

# XE

ADVANCED COMPILERS AND LIBRARIES

## Intel® Composer XE 2011

For Windows\* and Linux\*

### Product Brief

Intel® Composer XE 2011  
For Windows\* and Linux\*



### Get High Performance with Intel® Composer XE 2011

Intel® Composer XE is a tool bundle that includes the latest generation of Intel® C/C++ Compiler—Intel® C++ Compiler XE 12.0, and the latest Intel® Fortran compiler, Intel® Visual Fortran Compiler XE 12.0.

In addition, the package contains the following Intel performance and parallel libraries: Intel® Math Kernel Library (Intel® MKL), Intel® Integrated Performance Primitives (Intel® IPP), and Intel® Threading Building Blocks (Intel® TBB).

Intel® Composer XE 2011 replaces the popular Intel® Compiler Suite Professional Edition 11.1 bundle. This edition contains support for Intel® Architecture (IA)-32 and Intel® 64 architectures, available for Windows\* and Linux\* platforms.

### Build High-Performance Serial and Parallel Applications for Multicore

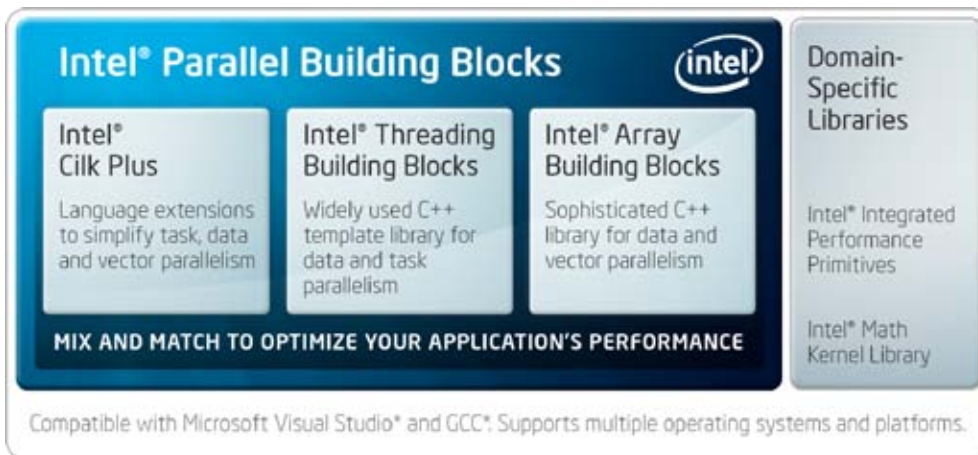
Intel Composer XE delivers performance-oriented features to software engineers using C/ C++ and Fortran, enabling them to develop and maintain high-performance and enterprise applications on the latest IA processors, including the upcoming Intel processor codenamed Sandy Bridge.

Its combination of industry-leading optimizing compilers for IA, including support for the industry-standard OpenMP\*, new innovations such as Intel® Parallel Building Blocks (Intel® PBB), and advanced vectorization support easier and faster development of fully optimized applications. The Intel Fortran compiler implements Co-Array Fortran as part of the Fortran 2008 standard. Applications vary, of course, but in many instances a simple recompile can enhance performance by 20 percent or more. Libraries of optimized math functions, such as Intel® MKL, and functions in many other domains like compression, crypto, and image processing, such as Intel® IPP, also provide automatic parallelization and performance.

#### Learn the New Names

Many tools in the Intel® Parallel Studio XE line are next-generation advancements of familiar industry-leading Intel® software development products. See below to learn more—and to help guide you during the upgrade process.

New Name	Old Name
Intel® Composer XE	Intel® Compiler Suite Professional Edition
Intel® C++ Composer XE	Intel® C++ Compiler Professional Edition
Intel® Visual Fortran Composer XE	Intel® Visual Fortran Compiler Professional Edition
Intel® Visual Fortran Composer XE with IMSL*	Intel® Visual Fortran Compiler Professional Edition with IMSL*
Intel® VTune™ Amplifier XE	Intel® VTune™ Performance Analyzer (including Intel® Thread Profiler)
Intel® Inspector XE	Intel® Thread Checker



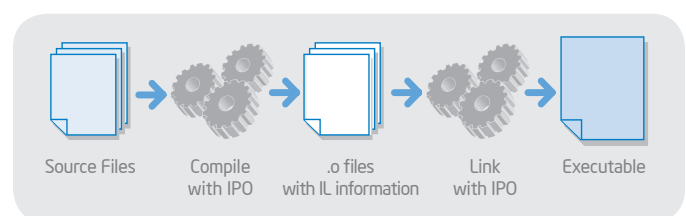
## Create faster applications that take advantage of multicore with Intel® Composer XE

Intel® Compilers continue to fully support the latest standard in OpenMP programming. For Fortran developers, Intel Composer XE offers Co-Array Fortran and additional support for the Fortran 2008 standard. In addition, enhanced vectorization capabilities are supported with SIMD pragmas and C++ array notations. Intel® PBB represents a set of comprehensive parallel development models, supporting multiple approaches to parallelism in C++. The components that embody the models easily integrate into existing applications. This helps preserve your investment in your existing code and speeds development of parallel applications. Intel PBB's parallel programming models offer more choices to match the parallel programming needs of businesses today and into the future. Components in Intel PBB include:

- **IntelTBB** is a C++ template library solution that can be used to enable general parallelism. It includes scalable memory allocation, load-balancing, highly efficient task scheduling, a thread-safe pipeline and concurrent containers, high-level parallel algorithms, and numerous synchronization primitives.
- **Intel® Cilk Plus** is an Intel® C/C++ Compiler-specific implementation of two technologies for parallelism: Intel® Cilk Plus and array notation. The combination offers superior functionality by combining advanced vectorization features with array notation and high-level loop-type data parallelism and tasking parallelism.
- **Intel® Array Building Blocks** (Intel® ArBB, in beta, available separately) provides a generalized data parallel programming solution that frees application developers from dependencies on particular low-level parallelism mechanisms or hardware architectures. It produces scalable, portable, and deterministic parallel implementations from a single high-level, maintainable, and application-oriented specification of the desired computation.

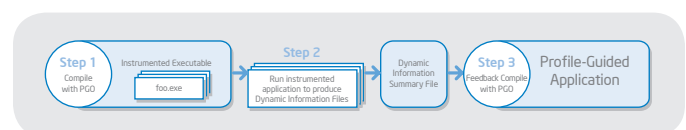
## Advanced Performance Features

- **High-Performance Parallel Optimizer (HPO)** offers an improved ability to analyze, optimize, and parallelize more loop nests. This revolutionary capability combines vectorization, parallelization, and loop transformations into a single pass that is faster, more effective, and more reliable than prior discrete phases.
- **Automatic Vectorizer** analyzes loops and determines when it is safe and effective to execute several iterations of the loop in parallel. Vectorization and auto-parallelization have been enhanced for broader applicability, improved application performance, and more insights into the vectorizer with the guided auto-parallelization (GAP) feature. In addition, SIMD programs are made available for added user control.
- **Interprocedural Optimization (IPO)** dramatically improves performance of small- or medium-sized functions that are used frequently, especially programs that contain calls within loops.



The interprocedural optimization process

- **Loop Profiler** is part of the compiler and can be used to generate low overhead loop and function profiling to show hotspots and where to introduce threads.



The profile-guided optimization process

- **Profile-Guided Optimization (PGO)** improves application performance by reducing instruction-cache thrashing, reorganizing code layout, shrinking code size, and reducing branch mispredictions.
- **OpenMP 3.0** is supported to help simplify pragma-based development of parallelism in your C/C++ applications.

## More Features

### Intel® Debugger

Improve the efficiency of the debugging process on code that has been optimized for Intel Architectures by using the Intel Debugger, which includes new threaded code debugging features.

### Intel® Performance Libraries

Intel Composer XE includes Intel MKL and Intel IPP to help applications access optimized and parallelized domain-specific routines in math and data processing.

### Integration into Microsoft Visual Studio\* and the Microsoft Visual Studio 2008\* Shell

Intel Composer XE integrates into Microsoft Visual Studio 2005\*, 2008, and 2010\*.

## Compatibility

Intel Composer XE is designed to work with Microsoft development products and GNU C/C++ compilers. It provides expanded 32-bit and 64-bit multicore processor support, including enhanced Intel® AVX support. As noted above, the Intel C++ Compiler supports the latest C and C++ standards, including C++ 0x and C99.

*"I was pleasantly surprised by all the functionality in Intel® Parallel Studio XE 2011, and particularly impressed with the memory and threading analysis capabilities. I found the compiler in Intel® C++ Composer XE 2011 to be very solid. Its Guided Auto Parallelism (GAP) and array notation features were very helpful in adding performance."*

*Erik Van Grunderbeeck  
Owner  
Ionix*

## System Requirements

Please refer to [www.intel.com/software/products/systemrequirements/](http://www.intel.com/software/products/systemrequirements/) for details on hardware and software requirements.

## Support

Every purchase of an Intel® Software Development Product includes one year of support services, which provides access to Intel® Premier Support and all product updates during that time. Intel Premier Support gives you online access to technical notes, application notes, and documentation. You can also take advantage of the active Intel Support Forums. More information at <http://software.intel.com/en-us/forums>

### Intel® Software Development Products

Intel Software Development Products help you create the fastest software possible by offering a full suite of tools:

- Intel® Parallel Studio XE 2011
- Intel® VTune™ Amplifier XE 2011 Performance Profiler
- Intel® Performance Libraries
- Intel® Inspector XE 2011 correctness analyzer
- Intel® Cluster Studio 2011—Tools for MPI development

Visit our website at [www.intel.com/software/products](http://www.intel.com/software/products) for details about our entire line of products.

Download a trial version of Intel Composer XE today.  
[www.intel.com/software/products/eval](http://www.intel.com/software/products/eval)

### More Information and Purchase Options

[www.intel.com/software/products](http://www.intel.com/software/products).

## Optimization Notice

Intel® Compiler includes compiler options that optimize for instruction sets that are available in both Intel® and non-Intel microprocessors (for example SIMD instruction sets), but do not optimize equally for non-Intel microprocessors. In addition, certain compiler options for Intel® Compiler are reserved for Intel microprocessors. For a detailed description of these compiler options, including the instruction sets they implicate, please refer to "Intel® Compiler User and Reference Guides > Compiler Options." Many library routines that are part of Intel® Compiler are more highly optimized for Intel microprocessors than for other microprocessors. While the compilers and libraries in Intel® Compiler offer optimizations for both Intel and Intel-compatible microprocessors, depending on the options you select, your code and other factors, you likely will get extra performance on Intel microprocessors.

While the paragraph above describes the basic optimization approach for Intel® Compiler, with respect to Intel's compilers and associated libraries as a whole, Intel® Compiler 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 Intel® Streaming SIMD Extensions 2 (Intel® SSE2), Intel® Streaming SIMD Extensions 3 (Intel® SSE3), and Supplemental Streaming SIMD Extensions 3 (Intel® 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.

Intel recommends that you evaluate other compilers to determine which best meet your requirements.

