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Laurent Lefevre and François Rossigneux, Inria contributors.

How would you present the XLcloud project?

XLCloud promotes the concept of HPC as a service. The Inria Avalon team contributes in providing energy reporting, resrources reservation and energy efficient frameworks able to support « Green HPC as a service ».

What is your role in the project?

Inria Avalon has mainly contributed to the activites concerning energy efficiency of the XLCloud architecture. We have worked with Bull on the design of the Climate (now renamed Blazar) reservation framework for OpenStack. More information : http://greencloud.ens-lyon.fr/xlcloud/

What key innovation do you bring or help to develop?

We developed and contributed to two main projects to improve HPC energy efficiency:
- Kwapi, a tool designed to collect power consumption from various wattmeters.
- Climate/Blazar, a resource reservation service with an efficient scheduling algorithm.

Kwapi is a distributed and modular framework supporting various wattmeters (IPMI, Eaton PDU, Wattsup, etc). It is organized around a bus and is able to monitor thousand nodes. The measurements are processed by different plugins (chart, log, API).

Blazar is a resource reservation service allowing the user to book physical machines. It supports immediate and in advance reservations. It provides a mono-tenancy environment with homogeneous performances suitable for HPC applications. The compute nodes are selected according to their efficiency. The efficiency metric is a mix of the power consumption, collected with Kwapi, and the performance index given by an Unix bench. Each new machine added to the cloud is benchmarked, because we observed that for two identical CPU, the consumption may vary up to 20%.

Our contribution to this project helped to reduce the power consumption of HPC datacenters without performance degradation.

A word about yourself and your organization.

We are part of the Inria Avalon working group, from the LIP in Ecole Normale Superieure of Lyon. Our team works on the design of models, systems, and algorithms to execute applications on distributed resources while ensuring constraints (price, energy, performance, etc.). We are more specifically working on energy efficiency of large scale distributed systems (datacenters, HPC, Clouds).

Author Biographies:

Laurent Lefevre is a permanent researcher in computer science at Inria (the French Institute for Research in Computer Science and Control). He is a member of the Avalon team (Algorithms and Software Architectures for Distributed and HPC Platforms) from the LIP laboratory in Ecole Normale Supe´rieure of Lyon (France). He has co-authored more than 100 papers published in refereed journals and conference proceedings. He has leaded and participated in several french, european, and international funded research projects on energy efficiency in large scale distributed systems (datacenters, clouds and networks).
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Francois Rossigneux is an Inria engineer working on the energy efficiency aspects of the XLCloud project since January 2013.