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Extending the distributed computing infrastructure of the CMS experiment with HPC resource

Particle accelerators are an important tool to study the fundamental properties of elementary particles. Currently the highest energy accelerator is the LHC at CERN, in Geneva, Switzerland. Each of its four major detectors, such as the CMS detector, produces dozens of Petabytes of data per year to be analyzed by a large international collaboration. The processing is carried out on the Worldwide LHC Computing Grid, that spans over more than 170 compute centers around the world and is used by a number of particle physics experiments. Recently the LHC experiments were encouraged to make increasing use of HPC resources. While Grid resources are homogeneous with respect to the used Grid middleware, HPC installations can be very different in their setup. In order to integrate HPC resources into the highly automatized processing setups of the CMS experiment a number of challenges need to be addressed. For processing, access to primary data and metadata as well as access to the software is required. At Grid sites all this is achieved via a number of services that are provided by each center. However at HPC sites many of these capabilities cannot be easily provided and have to be enabled in the user space or enabled by other means. At HPC centers there are often restrictions regarding network access to remote services, which is again a severe limitation. The paper discusses a number of solutions and recent experiences by the CMS experiment to include HPC resources in processing campaigns.

Significance

The contribution will present production experiences with some approaches that were previously reported. New HPC allocations pose additional challenges to which new solutions or methods get applied.

References

Speaker time zone

Compatible with Europe

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