

# Improving MySQL Server Performance with Intel C++ Compiler

A large, faint, light gray watermark of the MySQL fish logo is visible on the left side of the slide.

**Peter Zaitsev**  
**High Performance Group, Manager**

**LinuxWorld 2005, Boston**  
**February 15, 2005**

**MySQL AB**

# The World's Most Popular Open Source Database

- Founded in 1995; operations in 20 countries
- Over 5,000,000 installations; 35,000 downloads / day
- Part of a rapidly growing open source stack
- Dramatically reduces Total Cost of Ownership (TCO)
- Used by leading IT organizations and ISVs













## Intel & MySQL AB

- Cross platform availability: Itanium, Xeon, Pentium 4, and EM64T
- Tuned binaries (up to 61% additional performance) on Intel platforms using Intel compiler
- MySQL available to ISVs in Intel Remote Access Center
- Benchmarking and tuning activities
  - Improving MySQL Server performance on Intel Architectures
  - Improving Intel C++ Compiler optimization algorithms.
- Intel Platinum sponsor of the MySQL Users Conference, April 18-21 in CA

## Set Query Benchmark

- Set Query - Benchmark of “Data Sets” operations
  - Decision Support, Direct Marketing, Document Search
  - See <http://www.benchmarkresources.com/handbook/chapter6.pdf>
- Database was sized to fit in memory

## Hardware and Software

- Intel C++ Compiler 8.1 and GCC 3.4.1
- Pentium 4 2.66Ghz 1MB L2 Cache, 512MB RAM
  - Running SuSE Linux 9.0
- Itanium 2 1.2Ghz 6MB L3 Cache, 1GB RAM
  - Running RedHat EL AS 2.1 Update 3
- Intel Xeon with EM64T support, 3.2Ghz, 1MB L2 Cache 4G RAM
  - Running RedHat EL AS 3.0 Update 2
- MySQL 4.1.3-beta

## Pentium 4 Results (sec)

- Set Query completes up to 1.35 times faster

|                         | GCC | ICC | Ratio |
|-------------------------|-----|-----|-------|
| Normal Optimization     | 928 | 731 | 1.27  |
| Aggressive Optimization | 913 | 677 | 1.35  |

## Itanum 2 Results

- Set Query completes up to 1.24 times faster

|                         | GCC | ICC | Ratio |
|-------------------------|-----|-----|-------|
| Normal Optimization     | 650 | 524 | 1.24  |
| Aggressive Optimization | 619 | 505 | 1.23  |

## Intel Xeon with EM64T

- Set Query Completes up to **2.55** times faster

|                         | GCC | ICC | Ratio |
|-------------------------|-----|-----|-------|
| Normal Optimization     | 627 | 248 | 2.53  |
| Aggressive Optimization | 608 | 238 | 2.55  |

# Estimating improvement for your application

- In some cases Intel Compiler may double performance
- In some narrow cases GCC could be faster few percent
- 20-30% performance improvement is Typical on Pentium 4 processor for CPU bound load
- Xeon with EM64T support shows best improvement among platforms
- Disk Bound loads show insignificant performance improvement
- Computations benefit more than just memory scans

## Future

- Increased collaboration with Intel to build faster and robust binaries
- Perform more benchmarks to cover wider range of workloads
- Investigate performance benefit from PGO (profile guided optimization)
- Use VTUNE to find and fix more MySQL Server bottlenecks
- Use Intel Thread Checker to spot thread level bottlenecks

## Resources

- MySQL Developers zone: <http://dev.mysql.com>
- Intel C++ Compiler and VTUNE
  - <http://www.intel.com/software/products/>
- MySQL Benchmarks mailing list:
  - <http://lists.mysql.com>
- MySQL Binaries optimized by Intel C++ Compiler
  - <http://dev.mysql.com/downloads/mysql/>
- Contact me with questions [peter@mysql.com](mailto:peter@mysql.com)