Contribution ID: **229** Type: **Poster**

Evolution of the Virtualized HPC Infrastructure of Novosibirsk Scientific Center

Tuesday 22 May 2012 13:30 (4h 45m)

Novosibirsk Scientific Center (NSC), also known worldwide as Akademgorodok, is one of the largest Russian scientific centers hosting Novosibirsk State University (NSU) and more than 35 research organizations of the Siberian Branch of Russian Academy of Sciences including Budker Institute of Nuclear Physics (BINP), Institute of Computational Technologies, and Institute of Computational Mathematics and Mathematical Geophysics (ICM&MG). Since each institute has specific requirements on the architecture of computing farms involved in its research field, currently we've got several computing facilities hosted by NSC institutes, each optimized for the particular set of tasks, of which the largest are the NSU Supercomputer Center, Siberian Supercomputer Center (ICM&MG), and a Grid Computing Facility of BINP. A dedicated optical network with the initial bandwidth of 10 Gbps connecting these three facilities was built in order to make it possible to share the computing resources among the research communities, thus increasing the efficiency of operating the existing computing facilities and offering a common platform for building the computing infrastructure for future scientific projects. Unification of the computing infrastructure is achieved by extensive use of virtualization technology based on XEN and KVM platforms. Our contribution gives a thorough review of the recent developments, present status and future plans for the NSC virtualized computing infrastructure focusing on its consolidation for the prospected deployment on other remote supercomputer sites and its applications for handling everyday data processing tasks of HEP experiments being carried out at BINP, the KEDR experiment in particular. We also present the results obtained while evaluating performance and scalability of the virtualized infrastructure following multiple hardware upgrades of the computing facilities involved over the last 2 years.

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Session Classification: Poster Session

Track Classification: Computer Facilities, Production Grids and Networking (track 4)