



Intel® Software Development Products for  
Intel Platforms and Technologies

## Boosting Performance for Academy Award\* Winning 3D Graphics Products

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dynamics code [turbulence feature]  
jumped by up to 90 percent after  
using the Intel compiler. ”

**Rob Hoffmann**  
Senior Maya Product Marketing Manager  
Alias

### Speeding up 3D graphics technology

Designers of leading-edge 3D graphics technology require software development tools that provide the fastest runtime speeds possible for their products. Using the Intel® C++ Compiler for Windows\* and the Intel® VTune™ Performance Analyzer, Alias developers significantly enhanced their Maya\* 5 product line's ability to quickly render complex animation and visual effects for their customers.

### Intel® C++ Compiler and Intel® VTune™ Analyzer maximize performance

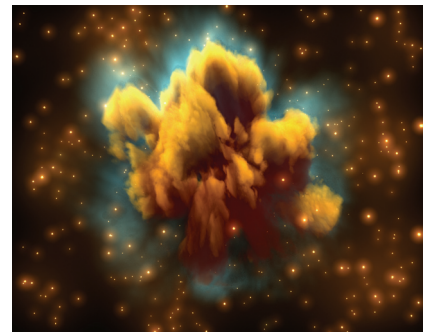
The Intel C++ Compiler for Windows helps software run at top speed on Intel® processor-based systems. The compiler is compatible with popular development environments, supporting the way developers work, and is source and binary compatible with popular compilers.

Intel VTune Performance Analyzer helps locate and remove software performance bottlenecks by collecting, analyzing, and displaying system-wide data down to specific functions, modules, or instructions. The VTune analyzers provide profiling technologies that enable optimization across multiple operating system platforms and development environments and support the latest Intel processors.

#### THE APPLICATION

### Complex 3D imaging requires optimal runtime

Alias is a leading innovator of 3D graphics technology. Their Academy Award\* winning Maya 5 software application provides tools for creating engaging digital imagery, animation, and visual effects in film, broadcast, game development, design visualization, print, Web and multimedia presentations. Customers who use the Maya 5 software demand speed, stability, and flexibility to run Maya on a variety of operating systems and processor platforms.



*Maya\* 5 is a 3D, modeling, animation, and dynamic software package used extensively in visual effects applications.*

#### THE CHALLENGE

### 3D features require fast code and multiple platform support

Alias developers needed a compiler and a performance analyzer that optimized the Maya 5 application across the processor platforms and operating systems required by their customers. The Maya application runs on several operating systems, including Windows and Linux\*, and on a variety of platforms, including Pentium® III, Pentium 4 and Intel® Xeon™ processor-based systems.

The software renderer is a feature of the Maya 5 application where users often spend several minutes waiting for the computer to produce an image. Dynamics — allowing simulation of realistic, fluid, particle, hard and

soft body motions for graphic objects — is another feature of Maya 5 for which runtime speed is a crucial factor. Since both features frequently require thousands of frames for a typical animation, even a small percentage of improvement in runtime performance can significantly reduce a customer's production time.

The table below shows the runtime performance gains achieved for Maya 5 dynamics features after the development team switched from their previous compiler to the Intel C++ Compiler for Windows 6.0 and used the compiler's -O2 optimization flag. "The performance of Maya 5's dynamics code [turbulence feature] jumped by up to 90 percent after using the Intel compiler," said Rob Hoffmann, Senior Product Marketing Manager of the Maya Product Development Group.

Maya* 5 Dynamics Feature	Runtime Performance Improvement <sup>1</sup>
Turbulence <sup>2</sup>	90%
Fields <sup>3</sup>	Over 60%
Surface Emission <sup>4</sup>	Over 50%
Spring Mesh <sup>5</sup>	Over 15%
Rigid Body <sup>6</sup>	10%

<sup>1</sup>The performance data was provided by Alias. Runtime tests were performed on Maya\* 5 dynamics code, for the features listed above, after the code was compiled using Intel® C++ Compiler for Windows\* 6.0 versus a competitive compiler. The operating system for the Intel® Pentium® 4 processor-based server was Windows 2000, and hardware specifications were Pentium 4 processor, 1.8 GHz, 512 MB, 512KB cache. Tests were run using the Intel compiler's -O2 optimization flag.

<sup>2</sup>Simulates a group of particles perturbed by a turbulent field such that they move randomly.

<sup>3</sup>Simulates particles perturbed by various types of fields, including gravity, vortex, radial, and uniform fields.

<sup>4</sup>Simulates emission of a continuous stream of particles from a surface.

<sup>5</sup>Simulates a group of particles moving randomly and perturbing each other based on their separation.

<sup>6</sup>Simulates a group of objects falling under the influence of gravity and colliding realistically with other objects as they fall.

## THE ANSWER

### Eliminating bottlenecks, increasing speed

Alias developers have been very pleased with the Intel compiler's robustness, stability and the quality of the code it generates; and they were also particularly impressed with the compiler's optimization features and the excellent support Intel provided. The Intel compiler has been used to compile the Maya rendering code since

Images courtesy of Alias Systems Corporation

On March 1, 2003, for the awards year 2002, the Academy of Motion Picture Arts and Sciences awarded Alias|Wavefront™ an Oscar® for scientific and technical achievement for the development of Maya software, the professional 3D animation and effects package.

Intel provides both the tools and support to enhance the performance, functionality, and efficiency of software applications.

Compatible with leading Windows\* and Linux\* development environments, Intel® Software Development Products are the fastest and easiest way to take advantage of the latest features of Intel processors. Intel Software Development Products are designed for use in the full development cycle, and include Intel® Performance Libraries, Intel Compilers (C++, Fortran for Windows and Linux), Intel® VTune™ analyzers, and Intel® Thread Checker.

Performance and benchmark information were provided by Alias, a Silicon Graphics, Inc. company. Performance depends upon the specific computer systems, components and/or measurement methods used; your results will vary. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing.

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Maya 4, and for Maya 5 Alias decided to build the Maya Dynamics code the same way after discovering that they could realize significant performance improvements just by switching compilers. To aid in further optimizing application performance, the Maya team also used the VTune Performance Analyzer to locate and alleviate hotspots in code where the majority of processor time was spent.

## THE ADVANTAGE

### Achieving faster performance

Using the VTune Performance Analyzer, Alias developers were able to rapidly search their large code databases to pinpoint performance bottlenecks and hotspots, significantly reducing the time it took to optimize the Maya 5 application. Using the Intel C++ Compiler and the VTune Performance Analyzer, Alias reduced development time and delivered a faster, more robust application across multiple OS and processor platforms. As Rob Hoffmann, Senior Maya Product Marketing Manager, stated, "We're anxiously waiting to see what Intel comes out with next. Based upon Intel's track record, we expect only good things coming out of them in the future."



Turbulent Flames is an example of an image Maya sped up after tuning with Intel C++ Compiler and VTune analyzer.

“ The VTune analyzer allowed us to quickly locate performance hotspots in Maya. Because of the size and complexity of the Maya code base, locating those hot-spots manually would have taken days or weeks longer. The use of VTune analyzer resulted in a significant, and very valuable, productivity benefit for Alias. ”

**Martin Watt**  
Software Architect, Maya Engineering Team  
Alias

**Performance.**  
**Compatibility.**  
**Support.**



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