

Open marketplace for simulation software on the basis of a web platform

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The work examines the current trends in designing of systems for convenient and secure remote job submission to various computer resources, including supercomputers, computer clusters, cloud resources, data storages and databases, and grid infrastructures by authorized users, as well as remote job monitoring and obtaining the results. Currently, high-performance computing and storage resources are capable of solving independently the majority of practical simulation problems in the field of science and technology. Therefore, the focus in the development of a new generation of middleware shifts from the global grid systems to building convenient and efficient web platforms for remote access to individual computing resources.

The sets of features of the web platforms can vary significantly. The following are the basic features of web platforms: web platforms for job submission provide remote submission, monitoring, and obtaining the job results; web platforms for job submission and software installation provide, in addition to the preceding features, remote installation and configuring of application packages; web hubs provide features from the two preceding items plus providing the features of professional social networks, for example, allowing to exchange the experience in the use of the platform tools, interaction with the developers, forming the rating of individual application packages/tools.

Further line of development of the web toolkit, suggested in this work, is related not only with the quantitative increase in the number of web-based platforms for remote access and the expansion of scientific, engineering, and manufacturing areas in which they are used, but also with the improvement of the technology of remote deployment of new application software on resources interacting with the web platforms.

This approach will help to overcome an important problem associated with the use of the Software as a Service (SaaS) model in scientific areas, namely, limited set of application packages offered by SaaS providers. Often, these providers focus on mass servicing of single-type customers and scientific activity is beyond the scope of their interests. Currently, the provision of services for providers of application software in the context of scientific-oriented web platforms is not developed enough. Although some implementations (for example, e-Science Central; <http://www.esciencecentral.co.uk>) have services for remote application software deployment, they are still insufficient to ensure the creation of a web platform capable of performing the whole range of tasks characteristic for a free open market. The web platforms of application software market should have all the above mentioned features plus provision of information and computing web services for interaction between the providers and consumers of simulation application packages based on market principles (analogue of such app stores as AppStore, Google Play etc.)

The technology of creating such web platforms market of application software is based both on the original solutions and on the synthesis and adaptation of the solutions used in research hubs (e.g., nanoHUB; nanohub.org), cloud and grid systems, as well as in on-line app stores. However, unlike the on-line app stores, the platform will not only provide information services for searching the tools needed by users, but also provide the feasibility of direct using of the necessary tools. Thus, the future web platforms will provide a single entry point both for web service providers and for their customers.