Intel® Parallel Inspector 2011
Release Notes

Installation Guide and Release Notes
Document number: 320754-002US

16 March 2011

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1 Introduction

Intel® Parallel Inspector 2011 is a serial and multithreading error checking analysis tool for Microsoft Visual Studio* C/C++ developers. Inspector detects memory leaks and errors as well as threading data races and deadlock errors. This comprehensive developer productivity tool pinpoints errors and provides guidance to help ensure application reliability and quality.

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

To learn more about this product, see the Inspector Documentation at:

- Start > All Programs > Intel Parallel Studio 2011 > Parallel Studio Documentation > Inspector Documentation.

- Or <install-dir>\documentation<locale>\documentation_inspector.htm. For example, if you install the product in the default installation path, you can find the documentation at: C:\Program Files\Intel\Parallel Studio 2011\Inspector\documentation\en\documentation_inspector.htm

For Technical support, including answers to questions not addressed in the installed tool, visit the technical support forum at: http://software.intel.com/sites/support/
Please remember to register your tool at https://registrationcenter.intel.com/ by providing your email address. This helps Intel recognize you as a valued customer in the support forum.

2 What’s New

Intel® Parallel Inspector 2011 Update 2:

- Improved GUI:
  - Simpler, more intuitive real-time analysis views, main result data view, and import view
  - Enhanced state management and problem filtering
  - New memory overhead gauge to help choose the optimal preset analysis configuration
- Updates for Operating System and IDE support
  - Added Microsoft Windows 7* SP1
  - Added Microsoft Visual Studio* 2010 SP1
- Added stability improvements

Intel® Parallel Inspector 2011 Update 1:

- Improved analysis configuration (The Collection dialog now contains three levels of analysis. Level of analysis formerly known as mi4/ti4 is now available as an additional option when you select mi3 or ti3 levels of analysis, respectively)
- New Managing Suppressions tutorial
- Bug fixes

Intel® Parallel Inspector 2011:

- Microsoft Visual Studio* 2010 support
- Resource leak detection
- Intel® Cilk™ Plus support
- Activation tool


3 System Requirements

For an explanation of architecture names, see http://software.intel.com/en-us/articles/intel-architecture-platform-terminology/

- A system with an IA-32 or Intel® 64 architecture processor supporting the Intel® Streaming SIMD Extensions 2 (Intel® SSE2) instructions (Intel® Pentium® 4 processor or later, or compatible non-Intel processor)
- Incompatible or proprietary instructions in non-Intel processors may cause the analysis capabilities of this tool to function incorrectly. Any attempt to analyze code not supported by Intel® processors may lead to failures in this tool.
- For the best experience, a multi-core or multi-processor system is recommended.

- 2GB RAM
- 4GB free disk space for all tool features and architectures

**Software requirements**
- Operating system: Microsoft Windows 7* SP1, Microsoft Windows XP* SP3, Microsoft Windows Vista* SP2, Microsoft Windows Server* 2003, Microsoft Windows Server* 2003 R2, Microsoft Windows Server* 2008 SP2, 32-bit or x64 editions – embedded editions not supported
- Microsoft Visual Studio* 2005 SP1, 2008 SP1 or 2010 SP1 software with C++ component installed [0] – Microsoft Visual Studio* Express Edition not supported

**Application coding requirements**
- Programming Language: C or C++ (native, not managed code)
- Threading methodologies supported by the analysis tool:
  - Intel® Threading Building Blocks (Intel® TBB)
  - Win32* Threads on Windows*
  - OpenMP* [1]
  - Intel's C/C++ Parallel Language Extensions
  - Intel® Cilk™ Plus

- Adobe* Reader* 7.0 or later to read installed documentation

Notes:

[0] Inspector supports analysis of applications built with the Intel® Parallel Composer, Intel® C++ Compiler Professional Edition version 10.0 or higher, and/or Microsoft Visual C++* 2005 SP1, 2008 SP1 or 2010 SP1 software.

[1] Applications that use OpenMP* technology and are built with the Microsoft* compiler must link to the OpenMP* compatibility library as supplied by an Intel® compiler.

## 4 Installation Notes

If you are installing the Inspector for the first time, please be sure to have the product serial number available so you can type it in during installation.

Inspector updates uninstall your currently installed Inspector version, and use the existing valid Inspector license on the system.
Default Installation Folders

The default top-level installation folder for the Inspector is:

   C:\Program Files\Intel\Parallel Studio 2011\Inspector

If you are installing on a system with a non-English language version of the Windows* operating system, the name of the Program Files folder may be different. On Intel® 64 architecture systems, the folder name is Program Files (x86) or the equivalent.

Changing, Updating and Removing the Tool

To remove, modify, or repair the Inspector:

1. Open the Control Panel.
2. Select the Add or Remove Programs applet.
4. Click the Change button.

Converting Evaluation-licensed Products to Fully Licensed Products

To convert your evaluation software to a fully licensed product:

1. From the start menu, click Start > All Programs > Intel Parallel Studio 2011 > Product Activation
2. Supply a valid product serial number
3. Click Activate

Inspector Documentation

Inspector documentation is automatically integrated into supported versions of Microsoft Visual Studio*. If documentation integration does not work or disappears, follow these steps to restore documentation integration:

1. Click Start > All Programs > Intel Parallel Studio 2011 > Command Prompt and choose any shortcut (such as IA-32 Visual Studio 2005 mode).
2. Remove integration:
   • “insp-vsreg -d 2005” to remove the Inspector integration with VS2005
   • “insp-vsreg -d 2008” to remove the Inspector integration with VS2008
   • “insp-vsreg -d 2010” to remove the Inspector integration with VS2010
3. Restore integration:
   • “insp-vsreg -i 2005” to restore the Inspector integration with VS2005
   • “insp-vsreg -i 2008” to restore the Inspector integration with VS2008
   • “insp-vsreg -i 2010” to restore the Inspector integration with VS2010
If you still cannot access integrated Inspector documentation from the Microsoft Visual Studio* Help menu, try accessing Inspector documentation from the Start menu (Start > Intel Parallel Studio 2011 > Parallel Studio Documentation > Inspector Documentation) or directly from the Inspector Documentation Index at <install-dir>\documentation\<locale>\documentation_inspector.htm.

Also, the Inspector Help may be unavailable in Microsoft Visual Studio* software if the language for non-Unicode programs does not match the operating system language: for example, the Japanese Windows* operating system with English language set for non-Unicode programs. Workaround: Configure the language for non-Unicode programs to match the operating system language (go to Control Panel > Regional and Language Options > tab: Advanced).

5 Issues and Limitations

Installation

- Inspector may not install correctly if an installation of other software is in progress.

- If you have both Microsoft Visual Studio* 2005 and 2008 integrated development environments (IDEs) installed on your system and integrate the Intel® Parallel Studio 2011 into both IDEs, removing the integration from one IDE can remove the integrated Intel® Parallel Studio documentation from both IDEs. To work around this problem, follow the instructions provided in Installation Notes/Inspector Documentation subsection. Follow only the steps for VS2005 and VS2008.

General Issues

- Inspector does not guarantee this software tool will detect or report every memory and threading error in an application.

  - Not all logic errors are detectable.
  - Heuristics used to eliminate false positives may hide real issues.
  - Highly correlated events will be grouped into a single problem.

- You can use the Inspector to analyze applications in debug and release modes. To learn more about options necessary to produce the most accurate, complete results, please refer to the following two resources:

• If no symbols are found for a module in which a problem is detected, the Inspector displays the call stack and observation source code of the first location where it can find symbols. If it cannot find any location in the call stack with symbols, it displays the module name and relative virtual address (RVA) for the location.

• Inspector analyzes only one process in an application: the initial process created by the execution of the targeted application. This means an application launched by a script results in analysis of the script, not the process the script starts.

• Applications that crash when run outside the Inspector may crash or hang the Inspector runtime analysis engine. For example, a corrupt return address on an application call stack crashes the runtime analysis engine. If a crash occurs, problems detected prior to that time can be viewed, but memory leaks are not reported.

• Inspector uses a socket to communicate between the graphical user interface and the runtime analysis engine. Preventing an application from opening a socket prevents the Inspector from analyzing the application.

• Inspector may report an incorrect call stack following an interruption of normal call flow, such as when an exception is thrown and caught. While the Inspector recognizes and attempts to correct result data when this situation occurs, it is possible for a threading or memory problem to be reported before the call stack is fully corrected.

• You cannot obtain meaningful results if the application under analysis launches a debugger.

• Synchronization, function calls and memory loads/stores that occur before the Inspector takes control of the program are not visible to the Inspector. Missing these events may cause the tool to report false positives. This situation can occur if these constructs occur in DllMain.

• When using the Help Viewer in Visual Studio 2010 SP1, if the user clicks the Where am I in the Workflow? icon in the upper-right of some Inspector help topics, to resume reading the original topic:
  • Click the original tab (where the user clicked the Where am I in the Workflow? icon).
  • Click its Back button.

**Threading Error Analysis**

• Inspector may report false positives and false negatives when analyzing applications that call Microsoft Windows* ThreadpoolWait, ThreadpoolTimer, and ThreadpoolIo APIs (first introduced in the Microsoft Windows Vista* operating system) or User-
Mode scheduling (UMS) APIs (first introduced in the Microsoft Windows 7* operating system).

- If you use Intel® Threading Building Blocks (Intel® TBB), set the macro TBB_USE_THREADING_TOOLS at compilation time to enable correct analysis of Intel® TBB applications. Otherwise the Inspector may generate false positives during threading error analysis. If you use Intel® TBB debug libraries, do one of the following to set the macro TBB_USE_THREADING_TOOLS:
  - Use the /MDd switch to set the _DEBUG preprocessor symbol (recommended).
  - Set the macro TBB_USE_DEBUG.

If you use Intel® TBB release libraries, set TBB_USE_THREADING_TOOLS macro. See Intel® TBB documentation for more information.

- Inspector does not detect deadlocks or potential deadlocks created with:
  - Some types of locks via Intel’s C/C++ parallel extension (__critical) provided by the Intel® Parallel Composer
  - Some types of locks in Intel® TBB (spin_mutex, spin_rw_mutex)
  - Non-exclusive ownership synchronization objects involved, for example, condition variables, semaphores and events etc.

- Inspector may not detect threading issues on data accessed in the C runtime library (like memmove and memcpy).

- Inspector does not detect inter-processes data races or deadlock/potential deadlocks.

- Inspector does not capture the main thread creation site if the .pdb symbol file is not in the location specified within the .exe or .dll executable file, or in the location containing the .exe or .dll executable file.

- Inspector may report false positives for analyzed applications using customized synchronization primitives.

**Memory Error Analysis**

- On the 64-bit version of the Windows 7* operating system, the Inspector may show incorrect call stacks associated with memory leaks detected by the narrow (mi1) analysis setting. Any stack frames corresponding to functions in libraries/executables that call LoadLibrary() will be missing in call stacks associated with memory leaks. Workaround: Analyze your application using a wider memory analysis setting (mi2 and mi3).
- Inspector does not report memory leaks when using the narrow (mi1) analysis setting if the application under analysis circumvents the normal termination flow and does not call ExitProcess() (which is a call normally made by the runtime library when the application’s main function ends). Workaround: Analyze your application using a wider memory analysis setting (mi2 and mi3).

- Inspector does not report memory as leaked if a pointer to the memory is available in the application memory space at the time the application exits, because the application has the ability to free this memory. For example, if an application allocates a block of memory and stores a pointer to the memory in a global variable, this memory is not included in a list of reported memory leaks. Only memory that has no pointer to it is considered as a leak.

- Inspector may report false positives when the analyzed application uses custom memory allocators.

- In some circumstances, the Inspector does not record the deallocation of memory freed during application shutdown. For example, the Inspector may not record the event if memory is freed from the destructor of an object that is located in global memory, and that destructor does not execute until late in the shutdown process. Such memory may be reported as a memory leak.

- If the semantics of standard C runtime allocators are changed (the application uses non-standard versions) such that the memory returned by the allocator is initialized, the behavior of the Inspector is unknown and could lead to abnormal analysis termination.

- Inspector may report mismatched allocation/deallocation for an array that appears correct with an allocation of new type[] and a matching delete[] if the code uses #include <new.h>. This occurs because the underlying implementation brought in by this include file may not actually use a matched deallocation to support backward compatibility. Applications that use #include <new.h> are non-conforming C++ applications. Workaround: Make the code conform by using #include <new> (which eliminates this problem), or suppress the code.

- Narrow memory error analysis setting (mi1) may not report leaks for the memory allocated with the operator new from mfc90ud.dll (mfc90u.dll). Workaround: Copy the corresponding pdb-file (mfc90ud.i386.pdb or mfc90ud.AMD64.pdb) from the C:\WINDOWS\symbols\dll directory to the directory where mfc90ud.dll is located.

- The behavior of Memory Leak Analysis level 1 (mi1) is undefined and could lead to abnormal analysis termination if the analyzed application links with the release version of tbbmalloc.dll. Workaround: Use the debug version of tbbmalloc.dll.

- When doing Memory Error Analysis on applications that use fibers or user-level threads, the Inspector may not work properly and/or results may be incorrect in some
cases. For such an application, if the “analyze stack accesses” feature is turned on, the application will not work properly and/or data collection will fail. If the “analyze stack accesses” feature is not turned on, then in some cases, incorrect call stacks may be reported. Intel® Cilk™ Plus uses fibers or user-level threads, and as such, this caveat applies to any software that uses Intel® Cilk™ Plus.

Command-line Interface

- Options put in a file and passed to the insp-cl command with the -option-file option cannot use the same syntax alternatives used when entering these options on the command line. The restrictions are as follows:
  - Put a newline character after the final line in the file, otherwise the final character is duplicated.
  - Use ‘=’ between the option name and its value(s)

For more information, please refer to Technical Support.

6 Attributions

wxWindows Library

This tool includes wxWindows software which can be downloaded from http://www.wxwidgets.org/downloads.

wxWindows Library Licence, Version 3.1

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