



IAP Newsletter Q1 2016

Carnegie Mellon Cloud Workshop - April 8, 2016

- The Carnegie Mellon Workshop is scheduled for Friday April 8, 2016 on the CMU campus in Pittsburgh. Expect a packed day of talks and posters from IAP members and CMU leaders in both ECE and CS <http://www.industry-academia.org/event-carnegie-mellon-cloud-workshop-2016.html>

IAP Student OpenStack Project at Cornell

- Prof Robbert van Renesse, Prof Hakim Weatherspoon, Dr. Weijia Song and several Cornell grad students in CS and ECE are contributing to the new cloud monitoring solution Kiloeyes. This is analogous to AWS Cloudwatch or Google Cloud Monitoring (Stackdriver). The students are working with Tong Li at IBM to add security features and agents to gather metrics from OpenStack Nova and Neutron, plus data visualization of metrics stored in Elastic Search using Kibana. This builds on the fine work by CMU grad students last year in the Liberty release - <http://www.industry-academia.org/student-projects.html>
- Let us know if you are interested to participate in an open source project next semester.

OpenStack Training for Professionals at CMU-Si Valley

- Earn a CMU Certificate at our next OpenStack workshop on Aug 15-18 <http://www.ini.cmu.edu/degrees/openstack/index.html>
- For info, please contact exec-ed-openstack@sv.cmu.edu

Other Recent and Upcoming Events

- RISC-V Workshop in Redwood Shores, CA, January 5-6, 2016. The RISC-V team won the Best Graduate Poster Award at our IAP Berkeley Cloud Workshop in February. Andrew Waterman released the technical report "Design of the RISC-V Instruction Set Architecture" - <https://aspire.eecs.berkeley.edu/publication/design-of-the-risc-v-instruction-set-architecture/>
- 22nd IEEE Symposium on High Performance Computer Architecture (HPCA), Barcelona, Spain, March 12-16 2016
 - Yang Li, Di Wang, Saugata Ghose, Jie Liu, Sriram Govindan, Sean James, Eric Peterson, John Siegler, Rachata Ausavarungnirun, and Onur Mutlu, "[SizeCap: Efficiently Handling Power Surges in Fuel Cell](#)"

Powered Data Centers" -

<https://users.ece.cmu.edu/~omutlu/projects.htm>

- Gennady Pekhimenko, Evgeny Bolotin, Nandita Vijaykumar, Onur Mutlu, Todd C. Mowry, and Stephen W. Keckler, "A Case for Toggle-Aware Compression for GPU Systems"
 - Onur Mutlu, "Reliability and Security Issues of DRAM and NAND Flash Scaling" - Memory Reliability Forum at HPCA
 - Mingyu Gao and Christos Kozyrakis, "Efficient and Flexible Reconfigurable Logic for Near-Data Processing" - How to achieve the area efficiency of coarse-grain reconfigurable logic and the power efficiency of fine-grain reconfigurable logic for data-intensive applications. - <http://csl.stanford.edu/~christos/papers.html>
 - Nathan Beckmann and Daniel Sanchez, "Modeling Cache Performance Beyond LRU" - <http://people.csail.mit.edu/sanchez/>
- 21st ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), Atlanta, GA, April 2–6, 2016
 - Xiaodong Wang and José Martínez, "ReBudget: Trading Off Efficiency vs. Fairness in Market-Based Multicore Resource Allocation via Runtime Budget Reassignment" - <http://csl.cornell.edu/~martinez/publications.html>
 - Anurag Mukkara, Nathan Beckmann, Daniel Sanchez, "Whirlpool: Improving Dynamic Cache Management with Static Data Classification"
 - Christina Delimitrou and Christos Kozyrakis, "HCloud: Resource-Efficient Provisioning in Shared Cloud Systems" - How to select between reserved and on-demand instances on cloud platforms.
 - Raghu Prabhakar, David Koeplinger, Kevin Brown, HyoukJoong Lee, Christopher De Sa, Christos Kozyrakis, Kunle Olukotun "Generating Configurable Hardware from Parallel Patterns" - How to generate optimized accelerators from domain specific languages.
 - Open Server Summit on April 13-14, 2015, Santa Clara Convention Center. See Keynotes and talks by IAP members including Cavium (Gopal Hegde), Cisco (Mark Nowell), and Samsung (Gunna Marripudi). <http://www.openserversummit.com>

Best Paper Awards

- Guowei Zhang, Webb Horn, Daniel Sanchez, "Exploiting Commutativity to Reduce the Cost of Updates to Shared Data in Cache-Coherent Systems" received the Best Paper Award at MICRO 2015.
- Mark C. Jeffrey, Suvinay Subramanian, Cong Yan, Joel Emer, Daniel Sanchez, "A Scalable Architecture for Ordered Parallelism" (also from MICRO 2015) received an IEEE Micro Top Picks 2015 award (a yearly selection of the 11

"most significant papers in computer architecture based on novelty and long-term impact")

- James Demmel, Laura Grigori, Mark Hoemmen, and Julien Langou, "Communication-Optimal Parallel and Sequential QR and LU Factorizations," 2016 SIAG/Supercomputing Best Paper Prize (published in SIAM Journal on Scientific Computing 2012). The SIAG/SC Best Paper Prize, established in 2015, is awarded to the authors of the most outstanding paper, as determined by the prize committee, in the field of parallel scientific and engineering computing.
<https://aspire.eecs.berkeley.edu/2016/03/professors-james-demmel-laura-grigori-mark-hoemmen-and-julien-langou-win-siagsupercomputing-best-paper-prize/>

Recent Books and Book Chapters

- Yakun Sophia Shao and David Brooks, "**Research Infrastructures for Hardware Accelerators**", *Synthesis Lectures on Computer Architecture*, Morgan & Claypool Publishers, November 2015.
- Aydın Buluç, Scott Beamer, Kamesh Madduri, Krste Asanović, and David Patterson, **Distributed-Memory Breadth-First Search on Massive Graphs**, In D. Bader, editor, *Parallel Graph Algorithms*, CRC Press, Taylor-Francis, 2016 - <http://www.cs.berkeley.edu/~sbeamer/research.html>

Campus Blogs and Magazines

- Cornell ECE Spotlight - José Martínez: "Reimagining computer architecture" - Feature article on Prof Martínez's research:
http://www.ece.cornell.edu/ece/news/spotlights.cfm?s_id=552&page=1

Milestones: ARM v8 Cloud Servers Are Live in the USA and France

- ARM 64 bit servers are accessible now via the internet. We are seeking ideas for projects (benchmarks, cloud workloads, etc.) and competitions that would be interesting for students enrolled in architecture and cloud computing classes next semester. Let us know if you have project ideas for a class or research group to tackle.
- The newest of these was announced on March 7 - the "Linaro Developer Cloud" is a virtual resource available to ISVs and other software developers who need access to a complete software stack running on enterprise-class 64-bit ARMv8 hardware. The Cloud will provide access to bare metal servers, virtualization, analytics, select applications and a management portal. The service will initially offer OpenStack with Debian and CentOS images running on ARM server platforms from Linaro/IAP members including Cavium and Huawei. <http://www.linaro.cloud>
- There is a cluster at U of Utah that uses AMCC Xgene 8-core SOC's with 64G Ram and 120G Flash. These can be used in bare metal mode with root access; they can also be accessed as a shared Unix machine, and as an OpenStack cluster. - <https://www.cloudlab.us/hardware.php#utah>

- There is a cluster in France at OVH.com that uses Cavium ThunderX 48-core. VM's can be selected from 1 to 24 cores (2GHz) & from 2 to 48 GB of RAM. - <https://www.runabove.com/armcloud.xml>

Copyright © 2016 Industry-Academia Partnership