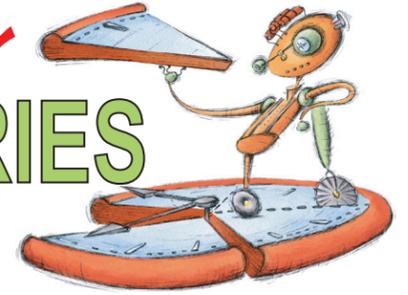


Special SDI/ISTC Seminar

PDL CONSORTIUM SPEAKER SERIES



Monday May 12, 2014
CIC 2101 2:00 - 5:00 pm

2:00 - 2:45 pm



Michael Kozuch, Intel

SYSTEM SOFTWARE FOR PERSISTENT MEMORY

Emerging byte-addressable, non-volatile memory technologies offer performance within an order of magnitude of DRAM, prompting their inclusion in the processor memory subsystem. However, such load/store accessible Persistent Memory (PM) has implications on system design, both hardware and software. In this paper, we explore system software support to enable low-overhead PM access by new and legacy applications. To this end, we implement PMFS, a light-weight POSIX file system that exploits PM's byte-addressability to avoid overheads of block-oriented storage and enable direct PM access by applications (with memory-mapped I/O). PMFS exploits the processor's paging and memory ordering features for optimizations such as fine-grained logging (for consistency) and transparent large page support (for faster memory-mapped I/O). To provide strong consistency guarantees, PMFS requires only a simple hardware primitive that provides software enforceable guarantees of durability and ordering of stores to PM. Finally, PMFS uses the processor's existing features to protect PM from stray writes, thereby improving reliability. Using a hardware emulator, we evaluate PMFS's performance with several workloads over a range of PM performance characteristics. PMFS shows significant (up to an order of magnitude) gains over traditional file systems (such as ext4) on a RAMDISK-like PM block device, demonstrating the benefits of optimizing system software for PM.

2:45 - 3:30 pm



Roger MacNicol, Oracle

COLUMNAR PROCESSING IN ORACLE: PIVOTS AND FRACTURED MIRRORS

Starting with a brief history of columnar databases, Roger MacNicol will be walking us through Oracle's high-level design choices in Hybrid Columnar and Pure Columnar database and some of the tradeoffs involved in RDBMS design. The talk will include showing the genesis of two of the key ideas in academic research.

4:00 - 5:00 pm



Sorin Faibish, EMC

NEW IO AND MEMORY ARCHITECTURES FOR NEXT GENERATION APPLICATIONS

This talk will discuss challenges being addressed by EMC as it seeks to bring new storage solutions for high-performance computing. Specifically, it will discuss new advances in parallel file systems, including POSIX interface changes and caching and write buffering schemes (e.g., burst buffers, IO-forwarding key-value stores, and flash memory hierarchies) for improving their efficiency. In addition to describing our ongoing efforts, I will highlight opportunities for research that could have a big impact.



For more information or questions:
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