

Ubiquitous Interactive Visualization of 3-D Mantle Convection Using a Web Portal with Java and Ajax Framework

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A new strategy has been developed for real-time visualization. This will force us to recognize a new paradigm for large-scale computing in view of the imminent flood of data coming out from the spigots of petascale computing. This philosophy calls for intense interactive sessions for a couple of hours at a time at the expense of storing data on many disk drives during regular or heroic runs on massively parallel systems. We have already carried out successfully real-time volume-rendering visualization by employing hundreds of processors for a grid with over 20 million unknowns. Both Cartesian and spherical 3-D mantle convection are visualized. The volume-rendered images are viewed on a large display device, with many panels holding around 13 million pixels. We will employ a software strategy involving a hierarchical rendering service, which will have as software an Ajax interface for interactive visualization of large data sets on many different platforms from desktop PC's to hand-held devices, such as the OQO and the Nokia-N800. We have installed a user interface as a web application, using Java and Ajax framework in order to achieve over the Internet reasonable accessibility to our ongoing runs. Our goal is to expand the array of interactive devices, which will make it feasible to carry out ubiquitous visualization and monitoring of large-scale simulations and to allow for collaborations across oceans.