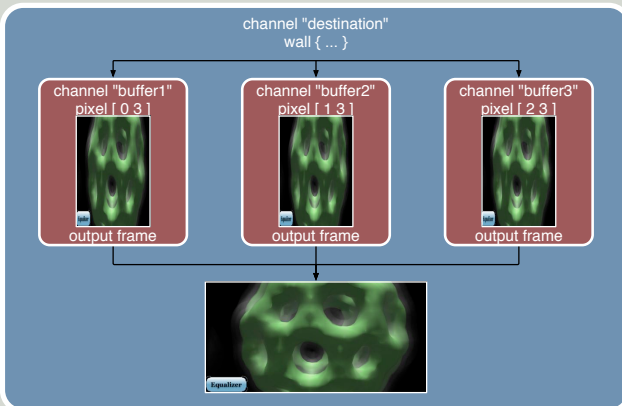


Screen-space decomposition applied to polygonal rendering using four GPU's



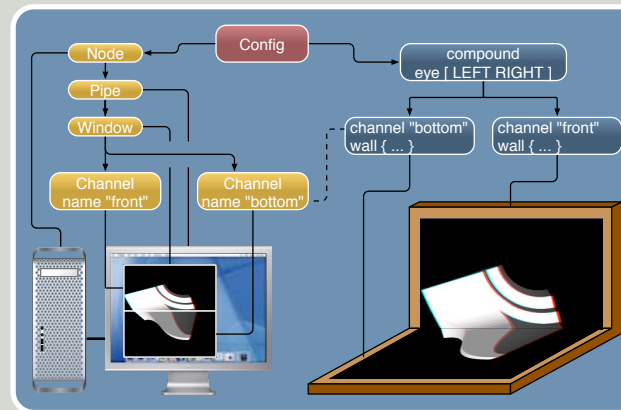
Pixel decomposition applied to volume rendering

Scalability

Equalizer is a framework to develop parallel OpenGL applications. This approach delivers optimal performance, in contrast to other solutions operating on the OpenGL command stream.

Equalizer provides a comprehensive set of algorithms to parallelize the rendering of large data sets. Multiple graphics cards, processor cores and computers can be combined to render a single view. Equalizer distributes the rendering task across the available resources (decomposition) and assembles the results on the final view (recomposition).

Equalizer supports task decomposition using sort-first (2D), sort-last (DB), pixel and stereo compounds.



Example configuration for a TAN Holobench™ using stereo rendering

www.equalizergraphics.com
info@equalizergraphics.com



Equalizer is a product of Eyescale Software GmbH.

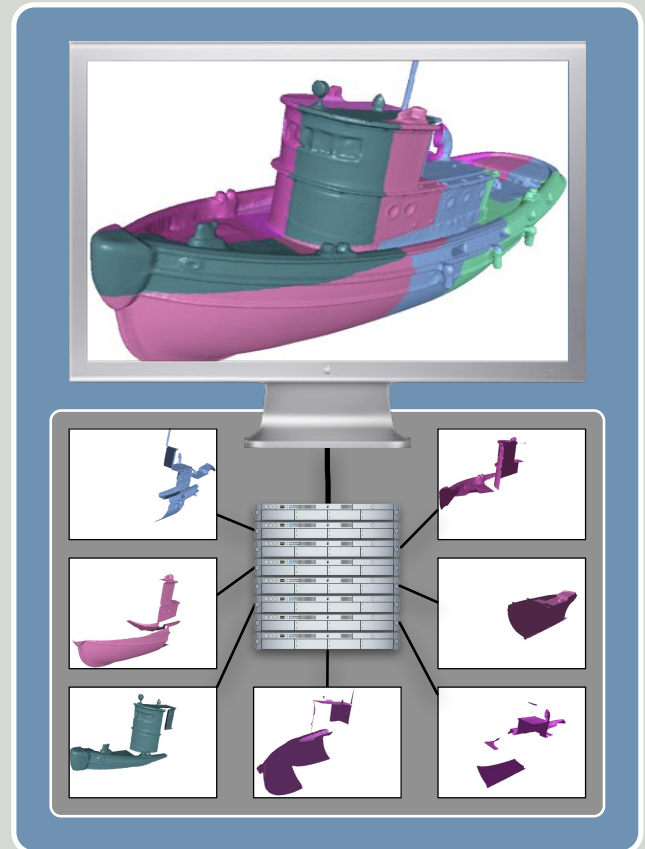
www.eyescale.ch
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Contributors:



Equalizer

Parallel Rendering



Equalizer is an open source project providing a minimally invasive programming interface and resource management system for parallel, scalable OpenGL® applications. It allows an application to run unmodified on any visualization system, from a simple workstation to large scale graphics clusters and multi-GPU workstations. Consulting and support is available from Eyescale Software GmbH.



A display wall running an Equalizer-based terrain rendering application

Parallel Programming Interface

Equalizer provides a minimally invasive programming interface. Most of the application is unmodified, only the rendering is modularized and plugged into the Equalizer framework. For this task, common graphic entities are abstracted by C++ classes, for example:

- **Node** - a single computer in the cluster
- **Pipe** - a graphics card and rendering thread
- **Window** - an OpenGL drawable
- **Channel** - a viewport within a window

The developer amends these entities by implementing application-specific task methods. Equalizer facilitates application porting by providing a default implementation for each task, which implements the typical use case.



A virtual reality installation using passive stereo and head tracking

Major Features

Runtime Configurability: An Equalizer application can run on any configuration, from laptops to large scale visualization clusters, without recompilation. The application is configured flexibly at runtime using an external configuration file.

Runtime Scalability: An Equalizer application can use multiple CPU's, GPU's and computers to scale the rendering performance and visual quality of a single or multiple views.

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

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

Use Cases

The Equalizer framework abstracts the runtime configuration from the application code. This allows an application to be deployed in many different ways without any modification, for example:

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

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

Scalable Rendering parallelizes the rendering of a view across multiple graphic cards, processors and potentially computers to render more data faster.

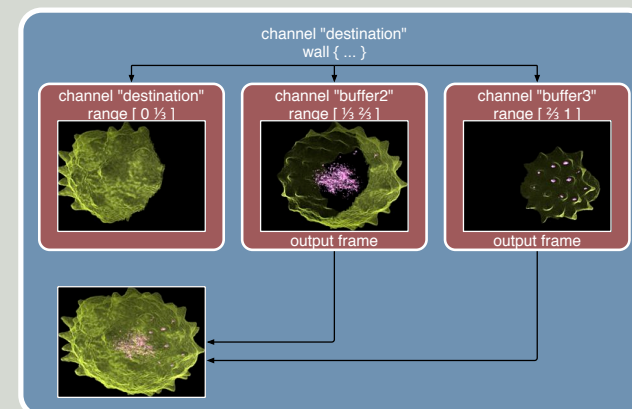
Multi-GPU Workstations are an affordable way to scale the rendering performance and display size. Equalizer applications can exploit multiple processors and graphic cards by running multiple rendering threads.

Major Benefits

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

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

Feature-Rich Framework: Equalizer contains state-of-the-art scalable rendering algorithms, and its open development model ensures constant improvement. The configurability allows to deploy Equalizer applications in many, often unforeseen environments.



Database decomposition applied to volume rendering using three graphics cards

Compatibility

OS Support: Linux, Windows XP and Mac OS X

Interconnects: Ethernet, InfiniBand

Portable: 32 and 64 bit, little- and big-endian

Minimally invasive: easy porting
Clusters and **Multi-GPU** workstations

LGPL license: commercial and open source use
Open standard for parallel rendering