

Energy Efficient High Performance Computing Working Group 12/11/18 Meeting Report

INTRODUCTION

The Energy Efficient High Performance Computing Working Group (EE HPC WG) held a meeting on 12/11/18. This Working Group is composed of members representing major governmental departments and independent agencies, private sector representatives, and members of the academic community. More information can be found at the working group's website, <https://eehpcwg.llnl.gov/>.

NEXT MEETING: Tuesday, February 12th, 2019 9:00-10:00AM Pacific Time

Introductions and Announcements: *Natalie Bates, EE HPC WG & Anna Maria Bailey, Lawrence Livermore National Laboratory*

Announcing the creation of two new teams; 1. Operational Data Analytics Team and 2. Liquid Cooled Server Rack Specification Team.

Conferences Sub-group Update: *Torsten Wilde, Hewlett Packard Enterprise and Siddhartha Jana, Intel*

7x24 conference

- 7x24 Conference was held in Phoenix in October and Dale Sartor moderated a panel on “Lessons Learned in Establishing Metrics, Setting Goals, and Achieving High Data Center Energy Performance”. Panelists were from Digital Realty Trust, Intel, Lawrence Livermore, and Lawrence Berkeley National Labs.
- Panel: <https://datacenters.lbl.gov/resources/establishing-metrics-setting-goals-and>
- Conference link: <https://www.7x24exchange.org/event/7x24-exchange-fall-2018-conference/>
- List of papers on Energy Eff of data center hosted on Lawrence Berkeley server: https://datacenters.lbl.gov/resources/presentations?field_resource_types_tid%5B0%5D=14&order=field_resource_date&sort=desc

International Green and Sustainable Computing Conference

- IGSC was held in October and the PowerAPI Team organized a workshop at this conference. Invited talks -- Power Mgmt w/ SLURM + PowerAPI, PowerAPI for Cray CX machines, PowerStack, GEOPM; panel discussion and open source software stacks
- IGSCC link : <https://www.igscc.org/workshops>
- PEMES link: <https://sites.google.com/site/pemesworkshop/home>

SC18

SC18 workshop link: <https://sc18.supercomputing.org/session/?sess=sess141>

Presentations: https://eehpcwg.llnl.gov/conf_sc18.html

Survey link: <https://www.surveymonkey.com/r/NZJYYHT>

The EE HPC WG had a very strong presence at SC18 with a full-day Workshop, six Birds of Feather, a Technical Paper, the Exhibitor Booth and a Panel Session. All of the sessions were well attended and generated good participation.

**** Workshop**

- We only had four respondents to the survey asking for feedback on the workshop. Everyone is encouraged to complete the survey as feedback helps to make the workshop a very valuable event. <https://www.surveymonkey.com/r/NZJYYHT>

- Attendance was comparable to recent prior years with a full room most of the day, mostly all-day participants but some who were attending multiple events and targeted specific sessions.

BoF: Total Cost of Ownership and HPC System Procurement

- Excellent presentations from Supercomputing Centers in the United States, Germany and Japan that were all focused on aspects of HPC system procurement that are related to the facility.

BoF: The Facility Perspective on Liquid Cooling: Experiences and Proposed Open Specification

- Great feedback from both the panelists and the audience on a proposed liquid cooling specification.

BoF: Power API and Redfish: Standardizing Power Measurement and Control for HPC

- The discussion was very lively and interesting with an opportunity for key players in these two standards organizations to further build relationships and coordinate.

BoF: State of the Practice: Energy and Power Aware Job Scheduling and Resource Management (EPA-JSRM)

- Strong attendance; the room was packed. The discussion continued in the hall after the BoF. Presentations went a bit long without much time for discussion during the BoF.

BoF: The Green500: Trends in Energy-Efficient Supercomputing

- This BoF is repeated every six months - alternating between ISC and SC. There were three presentations on L2/L3 power measurements.

BoF: Data Analytics for System and Facility Energy Management

- Great attendance, presentations and audience participation. Especially for a Thursday afternoon session, this BoF was very well executed.

BoF: PowerStack

Working groups on site policy <--> job scheduler <--> runtime <--> platform level interaction

Engineering driven research -- goal is to keep prototyping efforts on. Self-imposed milestone deadline -- mid June 2019

Panel: Software Improvements from Power/Energy Measurement Capabilities

- This is the second year we've had this panel. It was well attended and there was strong audience participation. Sid Jana is working with Inside HPC to publish a recording of the Panel Session.

Technical Paper:

The EPA JSRM Team presented a paper at a workshop held in conjunction with SC18.

Workshop on Data Center Automation, Analytics, and Control (DAAC)

“Energy and Power Aware Job Scheduling and Resource Management: Global Survey --- An In-Depth Analysis”

https://sc18.supercomputing.org/presentation/?sess=sess169&id=ws_daac102#038;id=ws_daac102

EE HPC WG Booth

The location was great and the booth was staffed by lots of volunteers. It also provided a meet-up and discussion location for members. We also recruited ~15 new members from the booth.

HPCAsia

There is an HPCAsia workshop “Benchmarking in the Data Center”. January 14-16, Guangzhou, China.

Link: <http://parallel.computer/>

ISC19

The research paper submission deadline extended for ISC19: December 19th, 2018.

Other event deadlines in Feb 2019

There are several research areas that include energy and/or power management and efficiency.

These include power and energy management and scheduling, energy efficient algorithms, power consumption, and energy measurement and modeling

Link: <https://www.isc-hpc.com/press-releases/the-entire-isc-2019-contributed-program-is-now-open.html>

ICPP

We have made a workshop submission to ICPP, which – if accepted- will be held in Kyoto n August 5th. The title of the workshop is EE HPC SOP, for Energy Efficient HPC State of the Practice. It is intended to be a paper workshop, but focused on state of the practice and not research. It is also centrally focused on practices and technologies that span both the infrastructure and HPC systems.

Paper at SUSCOM published online for Dec 2018

Small scale to extreme: Methods for characterizing energy efficiency in supercomputing applications

Andrew J.Younge, Ryan E.Grant, James H.Laros, Michael Levenhagen, Stephen L.Olivier, KevinPedretti, LeeWard

<https://www.sciencedirect.com/science/article/pii/S2210537918301021>

Other Conferences

The EE HPC WG website has a links and events page with many other conferences and workshops listed that have an HPC energy efficiency focus.

Events link: <https://eehpcwg.llnl.gov/events.html>

Conf link: <https://eehpcwg.llnl.gov/conf.html>

Infrastructure Sub-Group Update: *David Grant, Oak Ridge National Laboratory and Dave Martinez, Sandia National Laboratory*
and

Systems Sub-group Update: *Natalie Bates, EE HPC WG and Jim Laros, Sandia National Laboratory*

The team updates for the Infrastructure and Systems Sub-group is contained in a separate document. This document is a presentation named “Team Update Dec Gen Mbr Mtg”.

PARTICIPANTS INCLUDED

Name	Organization
Natalie Bates	EE HPC WG
Siddhartha Jana	Intel
Ted Kubaska	Independent
Dale Sartor	LBNL
Ryan Grant	Sandia NL
Robert Sty	M&W
John Dicus	DOE HQ
Brett Kettering	LANL
Jessica Gullbrand	Intel
David Sickinger	NREL
Kevin Carroll	DOE HQ
Shlomo Novotny	Independent
Alexander Moskovsky	RSC
Matt Koukl	AEI Engineering
Roy Wu	Coolanyp