HIGH PERFORMANCE INTEL C++ AND FORTRAN COMPILERS WITH INTEL PERFORMANCE LIBRARIES

Intel® Composer XE 2013

Product Brief

Key Features

- Leadership Application Performance
- Powerful Parallelism Models Simplify Multicore Support
- Optimized Libraries For Threading, Math, Media And Data Processing
- Compatible with Leading Development Environments

"Intel makes great C++ and Fortran compilers as well as math libraries"

Dr. Ronald C. Young, President, Multipath Corporation

Also available with one language:

- Intel® C++ Composer XE
- Intel® Fortran Composer XE

Interoperable Products

- Intel® VTune™ Amplifier XE Performance Analyzer
- Intel® Inspector XE Error Checker
- Intel Advisor XE Threading Assistant

Also included in:

- Intel® Parallel Studio XE
- Intel® C++ Studio XE
- Intel® Fortran Studio XE
- Intel® Cluster Studio XE

OS Support:

- Windows*
- Linux*
- † OS X*

† Available in Intel C++ Composer XE for OS X and Intel Fortran Composer XE for OS X

Fortran, C++, and Libraries in One Convenient Package

Intel Composer XE 2013 SP1 is for Fortran developers who want a matching C++ compiler. It combines all the compilers and tools from Intel® C++ Composer XE and Intel® Fortran Composer XE to help deliver outstanding performance for your applications as they run on systems using Intel® Core™ or Xeon® processors, compatible processors, and Intel® Xeon Phi™ coprocessors. Take advantage of a significant savings compared to purchasing individual components.

It's available on Windows* and Linux*. For Windows users, use of this suite requires that Microsoft Visual Studio* 2008, 2010 or 2012 is installed on your system.

Intel Composer XE features compiler-based innovations in vectorization and parallel programming to simplify development of performance-oriented application software. Among these are Intel® Cilk™ Plus, OpenMP* 4.0 features, and guided auto-parallelization. It's compatible with leading C++ compilers and developer environments on Windows and Linux.

Intel Performance Libraries are also included – Intel® Math Kernel Library (Intel® MKL) for advanced math processing and Intel® Integrated Performance Primitives (Intel® IPP) for multimedia, signal and data processing. These libraries offer highly optimized, threaded, and specialized functions that speed development and add application performance. A bonus for C++ developers is Intel® Threading Building Blocks (Intel® TBB), which helps simplify adding parallelism so that applications can take advantage of Intel multicore and many-core processor performance.

Performance, compatibility and innovative, easy-to-use parallelism capabilities make Intel Composer XE a powerful and productive tool. Download an eval today and give it a try!

Top Features

Code snippet before #pragma SIMD

```
for(int i = 2; i < n ;i++)
      y[i] = y[i-2] + 1;
```

Code snippet with #pragma SIMD

```
#pragma simd vectorlength(2)
for(int i = 2; i < n ;i++)
      y[i] = y[i-2] + 1;
```

Intel® Cilk™ Plus #pragma SIMD – Powerful Vectorization

Intel Cilk Plus #pragma SIMD is a powerful vectorization tool that extends the C/C++ language serial semantics to explicitly express data parallelism using relevant SIMD clauses. Developers can use this pragma to tell the compiler to generate accurate vectorized code. For instance, the vectorlength clause explicitly tells the compiler to use a specific vectorlength. Other supported clauses are reduction, private, linear, assert, firstprivate, lastprivate and vectorlengthfor. This Intel C++ capability makes it easier to take advantage of vectorization, get that vectorization right, and deliver improved application performance.

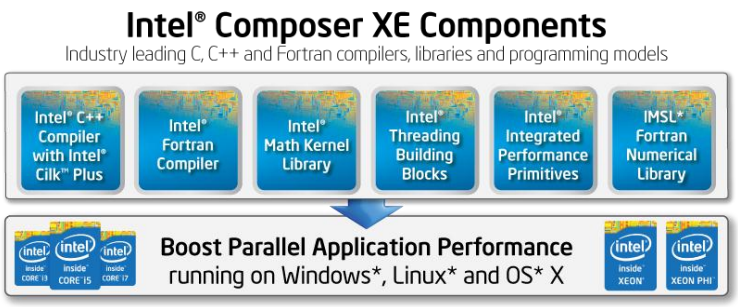
Example of Intel® Fortran Coarray Syntax

```
real, ALLOCATABLE :: grid(:,:)[:,:]
...
ALLOCATE(grid(0:N+1,0:M+1)[1:P,1:*])  ! with halo
...
SYNC ALL  !...wait for all iterations

grid(   0, 1:M) = grid(   N, 1:M)[north_P,me_Q] ! north
grid( N+1, 1:M) = grid(   1, 1:M)[south_P,me_Q] ! south
grid( 1:N, M+1) = grid( 1:N, 1  )[me_P, east_Q] ! east
grid( 1:N, 0  ) = grid( 1:N, M  )[me_P, west_Q] ! west
```

Intel® Fortran – Great Standards Supports

Intel Fortran offers enhanced Fortran 2003 and 2008 standards support and full source code compatibility with Compaq Visual Fortran. On Windows and Linux, it includes support for coarray Fortran, providing support for single multi-cpu shared-memory nodes. Cluster support is available in Intel® Cluster Studio XE package. The benefit is performance for your Fortran applications as they run on individual computers or clusters.



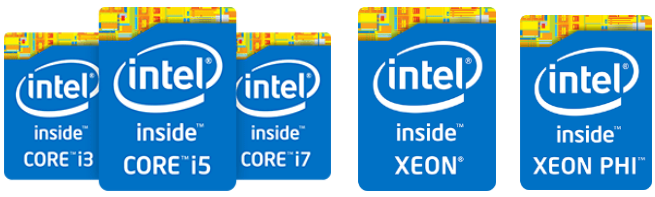
Intel® MKL, Intel® IPP and Intel® TBB libraries – Ready to Use Performance and Productivity

One of the easiest ways to take advantage of systems with wider-vectors and multiple cores is to use pre-optimized functions from Intel® Performance Libraries. Industry-leading Intel® MKL and Intel® IPP include a wealth of routines to improve performance and cut development time. These functions automatically scale across current and future processor architectures. Just re-link to the latest library version and your code is ready to take advantage of the latest processor features.

Intel® TBB offers a rich task-based approach to expressing parallelism in a C++ program. It is a library that helps you take advantage of multi-core processor performance without having to be a threading expert.

The Rogue Wave* IMSL* Numerical Library for Intel Visual Fortran (Windows only) is also available. This leading library offers the largest collection of commercially-available math and statistical functions for science, technical, and business environments.

Intel® C++ and Fortran compilers support Intel® Core® & Xeon® Processors and Intel® Xeon Phi™ Coprocessors



Intel compilers support Intel and compatible processors, including application offloading to Intel Xeon Phi coprocessors

Offloading and Co-Processor Support, Linux & Windows

Intel compilers support Linux-based systems using Intel Xeon Phi coprocessors. With the SP1 release, support is extended to Xeon Phi coprocessors hosted on Xeon-based systems using Windows.

Whether developing for Intel Xeon Phi co-processors, Intel Xeon processors, or Intel Core processors, developers use Intel Cilk Plus in the Intel C++ compiler, to tell the application which parts of the application to offload. Whether you are creating new applications or extending existing code, you use Intel C++ and the Intel Cilk Plus programming model to deliver outstanding application performance.

Take Comfort – Intel Composer XE is compatible with your code and the way you work

Intel Composer XE integrates into Microsoft Visual Studio* 2008, 2010 or 2012 and supports the gnu tool chain on Linux*. The Linux version includes the Intel® Debugger Extension to gdb to help you debug applications for Intel Xeon Phi coprocessors. And the C++ compiler produces code that is binary compatible with Visual C++ on Windows and gcc on Linux. Intel® Fortran on Windows continues to feature full source code compatibility with Compaq Visual Fortran*. This means the investment you have in your code, and how you work, is productively preserved. Composer XE supports all IA-32 and Intel 64 architectures, including Intel® Xeon Phi™ coprocessor, and includes one year of support. In addition, there's an active community of developers out there sharing their experiences on our Forums.

Take Advantage – Intel Composer XE delivers easy-to-use performance features

The Intel C++ Compiler in Intel Composer XE is focused on delivering great application performance with support for multiple parallel programming models. Intel Cilk Plus, part of Intel C++, helps streamline development of vectorized code with its #pragma SIMD and array notation capabilities and parallelism with easy-to-use keywords. Intel Fortran features similar directive-based approaches to vectorization. Both compilers continues to enhance proven features such as the High-Performance Parallel Optimizer (HPO), a powerful capability combines vectorization, parallelization, and loop transformations in a single pass that is faster, more effective, and more reliable than individual, discrete phases. They also support vectorization of code used on systems with conventional Intel® Xeon, Intel® Core and compatible processors and include vectorization tools for applications targeting Intel® MIC Architecture. Interprocedural optimization and profile-guided optimization continue to provide developers with opportunities to enhance performance by in-lining code and restructuring code based on workload. Performance is #1 at Intel.

Take it Easy – Intel Performance Libraries keep you productive and deliver application performance

Intel Composer XE is a lot more than C++ and Fortran compilers. It includes Intel® Threading Building Blocks, a widely used, award-winning C++ template library that simplifies creating reliable, portable, low-maintenance and scalable parallel applications. And Intel® Math Kernel Library is included. It's a library of highly optimized, extensively threaded math routines, including BLAS, LAPACK, ScaLAPACK, sparse solvers, fast Fourier transforms vector math and much more. Intel® Integrated Performance Primitives is also included. It offers highly optimized, extensively threaded functions for multimedia, compression, data processing, communications and more. For your convenience, Intel Composer XE includes lots of sample code and tutorials to simplify development with examples and code snippets.

Take a Test Drive – See for yourself how Intel Composer XE can help you deliver application performance

Intel Composer XE 30-day evaluations are available for download from our web site (**http://intel.ly/sw-tools-eval**). You'll need a system with Visual Studio 2008, 2010 or 2012 for a Windows eval. For Linux, you'll need a system with the gnu tool chain. Check out the link above for more details. The download includes tutorials and lots of code samples, or you can jump right in using your own code. To join the community of your fellow Intel Composer XE developers, visit the Intel Software Network Forums (**http://software.intel.com/en-us/forums/**) or go to the Composer XE web sites (http://software.inteo.com/en-us/articles/intel-composer-xe/) and click support.

What's New

Feature	Benefit
Performance Leadership	Provide users of your software a level of performance not provided by other compilers and libraries
Parallelism Tools and Methods	New with the SP1 release: enhanced support for OpenMP* 4.0 and enhanced support for C++ 11 , C++ 03, Fortran 2003 and Fortran 2008 standards. Enhanced Linux-based application debugging for Intel Xeon Phi coprocessors.
Compatibility	Preserve the investment in your code, the knowledge you have in using the development environments and tools, and deliver software with outstanding performance on systems with Intel and compatible processors.

Purchase Options: Language Specific Suites

Several suites are available combining the tools to build, verify and tune your application. The product covered in this product brief is highlighted in blue. Named-user or multi-user licenses along with volume, academic, and student discounts are available.

	Suites >>	Intel® Cluster Studio XE	Intel® Parallel Studio XE	Intel® C++ Studio XE	Intel® Fortran Studio XE	Intel® Composer XE	Intel® C++ Composer XE	Intel® Fortran Composer XE
Components	Intel® C / C++ Compiler	●	●	●		●	●	
	Intel® Fortran Compiler	●	●		●	●		●
	Intel® Integrated Performance Primitives[3]	●	●	●		●	●	
	Intel® Math Kernel Library[3]	●	●	●	●	●	●	●
	Intel® Cilk™ Plus	●	●	●		●	●	
	Intel® Threading Building Blocks	●	●	●		●	●	
	Intel® Inspector XE	●	●	●	●			
	Intel® VTune™ Amplifier XE	●	●	●	●			
	Intel® Advisor XE	●	●	●	●			
	Static Analysis	●	●	●	●			
	Intel® MPI Library	●						
	Intel® Trace Analyzer & Collector	●						
	Rogue Wave IMSL* Library[2]							●
	Operating System[1]	W, L	W, L	W, L	W, L	W, L	W, L, O	W, L, O

Note: [1] Operating System: W=Windows*, L= Linux*, O= OS X*. [2] Available in Intel® Visual Fortran Composer XE for Windows with IMSL*
[3] Not available individually on OS X, it is included in Intel® C++ & Fortran Composer XE suites for OS X

Technical Specifications

Specs at a Glance	
Processor Support	Supports both genuine Intel® processors and compatible processors.
Operating Systems	Windows*, Linux*, OS X*
Programming Languages	C, C++, Fortran
Compatibility	Designed to work with Microsoft development products and GNU C/C++ compilers with expanded 32-bit and 64-bit multicore processor support including Intel® AVX. The Intel C++ Compiler supports the latest C and C++ standards including key features of C++11 and C99. The Intel Fortran Compiler expands support of established standards: Fortran 90, Fortran 77, and Fortran IV, near-complete support for Fortran 2003 and significant parts of Fortran 2008.
System Requirements	Intel Composer XE is available for IA-32 and Intel® 64 architecture and compatible platforms. For details on hardware and software requirements, please refer to: www.intel.com/software/products/systemrequirements/
Documentation, including Release Notes	C++: http://software.intel.com/en-us/articles/intel-c-composer-xe-documentation/ Fortran: http://software.intel.com/en-us/articles/intel-fortran-composer-xe-documentation/
Support	All product updates, Intel® Premier Support services and Intel® Support Forums are included for one year. Intel Premier Support gives you secure, web-based, engineer-to-engineer support.

Learn more about Intel Composer XE

- Click or enter the link below: http://intel.ly/composer-xe
- Or scan the QR code on the left

Download a free 30-day evaluation

- Click or enter the link below: http://intel.ly/sw-tools-eval
- Click on 'Compilers and Libraries' link

Optimization Notice

Notice revision #20110804

Intel's compilers may or may not optimize to the same degree for non-Intel microprocessors for optimizations that are not unique to Intel microprocessors. These optimizations include SSE2, SSE3, and SSSE3 instruction sets and other optimizations. Intel does not guarantee the availability, functionality, or effectiveness of any optimization on microprocessors not manufactured by Intel. Microprocessor-dependent optimizations in this product are intended for use with Intel microprocessors. Certain optimizations not specific to Intel microarchitecture are reserved for Intel microprocessors. Please refer to the applicable product User and Reference Guides for more information regarding the specific instruction sets covered by this notice.

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