

# The Mach System



**This Chapter was first written in 1991 and has been modified over time**

In this appendix, we examine the Mach operating system. Mach is designed to incorporate the many recent innovations in operating-system research to produce a fully functional, technically advanced system. Unlike UNIX, which was developed without regard for multiprocessing, Mach incorporates multiprocessing support throughout. This support is exceedingly flexible, accommodating shared-memory systems as well as systems with no memory shared between processors. Mach is designed to run on computer systems ranging from one processor to thousands of processors. In addition, it is easily ported to many varied computer architectures. A key goal of Mach is to be a distributed system capable of functioning on heterogeneous hardware.

Although many experimental operating systems are being designed, built, and used, Mach satisfies the needs of most users better than the others because it offers full compatibility with UNIX 4.3 BSD. This compatibility also gives us a unique opportunity to compare two functionally similar, but internally dissimilar, operating systems. Mach and UNIX differ in their emphases, so our Mach discussion does not exactly parallel our UNIX discussion. In addition, we do not include a section on the user interface, because that component is similar to the user interface in 4.3 BSD. As you will see, Mach provides the ability to layer emulation of other operating systems as well; other operating systems can even run concurrently with Mach.

## Bibliographical Notes

The Accent operating system was described by [Rashid and Robertson (1981)]. A historical overview of the progression from an even earlier system, RIG, through Accent to Mach was given by [Rashid (1986)]. General discussions concerning the Mach model were offered by [Tevanian et al. (1989)].

[Accetta et al. (1986)] presented an overview of the original design of Mach. The Mach scheduler was described in detail by [Tevanian et al. (1987a)] and [Black (1990)]. An early version of the Mach shared memory and memory-mapping system was presented [Tevanian et al. (1987b)].

## Bibliography

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