



Intel® Software Development Products for
Intel® Platforms and Technologies

Accelerating One of the World's Fastest Databases

“ The MySQL database has been designed to maximize speed. The latest Intel C++ Compiler for Linux amplifies this native speed on three separate processors: the Intel Itanium 2 and 64-bit Intel Xeon processors, and IA-32. Using this compiler, we've seen proven performance gains of more than 20 percent over GCC 3.4. This extends MySQL's position as one of the fastest, most popular databases in the world. ”

Zack Urlocker
Vice President Marketing
MySQL AB

Speeding up databases with high-performance compilers

Today's heavy-load business applications and Web-centric client/server environments demand highly responsive database applications. The open-source MySQL* relational database management system (RDBMS), one of the most popular databases in the world, is designed for high speed. The MySQL AB engineers use Intel® Software Development Products to gain performance advantages on Intel® architecture-based systems.

Intel® C++ Compiler for maximum performance

The Intel® C++ Compiler for Linux* makes it easy to get outstanding performance from Intel processors, including: the Intel® Pentium® M

processor, a component of Intel® Centrino™ mobile technology; Pentium 4 processor supporting Hyper-Threading Technology, Intel® Itanium® and Itanium 2 processors, and the 64-bit Intel® Xeon™ processor. The Intel C++ Compiler produces great performance for applications by providing optimization technology, threaded application support, features to take advantage of Hyper-Threading Technology, and compatibility with leading tools and standards. The Intel C++ Compiler delivers leading-edge performance, excellent compatibility, and first-class customer support.

THE APPLICATION

Powering open-source database-driven applications

With an estimated 6 million installations and more than 35,000 downloads per day, MySQL is the world's most popular open source database.¹ Designed for Web site and application development and deployment, it offers a rich but streamlined feature set, and it is part of the well-known LAMP² open-source software stack. MySQL AB develops, markets, and supports the MySQL Database Server*.

As the heart of many high-volume, business-critical applications, MySQL database maximizes the speed, reliability, and value of Web sites and business applications. Increasingly found in business, government, and academic environments, it powers resource-intensive Web sites, data warehouses, e-Commerce, and business-critical enterprise applications, and it is embedded into third-party software and hardware.

THE CHALLENGE

Optimizing open-source database for Intel® processors

The MySQL AB engineers wanted to identify performance bottlenecks and also areas of optimization concern for MySQL database running on the latest Pentium 4, Itanium 2, and 64-bit Intel Xeon processor-based systems.



MySQL* is available under the free software/open source GNU general public license (GPL) or a non-GPL commercial license. For more information about MySQL, please go to www.mysql.com.

They used the SetQuery* benchmark to optimize and measure the performance of the open source MySQL database on Pentium 4, Itanium 2, and 64-bit Intel Xeon processor-based systems. They began by measuring the time that MySQL database took to execute the SetQuery runs.

The SetQuery benchmark measures database performance in a decision-support context. Also known as data-mining or management reporting, this benchmark calculates database performance in situations where querying the data is a key to the application performance as opposed to reading and writing records back into databases.

THE ANSWER Eliminating bottlenecks, increasing speed

The MySQL AB engineers benchmarked code compiled by the GNU C Compiler and the Intel C++ Compiler for Linux on Pentium 4, Itanium 2, and 64-bit Intel Xeon processor-based systems. The MySQL AB team relied on the Intel® Premier Support team for technical assistance during this exercise.

Because of the versatility of the Intel C++ Compiler, the MySQL AB engineering team used different sets of compiler switches: the regular -O2 switches and a more aggressive switch set. They compared these results to the code compiled with the GNU C Compiler with similar options.

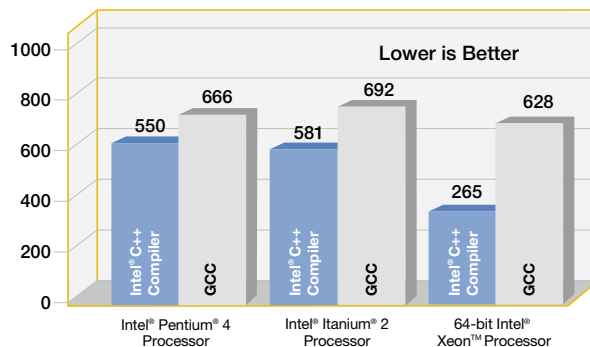
The user times showed that the MySQL code generated using the Intel C++ Compiler performed substantially faster than similar GNU C Compiler-generated code running on Pentium 4, Itanium 2, and 64-bit Intel Xeon processor-based systems.

THE ADVANTAGE Achieving faster performance

The Intel C++ Compiler decreased the execution time for the MySQL code by 15 to 59 percent for Pentium 4, Itanium 2, and 64-bit Intel Xeon processor-based servers, as shown in the table and graph in this document.

With this accelerated performance, the Intel C++ Compiler for Linux and MySQL database redefine the speed and economics of large database applications. This is accomplished by maximizing cost savings for users through efficient system utilization and speeding up resource-intensive performance for enterprise and Web-based business-critical applications.

For additional product information visit:
www.intel.com/software/products



User Times for SetQuery* (measured in seconds)	Intel® Pentium® 4 Processor ³		Intel® Itanium® 2 Processor ⁴		Intel® Xeon™ Processor Supporting Intel® EM64T ⁵	
	-O2	Aggressive ⁶	-O2	Aggressive ⁷	-O2	Aggressive ⁸
Intel C++ Compiler	550	519	581	567	265	263
GNU C Compiler	666	665	692	671	628	637
Execution Time Reduction	17%	22%	16%	15%	58%	59%

Intel® C++ Compiler-generated MySQL code performs from 15% to 59% faster than GNU C Compiler-generated code on the latest Pentium® 4, Itanium® 2, and 64-bit Intel® Xeon™ processor-based systems.

¹ MySQL Web site 2005 www.mysql.com

² LAMP usually refers to Linux, Apache, MySQL, PHP/Perl/Python.

³ The performance data has been provided by MySQL AB. The tests were performed using MySQL version 4.1.12, Intel C++ Compiler 9.0 for Linux², and the GNU C Compiler 3.4.4. The operating system for the Pentium 4 processor-based system was SuSE Linux Enterprise Server* 8.2, and hardware specifications were Pentium 4 processor 2.7 GHz, 1-GB RAM, 512KB L3 cache, Hyper-Threading Technology switched OFF.

⁴ The performance data has been provided by MySQL AB. The tests were performed using MySQL version 4.1.12, Intel C++ Compiler 9.0 for Linux, and the GNU C Compiler 3.4.4. The operating system for the Itanium 2-based server was Red Hat Enterprise Linux AS 2.1, update 3, and hardware specifications were Itanium 2 processor 1.2 GHz, 1-GB RAM, 6-MB L3 cache.

⁵ The performance data has been provided by MySQL AB. The tests were performed using MySQL version 4.1.12, Intel C++ Compiler 9.0 for Linux, and the GNU C Compiler 3.2.3. The operating system for the 64-bit Intel Xeon processor-based server was Red Hat Enterprise Linux AS 3, Taroon Update 2, and hardware specifications were 2-way Intel Xeon processor 3.2 GHz, 4-GB RAM, 1-MB L2 cache, Hyper-Threading Technology switched ON.

⁶ Intel C++ Compiler Aggressive Switches for Pentium 4 processor: -O3 -ip, GNU C Compiler 3.4.4 Aggressive Switches for Pentium 4 processor: -O3 -fomit-frame-pointer -felide-constructors fno-rtti -fno-exception

⁷ Intel C++ Compiler Aggressive Switches for Itanium 2 processor: -O1, GNU C Compiler 3.4.4 Aggressive Switches for Itanium 2 processor: -O3 -fomit-frame-pointer -felide-constructors fno-rtti -fno-exception

⁸ Intel C++ Compiler Aggressive Switches for 64-bit Intel Xeon processor: -O3, GNU C Compiler 3.2.3 Aggressive Switches for 64-bit Intel Xeon processor: -O3 -fomit-frame-pointer -felide-constructors fno-rtti -fno-exception

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 maximize the latest features of Intel processors. Designed for use in the full performance cycle, Intel Software Products include Intel® Compilers (C++ and Fortran), Intel® Performance Libraries, Intel® VTune™ Analyzers, Intel® Threading Tools, and Intel® Cluster Tools.

Performance information provided by MySQL AB. Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, refer to http://www.intel.com/performance/resources/benchmark_limitations.htm

Performance.
Compatibility.
Support.



Intel, the Intel logo, Itanium, Pentium, Intel Xeon, Intel Centrino, Intel XScale, and VTune are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

*Other names and brands may be claimed as the property of others.

Copyright © 2005, Intel Corporation. All rights reserved. 0105/DAM/TF/PP/1K

300461-003