Internship Project title :
Energy Efficient computing with EAR on applications using GPUs

Type of internship:
Research and development

Name of the supervisors from SURFsara
Sagar Dolas (Supervisor)

Start date : 15/07/2020 End Date : 15/01/2021

Brief Description of the internship

We are presently in collaboration with EAR-BSC team for evaluating policies present in the EAR framework and enabling energy aware computing on supercomputing infrastructure for HPC applications. EAR software is a management framework optimizing the energy and efficiency of a cluster of interconnected nodes. To improve the energy of the cluster, EAR provides energy control, accounting, monitoring and optimization of both the applications running on the cluster and of the overall global cluster.

This internship / Msc thesis will focus on evaluating CPU-GPU interaction, understand opportunities to reduce energy for applications running on GPU with benchmarks and coming up with policy and strategic recommendation to include them back into EAR framework.

The objective of the internship / MSc thesis is to

1. Provide holistic literature research on the topic.
2. Perform experimental studies to understand CPU-GPU interaction and opportunities to reduce energy while computing on GPUs with benchmarks.
3. Productize the recommendation into the independent tool such that it is then easy to integrate the ideas back into EAR tool.

Task List:(~ 6 months)

T1 : Literature research
T2 : Design of experiments and getting acquainted with the software framework
T3 : Perform experiments and finalize strategies and recommendations
T4 : Integrate the strategies back into independent software tool
T5 : Disseminate the research work with presentation, workshop or webinar session to the community.

Candidate Profile :

- Familiarity with programming and compiling C/C++ and Fortran applications
- Familiarity with programming and compiling applications on GPUs
- Basic knowledge of software engineering design principles
- Interest in high performance computing
- Interest in green computing
- Good communication and presentation skills