UBIVERTEX - Letter of Intention

Company

Name: SysFera S.A.   Country: France

Activity domain: Software edition for the management of heterogeneous and distributed HPC resources

Number of employees: X <50   ☐ <250   ☐ > 500

Scientific contact

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Challenge descriptions:

SysFera is a company providing software solutions for the management and mutualization of heterogeneous and distributed (multi-cluster, multi-sites) HPC infrastructures, dedicated to intensive applications. SysFera's solutions allow the users of these applications to have a private cloud easy to install, use and monitor in a reliable and efficient way.
SysFera develops and distributes SysFera-DS, a software suite that offers a simple, efficient, evolutive and transparent way to make using HPC resources easier and faster for end-users and administrators.

SysFera has identified several challenges that could benefit from a virtualized platform such as the one proposed by the UBIVERTEX project.

Data management in virtualized infrastructures:
Data management in distributed environments is a major problem for resource sharing and distributed computing. Each application has specific needs regarding the access or production of data, e.g., large quantities of small (a few kilobytes) data, or large (several terabytes) data. When using heterogeneous and distributed computing platforms, the storage resources (e.g., RAM, local drive, remote drive, virtualized storage) and the network links have widely disparate performance and size. It is thus necessary to adapt the policies for data movement, replication and positioning according to the applications' requirements as well as the underlying platform's possibilities, in order to minimize the simulations' execution time. UBIVERTEX will help to develop and validate data management algorithms in a virtualized environment. The key virtualized elements for this challenge are mainly storages and networks.

Task management in virtualized infrastructures:
Task management in distributed environments is a complex and major problem for resource sharing and distributed computing. Many constraints have to be solved to be able to efficiently run an application on a distributed

environment. Virtualization has leveraged some of them, as the dependency to hardware is removed. However, several problems still remain: we still need to select on which physical machine the VM has to be launched. Depending on this choice, the performance of the application, the impact on the environment and the overall cost can vary a lot, thus having an impact on the SLA we can provide. We intend to study scheduling algorithms coupled with migration techniques to improve task execution on a fully virtualized environment. The key virtualized elements for this challenge are the whole platform: computational elements, storages and networks, as to efficiently run a task we need to take into account both its CPU and data requirements.

Type of commitment (internship, Phd grant, engineering staff):
Phd, engineer, internship

Number of persons involved in these challenges:
4

Signature of Scientific Contact: Benjamin Depardon	Signature of the Legal Representative: David Loureiro
Date: 10/09/11	Date: 10/09/11