

Intel® Math Kernel Library 10.2 Update 5 for Windows* Release Notes

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1 Introduction

Intel® Math Kernel Library (Intel® MKL) is a library of highly optimized, extensively threaded math routines for science, engineering, and financial applications that require maximum performance. It offers optimized BLAS, LAPACK, Sparse Solvers, Fast Fourier Transforms, Vector Math, and more for all the latest Intel® architectures. Intel MKL can also be fully integrated with Microsoft Visual Studio*.

This document provides system requirements, installation instructions, issues and limitations, and legal information.

To learn more about this product's:

- New features, see the “New in Intel® MKL...” section below.
- Documentation, help, and samples, see the Intel® MKL documentation item in the Start menu program folder.
- Technical support, including answers to questions not addressed in the installed product, visit the technical support forum at: <http://www.intel.com/software/products/support/mkl>.

Please remember to register your product at <https://registrationcenter.intel.com/> by providing your email address. This helps Intel recognize you as a valued customer in the support forum.

New in Intel® MKL 10.2 Update 5

- New Features
 - Incorporated the LAPACK 3.2.1 update primarily consisting of fixes to LAPACK 3.2
- Performance improvements
 - FFTs
 - Improved performance for complex FFTs, 3D and higher on the Intel® 64 architecture
 - VSL
 - Improved performance of the MT19937 and MT2203 basic random number generators (BRNGs) on the 45nm Intel® Core™2 Duo processor and newer processors in 64-bit libraries
- Usability/Interface improvements
 - Added support for Boost version 1.41.0 in the ublas examples
 - Included Fortran 95 interfaces for the diagonally dominant solver functionality (?DTSVB, ?DTTRFB, ?DTTRSB)
 - Significantly reduced the memory consumption of in-place, multi-dimensional cluster FFTs

For further information on improvements in this and previous releases see the knowledgebase [article](#) on new features.

2 System Requirements

Supported Architectures and Terminology

Intel® Math Kernel Library supports the following architectures:

- **IA-32 Architecture** refers to systems based on 32-bit processors generally compatible with the Intel Pentium® processors, (for example, Intel® Pentium® 4 processor or Intel® Xeon® processor), or processors from other manufacturers supporting the same instruction set and running a 32-bit operating system.

- **Intel® 64 Architecture** refers to systems based on IA-32 architecture processors which have 64-bit architectural extensions, for example, Intel® Core™2 processor family, running a 64-bit operating system such as Microsoft Windows XP* Professional x64 Edition or Microsoft Windows Vista* x64. If the system is running a 32-bit version of the Windows operating system, then IA-32 architecture applies instead. Systems based on AMD processors running a 64-bit version of Windows are also supported.
- **IA-64 Architecture** refers to systems based on the Intel® Itanium® processor running a 64-bit operating system.

System Requirements

Hardware

To install and use Intel® MKL you will need a system with a supported processor and 1.1 GB of free hard disk space plus an additional 300 MB during installation for download and temporary files (host system only).

Supported processors:

- Intel® Core™ processor family
- Intel® Xeon® processor family
- Intel® Itanium® processor family
- Intel® Pentium® 4 processor family
- Intel® Pentium® III processor
- Intel® Pentium® processor (300 MHz or faster)
- Intel® Celeron® processor
- AMD Athlon* and Opteron* processors

Software

To use Intel® MKL you will need a supported compiler and MPI implementation.

Following is the list of supported operating systems:

- Windows 7* (IA-32/Intel® 64)
- Windows HPC Server* 2008 (for Intel® 64 architecture)
- Windows Server* 2008 (IA-32/Intel® 64/IA-64)
- Windows Vista* (IA-32/Intel® 64)

- Windows Server* 2003 (IA-32/Intel® 64/IA-64)
- Windows XP (IA-32)
- Windows XP Pro x64 Edition (Intel® 64)
- Windows Compute Cluster Server* 2003 (Intel® 64)
- Windows XP 64-bit Edition 2003 (IA-64)

Following is the list of supported C/C++ and Fortran compilers:

- Intel® Visual Fortran Compiler 11.1 for Windows*
- Intel® Visual Fortran Compiler 11.0 for Windows*
- Intel® Visual Fortran Compiler 10.1 for Windows*
- Intel® C++ Compiler 11.1 for Windows*
- Intel® C++ Compiler 11.0 for Windows*
- Intel® C++ Compiler 10.1 for Windows*
- Microsoft* Visual C++* 2008
- Microsoft* Visual Studio* 2005 Team Suite Edition
- Microsoft* Visual C++* .NET 2003
- Microsoft* Windows* SDK for Windows* 7 (Intel® 64)
- Microsoft* Windows* Software Development Kit Update for Windows Vista* (Intel® 64)
- Microsoft* Windows Server* 2003 R2 Platform SDK (Intel® 64/IA-64)
- Microsoft* Windows* Software Development Kit for Windows Server* 2008
- PGI* Workstation Complete version 10.x.x

Following is the list of MPI implementations that Intel® MKL has been validated against:

- Intel® MPI Library Version 3.1, 3.2.x, and 4.0 on IA-32 and Intel® 64 (<http://www.intel.com/go/mpi>)
- MPICH2 version 1.x.x (<http://www-unix.mcs.anl.gov/mpi/mpich>)
- MS MPI, CCE or HPC 2008 on Intel® 64 (<http://www.microsoft.com/downloads>)

Note: Usage of MPI linking instructions can be found in the User's Guide in the doc directory.

Following is a list of tools supported with example sources:

- uBLAS examples: Boost C++ library, version 1.x.x
- JAVA examples: J2SE* SDK 1.4.2, JDK 5.0 and 6.0 from Sun Microsystems, Inc.

Note:

- Parts of Intel® MKL have Fortran interfaces, and data structures, while other parts have C interfaces and C data structures. The User Guide in the doc directory contains advice on how to link to Intel® MKL with different compilers and from different programming languages.

3 Installation Notes

Guidance on the installation of Intel® MKL is provided at install time. Links will be provided to a file with step-by-step instructions (filename: Install.htm). This file can also be found in the doc directory.

4 Issues and Limitations

A full list of the [known limitations](#) in this release and the [issues it resolves](#) can be found on the Intel MKL knowledgebase.

5 Notices

The following change is planned for future versions of Intel MKL. Please contact [customer support](#) if you have concerns:

- Content in the libraries containing 'solver' in the filenames has been moved to the core library and the files that remain are there simply to prevent linking errors. These 'solver' libraries will be removed in a future version.

6 Attributions

As referenced in the End User License Agreement, attribution requires, at a minimum, prominently displaying the full Intel product name (e.g. "Intel® Math Kernel Library") and providing a link/URL to the Intel® MKL homepage (<http://www.intel.com/software/products/mkl>) in both the product documentation and website.

The original versions of the BLAS from which that part of Intel® MKL was derived can be obtained from <http://www.netlib.org/blas/index.html>.

The original versions of LAPACK from which that part of Intel® MKL was derived can be obtained from <http://www.netlib.org/lapack/index.html>. The authors of LAPACK are E. Anderson, Z. Bai, C. Bischof, S. Blackford, J. Demmel, J. Dongarra, J. Du Croz, A. Greenbaum, S. Hammarling, A. McKenney, and D. Sorensen. Our FORTRAN 90/95 interfaces to LAPACK are similar to those in the LAPACK95 package at <http://www.netlib.org/lapack95/index.html>. All interfaces are provided for pure procedures.

The original versions of ScaLAPACK from which that part of Intel® MKL was derived can be obtained from <http://www.netlib.org/scalapack/index.html>. The authors of ScaLAPACK are L. S. Blackford, J. Choi, A. Cleary, E. D'Azevedo, J. Demmel, I. Dhillon, J. Dongarra, S. Hammarling, G. Henry, A. Petitet, K. Stanley, D. Walker, and R. C. Whaley.

PARDISO in Intel® MKL is compliant with the 3.2 release of PARDISO that is freely distributed by the University of Basel. It can be obtained at <http://www.pardiso-project.org>.

Some FFT functions in this release of Intel® MKL have been generated by the SPIRAL software generation system (<http://www.spiral.net/>) under license from Carnegie Mellon University. The Authors of SPIRAL are Markus Puschel, Jose Moura, Jeremy Johnson, David Padua, Manuela Veloso, Bryan Singer, Jianxin Xiong, Franz Franchetti, Aca Gacic, Yevgen Voronenko, Kang Chen, Robert W. Johnson, and Nick Rizzolo.

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Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See http://www.intel.com/products/processor_number for details.

This document contains information on products in the design phase of development.

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