Collaborative Visualization for Supporting Joint Researches in ITBL Project

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Abstract

In order to discuss experimental results or simulation results in the joint research between remote locations, it is indispensable to share visualization results (collaborative visualization). The Center for Promotion of Computational Science and Engineering of Japan Atomic Energy Research Institute (CCSE/JAERI) has performed the research and development of the visualization system having such a function in the Information-Technology-Based Laboratory (ITBL) project.

The ITBL project aims to construct the virtual research environment which shares intellectual resources such as the remote computers, the programs and data in Japanese research institutions and supports joint researches between remote locations. Six institutions have joined as initial project members: National Institute for Materials Science (NIMS), National Research Institute for Earth Science and Disaster Prevention (NIED), Japan Aerospace Exploration Agency (JAXA), the Physical and Chemical Research Institute (RIKEN), Japan Science and Technology Agency (JST) and Japan Atomic Energy Research Institute (JAERI).

In this project, CCSE/JAERI has developed the ITBL infrastructure software. An environment for operating the infrastructure software is composed of user terminals, ITBL servers and supercomputers. The infrastructure software offers a communication and security service, an application development service, etc. In the communication and security service, the communication function which can coexist with a firewall has been constructed using HTTPS protocol. Moreover, in the application development service, various services to share intellectual resources and support joint researches are constructed. The visualization system is positioned as one of these services. CCSE has developed two visualization systems: the parallel tracking steering (Patras)/ITBL and the application visualization system (AVS)/ITBL.

Patras/ITBL has been constructed based on Patras. The client/server system is adopted. A client operates on the Web browser of a user terminal as a Java applet. A server consists of a set of libraries and operates on a supercomputer. Moreover, the servlet which mediates the communication between the user terminal and the supercomputer operates on the ITBL server.

AVS/ITBL has been constructed based on the commercial visualization software AVS/Express. In addition to the function of AVS/Express which operates on a graphics server, AVS/ITBL has the function to directly read data on supercomputers located within the ITBL environment and the function to display a visualization image on the Web browser of a user terminal. Therefore, AVS/ITBL operates both on a graphics server (client visualization function) and on a user terminal (Web visualization function).

These visualization systems have the collaborative visualization function which enables researchers in remote locations to share the same visualization results. The function has been realized by sharing the visualization image file and sharing the visualization procedure file in Patras/ITBL and in AVS/ITBL, respectively. Using the method of sharing the visualization image file, the visualization process is performed only at once and thus the quick response is achieved. Using the method of sharing the visualization procedure file, each user respectively performs a visualization process and thus it is possible not only to display the completely same visualization image but also to perform a setup of a visualization parameter independently.

Now, the construction of a virtual meeting system has been advanced in the application development service. Combination of such a system and the visualization system will support joint researches between remote locations much more.

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