Equalizer

Parallel Rendering

Equalizer is the standard middleware to create parallel OpenGL®-based applications. It enables applications to benefit from multiple graphics cards, processors and computers to scale the rendering performance, visual quality and display size. An Equalizer-based application runs unmodified on any visualization system, from a simple workstation to large scale graphics clusters, multi-GPU workstations and Virtual Reality installations.
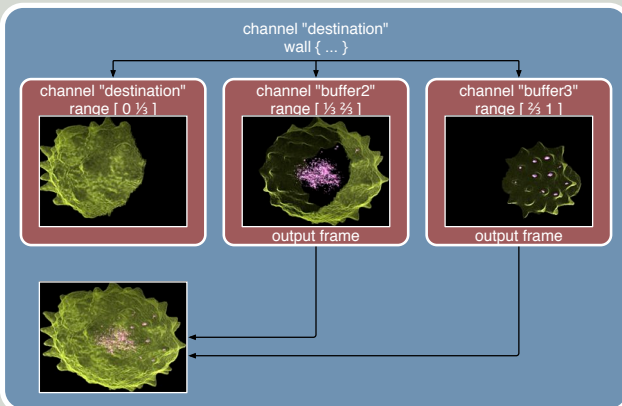

Screen-space decomposition applied to polygonal rendering using four GPU's

Database decomposition applied to volume rendering using three graphics cards

Scalability

Applications build with Equalizer are scalable, using multiple graphics cards, processors and computers to render a single or multiple views. The application's rendering code is parallelized, in contrast to other solutions which operate on the OpenGL command stream produced by a single application thread.

Equalizer provides a comprehensive set of algorithms to parallelize and load-balance the rendering of demanding data sets. The rendering is distributed across all available resources (decomposition) and the results are assembled on the final view (recomposition).

Equalizer supports screen-space, database, time-multiplex, pixel and stereo task distribution.
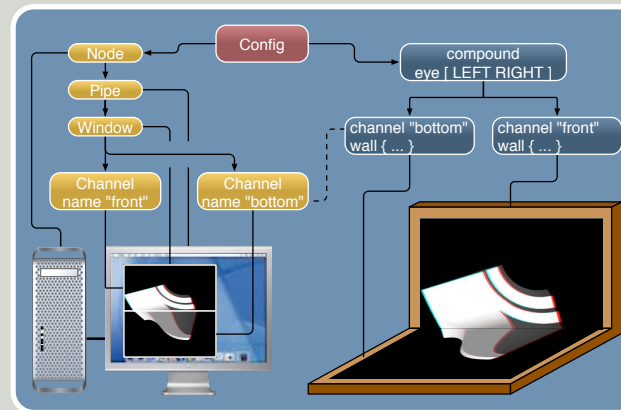
Example configuration for a TAN Holobench™ using stereo rendering

www.equalizergraphics.com
info@equalizergraphics.com

Equalizer is a product of Eyescale Software GmbH.
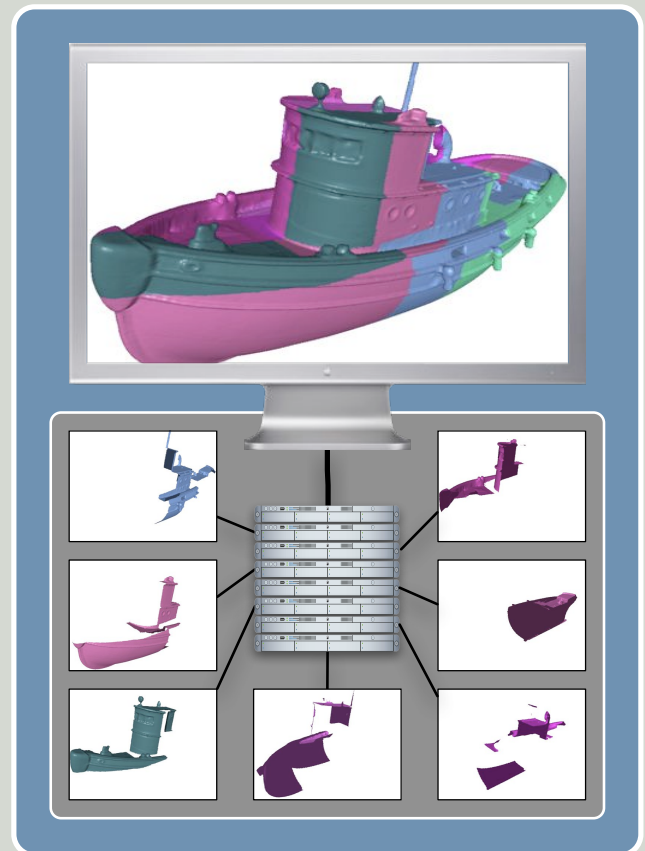
www.eyescale.ch
**info@eyescale.ch**

Contributors:

RTT Scale module for RTT Deltagen (Copyright Realtime Technologies AG, 2008)

Parallel Programming Interface

Equalizer distilles the expertise of three generations of parallel rendering APIs, delivering multi-view, resource aggregation and cluster-based execution. It provides the fastest porting path to create parallel, scalable OpenGL-based applications.

The Equalizer API is a GLUT-like, minimally invasive parallel programming interface. Most of the application is unmodified, only the application's rendering code is plugged into the Equalizer framework for parallel execution.

The application data structures, scene graph and rendering logics are unchanged and keep using the OpenGL hardware for maximum performance and compatibility.
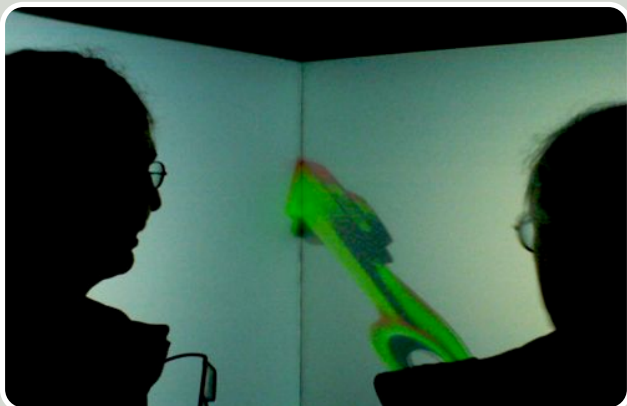
A virtual reality installation using passive stereo and head tracking

Features

Runtime Configurability: An Equalizer application can run optimally on any configuration, from laptops to large scale visualization clusters. The application is configured flexibly at runtime using a simple configuration file.

Runtime Scalability: An Equalizer application can aggregate the power of multiple processors, graphics cards and computers to scale the rendering performance, visual quality and display size.

Distributed Execution: Equalizer applications can be written to support cluster-based execution. The task of distributing the application data is simplified through versioned, distributed objects.

Support for Immersive Environments: Equalizer supports both active and passive stereo rendering, as well as head tracking used in Virtual Reality installations.

Use Cases

An application written with Equalizer can be deployed in many different ways, without any modification or recompilation, for example:

Display Walls are one of the common uses for visualization clusters today. One instance of the application's rendering code is executed locally on each display node.

Virtual Reality Installations use passive or active stereo rendering with head tracking, both supported by Equalizer.

Scalable Rendering aggregates multiple graphics cards, processors and potentially computers to render more data faster.

Multi-GPU Workstations are an affordable way to scale the rendering performance and display size. Equalizer applications can exploit multiple processors and graphics cards by running multiple rendering threads on a single computer.

Benefits

Parallel Rendering Know-How: Equalizer contains the essence of 10+ years of experience in parallel and scalable rendering, easily integrated into your application.

Fast Path for Scalable OpenGL Applications: Equalizer provides the natural parallel execution model to exploit the parallelism of multicore, multi-GPU workstations and graphics clusters.

Feature-Rich Framework: Equalizer contains state-of-the-art scalable rendering algorithms, and its open development model ensures constant improvement. Equalizer applications are flexible and deployable in many, rapidly changing environments.
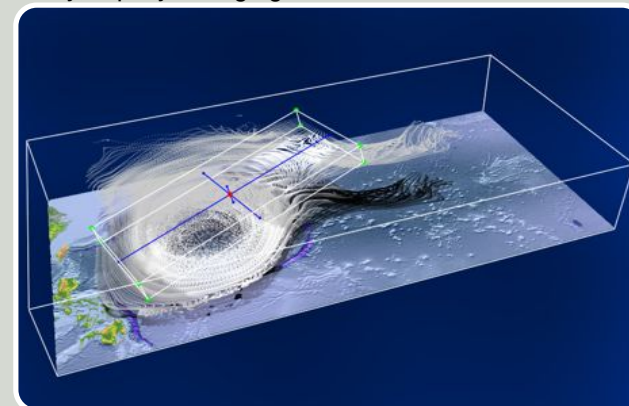
GPU-based Flow Visualization (Courtesy University of Siegen, 2008)

Highlights

Cross-Platform: Linux, Windows XP and Mac OS X
Interconnects: Ethernet, InfiniBand
Portable: 32 and 64 bit, little- and big-endian

Minimally invasive: easy porting
C++ API with a modern, high-performance design
Clusters and **Multi-GPU** workstations

LGPL license: free commercial and open source use
Open standard, open development community
Commercial support and feature development