

## Executive Summary

This report highlights a set of challenges that are becoming more acute as the HPC technology and use is profoundly changing. The introduction of big data in the discovery process is driving application to be implemented as large-scale distributed workflows that need to be deployed on a large set of systems, each one having its own idiosyncrasies (e.g. quantum accelerator) that questions the way application are implemented.

This is the first step on the way to a shared Transversal Vision developed in the frame of EXDCI-2. The goal is to identify key challenges for the workflow-based applications: understand the requirements and understand where research and innovation is needed to preparing Europe's HPC machines, its users, its software developers and vendors. This report presents the driving factors (cf. Section 2) for this transformation and suggests ways to cope with these challenges, presented in Section 3 of this report).

As driving factors we have identified the considerable impact of data for the design of applications, secondly an opening of HPC to other user communities and for other usages, and thirdly, the advent of new, disruptive hardware.

The data challenge can be addressed by workflows, and service-oriented architectures allow to address usage evolution.

In the upcoming months, this Transversal Vision will be developed further with support from the EXDCI community and with the support of European experts in these domains.