



KV-DIRECT: HIGH-PERFORMANCE IN-MEMORY KEY-VALUE STORE

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ABSTRACT: Performance of in-memory key-value store (KVS) continues to be of great importance as KVS goes beyond the traditional object-caching workload and becomes a key infrastructure to support in-memory computations. In this talk, I'll discuss KV-Direct, a high-performance key-value store system that combines FPGA based reconfigurable network interface card (NIC) with several novel hardware and software designs choices. KV-Direct achieves performances that is close to the physical limit of the underlying hardware both in terms of throughput and latency. KV-Direct with a single NIC can process up to 160M key-value operations per second, whose throughput is equivalent to 32 CPU cores, power efficiency is 16x higher than CPU, and tail latency is 10x lower than CPU.

BIOGRAPHY: Lintao Zhang is a Principle Researcher of MSR-Asia in Beijing and is currently managing the Systems Research Group of MSRA. Before joining MSR-A in late 2008, he was a researcher in Microsoft Research Silicon Valley. In the past he has worked on a diverse set of exciting projects, including verification and logic, internet security, distributed systems, reconfigurable computing, search engines, and most recently deep learning and AI. He served as the architect for Bing's current index serving engine. Lintao has won several awards for his research, including best paper awards in SOSP and DATE, most influential and most cited paper awards in ICCAD and CAV, and Richard Newton Technical Impact Award in Electronic Design Automation. Lintao earned his BS degree in Physics from Peking University, and his PhD in EE from Princeton University.