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Dynamic Provisioning of Storage Resources: A Case Study with Burst Buffers

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Complex applications and workflows needs are often exclusively expressed in terms of computational resources on HPC systems. In many cases, other resources like storage or network are not allocatable and are shared across the entire HPC system. By looking at the storage resources in particular, any workflow or application should be able to select both its preferred data manager and its required storage capability or capacity. To achieve such a goal, new mechanisms should be introduced. In this work, we present such a tool that dynamically provision a data management system on top of storage devices. We propose a proof-of-concept that is able to deploy, on-demand, a parallel filesystem across intermediate storage nodes on a Cray XC50 system. We show how this mechanism can be easily extended to support more data managers and any type of intermediate storage. Finally, we evaluate the performance of the provisioned storage system with a set of benchmarks.

Presenter: MARTINASSO, Maxime (CSCS)