

Taken from:

Maurice J. Bach, The Design of the UNIX Operating System, Prentice-Hall, 1986.

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GENERAL OVERVIEW OF THE SYSTEM

... develop a new operating system called Multics [Organick 72]. The goals of the Multics system were to provide simultaneous computer access to a large community of users, to supply ample computation power and data storage, and to allow users to share their data easily, if desired. Many people who later took part in the early development of the UNIX system participated in the Multics work at Bell Laboratories. Although a primitive version of the Multics system was running on a GE 645 computer by 1969, it did not provide the general service computing for which it was intended, nor was it clear when its development goals would be met. Consequently, Bell Laboratories ended its participation in the project.

With the end of their work on the Multics project, members of the Computing Science Research Center at Bell Laboratories were left without a "convenient interactive computing service" [Ritchie 84a]. In an attempt to improve their programming environment, Ken Thompson, Dennis Ritchie, and others sketched a paper design of a file system that later evolved into an early version of the UNIX file system. Thompson wrote programs that simulated the behavior of the proposed file system and of programs in a demand-paging environment, and he even encoded a simple kernel for the GE 645 computer. At the same time, he wrote a game program, "Space Travel," in Fortran for a GECOS system (the Honeywell 635), but the program was unsatisfactory because it was difficult to control the "space ship" and the program was expensive to run. Thompson later found a little-used PDP-7 computer that provided good graphic display and cheap executing power. Programming "Space Travel" for the PDP-7 enabled Thompson to learn about the machine, but its environment for program development required cross-assembly of the program on the GECOS machine and carrying paper tape for input to the PDP-7. To create a better development environment, Thompson and Ritchie implemented their system design on the PDP-7, including an early version of the UNIX file system, the process subsystem, and a small set of utility programs. Eventually, the new system no longer needed the GECOS system as a development environment but could support itself. The new system was given the name UNIX, a pun on the name Multics coined by another member of the Computing Science Research Center, Brian Kernighan.

Although this early version of the UNIX system held much promise, it could not realize its potential until it was used in a real project. Thus, while providing a text processing system for the patent department at Bell Laboratories, the UNIX system was moved to a PDP-II in 1971. The system was characterized by its small size: 16K bytes for the system, 8K bytes for user programs, a disk of 512K bytes, and a limit of 64K bytes per file. After its early success, Thompson set out to implement a Fortran compiler for the new system, but instead came up with the language B, influenced by BCPL [Richards 69]. B was an interpretive language with the performance drawbacks implied by such languages, so Ritchie developed it into one he called C, allowing generation of machine code, declaration of data types, and definition of data structures. In 1973, the operating system was rewritten in C, an unheard of step at the time, but one that was to have tremendous impact on its acceptance among outside users. The number of installations at Bell ...