Using OpenGL to Display Jumpshot Visualizations on the PowerWall

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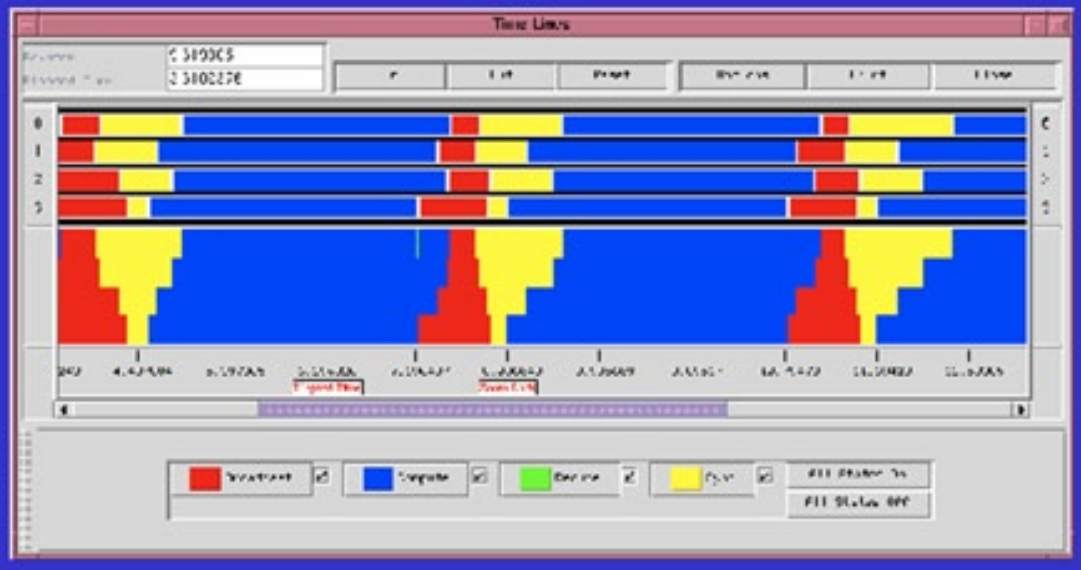
http://www.csm.ornl.gov/Internships/rams_05/abstracts/m_frazier.pdf

Abstract

This project explores the advantages of, and the options for, displaying performance data using ORNL's EVEREST visualization cluster and PowerWall. The visualization cluster offers enhanced visualization capabilities, which are not available on conventional monitors such as a large screen and the ability to display high resolution images. Also, the cluster allows multiple sources to be displayed on the wall without any images being distorted. This is done by placing the images seamlessly to a large number of screens, known as tiles, which are driven by advanced graphics cards. Software such as OpenGL and Chromium are used in order to display an image on the PowerWall. OpenGL, an industry standard API (Application Programming Interface), can be used to develop portable, interactive 2D and 3D graphic applications, while Chromium is used to present OpenGL applications on tiled displays. To investigate the behavior of large-scale scientific applications of interest to ORNL, this project focused on how to modify a graphical tool called Jumpshot to use OpenGL code to display performance data on the PowerWall.



Example Timeline Display

From "Toward Scalable Performance Visualization with Jumpshot," O. Zaki, E. Lusk, W. Gropp, and D. Swider, International Journal of High Performance Computing Applications 13(3): 277-288, Fall 1999.

Summary

One of the benefits of modifying some of the Jumpshot code to OpenGL is that it will give the user an opportunity to place a scientific code on to the PowerWall. The PowerWall creates advantage on viewing a Timeline display for larger number of processes than using a conventional monitor. In the example display the timeline shows eight processes that was shown on a conventional monitor but on the PowerWall it has the capability of showing tens of thousands of processes. Also, it provides the ability to look at a display clearly without obstruction of view. Full modification of the code will require additional time.

Research Experience

- Java script
- OpenGL

JUMPSHOT

Cluster-driven PowerWall

OpenGL
- **Low-level graphics library**
- **2D or 3D**
- **Program languages**

EVEREST Power wall
- **Purpose**
- **Features**

JUMPSHOT
- **Graphical tool**
- **Logfile data**
- **Java**

CHROMIUM
- **Graphics library**
- **Applications**
- **Program languages**

Office of Science U.S. DEPARTMENT OF ENERGY

The Research Alliance in Math and Science program is sponsored by the Mathematical, Information, and Computational Sciences Division, Office of Advanced Scientific Computing Research, U.S. Department of Energy. The work was performed at the Oak Ridge National Laboratory, which is managed by UT-Battelle, LLC under Contract No. De-AC05-00OR22725. This work has been authored by a contractor of the U.S. Government, accordingly, the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for U.S. Government purposes.

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