

OS History Why, What, Then

ENIAC first programmable digital computer, designed at US Ballistic Research Lab, Program was input by flipping switches, No OS, the memory 30 tons.

IBM 701 IBM's first commercial computer, mainframe, and for scientific computation. First computer to use magnetic disk for data storage. Cards, No. 0 Batch processing, (multiple jobs were run one after other), human operators required.

1955 - Mock 201 Monitor Made at IBM for the IBM 701, could switch between jobs, handle basic I/O without operator. Known as resident monitor since it was always in memory.

1956 - GM - NAA 100 First OS, made for IBM 704, better I/O automation than the Mock 701.

CTSS Why? for programmers, to work on some computers simultaneously, for IBM 7090, which had job queueing. OS clock interrupt was used, which interleaved OS, clock interrupt files were stored on tape. File can be password protected and read commands. File commands to share information through PS, origin of Email.

1959 - OS/00 Why? to run some programs on different computers. What? collection of main frame computer ranging in performance, all had different instruction sets. Instructions first OS had to load word at a time, hardware then. Then they had to load word at a time, hardware then. Then they had to load word at a time, hardware then.

1961 - Bell 7000 Does OS, high demand.

1961 - CTSS Why? to support CTSS, to run 274 as an application, with higher priority in mind to access data multiple times. What? First OS with hierarchical file system. Introduced ring structure of access for protection (no privilege). Who?

Multics Multics was created by, co-developed on an IBM 7090 (750k memory), Ken Thompson, Coded Unix v1.0 at Bell Labs, released 1969.

At the same time, developed B programming language, renamed to C in 1972. What? 4 of OS released in 1974. Kernel written in C. One of the first OS written in high level lang. C made just portable. Then continuous development, patches, bug fixes, licensing cost, and maintenance. New versions released in 80s including for micro computers

1971 - CP/M

Flagship small inexpensive storage. Disk 95 used a floppy to boot, provided FS for floppy, for single user. Why? CP/M was made as a control program for Micro computers at DEC. What? Most popular OS for micro computers, created by Gary Kildall, sold by MITS. Had 8080 processor, 16KB RAM, 16KB ROM, 32KB code space.

Basic OS, no GUI, no graphics, no sound, no serial ports, no mouse, no printer, no floppy, no console, no processor sharing.

Then, CP/M was dominant, so software targeted started to work for a profit.

1974 - MS-DOS Why? IBM wanted creation of a standard OS for their new PC. They wanted to make it easy to use, but not too much. Tim Paterson wrote his own version of CP/M and called it MS-DOS. Sold Gates bought QDOS \$75,000, renamed it as MS-DOS, released it in 1981. Then, MS-DOS became the most popular OS in the world. It was a success, highest sale in microcomputers. IBM became most valuable company in world by 1984.

1974 - GUIs and the Mac What? Xerox has research lab in AT&T PARC. First graphical user interface, then Apple computer to compete with the graphical user interface. Steve Jobs worked at Xerox Parc star was the first computer with GUI, failed too costly. Steve Jobs joined PARC, worked on GUI, failed again. Microsoft bought Xerox \$100M, released Xerox 11, 1985. Linux 1.0, 1991, 300,000 sold commercially. Apple lowered cost with the Macintosh, 128 KB RAM, no multitasking, no disk, no user kernel mode, while Mac. Then, Macintosh failed, slow & no hard drive. Had big impact on future. GUIs - 1986 - Power Mac. This was breakthrough success with creative interface.

1985 - Windows Why? Gates leave PARC, Robert H. Morris, his son, Bill. What? Bill was asked to work on top of MS-DOS. (Simpson executives which provided a GUI) and Microsoft, who didn't like the OS, was compatible with lots of computers. It was more primitive than the mac OS. Then, Apple complains that windows was infringing on their patent. So, they had to stop using windows. Microsoft had to pay \$200,000.

1987, Apple sued windows, losing. GUI became standard. Windows 3.1, icons for files instead of lists, better looking, custom appearance, better memory use. Total Success.

1991 - Linux Why? Unix could not run in micro computers, so it was expensive, cost per hour was high compared to Unix. (see how it fails)

(2) 1989 - IEEE introduced POSIX, the Portable OS Interface Specifications. MINIX Unix-like OS that worked on micro kernels. \$64.95!

1991 - Linus Torvalds announces a Unix-like Kernel on Comp os misc. newsgroup. What? Linus was based off of GNU tools, C compiler and minix kernel. Had a monolithic design as opposed to minix. Distributed with GPL license, any one could run share, modify. Its development took place via mail. Then, 1993, interest gathered around Linux (free open source and companies could use it). IBM, Intel used it to build Linux is now running on ~1.5B PCs, 95% of servers, 90% of mobile phones, 90% of super computers. Linux market G+ in 2003.

1989-95 - NeXTSTEP Why? 1985, John resigns from Apple, starts NeXT, decides to make Computer workstation (for scientific, etc). 1990, will be the NeXTstation, a mini-OS based on the Mach Kernel and BSD Unix. Had Dock and scroll bar dragging and drop Real time rendering, shadow dragging, window in Objective-C (cool). Sold to universities (\$50000 sold). Then, bought by Apple in 1997, John becomes CEO.

1995-2000 - Windows 95

Why? Windows 3 was based on 16 bit architecture from 64 Kbytes. 1993, Windows NT, some 32 bit, no longer relies on MS-DOS, 32 bit arch. Instead of Slow, and long bootup times. What? Windows 95 is the compact follow up to NT, however system is less powerful, 32 bit, slower bootup, APIs are not as good. It has a taskbar, scroll bar, start button. Then, Auto-start, 65 applications sold in 6 months. Windows 95 predicts to be 25 million. Why such a success? easier to use than 3.1. After CGX, boosted from GUI, not MS-DOS, better look and feel. Windows 98 upgrade with web integration.

1996 - Mac OS 1947, System 7, updated virtual memory, 32 bit, 32 bit real mode. Apple license, System 7 ("classic"). Then, 1997, Rhapsody, 3.0, multi-tasking, Power, update 11.0. Mac OS client component. Windows Apple needed OS to compete with them. Then, 1998, bought one from other company, NeXT, for 40 dollars from NeXT. Then, 1999, NeXT and killed the classic. Restructured programmatic distinction between program and controller with microtask + self-timed. Pod introduced, which was a component of NeXT, and had compatibility. Later came from NeXT to Mac OS X. NeXT, UI, in order to catch windows. Mac OS, multi-tasking, memory protection, preemptive scheduling, threads, shared memory, shared memory, and multithreading. The next year, first big new update was 1.2, 124 first time. APFS, now OpenFS (2017), replaced HFS Optimized by SSDs, copy-on-write (COW) (data is copied to another location, then deleted from original location, then copied back to original location). User can now bookmark. Full disk encryption, journaling, virus, related on-wire. Similar to Solaris.

2001 - BeOS Why? 5.5

Did not get to work on Windows NT and Linux, so he created BeOS. 2001, got 1000 users. Now, BeOS is based on NT architecture, so no longer. 2002, BeOS 5.0, BeOS 5.5, BeOS 6.0, BeOS 7.0, BeOS 8.0, BeOS 9.0, BeOS 9.5, BeOS 10.0, BeOS 10.5, BeOS 11.0, BeOS 12.0, BeOS 13.0, BeOS 14.0, BeOS 15.0, BeOS 16.0, BeOS 17.0, BeOS 18.0, BeOS 19.0, BeOS 20.0, BeOS 21.0, BeOS 22.0, BeOS 23.0, BeOS 24.0, BeOS 25.0, BeOS 26.0, BeOS 27.0, BeOS 28.0, BeOS 29.0, BeOS 30.0, BeOS 31.0, BeOS 32.0, BeOS 33.0, BeOS 34.0, BeOS 35.0, BeOS 36.0, BeOS 37.0, BeOS 38.0, BeOS 39.0, BeOS 40.0, BeOS 41.0, BeOS 42.0, BeOS 43.0, BeOS 44.0, BeOS 45.0, BeOS 46.0, BeOS 47.0, BeOS 48.0, BeOS 49.0, BeOS 50.0, BeOS 51.0, BeOS 52.0, BeOS 53.0, BeOS 54.0, BeOS 55.0, BeOS 56.0, BeOS 57.0, BeOS 58.0, BeOS 59.0, BeOS 60.0, BeOS 61.0, BeOS 62.0, BeOS 63.0, BeOS 64.0, BeOS 65.0, BeOS 66.0, BeOS 67.0, BeOS 68.0, BeOS 69.0, BeOS 70.0, BeOS 71.0, BeOS 72.0, BeOS 73.0, BeOS 74.0, BeOS 75.0, BeOS 76.0, BeOS 77.0, BeOS 78.0, BeOS 79.0, BeOS 80.0, BeOS 81.0, BeOS 82.0, BeOS 83.0, BeOS 84.0, BeOS 85.0, BeOS 86.0, BeOS 87.0, 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