

Sweet Spots and Limits for Virtualization

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Abstract

This year at VEE, we added a panel to discuss the state of virtualization: what problems are solved? what problems are important? and what problems may not be worth solving? The panelist are experts in areas ranging from hardware virtualization up to language-level virtualization.

Moderator: Carl Waldspurger

Carl Waldspurger has a long record of innovation in systems software and virtualization. As a consultant and technical advisor, he works closely with engineering and research teams on a range of topics including virtualized datacenter analytics, storage caching, security, resource management, and hardware support for processor-level QoS. Carl is active in the research community, and is currently serving as the program co-chair for FAST '17.

While at VMware, Carl led the design and implementation of processor scheduling and memory management for the ESX hypervisor, and was the architect for VMware's Distributed Resource Scheduler (DRS). Prior to VMware, he was a researcher at the DEC Systems Research Center. Carl holds a Ph.D. in computer science from MIT, for which he received the ACM Doctoral Dissertation Award.

Panelists

Emery Berger. Emery Berger is a Professor in the College of Information and Computer Sciences at the University of Massachusetts Amherst, where he co-directs the PLASMA lab (Programming Languages and Systems at Massachusetts) and is a regular visiting researcher at Microsoft Research. He is the creator of a number of influential software systems including Hoard, a fast and scalable memory manager that accelerates multithreaded applications (used by companies including British Telecom, Cisco, Credit Suisse, Reuters, Royal Bank of Canada, SAP, and Tata, and on which the Mac OS X memory manager is based); DieHard, an error-avoiding memory manager that directly influenced the design of the Windows 7 Fault-Tolerant Heap; and DieHarder, a secure memory manager that was an inspiration for hardening changes made to the Windows 8 heap. He is currently serving / surviving as Program Chair for PLDI 2016, and maintains his blood-caffeine level at roughly 0.94.

Abhishek Bhattacharjee. Abhishek Bhattacharjee is an

assistant professor in the department of Computer Science at Rutgers University. His research interests lie at the intersection of architectures and systems software. He received his PhD from Princeton University in 2010. His research is partly funded by an NSF Career award, and in the past, his work has been selected for IEEE Micro's Top Picks in Computer Architecture journal.

Kevin Pedretti is a Principal Member of the Technical Staff at Sandia National Laboratories in the Center for Computing Research. His research is centered on scalable system software for extreme-scale parallel computing platforms, with specific focus on lightweight operating systems, networking, and power management. He is the lead of the Kitten Lightweight Kernel project and is a collaborator on the Palacios Virtual Machine Monitor, which together are seeking to leverage virtualization to increase the functionality and flexibility of HPC system software stacks. Recent work has explored the use of lightweight virtualization to enable application composition, allowing discrete simulation, analysis, and tool components to be composed with one another across virtual machine boundaries.

Simon Peter. Simon is an assistant professor at the University of Texas at Austin, where he leads research in operating systems and networks. He received a Ph.D. in Computer Science from ETH Zurich in 2012 and an MSc in Computer Science from the Carl-von-Ossietzky University Oldenburg, Germany in 2006. Before joining UT Austin in 2016, he was a research associate at the University of Washington from 2012-2016. For his work on the Arrakis high I/O performance operating system, he received the Jay Lepreau best paper award (2014) and the Madrona prize (2014). He has conducted further award-winning systems research at various locations, including MSR SVC and Cambridge, Intel Labs, and UC Riverside.

Chris Rossbach. Chris Rossbach is a Senior Researcher at VMware Research Group, an Assistant Professor at the University of Texas at Austin, and an alumnus of Microsoft Research's Silicon Valley Lab. He received his PhD in computer science from The University of Texas at Austin in 2009. Chris' research focuses on operating system and architectural support for emerging hardware, particularly those that leverage concurrency. He is interested in concurrency in the broadest sense, but has a particular affinity for exploring abstractions that enable systems to take advantage of concurrency to improve performance and mechanisms that simplify the development of parallel programs.

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VEE '16, April 2-3, 2016, Atlanta, GA, USA.

ACM 978-1-4503-3947-6/16/04

DOI: <http://dx.doi.org/10.1145/2892242.2892249>