

Profiling I/O Interrupts in Modern Architectures

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Abstract

As applications grow increasingly communication-oriented, interrupt performance quickly becomes a crucial component of high performance I/O system design. At the same time, accurately measuring interrupt handler performance is difficult with the traditional simulation, instrumentation, or statistical sampling approaches.

One of the most important components of interrupt performance is cache behavior. This paper presents a portable method for measuring the cache effects of I/O interrupt handling using native hardware performance counters. To provide a portability stress test, the method is demonstrated on two commercial platforms with different architectures, the SGI Origin 200 and the Sun Ultra-1. This case study uses the methodology to measure the overhead of the two most common forms of interrupt traffic: disk and network interrupts. The study demonstrates that the method works well and is reasonably robust. In addition, the results show that disk interrupts behave similar on both platforms, while differences in OS organization cause network interrupts to behave very differently. Furthermore, network interrupts exhibit significantly larger cache footprints.