Energy Efficient High Performance Computing Working Group
4/9/13 Meeting Report

INTRODUCTION

The EE HPC WG held a meeting on 4/9/13. This Working Group is composed of members representing major Federal departments and independent agencies, private sector representatives, and members of the academic community. More information can be found at the working group's website, http://eehpcwg.lbl.gov.

Documents from the group can be found at https://docs.google.com/leaf?id=0BzyTVVVRdMKpNWVjNTI5YTEtMTllZi00YTA5LTlkMTYtZmY3ZDIyZjJjZmMy&hl=en.

NEXT MEETING: June 11th, 9:00-10:00AM Pacific Time

NEXT Scheduled WEBINAR: June 6th, 9:00-10:00AM Pacific Time
Hubert Huber from LRZ & Ingmar Meijer from IBM Research will present on some of the energy efficiency highlights of the Leibniz Supercomputing Center, including warm water cooling and contractual specialties. This presentation was given at the SC12 EE HPC WG Workshop.

Introductions and Announcements: *Natalie Bates & Dale Sartor, LBNL*

- New members have been added and at last count we were at 338 members.
- We had two webinars since the last meeting; Mike Patterson on Metrics and Steve Hammond on NREL's data center.
- We sent out a questionnaire soliciting feedback from the membership to better understand the interests, abilities and potential level of contribution of our members. Many of you participated and Natalie presented some of the results. A special thanks to all those who participated, your input is invaluable. The results are posted on the working group's website, http://eehpcwg.lbl.gov.

Conferences Sub-group Update: *Anna Maria Bailey & Marriann Silveira, LLNL*

1. Bill Tschudi and Wu Feng hosted Alliance Round Tables with a focus on HPC energy efficiency. Wu also participated in the Exascale Panel along with Terri Quinn from LLNL and a few others. The Panel was taped and aired on insideHPC http://insidehpc.com/2013/04/05/video-panel-discussion-on-exascale-computing-and-hpc-energy-efficiency/

➢ **News on EE HPC WG participation in upcoming Conferences**

- SC13 Supercomputing Conference will be held in Denver from November 17-22.

The SC13 Workshop submission was accepted. We asked for 1.5 days- and got it! Last year we also asked for 1.5 days, but only received one day. This will be on Sunday and 1/2 day Monday.

- The International Supercomputing Conference, ISC13, will be held in Leipzig, Germany from June 16-20. Our ISC13 BoF was accepted for the System Metric team to cover the power measurement methodology. Wu Feng and Michael Patterson will be attending the conference and will help organize and run the BoF. Also, a paper authored by members of the EE HPC WG on Total Usage Effectiveness with an ORNL case study was accepted by ISC13 and will be presented by Michael Patterson.

- Another paper on Dashboards also authored by members of the EE HPC WG was accepted by the High Performance Power Aware Computing Workshop, to be held in Boston in May. Natalie Bates will attend that workshop and present the paper.

➢ **Submissions that are planned or in the works**.

The SC13 Paper submission deadline was extended. Abstracts are due April 19th and Full Papers are due April 26th. The System Metrics team is planning on making a paper submission.

The SC13 BoF deadline is July 31st. We will probably submit at least one BoF, but won't decide until closer to the deadline.

We mentioned last month that the System Metrics team was contemplating submitting a tutorial, but decided not to submit any tutorials. The Workshop and BoF format is better than a Tutorial for the kind of innovative work we'd be presenting.

Future Conferences: (more details at http://eehpcwg.lbl.gov/events-and-links)

- ❖ Eighth IEEE Workshop on High-Performance, Power-Aware Computing (HP-PAC), May 20, 2013 Boston, Massachusetts USA
- ❖ ISC13, June 16-20, Leipzig, Germany
- ❖ Collaborative and Autonomic Green computing, track 22 IEEE International Conference on Collaboration Technologies and Infrastructures. Hammamet, Tunisia June 17-20, 2013
- ❖ Fourth International Green Computing Conference, June 26-29, 2013 Arlington, Virginia USA Workshop, Tutorial submission: TBD
- ❖ IEEE GreenCom2013, Aug 20-24, 2013, Beijing, China. Paper submission: Apr 10, 2013
- ❖ International Conference on Energy Aware High Performance Computing, September 2-3, 2013 Dresden, Germany. Paper submission: 26 April 2013
- ❖ Energy-Efficient High Performance Computing & Communication Workshop, September 17, 2013, Madrid, Spain.
- ❖ SC13, November 17-22, 2013 Denver, Colorado

The EE HPC WG website Links and Events page lists many upcoming Conferences and Workshops that have an HPC Energy Efficiency Focus

Infrastructure Sub-Group Update: ***William Tschudi, LBNL & Dave Martinez, LBNL***

- **LIQUID COOLED COMMISSIONING:** Dave Martinez is continuing to lead a team focused on developing best practices for commissioning infrastructure for liquid cooled HPC systems. The team is in the process of reviewing examples of existing commissioning plans. They have material from NREL, LLNL, LRZ, ORNL and NCSA.

- **DEMAND RESPONSE AND ELECTRIC GRID INTEGRATION:** The demand response team has completed the problem definition phase. They recognize that HPC data centers can participate in grid-integrated energy management as well as affect and get affected by power quality. Their immediate output is to develop a whitepaper that provides a state of the practice survey of strategies for implementing HPC data center demand response. They target completion of the whitepaper by the end of October '13.

- **DASHBOARD TEAM:** The Dashboard paper was accepted and will be presented at the High Performance Power Aware Computing Workshop. The workshop will be held in Boston on May 20th. The paper will be published as part of the IEEE Conference proceedings (27th IEEE International Parallel & Distributed Processing Symposium). Natalie Bates will attend and present the paper.

- **TUE TEAM:** The TUE paper was also accepted and will be presented at the International Supercomputing Conference (ISC'13). This conference will be held in Leipzig, Germany in mid-June. This paper will also be published as part of the IEEE Conference proceedings. Mike Patterson will attend and present the paper.

- **ENERGY REUSE EFFECTIVENESS:** Still looking for a site that will help test the ERE metric. Please contact Natalie if you are interested.

Compute System Sub-group Update: *Natalie Bates, LBNL*

POWER MEASUREMENT METHODOLOGY:
As reported in last month's general meeting, we completed beta testing of the power measurement methodology. No show stoppers were identified as a result of the beta testing. There were, however, several major change requests that are a carryover from the alpha testing. The top one being whether or not to include an idle power measurement as part of the 'workload'.

After considerable discussion and survey feedback, almost everyone agreed that understanding system idle is important and warrants measurement. The results were divided on whether or not to include idle measurements as part of any workload. Half of the respondents voted as #1 that idle should be measured and reported before and after the workload run. Many others responded that 'idle = idle' only under very specific circumstances and there are many conditions that affect idle energy consumption. The decision was taken to make idle its own workload. Idle can be measured once, at any time. Reporting an idle measurement will be required for a L3 submission for HPL as well as for any other workload (like the Graph500). The methodology for measuring energy/power during idle will be the same as that used for measuring energy/power for during the HPL run.

MEMORY WORKLOAD/BENCHMARK:
We still intend to kick off a new team to address the question of additional workloads that stress the other sub-systems - like memory, Storage and Communication.

RFP CONSIDERATIONS:

On-going work in generating a guideline for RFP/RFI's that will address- among other things- the power measurement and management capabilities desired of HPC systems.

PARTICIPANTS INCLUDED

Name	Organization
Abdulla, Ghaleb	LLNL
Bailey, Anna Maria	LLNL
Bates, Natalie	LBNL
Campbell, Matt	SDSC
Chung-Hsing, Hsu	ORNL
Cocilova, Anita	LLNL
Elliott, John	LBNL
Harrington, Steve	Flometrics
Huber, Herbert	LRZ
Martinez, Dave	LBNL
Patterson, Mike	Intel
Richman, Jim	Institute for Defense Analysis
Sartor, Dale	LBNL
Tschudi, Bill	LBNL
Siebold, Larry	Seibold Systems
Silveira, Marriann	LLNL
Sines, John	LLNL
Wescott, Ralph	PNNL