



IAP Newsletter Q4 2015

Cornell Cloud Workshop – October 2

- Student Udit Gupta commented, “Attending the Cloud workshop was an amazing experience! It really introduced me to a lot of interesting challenges and innovative work being done in the field. All the presentations were engaging and instructive!”
- We received many other positive comments about this workshop. Please see a summary here of the workshop with quotes and photos - <http://www.industry-academia.org/event-cornell-workshop-2015.html>
- Relative to the 2013 Cornell Workshop: Student registration was up more than 50%, there were 16 technical presentations, and the number of industry talks more than doubled.
- The Career Fair was the most successful to date (of any venue), with some IAP Platinum members collecting more than 50 student resumes.
- Additional comments and links by attendees are posted on our LinkedIn Cloud Forum under the discussion "The IAP Cornell Workshop ..." <https://www.linkedin.com/groups/6629132>
- The presentations slides and videos are posted at the members site - <http://www.industry-academia.org/login.html>
- Thanks to the many speakers, IAP Advisor Prof. José Martínez for hosting and organizing, and to Dan Richter and the Cornell student IEEE chapter for their terrific support.

Carnegie Mellon Cloud Workshop – Save the Date - April 8, 2016

- The Carnegie Mellon Workshop is scheduled for Friday April 8, 2016 in Pittsburgh. Expect a packed day of talks and posters from IAP members and CMU leaders in both ECE and CS (Prof. Garth Gibson, Greg Ganger, Andy Pavlo, our host Onur Mutlu, and many others) <http://www.industry-academia.org/event-carnegie-mellon-cloud-workshop-2016.html>

IAP Student Project Released in OpenStack Liberty on October 15

- Students at CMU collaborated with IBM for two semesters on a new cloud monitoring solution named Kiloeyes. This is analogous to AWS Cloudwatch or Google Cloud Monitoring (Stackdriver). The students worked with Tong Li at IBM to build out multiple micro services for alarm detection, notification and anomaly detection. Kiloeyes uses Kafka as a front end and Elastic Search as the db - <http://www.industry-academia.org/student-projects.html>

- Dr. Brad Topol, IBM Distinguished Engineer, OpenStack commented, “Thank you to the IAP and CMU team for their hard work and attention to detail. This was an outstanding collaboration with fantastic results!”
- Let us know if you are interested to participate in an open source project next semester.

OpenStack Training for Students and Professionals at CMU-Si Valley

- 24 students and professionals earned a CMU Certificate at our last OpenStack workshop on Aug 10-13
<http://www.ini.cmu.edu/degrees/openstack/index.html>
- For info on upcoming workshops, please contact exec-ed-openstack@sv.cmu.edu

Other Recent and Upcoming Events

- Software Defined Infrastructure Summit on December 2-3, 2015, Santa Clara Convention Center. See Keynotes and talks by IAP members Altera (Mike Strickland), Cisco (Errol Roberts), IBM (Nick Werstiuk, Clod Barrera), and SanDisk (Allen Samuels). Their presentations and the full proceedings are available for download on the Summit site <http://www.sdisummit.com>
- 48th Annual IEEE/ACM International Symposium on Microarchitecture, 2015. December 5-9, 2015 MICRO-48 Waikiki, Hawaii.
<http://www.microarch.org/micro48/>
 - Multiple papers by IAP Advisors Prof. Onur Mutlu and Prof. Daniel Sanchez.
 - IAP Advisor Prof. David Brooks and Svilen Kanev (Harvard) and Prof. Chris Batten (Cornell) are leading the “2015 Workshop on Negative Outcomes, Post-mortems, and Experiences (NOPE)”
 - Prof. Onur Mutlu is the keynote speaker at NoArc “Rethinking Memory System Design (along with Interconnects)”
 - Prof. Sanchez is conducting a tutorial on his team’s fast and accurate architectural simulator (www.zsim.csail.mit.edu)
- 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. <http://www.riscv.org>

Other Notable Cloud-Related Talks

- “SOSP History Day” at the 25th ACM Symposium on Operating Systems Principles, Monterey, CA, Oct 4-7 offered a day of fascinating talks, including Prof. Ken Birman, “**Evolution of Fault Tolerance**”, Prof. Dave Patterson, “**Past and Future of Hardware and Architecture**”, Prof. Mahadev Satyanarayanan (Satya), “**Evolution of File and Memory Management**”, plus several talks by MIT CSAIL professors and many who were leaders in OS R&D in the 60’s and 70’s
<http://sigops.org/sosp/sosp15/history/index.html>

- Zheng, Qing, Kai Ren, Garth Gibson, Bradley W. Settlemyer, Gary Grider, "**DeltaFS: Exascale File Systems Scale Better Without Dedicated Servers**". Proc. of the Tenth Parallel Data Storage Workshop (PDSW15), co-located with the Int. Conference for High Performance Computing, Networking, Storage and Analysis (SC15), Austin, TX, November 2015. <http://www.pdsw.org/pdsw15/papers/p1-zheng.pdf>

Best Paper Awards for Students

- Scott Beamer, Krste Asanović, and David Patterson, "**Locality Exists in Graph Processing: Workload Characterization on an Ivy Bridge Server**", IEEE International Symposium on Workload Characterization (IISWC-2015), Atlanta, October 2015 - **Winner Best Paper Award** <http://www.cs.berkeley.edu/~sbeamer/beamer-iiswc2015.pdf>
- Mohammad Fattah, Antti Airola, Rachata Ausavarungnirun, Nima Mirzaei, Pasi Liljeberg, Juha Plosila, Siamak Mohammadi, Tapio Pahikkala, Onur Mutlu, and Hannu Tenhunen - "**A Low-Overhead, Fully-Distributed, Guaranteed-Delivery Routing Algorithm for Faulty Network-on-Chips**" *Proceedings of the 9th ACM/IEEE International Symposium on Networks on Chip (NOCS)*, Vancouver, BC, Canada, September 2015 - **One of the three papers nominated for the Best Paper Award by the Program Committee.** https://users.ece.cmu.edu/~omutlu/pub/maze-routing_nocs15.pdf
- Guowei Zhang, Webb Horn, Daniel Sanchez, "**Exploiting Commutativity to Reduce the Cost of Updates to Shared Data in Cache-Coherent Systems**", *Proceedings of the 48th annual IEEE/ACM international symposium on Microarchitecture (MICRO-48)*, December 2015 (to appear) - **One of the three papers nominated for the Best Paper Award by the Program Committee.** <http://people.csail.mit.edu/sanchez/papers/2015.coup.micro.pdf>

Other Recent Papers

- Mingyu Gao, Grant Ayers and Christos Kozyrakis, "**Practical Near-Data Processing for In-memory Analytics Frameworks**", Proceedings of the 24th International Conference on Parallel Architectures and Compilation Techniques (PACT), San Francisco, CA, October 2015. <http://csl.stanford.edu/~christos/publications/2015.ndp.pact.pdf>
- Christina Delimitrou, Daniel Sanchez, Christos Kozyrakis, "**Tarcil: Reconciling Scheduling Speed and Quality in Large Shared Clusters**", Proceedings of the ACM Symposium on Cloud Computing (SOCC), Kohala Coast, HI, August 2015. <http://csl.stanford.edu/~christos/publications/2015.tarcil.socc.pdf>
- Scott Beamer, Krste Asanović, and David Patterson, "**GAIL: The Graph Algorithm Iron Law**", *To appear*, 5th Workshop on Irregular Applications: Architectures and Algorithms (IA3-2015), at the International Conference for High Performance Computing, Networking, Storage and Analysis

(Supercomputing'15), Austin, Texas, November 2015.

<http://www.cs.berkeley.edu/~sbeamer/beamer-iaaa2015.pdf>

- Onur Mutlu and Lavanya Subramanian, "**Research Problems and Opportunities in Memory Systems**" *Invited Article in Supercomputing Frontiers and Innovations* (www.SUPERFRI.org), 2015.
- Jinglei Ren, Jishen Zhao, Samira Khan, Jongmoo Choi, Yongwei Wu, and Onur Mutlu, "**ThyNVM: Enabling Software-Transparent Crash Consistency in Persistent Memory Systems**", *Proceedings of the 48th International Symposium on Microarchitecture (MICRO)*, Waikiki, Hawaii, USA, December 2015. https://users.ece.cmu.edu/~omutlu/pub/ThyNVM-transparent-crash-consistency-for-persistent-memory_micro15.pdf

Other Student Awards

- Nathan Beckmann (Prof. Daniel Sanchez) finished his PhD and received the George M. Sprowls award for best PhD thesis in computer science at MIT. <http://www.eecs.mit.edu/news-events/announcements/fall-2015-best-thesis-awards>

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.
- 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>