipedia.org/wiki/Msvcrt), Microsoft's old Visual C runtime library.
* [Microsoft POSIX subsystem](https://en.wikipedia.org/wiki/Microsoft_POSIX_subsystem), an optional Windows subsystem included in Windows NT-based operating systems up to Windows 2000. POSIX-1 as it stood in 1990 revision, without threads or sockets.
* [Interix](https://en.wikipedia.org/wiki/Interix), originally OpenNT by Softway Systems, Inc., is an upgrade and replacement for [Microsoft POSIX subsystem](https://en.wikipedia.org/wiki/Microsoft_POSIX_subsystem) that was purchased by [Microsoft](https://en.wikipedia.org/wiki/Microsoft) in 1999. It was initially marketed as a stand-alone add-on product and then later included it as a component in [Windows Services for UNIX](https://en.wikipedia.org/wiki/Windows_Services_for_UNIX) (SFU) and finally incorporated it as a component in [Windows Server 2003 R2](https://en.wikipedia.org/wiki/Windows_Server_2003_R2) and later Windows OS releases under the name "Subsystem for UNIX-based Applications" (SUA); later made deprecated in 2012 (Windows 8)[[31]](https://en.wikipedia.org/wiki/POSIX#cite_note-31) and dropped in 2013 (2012 R2, 8.1). It enables full POSIX compliance for certain [Microsoft Windows](https://en.wikipedia.org/wiki/Microsoft_Windows) products[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed" \o "Wikipedia:Citation needed)*].
* [UWIN](https://en.wikipedia.org/wiki/UWIN) from AT&T Research implements a POSIX layer on top of the Win32 APIs.
* [MKS Toolkit](https://en.wikipedia.org/wiki/MKS_Toolkit), originally created for MS-DOS, is a software package produced and maintained by [MKS Inc.](https://en.wikipedia.org/wiki/MKS_Inc.) that provides a [Unix-like](https://en.wikipedia.org/wiki/Unix-like) environment for scripting, connectivity and porting [Unix](https://en.wikipedia.org/wiki/Unix) and [Linux](https://en.wikipedia.org/wiki/Linux) software to both 32- and 64-bit [Microsoft Windows](https://en.wikipedia.org/wiki/Microsoft_Windows) systems. A subset of it was included in the first release of [Windows Services for UNIX](https://en.wikipedia.org/wiki/Windows_Services_for_UNIX) (SFU) in 1998.[[32]](https://en.wikipedia.org/wiki/POSIX#cite_note-32)
* [Windows C Runtime Library](https://en.wikipedia.org/wiki/Microsoft_Windows_library_files#Runtime_libraries) and [Windows Sockets API](https://en.wikipedia.org/wiki/Winsock) implement commonly used POSIX API functions for file, time, environment, and socket access,[[33]](https://en.wikipedia.org/wiki/POSIX" \l "cite_note-33) although the support remains largely incomplete and not fully interoperable with POSIX-compliant implementations.[[34]](https://en.wikipedia.org/wiki/POSIX#cite_note-34)[[35]](https://en.wikipedia.org/wiki/POSIX#cite_note-35)[[*discuss*](https://en.wikipedia.org/wiki/Talk:POSIX#BSD_sockets_as_.22POSIX.22)]

**POSIX for OS/2**

Mostly POSIX compliant environments for [OS/2](https://en.wikipedia.org/wiki/OS/2):

* [emx+gcc](https://en.wikipedia.org/wiki/EMX_%28programming_environment%29) – largely POSIX compliant

**POSIX for DOS**

Partially POSIX compliant environments for [DOS](https://en.wikipedia.org/wiki/DOS) include:

* [emx+gcc](https://en.wikipedia.org/wiki/EMX_%28programming_environment%29) – largely POSIX compliant
* [DJGPP](https://en.wikipedia.org/wiki/DJGPP) – partially POSIX compliant
* [DR-DOS](https://en.wikipedia.org/wiki/DR-DOS) multitasking core via EMM386 /MULTI - a POSIX threads frontend API extension is available

**Compliant via compatibility feature**

The following are not officially certified as POSIX compatible, but they conform in large part to the standards by implementing POSIX support via some sort of compatibility feature, usually translation libraries, or a layer atop the kernel. Without these features, they are usually noncompliant.

* [eCos](https://en.wikipedia.org/wiki/ECos) – POSIX is part of standard distribution, and used by many applications. 'external links' section below has more information.
* [MorphOS](https://en.wikipedia.org/wiki/MorphOS) (through the built-in ixemul library)
* [OpenVMS](https://en.wikipedia.org/wiki/OpenVMS) (through optional POSIX package)
* [Plan 9 from Bell Labs](https://en.wikipedia.org/wiki/Plan_9_from_Bell_Labs) APE - ANSI/POSIX Environment[[36]](https://en.wikipedia.org/wiki/POSIX#cite_note-APE-36)
* [RIOT](https://en.wikipedia.org/wiki/RIOT_%28operating_system%29) (through optional POSIX module)
* [Symbian OS](https://en.wikipedia.org/wiki/Symbian_OS) with [PIPS](https://en.wikipedia.org/wiki/PIPS) (PIPS Is POSIX on Symbian)
* [Windows NT kernel](https://en.wikipedia.org/wiki/Architecture_of_Windows_NT) when using Microsoft [SFU](https://en.wikipedia.org/wiki/Windows_Services_for_Unix) 3.5 or SUA
  + [Windows 2000 Server or Professional with Service Pack 3 or later](https://en.wikipedia.org/wiki/Windows_2000). To be POSIX compliant, one must activate optional features of Windows NT and Windows 2000 Server.[[37]](https://en.wikipedia.org/wiki/POSIX#cite_note-MS-37)
  + [Windows XP Professional with Service Pack 1 or later](https://en.wikipedia.org/wiki/Windows_XP)
  + [Windows Server 2003](https://en.wikipedia.org/wiki/Windows_Server_2003)
  + [Windows Server 2008](https://en.wikipedia.org/wiki/Windows_Server_2008) and Ultimate and Enterprise versions of [Windows Vista](https://en.wikipedia.org/wiki/Windows_Vista)
  + [Windows Server 2008 R2](https://en.wikipedia.org/wiki/Windows_Server_2008_R2) and Ultimate and Enterprise versions of [Windows 7](https://en.wikipedia.org/wiki/Windows_7)
  + albeit deprecated, still available for [Windows Server 2012](https://en.wikipedia.org/wiki/Windows_Server_2012) and Enterprise version of [Windows 8](https://en.wikipedia.org/wiki/Windows_8)
* [UNIX System Services](https://en.wikipedia.org/wiki/UNIX_System_Services) that runs on [z/OS](https://en.wikipedia.org/wiki/Z/OS) (certified as compliant)

**See also**

* [POSIX signal](https://en.wikipedia.org/wiki/POSIX_signal)
* [POSIX Threads](https://en.wikipedia.org/wiki/POSIX_Threads)
* POSIX sockets are basically [Berkeley sockets](https://en.wikipedia.org/wiki/Berkeley_sockets)[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]
* [TRON project](https://en.wikipedia.org/wiki/TRON_project) – alternative OS standards to POSIX
* [Common User Access](https://en.wikipedia.org/wiki/Common_User_Access) – User interface standard
* [Interix](https://en.wikipedia.org/wiki/Interix) – a full-featured POSIX and Unix environment subsystem for Microsoft's Windows NT-based operating systems
* [C POSIX library](https://en.wikipedia.org/wiki/C_POSIX_library)
* [Real-time operating system](https://en.wikipedia.org/wiki/Real-time_operating_system)
* [Portable character set](https://en.wikipedia.org/wiki/Portable_character_set)