

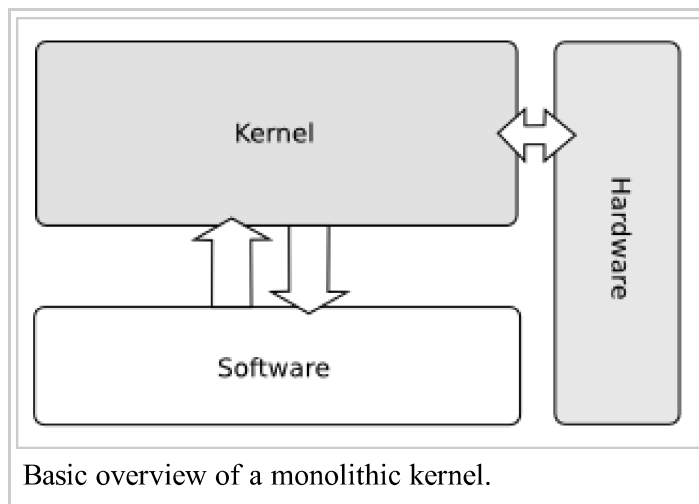
Monolithic Kernel

From OSDev Wiki

Design

A monolithic kernel includes all (or at least, most) of its services in the kernel proper.

This reduces the amount of context switches and messaging involved, making the concept faster than a Microkernel. On the downside, the amount of code running in kernel space makes the kernel more prone to fatal bugs.



Kernel Designs

Models

Monolithic Kernel

Microkernel
Hybrid Kernel
Exokernel
Nano/Picokernel
Cache Kernel
Virtualizing Kernel
Megalithic Kernel

Other Concepts

Modular Kernel
Higher Half Kernel
64-bit Kernel
Bare Bones

The word "monolithic" by itself means a single piece (mono) that is of or like stone (lithic), however when applied to kernels the exact meaning is more general. Most people consider that a kernel where device drivers and services run as part of the kernel is a monolithic kernel, regardless of whether parts are dynamically loaded "kernel modules" or if everything is a true single unchangeable binary. For this reason I draw a distinction between "monolithic" and "pure monolithic".

Modern versions of Linux are a well-known example of a monolithic kernel - while drivers are shipped as dynamically loaded "kernel modules" they are still loaded into and running in kernel space. Monolithic kernels are common for the 80x86/PC architecture.

Examples of "pure monolithic" kernels are rare for the 80x86/PC architecture (but more common in embedded systems). This is because of the wide variety of devices, hardware and CPU features that may be present within a modern PC - a pure monolithic kernel would need to be far too large or compiled specifically for the computer before use.

In general most OS's aren't "pure monolithic" or "pure micro-kernel", but fall somewhere between these extremes in order to make use of the advantages of both methods.

Examples

- Linux
- Windows 9x (95, 98, Me)
- Mac OS <= 8.6
- BSD

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Category: Kernel

- This page was last modified on 22 October 2008, at 04:53.
- This page has been accessed 54,975 times.