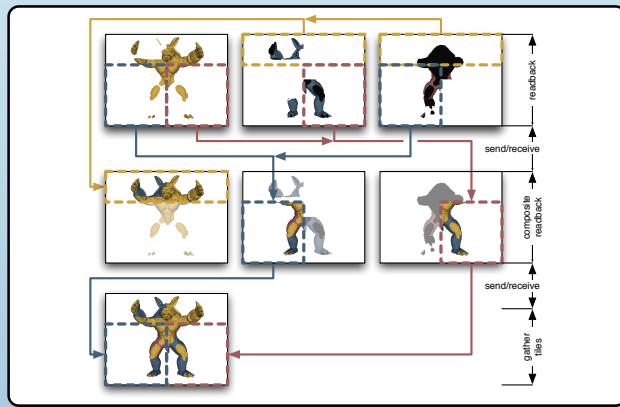


Sort-last (DB), sort-first(2D) and multi-level compounds

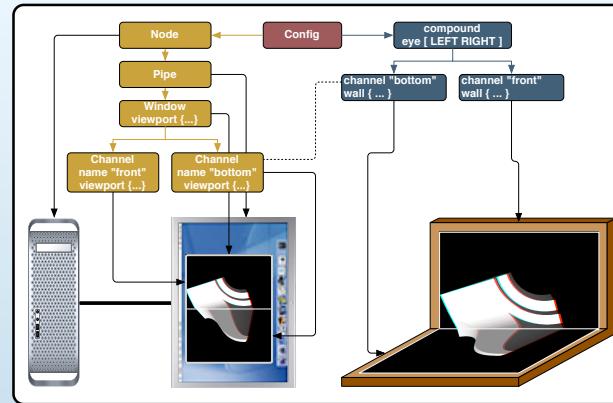


## Scalability

Equalizer implements a wide range of algorithms to parallelize the rendering of large data sets. Multiple graphic cards, processors 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).

For the task decomposition, Equalizer currently supports sort-first (2D), sort-last (DB) and stereo (Eye) compounds. Time-multiplex (Dplex) is planned.

Equalizer supports virtually any parallel compositing algorithm, for example binary swap or direct send for sort-last, and tile gathering for sort-first rendering.



Example configuration for a TAN Holobench™

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## Contributors:



## Support and Development Services:



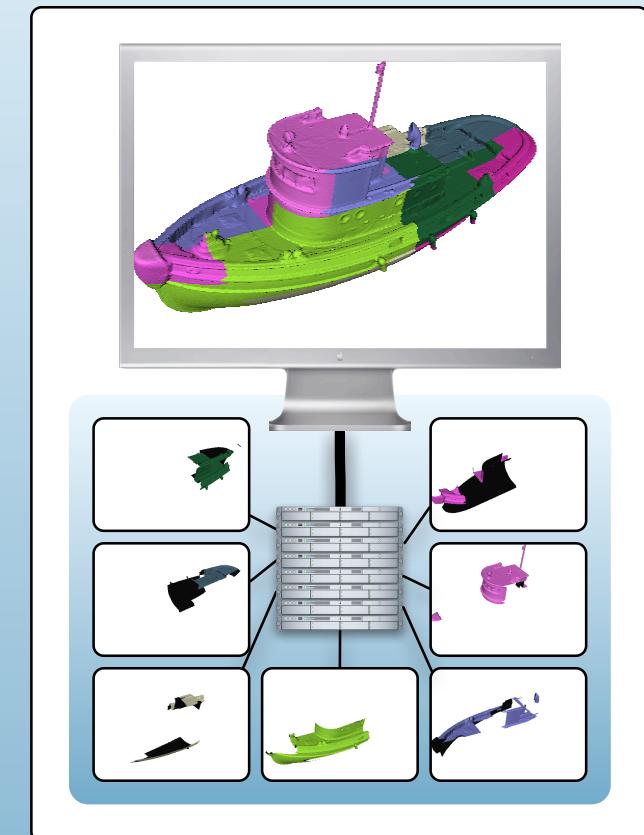
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# Equalizer

## Scalable Rendering



Equalizer is an open source programming interface and resource management system for *parallel*, *scalable* OpenGL® applications. An Equalizer application can run unmodified on any visualization system, from a singlepipe workstation to large scale graphics clusters and multi-GPU workstations. The foundation of Equalizer is a *minimally invasive* programming interface which addresses the problems common to any multipipe application.

## Major Benefits

**Parallel Rendering Know-How:** Equalizer contains 10+ years of experience in parallel and scalable rendering, easily combined with 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 it's open source.

The configuration flexibility allows to deploy Equalizer applications in many, often unforeseen environments.

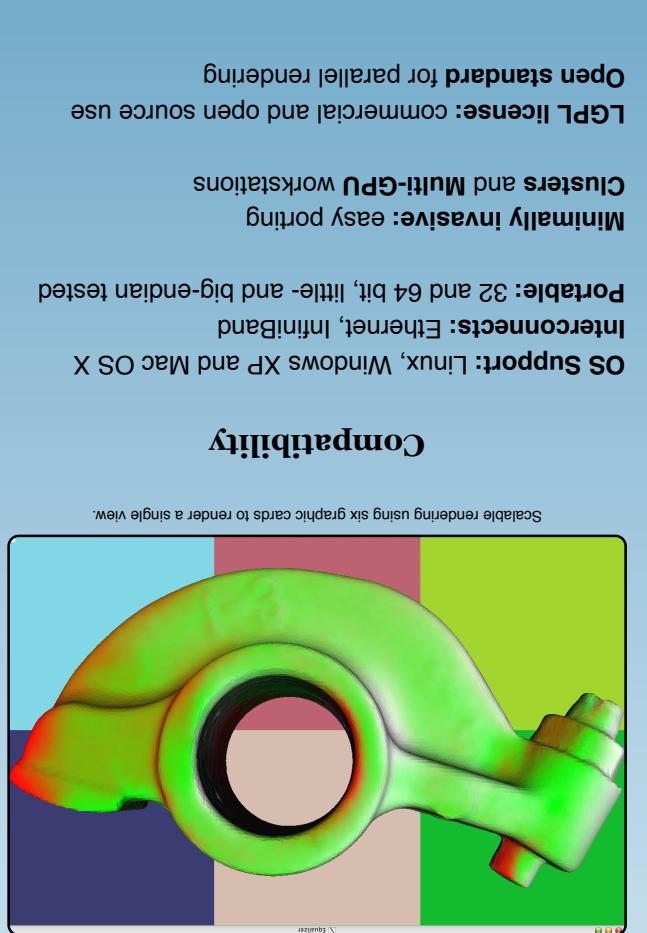
**Runtime Configurability:** An Equalizer application can run on any configuration, from laptops to large scale visualization clusters, without recompilation. The application to a systemwide resource server.

**Run-time Scalability:** An Equalizer application can use multiple CPUs, GPUs and computers to scale run-time configuration is externalized from the application to support cluster-based execution. The task of distributing to support applications can be written to support head active and passive stereo rendering, as well as head tracking, which is required for immersive Virtual Reality installations.

**Support for Immersive Environments:** Equalizer supports both active and passive stereo rendering, as well as head tracking and passive stereoscopic rendering.

**Use Cases**

**Scalable rendering using six graphic cards to render a single view.**



**OS Support:** Linux, Windows XP and Mac OS X

**Interconnects:** Ethernet, InfiniBand

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

**Minimally invasive:** Easy porting

**Custers and Multi-GPU workstations**

**GPL license:** commercial and open source use

**Open standard for parallel rendering**

## Major Features

**Run-time Configurability:** An Equalizer application can run on any configuration, from laptops to large scale visualization clusters, without recompilation. The application to a systemwide resource server.

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**Scalable Rendering:** Equalizer supports both active and passive stereoscopic rendering.

**Virtual Reality Installations:** Equalizer can be used to support head active and passive stereo rendering, as well as head tracking, which is required for immersive Virtual Reality installations.

**Display Walls:** Equalizer is one of the common uses for visualization clusters today. Typically one instance of the application runs on each display. This allows an application to be deployed in many different ways without any modification, for example:

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 Clusters:** Equalizer typically runs locally on a node for each display.

**Scalable Rendering:** Equalizer parallelizes the rendering of a scene across multiple graphics cards by running multiple threads.

**Multi-GPU Workstations:** Equalizer applications can exploit multiple processors to scale the rendering performance and display size. Multi-GPU workstations are an affordable way to single view across multiple graphic cards, both supported by OpenGL.

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

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## Parallel Programming Interface

A display wall running an Equalizer-based terrain rendering application



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.

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

**Equalizer API for parallelized terrain rendering application**

Equalizer uses a minimally invasive programming interface. Most of the application is unmodified, only the render function is separated and plugged into the Equalizer API for parallelized terrain rendering. Common graphic interface uses a minimally invasive programming interface. Most of the application is unmodified, only the render function is separated and plugged into the Equalizer API for parallelized terrain rendering. Only the rendering is parallelized, while the rest of the application remains unchanged.

**Equalizer -** a single computer in the cluster

**Node -** a single computer in the cluster

**Pipe -** a graphics card and rendering thread

**Window -** an OpenGL drawable

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**Case -** 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.