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Resource and task management tools for physics applications

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Efficient distribution of high performance computing resources according to actual application needs along with comfortable and transparent access to these resources has been an open question since HPC technologies became widely introduced. One of the application classes that require such functionality are physics applications. In this paper we discuss issues and approaches to manage resources for large-scale applications from physics and related fields, and describe tools to do this with special attention to virtualization technologies. We evaluate resource distribution and balancing methods applied to physics software packages, analyze the efficiency of our approach compared to traditional methods of HPC resource management, and highlight the concept of virtual private supercomputer - a virtual computing environment tailored specifically for a target user with particular target applications.

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