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Virtualization of the ATLAS software environment on a shared HPC system

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High-Performance Computing (HPC) and other research cluster computing resources provided by universities can be useful supplements to the collaboration's own WLCG computing resources for data analysis and production of simulated event samples. The shared HPC cluster "NEMO" at the University of Freiburg has been made available to local ATLAS users through the provisioning of virtual machines incorporating the ATLAS software environment analogously to a WLCG center. The talk describes the concept and implementation of virtualizing the ATLAS software environment to run both data analysis and production on the HPC host system which is connected to the existing Tier-3 infrastructure. Main challenges include the integration into the NEMO and Tier-3 schedulers in a dynamic, on-demand way, the scalability of the OpenStack infrastructure, as well as the automatic generation of a fully functional virtual machine image providing access to the local user environment, the dCache storage element and the parallel file system. The performance in the virtualized environment is evaluated for typical High-Energy Physics applications.

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