

Unix was developed at AT&T Bell Labs in 1969 on a DEC PDP-7 by Dennis Ritchie and Ken Thompson. Unix was freely given to universities and was sold to other firms through subsidiaries, such as Western Electric and other licensed sellers. The University of California at Berkeley heavily modified AT&T Unix Version 7 to what is now known as the Berkeley Software Distribution (BSD). Licensees soon began publishing their own versions of Unix derived from AT&T System III/V and BSD. AT&T eventually sold Unix and its associated Unix System Laboratories to Novell. It was then rechristened UnixWare, and was bought by its current owner, the Santa Cruz Operation (SCO). Over the past 30 years, Unix has shaped and affected the computer industry through its design, legal issues, and users' culture.

Directories are databases used to contain information on the logical location of files, or collective groups of similar data, such as a document or spreadsheet (Mueller 1006). "Microsoft even tried to emulate the UNIX directory structure, but only succeeded in implementing the concept of nested directories" (Lehey 7). DOS inherited this structure as late as v2.0 (Mueller 978). One of the major design concepts of the Unix OS is that the user interface was separate from the OS. A user has the ability to use whatever shell he/she wishes. DOS and Windows allow the use of alternate shells through the "shell=xxx" command in the configuration files. The Unix system was made up of several small, separate but thoroughly integrated parts. The kernel, system tools, etc, work together to complete a single, working operating system. For a considerable amount of time, a graphical system did not exist. It came about as an extension to show graphics on bitmapped terminals from a networked server (Nye 3-5). Kernel modules are loadable object files that can be inserted into the kernel and then removed when no longer needed (Lehey 46). This ability to delegate certain tasks to subprocesses led to the development of the microkernel. A microkernel system is a modern system design in which most of the OS's functions exist as separate processes outside the main kernel. Such a modern system is the Windows NT Workstation and Server operating systems (DiBona 222). Early systems had to rely on disk-swapping if there was not enough physical memory for a process. With the advent of the VAX, programs were

allowed to address memory that wasn't physically installed, but resided as an image on the hard disk. The i286 from Intel was the first consumer chip that had these advanced capabilities, but it wasn't until the early 1990s that an operating system had the ability to use these functions (Mueller 157). Multitasking is the ability to run multiple processes at the same time. Unix had this from the beginning. Until Windows NT and OS/2, the only forms of multitasking available to lower end consumers were cooperative multitasking. Cooperative multitasking is still found and used in Windows and Mac OS. Modern versions of Windows only use it for legacy applications, though (Hacker 9-10). Portability is the ability to move application and system software to another architecture. Unix has been very portable, as it has been ported from large machines to tiny desktop computers. Unix started on the minicomputer, but inside AT&T we've got Unix running on mainframes. Unix plays very well across mainframes, minis and micros. It has this accordian like capability to spread across that entire range (Scanlon). Portability has been an issue with operating systems of the 1990s as well. Windows NT runs on several architectures, such as Intel, ALPHA, and MIPS. 4.2BSD also gave birth to the first TCP/IP stack implementation. TCP/IP is the protocol that the internet uses natively. It was based upon BSD Sockets, an interface to the Unix filesystem. With the internet becoming popular, Windows software vendors began publishing their own versions of an interface to the protocol. At a trade show in the early 1990s, several of these vendors came together to design a single interface. This was based on the original TCP/IP interface, and was called Windows Sockets, after it's UNIX counterpart (Levine 40).

Originally, since AT&T was just a phone company and was not in the computer industry, it freely gave Unix away to subsidiaries and Universities. Over time it realized Unix was a positive marketing strategy, and with certain legal rulings, it began licensing to other vendors. AT&T soon began marketing Unix on its own, releasing System III in 1982 and System V (SysV) in 1983 (Lehey 7-8). It then teamed up with Digital Research, Inc, to expand SysV's install and application base (Scanlon). With Unix being almost 20 years into development, it was no

longer fit to be used as a research platform. The Computer Systems Research Group at the University of California at Berkeley was to shut down. Individuals began leaving to form a company called Berkeley Software Design, Inc. (BSDi). They made an effort to port BSD to the Intel line of processors (The first experimental version was called 386/BSD). AT&T's Unix System Laboratories filed a lawsuit first against BSDi, then later included UC Berkeley. They alleged that BSDi broke license agreements by redistributing source code. An out of court settlement led BSDi to move to the 4.4BSD-Lite sources (Lehey 8).

When Unix was young, there was no support. AT&T and DEC could not help with problems. When they could, they would try to the best of their abilities to provide as much as possible, but this was not always enough (Walker 5). A similar predicament has come with the advent of the free Unix clones. Linux and FreeBSD are not officially supported by many hardware companies, and only a few are willing to provide any kind of support. These two instances have led to the development of Unix and Linux users' groups. Students, professors, and anyone related to or interested in Linux/Unix have held conferences, written books and programs, and provided assistance to others. Recursive acronyms have become popular in the Unix world. Examples such as "GNU's Not Unix", "PINE Is Not Elm", and "JOE's Own Editor" are some of the most popular. GNU HURD, a free Unix system, has one of the most unique recursive acronyms. HURD stands for "HIRD of Unix-Replacing Daemons", and HIRD stands for "HURD of Interfaces Representing Death." Logos have also been an important trademark in the Unix industry. The UNIX daemon, more commonly referred to as the BSD Daemon, was one of the first. Phil Foglio, a comic artist, readily agreed to draw a t-shirt design for UNIX. "I went down to my lab and some took Polaroid snaps of the PDP-11 system I was running UNIX on at the time, and gave it to Phil with some descriptions of visual puns I wanted: popes, demons with forks running down the pipes, a 'bit-bucket' named /dev/null, all that" (Lehey 19-20). FreeBSD, NetBSD, and other versions of BSD use a similar daemon. Linux, a clone, uses a penguin, although with some opposition. The original author and current maintainer of Linux commented on this:

Some people have told me they don't think a fat penguin really embodies the grace of Linux, which just tells me they have never seen an angry penguin charging at them in excess of 100 mph. They'd be a lot more careful about what they say if they had (Linux.org).

The Free Software Foundation (FSF) is a group of volunteers who write free software for the GNU Project and also promote the cause of free software. Free software is not of price, but of freedom to copy, change, and redistribute source code. This is called a "copyleft" (Hacker 138-139). This has sparked a commercial movement known as "open source." The open source business model has been embraced by companies like Cygnus Solutions, RedHat, Apache, etc. These and similar companies provide applications as free downloads, both in source and binary form, but make profit off of the commercial sale of "distributions", meaning collections of their and other's software on disk (DiBona 177). Major companies such as Microsoft see free and open source software as a threat, as shown by the Halloween Documents (DiBona 216).

Unix has affected more than just the groups who use it; it has affected those in and out of the computer industry. It has given birth to ideas in technology, to ideas about how software should be managed, marketed, etc, and to zealots who favor Unix and its clones. Unix is a way of life for many individuals, and a perfect solution to many business needs.