One-Day Symposium on Energy Efficiency Challenges for HPC Systems

Date: 17 May 2019
Venue: C-DAC Knowledge Park, Bengaluru - 560038

PREAMBLE

The designing of High-Performance Computing (HPC) System has multidimensional challenges. Especially, Power and energy efficiency is one of the significant challenges in the burgeoning path of Exascale system. Excessive power consumption is a key limitation for further scaling of HPC Systems. Hence, an Adaptive Power Management Framework is essential for HPC System design and operation for better energy efficiency. Self-awareness, autonomous decision-making and the ability to characterize workloads online, the provision of pluggable control algorithms and provision of a fine-grained spatial and temporal power measurement empowered with seamless visualization and powerful analytics techniques are the essential aspects of an efficient power management system. Furthermore, Energy and Power-Aware Job Scheduling and Resource Management are also crucial for improving energy efficiency. In addition, Artificial Intelligence (AI) is going to be crucial in the next-generation HPC System operations and management. In particular, reinforcement learning (RL) based control algorithms can be significant for effective power management.

Achieving Exaflop performance within the 20-megawatt of targeted power consumption is a very daunting task. Moreover, the high variability in loads due to recurrent transition between phases of computation of HPC applications requires different power levels at a different timeline. Multi-MW step variations in loads would affect the entire ecosystem which includes power grid and utilities as well. In this perspective, the integration, coordination and orchestration of HPC facilities and the Power Grid have become crucial for reducing energy costs and carbon emissions. The Power Variability Prediction Models would be very important in this regard.

The key objective of this symposium is to provide a platform for researchers, academicians and industry to share their thoughts and to give their insights in building the next generation energy-efficient HPC Systems. C-DAC would like to take the viable approaches forward to build energy-efficient HPC System under the National Supercomputing Mission (NSM).

FOCUS AREAS

- Adaptive Runtime System & Power Management Framework for HPC
- Novel control algorithms for optimizing energy consumption for parallel workloads
- Energy and Power-Aware Job Scheduling and Resource Management
- Effective Visualization and powerful Analytics Techniques for HPC workload
- Power Variability Prediction Models and Protection Mechanism for Grid Stability due to variability in loads

EXPECTED LEARNING

- Energy Efficiency Challenges in Parallel Computing
- The need for fine-grained workload characterization and Application-Aware Power Profiling of parallel workload
- The need for Energy and Power-Aware Job Scheduling and Resource Management
- Current state-of-the-art technologies for Adaptive Power Management, Visualization and Analytics in HPC
- The need for HPC and Power Grid Integration and associated challenges

REGISTRATION FEES:

Category	Amount (INR) Incl. GST
Non IEEE Member	₹ 2500
IEEE Member	₹ 2000
Non IEEE Faculty/Student Member	₹ 1500
IEEE Faculty/Student Member	₹ 1000

REGISTRATION DETAILS:

Registration from 15 March 2019
Registration closes by 15 May 2019

MODE OF PAYMENT:

Registration fee should be sent through DD in favour of "C-DAC Bengaluru", payable at Bengaluru along with the completely filled online registration form available at:
https://goo.gl/UEVpdh
OR through RTGS/NEFT/IMPS

COORDINATOR:

Sumit Kumar Saurav

VENUE:

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