

Intel® VTune™ Amplifier XE 2011 Release Notes for Windows* OS

Installation Guide and Release Notes

Document number: 323401-002US

4 July 2012

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1 Introduction

The Intel® VTune™ Amplifier XE 2011 provides an integrated performance analysis and tuning environment with graphical user interface that helps you analyze code performance on systems with IA-32 or Intel® 64 architectures.

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

The VTune Amplifier XE has a standalone graphical user interface (GUI) as well as a command-line interface (CLI).

To learn more about this product's documentation, help, and samples, see the Intel® VTune™ Amplifier XE 2011 Documentation item in the Start menu program folder.

2 What's New

VTune Amplifier XE 2011 Update 10:

- Bug fixes

VTune Amplifier XE 2011 Update 9:

- 3rd Generation Intel® Core™ processors (formerly code named Ivy Bridge) support, including General Exploration and Bandwidth analysis types that are available under “Advanced Intel(R) Microarchitecture Code Name Sandy Bridge Analysis” leaf

VTune Amplifier XE 2011 Update 8:

- Intel® Xeon® processor E5-XXXX (formerly code named Sandy Bridge-EP) support

VTune Amplifier XE 2011 Update 7:

- Bug fixes

VTune Amplifier XE 2011 Update 6:

- Intel® Atom™ processors (code name Saltwell and Cedarview) support, including hardware event-based sampling analysis types and metrics for advanced tuning
- Bandwidth analysis for the 32nm Intel® processors code name Eagleton
- Inline functions support (controlled by a filter bar mode)
- “Tiny” threads timeline mode
- Bug fixes

VTune Amplifier XE 2011 Update 5:

- Project Navigator
- Bandwidth Analysis for processors based on the Intel® microarchitecture code name Sandy Bridge
- Advanced options for analyzing child processes
- Command line reports with stacks
- Support for analysis of MPI programs that use the Intel® MPI library
- Usability improvements

VTune Amplifier XE 2011 Update 4:

- Update 3 sometimes incorrectly presented CPU Time in the thread timeline for Hotspots and Concurrency analysis types. Different scales were used for different threads and, thereby, could confuse a user by presenting low CPU Time in one thread as the same height in the chart as high CPU Time in another thread. The values presented in the tool tip when hovering over the chart were still correct. Update 4 resolves this problem completely.

VTune Amplifier XE 2011 Update 3:

- 32nm Westmere family of processors (code name Westmere-EX) support
- Pre-defined analysis for Intel® Atom™ processor
- Comparison mode in the Summary pane

VTune Amplifier XE 2011 Update 2:

- Support for processors based on the Intel® microarchitecture code name Sandy Bridge, including EBS based analysis types and metrics for advanced tuning
- Automatic highlighting and expansion in Bottom-Up and Top-Down Tree panes
- Tooltips for metrics description in grid panes
- Ability to import tb5/6 files from GUI
- JIT API support for Hotspots, Concurrency, and Locks and Waits analysis types
- Overhead time metric calculation for native threading synchronization

VTune Amplifier XE 2011 Update 1:

- Data export to CSV file format
- Source / assembly toggling button
- Bug fixes

3 System Requirements

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

Processor Requirements

- For general operations with user interface and all data collection except Hardware event-based sampling analysis
 - A PC based on 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).
 - For the best experience, a multi-core or multi-processor system is recommended.
 - Because the VTune Amplifier XE requires specific knowledge of assembly-level instructions, its analysis may not operate correctly if a program contains non-Intel instructions. In this case, run the analysis with a target executable that contains only Intel® instructions. After you finish using VTune Amplifier XE, you can use the assembler code or optimizing compiler options that provide the non-Intel instructions.
- For Hardware event-based sampling analysis (EBS)
 - EBS analysis makes use of the on-chip Performance Monitoring Unit (PMU) and requires a genuine Intel processor for collection. EBS analysis is supported on Intel® Pentium® M, Intel® Core™ microarchitecture and newer processors (for more precise details, see the list below).
 - EBS analysis is not supported on the Intel® Pentium® 4 processor family (Intel® NetBurst® MicroArchitecture) and non-Intel processors.
 - However, the results collected with EBS can be analyzed using any system meeting the less restrictive general operation requirements.
 - EBS analysis requires a non-virtual machine to ensure access to the on-chip PMU. EBS is not supported within a virtual machine environment.
- The list of supported processors is constantly being extended. Here is a partial list of processors where the EBS analysis is enabled:

Mobile processors

Intel® Atom™ Processor

Intel® Core™ i7 Mobile Processor Extreme Edition

Intel® Core™ i7, i5, i3 Mobile Processors

Intel® Core™2 Extreme Mobile Processor

Intel® Core™2 Quad Mobile Processor

Intel® Core™2 Duo Mobile Processor

Intel® Core™ Duo Processor

Intel® Core™ Solo Processor

Intel® Pentium® Mobile Processor

Desktop processors

Intel® Atom™ Processor

Intel® Core™ i7 Desktop Processor Extreme Edition

Intel® Core™ i7, i5, i3 Desktop Processors
Intel® Core™2 Quad Desktop Processor
Intel® Core™2 Extreme Desktop Processor
Intel® Core™2 Duo Desktop Processor

Server and workstation processors

Intel® Xeon® processors E7-8800/4800/2800 family
Intel® Xeon® processors E3-1200 family
Intel® Xeon® processors 65xx/75xx series
Intel® Xeon® processors 36xx/56xx series
Intel® Xeon® processors 35xx/55xx series
Intel® Xeon® processors 34xx series
Quad-Core Intel® Xeon® processors 7xxx, 5xxx, and 3xxx series
Dual-Core Intel® Xeon® processors 7xxx, 5xxx, and 3xxx series

System Memory Requirements

- At least 2 GB of RAM

Disk Space Requirements

- 650 MB free disk space required for all product features and all architectures

Software Requirements

- Supported operational systems:
 - Microsoft* Windows XP* SP2 and SP3
 - Microsoft* Windows XP Professional x64 Edition SP1 and SP2
 - Microsoft* Windows Vista* (Ultimate)
 - Microsoft* Windows 7* SP1
 - Microsoft* Windows Server 2008*
 - Embedded editions not supportedNOTE: In a future major release of this product, support for installation and use on Microsoft Windows Vista will be removed.
- We support all OS distributions above. For your information, the VTune Amplifier XE was qualified on the systems listed below:
 - Microsoft* Windows XP* SP2 and SP3
 - Microsoft* Windows Vista* (Ultimate) SP1 and SP2
 - Microsoft* Windows Server 2008* and SP2
 - Microsoft* Windows Server 2008* R2
 - Microsoft* Windows 7* and SP1
- Supported compilers:
 - Intel® C/C++ Compiler 11 and higher
 - Intel® Fortran Compiler 11 and higher

- Intel Parallel Composer
- Microsoft* Visual Studio* C/C++ Compiler
- Supported Microsoft Visual Studio versions:
 - Microsoft* Visual Studio* 2005
 - Microsoft* Visual Studio* 2008
 - Microsoft* Visual Studio* 2010 and SP1

NOTE: In a future major release of this product, support for installation and use with Microsoft Visual Studio 2005 will be removed. Intel recommends that customers migrate to Microsoft Visual Studio 2010* at their earliest convenience.
- Application coding requirements
 - Supported programming languages:
 - Fortran
 - C
 - C++
 - C# (only .NET versions 4.0 and below are supported)
 - Concurrency and Locks and Waits analysis types interpret the use of constructs from the following threading methodologies:
 - Intel® Threading Building Blocks
 - Win32* Threads on Windows*
 - OpenMP*
 - Intel's C/C++ Parallel Language Extensions
- To view PDF documents, use a PDF reader, such as Adobe Reader*.

4 Technical Support

If you did not register your product during installation, please do so at the [Intel® Software Development Products Registration Center](#). Registration entitles you to free technical support, product updates and upgrades for the duration of the support term.

For information about how to find Technical Support, Product Updates, User Forums, FAQs, tips and tricks, and other support information, please visit <http://www.intel.com/software/products/support/>

Note: If your distributor provides technical support for this product, please contact them for support rather than Intel.

5 Installation Notes

If you are installing the product for the first time, please be sure to have the product serial number available so you can type it in during installation. A valid license is required for installation and use.

The installation of the VTune Amplifier XE removes any earlier installed version of VTune Amplifier XE.

The product is a self-extracting executable archive with one IA-32 package you can install on either a 32-bit or 64-bit system.

To begin installation, double click on `VTune_Amplifier_XE_2011_update10_setup.exe` file as a user with *Administrative* privileges. This installs the full package (includes GUI front-end for using the VTune Amplifier XE as well as Microsoft* Visual Studio integration). Activation is required.

Installing Collectors on Remote Systems

You can install the command line data collection features of the product on remote systems to reduce overhead and simply collect data remotely. Data collection on a remote system does not require a license; however, you cannot view the data on a remote system unless a license is present.

The results of any data collection that is run on the remote system must then be copied to the system where the regular install was done for analysis, viewing, and reporting.

To do this:

1. Unpack the product web image manually using the command:
`VTune_Amplifier_XE_2011_update10_setup.exe --extract-only --silent --extract-folder C:\temp\AmplXE_update10_unpacked`

Use any convenient path for the `--extract-folder` option.

In case the `--extract-folder` option is omitted, the default location for the extracted image would be:

```
"C:\Program Files (x86)
\Intel\Download\VTune_Amplifier_XE_2011_update10_setup" for 64-bit and
"C:\Program Files
\Intel\Download\VTune_Amplifier_XE_2011_update10_setup" for 32-bit OS.
```

2. Copy the folder containing the installation files for the collectors and command line tools to the remote machine. With the example shown above, the location of this folder would be `C:\temp\AmplXE_update10_unpacked\Installs\ps_he_cli.*`

3. Run the `Amplifier_XE.msi` with *Administrative* privileges and follow the instructions. No activation will be required.
4. On 64-bit remote machine, from the VTune Amplifier XE installation location, run and install `msvcrt_x86.msi` and `msvcrt_x64.msi` (requires *Administrative* privileges).
5. On 32-bit remote machine, from the VTune Amplifier XE installation location, run and install `msvcrt_x86.msi` (requires *Administrative* privileges).

Default Installation Folders

The default top-level installation folder for this product is:

- `C:\Program Files\Intel\VTune Amplifier XE 2011\`

If you are installing on a system with a non-English language version of Windows, 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.

This product installs into an arrangement of folders shown in the diagram below. Not all folders will be present in a given installation.

- `C:\Program Files\Intel\Amplifier XE 2011\
 - bin32
 - bin64*
 - config
 - documentation
 - include
 - lib32
 - lib64*
 - message
 - resources
 - sepdk
 - samples`

(*) `bin64` and `lib64` are available for Intel® 64 architecture install package

How to Activate Your Evaluation Software after Purchasing

Users of evaluation versions of Intel Developer Products have a new tool that allows converting evaluation-licensed products to fully licensed products once the product is purchased and a serial number is obtained. 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.

Please click **Start > All Programs > Intel Parallel Studio XE 2011 > Product Activation**, supply a valid product serial number, and click **Activate** to convert your evaluation software to a fully licensed product.

Changing, Updating, and Removing the Product

If you want to add or remove components from an installation, open the Control Panel and select the Add or Remove Programs applet, select “Intel® VTune™ Amplifier XE 2011” and click **Change**. To remove the product, select **Remove** instead of **Change**.

When installing an updated version of the product, you do not need to remove the older version. Installation program will remove the old version automatically.

Note: If the SEP driver uninstallation failed during the normal uninstall process, open a Command Prompt window and execute the following commands with Administrative privileges to manually remove the SEP driver from the system:

```
cd %windir%\system32\drivers
dir sep*.sys
net stop sep3_4      # unload SEP3 driver from kernel
del sep3_4.sys      # delete SEP3 driver from filesystem
net stop sepdal     # unload PAX driver from kernel
del sepdal.sys      # delete PAX driver from filesystem
```

Known Installation and Configuration Issues

- If you encounter problems using F1 Help for the VTune Amplifier XE windows and dialog boxes on Microsoft Visual Studio* 2008 systems: Choose **Tools > Options > Help > Online > Try local first, then online**.
- When installing the VTune Amplifier XE for the first time on a Microsoft Visual Studio* 2010 system, you may be asked to initialize the Local Store for documentation. Follow **Help Library Manager** installation wizard instructions to register and install the VTune Amplifier XE Help documentation. You do not need to re-register the VTune Amplifier XE Help documentation when you install future VTune Amplifier XE updates. For more information, see <http://msdn.microsoft.com/en-us/library/dd264831.aspx>.

If you encounter problems viewing the VTune Amplifier XE (local) help: Choose **Help > Manage Help Settings > Settings**, and check **I want to use local help**.

6 Issues and Limitations

Known Issues and Limitations

- **Running time is attributed to a next instruction (200108041)**
 - To collect the data about time-consuming running regions of the target, the VTune™ Amplifier XE interrupts executing target threads and attributes the time to the context IP address.
 - Due to the collection mechanism, the captured IP address points to an instruction AFTER the one that is actually consuming most of the time. This leads to the running time being attributed to the next instruction (or, rarely to one of the subsequent instructions) in the Assembly view. In rare cases, this can also lead to wrong attribution of running time in the source - the time may be erroneously attributed to the source line AFTER the actual hot line.
 - In case the inline mode is ON and the program has small functions inlined at the hotspots, this can cause the running time to be attributed to a wrong function since the next instruction can belong to a different function in tightly inlined code.
- **Incorrect timing results when running on a 32-bit virtual machine (200137061)**
 - VTune Amplifier XE may fail to collect correct timing data when running on a virtual machine with problematic virtualization of time stamp counters. In this case the VTune Amplifier XE throws a warning message:
 - “Warning: Cannot load data file '<path_to_a_trace_file>.trace' (syncAcquiredHandler: timestamps aren't ascended!)”
- **An application that allocates massive chunks of memory may fail to work under VTune Amplifier XE (200083850)**
 - If a 32-bit application allocates massive chunks of memory (close to 2 GB) in the heap, it may fail to launch under the VTune Amplifier XE while running fine on its own. This happens because the VTune Amplifier XE requires additional memory when profiling an application. The workaround could be in using larger address space (for example, converting the project to 64-bit).
- **Hardware event-based analysis may crash certain Intel® Core™ i7 processor-based systems when deep sleep states are enabled (200149603)**

- On some Intel® Core™ i7 processor-based (code named Nehalem) systems with C-states enabled, sampling may cause system hanging due to a known hardware issue (see errata AAJ134 in <http://download.intel.com/design/processor/specupdt/320836.pdf>). To avoid this, disable the “Cn(ACPI Cn) report to OS” BIOS option before sampling with the VTune Amplifier XE analyzer on Intel Core i7 processor-based systems.
- **Link to instruction guide: instruction set reference document is not positioned on description of proper instruction.** (200091607)
 - The reference information for assembly instructions can be opened in any PDF viewer, but only Adobe Acrobat Reader* supports positioning the instruction reference document on the required page. To ensure correct functionality of this feature, you are recommended to install the latest available version of Adobe Acrobat Reader.
- **Uninstalling limitation: pin.exe stays running after detaching.** (200092295)
 - The VTune™ Amplifier XE cannot be uninstalled after attaching to the target to be profiled until running the target is over. The cause is that pin.exe keeps working after detaching from the target and exits only after the profiled application/process execution finishes.
- **VTune™ Amplifier XE does not support profiling an application launched under debugger** (200092508)
 - The Hotspot, Concurrency or Lock and Waits analysis types provide incorrect results when analyzing an application launched under a debugger. VTune Amplifier XE does not detect whether a debugger is attached to a profiled application. Make sure that no debugging tools are attached to the application that is profiled with the VTune Amplifier XE.
- **Second attach to the same application should print an error and exit immediately.** (200092650)
 - The VTune™ Amplifier XE allows running the analysis while the previous one is in progress but does not store any data for the second analysis run.

- **Intel® Compiler only produces first level of inlines. The nested inlines are not emitted into the debug information.** (200164310)
 - Intel® Compiler currently generates debug information only for the first level of inline functions. So, you cannot see performance data attributed to functions inlined to other inline functions. Instead, this performance data are attributed to corresponding functions inlined to regular (not inline) functions. This may also cause wrong source line attribution of performance data in the source view.
- **Timeline pane displays incorrect concurrency and thread states for a paused region in the Concurrency and Locks and Waits analyses.** (200204715)
 - Concurrency and thread state data may be incorrect in the Timeline pane for a region corresponding to the time when data collection was paused. Ignore the timeline data in a paused region during result analysis.
- **VTune™ Amplifier XE does not resolve symbols correctly on Windows XP SP1 operating system** (200216358)
 - When VTune™ Amplifier XE is ran on Windows XP Service Pack 1 operating system, a problem may be observed that symbols are not resolved correctly but instead are shown as "[foo.dll]" names. This happens because VTune™ Amplifier XE uses Microsoft DIA library version which requires Service Pack 2 to be installed. Please install the service pack to resolve the issue.
- **Information collected via ITT API is not available when attaching to a process.** (200172007)
 - When collecting statistics data using ITT API injected into a source code, like Frame Analysis or JIT-profiling, attaching to a process will not bring expected results. Use the VTune Amplifier XE analysis to start an application instead of attaching to a process.
- **Only one stack frame is shown in Java code if IBM* J9* JVM is used** (200227950)
 - Currently Java stack unwinding is not supported for IBM* J9* JVM.
- **VTune Amplifier XE can show [unknown stack frame(s)] as a hotspot in EBS analyses in Windows* 2008 R2** (200173627)

- Workaround is to start VTune Amplifier XE under the explicit “Run as administrator” option, even if current user has administrator credentials.
- **Attachment as Administrator to a process that launched by the 'System' user fails (200259643)**
 - You may use a utility from <http://technet.microsoft.com/en-us/sysinternals/bb897553> to profile w3wp.exe-based code from the command line using amplxe-cl.exe that is located in <product_install_dir>/bin32. Do the following:
 - 1. Configure the w3wp service to run with the permissions you use to log in: Open IIS Manager, right-click an application pool you are using and set “Process model:Identity” to the account under which w3wp needs to be run.
 - 2. Run the w3wp service and make sure you run it with proper credentials and remember its PID:
 - psexec -i 0 /path/to/amplxe-cl.exe -c=hotspots -r /path/for/your/data_dir --target-pid=PID
 - 3. Run your workload:
 - psexec -i 0 /path/to/amplxe-cl.exe -command detach -r /path/for/your/data_dir
 - 4. Open /path/for/your/data_dir in GUI:
 - <product_install_dir>/bin32/amplxe-gui /path/to/your/data_dir
- **Do not use -ipo option since it causes the inline debug information to switch off. (200260765)**
 - [Windows] If using the Intel® compiler to get performance data on inline functions, use the additional option “/debug:inline-debug-info”, but avoid using the /Qipo option. Currently this option disables generating the inline debug information in the compiler. Note that the Intel compiler integrated into the Microsoft Visual Studio* IDE uses the /Qipo by default in the Release configuration.
 - [Linux] If using the Intel® compiler to get performance data on inline functions, use the additional option “-inline-debug-info”, but avoid using the -ipo option. Currently this option disables generating the inline debug information in the compiler.

- **Intel® Compiler currently doesn't support function split ranges in debug info which may lead to wrong performance data attribution in case function ranges are overlapped (e.g. performance data attributed to one function, but should have been split by two).** (200260768)
 - In some cases the Intel® Compiler generates imprecise debug information about ranges of inline functions. This may lead to wrong performance data attribution when the Inline mode is turned on, for example: instead of two functions performance data is attributed just to one of them.

- **Attaching to managed run-time processes is not supported** (200179386)
 - When attaching to a .NET/Java application the information of managed run-time part of the application will not be provided in results. The resulting profile will contain only native code relevant information.

- **Attaching the VTune Amplifier XE to a process may take some time** (200276420)
 - Your target application may complete before the data collection starts, so the VTune Amplifier XE may report an error. Increase the duration of your test application if necessary.

- **Event-based collection on fixed counters with stacks collection enabled fails on some CPUs** (200179695)
 - On some old CPUs, fixed PMU counter values cannot be reliably read and, as a result, EBS collection with stacks gives all zeros for such counters. For example, see the errata for Intel® Core™ 2 Duo processors in <http://download.intel.com/design/processor/specupdt/318733.pdf>. To workaround this problem, launch a custom analysis with the Clockticks and Instructions Retired specified as precise events.

- **Limited event description for Intel® Xeon® processor E5-XXXX and the 2nd Generation Intel® Core™ processor family desktop processors.** (200285238)
 - Developers can find more details on events by checking the Intel® 64 and IA-32 Architectures Software Developer's Manual <http://download.intel.com/products/processor/manual/325462.pdf>, Tables 19-3, 19-4 and 19-5.

- **Hardware event-based analysis may cause unpredictable system behavior on Intel® Core™ i5 2500 and Intel® Core™ i7 2600 (with HT-Off) processor-based systems under Windows* 7 32-bit OS (200285401)**
 - On Intel® Core™ i7 2600 processor-based systems when Hyper-Threading technology is OFF and on Intel® Core™ i5 2500 systems under Windows* 7 32-bit OS, hardware event-based sampling may cause unpredictable system behavior due to known hardware issue (see erratum BK105 in <http://www.intel.com/content/dam/www/public/us/en/documents/specification-updates/2nd-gen-core-family-mobile-specification-update.pdf>). To avoid this, you are not recommended to run General Exploration, Client Analysis, Cycles and Uops, Loop Analysis or Custom Hardware event-based analysis with precise events on these systems unless a BIOS workaround for the erratum is provided.

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```
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```

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Glenn Randers-Pehrson
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June 14, 2012

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Changes to standard library modules:

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A brief summary of changes made to Python 2.5.2 source:

- On Windows*, the code of import, zipimport, and execfile was modified to handle directories containing Unicode characters.

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```
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   version 1.2.3, July 18th, 2005
```

```
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