eSiMon Dashboard simulation tool released

March 1 2011

Computational scientists have a new weapon at their disposal. On February 1, the Electronic Simulation Monitoring (eSiMon) Dashboard version 1.0 was released to the public, allowing scientists to monitor and analyze their simulations in real-time.

Developed by the Scientific Computing and Imaging Institute at the University of Utah, North Carolina State University, and Oak Ridge National Laboratory (ORNL), this "window" into running simulations shows results almost as they occur, displaying data just a minute or two behind the simulations themselves. Ultimately, the Dashboard allows the scientists to worry about the "science" being simulated, rather than learn the intricacies of high-performance computing such as file systems and directories, an increasingly complex area as leadership systems continue to break the petaflop barrier.

"In my experience, Dashboard has been an essential tool for monitoring and controlling the large-scale simulation data from supercomputers," said Seung-Hoe Ku, an assistant research professor at New York University's Courant Institute of Mathematical Sciences who uses the Dashboard to monitor simulations of hot, ionized gas at the edge of nuclear fusion reactors, an area of great uncertainty in a device that could one day furnish the world with a nearly limitless abundance of clean energy. "The FLASH interface provides easy accessibility with web browsers, and the design provides a simple and useful user experience. I have saved a lot of time for monitoring the simulation and managing the data using the Dashboard together with the EFFIS framework."

According to team member Roselyne Tchoua of the Oak Ridge Leadership Computing Facility (OLCF), the package offers three major benefits for computational scientists: first and foremost, it allows monitoring of the simulation via the web. It is the only single tool available that provides access and insight into the status of a simulation from any computer on any browser; second, it hides the low-level technical details from the users, allowing the users to ponder variables and analysis instead of computational elements; and finally, it allows collaboration between simulation scientists from different areas and degrees of expertise. In other words, researchers separated geographically can see the same data simultaneously and collaborate on the spot.

Furthermore, via easy clicking and dragging, researchers can generate and retrieve publication-quality images and video. Hiding the complexity of the system creates a lighter and more accessible web portal and a more inclusive and diverse user base.

The interface offers some basic features such as visualizing simulation-based images, videos and textual information. By simply dragging and dropping variable names from a tree view on the monitoring page onto the main canvas, users can view graphics associated with these variables at a particular time stamp. Furthermore, they can use playback features to observe the variables changing over time.

Researchers can also take electronic notes on the simulation as well as annotate movies. Other features include vector graphics with zoom/pan capabilities, data lineage viewing, and downloading processed and raw data onto local machines. Future versions will include hooks into external software and user-customized analysis and visualization tools.

"We are currently working on integrating the eSiMon application programming interface into an ADIOS method so that ADIOS users

automatically get the benefit of monitoring their running simulation," said the OLCF's Scott Klasky, a leading developer of ADIOS, an open-source I/O performance library.

The "live" version of the dashboard is physically located at Oak Ridge National Laboratory (ORNL) and can be accessed with an OLCF account at https://esimmon.ccs.ornl.gov. This version of the dashboard gives an overview of ORNL and National Energy Research Scientific Computing Center computers. Users can quickly determine which systems are up or down, which are busy and where they would like to launch a job. Users can also view the status of their running and past jobs as well as those of their collaborators.

However, a portable version of eSiMon is also available for any interested party, and the platform cuts across scientific boundaries so that the Dashboard can be used for any type of scientific simulation. For information on acquiring and/or using the eSiMon dashboard, visit http://www.olcf.ornl.gov/center-projects/esimmon/.

Provided by Oak Ridge National Laboratory