Energy Efficient High Performance Computing Working Group
10/08/2019 Meeting Report

NEXT MEETING: Tuesday, February ?th, 2020 9:00-10:00AM Pacific Time

ANNOUNCEMENTS:
Luigi Brochard announced that he and other colleagues just wrote a book that has been published by Wiley about the work that they did while at IBM and Lenovo on HPC and energy efficiency. The book is called "Energy Efficient Computing and Data Centers". It covers both the server and the data center perspective as well as energy re-use.
https://onlinelibrary.wiley.com/doi/book/10.1002/9781119422037

Michael Ellsworth announced that ASHRAE is writing a whitepaper that will cover how liquid cooling has actually been done in the past from an application stand-point. It is intended to be an educational document. There are still a lot of people who are afraid of liquid cooling, so this document will talk about what it is and why it is safe and why people should consider using it going forward, It is not a 'how to' guide.

TEAM UPDATES

Ryan Grant reported on the PowerAPI team. For those who aren't familiar, the PowerAPI is a standardized interface for the underlying hardware for power and energy measurements, monitoring and management that might be used for things like power caps. The purpose of this standardized interface is for ease of implementation and portability of applications that use these capabilities. A PowerAPI face to face meeting is scheduled for October 22nd in Minneapolis. The primary audience for this meeting is the technical committee interested in the specifics of the PowerAPI document. There will be some discussion of where the PowerAPI fits in a broader space of power saving techniques and data centers. For anyone who isn't currently on the PowerAPI mailing list but would like to participate, please let Ryan know. The goal of that meeting is to ratify a new version of the PowerAPI document and to define a path forward. The path forward includes collaborating with other projects, elaboration of the current PowerAPI document for things like interfaces with schedulers and resource managers. A Power API Birds of Feather (BoF) is also scheduled for SC19. This BoF will give an overview of PowerAPI and discuss where it fits strategically within the broader space.

Michael Ott reported on the Operational Data Analytics (ODA) Team. There is a BoF scheduled for SC19 where there will be 30 minutes of presentations from LBNL, ENI and RIKEN and another 30 minutes for discussion. The Team also has a one hour session in the SC19 EE HPC WG Workshop where we will present preliminary results on the global site survey we have been conducting. We will talk about why we created the ODA Team, the methodology used for the survey, what are the lessons learned and then have 25 minutes left for discussion. The team has still been working on the global site survey and has recently completed a questionnaire and interview with ORNL. We are still planning to complete a questionnaire and interview with LLNL and LANL. We have also been synthesizing and analyzing the results from the global site survey. This is quite an effort as there is a lot of information from each site in the questionnaires

and interviews and the more open-ended data collection process makes comparisons challenging, The sites interpreted the questions differently, some are concise and others more verbose. It probably warrants more follow-up and questions.

Chris Deprater reported on the Cooling Controls Team. This is a new Team that is using case studies to share control strategies, different control systems and their environments. We focus on a description of the system, what has worked well, what could have been done differently and what are the lessons learned, The case studies are the initial deliverables for this Team, but we may come up with a document that describes requirements or standards for different systems. The Team has met twice and turn-out has been very strong. There seems to be a lot of interest in the Team. We meet twice a month, every other week on Tuesday. This Team has submitted a case study for publication at the SC19 Data Center Analytics Automation and Controls (DAAC) Workshop. Notification of acceptance (or not) is expected shortly.

Natalie Bates reported on the Power Measurement Methodology Team. This Team is a collaborative effort with the Green500 and the Top500 to promote and encourage the use of a high quality power measurement methodology for use while running a system benchmark, like MPLinpack. There are three levels of measurement quality; L1-L3 with L3 producing the most accurate measurements. We are always looking for sites that have taken L2 or L3 measurements and would like to report on their experiences at either the SC or ISC BoF sessions.

Natalie Bates reported on the Procurement Considerations Team. This Team has written a document that is intended to provide suggestions for energy efficiency to consider when writing procurement documents for HPC systems. The document was first published in 2013 and has been updated several times. Another update is close to being ready for publication. This update provides an update to the format of the document that should make it much more readable. It also includes an update to the cooling section of the document. Finally, it includes a new section that describes facility integration. We are soliciting and have received feedback on this latest version of the document from Cray, HPE, Intel and the PowerStack Initiative. We welcome further participation and feedback. This Team also has an SC19 Birds of Feather. There will be presentations from NASA, AIST and CINECA, followed by a discussion.

Torsten Wilde and Sid Jana reported on the Conferences Sub-Group. The SC19 Workshop agenda has been finalized; we have a keynote speaker and most all of the other session speakers are finalized. Jeff Broughton, LBNL/NERSC is the keynote speaker. This is followed by the State of the Working Group, which is an update on the WG Teams. The other two morning sessions are on the Electricity Grid and Novel Cooling Technologies and Experiences. The afternoon sessions are on Exascale Challenges at three sites (ORNL, RIKEN and CINECA), a panel and some experiences on Silicon Manufacturing Variability and a final session on Operational Data Analytics. In addition to the Workshop, we four Bofs, a booth, and a panel on HPC, Big Data and AI: Computing Under Constraints.

Sid Jana then reported that prior to SC19, there will be a PowerStack seminar.
Face-to-face: HPC PowerStack (scheduled on the week prior to SC19 in Colorado)
https://hpcpowerstack.github.io/powerstack-nov19.html