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Commissioning and exploitation of the MareNostrum5 cluster at the Barcelona Supercomputing Center for CMS computing

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The MareNostrum 5 (MN5) is the new 750k-core general-purpose cluster recently deployed at the Barcelona Supercomputing Center (BSC). MN5 presents new opportunities for the execution of CMS data processing and simulation tasks but suffers from the same stringent network connectivity limitations as its predecessor, MN4. The innovative solutions implemented to navigate these constraints and effectively leverage the resources within the CMS distributed computing environment need to be revisited. First, the new worker nodes have increased their processor core count, and are thus capable of handling larger multicore CPU-bound CMS simulation tasks. Furthermore, the provisioning of larger disk storage capacity for MN5 broadens the spectrum of CMS workload types that can be accommodated at BSC. This storage space could, for example, be used to temporarily host large datasets required as input for CMS tasks, such as the pile-up samples, usually accessed by proton collision simulation jobs at runtime from remote grid sites' storages. These tasks were previously unsuitable for execution, given the connectivity limitations from BSC to remote storages. Enhanced network bandwidth between MN5 and the Port d'Informació Científica (PIC) can also facilitate the expansion of BSC capabilities by provisioning input for CMS data processing tasks at BSC, thus expanding the role of this resource in the CMS computing landscape. This contribution will provide an overview of the commissioning efforts and the results of the subsequent exploitation of MN5 for CMS, showcasing the new transformative capacities introduced by the MN5 cluster.

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