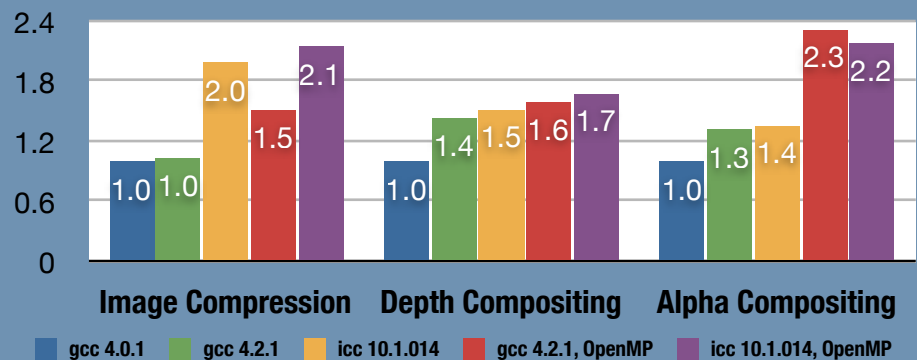


Performance of ICC, GCC and OpenMP

OpenMP and ICC improve the performance and scalability of task decompositions significantly.

Performance relative to gcc 4.0.1



Optimizing Scalable Rendering

Equalizer provides a flexible, scalable rendering framework for parallel OpenGL applications. This White Paper benchmarks OpenMP and different compilers on Mac OS X to optimize scalable rendering.

Introduction

Equalizer is a framework for the development and deployment of parallel OpenGL applications. An Equalizer application can run unmodified on any visualization system, from a single-pipe workstation to large scale graphics clusters.

Scalable rendering decomposes the task to render a view across multiple machines and graphics cards. The repositioning of the partial results computed by the graphics cards might become a bottleneck of the rendering pipeline.

Recomposition Tasks

In this benchmark, we test three different compilers: gcc 4.0.1 and 4.21 as well as the latest Intel C++ compile (icc). We also test the

performance using OpenMP to take advantage of multicore processors. The following algorithms are benchmarked:

- **Image Compression:** The image transfer over Ethernet network is accelerated by an RLE-like image compression algorithm.
- **Depth Compositing:** Database compounds reassemble polygonal data using the Z-Buffer information to compute the front-most color pixel.
- **Alpha Compositing:** Similar to depth compositing, volume data is reassembled using the alpha value to blend all input images.

Conclusion

Both the Intel C++ compiler and OpenMP help to speed up the CPU-intensive tasks

during scalable rendering. This improves rendering performance and increases scalability by reducing the compositing overhead. Memory bandwidth is the limiting factor for some algorithms.

Users of Equalizer can profit from the increased performance simply by choosing the right compiler and compiler options.

About

Equalizer is a product of Eyescale Software GmbH. Please visit www.eyescale.ch and www.equalizergraphics.com for more information.



2.16GHz Core 2 Duo Mac OS X 10.5.2	gcc 4.0.1	gcc 4.2.1	icc 10.1.014	gcc 4.2.1, OpenMP	icc 10.1.014, OpenMP
Equalizer 0.5, Rev 1893	-O2	-O2	-O2	-O2 -fopenmp	-O2 -openmp
Image Compression	634	656	1261	965	1363
Depth Compositing	1285	1842	1965	2053	2167
Alpha Compositing	354	468	485	823	773

Throughput in megabytes per second of the performance-critical parts during recomposition.