THREADING PROTOTYPING TOOL

Intel® Advisor XE 2013

Product Brief

Top Features

- Quickly model and compare the projected performance scaling of your threading designs
- Find synchronization errors; fix and re-model performance before implementing threading
- Project performance scaling for systems with many cores
- Save time and avoid wasted effort; design based on data without disrupting ongoing development

Intel® Advisor XE is included in all Intel® Studio XE products:

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

OS Support:

- Windows*
- Linux*

"Intel® Advisor XE can be invaluable in developing the understanding required to parallelize existing code. It assists with identifying opportunities, designing tests, modeling scenarios and revealing flaws."

Matt Osterberg,
Senior Software Engineer,
Vickery Research Alliance

Data Driven Threading Design

Intel® Advisor XE is a threading prototyping tool for C, C++, C# and Fortran software architects. Quickly model and compare the performance scaling of different threading designs without the cost and disruption of implementation. Find and eliminate data sharing issues during design when they are less expensive to fix. Model the performance impact of any added synchronization and project the scaling on systems with larger core counts.

Explore Alternatives Before Implementation

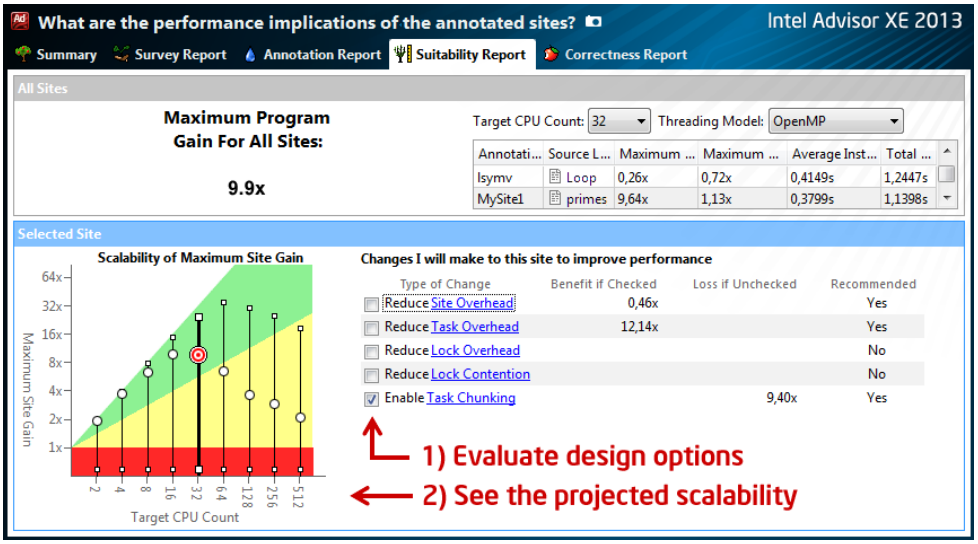
Intel Advisor XE runs a performance analysis to identify opportunities for loop, task and recursive parallelism. Next, use simple code annotations to quickly describe potential parallelism and let Intel Advisor XE estimate the performance and suggest changes. Then run a correctness report to discover critical synchronization issues. Looping through this design process lets you quickly explore alternatives and make tradeoffs. Intel Advisor XE helps you make better design decisions by accurately projecting performance and identifying synchronization errors. You get faster parallel performance while avoiding costly design errors.

Parallelize Without Adding Schedule Risk

Annotations describe your design to Intel Advisor XE letting it give you performance and correctness information, but make no changes to your compiled code. Continue to release product updates during the design phase. All your test cases continue to work. Verify that your application is stable and correct before you go to the final step – implementing parallelism.

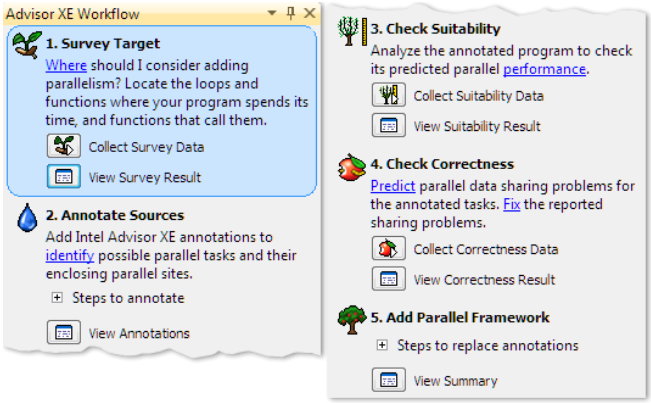
Implement With Productive Parallel Programming Models

All the Intel Studio XE products include a selection of productive parallel models such as Intel® Threading Building Blocks (Intel® TBB), Intel® Cilk™ Plus and Intel® OpenMP. Implementing parallelism at a higher level yields scalable and reliable parallelism with fewer lines of code. Task-based algorithms, containers and synchronization primitives simplify parallel application development. The task scheduler for Intel TBB and Intel Cilk Plus dynamically maps tasks to threads to load balance, preserve cache locality and increase performance. This lets you develop faster and deliver more performance with less code to maintain.



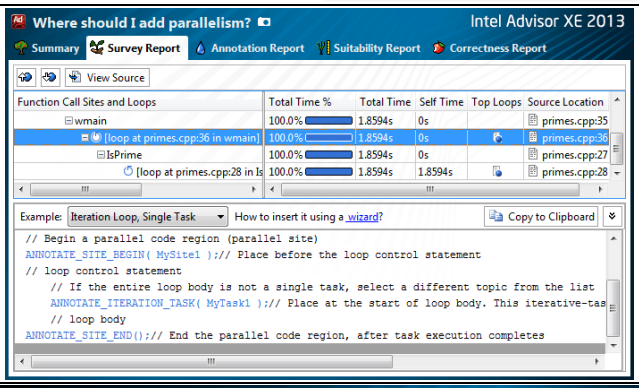
Intel Advisor XE's suitability analysis gives you a performance estimate before you invest significant effort in implementation. Implement only the options that have a high return on investment.

Top Features



Workflow For Effective Design

Intel® Advisor XE's workflow panel guides you through the steps to successfully add effective threading to your application. Implementation is delayed until step 5. This lets you use the active code base and continue to release product updates during the design phase (steps 1-4).

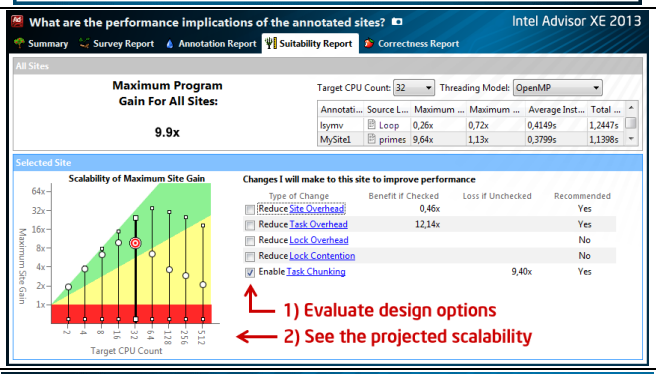


1. Survey – Search for Parallel Sites

Start by measuring you app to see where it will benefit from parallelism.

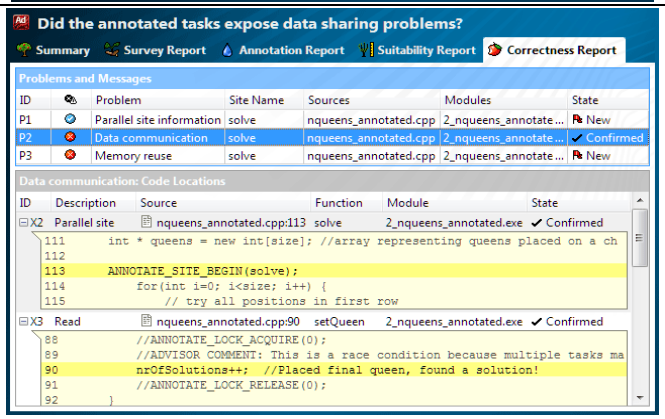
2. Annotate Your Source

Insert annotations in your source code to quickly sketch out potential parallelism. Intel Advisor XE provides coding examples and lets you easily cut and paste them into your source.



3. Check Performance - Compare Alternative Designs

Check the performance and scalability of the design you sketched out. Is it as fast as you thought? How will it scale on systems with more processors? Intel Advisor XE lets you evaluate design options and see the projected scalability. Understand potential load imbalance, lock contention and the impact of runtime overhead.



4. Check Correctness

Do you have any data sharing problems that can lead to deadlocks or races? Find and fix them now before you implement the parallelism.

Intel Advisor XE gives you a list of errors and shows you a snippet of the code at all the related code locations, with click-through navigation to the actual source location.

Parallel Programming Models	
C, C++ – Intel® TBB – Intel® Cilk™ Plus – OpenMP	**C#** – Microsoft TPL* **Fortran** – OpenMP

5. Implement - Choose A Parallel Programming Model

Implement parallelism using a productive parallel programming model that yields scalable and reliable parallelism with fewer lines of code.

Intel® Threading Building Blocks (Intel® TBB) has a rich set of abstractions. Intel Cilk Plus is simple. OpenMP is compatible with legacy code. Microsoft TPL* is designed for C#.

Details

Speed For Your App

The addition of threading can dramatically improve your application's performance with today's multicore processors. Using Intel® Advisor XE, you can easily explore multiple threading designs and pick the one that gives the best return on your time investment.

Simplify

Ideally Intel Advisor XE would automatically add threading to your application and make it run faster. Unfortunately, the technology for doing this well is beyond the current *state of the art*. Instead, Intel Advisor XE is designed for a software architect or developer. It automates the analyses required and gives the developer the information needed to productively add effective threading to an existing application.

Demystify

Intel Advisor XE's workflow window sequences and tracks the steps required for effective threading design. Whether you are new to threading or an experienced professional, this checklist approach keeps you organized. Once the design is final, Intel Advisor XE provides cut and paste templates to implement threading using a one of several parallel programming models.

Speed Implementation – Design Threading Without Impacting Normal Development

The delayed implementation workflow means that the threading design, performance projection and error analysis can proceed in parallel with normal release development. During the design phase no changes are made to the source that impact code generation. You can continue to build, test and release your application while you design and test the threading. Implement threading only when you are confident that your app is stable, the threading design is solid and the timing is right for your release schedule. Intel Advisor XE's automation makes developers and architects more productive, reducing the time needed to add effective threading to an application.

Open Parallel Programming Models

Intel Advisor XE gives you a choice of open and industry standard parallel programming models.

- Intel® Threading Building Blocks (Intel® TBB) – commercial and open source
- Intel® Cilk™ Plus – Intel® and GCC* compilers (currently in the development branch for GCC watch for it the release.)
- Intel® OpenMP – Industry standard
- Microsoft TPL* - Microsoft standard for C#

What's New

Feature	Benefit
Linux* OS	Intel Advisor XE is now available for both Windows* and Linux*.
More languages: C, C++, C# and Fortran	New support for C# and Fortran enables developers to use Intel Advisor XE on more applications.
More parallel models: Intel® TBB, Intel® Cilk Plus, TPL* and OpenMP*	Choose a parallel programming model that best fits your needs.
Command line, standalone user interface, Visual Studio* Integration	Work the way that is most natural and productive for you. Use Intel Advisor XE integrated with Microsoft Visual Studio* or with a standalone interactive user interface or from a command line.
Faster analysis ★	Pause / resume saves time by eliminating analysis of low risk code.
Compare Designs ★	Snapshot copy saves a copy of your workspace making it easy to compare different designs.
Easier to Learn ★	New tutorial, new training videos and an improved assistance window.

★ – New since the original gold release. New features are continuously released in product updates, free with a current support subscription.

Purchase Options: Language Specific Suites

Intel® Advisor XE is not sold separately. It is only available as a part of a product suite. 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	Intel® processors and compatible processors when analyzing applications containing Intel® instructions.
Operating Systems	Windows* and Linux*
Development Tools and Environments	Compatible with compilers from vendors that follow platform standards (e.g., Microsoft*, GCC, Intel compilers). Can be integrated with Microsoft Visual Studio* 2008, 2010 and 2012. See http://www.intel.com/software/products/systemrequirements for the latest details.
Programming Languages	C, C++, C#, Fortran.
System Requirements	See http://www.intel.com/software/products/systemrequirements for details
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.
Community	Join the Intel® Support Forums community to learn, contribute, or just browse! http://software.intel.com/en-us/forums

Learn more about Intel Advisor XE:

- Click or enter the link below: http://intel.ly/advisor-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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