How to make large computer simulation user friendly: one practical example

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Modern research requires a lot of different pieces of technology and methodology to be combined into a single system. The field of computaional physics is not an exception. Computer simulations require knowledge of hardware and software, of modern computing libraries, methods of parallel programming, techniques of visualization and data analysis. Development of such a complex system from the very beginning is usually a difficult task and requires a lot of effort.

One possible solution to the outlined problem is to develop some middleware which can hide the complexity of the underlying system providing an interface to different services, starting from data and task management, parallel execution of tasks and ending with visualization and data analysis. Such combination of hardware and correspoinding middleware is called a platform and is a basic part of cloud computing technology. Since computational physics simulations are usually very complex and are based on the combination of a large number of elements, cloud computer systems that provide complete set of services are still in emergent stage. The most advanced and popular cloud computing system nanohub.org is based on Hubzero [1] platform developed at Purdue university.

In this paper we present our experience with the Hubzero platform [2], describe our own software for diffusion-limited-model simulation [3] adapted for Hubzero platform and also present modifications to the platform that are already implemented. We also propose some new ideas that should make cloud computing software more user-friendly and more popular in the area of computational physics.

References

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