Click to verify

God of War - The Official Novelization PDF By:J. M. BarlogPublished on 2018-08-28 by Titan Books (US, CA)The novelization of the highly anticipated God of War game. His vengeance against the Gods of Olympus years behind him, Kratos now lives as a man in the realm of Norse gods and monsters. It is in this harsh, unforgiving world that he must fight to survive... and teach his son to do the same. This startling reimagining of God of War deconstructs the core elements that defined the series-- satisfying combat; breathtaking scale; and a powerful narrative--and fuses them anew.This Book was ranked at 17 by Google Books for keyword Genre Fiction War novel.Book ID of God of War - The Official Novelization's Books is jFhbDwAAQBAJ, Book which was written byJ. M. Barloghave ETAG "OJD1Heiy0Ug"Book which was published by Titan Books (US, CA) since 2018-08-28 have ISBNs, ISBN 13 Code is 9781789090154 and ISBN 10 Code is 1789090156Reading Mode in Text Status is true and Reading Mode in Image Status is trueBook which have "416 Pages" is Printed at BOOK under CategoryFictionBook was written in eneBook Version Availability Status at PDF is true and in ePub is trueBook PreviewDownload God of War - The Official Novelization PDF FreeDownload God of War - The Official Novelization Books FreeDownload God of War - The Official Novelization FreeDownload God of War - The Official Novelization PDFDownload God of War - The Official Novelization Books Thera's Bane upgrades Blades of Athena with powerful fire abilities and enhanced combat features. Guardian Shield offers defensive abilities and enhances combat skills, adding versatility to Kratos's arsenal. Draupnir Spear provides ranged and close-range combat options with unique abilities like wind affinity and duplication. Throughout the God of War series, bloodshed, vengeance, an iconic story, and savage weaponry are expected and beloved by fans for many years. Among fans of the series, the weaponry aspects are often cited as one of their favorite things about God of War, especially certain overpowered items. This list will mainly focus on weapons, and will not include spells or tools like the Head of Medusa. Weapon enchantments will also not appear on this list, so runes and enhancements are out. Now that the rules are set, here's why these are the best weapons in God of War. Related The God of War franchise has been home to some iconic Easter eggs over the years, and one Ragnarok collectible should find new life in the next entry. Updated January 4, 2025, by Rhenn Taguiam: Fans of the God of War franchise wait with bated breath as the series marks its 20th anniversary in 2025, which means surprises might be in store to celebrate. While there has been no news of remasters or new releases yet, fans might want to start replaying their favorite God of War titles. However, fans going through the games might be eager to remind themselves which weapons Kratos wielded the best in his tenure as Ares’s soldier and as the God of War. 19 Thera’s Bane Engulf The Blades Of Athena In Flames While Thera’s Bane in God of War: Ghost of Sparta is essentially an “ability,” its nature and gameplay effect practically transforms it into a new weapon. Kratos can only get Thera’s Bane from the chest of the titular Titan, Thera, as he frees her from her prison deep in Atlantis. As a result, Kratos gets access to “primal” fire that engulfs his Blades of Athena in fierce fire. Gameplay-wise, this simply “upgrades” the Blades of Athena. However, in addition to boosting their power and speed, Kratos can now use the Blades of Athena to “implant” exploding magma into his enemies and can even destroy the armor and shields of other creatures more easily. Thera’s Bane also gives the Blades of Athena a black and red color scheme, making them more effective representations of Kratos’s wrath. Obtained during the events of God of War, the Guardian Shield first appears as part of Kratos’s left gauntlet. In this form, the Guardian Shield consists of a small disc surrounded by a wrench-shaped swirling plate and two longer plates underneath. When activated, the Guardian Shield extends into a buckler that allows Kratos to protect himself from attacks. Gameplay-wise, the Guardian Shield can be used in conjunction with Kratos’s fists, the Blades of Chaos, and the Leviathan Axe. Kratos using the Guardian Shield is a testament that the aged former God of War is still capable of holding his own in combat. When used, the Guardian Shield endows Kratos with a plethora of skills, such as being able to break an opponent’s guard and even deflect blasts back to opponents. He can attack opponents from a sprint, and even quickly swap stances to perform swift attacks. Alongside the Leviathan Axe, the Draupnir Spear is considered the second “official” Norse armament that Kratos manages to acquire in God of War Ragnarok. Originally taking the appearance of an enchanted duplicating ring, Kratos was instructed to bring the ring to the Lady of the Forge to ask for her assistance in transforming it into a spear. After transforming into a spear as it appeared in the Norse myth, Kratos hoped to use it in the fight against Heimdall in the hopes of stopping his “fate” of killing his son Atreus in Ragnarok. In the game, Draupnir is a dual-purpose weapon with its ability to hit opponents at any range. Its affinity to wind can draw enemies close before blasting them from afar. Meanwhile, the duplicating magic of its ring source meant Kratos could spawn near-infinite copies of Draupnir to do with as he wanted, such as throwing them at opponents, creating platforms for traversal, or detonating powerful blasts by slamming them on the ground. While the Blades of Chaos remain as Kratos’s most recognizable and best weapons, the Blades of Athena were perhaps the most recognizable upgrades throughout the franchise. Bestowed by none other than Athena herself, the Blades of Athena served exactly the same function and purpose as the Blades of Chaos. This time around, her own variation had more godly power, as reflected with the engravings that glowed red and the golden aura it gave in Kratos’s possession as the God of War. 2:45 Related The best enchantments in God of War Ragnarok will certainly save Kratos from the most dangerous of situations that they will face in the Nine Realms. Given their godly nature, the Blades of Athena had some sort of divine power when activated by Kratos. Named Divine Reckoning, this is activated when Kratos slams the blades into the ground, causing a tornado to encircle Kratos and blast away anyone who dared come near him. Compared to his signature Blades of Chaos, the Blade of Artemis was a huge and curved blade that fit Kratos’s huge stature. Bestowed to him by Artemis for his fight against Ares, the Blade of Artemis has a characteristically slower yet more brutal approach to combat, unlike the fast and loose Blades of Chaos. What makes the Blade of Artemis quite a sight to behold is its origins. According to Artemis, Goddess of the Hunt, she used the Blade of Artemis to slay a Titan. Its armor-piercing qualities perhaps reflect its innate strength. Should Kratos have planned on using this in his later adventures, the Blade of Artemis would’ve allowed him to go toe-to-toe with the ancient Titans with relative ease. Despite its gargantuan size, Kratos still managed to wield the Gauntlet of Zeus and use its destructive energies to kill the likes of Persephone. And while Kratos would eventually lose this to its rightful owner, Zeus, shortly after retrieving it from its temple, the Gauntlet of Zeus was still extremely powerful. At its core, Zeus had Hephaestus forge the Gauntlet as a means of being able to chain the Titans to the depths of Tartarus. Given its gigantic size, it was meant to be wielded by Zeus in his gigantic godly form. When wielded properly, the Gauntlet of Zeus can help its user achieve superhuman feats of strength, as well as summon various kinds of lightning that reflect Zeus’s control over the elements. Kratos was at some point to possess armor that allowed him to wield the Gauntlet at its full power. Although not a weapon per se, Army of Hades was a power that Hades himself granted Kratos after the latter had slain Pandora’s Guardian. Various variations of the Army of Hades appear in subsequent games, all manifesting whenever Kratos defeats Hades or an aspect of his power. Unlike other more destructive godly energies, the Army of Hades was proof of the gods’ insurmountable power as divine beings. When using this power, Kratos uses the army of the dead to do his bidding, allowing him to summon various forces of the undead to fight on his behalf. These begin as ordinary souls that wielded swords, to souls that wielded various weapons such as axes and falchions - a reflection of Kratos’ growing capabilities of calling upon stronger souls from the deeper parts of the Underworld. Players who roamed around during the first God of War game would see a strange-looking footbridge that connected the Statue of Athena with Suicide Bluffs, particularly because of its shape - a sword. However, this was actually an actual sword, with the blade being made of metal. Named the Blade of the Gods, Kratos actually used the sword in his fight against Ares after Pandora's Box increased his size to that of a god’s. Related For all of the twisted and evil Gods to appear throughout the series, none are quite as villainous as the God of War himself; Kratos. The Blade of the Gods acted like an actual sword, with Kratos being able to take full advantage of his physique to wield it. This was the sword he used to land the killing blow to Ares and replace him as the God of War, making it quite a memorable weapon capable of slaying the gods. While the Bow of Apollo restriction is to the tool’s category, it holds more power than other weapons that share the utility category. Much like Typhon's Bane from God of War 2, that was a weapon it merely is best for crowd control. The Bow of Apollo makes this list for its ability to maintain combos better than most weapons. The bow shares its resource bar with other tools allowing it to break attack chains and AOE down foes. It is undoubtedly the least powerful weapon on this list. Yet, its utility of continuing combos and suspending smaller enemies makes it a great help. Early on in the first God of War, Athena grants players this purple scimitar-like sword. At first, this weapon is good to use, but most players will drop the weapon after a few moments of using it. When fully upgraded, this weapon does hold an impressive power, able to down weaker foes in just a few swings. The primary cons of this weapon are its very stale move set. Unlike most weapons that gain new moves when leveling them up, the Artemius blade only grows in power. A simple and powerful weapon, at least it glows red when at full strength, which is the only noticeable difference. 100%(1)100% found this document useful (1 vote)31 viewsThe document is an official strategy guide for the game 'God of War,' detailing gameplay mechanics, maps, and walkthroughs for various challenges. It includes sections on equipment, skills, ...SaveSave God of War Official Strategy Guide Unknown downloa... For Later100%100% found this document useful, undefined100%(1)100% found this document useful (1 vote)31 viewsThe document is an official strategy guide for the game 'God of War,' detailing gameplay mechanics, maps, and walkthroughs for various challenges. It includes sections on equipment, skills, ... Computer operating systems "Windows" redirects here. For the part of a building, see Window. For other uses, see Windows (disambiguation). This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed.Find sources: "Microsoft Windows" – news · newspapers · books · scholar · JSTOR (December 2024) (Learn how and when to remove this message) Operating system WindowsLogo as of October 2021DeveloperMicrosoftSource modelClosed-sourceSource-available (through Shared Source Initiative)Initial releaseNovember 20, 1985; 39 years ago (1985-11-20)Latest release24H2 (10.0.26100.4351) (June 11, 2025; 6 days ago (2025-06-11)[1]) [±]Latest preview Release Preview Channel 24H2 (10.0.26100.4351) (June 11, 2025; 6 days ago (2025-06-11)[2][3]) [±] Beta Channel 24H2 (10.0.26120.4441) (June 13, 2025; 4 days ago (2025-06-13)[4]) [±] Dev Channel 24H2 (10.0.26200.5651) (June 13, 2025; 4 days ago (2025-06-13)[5]) [±] Canary Channel 10.0.27871.1000 (June 4, 2025; 13 days ago (2025-06-04)[6]) [±]Marketing targetPersonal computingAvailable in110 languagesUpdate methodWindows UpdateMicrosoft StoreWindows Server Update Services (WSUS)Package managerWindows Installer (.msi, .msp),[7] App Installer (.msix,.[8] msixbundle[9][10]), Microsoft Store (.appx, .appxbundle),[11] Windows Package ManagerPlatformsIA-32, x86-64, ARM, ARM64 Previously: 16-bit x86, DEC Alpha, MIPS, PowerPC, ItaniumKernel type Windows NT family: Hybrid Windows Embedded Compact/Windows CE: Hybrid or Monolithic Windows 9x and earlier: Monolithic (MS-DOS and VMM32) Defaultuser interfaceWindows shellLicenseProprietary commercial softwareOfficial websitewindows.com Windows is a product line of proprietary graphical operating systems developed and marketed by Microsoft. It is grouped into families and subfamilies that cater to particular sectors of the computing industry – Windows (unqualified) for a consumer or corporate workstation, Windows Server for a server and Windows IoT for an embedded system. Windows is sold as either a consumer retail product or licensed to third-party hardware manufacturers who sell products bundled with Windows.[citation needed] The first version of Windows, Windows 1.0, was released on November 20, 1985, as a graphical operating system shell for MS-DOS in response to the growing interest in graphical user interfaces (GUIs).[12] The name "Windows" is a reference to the windowing system in GUIs.[13] The 1990 release of Windows 3.0 catapulted its market success and led to various other product families, including the now-defunct Windows 9x, Windows Mobile, Windows Phone, and Windows CE/Embedded Compact. Windows is the most popular desktop operating system in the world, with a 70% market share as of March 2023[update], according to StatCounter;[14] however when including mobile operating systems, it is in second place, behind Android.[15] The most recent version of Windows is Windows 11 for consumer PCs and tablets, Windows 11 Enterprise for corporations, and Windows Server 2025 for servers. Still supported are some editions of Windows 10, Windows Server 2016 or later (and exceptionally with paid support down to Windows Server 2008).[16][17] This section needs additional citations for verification. Please help improve this article by adding citations to reliable sources in this section. Unsourced material may be challenged and removed. (December 2024) (Learn how and when to remove this message) As of 2025,[update] the only active top-level family is Windows NT.[citation needed] The first version, Windows NT 3.1, was intended for server computing and corporate workstations. It grew into a product line of its own and now consists of four sub-families that tend to be released almost simultaneously and share the same kernel. Windows (unqualified): For a consumer or corporate workstation or tablet. The latest version is Windows 11.[citation needed] Its main competitors are macOS by Apple and Linux for personal computers and iPadOS and Android for tablets (cf. Usage share of operating systems § Market share by category). Of note: "Windows" refers to both the overall product line and this sub-family of it. Windows Server: For a server computer. The latest version is Windows Server 2025. Unlike its client sibling, it has adopted a strong naming scheme. The main competitor of this family is Linux. (cf. Usage share of operating systems § Market share by category) Windows PE: A lightweight version of its Windows sibling, meant to operate as a live operating system, used for installing Windows on bare-metal computers (especially on many computers at once), recovery, or troubleshooting purposes. The latest version is Windows PE 10.[citation needed] Windows IoT (previously Windows Embedded): For IoT and embedded computers. The latest version is Windows 11 IoT Enterprise.[18] Like Windows Server, the main competitor of this family is Linux. (cf. Usage share of operating systems § Market share by category) These top-level Windows families are no longer actively developed: Windows 9x: Intended exclusively for the consumer market. The first version was Windows 95, which was followed by Windows 98. The last version of the Windows 9x family was Windows Me, which was widely regarded as one of the worst operating systems of all time, with PC World labeling it as "Mistake Edition" and placing it 4th in their list of Worst Tech Products in 2006[19]). All versions of the Windows 9x family have a monolithic kernel that uses MS-DOS as a foundation alongside the kernel first used with Windows 95. This line has since been defunct, with Microsoft now catering to the consumer market with Windows NT starting with Windows XP.[citation needed] Windows Mobile: The predecessor to Windows Phone, a mobile phone and PDA operating system. The first version was called Pocket PC 2000. The third version, Windows Mobile 2003, was the first version to adopt the Windows Mobile trademark. The last published version was Windows Mobile 6.5. Windows Phone: Sold only to smartphone manufacturers. The first version was Windows Phone 7, followed by Windows Phone 8 and Windows Phone 8.1. It was succeeded by Windows 10 Mobile, which is also defunct. Windows Embedded Compact: Most commonly known by its former name, Windows CE, it is a hybrid kernel operating system optimized for low power and memory systems, with OEMs able to modify the UI to suit their needs. The final version was Windows Embedded Compact 2013, and it is succeeded by Windows IoT.[citation needed] Main article: Microsoft Windows version history See also: List of Microsoft Windows versions The term Windows collectively describes any or all of several generations of Microsoft operating system products. These products are generally categorized as follows: Main articles: Windows 1.0, Windows 2.0, and Windows 2.1 The history of Windows dates back to 1981 when Microsoft started work on a program called "Interface Manager". The name "Windows" comes from the fact that the system was one of the first to use graphical boxes to represent programs; in the industry, at the time, these were called "windows" and the underlying software was called "windowing software."[13] It was announced in November 1983 (after the Apple Lisa, but before the Macintosh) under the name "Windows", but Windows 1.0 was not released until November 1985.[20] Windows 1.0 was to compete with Apple's operating system, but achieved little popularity. Windows 1.0 is not a complete operating system; rather, it extends MS-DOS. The shell of Windows 1.0 is a program known as the MS-DOS Executive. Components included Calculator, Calendar, Cardfile, Clipboard Viewer, Clock, Control Panel, Notepad, Paint, Reversi, Terminal and Write. Windows 1.0 does not allow overlapping windows. Instead, all windows are tiled. Only modal dialog boxes may appear over other windows. Microsoft sold as included Windows Development libraries with the C development environment, which included numerous windows samples.[21] Windows 2.0 was released in December 1987, and was more popular than its predecessor. It features several improvements to the user interface and memory management.[22] Windows 2.03 changed the OS from tiled windows to overlapping windows. The result of this change led to Apple Computer filing a suit against Microsoft alleging infringement on Apple's copyrights (eventually settled in court in Microsoft's favor in 1993).[23][24] Windows 2.0 also introduced more sophisticated keyboard shortcuts and could make use of expanded memory. Windows 2.1 was released in two different versions: Windows/286 and Windows/386. Windows/386 uses the virtual 8086 mode of the Intel 80386 to multitask several DOS programs and the paged memory model to emulate expanded memory using available extended memory. Windows/286, in spite of its name, runs on both Intel 8086 and Intel 80286 processors. It runs in real mode but can make use of the high memory area.[25] In addition to full Windows packages, there were runtime-only versions that shipped with early Windows software from third parties and made it possible to run their Windows software on MS-DOS and without the full Windows feature set. The early versions of Windows are often thought of as graphical shells, mostly because they ran on top of MS-DOS and used it for file system services.[26] However, even the earliest Windows versions already assumed many typical operating system functions; notably, having their own executable file format and providing their own device drivers (timer, graphics, printer, mouse, keyboard and sound). Unlike MS-DOS, Windows allowed users to execute multiple graphical applications at the same time, through cooperative multitasking. Windows implemented an elaborate, segment-based, software virtual memory scheme, which allows it to run applications larger than available memory: code segments and resources are swapped in and thrown away when memory became scarce; data segments moved in memory when a given application had relinquished processor control. Main articles: Windows 3.0 and Windows 3.1 Windows 3.0, released in 1990 Windows 3.0, released in 1990, improved the design, mostly because of virtual memory and loadable virtual device drivers (VxDs) that allow Windows to share arbitrary devices between multi-tasked DOS applications.[citation needed] Windows 3.0 applications can run in protected mode, which gives them access to several megabytes of memory without the obligation to participate in the software virtual memory scheme. They run inside the same address space, where the segmented memory provides a degree of protection. Windows 3.0 also featured improvements to the user interface. Microsoft rewrote critical operations from C into assembly. Windows 3.0 was the first version of Windows to achieve broad commercial success, selling 2 million copies in the first six months.[27][28] Versions before Windows 95 had to be installed from floppy disks by end users (or in professional environments with a network installation); here Windows for Workgroups with nine 3.5-inch-disks to be inserted sequentially. Windows 3.1, made generally available on March 1, 1992, featured a facelift. In October 1992, Windows for Workgroups, a special version with integrated peer-to-peer networking features, was released. It was sold along with Windows 3.1. Support for Windows 3.1 ended on December 31, 2001.[29] Windows 3.2, released in 1994, is an updated version of the Chinese version of Windows 3.1.[30] The update was limited to this language version, as it fixed only issues related to the complex writing system of the Chinese language.[31] Windows 3.2 was generally sold by computer manufacturers with a ten-disk version of MS-DOS that also had Simplified Chinese characters in basic output and some translated utilities.[citation needed] Main articles: Windows 9x, Windows 95, Windows 98, and Windows Me The next major consumer-oriented release of Windows, Windows 95, was released on August 24, 1995. While still remaining MS-DOS-based, Windows 95 introduced support for native 32-bit applications, plug and play hardware, preemptive multitasking, long file names of up to 255 characters, and provided increased stability over its predecessors. Windows 95 also introduced a redesigned, object oriented user interface, replacing the previous Program Manager with the Start menu, taskbar, and Windows Explorer shell. Windows 95 was a major commercial success for Microsoft; Ina Fried of CNET remarked that "by the time Windows 95 was finally ushered off the market in 2001, it had become a fixture on computer desktops around the world."[32] Microsoft published four OEM Service Releases (OSR) of Windows 95, each of which was roughly equivalent to a service pack. The first OSR of Windows 95 was also the first version of Windows to be bundled with Microsoft's web browser, Internet Explorer.[33] Mainstream support for Windows 95 ended on December 31, 2000, and extended support for Windows 95 ended on December 31, 2001.[34] Windows 95 was followed up with the release of Windows 98 on June 25, 1998, which introduced the Windows Driver Model, support for USB composite devices, support for ACPI, hibernation, and support for multi-monitor configurations. Windows 98 also included integration with Internet Explorer 4 through Active Desktop and other aspects of the Windows Desktop Update (a series of enhancements to the Explorer shell which was also made available for Windows 95). In May 1999, Microsoft released Windows 98 Second Edition, an updated version of Windows 98. Windows 98 SE added Internet Explorer 5.0 and Windows Media Player 6.2 amongst other upgrades. Mainstream support for Windows 98 ended on June 30, 2002, and extended support for Windows 98 ended on July 11, 2006.[35] On September 14, 2000, Microsoft released Windows Me (Millennium Edition), the last DOS-based version of Windows. Windows Me incorporated visual interface enhancements from its Windows NT-based counterpart Windows 2000, had faster boot times than previous versions (which however, required the removal of the ability to access a real mode DOS environment, removing compatibility with some older programs),[36] expanded multimedia functionality (including Windows Media Player 7, Windows Movie Maker, and the Windows Image Acquisition framework for retrieving images from scanners and digital cameras), additional system utilities such as System File Protection and System Restore, and updated home networking tools.[37] However, Windows Me was faced with criticism for its speed and instability, along with hardware compatibility issues and its removal of real mode DOS support. PC World considered Windows Me to be one of the worst operating systems Microsoft had ever released, and the fourth worst tech product of all time.[19] Main article: Windows NT Main articles: Windows NT 3.1, Windows NT 3.5, Windows NT 3.51, Windows NT 4.0, and Windows 2000 Windows logo (1995–2001) In November 1988, a new development team within Microsoft (which included former Digital Equipment Corporation developers Dave Cutler and Mark Lucovsky) began work on a revamped version of IBM and Microsoft's OS/2 operating system known as "NT OS/2". NT OS/2 was intended to be a secure, multi-user operating system with POSIX compatibility and a modular, portable kernel with preemptive multitasking and support for multiple processor architectures. However, following the successful release of Windows 3.0, the NT development team decided to rework the project to use an extended 32-bit port of the Windows API known as Win32 instead of those of OS/2. Win32 maintained a similar structure to the Windows APIs (allowing existing Windows applications to easily be ported to the platform), but also supported the capabilities of the existing NT kernel. Following its approval by Microsoft's staff, development continued on what was now Windows NT, the first 32-bit version of Windows. However, IBM objected to the changes, and ultimately continued OS/2 development on its own.[38][39] Windows NT was the first Windows operating system based on a hybrid kernel. The hybrid kernel was designed as a modified microkernel, influenced by the Mach microkernel developed by Richard Rashid at Carnegie Mellon University, but without meeting all of the criteria of a pure microkernel. The first release of the resulting operating system, Windows NT 3.1 (named to associate it with Windows 3.1) was released in July 1993, with versions for desktop workstations and servers. Windows NT 3.5 was released in September 1994, focusing on performance improvements and support for Novell's NetWare, and was followed up by Windows NT 3.51 in May 1995, which included additional improvements and support for the PowerPC architecture. Windows NT 4.0 was released in June 1996, introducing the redesigned interface of Windows 95 to the NT series. On February 17, 2000, Microsoft released Windows 2000, a successor to NT 4.0. The Windows NT name was dropped at this point in order to put a greater focus on the Windows brand.[39] Main article: Windows XP A variation of the 2001–2006 Windows logo from 2003 using the Segoe typeface instead of the Franklin Gothic typeface. This variation was mainly used for branding purposes. The next major version of Windows NT, Windows XP, was released to manufacturing (RTM) on August 24, 2001, and to the general public on October 25, 2001. The introduction of Windows XP aimed to unify the consumer-oriented Windows 9x series with the architecture introduced by Windows NT, a change which Microsoft promised would provide better performance over its DOS-based predecessors. Windows XP would also introduce a redesigned user interface (including an updated Start menu and a "task-oriented" Windows Explorer), streamlined multimedia and networking features, Internet Explorer 6, integration with Microsoft's .NET Passport services, a "compatibility mode" to help provide backwards compatibility with software designed for previous versions of Windows, and Remote Assistance functionality.[40][41] At retail, Windows XP was marketed in two main editions: the "Home" edition was targeted towards consumers, while the "Professional" edition was targeted towards business environments and power users, and included additional security and networking features. Home and Professional were later accompanied by the "Media Center" edition (designed for home theater PCs, with an emphasis on support for DVD playback, TV tuner cards, DVR functionality, and remote controls), and the "Tablet PC" edition (designed for mobile devices meeting its specifications for a tablet computer, with support for stylus pen input and additional pen-enabled applications).[42][43][44] Mainstream support for Windows XP ended on April 14, 2009. Extended support ended on April 8, 2014.[45] After Windows 2000, Microsoft also changed its release schedules for server operating systems; the server counterpart of Windows XP, Windows Server 2003, was released in April 2003.[39] It was followed in December 2005, by Windows Server 2003 R2. Main article: Windows Vista After a lengthy development process, Windows Vista was released on November 30, 2006, for volume licensing and January 30, 2007, for consumers. It contained a number of new features, from a redesigned shell and user interface to significant technical changes, with a particular focus on security features. It was available in a number of different editions, and has been subject to some criticism, such as drop of performance, longer boot time, criticism of new UAC, and stricter license agreement. Vista's server counterpart, Windows Server 2008 was released in early 2008. Main article: Windows 7 On July 22, 2009, Windows 7 and Windows Server 2008 R2 were released to manufacturing (RTM) and released to the public three months later on October 22, 2009. Unlike its predecessor, Windows Vista, which introduced a large number of new features, Windows 7 was intended to be a more focused, incremental upgrade to the Windows line, with the goal of being compatible with applications and hardware with which Windows Vista was already compatible.[46] Windows 7 has multi-touch support, a redesigned Windows shell with an updated taskbar with revealable jump lists that contain shortcuts to files frequently used with specific applications and shortcuts to tasks within the application,[47] a home networking system called HomeGroup,[48] and performance improvements. Main articles: Windows 8 and Windows 8.1 Windows logo (2012–2015) Windows 8, the successor to Windows 7, was released generally on October 26, 2012. A number of significant changes were made on Windows 8, including the introduction of a user interface based around Microsoft's Metro design language with optimizations for touch-based devices such as tablets and all-in-one PCs. These changes include the Start screen, which uses large tiles that are more convenient for touch interactions and allow for the display of continually updated information, and a new class of apps which are designed primarily for use on touch-based devices. The new Windows version required a minimum resolution of 1024×768 pixels,[49] effectively making it unfit for netbooks with 800×600-pixel screens. Other changes include increased integration with cloud services and other online platforms (such as social networks and Microsoft's own OneDrive (formerly SkyDrive) and Xbox Live services), the Windows Store service for software distribution, and a new variant known as Windows RT for use on devices that utilize the ARM architecture, and a new keyboard shortcut for screenshots.[50][51][52][53][54][55][56] An update to Windows 8, called Windows 8.1,[57] was released on October 17, 2013, and includes features such as new live tile sizes, deeper OneDrive integration, and many other revisions. Windows 8 and Windows 8.1 have been subject to some criticism, such as the removal of the Start menu. Main article: Windows 10 Windows logo (2015–2021) On September 30, 2014, Microsoft announced Windows 10 as the successor to Windows 8.1. It was released on July 29, 2015, and addresses shortcomings in the user interface first introduced with Windows 8. Changes on PC include the return of the Start Menu, a virtual desktop system, and the ability to run Windows Store apps within windows on the desktop rather than in full-screen mode. Windows 10 is said to be available to update from qualified Windows 7 with SP1, Windows 8.1 and Windows Phone 8.1 devices from the Get Windows 10 Application (for Windows 7, Windows 8.1) or Windows Update (Windows 7).[58] In February 2017, Microsoft announced the migration of its Windows source code repository from Perforce to Git. This migration involved 3.5 million separate files in a 300-gigabyte repository.[59] By May 2017, 90 percent of its engineering team was using Git, in about 8500 commits and 1760 Windows builds per day.[59] In June 2021, shortly before Microsoft's announcement of Windows 11, Microsoft updated their lifecycle policy pages for Windows 10, revealing that support for their last release of Windows 10 will end on October 14, 2025.[60][61] On April 27, 2023, Microsoft announced that version 22H2 would be the last of Windows 10.[62][63] Windows logo (2021–present) Main article: Windows 11 On June 24, 2021, Windows 11 was announced as the successor to Windows 10 during a livestream. The new operating system was designed to be more user-friendly and understandable. It was released on October 5, 2021.[64][65] As of May 2022,[update] Windows 11 is a free upgrade to Windows 10 users who meet the system requirements.[66] See also: Azure Virtual Desktop Not to be confused with Microsoft 365 or Windows/386. In July 2021, Microsoft announced it will start selling subscriptions to virtualized Windows desktops as part of a new Windows 365 service in the following month. The new service will allow for cross-platform usage, aiming to make the operating system available for both Apple and Android users. It is a separate service and offers several variations including Windows 365 Frontline, Windows 365 Boot, and the Windows 365 app.[67] The subscription service will be accessible through any operating system with a web browser. The new service is an attempt at capitalizing on the growing trend, fostered during the COVID-19 pandemic, for businesses to adopt a hybrid remote work environment, in which "employees split their time between the office and home". As the service will be accessible through web browsers, Microsoft will be able to bypass the need to publish the service through Google Play or the Apple App Store.[68][69][70][71][72] Microsoft announced Windows 365 availability to business and enterprise customers on August 2, 2021.[73] See also: Multilingual User Interface Multilingual support has been built into Windows since Windows 3.0. The language for both the keyboard and the interface can be changed through the Region and Language Control Panel. Components for all supported input languages, such as Input Method Editors, are automatically installed during Windows installation (in Windows XP and earlier, files for East Asian languages, such as Chinese, and files for right-to-left scripts, such as Arabic, may need to be installed separately, also from the said Control Panel). Third-party IMEs may also be installed if a user feels that the provided one is insufficient for their needs. Since Windows 2000, English editions of Windows NT have East Asian IMEs (such as Microsoft Pinyin IME and Microsoft Japanese IME) bundled, but files for East Asian languages may be manually installed on Control Panel. Interface languages for the operating system are free for download, but some languages are limited to certain editions of Windows. Language Interface Packs (LIPs) are redistributable and may be downloaded from Microsoft's Download Center and installed for any edition of Windows (XP or later) – they translate most, but not all, of the Windows interface, and require a certain base language (the language which Windows originally shipped with). This is used for most languages in emerging markets. Full Language Packs, which translate the complete operating system, are only available for specific editions of Windows (Ultimate and Enterprise editions of Windows Vista and 7, and all editions of Windows 8, 8.1 and RT except Single Language). They do not require a specific base language and are commonly used for more popular languages such as French or Chinese. These languages cannot be downloaded through the Download Center, but are available as optional updates through the Windows Update service (except Windows 8). The interface language of installed applications is not affected by changes in the Windows interface language. The availability of languages depends on the application developers themselves. Windows 8 and Windows Server 2012 introduce a new Language Control Panel where both the interface and input languages can be simultaneously changed, and language packs, regardless of type, can be downloaded from a central location. The PC Settings app in Windows 8.1 and Windows Server 2012 R2 also includes a counterpart settings page for this. Changing the interface language also changes the language of preinstalled Windows Store apps (such as Mail, Maps and News) and certain other Microsoft-developed apps (such as Remote Desktop). The above limitations for language packs are however still in effect, except that full language packs can be installed for any edition except Single Language, which caters to emerging markets. Windows NT included support for several platforms before the x86-based personal computer became dominant in the professional world. Windows NT 4.0 and its predecessors supported PowerPC, DEC Alpha and MIPS R4000 (although some of the platforms implement 64-bit computing, the OS treated them as 32-bit). Windows 2000 dropped support for all platforms, except the third generation x86 (known as IA-32) or newer in 32-bit mode. The client line of the Windows NT family still ran on IA-32 up to Windows 10[66] (the server line of the Windows NT family still ran on IA-32 up to Windows Server 2008). With the introduction of the Intel Itanium architecture (IA-64), Microsoft released new versions of Windows to support it. Itanium versions of Windows XP and Windows Server 2003 were released at the same time as their mainstream x86 counterparts. Windows XP 64-Bit Edition (Version 2003), released in 2003, is the last Windows client operating system to support Itanium. Windows Server line continues to support this platform until Windows Server 2012; Windows Server 2008 R2 is the last Windows operating system to support Itanium architecture. On April 25, 2005, Microsoft released Windows XP Professional x64 Edition and Windows Server 2003 x64 editions to support x86-64 (or simply x64), the 64-bit version of x86 architecture. Windows Vista was the first client version of Windows NT to be released simultaneously in IA-32 and x64 editions. As of 2024, x64 is still supported. An edition of Windows 8 known as Windows RT was specifically created for computers with ARM architecture, and while ARM is still used for Windows smartphones with Windows 10, tablets with Windows RT will not be updated. Starting from Windows 10 Fall Creators Update (version 1709) and later includes support for ARM-based PCs.[74] Main articles: Windows CE and Windows Phone Windows CE (officially known as Windows Embedded Compact), is an edition of Windows that runs on minimalistic computers, like satellite navigation systems and some mobile phones. Windows Embedded Compact is based on its own dedicated kernel, dubbed Windows CE kernel. Microsoft licenses Windows CE to OEMs and device makers. The OEMs and device makers can modify and create their own user interfaces and experiences, while Windows CE provides the technical foundation to do so. Windows CE was used in the Dreamcast along with Sega's own proprietary OS for the console. Windows CE was the core from which Windows Mobile was derived. Its successor, Windows Phone 7, was based on components from both Windows CE 6.0 R3 and Windows CE 7.0. Windows Phone 8 however, is based on the same NT-kernel as Windows 8. Windows Embedded Compact is not to be confused with Windows XP Embedded or Windows NT 4.0 Embedded, modular editions of Windows based on Windows NT kernel. Main article: Xbox system software Xbox OS is an unofficial name given to the version of Windows that runs on Xbox consoles.[75] From Xbox One onwards it is an implementation with an emphasis on virtualization (using Hyper-V) as it is three operating systems running at once, consisting of the core operating system, a second implemented for games and a more Windows-like environment for applications.[76] Microsoft updates Xbox One's OS every month, and these updates can be downloaded from the Xbox Live service to the Xbox and subsequently installed, or by using offline recovery images downloaded via a PC.[77] It was originally based on NT 6.2 (Windows 8) kernel, and the latest version runs on an NT 10.0 base. This system is sometimes referred to as "Windows 10 on Xbox One".[78][79] Xbox One and Xbox Series operating systems also allow limited (due to licensing restrictions and testing resources) backward compatibility with previous generation hardware,[80] and the Xbox 360's system is backwards compatible with the original Xbox.[81] Up to and including every version before Windows 2000, Microsoft used an in-house version control system named Source Library Manager (SLM). Shortly after Windows 2000 was released, Microsoft switched to a fork of Perforce named Source Depot.[82] This system was used up until 2017 once the system could not keep up with the size of Windows.[citation needed] Microsoft had begun to integrate Git into Team Foundation Server in 2013,[83] but Windows (and Office) continued to rely on Source Depot.[84] The Windows code was divided among 65 different repositories with a kind of virtualization layer to produce unified view of all of the code.[citation needed] In 2017 Microsoft announced that it would start using Git, an open source version control system created by Linus Torvalds, and in May 2017 they reported that the migration into a new Git repository was complete.[59][85][86] Each Git repository contains a complete history of all the files, which tends to be very large for Windows.[87] Microsoft has been working on a new project called the Virtual File System for Git (VFSForGit) to address these challenges.[86] In 2021 the VFS for Git was superseded by Scalar.[88] Legend:UnsupportedSupportedLatest versionPreview versionFuture version Table of Windows versions Product name Latest version General availability date Codename Support until[89] Latest version of Mainstream Extended IE DirectX Edge Unsupported: Windows 1.0 1.04 November 20, 1985 Interface Manager December 31, 2001 — — — Unsupported: Windows 2.0 2.03 December 9, 1987 — Unsupported: Windows 2.1 2.11 May 27, 1988 — Unsupported: Windows 3.0 3.0 May 22, 1990 — Unsupported: Windows 3.1 3.1 April 6, 1992 — 5 Unsupported: Windows For Workgroups 3.1 3.1 October 1992 Sparta, Winball Unsupported: Windows NT 3.1 NT 3.1.528 July 27, 1993 — December 31, 2000 2 Unsupported: Windows For Workgroups 3.11 3.11 August 11, 1993 Sparta, Winball December 31, 2001 5 Unsupported: Windows 3.2 3.2 November 22, 1993 — Unsupported: Windows NT 3.5 NT 3.5.807 September 21, 1994 Daytona 3 Unsupported: Windows NT 3.51 NT 3.51.1057 May 30, 1995 — 5 Unsupported: Windows 95 4.0.950 August 24, 1995 Chicago, 4.0 December 31, 2000 December 31, 2001 5.5 8.0a Unsupported: Windows NT 4.0 NT 4.0.1381 July 31, 1996 Cairo June 30, 2002 June 30, 2004 6 3.0a Unsupported: Windows 98 4.10.1998 June 25, 1998 Memphis, 97, 4.1 July 11, 2006 9.0c Unsupported: Windows 98 SE 4.10.2222 May 5, 1999 — Unsupported: Windows 2000 NT 5.0.2195 February 17, 2000 — June 30, 2005 July 13, 2010 Unsupported: Windows Me 4.90.3000 September 14, 2000 Millennium, 4.9 December 31, 2003 July 11, 2006 Unsupported: Windows XP NT 5.1.2600 October 25, 2001 Whistler April 14, 2009 April 8, 2014 8 Unsupported: Windows XP 64-bit Edition NT 5.2.3790 March 28, 2003 — Unsupported: Windows Server 2003 April 24, 2003 Whistler Server July 13, 2010 July 14, 2015 Unsupported: Windows XP Professional x64 Edition April 25, 2005 — April 14, 2009 April 8, 2014 Unsupported: Windows Fundamentals for Legacy PCs NT 5.1.2600 July 8, 2006 Eiger, Mönch Unsupported: Windows Vista NT 6.0.6003 January 30, 2007 Longhorn April 10, 2012 April 11, 2017 9 11 Unsupported: Windows Home Server NT 5.2.4500 November 4, 2007 Quattro January 8, 2013 8 9.0c Unsupported: Windows Server 2008 NT 6.0.6003 February 27, 2008 Longhorn Server January 13, 2015 January 14, 2020 9 11 Unsupported: Windows 7 NT 6.1.7601 October 22, 2009 Windows 7[90] 11 109 Unsupported: Windows Server 2008 R2 October 22, 2009 Windows Server 7 Unsupported: Windows Home Server 2011 NT 6.1.8400 April 6, 2011 Vail April 12, 2016 Unsupported: Windows Server 2012 NT 6.2.9200 September 4, 2012 Server 8 October 9, 2018 October 10, 2023 11.1 Unsupported: Windows 8 October 26, 2012 — January 12, 2016 10 Unsupported: Windows 8.1 NT 6.3.9600 October 17, 2013 Blue January 9, 2018 January 10, 2023 11 11.2 Unsupported: Windows Server 2012 R2 October 18, 2013 Server Blue October 9, 2018 October 10, 2023 Supported: Windows 10 NT 10.0.19045 July 29, 2015 Various October 14, 2025[60][61] 12 136 Supported: Windows Server 2016 NT 10.0.14393 October 12, 2016 — January 11, 2022 January 12, 2027 Supported: Windows Server 2019 NT 10.0.17763 October 2, 2018 — January 9, 2024 January 9, 2029 Supported: Windows Server 2022 NT 10.0.20348 August 18, 2021 — October 13, 2026 October 14, 2031 Latest version: Windows 11 NT 10.0.26100 October 5, 2021 Various October 12, 2027[91] — Latest version: Windows Server 2025 NT 10.0.26100 November 1, 2024 — October 9, 2029 October 10, 2034 Timeline of Windows versions vte The Windows family tree Main article: Usage share of operating systems This box: viewtalkedit Version market share As a percentage of desktop and laptop systems using Microsoft Windows,[92] according to StatCounter data as of June 2025[93]: Desktop OS StatCounter Other versions 0.06% Windows XP 0.37% Windows 7 2.26% Windows 8 0.44% Windows 8.1 0.3% Windows 10 48.93% Windows 11 47.54% Use of Windows 10 has exceeded Windows 7 globally since early 2018.[94] For desktop and laptop computers, according to Net Applications and StatCounter (which track the use of operating systems in devices that are active on the Web), Windows was the most used operating-system family in August 2021, with around 91% usage share according to Net Applications[95] and around 76% usage share according to StatCounter.[96] Including personal computers of all kinds (e.g., desktops, laptops, mobile devices, and game consoles), Windows OSes accounted for 32.67% of usage share in August 2021, compared to Android (highest, at 46.03%), iOS's 13.76%, iPadOS's 2.81%, and macOS's 2.51%, according to Net Applications[97] and 30.73% of usage share in August 2021, compared to Android (highest, at 42.56%), iOS/iPadOS's 16.53%, and macOS's 6.51%, according to StatCounter.[98] Those statistics do not include servers (including cloud computing, where Linux has significantly more market share than Windows) as Net Applications and StatCounter use web browsing as a proxy for all use. This section needs to be updated. Please help update this article to reflect recent events or newly available information. (May 2020) Early versions of Windows were designed at a time where malware and networking were less common, and had few built-in security features; they did not provide access privileges to allow a user to prevent other users from accessing their files, and they did not provide memory protection to prevent one process from reading or writing another process's address space or to prevent a process from code or data used by privileged-mode code. While the Windows 9x series offered the option of having profiles for multiple users with separate profiles and home folders, it had no concept of access privileges, allowing any user to edit others' files. In addition, while it ran separate 32-bit applications in separate address spaces, protecting an application's code and data from being read or written by another application, it did not protect the first megabyte of memory from userland applications for compatibility reasons. This area of memory contains code critical to the functioning of the operating system, and by writing into this area of memory an application can crash or freeze the operating system. This was a source of instability as faulty applications could accidentally write into this region, potentially corrupting important operating system memory, which usually resulted in some form of system error and halt.[99] Windows NT was far more secure, implementing access privileges and full memory protection, and, while 32-bit programs meeting the DoD's C2 security rating,[100] yet these advantages were nullified[improper synthesis?] by the fact that, prior to Windows Vista, the default user account created during the setup process was an administrator account; the user, and any program the user launched, had full access to the machine. Though Windows XP did offer an option of turning administrator accounts into limited accounts, the majority of home users did not do so, partially due to the number of programs which required administrator rights to function properly. As a result, most home users still ran as administrator all the time. These architectural flaws, combined with Windows's very high popularity, made Windows a frequent target of computer worm and virus writers.[101][102][103] Furthermore, although Windows NT and its successors are designed for security (including on a network) and multi-user PCs, they were not initially designed with Internet security in mind as much, since, when it was first developed in the early 1990s, Internet use was less prevalent.[104] In a 2002 strategy memo entitled "Trustworthy computing" sent to every Microsoft employee, Bill Gates declared that security should become Microsoft's highest priority.[105][106] Windows Vista introduced a privilege elevation system called User Account Control.[107] When logging in as a standard user, a logon session is created and a token containing only the most basic privileges is assigned. In this way, the new logon session is incapable of making changes that would affect the entire system. When logging in as a user in the Administrators group, two separate tokens are assigned. The first token contains all privileges typically awarded to an administrator, and the second is a restricted token similar to what a standard user would receive. User applications, including the Windows shell, are then started with the restricted token, resulting in a reduced privilege environment even under an Administrator account. When an application requests higher privileges or "Run as administrator" is clicked, UAC will prompt for confirmation and, if consent is given (including administrator credentials if the account requesting the elevation is not a member of the administrators group), start the process using the unrestricted token.[108] Leaked documents from 2013 to 2016 codenamed Vault 7 detail the capabilities of the CIA to perform electronic surveillance and cyber warfare,[109] such as the ability to compromise operating systems such as Windows.[110] In August 2019, computer experts reported that the BlueKeep security vulnerability, CVE-2019-0708, that potentially affects older unpatched Windows versions via the program's Remote Desktop Protocol, allowing for the possibility of remote code execution, may include related flaws, collectively named DejaBlue, affecting newer Windows versions (i.e., Windows 7 and all recent versions) as well.[111] In addition, experts reported a Microsoft security vulnerability, CVE-2019-1162, based on legacy code involving Microsoft CTF and ctfmon (ctfmon.exe), that affects all Windows versions from Windows XP to the then most recent Windows 10 versions; a patch to correct the flaw is available.[112] Microsoft releases security patches through its Windows Update service approximately once a month (usually the second Tuesday of the month), although critical updates are made available at shorter intervals when necessary.[113] Versions subsequent to Windows 2000 SP3 and Windows XP implemented automatic download and installation of updates, substantially increasing the number of users installing security updates.[114] Windows integrates the Windows Defender antivirus, which is seen as one of the best available.[115] Windows also implements Secure Boot, Control Flow Guard, ransomware protection, BitLocker disk encryption, a firewall, and Windows SmartScreen. In July 2024, Microsoft signalled an intention to limit kernel access and improve overall security, following a highly publicised CrowdStrike update that caused 8.5 million Windows PCs to crash.[116] Part of that initiative is to rewrite parts of Windows in Rust, a memory-safe language.[117] All Windows versions from Windows NT 3 have been based on a file system permission system referred to as AGDLP (Accounts, Global, Domain Local, Permissions) in which file permissions are applied to the file/folder in the form of a 'local group' which then has other 'global groups' as members. These global groups then hold other groups or users depending on different Windows versions used. This system varies from other vendor products such as Linux and NetWare due to the 'static' allocation of permission being applied directly to the file or folder. However using this process of AGLP/AGDLP/AGUDLP allows a small number of static permissions to be applied and allows for easy changes to the account groups without reapplying the file permissions on the files and folders.[citation needed] Owing to the operating system's popularity, a number of applications have been released that aim to provide compatibility with Windows applications, either as a compatibility layer for another operating system, or as a standalone system that can run software written for Windows out of the box. These include: Wine – a free and open-source implementation of the Windows API, allowing one to run many Windows applications on x86-based platforms, including UNIX, Linux and macOS. Wine developers refer to it as a "compatibility layer"[118] and use Windows-style APIs to emulate Windows environment. CrossOver – a Wine package with licensed fonts. Its developers are regular contributors to Wine. Proton – A fork of Wine by Valve to run Windows games on Linux and other Unix-like OS. ReactOS – an open-source OS intended to run the same software as Windows, originally designed to simulate Windows NT 4.0, later aiming at Windows 7 compatibility. It has been in the development stage since 1996. Freedows OS – an open-source attempt at creating a Windows clone for x86 platforms, intended to be released under the GNU General Public License. Started in 1996 by Reece K. Sellin, the project was never completed, getting only to the stage of design discussions which featured a number of novel concepts until it was suspended in 2002.[119][120][121] Wintel

^ "June 11, 2025—KB5063060 (OS Build 26100.4351) Out-of-band". Microsoft Support. Microsoft. ^ "Releasing Windows 11 Build 26100.4188 to the Release Preview Channel". Windows Insider Blog. May 19, 2025. ^ "June 11, 2025—KB5063060 (OS Build 26100.4351) Out-of-band". Microsoft Support. Microsoft. ^ "Announcing Windows 11 Insider Preview Build 26120.4441 (Beta Channel)". Windows Insider Blog. June 13, 2025. ^ "Announcing Windows 11 Insider Preview Build 26200.5651 (Dev Channel)". Windows Insider Blog. June 13, 2025. ^ "Announcing Windows 11 Insider Preview Build 27871 (Canary Channel)". Windows Insider Blog. June 4, 2025. ^ Su, Christy; Xu, Simonx (November 25, 2021). "FAQ about the Windows Installer .msp files - Dynamics GP". Microsoft Learn. Archived from the original on July 8, 2023. Retrieved September 13, 2023. ^ dianmsft; Jenks, Alma; Coulter, David; Schofield, McLean; Vintzel, John; Satran, Michael; Donthini, Chaitanya; Kinsman, Mike (December 30, 2021). "What is MSIX?". Microsoft Learn. Archived from the original on September 25, 2023. Retrieved September 13, 2023. ^ Jahiu, Dhurata; Jenks, Alma; v-chmccl; Power, Cory; Coulter, David; Schofield, McLean; Donthini, Chaitanya; Satran, Michael (April 13, 2022). "How to bundle MSIX packages". Microsoft Learn. Archived from the original on October 4, 2023. Retrieved September 13, 2023. ^ Vera (June 26, 2023) [April 14, 2023]. "How to Install MSIXBundle on Windows 10/11? 2 Ways to Try!". MiniTool. Archived from the original on August 21, 2023. Retrieved September 13, 2023. ^ "App packages and deployment (Windows Store apps) (Windows)". Microsoft Learn. October 19, 2021 [October 6, 2015]. Archived from the original on March 30, 2014. Retrieved April 5, 2014. ^ Bellis, Mary (October 4, 2019). "The Unusual History of Microsoft Windows". Archived from the original on March 14, 2020. Retrieved January 13, 2023. ^ a b Edwards, Benj (February 7, 2022). "Why Is Windows Called Windows?". How-To Geek. Retrieved September 3, 2024. ^ "Desktop Operating System Market Share Worldwide". StatCounter Global Stats. Archived from the original on January 27, 2020. Retrieved July 16, 2023. ^ Keizer, Gregg (July 14, 2014). "Microsoft gets real, admits its device share is just 14%". Computerworld. IDG. Archived from the original on August 21, 2016. [Microsoft's chief operating officer] Turner's 14% came from a new forecast released last week by Gartner, which estimated Windows' share of the shipped device market last year was 14%, and would decrease slightly to 13.7% in 2014. Android will dominate, Gartner said, with a 48% share this year ^ "Windows Server Premium Assurance SQL Server Premium Assurance" (PDF). Licensing School. Retrieved April 27, 2025. ^ Mackie, Kurt (July 13, 2018). "Microsoft Replacing 'Premiere Assurance' Support with New Security Plan". Redmond Channel Partner. 1105 Media. Retrieved April 27, 2025. ^ "RTOS: Embedded Real Time Operating Systems". microsoft.com. Microsoft. Archived from the original on December 15, 2014. Retrieved November 7, 2014. ^ a b "The 25 Worst Tech Products of All Time". PC World. IDG. May 26, 2006. Archived from the original on January 7, 2023. Retrieved January 7, 2023. ^ "A history of Windows". Microsoft Windows. Archived from the original on June 11, 2016. Retrieved January 7, 2023. ^ Microsoft C 5.0: C Language Reference Guide. Microsoft. 1987. pp. 250–267. ^ "A legacy of Windows, part 1: Windows 1-2-3 – TechRepublic". TechRepublic. Archived from the original on March 27, 2017. Retrieved March 26, 2017. ^ "The Apple vs. Microsoft GUI Lawsuit". 2006. Archived from the original on March 4, 2008. Retrieved March 12, 2008. ^ "Apple Computer, Inc. v. MicroSoft Corp., 35 F.3d 1435 (9th Cir. 1994)". Archived from the original on December 14, 2007. Retrieved March 12, 2008. ^ Patton, Carole; Mace, Scott (July 4, 1988). "Windows Gets More Memory With Upgrade". InfoWorld. Vol. 10, no. 27. p. 1. ISSN 0199-6649. Archived from the original on January 9, 2024. Retrieved January 9, 2024. ^ "Windows Evolution". Soft32.com News. Archived from the original on February 8, 2008. ^ "Chronology of Personal Computer Software". Archived from the original on February 11, 2012. ^ "Microsoft Company". Archived from the original on May 14, 2008. ^ "Windows 3.1 Standard Edition Support Lifecycle". Archived from the original on January 12, 2012. Retrieved January 3, 2011. ^ "Microsoft Windows Simplified Chinese 3.2 Upgrade Is Available". Microsoft Support. Microsoft. Archived from the original on November 8, 2006. ^ "Microsoft Windows Simplified Chinese 3.2 Upgrade Is Available". Microsoft. October 30, 2003. Archived from the original on May 24, 2011. Retrieved September 4, 2009. ^ Fried, Ina (August 25, 2010). "Windows 95 turns 15: Has Microsoft's OS peaked?". CNET/CNN Tech. Archived from the original on August 26, 2010. Retrieved August 22, 2012. ^ "Microsoft Internet Explorer Web Browser Available on All Major Platforms, Offers Broadest International Support". News Center. San Jose, California: Microsoft. April 30, 1996. Archived from the original on January 15, 2008. Retrieved February 14, 2011. ^ "Windows 95 Support Lifecycle". Microsoft. Archived from the original on November 22, 2012. Retrieved January 3, 2011. ^ "Windows 98 Standard Edition Support Lifecycle". Microsoft. Archived from the original on November 22, 2012. Retrieved January 3, 2011. ^ "Improving "Cold Boot" Time for System Manufacturers". Microsoft. December 4, 2001. Archived from the original on February 13, 2010. Retrieved August 26, 2010. ^ "Windows Millennium Edition: All About Me". PC World. Archived from the original on August 1, 2013. Retrieved May 21, 2013. ^ Custer, Helen (1993). Inside Windows NT. Redmond: Microsoft Press. ISBN 1-55615-481-X. ^ a b c Thurrott, Paul (January 24, 2003). "Windows Server 2003: The Road To Gold – Part One: The Early Years". Archived from the original on January 1, 2005. Retrieved May 28, 2012. ^ "Windows XP review". CNET. Archived from the original on May 26, 2013. Retrieved May 24, 2013. ^ "Windows XP Program Compatibility Wizard". ServerWatch. March 12, 2002. Archived from the original on November 13, 2021. Retrieved November 13, 2021. ^ David Coursey (October 25, 2001). "The 10 top things you MUST know about Win XP". ZDNet. Archived from the original on April 3, 2009. Retrieved July 22, 2008. ^ David Coursey (August 31, 2001). "Your top Windows XP questions answered! (Part One)". ZDNet. CNET Networks. Archived from the original on December 19, 2007. Retrieved January 3, 2011. ^ "A Look at Freestyle and Mira". Paul Thurrott's SuperSite for Windows. Penton. September 3, 2002. Retrieved January 3, 2011.[permanent dead link] ^ "Windows XP Professional Lifecycle Support". Archived from the original on February 27, 2013. Retrieved January 3, 2011. ^ Nash, Mike (October 28, 2008). "Windows 7 Unveiled Today at PDC 2008". Windows Experience Blog. Microsoft. Archived from the original on November 1, 2008. Retrieved November 11, 2008. ^ Kiriaty, Yochay; Goldshtein, Sasha (2009). "Windows 7 Taskbar APIs". docs.microsoft.com. Archived from the original on August 21, 2021. Retrieved August 21, 2021. ^ LeBlanc, Brandon (October 28, 2008). "How Libraries & HomeGroup Work Together in Windows 7". Windows Experience Blog. Microsoft. Archived from the original on November 2, 2008. Retrieved November 11, 2008. ^ "New Windows 8 hardware specs hint at 7-inch tablets and a Microsoft Reader". ZDNet. Archived from the original on December 4, 2014. Retrieved March 29, 2013. ^ Paul, Ian (July 5, 2021). "How to Take Screenshots in Windows 10, 8, and 7". Archived from the original on March 19, 2022. Retrieved August 11, 2021. ^ Case, Loyd. "Test Driving Windows 8 RTM". PC World. IDG. Archived from the original on January 7, 2023. Retrieved January 7, 2023. ^ Rosoff, Matt. "Here's Everything You Wanted To Know About Microsoft's Upcoming iPad Killers". Business Insider. Archived from the original on January 22, 2013. Retrieved February 10, 2012. ^ "Announcing the Windows 8 Editions". Microsoft. April 16, 2012. Archived from the original on April 18, 2012. Retrieved April 17, 2012. ^ "Building Windows for the ARM processor architecture". Microsoft. Archived from the original on November 26, 2012. Retrieved November 21, 2012. ^ "Microsoft talks Windows Store features, Metro app sandboxing for Windows 8 developers". The Verge. Vox Media. May 17, 2012. Archived from the original on September 10, 2012. Retrieved September 8, 2012. ^ Miller, Michael. "Build: More Details On Building Windows 8 Metro Apps". PC Magazine. Archived from the original on February 17, 2012. Retrieved February 10, 2012. ^ "Windows 8.1 now available!". blogs.windows.com. Archived from the original on October 19, 2013. Retrieved October 31, 2013. ^ "Announcing Windows 10 – Windows Blog". September 30, 2014. Archived from the original on September 10, 2015. Retrieved September 30, 2014. ^ a b c Bright, Peter (May 24, 2017). "Windows switch to Git almost complete: 8,500 commits and 1,760 builds each day". Ars Technica. Condé Nast. Archived from the original on May 24, 2017. ^ a b "Window 10 Home and Pro Lifecycle". Microsoft. Archived from the original on June 10, 2021. Retrieved July 2, 2021. ^ a b "Window 10 Enterprise and Education Lifecycle". Microsoft. Archived from the original on July 1, 2021. Retrieved July 2, 2021. ^ Leznek, Jason (April 27, 2023). "Windows client roadmap update". Microsoft. Archived from the original on September 3, 2023. Retrieved May 1, 2023. ^ Bowden, Zack (April 27, 2023). "Windows 10 is finished — Microsoft confirms 'version 22H2' is the last". Windows Central. Archived from the original on September 3, 2023. Retrieved May 1, 2023. ^ Cox, George. "Windows 11 release date is October 5". The Spectrum. Archived from the original on February 18, 2023. Retrieved September 18, 2021. ^ Warren, Tom (June 24, 2021). "Microsoft announces Windows 11, with a new design, Start menu, and more". The Verge. Archived from the original on June 24, 2021. Retrieved June 24, 2021. ^ a b "Windows 11 Specs and System Requirements". Microsoft. Archived from the original on May 31, 2022. Retrieved May 31, 2022. ^ Warren, Tom (April 6, 2023). "Microsoft's Windows 365 Cloud PCs get more flexible, LG TV integration, and more". The Verge. Archived from the original on September 3, 2023. Retrieved June 2, 2023. ^ Foley, Mary Jo (July 14, 2021). "Microsoft brings Windows to the cloud with Windows 365 and Cloud PC". ZDNet. Archived from the original on July 28, 2021. Retrieved July 14, 2021. ^ Tilley, Aaron (July 14, 2021). "Microsoft Aims to Put Windows in Hands of Apple, Android Users Through Hybrid Work". The Wall Street Journal. ISSN 0099-9660. Archived from the original on July 28, 2021. Retrieved July 15, 2021. ^ Higgins, Tim (June 23, 2021). "Apple's Fight for Control Over Apps Moves to Congress and EU". The Wall Street Journal. ISSN 0099-9660. Archived from the original on July 28, 2021. Retrieved July 15, 2021. ^ "Microsoft unveils Windows 365, a Windows 10 PC in the cloud". Engadget. July 14, 2021. Archived from the original on July 28, 2021. Retrieved July 15, 2021. ^ "Windows 365 Cloud PC | Microsoft". www.microsoft.com. Archived from the original on July 28, 2021. Retrieved July 15, 2021. ^ Hill, Paul (August 2, 2021). "Microsoft announces the general availability of Windows 365". Neowin. Archived from the original on August 2, 2021. Retrieved August 2, 2021. ^ Bott, Ed (October 7, 2019). "Windows 10 on Arm: What you need to know before you buy a Surface Pro X". ZDNet. Archived from the original on July 1, 2021. Retrieved June 14, 2021. ^ Anand Lal Shimpi. "The Xbox One – Mini Review & Comparison to Xbox 360/PS4". anandtech.com. Archived from the original on October 12, 2014. Retrieved October 21, 2014. ^ "Xbox One: Hardware and software specs detailed and analyzed – Three operating systems in one". ExtremeTech. Archived from the original on November 16, 2013. Retrieved December 1, 2013. ^ "How to use the Offline System Update Diagnostic Tool on Xbox One". Xbox Official Site. Microsoft. Archived from the original on April 27, 2021. Retrieved November 30, 2013. ^ "Xbox One Is "Literally a Windows Device"". GameSpot. Archived from the original on December 27, 2015. ^ "New Xbox One Update Will Make Some Functionality 50 Percent Faster". GameSpot. Archived from the original on February 2, 2016. ^ Tom Warren (June 16, 2015). "Xbox One dashboard update includes a huge new design and Cortana". The Verge. Vox Media. Archived from the original on July 8, 2017. ^ Eric Qualls. "Xbox 360 and Xbox Games Backwards Compatibility". About.com Tech. Archived from the original on September 28, 2015. ^ Chen, Raymond (January 22, 2018). "The history of change-packing tools at Microsoft (so far)". The Old New Thing. Microsoft Developer Blogs (DevBlogs). Archived from the original on May 25, 2022. Retrieved September 2, 2023. ^ Lewis, Andy (June 26, 2013). "Visual Studio 2013 Preview: Git version control and Team Foundation Build". Azure DevOps Blog. Microsoft Developer Blogs (DevBlogs). Archived from the original on September 3, 2023. Retrieved September 2, 2023. ^ Harry, Brian (February 3, 2017). "Scaling Git (and some back story)". Brian Harry's Blog. Microsoft Developer Blogs (DevBlogs). Archived from the original on September 3, 2023. Retrieved September 2, 2023. ^ "The largest Git repo on the planet". Brian Harry's Blog. May 24, 2017. Archived from the original on October 6, 2021. Retrieved October 8, 2021. ^ a b Bright, Peter (February 6, 2017). "Microsoft hosts the Windows source in a monstrous 300 GB Git repository". Ars Technica. Archived from the original on December 26, 2017. Retrieved December 26, 2017. ^ Chacon, Scott; Straub, Ben (2014). "2.1 Git Basics – Getting a Git Repository: Cloning an Existing Repository". Pro Git. The version found here has been updated with corrections and additions from hundreds of contributors. (2nd ed.). Apress. ISBN 978-1-4842-0077-3. Archived from the original on September 1, 2023. Retrieved September 2, 2023 – via the Git Project. ^ Stolee, Derrick (May 28, 2020). "Frequently Asked Questions: Why Are You Abandoning VFS for Git?". GitHub. Microsoft. Archived from the original on May 1, 2023. Retrieved September 2, 2023. ^ "Microsoft Support Lifecycle". Microsoft. Archived from the original on October 11, 2008. ^ Chen, Raymond (July 22, 2019). "What was the code name for Windows 7?". The Old New Thing. Archived from the original on September 26, 2021. Retrieved October 6, 2021. ^ "Windows 11 Home and Pro Product Life Cycle". Microsoft. September 20, 2022. Archived from the original on March 21, 2023. Retrieved February 14, 2023. ^ "Frequently Asked Questions". StatCounter. Are laptops included in the desktop platform?. ^ "Desktop Windows Version Market Share Worldwide (June 2025)". StatCounter. ^ "Desktop Windows Version Market Share Worldwide | StatCounter Global Stats". StatCounter Global Stats.

Archived from the original on April 20, 2019. Retrieved November 24, 2019. ^ "Desktop Operating system market share: August 2021". Net Applications. Archived from the original on September 8, 2021. Retrieved September 8, 2021. ^ "Desktop Operating System Market Share Worldwide: August 2021". StatCounter. Archived from the original on January 27, 2020. Retrieved September 8, 2021. ^ "Operating system market share: August 2021". Net Applications. Archived from the original on September 8, 2021. Retrieved September 8, 2021. ^ "Operating System Market Share Worldwide: August 2021". StatCounter. Archived from the original on February 15, 2020. Retrieved September 8, 2021. ^ "Transcript: Chat with Ed Bott and Carl Siechert, Co-Authors of Microsoft Windows XP Inside Out". Microsoft. November 21, 2001. Archived from the original on September 18, 2004. Retrieved April 20, 2019. ^ Russinovich, Mark (April 30, 1998). "Windows NT Security, Part 1". ITPro Today. Archived from the original on September 29, 2022. Retrieved September 29, 2022. ^ Bruce Schneier (June 15, 2005). "Crypto-Gram Newsletter". Schneier.com. Counterpane Internet Security, Inc. Archived from the original on June 6, 2007. Retrieved April 22, 2007. ^ Andy Patrizio (April 27, 2006). "Linux Malware On The Rise". InternetNews. QuinStreet. Archived from the original on February 5, 2012. Retrieved January 3, 2011. ^ "Windows intentionally weak on worms, viruses - The Arizona State Press". www.statepress.com. Retrieved June 12, 2024. ^ "Telephones and Internet Users by Country, 1990 and 2005". Information Please Database. Archived from the original on May 22, 2009. Retrieved June 9, 2009. ^ Gates, Bill. "Bill Gates: Trustworthy Computing". Wired. ISSN 1059-1028. Archived from the original on September 29, 2022. Retrieved September 29, 2022. ^ Verloy, Filip. "20 Years After Bill Gates' Trustworthy Computing Memo, Cybersecurity Issues Are An Even Harder Problem". nonamesecurity.com. Archived from the original on September 29, 2022. Retrieved September 29, 2022. ^ Northrup, Tony (June 1, 2005). "Windows Vista Security and Data Protection Improvements". TechNet. Microsoft Docs. Archived from the original on October 20, 2021. Retrieved October 20, 2021. In Windows Vista, the User Account Control (UAC) initiative introduces fundamental operating system changes to enhance the experience for the non-administrative user. ^ Kenny Kerr (September 29, 2006). "Windows Vista for Developers – Part 4 – User Account Control". Archived from the original on March 29, 2007. Retrieved March 15, 2007. ^ Greenberg, Andy (March 7, 2017). "How the CIA Can Hack Your Phone, PC, and TV (Says WikiLeaks)". WIRED. Archived from the original on March 20, 2019. Retrieved December 18, 2018. ^ "Vault 7: Wikileaks reveals details of CIA's hacks of Android, iPhone Windows, Linux, MacOS, and even Samsung TVs". Computing. March 7, 2017. Archived from the original on April 12, 2019. Retrieved December 18, 2018. ^ Greenberg, Andy (August 13, 2019). "DejaBlue: New BlueKeep-Style Bugs Renew The Risk Of A Windows worm". wired. Archived from the original on April 13, 2021. Retrieved August 15, 2019. ^ Seals, Tara (August 14, 2019). "20-Year-Old Bug in Legacy Microsoft Code Plagues All Windows Users". ThreatPost.com. Archived from the original on April 17, 2021. Retrieved August 15, 2019. ^ Ryan Naraine (June 8, 2005). "Microsoft's Security Response Center: How Little Patches Are Made". eWeek. Ziff Davis Enterprise. Retrieved January 3, 2011. ^ John Foley (October 20, 2004). "Windows XP SP2 Distribution Surpasses 100 Million". InformationWeek. UBM TechWeb. Archived from the original on May 27, 2010. Retrieved January 3, 2011. ^ "Test antivirus software for Windows 10 – June 2022". www.av-test.org. Archived from the original on September 29, 2022. Retrieved September 29, 2022. ^ Christoffel, Ryan (July 26, 2024). "Microsoft starts campaign to make Windows security more like Mac post-CrowdStrike". 9to5Mac. Retrieved July 27, 2024. ^ Warren, Tom (November 19, 2024). "Microsoft's new Windows Resiliency Initiative aims to avoid another CrowdStrike incident". The Verge. Retrieved November 19, 2024. ...and Microsoft is making changes to Windows, too. It's 'gradually moving functionality from C++ implementation to Rust' in Windows, to help further improve the security of the OS. ^ "Wine". Winehq.org. Archived from the original on April 4, 2014. Retrieved April 5, 2014. ^ "A Student's Dream of Creating A New Operating System Encounters Problems". The Chronicle of Higher Education. September 18, 1998. Retrieved May 17, 2013. ^ "Older blog entries for chipx86". Advogato.org. Advogato. June 27, 2002. Archived from the original on May 20, 2013. Retrieved May 17, 2013. ^ "Freedoms splits". Slashdot. Dice Holdings. August 31, 1998. Retrieved May 17, 2013. Microsoft Windows at Wikipedia's sister projects Media from CommonsTextbooks from WikibooksResources from Wikiversity Official website Official Windows Blog Archived January 15, 2017, at the Wayback Machine Microsoft Developer Network Archived January 7, 2009, at the Wayback Machine Windows Developer Center Archived December 16, 2016, at the Wayback Machine Microsoft Windows History Timeline Pearson Education, InformIT Archived June 28, 2021, at the Wayback Machine – History of Microsoft Windows Microsoft Business Software Solutions Archived December 5, 2019, at the Wayback Machine Windows 10 release Information Archived May 7, 2019, at the Wayback Machine Retrieved from " 2Operating system from IBM "CP/DOS" redirects here. For the similarly named Digital Research operating system, see CP/M. Operating system OS/2OS/2 Warp 4 desktop. This version was released on 25 September 1996.[1]DeveloperIBMMicrosoft (1.0–1.3)Written inC, C++ and assembly languageWorking stateHistorical, now developed as ArcaOSSource modelClosed sourceInitial releaseDecember 1987; 37 years ago (1987-12)Latest release4.52 / December 2001; 23 years ago (2001-12)Marketing targetProfessionals, serversAvailable inChinese, English, French, German, Italian, Japanese, Korean, Spanish, Slovenian, Portuguese, RussianPlatforms32-bit x86, PowerPCKernel typeHybrid kernelInfluenced byMS-DOS, IBM PC DOSDefaultuser interfaceWorkplace ShellLicenseProprietarySucceeded byeComStationArcaOSOfficial websiteOS/2 Warp (Archived) OS/2 is a proprietary computer operating system for x86 and PowerPC based personal computers. It was created and initially developed jointly by IBM and Microsoft, under the leadership of IBM software designer Ed Iacobucci,[2] intended as a replacement for DOS. The first version was released in 1987. A feud between the two companies beginning in 1990 led to Microsoft’s leaving development solely to IBM, which continued development on its own. OS/2 Warp 4 in 1996 was the last major upgrade, after which IBM slowly halted the product as it failed to compete against Microsoft's Windows; updated versions of OS/2 were released by IBM until 2001. The name stands for "Operating System/2", because it was introduced as part of the same generation change release as IBM's "Personal System/2 (PS/2)" line of second-generation PCs. OS/2 was intended as a protected-mode successor of PC DOS targeting the Intel 80286 processor. Notably, basic system calls were modelled after MS-DOS calls; their names even started with "Dos" and it was possible to create "Family Mode" applications – text mode applications that could work on both systems.[3] Because of this heritage, OS/2 shares similarities with Unix, Xenix, and Windows NT. OS/2 sales were largely concentrated in networked computing used by corporate professionals. OS/2 2.0 was released in 1992 as the first 32-bit version as well as the first to be entirely developed by IBM, after Microsoft severed ties over a dispute over how to position OS/2 relative to Microsoft's new Windows 3.1 operating environment.[4][5] With OS/2 Warp 3 in 1994, IBM attempted to also target home consumers through a multi-million dollar advertising campaign.[6] However it continued to struggle in the marketplace, partly due to strategic business measures imposed by Microsoft in the industry that have been considered anti-competitive.[7][8] Following the failure of IBM's Workplace OS project, OS/2 Warp 4 became the final major release in 1996; IBM discontinued its support for OS/2 on December 31, 2006.[9] Since then, OS/2 has been developed, supported and sold by two different third-party vendors under license from IBM – first by Serenity Systems as eComStation from 2001 to 2011,[10] and later by Arca Noae LLC as ArcaOS since 2017.[11][12][13] This section needs additional citations for verification. Please help improve this article by adding citations to reliable sources in this section. Unsourced material may be challenged and removed. (April 2012) (Learn how and when to remove this message) Ironically, Microsoft is competing against itself in the operating systems market. Besides Xenix, Microsoft has announced Windows 386, which [is] somewhat similar to OS/2. Of course, either way users turn, Microsoft wins.—Computerworld, 1987[14] Logo of OS/2 1.xOS/2 1.0 featured a text-mode interface similar to MS-DOS. The development of OS/2 began when IBM and Microsoft signed the "Joint Development Agreement" in August 1985.[15][16] It was code-named "CP/DOS" and it took two years for the first product to be delivered. OS/2's release was long delayed. It was widely believed that all IBM programmers used assembly language, and a rumor said that the delay was because they had to learn C.[17] OS/2 1.0 was announced in April 1987 and released in December. The original release only ran in text mode, and a GUI was introduced with OS/2 1.1 about a year later. OS/2 features an API for controlling the video display (VIO) and handling keyboard and mouse events so that programmers writing for protected mode need not call the BIOS or access hardware directly. Other development tools included a subset of the video and keyboard APIs as linkable libraries so that family mode programs are able to run under MS-DOS,[citation needed] and, in the OS/2 Extended Edition v1.0, a database engine called Database Manager or DBM (this was related to DB2, and should not be confused with the DBM family of database engines for Unix and Unix-like operating systems).[18] A task-switcher named Program Selector was available through the Ctrl-Esc hotkey combination, allowing the user to select among multitasked text-mode sessions (or screen groups; each can run multiple programs).[19] Communications and database-oriented extensions were delivered in 1988, as part of OS/2 1.0 Extended Edition: SNA, X.25/APPC/LU 6.2, LAN Manager, Query Manager, SQL. Microsoft's Bill Gates predicted at a 1987 Computerworld interview that "three years out, over 80% of new office systems will be based on OS/2". Ashton-Tate's Ed Esber also predicted success, while Lotus Development's Jim Manzi said "I don't know anyone who's screaming for OS/2. End users would really prefer that the whole thing never happened". Gates said that Microsoft would release Windows software first with "very cheap upgrades" to OS/2 versions, while the other two said their companies would release for OS/2 first.[20] OS/2 1.1 was the first version to feature the Presentation Manager GUI. The promised user interface, Presentation Manager, was introduced with OS/2 1.1 in October 1988.[21] It had a similar user interface to Windows 2.1, which was released in May of that year. (The interface was replaced in versions 1.2 and 1.3 by a look closer in appearance to Windows 3.0.) The Extended Edition of 1.1, sold only through IBM sales channels, introduced distributed database support to IBM database systems and SNA communications support to IBM mainframe networks. In 1989, Version 1.2 introduced Installable Filesystems and, notably, the HPFS filesystem. HPFS provided a number of improvements over the older FAT file system, including long filenames and a form of alternate data streams called Extended Attributes.[22] In addition, extended attributes were also added to the FAT file system.[23] Installation Disk A of Microsoft OS/2 1.3 (3½-inch floppy disk) The Extended Edition of 1.2 introduced TCP/IP and Ethernet support. OS/2- and Windows-related books of the late 1980s from both Microsoft's Gordon Letwin and his IBM counterpart Ed Iacobucci acknowledged the existence of both systems and promoted OS/2 as the system of the future.[24][17] Logo of Microsoft's OS/2 until the breakup The collaboration between IBM and Microsoft unravelled in 1990, between the releases of Windows 3.0 and OS/2 1.3. During this time, Windows 3.0 became a tremendous success, selling millions of copies in its first year.[25] Much of its success was because Windows 3.0 (along with MS-DOS) was bundled with most new computers.[26] OS/2, on the other hand, was available only as an additional stand-alone software package. In addition, OS/2 lacked device drivers for many common devices such as printers, particularly non-IBM hardware.[27] Windows, on the other hand, supported a much larger variety of hardware. The increasing popularity of Windows prompted Microsoft to shift its development focus from cooperating on OS/2 with IBM to building its own business based on Windows.[28] Several technical and practical reasons contributed to this breakup. The two companies had significant differences in culture and vision. Microsoft favored the open hardware system approach that contributed to its success on the PC. IBM sought to use OS/2 to drive sales of its own hardware, and urged Microsoft to drop features, such as fonts, that IBM's hardware did not support. Microsoft programmers also became frustrated with IBM's bureaucracy and its use of lines of code to measure programmer productivity.[29] IBM developers complained about the terseness and lack of comments in Microsoft's code, while Microsoft developers complained that IBM's code was bloated.[30] The two products have significant differences in API. OS/2 was announced when Windows 2.0 was near completion, and the Windows API already defined. However, IBM requested that this API be significantly changed for OS/2.[31] Therefore, issues surrounding application compatibility appeared immediately. OS/2 designers hoped for source code conversion tools, allowing complete migration of Windows application source code to OS/2 at some point. However, OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 and Windows in parallel. OS/2 1.3 was the final 16-bit only version of OS/2, and the last to be sold by Microsoft. OS/2 1.x targets the Intel 80286 processor and DOS fundamentally does not. IBM insisted on supporting the 80286 processor, with its 16-bit segmented memory mode, because of commitments made to customers who had purchased many 80286-based PS/2s as a result of IBM's promises surrounding OS/2.[32] Until release 2.0 in April 1992, OS/2 ran in 16-bit protected mode and therefore could not benefit from the Intel 80386's much simpler 32-bit flat memory model and virtual 8086 mode features. This was especially painful in providing support for DOS applications. While, in 1988, Windows/386 2.1 could run several cooperatively multitasked DOS applications, including expanded memory (EMS) emulation, OS/2 1.3, released in 1991, was still limited to one 640 kB "DOS box". Given these issues, Microsoft started to work in parallel on a version of Windows which was more future-oriented and more portable. The hiring of Dave Cutler, former VAX/VMS architect, in 1988 created an immediate competition with the OS/2 team, as Cutler did not think much of the OS/2 technology and wanted to build on his work on the MICA project at Digital rather than creating a "DOS plus". His NT OS/2 was a completely new architecture.[33] IBM grew concerned about the delays in development of OS/2 2.0. Initially, the companies agreed that IBM would take over maintenance of OS/2 1.0 and development of OS/2 2.0, while Microsoft would continue development of OS/2 3.0. In the end, Microsoft decided to recast NT OS/2 3.0 as Windows NT, leaving all future OS/2 development to IBM. From a business perspective, it was logical to concentrate on a consumer line of operating systems based on DOS and Windows, and to prepare a new high-end system in such a way as to keep good compatibility with existing Windows applications. While it waited for this new high-end system to develop, Microsoft would still receive licensing money from Xenix and OS/2 sales. Windows NT's OS/2 heritage can be seen in its initial support for the HPFS filesystem, text mode OS/2 1.x applications, and OS/2 LAN Manager network support. Some early NT materials even included OS/2 copyright notices embedded in the software.[citation needed] One example of NT OS/2 1.x support is in the WIN2K resource kit. Windows NT could also support OS/2 1.x Presentation Manager and AVIO applications with the addition of the Windows NT Add-On Subsystem for Presentation Manager.[34] OS/2 2.0 was the first 32-bit release of OS/2, and the first to feature the Workplace Shell. OS/2 2.0 was released in April 1992. At the time, the suggested retail price was US$195, while Windows retailed for $150.[35] OS/2 2.0 provided a 32-bit API for native programs, though the OS itself still contained some 16-bit code and drivers. It also included a new OOUI (object-oriented user interface) called the Workplace Shell. This was a fully object-oriented interface that was a significant departure from the previous GUI. Rather than merely providing an environment for program windows (such as the Program Manager), the Workplace Shell provided an environment in which the user could manage programs, files and devices by manipulating objects on the screen. With the Workplace Shell, everything in the system is an "object" to be manipulated. OS/2 2.0 was touted by IBM as "a better DOS than DOS and a better Windows than Windows".[36] It managed this by including the fully-licensed MS-DOS 5.0, which had been patched and improved upon. For the first time, OS/2 was able to run more than one DOS application at a time. This was so effective that it allowed OS/2 to run a modified copy of Windows 3.0, itself a DOS extender, including Windows 3.0 applications. Because of the limitations of the Intel 80286 processor, OS/2 1.x could run only one DOS program at a time, and did this in a way that allowed the DOS program to have total control over the computer. A problem in DOS mode could crash the entire computer. In contrast, OS/2 2.0 could leverage the virtual 8086 mode of the Intel 80386 processor to create a much safer virtual machine in which to run DOS programs. This included an extensive set of configuration options to optimize the performance and capabilities given to each DOS program. Any real-mode operating system (such as 8086 Xenix) could also be made to run using OS/2's virtual machine capabilities, subject to certain direct hardware access limitations. The OS/2 2.0 upgrade box Like most 32-bit environments, OS/2 could not run protected-mode DOS programs using the older VCPI interface, unlike the Standard mode of Windows 3.1; it only supported programs written according to DPMI. (Microsoft discouraged the use of VCPI under Windows 3.1, however, due to performance degradation.)[37] Unlike Windows NT, OS/2 always allowed DOS programs the possibility of masking real hardware interrupts, so any DOS program could deadlock the machine in this way. OS/2 could, however, use a hardware watchdog on selected machines (notably IBM machines) to break out of such a deadlock. Later, release 3.0 leveraged the enhancements of newer Intel 80486 and Intel Pentium processors—the Virtual Interrupt Flag (VIF), which was part of the Virtual Mode Extensions (VME)—to solve this problem. To accommodate those who wanted to have multiple operating systems on their machine, Boot Manager was introduced that allowed for the creation of separate partitions on the boot drive which could be used to install different versions of DOS, Windows and OS/2 and give the user a choice of which partition to boot from.[38] Further information: VME (CONFIG.SYS directive) OS/2 2.1 was released in 1993. This version of OS/2 achieved compatibility with Windows 3.0 (and later Windows 3.1) by adapting Windows user-mode code components to run inside a virtual DOS machine (VDM). Originally, a nearly complete version of Windows code was included with OS/2 itself: Windows 3.0 in OS/2 2.0, and Windows 3.1 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows version the user had installed previously, patching it on the fly, and sparing the cost of an additional Windows license.[39] It could either run full-screen, using its own set of video drivers, or "seamlessly," where Windows programs would appear directly on the OS/2 desktop. The process containing Windows was given fairly extensive access to hardware, especially video, and the result was that switching between a full-screen WinOS/2 session and the Workplace Shell could occasionally cause issues.[40] Because OS/2 only runs the user-mode system components of Windows, it is incompatible with Windows device drivers (VxDs) and applications that require them. Multiple Windows applications run by default in a single Windows session – multitasking cooperatively and without memory protection – just as they would under native Windows 3.x. However, to achieve true isolation between Windows 3.x programs, OS/2 can also run multiple copies of Windows in parallel, with each copy residing in a separate VDM. The user can then optionally place each program either in its own Windows session – with preemptive multitasking and full memory protection between sessions, though not within them – or allow some applications to run together cooperatively in a shared Windows session while isolating other applications in one or more separate Windows sessions. At the cost of additional hardware resources, this approach can protect each program in any given Windows session (and each instance of Windows itself) from every other program running in any separate Windows session (though not from other programs running in the same Windows session).[41] Whether Windows applications are running in full-screen or windowed mode, and in one Windows session or several, it is possible to use DDE between OS/2 and Windows applications, and OLE between Windows applications only.[42] IBM's OS/2 for Windows product (codename Ferengi), also known as "OS/2, Special Edition", was interpreted as a deliberate strategy "of cashing in on the pervasive success of the Microsoft platform" but risked confusing consumers with the notion that the product was a mere accessory or utility running on Windows such as Norton Desktop for Windows when, in fact, it was "a complete, modern, multi-tasking, pre-emptive operating system", itself hosting Windows instead of running on it. Available on CD-ROM or 18 floppy disks, the product documentation reportedly suggested Windows as a prerequisite for installing the product, also being confined to its original FAT partition, whereas the product apparently supported the later installation of Windows running from an HPFS partition, particularly beneficial for users of larger hard drives. Windows compatibility, relying on patching specific memory locations, was reportedly broken by the release of Windows 3.11, prompting accusations of arbitrary changes to Windows in order to perpetrate "a deliberate act of Microsoft sabotage" against IBM's product.[41] Wordmark of OS/2 Warp 3.0OS/2 Warp Connect 3.0, showing the Windows 3.1 Program Manager, QBASIC in a DOS window, and the LaunchPad (bottom center) Released in 1994, OS/2 version 3.0 was labelled as OS/2 Warp to highlight the new performance benefits, and generally to freshen the product image. "Warp" had originally been the internal IBM name for the release: IBM claimed that it had used Star Trek terms as internal names for prior OS/2 releases, and that this one seemed appropriate for external use as well. At the launch of OS/2 Warp in 1994, Patrick Stewart was to be the Master of Ceremonies; however Kate Mulgrew[43] of the then-upcoming series Star Trek: Voyager substituted for him at the last minute.[44][45] OS/2 Warp offers a host of benefits over OS/2 2.1, notably broader hardware support, greater multimedia capabilities, Internet-compatible networking, and it includes a basic office application suite known as IBM Works. It was released in two versions: the less expensive "Red Spine" and the more expensive "Blue Spine" (named for the color of their boxes). "Red Spine" was designed to support Microsoft Windows applications by utilizing any existing installation of Windows on the computer's hard drive. "Blue Spine" includes Windows support in its own installation, and so can support Windows applications without a Windows installation. As most computers were sold with Microsoft Windows pre-installed and the price was less, "Red Spine" was the more popular product.[46] OS/2 Warp Connect—which has full LAN client support built-in—followed in mid-1995. Warp Connect was nicknamed "Grape".[21] In OS/2 2.0, most performance-sensitive subsystems, including the graphics (Gre) and multimedia (MMPM/2) systems, were updated to 32-bit code in a fixpack, and included as part of OS/2 2.1. Warp 3 brought about a fully 32-bit windowing system, while Warp 4 introduced the object-oriented 32-bit GRADD display driver model. Main article: Workplace OS In 1991, IBM started development on an intended replacement for OS/2 called Workplace OS. This was an entirely new product, brand new code, that borrowed only a few sections of code from both the existing OS/2 and AIX products. It used an entirely new microkernel code base, intended (eventually) to host several of IBM's operating systems (including OS/2) as microkernel "personalities". It also included major new architectural features including a system registry, JFS, support for UNIX graphics libraries, and a new driver model.[47] Workplace OS was developed solely for POWER platforms, and IBM intended to market a full line of PowerPCs in an effort to take over the market from Intel. A mission was formed to create prototypes of these machines and they were disclosed to several corporate customers, all of whom raised issues with the idea of dropping Intel. Advanced plans for the new code base would eventually include replacement of the OS/400 operating system by Workplace OS, as well as a microkernel product that would have been used in industries such as telecommunications and set-top television receivers. A partially functional pre-alpha version of Workplace OS was demonstrated at Comdex, where a bemused Bill Gates stopped by the booth. The second and last time it would be shown in public was at an OS/2 user group in Phoenix, Arizona; the pre-alpha code refused to boot. It was released in 1995. But with $990 million being spent per year on development of this as well as Workplace OS, and no possible profit or widespread adoption, the end of the entire Workplace OS and OS/2 product line was near. Firefox 3.5.4 for OS/2 Warp 4 Wordmark of OS/2 Warp 4OS/2 Warp 4 desktop after installation In 1996, Warp 4 added Java and speech recognition software.[48] IBM also released server editions of Warp 3 and Warp 4 which bundled IBM's LAN Server product directly into the operating system installation. A personal version of Lotus Notes was also included, with a number of template databases for contact management, brainstorming, and so forth. The UK-distributed free demo CD-ROM of OS/2 Warp essentially contained the entire OS and was easily, even accidentally, cracked[clarification needed], meaning that even people who liked it did not have to buy it. This was seen as a backdoor tactic to increase the number of OS/2 users, in the belief that this would increase sales and demand for third-party applications, and thus strengthen OS/2's desktop numbers.[citation needed] This suggestion was bolstered by the fact that this demo version had replaced another which was not so easily cracked, but which had been released with trial versions of various applications.[citation needed] In 2000, the July edition of Australian Personal Computer magazine bundled software CD-ROMs, included a full version of Warp 4 that required no activation and was essentially a free release. Special versions of OS/2 2.11 and Warp 4 also included symmetric multiprocessing (SMP) support. OS/2 sales were largely concentrated in networked computing used by corporate professionals; however, by the early 1990s, it was overtaken by Microsoft Windows NT. While OS/2 was arguably technically superior to Microsoft Windows 95, OS/2 failed to develop much penetration in the consumer and stand-alone desktop PC segments; there were reports that it could not be installed properly on IBM's own Aptiva series of home PCs.[49] Microsoft made an offer in 1994 where IBM would receive the same terms as Compaq (the largest PC manufacturer at the time) for a license of Windows 95, if IBM ended development of OS/2 completely. IBM refused and instead went with an "IBM First" strategy of promoting OS/2 Warp and disparaging Windows, as IBM aimed to drive sales of its own software as well as hardware. By 1995, Windows 95 negotiations between IBM and Microsoft, which were already difficult, stalled when IBM purchased Lotus SmartSuite, which would have directly competed with Microsoft Office. As a result of the dispute, IBM signed the license agreement 15 minutes before Microsoft's Windows 95 launch event, which was later than their competitors and this badly hurt sales of IBM PCs. IBM officials later conceded that OS/2 would not have been a viable operating system to keep them in the PC business.[50][51] This section does not cite any sources. Please help improve this section by adding citations to reliable sources. Unsourced material may be challenged and removed. (March 2013) (Learn how and when to remove this message) A project was launched internally by IBM to evaluate the looming competitive situation with Microsoft Windows 95. Primary concerns included the major code quality issues in the existing OS/2 product (resulting in over 20 service packs, each requiring more diskettes than the original installation), and the ineffective and heavily matrixed development organization in Boca Raton (where the consultants reported that "basically, everybody reports to everybody") and Austin. That study, tightly classified as "Registered Confidential" and printed only in numbered copies, identified untenable weaknesses and failures across the board in the Personal Systems Division as well as across IBM as a whole. This resulted in a decision being made at a level above the Division to cut over 95% of the overall budget for the entire product line, end all new development (including Workplace OS), eliminate the Boca Raton development lab, end all sales and marketing efforts of the product, and lay off over 1,300 development individuals (as well as sales and support personnel). $990 million had been spent in the last full year. Warp 4 became the last distributed version of OS/2. Although a small and dedicated community remains faithful to OS/2,[52] OS/2 failed to catch on in the mass market and is little used outside certain niches where IBM traditionally had a stronghold. For example, many bank installations, especially automated teller machines, run OS/2 with a customized user interface; French SNCF national railways used OS/2 1.x in thousands of ticket selling machines.[citation needed] Telecom companies such as Nortel used OS/2 in some voicemail systems. Also, OS/2 was used for the host PC used to control the Satellite Operations Support System equipment installed at NPR member stations from 1994 to 2007, and used to receive the network's programming via satellite.[citation needed] Although IBM began indicating shortly after the release of Warp 4 that OS/2 would eventually be withdrawn, the company did not end support until December 31, 2006,[53] with sales of OS/2 stopping on December 23, 2005. The latest IBM OS/2 Warp version is 4.52, which was released for both desktop and server systems in December 2001. IBM is still delivering defect support for a fee.[53][54] IBM urges customers to migrate their often highly complex applications to e-business technologies such as Java in a platform-neutral manner. Once application migration is completed, IBM recommends migration to a different operating system, suggesting Linux as an alternative.[55][56][57] Main articles: eComStation and ArcaOS ArcaOS is the most recent OS/2-based operating system developed outside of IBM. After IBM discontinued development of OS/2, various third parties approached IBM to take over future development of the operating system. The OS/2 software vendor Stardock made such a proposal to IBM in 1999, but it was not followed through by the company.[58] Serenity Systems succeeded in negotiating an agreement with IBM, and began reselling OS/2 as eComStation in 2001.[59] eComStation is now sold by XEU.com, the most recent version (2.1) was released in 2011.[60] In 2015, Arca Noae, LLC announced that they had secured an agreement with IBM to resell OS/2.[11] They released the first version of their OS/2-based operating system in 2017 as ArcaOS.[13] As of 2023, there have been multiple releases of ArcaOS, and it remains under active development.[61] Many people hoped that IBM would release OS/2 or a significant part of it as open source. Petitions were held in 2005 and 2007, but IBM refused them, citing legal and technical reasons.[62] It is unlikely that the entire OS will be open at any point in the future because it contains third-party code to which IBM does not have copyright, and much of this code is from Microsoft. IBM also once engaged in a technology transfer with Commodore, licensing Amiga technology for OS/2 2.0 and above, in exchange for the REXX scripting language.[63] This means that OS/2 may have some code that was not written by IBM, which can therefore prevent the OS from being re-announced as open-sourced in the future.[64][failed verification][65] On the other hand, IBM donated Object REXX for Windows and OS/2 to the Open Object REXX project maintained by the REXX Language Association on SourceForge.[66] There was a petition, arranged by OS2World, to open parts of the OS. Open source operating systems such as Linux have already profited from OS/2 indirectly through IBM's release of the improved JFS file system, which was ported from the OS/2 code base. As IBM didn't release the source of the OS/2 JFS driver, developers ported the Linux driver back to eComStation and added the functionality to boot from a JFS partition. This new JFS driver has been integrated into eComStation v2.0, and later into ArcaOS 5.0. Release dates refer to the US English editions unless otherwise noted.[67][68] Date Version December 1987 OS/2 1.0 November 1988 OS/2 1.1 October 1989 OS/2 1.2 December 1990 OS/2 1.3 October 1991 OS/2 2.0 LA (Limited Availability) April 1992 OS/2 2.0 October 1992 OS/2 2.00.1 May 1993 OS/2 2.1 November 1993 OS/2 for Windows February 1994 OS/2 2.11 July 1994 OS/2 2.11 SMP October 1994 OS/2 Warp 3 May 1995 OS/2 Warp Connect December 1995 OS/2 Warp, PowerPC Edition February 1996 OS/2 Warp Server 4 September 1996 OS/2 Warp 4 September 1996 OS/2 Warp Server Advanced SMP November 1997 WorkSpace On-Demand 1.0 October 1998 WorkSpace On-Demand 2.0 April 1999 OS/2 Warp Server for e-Business (version 4.50) November 2000 OS/2 Convenience Pack 1 (version 4.51) November 2001 OS/2 Convenience Pack 2 (version 4.52) The graphic system has a layer named Presentation Manager that manages windows, fonts, and icons. This is similar in functionality to a non-networked version of X11 or the Windows GDI. On top of this lies the Workplace Shell (WPS) introduced in OS/2 2.0. WPS is an object-oriented shell allowing the user to perform traditional computing tasks such as accessing files, printers, launching legacy programs, and advanced object oriented tasks using built-in and third-party application objects that extended the shell in an integrated fashion not available on any other mainstream operating system. WPS follows IBM's Common User Access user interface standards. WPS represents objects such as disks, folders, files, program objects, and printers using the System Object Model (SOM), which allows code to be shared among applications, possibly written in different programming languages. A distributed version called DSOM allowed objects on different computers to communicate. DSOM is based on CORBA. The object oriented aspect of SOM is similar to, and a direct competitor to, Microsoft's Component Object Model, though it is implemented in a radically different manner; for instance, one of the most notable differences between SOM and COM is SOM's support for inheritance (one of the most fundamental concepts of OO programming)—COM does not have such support. SOM and DSOM are no longer being developed. The multimedia capabilities of OS/2 are accessible through Media Control Interface commands. The last update (bundled with the IBM version of Netscape Navigator plugins) added support for MPEG files. Support for newer formats such as PNG, progressive JPEG, DivX, Ogg, and MP3 comes from third parties. Sometimes it is integrated with the multimedia system, but in other offers it comes as standalone applications. OS/2 Window (cmd.exe) on Microsoft OS/2 Version 1.3 The following list of commands is supported by cmd.exe on OS/2.[69][70] ansi append assign attrib backup boot break cache call cd chcp chdir chkdsk cls cmd codepage command comp copy createdd date ddinstal debug del detach dir diskcomp diskcopy doskey dpath eautil echo endlocal erase exit extproc fdisk fdiskpm find for format fsaccess goto graftabl help if join keyb keys label makeini md mem mkdir mode more move patch path pause picview pmrexx print prompt pstat rd recover rem ren rename replace restore rmdir set setboot setcom40 setlocal share shift sort spool start subst syslevel syslog time trace tracebuf tracefmt tree type undelete unpack ver verify view vmdisk vol xcopy This section needs expansion. You can help by adding to it. (April 2019) The TCP/IP stack is based on the open source BSD stack as visible with SCCS what compatible tools. IBM included tools such as ftp and telnet and even servers for both commands. IBM sold several networking extensions including NFS support and an X11 server. Architecture of OS/2 Warp under x86 Hardware vendors were reluctant to support device drivers for alternative operating systems including OS/2, leaving users with few choices from a select few vendors. To relieve this issue for video cards, IBM licensed a reduced version of the Scitech display drivers, allowing users to choose from a wide selection of cards supported through Scitech's modular driver design.[71] Document detailing OS/2's architecture. OS/2 has historically been more difficult to run in a virtual machine than most other legacy x86 operating systems because of its extensive reliance on the full set of features of the x86 CPU; in particular, OS/2's use of ring 2 prevented it from running in early versions of VMware.[72] Newer versions of VMware provide official support for OS/2, specifically for eComStation.[73] VirtualPC from Microsoft (originally Connectix) has been able to run OS/2 without hardware virtualization support for many years. It also provided "additions" code which greatly improves host–guest OS interactions in OS/2. The additions are not provided with the current version of VirtualPC, but the version last included with a release may still be used with current releases. At one point, OS/2 was a supported host for VirtualPC in addition to a guest. Note that OS/2 runs only as a guest on those versions of VirtualPC that use virtualization (x86 based hosts) and not those doing full emulation (VirtualPC for Mac). VirtualBox from Oracle Corporation (originally InnoTek, later Sun) supports OS/2 1.x, Warp 3 through 4.5, and eComStation as well as "Other OS/2" as guests. However, attempting to run OS/2 and eComStation can still be difficult, if not impossible, because of the strict requirements of VT-x/AMD-V hardware-enabled virtualization and only ACP2/MCP2 is reported to work in a reliable manner.[74] ArcaOS supports being run as a virtual machine guest inside VirtualBox, VMware ESXi and VMWare Workstation.[75] It ships with VirtualBox Guest Additions, and driver improvements to improve performance as a guest operating system.[76] The difficulties in efficiently running OS/2 have, at least once, created an opportunity for a new virtualization company. A large bank in Moscow needed a way to use OS/2 on newer hardware that OS/2 did not support. As virtualization software is an easy way around this, the company desired to run OS/2 under a hypervisor. Once it was determined that VMware was not a possibility, it hired a group of Russian software developers to write a host-based hypervisor that would officially support OS/2. Thus, the Parallels, Inc. company and their Parallels Workstation product was born.[77] OS/2 has few native computer viruses;[78] while it is not invulnerable by design, its reduced market share appears to have discouraged virus writers. There are, however, OS/2-based antivirus programs, dealing with DOS viruses and Windows viruses that could pass through an OS/2 server.[79] Some problems were classic subjects of comparison with other operating systems: Synchronous input queue (SIQ): if a GUI application was not servicing its window messages, the entire GUI system could get stuck and a reboot was required. This problem was considerably reduced with later Warp 3 fixpacks and refined by Warp 4, by taking control over the application after it had not responded for several seconds.[80][81]:565 No unified object handles (OS/2 v2.11 and earlier): The availability of threads probably led system designers to overlook mechanisms which allow a single thread to wait for different types of asynchronous events at the same time, for example the keyboard and the mouse in a "console" program. Even though select was added later, it only worked on network sockets. In case of a console program, dedicating a separate thread for waiting on each source of events made it difficult to properly release all the input devices before starting other programs in the same "session". As a result, console programs usually polled the keyboard and the mouse alternately, which resulted in wasted CPU and a characteristic "jerky" reactivity to user input. In OS/2 3.0 IBM introduced a new call for this specific problem.[82] This section needs additional citations for verification. Please help improve this article by adding citations to reliable sources in this section. Unsourced material may be challenged and removed. (June 2011) (Learn how and when to remove this message) OS/2 has been widely used by Iran Export Bank (Bank Saderat Iran) in their teller machines, ATMs and local servers (over 35,000 working stations). As of 2011, the bank moved to virtualize and renew their infrastructure by moving OS/2 to Virtual Machines running over Windows. OS/2 was widely used by Brazilian banks. Banco do Brasil had a peak 10,000 machines running OS/2 Warp in the 1990s. OS/2 was used in automated teller machines until 2006. The workstations and automated teller machines and attendant computers have been migrated to Linux.[83] An ATM in Australia revealing during a reboot that it is based on OS/2 Warp OS/2 has been used in the banking industry. Suncorp bank in Australia still ran its ATM network on OS/2 as late as 2002. ATMs at Perisher Blue used OS/2 as late as 2009, and even the turn of the decade.[84] OS/2 was widely adopted by accounting professionals and auditing companies. In mid-1990s native 32-bit accounting software were well developed and serving corporate markets. OS/2 ran the faulty baggage handling system at Denver International Airport. The OS was eventually scrapped, but the software written for the system led to massive delays in the opening of the new airport. The OS itself was not at fault, but the software written to run on the OS was. The baggage handling system was eventually removed. OS/2 was used by radio personality Howard Stern. He once had a 10-minute on-air rant about OS/2 versus Windows 95 and recommended OS/2. He also used OS/2 on his IBM 760CD laptop. OS/2 was used as part of the Satellite Operations Support System (SOSS) for NPR's Public Radio Satellite System. SOSS was a computer-controlled system using OS/2 that NPR member stations used to receive programming feeds via satellite. SOSS was introduced in 1994 using OS/2 3.0, and was retired in 2007, when NPR switched over to its successor, the ContentDepot. OS/2 was used to control the SkyTrain automated light rail system in Vancouver, Canada until the late 2000s when it was replaced by Windows XP. OS/2 was used in the London Underground Jubilee Line Extension Signals Control System (JLESCS) in London, England. This control system delivered by Alcatel was in use from 1999 to 2011 i.e. between abandonment before opening of the line's unimplemented original automatic train control system and the present SelTrac system. JLESCS did not provide automatic train operation only manual train supervision. Six OS/2 local site computers were distributed along the railway between Stratford and Westminster, the shunting tower at Stratford Market Depot, and several formed the central equipment located at Neasden Depot. It was once intended to cover the rest of the line between Green Park and Stanmore but this was never introduced. OS/2 has been used by The Co-operative Bank in the UK for its domestic call centre staff, using a bespoke program created to access customer accounts which cannot easily be migrated to Windows. OS/2 has been used by the Stop & Shop supermarket chain (and has been installed in new stores as recently as March 2010). OS/2 has been used on ticket machines for Tramlink in outer-London. OS/2 has been used in New York City's subway system for MetroCards.[85] Rather than interfacing with the user, it connects simple computers and the mainframes. When NYC MTA finishes its transition to contactless payment, OS/2 will be removed.[86] OS/2 was used in checkout systems at Safeway supermarkets.[85] OS/2 was used by Trenitalia, both for the desktops at Ticket Counters and for the Automatic Ticket Counters up to 2011. Incidentally, the Automatic Ticket Counters with OS/2 were more reliable than the current ones running a flavor of Windows.[citation needed] OS/2 was used as the main operating system for Abbey National General Insurance motor and home direct call centre products using the PMSC Series III insurance platform on DB2.2 from 1996 to 2001. BYTE in 1989 listed OS/2 as among the "Excellence" winners of the BYTE Awards, stating that it "is today where the Macintosh was in 1984: It's a development platform in search of developers". The magazine predicted that "When it's complete and bug-free, when it can really use the 80386, and when more desktops sport OS/2-capable PCs, OS/2 will—deservedly—supersede DOS. But even as it stands, OS/2 is a milestone product".[87] In March 1995 OS/2 won seven awards[88] InfoWorld Product of the Year.[89] Five Awards at CeBIT. PC Professional Magazine - Innovation of the Year award. CHIP Magazine named OS/2 Warp the Operating System of the Year. DOS International named OS/2 Warp the Operating System of the Year. 1+1 Magazine awarded it with the Software Marketing Quality award. Industrie Forum awarded it with its Design Excellence. SPA Best Business Software Award. IBM has used OS/2 in a wide variety of hardware products, effectively as a form of embedded operating system. Product Product type Usage of OS/2 IBM 2074 Console support controller Used to connect 3270 sessions to host via ESCON channels. Introduced in September 2000 as a replacement for local, non-SNA 3174 Control Units. All models were withdrawn in 2006 and replaced by the Open System Adapter Integrated Console Controller (OSA ICC).[90] IBM 3494 Tape library Used as the operating system for the Library Manager (LM) that controlled the tape accessor (robot)[91] IBM 3745 Communications controller Used as the operating system for the Service Processor (SP) and if installed, the Network Node Processor (NNP).[92] IBM 3890 Document processor The 3890/XP1 was announced November 12, 1988. It initially used OS/2 1.1 Extended Edition[93] on a PS/2 Model 80 to emulate the stacker control software that previously ran on a System/360. IBM later switched to OS/2 Warp.[94] IBM 473x ATM Used in a range of automatic teller machines manufactured by IBM. Was also used in later 478x ATMs manufactured with Diebold. IBM 9672 IBM mainframe Used as the operating system for the Hardware Management Console (HMC) and Support Element (SE).[95] Was also used in later mainframe models such as the IBM 2064. History of the graphical user interface Multiple Virtual DOS Machine (MVDM) – OS/2 virtual DOS machine and seamless Windows integration OpenDoc – Software standard System Object Model – Programming frameworkPages displaying short descriptions of redirect targets Team OS/2 Windows Libraries for OS/2 LAN Manager ^ Matthew Nawrocki (26 February 2013). "Preview: eComStation 2.2 Beta, the legacy of OS/2 lives on". TechRepublic.com. Archived from the original on 2 September 2022. Retrieved 22 September 2013. ^ Nuska, Andrew (June 21, 2013). "Ed Iacobucci, co-founder of Citrix, dies of cancer". ZDNet. Archived from the original on 25 February 2023. Retrieved 20 May 2017. ^ Necasek, Michal (2001-09-08). "OS/2 1.3: Ten Years Ago". The History of OS/2. Archived from the original on 2007-10-12. ^ McCracken, Harry (2012-04-02). "25 Years of IBM's OS/2: The Strange Days and Surprising Afterlife of a Legendary Operating System". Time. ISSN 0040-781X. Archived from the original on 2022-11-28. Retrieved 2024-07-26. ^ Markoff, John (1992-06-28). "I.B.M. and Microsoft Settle Operating-System Feud". The New York Times. ISSN 0362-4331. Retrieved 2024-07-26. ^ Lewis, Peter H. (8 August 1995). "PERSONAL COMPUTERS; OS/2 No Longer at Home at Home". The New York Times. ^ Lea, Graham (15 June 1999). "IBM chief: Microsoft killed OS/2". BBC. ^ "Microsoft Hampered OS/2, I.B.M. Official Tells Court (Published 1998)". The New York Times. ^ "Changes in support for IBM OS/2 Warp 4 and OS/2 Warp Server for e-business". IBM. 12 July 2005. Archived from the original on 27 April 2006. Retrieved 9 June 2006. ^ "eComStation (eCS) history". Archived from the original on 2021-02-04. Retrieved 2020-08-29. ^ a b Sanders, James (2015-11-02). "OS/2: Blue Lion to be the next distro of the 28-year-old OS". Archived from the original on 25 February 2023. ^ Sanders, James (2016-08-31). "OS/2 resurrected: Blue Lion becomes ArcaOS, details emerge for upcoming release". TechRepublic. Archived from the original on 25 October 2022. ^ a b Sharwood, Simon (19 May 2017). "What is dead may never die: a new version of OS/2 just arrived". The Register. Archived from the original on 19 January 2023. ^ Barney, Douglas (1987-11-02). "Balancing on the high wire of Microsoft's success". Computerworld. Vol. XXI, no. 44. p. SR15. Retrieved 2025-06-08. ^ "Joint Development Agreement Between International Business Machines Corporation And Microsoft Corporation" (PDF). Tech Insider. Archived (PDF) from the original on August 15, 2021. Retrieved August 15, 2021. ^ Michal Necasek (April 2, 1987). "Microsoft Operating System/2 With Windows Presentation Manager Provides Foundation for Next Generation of Personal Computer Industry". The History of OS/2 (Press release). Archived from the original on April 10, 2010. Retrieved March 25, 2013. ^ a b Vose, G. Michael (July 1988). "Reader's Guide to OS/2". Book Reviews. Byte. pp. 51–54. Retrieved 2025-04-12. ^ "DBA Certification Course (Summer 2008) Chapter 1: DB2 Products and Tools" (PDF). Users.informatik.uni-halle.de. Retrieved 2 April 2019. ^ Michal Necasek (2001-07-16). "OS/2 1.0". The History of OS/2. Archived from the original on 2010-08-11. ^ Gates, Bill; Manzi, Jim; Esber, Ed (1987-11-02). "The great software debate". Computerworld (Interview). Vol. XXI, no. 44. Interviewed by Paul Gillin. p. SR7. Retrieved 2025-06-08. ^ a b David Both (May 2, 2012) [originally published December 19, 1996]. "A Short History of OS/2". DataBook for OS/2 Warp. Archived from the original on February 18, 2013. Retrieved April 9, 2013. ^ H. Gilbert (1995). "HPFS". Das Boot. PC Lube and Tune. Archived from the original on 2006-07-14. Retrieved 2006-06-09. ^ Bob Eager (28 October 2000). "Implementation of extended attributes on the FAT file system". Tavi Systems. ^ Iacobucci, Ed; foreword by Bill Gates (1988). "Foreword". OS/2 Programmer's Guide. McGraw-Hill Osborne Media. ISBN 0-07-881300-X. I believe OS/2 is destined to be the most important operating system, and possibly program, of all time. As the successor to DOS, which has over 10,000,000 systems in use, it creates incredible opportunities for everyone involved with PCs. ^ Bellis, Mary. "The Unusual History of Microsoft Windows". ThoughtCo. Dotdash. ^ Thomas Hormby (25 May 2005). "Windows History (1985–1994)". osviews.com. Archived from the original on March 12, 2006. Retrieved April 9, 2013. ^ Michal Necasek (2001-10-29). "OS/2 1.1 and 1.2: The Early Years". The History of OS/2. Archived from the original on 2006-06-13. ^ Paul Thurrott (24 January 2003). "Windows Server 2003: The Road To Gold". winsupersite.com. Archived from the original on 4 June 2010. ^ Gates, Bill; Myhrvold, Nathan; Rinearson, Peter (1996-10-08). The Road Ahead. ISBN 0-670-77289-5. ^ Michael Lee Vasu; Debra W. Stewart; G. David Garson (1998-03-03). Organizational behavior and public management. Taylor & Francis. p. 268. ISBN 978-0-8247-0135-2. ^ Gordon Letwin. ""What's happening to OS/2," a Usenet post by Gordon Letwin from August 1995, the point of view of a Microsoft employee". Google Groups. Archived from the original on 2007-09-23. Retrieved 2007-10-18. ^ Gates, Bill. "Bill Gates Interview". Computer History Collection (transcript of a Video History interview). Interviewed by David Allison. National Museum of American History, Smithsonian Institution. Retrieved April 10, 2013. ^ Microsoft (2000). Inside Out, Microsoft—In Our Own Words. Warner Business Books. ISBN 0-446-52739-4. ^ Microsoft (11 September 2008). "Compatibility of OS/2-based Applications and APIs". Microsoft TechNet. Microsoft. Retrieved April 9, 2013. ^ Corr, O. Casey (1992-04-06). "GIANT-KILLER? Microsoft mounts challenge to IBM". The Baltimore Sun. Archived from the original (Not available in the EU; check the archive URL instead) on 2020-03-05. ^ Robert X. Cringely (27 April 2006). "Killer Apps: For Apple's Windows Strategy to Work, It Must Replace Microsoft Office and Buy Adobe Systems". pbs.org. Archived from the original on September 7, 2012. ^ Microsoft (6 November 1999). "Windows 3.1 Standard Mode and the VCPI". support.microsoft.com. Archived from the original on March 9, 2013. ^ "Using OS/2 Boot Manager to install multiple operating systems on a single hard file - IBM PC/IBM IntelliStation". www.ibm.com. 2014-08-05. Retrieved 2025-05-05. ^ Christian Alice Scarborough (15 September 1998). "Team OS/2 Frequently Asked Questions". ^ "OS/2 Games Setting Archive". Game Zero magazine. 6 March 1995. Archived from the original on 14 June 2006. Retrieved 9 June 2006. ^ a b Bidmead, Chris (July 1994). "OS/2 for Windows". Personal Computer World. pp. 251–252. ^ Timothy F. Sipples (20 February 1995). "OS/2 Warp Frequently Asked Questions List". ^ "Biography for Kate Mulgrew". Internet Movie Database. In 1996, was contracted by IBM to help promote the latest release of OS/2 Warp, version 4 (previously codenamed Merlin), due to associations with Star Trek. ^ "In Search of Stupidity, Excerpts from Chapter 6". Insearchofstupidity.com. Archived from the original on January 27, 2013. Retrieved April 9, 2013. ^ Chapman, Merrill R. (2006). In Search of Stupidity: Over 20 Years of High-tech Marketing Disasters (Paperback) (2nd ed.). Berkeley, California: Apress. p. 108). ISBN 9781590597217. OCLC 71275572. They rented a hall in New York City and invited hundreds to see Patrick Stewart, the then current captain of the Starship Enterprise to help roll out the product in a gala event. (Stewart was a no-show. ^ Reimer, Jeremy (November 2013). "Half an operating system: The triumph and tragedy of OS/2". Ars Technica. Archived from the original on 26 March 2023. Retrieved 4 April 2023. ^ Fleisch, Brett D; Allan, Mark (September 23, 1997). Workplace Microkernel and OS: A Case Study (Technical report). John Wiley & Sons, Ltd. Archived from the original (PostScript) on August 24, 2007. Retrieved March 25, 2013. ^ Edwards, Ben J. (26 September 2021). "OS/2's Last Stand: IBM OS/2 Warp 4 Turns 25". www.howtogeek.com. HowToGeek. Retrieved 26 September 2021. ^ Lewis, Peter H. (8 August 1995). "PERSONAL COMPUTERS; OS/2 No Longer at Home at Home". The New York Times. ^ Wasserman, Elizabeth (June 8, 1999). "MS/DoJ: Microsoft urged IBM to yank Smart Suite". PC World. Archived from the original on January 16, 2014. Retrieved April 10, 2013. ^ "C. The Similar Experiences of Other Firms in Dealing with Microsoft". Albion.com. Retrieved 2013-03-20. ^ "OS2 World Community Forum – Index". Os2world.com. Retrieved 2013-03-20. ^ a b IBM. "End of Standard Support". Archived from the original on 2006-09-09. Retrieved 2006-08-08. ^ "OS/2 Warp: Warranties and Licenses". IBM. Retrieved April 9, 2013. ^ "Migration Station". IBM. Archived from the original on May 13, 2010. Retrieved April 9, 2013. ^ "IBM Redbooks | OS/2 Server Transition". Redbooks.ibm.com. 2003-10-06. Archived from the original on 2014-02-01. Retrieved 2013-03-20. ^ "3346/GEN/K (1–32) (Page 1)" (PDF). Archived from the original (PDF) on 2012-03-18. Retrieved 2013-03-20. ^ Dan Casey: OS/2 Voice Press Release Archived 2011-10-08 at the Wayback Machine - 21 Sept 1999. ^ "OS/2, ArcaOS and eComStation Versions and Languages". Retrieved 2020-08-24. ^ "News :: eComStation 2.1 GA available". eComStation.com. Archived from the original on 2013-05-12. Retrieved 2013-03-20. ^ "Roadmap: ArcaOS". arcanoae.com. 2023-09-02. Retrieved 2023-10-21. ^ "Slashdot: IBM Won't Open-Source OS/2". 22 January 2008. ^ Reimer, Jeremy (November 24, 2013). "Half an operating system: The triumph and tragedy of OS/2". Ars Technica. Retrieved June 12, 2025, from ^ "IBM OS/2 Warp History". 2004-06-24. Archived from the original on 2008-09-19. Retrieved 2008-09-09. ^ The Art of Unix Programming p. 66 ISBN 0-13-142901-9, ISBN 978-0-13-142901-7 ^ "Open Object REXX FAQ". Retrieved 2011-07-05. ^ "OS/2 Timeline". OS/2 Museum. Retrieved 2016-12-19. ^ "PC Magazine (archives scanned by Google)" (PDF). PC Magazine. Retrieved 2016-12-19. ^ "JaTomes Help - OS/2 Batch File Commands". www.jatomes.com. Archived from the original on 2019-04-14. Retrieved 2019-04-14. ^ "JaTomes Help - OS/2 Commands". www.jatomes.com. Archived from the original on 2019-04-14. Retrieved 2019-04-14. ^ "OS/2 to Linux Client Transition" (PDF). IBM redbook. 2004. p. 9. Archived from the original (PDF) on 2011-11-24. Retrieved 2011-07-05. ^ The VMware Team. "A Notice to OS/2 Users". Archived from the original on 2006-04-20. ^ "Guest Operating System Installation Guide - eComStation 2.x". VMware. 2014. Retrieved 2022-01-13. ^ VirtualBox. "VirtualBox Guest_OSes". ^ "Virtual Machine Configuration". Arca Noae. Retrieved 2020-09-05. ^ "ArcaOS 5.0 Changes". arcanoae.com. Retrieved 2020-09-04. ^ Timothy Prickett Morgan. "Breaking News—Parallels Joins the PC and Server Virtualization Fray". itjungle.com. Archived from the original on 2007-04-03. Retrieved 2007-10-19. ^ John F. Morar, David M. Chess. "the effect of computer viruses on OS/2 and Warp". research.ibm.com. Archived from the original on 2011-06-04. ^ "OS/2 Power Wiki : ClamAV". January 2011. Archived from the original on 2010-10-03. Retrieved 2012-08-17. ^ see IBM Developer Connection for OS/2, Internal Fixpack 12J ^ Bidmead, Chris (July 1994). "Just jamming". Personal Computer World. pp. 565–568. ^ KbdGetConsole() and DosWaitMuxWaitSem(), see Control Program Programming Guide and Reference, IBM OS/2 Toolkit ^ "Brazilian banks look to Linux for ATMs". Archived from the original on 2012-07-28. Retrieved 2008-05-27. ^ "NetIQ Manages Over 1000 Windows Servers for One of Australia's Largest Banks; ANZ Bank Completes Roll Out of NetIQ Management Software to 1,300 Servers" (fee). Business Wire. January 24, 2002. Retrieved 2010-01-24.[permanent dead link][dead link] ^ a b McCracken, Harry (April 2, 2012). "25 Years of IBM's OS/2: The Strange Days and Surprising Afterlife of a Legendary Operating System". Time. Technologizer. Retrieved April 9, 2013. ^ Subway History: How OS/2 Powered The NYC Subway For Decades Archived 2019-07-30 at the Wayback Machine, Andrew Egan, Jun 13, 2019, Tedium ^ "The BYTE Awards". BYTE. January 1989. p. 327. ^ "IBM's Developer Support News 1995 Issue 4". Public.dhe.ibm.com. Archived from the original on 2022-04-08. Retrieved 2021-10-11. ^ "InfoWorld". Books.google.com. 25 March 1996. p. 72. ^ "IBM 2074 Model 2 Console Support Controller — Consolidating and Streamlining Console Support Function". 26 February 2002. Retrieved 19 June 2014. ^ IBM TotalStorage 3494 Tape Library: A Practical Guide to Tape Drives and Tape Automation. IBM. 2009. p. 420. ISBN 978-0-7384-3222-9. ^ "IBM 3746 Software Plan" (PDF). IBM. ^ "IBM Announcement Letter". IBM. Retrieved 30 December 2011. ^ "IBM Announcement Letter". Retrieved 30 December 2011. ^ "Support Element Operations Guide". Archived from the original on 2014-03-05. Retrieved 30 December 2011. Harvey M. Deitel and Michael S. Kogan (1992). The Design of OS/2. Addison-Wesley. ISBN 0-201-54889-5. Letwin, Gordon (1988). Inside OS/2. Microsoft Press. ISBN 1-55615-117-9. Pascal, Zachary (1994). Showstopper! The Breakneck Race to Create Windows NT and the Next Generation at Microsoft. Warner Books. ISBN 0-02-935671-7. Peter Moylan (2004-07-23). "Some fundamental OS/2 concepts". Archived from the original on 2022-12-17. Michal Necasek (2005-12-03). "OS/2 Warp, PowerPC Edition". The History of OS/2. Archived from the original on August 12, 2010. Retrieved April 10, 2013.—Necasek discusses an aborted port to PowerPC machines. Reimer, Jeremy. "Half an operating system: The triumph and tragedy of OS/2". Archived from the original on 10 December 2013. Retrieved 12 December 2013. os2world.com – Community of OS/2 users ecomstation.ru – Community of eComStation and OS/2 users netlabs.org – OpenSource Software for OS/2 and eCS OS/2 FAQ hobbes.nmsu.edu – The OS/2 software repository Archived 2020-04-06 at the Wayback Machine EDM/2 – The source for OS/2 developers eCSoft/2 – The OS/2 and eComstation software guide Archived 2010-06-08 at the Wayback Machine osFree an open source project to build an OS/2 clone operating system Voyager Project, a defunct project to reimplement OS/2 on modern technology OS/2 to Linux API porting project Open Source OS/2 API implementation for Windows Microsoft documentation of OS/2 API compatibility with Windows NT The History of OS/2 Technical details of OS/2 OS/2 Warp 4 Installation and Update Manual; with boot disks and many links Retrieved from " 3 This is the talk page for discussing improvements to the OS/2 article. This is not a forum for general discussion of the article's subject. Put new text under old text. Click here to start a new topic. New to Wikipedia? Welcome! Learn to edit; get help. Assume good faith Be polite and avoid personal attacks Be welcoming to newcomers Seek dispute resolution if needed Article policies Neutral point of view No original research Verifiability Find sources: Google (books · news · scholar · free images · WP refs) · FENS · JSTOR · TWLArchives: 1Auto-archiving period: 12 months This article is rated C-class on Wikipedia's content assessment scale.It is of interest to multiple WikiProjects.Computing: Software Mid-importanceThis article is within the scope of WikiProject Computing, a collaborative effort to improve the coverage of computers, computing, and information technology on Wikipedia. If you would like to participate, please visit the project page, where you can join the discussion and see a list of open tasks.ComputingWikipedia:WikiProject ComputingTemplate:WikiProject ComputingComputingMidThis article has been rated as Mid-importance on the project's importance scale.This article is supported by WikiProject Software (assessed as Low-importance). Microsoft Mid-importanceThis article is within the scope of WikiProject Microsoft, a collaborative effort to improve the coverage of articles relating to Microsoft on Wikipedia. If you would like to participate, please visit the project page, where you can join the discussion and see a list of open tasks.MicrosoftWikipedia:WikiProject MicrosoftTemplate:WikiProject MicrosoftMicrosoftMidThis article has been rated as Mid-importance on the project's importance scale. Technology Technology portalThis article is within the scope of WikiProject Technology, a collaborative effort to improve the coverage of technology on Wikipedia. If you would like to participate, please visit the project page, where you can join the discussion and see a list of open tasks.TechnologyWikipedia:WikiProject TechnologyTemplate:WikiProject TechnologyTechnology The following references may be useful when improving this article in the future: Reimer, Jeremy (25 November 2013). "Half an operating system: The triumph and tragedy of OS/2". Ars Technica. Condé Nast. ESR has a good resume of history of OS/2 in The Art of Unix Programming: see The Art of Unix Programming Davidme — Preceding undated comment added 07:53, 29 June 2007 (UTC)[reply] Someone(s) should flesh out the following summary of a neglected part of the OS/2 history. I can contribute, but certain authoritative references might take considerable effort to obtain. IBM was a member of the Open Software Foundation, and participated with Digital Equipment Corp. on the OSF Research Institute's OSF/1 Mach kernel (OSFMK 7.3 kernel) microkernel design. That microkernel was derived from both the CMU CS Mach microkernel and the CMU CS Alpha real-time microkernel. Alpha's contributions were primarily application-specific scheduling algorithms and distributed threads. IBM Boca and Austin (VP Larry Loucks) decided to base the microkernel of Workplace OS for Power PC on that OSF microkernel. DEC had acquired most of the key Alpha designers, and was developing a real-time OS product based on MK7.3A. IBM contracted with the DEC Real-Time Business Unit to consult on the design and implementation of the WPOS/PPC microkernel. That collaboration included some key Alpha and MK7.3A designers at the OSF/RI. The IBM WPOS/PPC project was subsequently cancelled (as is documented herein), the OSF morphed into being the Object Management Group, dissolving the RI (its key MK7.3A designer went to Apple), and DEC's Real-Time Business Unit was terminated when Compaq purchased DEC. E Douglas Jensen (talk) 21:13, 28 January 2023 (UTC)[reply] during the mid 90s, os/2 was still under development and was a new thing. a coming soon thing. the article also says that protected mode was present in the 286 processors. it was not. i tested protected mode games on a 286 processor and they did not work, because of a lack of protected mode. this is not a joke 84.212.100.141 (talk) 14:58, 1 April 2023 (UTC)[reply] I am unsure as to what specifically your objection "during the mid 90s, os/2 was still under development and was a new thing. a coming soon thing." refers, but feel free to be more specific as to what sections or sentences you feel are incorrect or inappropriate. As to the 286 protected mode, all RS I have been able to find documents the ability of the 286 to enter protected mode, but it certainly seemed like it was very difficult to use in practice, and one of it's main criticisms was especially the fact that you could not escape protected mode without resetting the 286. This thread on stackexchange explains in detail how to put a 286 in protected mode, if you are interested. askeuhd (talk) 10:36, 4 April 2023 (UTC)[reply] 286 did have a protected mode and it could be 'exited' (return to RM). I think the OP was trying to run 386 PM software on a 286 which isn't going to work for obvious reasons. 57.135.233.22 (talk) 15:37, 8 May 2024 (UTC)[reply] The commands list (OS/2#Commands) seems to break up the general flow and seems to provide excessive information considering the rest of the article. Seems out of place, placing {{summarize section}} tag until further input has been received on what should be done with this section. Vghfr (talk) 04:53, 8 January 2024 (UTC)[reply] This section heading seems fundamentally wrong – Windows 3.0 compatibility already shipped in 1992's OS/2 2.0, as the text of this section itself confirms. OS/2 2.1 brought about improved Windows compatibility (i.e. support for Windows 3.1 as opposed to Windows 3.0), but Windows support was already there in 1992's OS/2 2.0 SomethingForDeletion (talk) 07:47, 6 April 2025 (UTC)[reply] Retrieved from " 4 The following pages link to Talk:OS/2 External tools (link count transclusion count sorted list) · See help page for transcluding these entries Showing 26 items. View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Talk:OS (links | edit) Talk:The Hobbit (film series)/Archive 2 (links | edit) Talk:Derry/Archive 9 (links | edit) Talk:OS/2/Archive 1 (transclusion) (links | edit) User:Blaxthos/IBM (links | edit) User:Blaxthos/IBM/Articles/Software (links | edit) User:Blaxthos/IBM/Articles (links | edit) User:Saikat 2012/sandbox (links | edit) User:Becky Sayles/sandbox/awb (links | edit) User:Syed yasser ahmed/sandbox (links | edit) User talk:Bruce Bathurst (links | edit) User talk:Abd/Archive 16 (links | edit) User talk:Davidgothberg/Archive 6 (links | edit) User talk:DMarti (links | edit) User talk:Tom29739/Archive 2 (links | edit) User talk:Tom29739/Archive 5 (links | edit) User talk:Doniago/Archive 70 (links | edit) User talk:182.66.30.147 (links | edit) User talk:Callmemirela/Archive 25 (links | edit) Wikipedia:Subpages (links | edit) Wikipedia:WikiProject Spam/LinkSearch/groups.google.com (links | edit) Wikipedia:Bot requests/Archive 22 (links | edit) Wikipedia:Village pump (technical)/Archive 89 (links | edit) Wikipedia:Redirects for discussion/Log/2014 January 5 (links | edit) Wikipedia:Redirects for discussion/Log/2014 January 15 (links | edit) Wikipedia:Village pump (technical)/Archive 174 (links | edit) View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500) Retrieved from " WhatLinksHere/Talk:OS/2" Ask the publishers to restore access to 500,000+ books.