Remote and Distributed Visualization at Berkeley Lab

Driven by Science Needs

Our objective is to develop new capabilities in remote and distributed visualization that are driven by the needs of contemporary, high-performance scientific projects. This work is driven by the needs of the DOE Office of Science, which funds projects in areas such as astrophysics, computational biology, and accelerator design.

Astrophysics

- Black Hole Merger Simulations
- Neutron Star Collisions
- Mass Accretion Disks

Accelerator Design

- Particle Accelerator Control System
- Beam Dynamics Simulation
- Machine Learning for Beam Physics

AMR Data Visualization (AMR) Data Visualization

- AMR Data Visualization
- Visualization of Large Scientific Datasets
- Remote and Distributed Visualization

AMR Volume Rendering

- Interactive, parallel software for high-performance visualization
- Visualization of large scientific datasets
- Optimization for remote access

AMR Data Visualization Project Objectives – FY02/03

- Interactive, parallel software for high-performance visualization
- Visualization of large scientific datasets
- Remote and Distributed Visualization

Deployment

The biggest challenge associated with deployment of remote and distributed visualization tools and techniques is the need for robust and scalable infrastructure that can support the needs of distributed components and efficient movement of data between visualization nodes.

Godiva—Component-Based Framework for Remote and Distributed Visualization

This framework relies on a high-level network to facilitate communication between distributed components. It is designed to support the deployment of remote and distributed visualization tools and techniques.

Several new technologies are required in order to make Godiva viable. These include:

- New forms of latency tolerant graphics and visualization algorithms.
- Methodology for obtaining performance estimates from a given application.
- Services and component networks that can be used to schedule and tune component networks to achieve optimum performance.
- New forms of latency tolerant graphics and visualization algorithms.
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Remote and Distributed Visualization at Berkeley Lab

- Distributed Visualization
- Remote Access
- Interactive Rendering

Latency Tolerant Graphics and Visualization Algorithms

Shared, high-performance rendering architecture for large parallel systems. It enables remote access to large scientific datasets. It achieves steady interactivity irrespective of network performance characteristics.

Visapult

- Interactive, parallel software for high-performance visualization
- Visualization of large scientific datasets
- Remote and Distributed Visualization

Visit portal.lbl.gov for more information.

Visapult, screen dump

Visapult, running on a laptop. Achieved SC01 Bandwidth Challenge Winner!

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