A Distributed Volume Visualization Architecture on the Grid

Yaolin Gu   Zhe Cao
School of Information Engineering, Southern Yangtze University
Wuxi 214036, Jiangsu, P.R. China
Email: gyl627@sytu.edu.cn   Tel: +86-0510-5863635

ABSTRACT

In this paper, we present a distributed software architecture for volume visualization that utilizes conventional PCs to generate high-quality interactive graphics. We present a method for enabling progressive client–server volume visualization of data from the computing grid. Rendering is performed on clients, while servers on the grid provide wavelet compressed volume data. It provides a modular framework that can accommodate a wide variety of rendering algorithms and data formats. Demonstration modules that implement ray tracing, fractal rendering, and volume rendering algorithms were developed to evaluate the architecture. Results are encouraging, the system can interactively render simple to moderately complex data sets at modest resolution. Excellent scalability is achieved.

Keywords: distributed architecture, volume rendering, ray-tracing, grid computing