



@ron Man, I don't know. If calc and notepad work, the agent is working, so that's a start. What exactly do you have in your command field? If you type that same thing in your command field? If you type that same thing in your command field? If you type that same thing in your command field? If you type that same thing in your command field? If you type that same thing in your command field? If you type that same thing in your command field? If you type that same thing in your command field? folder where the batch file is, so you could add a command to your batch file to cd to that folder. EDIT: Ron and I figured this out. It turned out he needed to close and open the TRIGGERcmd agent (or just reboot) after he added the batch file's folder to his PATH. Ron also explained how ahcmd works. It can send commands to X10 devices. It's a simpler way to do it than @Nate-Hales (aka Bubba's) method that uses the curl command. The ahcmd sendrf e1 on So with SmartThings, he could turn on parameters and make the command: ahcmd sendrf e1 And SmartThings would add the on or off part of the command. More info about ahcmd: Script file for Microsoft computer operating systems Batch fileFilename extensions.bat, .cmd, .btmInternet media type application/x-bat application/x-bat application/x-msdos-program text/plain Type of formatScriptingContainer forScripts A batch file is a script file in DOS, OS/2 and Microsoft Windows. It consists of a series of commands to be executed by the command-line interpreter, stored in a plain text file. A batch file may contain any command the interpreter accepts interactively and use constructs that enable conditional branching and looping within the batch file, such as IF, FOR, and GOTO labels. The term "batch" is from batch processing, meaning "non-interactive execution", though a batch file might not process a batch of multiple data. Similar to Job Control Language (JCL), DCL and other systems on mainframe and minicomputer systems, batch files were added to ease the work required for certain regular tasks by allowing the user to set up a script to automate them. When a batch file is run, the shell program (usually COMMAND.COM or cmd.exe) reads the file and executes its commands, normally line-by-line.[1] Unix-like operating systems, such as Linux, have a similar, but more flexible, type of file called a shell script.[2] The filename extension .bat is used in DOS and Windows. Windows NT and OS/2 also added .cmd. Batch files for other environments may have different extensions, e.g., .btm in 4DOS, 4OS2 and 4NT related shells. The detailed handling of batch files has changed significantly between versions. Some of the detail in this article applies to all batch files, while other details apply only to certain versions. Variants DOS In DOS, a batch file can be started from the command-line interface by typing its name, followed by any required parameters and pressing the 4 Enter key. When DOS loads, the file AUTOEXEC.BAT, when present, is automatically executed, so any commands that need to be run to set up the DOS environment may be placed in this file. Computer users would have the AUTOEXEC.BAT file set up the system date and time, initialize the DOS environment, load any resident programs or device drivers, or initialize network connections and assignments. A .bat file name extension identifies a file containing commands that are executed by the command interpreter COMMAND.COM line by line, as if it were a list of commands entered manually, with some extra batch-file-specific commands for basic programming functionality, including a GOTO command for changing flow of line execution. Early Windows was introduced in 1985 as a graphical user interface-based (GUI) overlay on text-based operating systems and was designed to run on DOS. In order to start it, the WIN command was used, which could be added to the end of the AUTOEXEC.BAT file to allow automatic loading of Windows. In the earlier, as well as Windows 3.1x and earlier, as well as Windows 9x invoked COMMAND.COM to run batch files. OS/2 The IBM OS/2 operating system supported DOS-style batch files. It also included a version of REXX, a more advanced batch-file scripting language. IBM and Microsoft started developing this system, but during the construction of it broke up after a dispute; as a result of this, IBM referred to their DOS-like console shell without mention of Microsoft, naming it just DOS, although this seemingly made no difference with regard to the way batch files worked from COMMAND.COM. OS/2's batch file interpreter also supports an EXTPROC file as a data file. The named program can be a script file; this is similar to the #! mechanism. Windows NT Unlike Windows 98 and earlier, the Windows NT family of operating systems does not depend on MS-DOS. Windows NT introduced an enhanced 32-bit command interpreter (cmd.exe) that could execute scripts with either the .CMD or .BAT extension. Cmd.exe added additional commands, and implemented existing ones in a slightly different way, so that the same batch file (with different extension) might work differently with cmd.exe and COMMAND.COM. In most cases, operation is identical if the few unsupported commands are not used. Cmd.exe's extensions to COMMAND.COM can be disabled for compatibility. Microsoft released a version of cmd.exe for Windows 9x and ME called WIN95CMD to allow users of older versions of Windows to use certain cmd.exe-style batch files. As of Windows 8[update], cmd.exe is the normal command interpreter for batch files; the older COMMAND.COM can be run as well in 32-bit versions of Windows able to run 16-bit programs.[nb 1] Filename extensions .bat The first filename extension used by Microsoft for batch files. This extension runs with DOS and all versions of Windows, under COMMAND.COM does not recognize this file name extension, so cmd.exe for interpretation. COMMAND.COM does not recognize this file name extension, so cmd.exe scripts are not executed in the wrong Windows environment by mistake. In addition, append, dpath, ftype, set, path, assoc and prompt commands, when executed from a .bat file, alter the value of the errorlevel variable only upon an error, whereas from within a .cmd file, they would affect errorlevel even when returning without an error.[3] It is also used by IBM's OS/2 for batch files. .btm The extension used by 4DOS, 4OS2, 4NT and Take Command. These scripts are faster, especially with longer ones, as the script is loaded entirely ready for execution, rather than line-by-line.[4] Batch file parameters COMMAND.COM and cmd.exe support special variables (%0, %1 through %9) in order to refer to the path and name of the batch job and the first nine calling parameters from within the batch job, see also SHIFT. Non-existent parameters are replaced by a zero-length string. They can be used similar to environment variables, but are not stored in the environment. Microsoft and IBM refer to these variables as replacement parameters or replaceable parameters, whereas Digital Research, Novell and Caldera established the term replacement variables[5] for them. JP Software calls them batch file displays Hello World!, prompts and waits for the user to press a key, and then terminates. (Note: It does not matter if commands are lowercase or uppercase unless working with variables) @ECHO OFF ECHO Hello World! PAUSE To execute the file, it must be saved with the filename extension suffix .bat (or .cmd for Windows NT-type operating systems) in plain text mode. When executed, the following is displayed: Hello World! Press any key to continue . . . Explanation The interpreter executes each line in turn, starting with the first. The @ symbol at the start of any line prevents the prompt from displaying that command as it is executed. The command ECHO OFF turns off the prompt permanently, or until it is turned on again. The combined @ECHO OFF is often as here the first line of a batch file, preventing any commands from displaying, itself included. Then the next line is executed and the ECHO Hello World!. The next line is executed and the PAUSE command displays Press any key to continue . . . and pauses the script's execution. After a key is pressed, the script terminates, as there are no more commands. In Windows, if the script is executed from an already running command prompt window, the window remains open at the prompt as in MS-DOS; otherwise, the window remains open at the prompt as in
MS-DOS; otherwise, the window remains open at the prompt as in MS-DOS; otherwise, the window remains open at the prompt as in MS-DOS; otherwise, the window remains open at the prompt as in MS-DOS; otherwise, the window remains open at the promp expansions are substituted textually into the command, and thus variables which contain nothing simply disappear from the syntax, and variables which contain spaces turn into multiple tokens. This can lead to syntax errors or bugs. For example, if %foo% is empty, this statement: IF %foo%==bar ECHO Equal parses as the erroneous construct: IF ==bar ECHO Equal Similarly, if %foo% contains abc def, then a different syntax error results: IF abc def==bar ECHO Equal The usual way to prevent this problem is to surround variable expansions in quotes so that an empty variable expands into the valid expression IF ""=="bar" instead of the invalid IF ==bar. The text that is being compared to the variable must also be enclosed in quotes, because the quotes are not special delimiting syntax; these characters represent themselves. IF "%foo%"=="bar" ECHO Equal The delayed !VARIABLE! expansion available in Windows 2000 and later may be used to avoid these syntactical errors. In this case, null or multi-word variables do not fail syntactically because the value is expanded after the IF command is parsed: IF !foo!==bar ECHO Equal Another difference in Windows 2000 or higher is that an empty variable (undefined) is not substituted. As described in previous batch interpreter behaviour would have resulted in an empty string. Example: C:\>set MyVar= C:\>echo %MyVar% C:\>if "%MyVar% Detection marks and spaces in passed strings Unlike Unix/POSIX processes, which receive their command-line arguments and spaces in passed strings Unlike Unix/POSIX processes, which receive their command-line arguments and spaces in passed strings Unlike Unix/POSIX processes, which receive their command-line arguments and spaces in passed strings Unlike Unix/POSIX processes, which receive their command-line arguments and spaces in passed strings Unlike Unix/POSIX processes, which receive their command-line arguments arguments argument of the unix/POSIX processes, which receive their command-line arguments argument of the unix/POSIX processes, which receive the unix/POSIX processes, whi already split up by the shell into an array of strings, a Windows application can implement its own parser to split the entire command-line as a single string, via the GetCommandLine API function. As a result, each Windows application can implement its own parser to split the entire command line into arguments. syntax for doing that, and so there is no single convention for quoting or escaping metacharacters on Windows command lines. For some commands, spaces are enclosed by quotation marks. Various conventions exist of how quotation marks can be passed on to the application: A widely used convention is implemented by the command-line parser built into the Microsoft Visual C++ runtime library in the CommandLineToArgvW function. It uses the convention that 2n backslashes followed by a quotation mark (") produce n backslashes followed by a quotation mark (") again produce n backslashes followed by a quotation mark literal. The same convention is part of the .NET Framework specification.[7] An undocumented aspect is that "" occurring in the middle of a quoted string produces a single quotation mark.[7] (A CRT change in 2008 [msvcr90] modified this undocumented handling of quotes.[8]) This is helpful for inserting a quotation mark in an argument without re-enables these special meanings on seeing the quote. It re-enables these special meanings on seeing the quotation has ended.) Another convention is that a single quotation mark (") is not included as part of the string. However, an escaped quotation mark (""") can be part of the string.[citation needed] Yet another common convention comes from the use of Cygwin-derived ported programs. It does not differentiate between backslashes occurring before or not before quotes. See glob (programming) § Windows and DOS for information on these alternative command-line parsers.[9] Some important Windows commands, like cmd.exe and wscript.exe, use their own rules.[8] For other commands, spaces are not treated as delimiters and therefore do not need quotation marks. If quotes are included they become part of the string. This applies to some built-in commands like echo. Where a string contains quotation marks, and is to be inserted into another line of text that must also be enclosed in quotation marks, particular attention to the quoting mechanism is required: C:>set foo="this string is enclosed in quotation marks, particular attention to the quoting mechanism is required: C:>set foo="this string is enclosed in quotation marks, particular attention to the quoting mechanism is required: C:>set foo="this string is enclosed in quotation marks, particular attention to the quotation marks, particular attention to the quoting mechanism is required: C:>set foo="this string is enclosed in quotation marks, particular attention to the quotation marks, particular attention to t System /SO "Source" /D "Example: %foo%" ERROR: Invalid Argument/Option - 'string'. Type "EVENTCREATE /?" for usage. On Windows 2000 and later, the solution is to replace each occurrence of a quote character within a value by a series of three quote characters: C:\>set foo="this string is enclosed in quotes" C:\>set foo=%foo:"="""% C:\>echo "test 1 %foo%" "test 1 """this string is enclosed in quotes"""" C:>eventcreate /T Warning /ID 1 /L System /SO "Source" /D "Example: %foo%" SUCCESS: A 'Warning' type event is created in the 'Source' log/source. Escaped characters, such as pipe (|) characters, have special meaning to the command line. They cannot be printed as text using the ECHO command unless escaped using the caret ^ symbol: C:\>Echo foo | bar 'bar' is not recognized as an internal or external command, operable program or batch file. C:\>Echo foo ^| bar foo | bar However, escaping does not work as expected when inserting the escaped character into an environment variable. The variable ends up containing a live pipe command when merely echoed. It is necessary to escape both the caret itself and the escaped character for the character for the character for the character display as text in the variable: C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C:\>set foo=bar | baz 'baz' is not recognized as an internal or external command, operable program or batch file. C: recognized as an internal or external command, operable program or batch file. C:\>echo %foo% bar | baz The delayed !VARIABLE! expansion available with CMD /V:ON or with SETLOCAL ENABLEDELAYEDEXPANSION in Windows 2000 and later may be used to show special characters stored in environment variables because the variable value is expanded after the command was parsed: C:\>cmd /V:ON Microsoft Windows [Version 6.1.7601] Copyright (c) 2009 Microsoft Corporation. All rights reserved. C:\>echo !foo! bar | baz C:\>echo !foo! bar | baz Sleep or scripted delay Until the TIMEOUT command was introduced with Windows Vista, there was no easy way to implement a timed pause, as the PAUSE command halts script activity indefinitely until any key is pressed. Many workarounds were possible, [10] but generally only available in older DOS versions, PING was only available in older DOS versions, PING was only available in older DOS versions. from Microsoft, but a number of small utility programs, could be installed from other sources. A commercial example would be the 1988 Norton Utilities Batch Enhancer (BE) command, where BE DELAY 18 would wait for 1 second, or the free 94-byte WAIT.COM[11] where WAIT 5 would wait for 5 seconds, then return control to the script. Most such programs are 16-bit .COM files, so are incompatible with 64-bit Windows. Text output with stripped CR/LF Normally, all printed text automatically has the control characters for carriage return (CR) and line feed (LF) appended to the end of each line. batchtest.bat @echo foo @echo bar C:>batchtest.bat foo bar It does not matter if the two echo commands share the same command line; the CR/LF codes are inserted to break the output onto separate lines: C:>@echo Message 2 A trick discovered with Windows
2000 and later is to use the special prompt for input to output text without CR/LF trailing the text. In this example, the CR/LF does not follow Message 1, but does follow Line 2 and Line 3: batchtest2.bat @echo off set /p ="Message 1"batchtest2.bat Message 2">data.txt C:\>set /p ="Message 2">data.txt C:\>set /p ="Message 3">data.txt C:\>set /p ="Message 1"batchtest2.bat Message 3">data.txt C:\>set /p ="Message 1"batchtest2.bat @echo off set /p ="Message 3">data.txt C:\>set /p ="Message 1"batchtest2.bat Message 3">data.txt C:\>set /p ="Message 1"batchtest2.bat @echo off set /p ="Message 3">data.txt C:\>set /p ="Message 1"batchtest2.bat Message 3">data.txt C:\>set /p = "Message 3" Message 1Message 2Message 3 However, there is no way to inject this stripped CR/LF prompt output directory; e.g. \\server\share\directory\ The command prompt requires the use of drive letters to assign a working directory, which makes running complex batch files stored on a server UNC share more difficult. While a batch file can be run from a UNC file path, the working directory default is C:\Windows\System32\. In Windows\System32\. In Windows 2000 and later, a workaround is to use the PUSHD and POPD command with command extensions.[nb 2] If not enabled by default, command extensions can be temporarily enabled using the /E:ON switch for the command interpreter. So to run a batch file on a UNC share, assign a temporary drive letter to the UNC share, and use the UNC share as the working directory of the batch file, a Windows shortcut can be constructed that looks like this: Target: %COMSPEC% /E:ON /C "PUSHD """\\SERVER\SHARE\DIR1\DIR2\""" & BATCHFILE.BAT & POPD" The working directory attribute of this shortcut is ignored. This also solves a problem related to User Account Control (UAC) on Windows Vista and newer. When an administrator is logged on and UAC is enabled, and they try to run a batch file as administrator from a network drive letter, using the right-click file context menu, the operation will unexpectedly fail. This is because the elevated context via the Explorer shell or logon scripts. However, by creating a shortcut to the batch file using the above PUSHD / POPD construct, and using the shortcut to run the batch file as administrator, the temporary drive letter will be created and removed in the elevated account context, and the batch file using the shortcut to run the batch file as administrator, the temporary drive letter will be created and removed in the elevated account context, and the batch file using the shortcut to run the batch file using the shortcut to run the batch file using the shortcut to run the batch file as administrator, the temporary drive letter will be created and removed in the elevated account context, and the batch file using the shortcut to run the batch file using the shortcut to r correctly expand to the path of the current batch script. %~dp0 UNC default paths are turned off by default as they used to crash older programs.[12] The Dword registry value DisableUNCCheck at HKEY\_CURRENT\_USER\Software\Microsoft\Command Processor[12] allows the default directory to be UNC. CD command will refuse to change but placing a UNC path in Default Directory in a shortcut to Cmd or by using the Start command. start "" /d \\127.0.0.1\C\$ "cmd /k" (C\$ share is for administrators). Character set Batch files use an OEM character set, as defined by the computer, e.g. Code page 437. The non-ASCII parts of these are incompatible with the Unicode or Windows character sets otherwise used in Windows so care needs to be taken.[13] Non-English file names work only if entered through a DOS character set compatible editor. File names with characters outside this set do not work in batch files. To get output in Unicode into file pipes from an internal command such as dir, one can use the cmd /U command. For example, cmd /U /C dir > files.txt creates a file containing a directory listing with correct Windows characters, in the UTF-16LE encoding. Batch files can be used maliciously. Simple trojans and fork bombs are easily created, and batch files can do a form of DNS poisoning by modifying the hosts file. Batch viruses are possible, and can also spread themselves via USB flash drives by using Windows' Autorun capability.[14] The following command in a batch file will delete all the data in the current directory (folder) - without first asking for confirmation: del /Q \*.\* These three commands are a simple fork bomb that will continually replicate itself to deplete available system resources, slowing down or crashing the system: :TOP start "" %0 goto TOP Other Windows scripting languages The cmd.exe command processor that interprets .cmd files is supported in all 32- and 64-bit versions of Windows up to at least Windows 10[update]. COMMAND.EXE, which interprets .BAT files, was supported in all 16- and 32-bit versions up to at least Windows 10.[nb 3] There are other, later and more powerful, scripting language interpreter to be installed before they can be used: KiXtart (.kix) — developed by a Microsoft employee in 1991, specifically to meet the need for commands useful in a network logon script.exe and wscript.exe and wscript.exe host) or in consolebased mode (with the cscript.exe host). They have been a part of Windows since Windows 98. PowerShell (.ps1) - released in 2006 by Microsoft and can operate both interactively (from a command-line interface) and also via saved scripts, and has a strong resemblance to Unix shells.[15] Unix-style shell scripting languages can be used if a Unix compatibility tool, such as Cygwin, is installed. Cross-platform scripting tools including Perl, Python, Ruby, Rexx, Node.js and PHP are available for Windows. Script files run if the filename without extension is entered. There are rules of precedence governing interpretation of, say, DoThis if DoThis.com, DoThis.com, DoThis.com, atc. exist; by default DoThis.com has highest priority. This default order may be modified in newer operating systems by the user-settable PATHEXT environment variable. See also List of DOS commands Notes ^ To verify that COMMAND.COM remains available (in the WINDOWS\SYSTEM32 directory), type COMMAND.COM at the 32-bit Windows 7 command prompt. ^ "If Command Extensions are enabled the PUSHD command accepts network paths in addition to the normal drive letter and path. If a network path is specified, PUSHD creates a temporary drive letter that points to that specified network resource and then change the current drive and directory, using the newly defined drive letter. Temporary drive letters are allocated from Z: on down, using the first unused drive letter found." -- The help for PUSHD in Windows 7 ^ Availability of CMD.EXE and COMMAND.COM can be confirmed by invoking them in any version of Windows (COMMAND.COM) not in 64-bit versions; probably only available in Windows 8 32-bit versions if installed with option to support 16-bit programs). References ^ "Using batch files: Scripting; Management Services". Technet.microsoft.com. 2005-01-21. Retrieved 2012-11-30. ^ Henry-Stocker, Sandra (2007-07-18). itworld.com. IT World. Retrieved 2018-06-13. ^ "Difference between bat and cmd | WWoIT - Wayne's World of IT". waynes-world-it.blogspot.fr. 2012-11-30. ^ "btm file extension :: all about the .btm the original on 2016-11-05, retrieved 2013-08-10 ^ Brothers, Hardin; Rawson, Tom; Conn, Rex C.; Paul, Matthias R.; Dye, Charles E.; Georgiev, Luchezar I. (2002-02-27). 4DOS 8.00 online help. ^ a b ".NET Core Runtime: System.Diagnostics.Process.Unix". GitHub. Retrieved 2020-02-11. Two consecutive double quotes inside an inQuotes region should result in a literal double quote (the parser is left in the inQuotes region). This behavior is not part of the spec of code:ParseArgumentsIntoList, but is compatible with CRT and .NET Framework. ^ a b Deley, David. "How Command Line, NodeJS PR #29576". GitHub. Retrieved 2020-02-11. ^ "How to do a delay", ericphelps.com ^ Utilities for DOS, linking to WAIT.COM) and other programs ^ a b dead link] ^ Chen, Raymond. "Keep your eye on the code page". Microsoft. ^ ^ "Windows PowerShell - Unix comes to Windows". Geekswithblogs.net. Retrieved 2012-11-30. External links Wikibooks has a book on the topic of: Guide to Windows commands Microsoft Windows XP Batch file reference How Windows Command Line Interface script programming links scripting related information (also command line) dbenham. "How does the Windows Command Interpreter (CMD.EXE) parse scripts?". Stack Overflow. {{cite web}}: Missing or empty |url= (help) Retrieved from "20perating system, see CP/M. 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 release4.52 / December 2001; 20 years ago (2001-12)Marketing targetProfessionals, serversAvailable inChinese, English, French, German, Italian, Japanese, Korean, Spanish, Portuguese, RussianPlatformsx86, PowerPCKernel typeHybrid kernelInfluenced byMS-DOS, IBM PC DOSDefaultuser interfaceWorkplace Shell Graphical user interfaceWorkplace Shell Graphical use System/2) is a series of computer operating systems, initially created by Microsoft and IBM under the leadership of IBM software designer Ed Iacobucci.[2] As a result of a feud between the two companies severed the relationship in 1992 relative to Microsoft's new Windows 3.1 operating environment,[3] the two companies severed the relationship in 1992 relative to Microsoft's new Windows 3.1 operating environment,[3] the two companies severed the relationship in 1992 relative to Microsoft's new Windows 3.1 operating environment,[3] the two companies evered the relationship in 1992 relative to Microsoft's new Windows 3.1 operating environment,[3] the two companies evered the relationship in 1992 relative to Microsoft's new Windows 3.1 operating environment,[3] the two
companies evered the relationship in 1992 relative to Microsoft's new Windows 3.1 operating environment,[3] the two companies evered the relationship in 1992 relative to Microsoft's new Windows 3.1 operating environment,[3] the two companies evered the relationship in 1992 relative to Microsoft's new Windows 3.1 operating environment,[3] the two companies evered the relationship in 1992 relative to Microsoft's new Windows 3.1 operating environment,[3] the two companies evered the relationship in 1992 relative to Microsoft's new Windows 3.1 operating environment,[3] the two companies every ev and OS/2 development fell to IBM exclusively.[4] The name stands for "Operating System/2", because it was introduced as part of the same generation personal computers. The first version of OS/2 was released in December 1987 and newer versions were released until December 2001. OS/2 was intended as a protected-mode successor of PC DOS. Notably, basic system calls were modeled after MS-DOS calls; their names even started with "Dos" and it was possible to create "Family Mode" applications that could work on both systems.[5] Because of this heritage, OS/2 shares similarities with Unix, Xenix, and Windows NT. IBM discontinued its support for OS/2 on 31 December 2006.[6] 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 since 2001,[7] and later by Arca Noae LLC as ArcaOS since 2017.[8][9][10] Development history 1985-1989: Joint development OS/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 OS/2 1.0 was announced in April 1987 and released in December. The original release is textmode-only, 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 engines for Unix and Unix-like operating systems).[13] 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).[14] 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, SQL. OS/2 1.1 was the first version to feature the Presentation Manager, GUI. The promised 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 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. [16] In addition, extended attributes [16] In addition, extended attributes were also added to the FAT file system. HPFS filesystem and a form of alternate data streams called Extended Attributes. [16] In addition, extended attributes were also added to the FAT file system. disk) The Extended Edition of 1.2 introduced TCP/IP and Ethernet support. OS/2- and Windows-related books of the late 1980s acknowledged the existence of both systems and promoted OS/2 as the system of the future.[18] 1990: 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.[19] Much of its success was because Windows 3.0 (along with MS-DOS) was bundled with most new computers.[20] 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. [21] Windows, on the other hand, supported a much larger variety of hardware. [21] Windows, [22] Several technical and practical reasons contributed to this breakup. The two companies had significant differences in culture and vision. Microsoft favored the open hardware, and urged Microsoft to drop features, such as fonts, tha IBM's hardware did not support. Microsoft programmers also became frustrated with IBM's code was bloated.[24] 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.[25] 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.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors to avoid developing for both OS/2 1.x did not gain enough momentum to allow vendors 80286 processor and DOS fundamentally doesn't. 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.[26] 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, 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.[27] 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 Presentation Manager and AVIO applications with the addition of the Windows NT could also support IS/2 1.x Presentation 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 for program windows (such as the Program Manager). 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. DOS compatibility OS/2 2.0 was touted by IBM as "a better DOS than DOS and a better DOS
than DO 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 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. 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; it only supported programs using the older VCPI interface) and the use of VCPI under Windows 3.1; it only support of the use of VCPI under Windows 3.1; it only support allowed DOS programs the possibility of masking real hardware interrupts, so any DOS program could deadlock the 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. Further information: VME (CONFIG.SYS directive) Windows 3.1) was achieved by adapting Windows 3.2 (and later Windows 3.1) was achieved by adapting Windows 3.2 (and later Windows 3.2) was achieved by adapting Windows 3. machine (VDM). Originally, a nearly complete version of Windows 3.0 in OS/2 1.1 Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions of OS/2 that would use whatever Windows 3.0 in OS/2 2.1. Later, IBM developed versions 0.1. In OS/2 2.1. Later, IBM developed versions [32] 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.[33] Because OS/2 only runs the user-mode system components of Windows applications run by default in a single Windows applications run by default 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 session (and each instance of Windows itself) from every other program running in any separate Windows session (though not from other programs running in full-screen or windows applications, and OLE between Windows applications only.[35] IBM's OS/2 for Windows product, 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 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 running from an HPFS partition, particularly beneficial for users of larger hard drives. Windows in order to perpetrate "a deliberate act of Microsoft sabotage" against IBM's product.[34] 1994: OS/2 Warp OS/2 Warp 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[36] of the then-upcoming series Star Trek: Voyager substituted him at the last minute.[37][38]:p. 108 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" includes 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.[citation needed] OS/2 Warp Connect was nicknamed "Grape".[15] Firefox 3.5.4 for OS/2 Warp 4 OS/2 Warp 4 desktop after installation 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 a fixpack and included as part of OS/2 2.1. Warp 3 brought about a fully 32-bit windowing system, while a fixpack and included as part of OS/2 2.1. Warp 4 desktop after installation In OS/2 2.1. Warp Warp 4 introduced the object-oriented 32-bit GRADD display driver model. 1996; Warp 4 added Java and speech recognition software.[39] 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 seen as a backdoor taction needed], meaning that even people who liked it did not have to buy it. This was seen as a backdoor taction needed 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 taction needed 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. 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 a full version of Warp 4 also included a full version of OS/2 2.11 and Warp 4 also included a full version of OS/2 alessentially a free release. were largely concentrated in networked computing used by corporate professionals; however, by the early 1990s, it was overtaken by 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.[40] 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.[41][42] Workplace OS This section needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. (April 2012) (Learn how and when to remove this template message) 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 "personalities". It also included major new architectural features including a system registry, JFS, support for UNIX graphics libraries, and a new driver model.[43] Workplace OS was developed solely for POWER platforms, and IBM intended to 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. Downsizing This section by adding citations to reliable sources. Unsourced material may be challenged and removed. (March 2013) (Learn how and when to remove this template 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") 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, and lay off over 1,300 the product, and lay off over 1,300 the product line, end all new development (including Workplace OS), eliminate the Boca Raton development (including Workplace OS), eliminate the Boca Raton development (and lay off over 1,300 the product). development individuals (as well as sales and support personnel). \$990 million had been spent in the last distributed version of OS/2. 2001: Fading out Although a small and dedicated community remains faithful to OS/2,[44] 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 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.[45] Sales of OS/2 stopped 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.[45][46] 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.[47][48][49] Third-party development Main articles: eComStation and 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.[50] Serenity Systems succeeded in negotiating an agreement with IBM, and began reselling OS/2 as eComStation in 2001.[51] eComStation is now sold by XEU.com, the most recent version (2.1) was released in 2011.[52] In 2015, Arca Noae, LLC announced that they had secured an agreement with IBM to resell OS/2.[8] They released the first version of their OS/2-based operating system in 2017 as ArcaOS.[10] As of 2021, there have been multiple releases of ArcaOS, and it remains under active development.[53] Petitions for open source. Petitions were held in 2005 and 2007, but IBM refused them, citing legal and technical reasons.[54] 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.[55][unreliable source?] 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.[56][failed verification][57] On the other hand, IBM donated Object REXX for Windows and OS/2 to the Open Object REXX for Windows and OS/2 to the Open Object REXX project maintained by the REXX Language Association on SourceForge.[58] There was a petition, arranged by OS2World, to open parts of the OS/2 IFS driver, developers ported from the OS/2 indirectly through IBM's release of the improved JFS file systems such as 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. Summary of releases Release dates refer to the US English editions unless otherwise noted. [59][60] 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 1993 OS/2 2.11 July 1994 OS/2 2.11 SMP October 1994 OS/2 2.11 SMP October 1993 OS/2 Warp 3 May 1995 OS/2 Warp 7 May 1995 OS/2 Warp 7 May 1993 OS/2 2.11 July 1994 OS/2 2.11 SMP October 1996 OS/2 Warp Server 4 September 1996 OS/2 Warp Server for e-Business (version 4.50) November 2000 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 1 (version 4.50) November 2001 OS/2 Convenience Pack 1 (version 4.50) November 2001 OS/2 Convenience Pack 1 (version 4.50) November 2000 OS/2 Convenience Pack 1 (version 4.50) November 2001 OS/2 Convenience Pack 1 (versi 2 (version 4.52) Features and technology User interface 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 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. Commands 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.[61][62] 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 sysley time traceful trace 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. 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's modular driver design.[63] Virtualization 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.[64] Newer versions of VMware.[65] 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 quest. Note that OS/2 runs only as a quest on those versions of VirtualPC for Mac). VirtualBox from Oracle Corporation (virtualPC in addition to a quest. Note that 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.[66] ArcaOS supports being run as a virtual machine guest inside VirtualBox, VMware ESXi and VMWare Workstation.[67] It ships with VirtualBox Guest Additions, and driver improvements to improve performance as a guest operating system.[68] 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.[69] Security niche OS/2 has few native computer viruses;[70] 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.[71] Problems 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. fixpacks and refined by Warp 4, by taking control over the application after it had not responded for several seconds.[72][73]: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.[74] Historical uses This section needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. (June 2011) (Learn how and when to remove this template message) OS/2 has been widely used in Iran Export Bank (Bank Saderat Iran) in their teller machines, ATMs and local servers (over 30,000 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 in 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 and attendant computers have been migrated to Linux [75] An ATM in Australia revealing during a reboot that it is based on OS/2 was widely adopted by accounting 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 [76] 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 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 was used as part of the Satellite Operations Support System (SOSS) for NPR's Public Radio Satellite. 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 on ticket machines for Tramlink in outer-London. with the user, it connects simple computers and the mainframes. When NYC MTA finishes its transition to contactless payment, OS/2 was used in checkout systems at Safeway supermarkets.[77] 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 1996-2001. Awards 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 development platform in search of development platform. 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".[79] In March 1995 OS/2 won seven awards[80] InfoWorld Product of the Year. [81] Five Awards at CeBIT. PC Professional Magazine - Innovation of the Year.[81] Five Awards at CeBIT. PC Professional Magazine - Innovation of the Year. [81] Five Awards at CeBIT. PC Professional Magazine - Innovation of the Year. [81] Five Awards at CeBIT. PC Professional Magazine - Innovation of the Year. [81] Five Awards at CeBIT. PC Professional Magazine - Innovation of the Year. [81] Five Awards at CeBIT. 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[81] Five Awards [80] Five Awards [80] Five Awards [81] Five Awards [82] Five 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 products utilizing OS/2 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 3494 Tape Library Used as the operating system for the Library Manager (LM) that controlled the tape accessor (robot)[82] IBM 3745 Communications Controller Used as the operating system for the Service Processor (SP) and if installed, the Network Node Processor (NNP).[83] IBM 3890 Document Processor The 3890/XP1 was announced November 12, 1988. It initially used OS/2 1.1 Extended Edition[84] 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.[85] 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 Mainframe Used as the operating system for the Support Element (SE).[86] Was also used in later mainframe models such as the IBM 2064 and 2074.[87] See also History of the graphical user interface Multiple Virtual DOS Machine (MVDM) - OS/2 virtual DOS machine and seamless Windows integration OpenDoc - Software componentry framework standard System Object Model Team OS/2 LAN Manager References ^ Matthew Nawrocki (26 February 2013). "Preview: eComStation 2.2 Beta, the legacy of OS/2 lives on". TechRepublic.com. Retrieved 22 September 2013. ^ Nuska, Andrew (June 21, 2013). "Ed Iacobucci, co-founder of Citrix, dies of cancer". ZD Net. Retrieved 20 May 2017. ^ McCracken, Harry (April 2, 2012). "25 Years of IBM's OS/2: The Strange Days and Surprising Afterlife of a Legendary Operating System". Time Magazine. 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