

Intel® Parallel Inspector 2011

Release Notes

Installation Guide and Release Notes
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1 Introduction

The Intel® Parallel Inspector 2011 is a serial and multithreading error checking analysis tool for Microsoft Visual Studio* C/C++ developers. The Inspector detects challenging memory leaks and corruption 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 choose 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

The Intel® Parallel Inspector 2011:

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

The Inspector Update 2:

- Analysis support on the Microsoft Windows 7* operating system
- Deadlock detection involving the critical construct and locking API in OpenMP* programs if developers use an Intel OpenMP* runtime library

See <http://software.intel.com/en-us/intel-parallel-inspector/> or the What's New section in the help.

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
- Microsoft Windows 7*, Microsoft Windows XP*, Microsoft Windows Vista*, Microsoft Windows Server* 2003 or Microsoft Windows Server* 2008, 32-bit or “x64” editions – embedded editions not supported
- Microsoft Visual Studio* 2005, 2008 or 2010 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) [0]
- Threading methodologies supported by the analysis tool:
 - Intel® Threading Building Blocks (Intel® TBB)
 - Win32* Threads on Windows*
 - OpenMP* [0]
 - Intel's C/C++ Parallel Language Extensions
 - Intel® Cilk™ Plus
- Adobe* Reader* 7.0 or later to read installed documentation

Notes:

The 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, 2008 or 2010 software.

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 Intel® Parallel Inspector 2011 for the first time, please be sure to have the product serial number available so you can type it in during installation.

The Inspector updates/uninstalls your current version, and uses the existing valid 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.
3. Select **Intel Parallel Inspector 2011**.
4. Click the **Change** button.

Converting Evaluation-licensed Products to Fully Licensed Products

Users of evaluation versions of Intel Developer Products have a new tool that allows converting evaluation-licensed products to fully licensed products. The “Activation Tool” is a utility that allows users of evaluation products to enter a valid product Serial Number to convert the product to fully licensed status. Intel Parallel Studio 2011 users will find a shortcut named “Product Activation” in their Start Menu Programs Group for “Parallel Studio 2011”. Click **Start > All Programs > Intel Parallel Studio 2011 > Product Activation**. From the start menu, supply a valid product serial number, and click **Activate** to convert your evaluation software to a fully licensed product.

Inspector Documentation

The Inspector Documentation is automatically integrated into supported versions of Microsoft® Visual Studio. In the event this integration does not work or disappears entirely, please follow the steps below to restore the integration of the Inspector documentation:

1. Open the IPS command prompt. Go to **Start > All Programs > Intel Parallel Studio 2011 > Command Prompt** and choose any shortcut here, for example. **IA-32 Visual Studio 2005 mode**).
2. First remove the existing integration:
 - “`insp-vsreg -d 2005`” for removing the Inspector integration with VS2005
 - “`insp-vsreg -d 2008`” for removing the Inspector integration with VS2008
 - “`insp-vsreg -d 2010`” for removing the Inspector integration with VS2010
3. Then add back the integration:
 - “`insp-vsreg -i 2005`” for adding the Inspector integration with VS2005
 - “`insp-vsreg -i 2008`” for adding the Inspector integration with VS2008
 - “`insp-vsreg -i 2010`” for adding the Inspector integration with VS2010

5 Issues and Limitations

Installation

- The Intel® Parallel Inspector 2011 may not install correctly if an installation of another tool that integrates with Microsoft Visual Studio* software is in progress.
- The Inspector help integrates into Visual Studio* 2005, 2008 and 2010 software. To access, click **Help > Intel Parallel Studio 2011 > Parallel Studio Help > Inspector Help**. If you cannot view the Inspector help within the Visual Studio* software, double-click the following file: `<install-dir>\documentation\<locale>\documentation_inspector.htm`.
- If you have both Microsoft Visual Studio* 2005 and 2008 installed on your system and integrate Intel® Parallel Studio 2011 into both IDEs, removing the integration

from one of the IDEs can remove the integrated Intel® Parallel Studio documentation from both. To work around this problem, please follow instructions provided in the “4. Installation Notes”, “Inspector Documentation” section. Please only follow the steps for VS2005 and VS2008.

General Issues

- The Intel® Parallel Inspector 2011 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:
 - Memory error analysis: <http://software.intel.com/en-us/articles/compiler-settings-for-memory-error-analysis-in-intel-parallel-inspector/>
 - Threading error analysis: <http://software.intel.com/en-us/articles/compiler-settings-for-threading-error-analysis-in-intel-parrallel-inspector/>
- To reduce false positives and false negatives when analyzing applications using Intel® TBB, include “TBB_USE_THREADING_TOOLS” in the list of compilation Preprocessor Definitions (/D TBB_USE_THREADING_TOOLS).
- 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.
- The 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.
- The 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.

- The 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.
- 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**).
- 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`.

Threading Error Analysis

- The Intel® Parallel Inspector 2011 may report false positives and false negatives when analyzing applications that call Microsoft Windows* thread pool 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).
- The 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.
- The Inspector may not detect threading issues on data accessed in the C runtime library (like `memmove` and `memcpy`).
- The Inspector does not detect inter-processes data races or deadlock/potential deadlocks.
- The 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.

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

Memory Error Analysis

- On 64-bit version of the Windows 7* operating system, the Intel® Parallel Inspector 2011 may show incorrect call stacks associated with memory leaks detected by the low (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 any of the higher memory analysis settings (mi2, mi3, and mi4).
- The Inspector does not report memory leaks when using the low (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: Use any of the higher memory analysis settings (mi2, mi3, and mi4).
- The 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.
- The 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.
- The behavior of the Inspector is unknown and could lead to abnormal analysis termination if the semantics of standard C runtime allocators are changed (the application is using non-standard versions) such that the memory returned by the allocator is initialized.
- The 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.

- Memory Error Analysis level 1 may not report leaks for the memory allocated with the operator new from mfc90ud.dll (mfc90u.dll). To fix the problem you should copy 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.

Command-line Interface

- The help available in PDF format at `install-dir\documentation\en\help_inspector.pdf` does not contain help on the command-line interface (`insp-cl` command). The help for the `insp-cl` command is available from the Microsoft Visual Studio* Help menu: Choose **Intel Parallel Studio 2011 > Parallel Studio Help > Inspector Help**.
- 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.

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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