SORS: "Reinventing virtual memory for modern hardware"

Objectives

Abstract:

Paged-based virtual memory forms the basis of memory management in modern hardware, and has in the past decades been extended with support for accelerators and I/O devices. As memory sizes grow to terabytes and beyond, though, the complexity and overhead of address translation has become costly.
My research group has been tackling this problem a decade, looking for ways to provide the flexibility and benefit of paged-based memory at greater efficiencies. In this talk, I will cover our recent work on how to adapt virtual memory mechanisms in hardware and software for modern computing environments. First, I'll discuss devirtualized memory for computation accelerators, a hardware mechanism that provides the protection benefits of virtual memory at lower cost by removing address translation. Second, I'll talk BypassD, which enables user-space access to files without kernel interference on the datapath. It moves storage address translation into hardware to greatly reduce latency.

Short Bio:

Michael Swift is a professor at the University of Wisconsin--Madison. His research focuses on the hardware/operating system boundary, including virtual memory, persistence and storage, new compute technologies, and device drivers. He received his BA from Cornell University in 1992 and Ph.D. from the University of Washington in 2005. Before graduate school, he worked at Microsoft in the Windows group, where he implemented authentication and access control functionality in Windows Cairo, Windows NT, and Windows 2000.

Speakers

Speaker: Michael Swift. Professor from the Computer Sciences Department at University of Wisconsin, Madison.
Host: Osman Unsal.Computer Architecture For Parallel Paradigms-Group Manager, Computer Sciences Department, BSC.
Barcelona Supercomputing Center - Centro Nacional de Supercomputación

---