

# Intel® VTune™ Amplifier XE 2011 Release Notes for Linux

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Installation Guide and Release Notes

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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 Intel® VTune™ Amplifier XE 2011 has a standalone graphical user interface (GUI) as well as a command-line interface (CLI).

## 2 What's New

The Intel® VTune™ Amplifier XE 2011 Update5 adds:

- Project Explorer
- Bandwidth Analysis for the 2nd Generation Intel® Core™ Processor Family (codenamed 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
- Newer Linux OS support: Fedora 15, Ubuntu 11.04, Debian 5, MeeGo 1.2 Gold

#### The Intel® VTune™ Amplifier XE 2011 Update4:

- 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.
- Debian\* 6.0 support
- Ubuntu\* 11.04 support

#### The Intel® VTune™ Amplifier XE 2011 Update3:

- 32nm Westmere Family of Processors (codenamed Westmere-EX) support
- Pre-defined analysis for Intel® Atom™ Processor
- Attach/detach to process for the Hotspots, Concurrency, and Locks and Waits analysis types
- Comparison mode in Summary pane

#### The Intel® VTune™ Amplifier XE 2011 Update2:

- The 2nd Generation Intel® Core™ Processor Family (codenamed Sandy Bridge) support including EBS based analysis types and metrics for advanced tuning
- Fedora\* 14 support
- Automatic highlighting and expansion in Bottom-Up and Top-Down 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

The Intel® VTune™ Amplifier XE 2011 Update1:

- Red Hat\* Enterprise Linux 6 support
- CentOS\* 5.5 support
- Ubuntu\* 10.04 support
- Data export to CSV file format
- Source / assembly toggling button
- Several bugs were fixed.

### 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 Intel® 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 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**

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

## Software Requirements

- Supported Linux\* distributions:
  - Red Hat\* Enterprise Linux 4 (starting from Update 8)
  - Red Hat\* Enterprise Linux 5 and 6
  - SUSE\* Linux\* Enterprise Server (SLES) 10 and 11
  - Fedora\* 14 and 15
  - Ubuntu\* 10.04
  - Ubuntu\* 10.10<sup>†</sup>
  - Ubuntu\* 11.04<sup>†</sup>
  - Debian\* 5.0 and 6.0
  - MeeGo\* 1.1 and MeeGo\* 1.2 Gold<sup>††</sup>  
<sup>†</sup>VTune™ Amplifier XE supports Ubuntu\* 10.10 and Ubuntu\* 11.04 default configuration only for event-based sampling analysis in the command line mode. To learn how to enable all other types of analysis and GUI results, please see the solutions described in the Known Limitation section, items 200197559, 200197563, of this document.  
<sup>††</sup>Please refer to the Intel® AppUp™ SDK Suite for MeeGo\* documentation for more information.
- We support all OS distributions above. For your information, VTune™ Amplifier XE was qualified on the builds listed below:
  - Red Hat\* Enterprise Linux 4 Update 8
  - Red Hat\* Enterprise Linux 5 Update 5 and 6
  - SUSE\* Linux Enterprise Server 10 Service Pack 4
  - SUSE\* Linux Enterprise Server 11 Service Pack 1
  - Fedora\* 14 and 15
  - Ubuntu\* 10.04 and 11.04
  - Debian\* 5.0 and 6.0
- Supported compilers:
  - Intel® C/C++ Compiler 11 and higher
  - Intel® Fortran Compiler 11 and higher
  - GNU C/C++ Compiler 3.4.6 and higher
- Application coding requirements
  - Supported programming languages:
    - Fortran
    - C
    - C++
  - Supported threading methodologies:
    - Intel® Threading Building Blocks
    - Posix\* Threads on Linux\*
    - OpenMP\*[1]
    - Intel's C/C++ Parallel Language Extensions
- To view PDF documents, use a PDF reader, such as Adobe Reader\*.

### Notes:

1. VTune™ Amplifier XE supports analysis of applications built with Intel® Fortran Compiler Professional Edition version 11.0 or higher, Intel® C++ Compiler Professional Edition version

11.0 or higher, or GNU C/C++ Compiler 3.4.6. Applications that use OpenMP\* technology and are built with the GNU compiler must link to the OpenMP\* compatibility library as supplied by an Intel® compiler.

## 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.

This product package can be used to install the software on both IA-32 systems and Intel® 64 systems. The installer determines the system architecture and installs the appropriate files. Both 32-bit and 64-bit versions of the software are automatically installed on an Intel® 64 system.

To begin installation, do the following:

1. *gunzip* and *untar* to retrieve the installation packages.
2. Execute the `./install.sh` script file (available at the top level in the untarred contents) as a root user. Activation is required.

Note:

1. To install all components to a network-mounted drive or shared file system, execute the following command in place of the one in step 2 above: `./install.sh --  
SHARED_INSTALL`

2. The install can be run as a non-root user, but in this case not all collectors will be available to the user.
3. For successful installation you should have read and write permissions for the `/tmp` directory.

## 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, viewing of the data cannot be done on the 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. Copy the `CLI_install` folder (found at the top level in the untarred product install package) to the remote machine.
2. Execute `./install.sh` script file (this file is located inside the `CLI_install` folder). No activation will be required.

## Default Installation Directories

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

- `/opt/intel/vtune_amplifier_xe_2011/`

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

- `/opt/intel/vtune_amplifier_xe_2011/`
  - `bin32`
  - `bin64*`
  - `config`
  - `documentation`
  - `include`
  - `lib32`
  - `lib64*`
  - `man`
  - `message`
  - `resources`

- o `sepdk`
- o `samples`

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

## Establishing the VTune™ Amplifier XE Environment

The `amplxe-vars.sh` script is used to establish the VTune™ Amplifier XE environment.

The command takes the form:

```
source <install-dir>/amplxe-vars.sh
```

## Advanced Installation Options

VTune™ Amplifier XE uses a kernel driver to enable event-based sampling (EBS) analysis. If you are not using a default kernel on the supported Linux\* distributions listed above, use the SEP Driver Kit in VTune™ Amplifier XE to compile drivers for your kernel.

If no pre-built drivers are provided for your kernel, VTune™ Amplifier XE installer will automatically use the SEP Driver Kit to try and build a driver for your kernel. The driver can also be built manually after the product is installed using the SEP Driver Kit.

Note: additional software may be needed in order to build and load the SEP kernel driver on the Linux\* operating system. For details, see the `README.txt` file in the `sepdk/src` directory.

When the Advanced installation is chosen, the following options are available:

- Driver install type [ use pre-built driver (default) / build driver / driver kit files only ]

If no pre-built driver for this system is found, the option will be set to 'build driver'.

You may change the option to 'driver kit files only' if you don't want to build/install driver or want to do it manually after installation.

- Driver access group [ vtune (default) ]

Setting the driver access group ownership is a security feature and is used to control access to the kernel module. By default the group for accessing the driver is "vtune". You may set your own group during installation or change it manually after installation by executing '`./boot-script --group <your_group>`' from the `sepdk/src` directory.

- Load driver [ yes (default) ]

By default installation loads the driver into kernel.

- Install boot script [ yes (default) ]

By default installation sets up a boot script which loads the driver into the kernel each time the system is rebooted. The boot script can be disabled later by executing '`./boot-script --uninstall`' from the `sepdk/src` directory.

## 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.

Run the `/opt/intel/ActivationTool/Activate` script, and provide your purchased product serial number, either as an argument to the program, or when prompted. For example:

```
/opt/intel/ActivationTool/Activate ABCD-123AB45C
```

Be sure to login or “su” to root if you want the product license to be available to all system users.

## Removing the Product

If you want to remove components from an installation, run `uninstall.sh` script as root user from the product installation folder.

# 6 Issues and Limitations

## Known Issues and Limitations

- **Running time is attributed with a skid of 1 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 the instruction occurred AFTER the one that is actually consuming most of the time. This leads to the skid of one instruction for running time distribution 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.
- **Re-finalized Hotspots analysis result may contain <unknown> items (200109010)**
  - Re-finalized results for the C++ projects with the active build or target configurations different from those used during collection may contain incorrect

function/source files names. To resolve this problem, re-finalize results using the same active build and target configurations as for the collection.

- **SEP may crash certain NHM systems when deep sleep states are enabled** (200149603)
  - On some Intel® Core™ i7 processor-based 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.** (200091200)
  - 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.
  
- **Specifying too low "Sampling After Value" for some events may cause system hang due to frequent events triggering during the collection** (200093394)
  - Use reasonable "Sampling After Value" that result in about 1000 events triggering per second. This is statistically sufficient for the data analysis. For more fine grained analysis of sampling results, decrease the "Sampling After Value" gradually observing the system responsiveness slowdown due to frequent interruptions.
  
- **Security-enhanced Linux\* is not supported** (200155374)
  - Security-enhanced Linux\* settings (SELinux) are currently not supported by the Intel® VTune™ Amplifier XE and need to be either disabled or set to permissive for a successful tool suite installation. If your Linux\* distribution has SELinux enabled the following error message will be issued by the installer:
  - Your system is protected with Security-enhanced Linux (SELinux). We currently support only "Permissive" mode, which is not found on the system. To rectify this

issue, you may either disable SELinux by - setting the line "SELINUX=disabled" in your /etc/sysconfig/selinux file - adding "selinux=0" kernel argument in lilo.conf or grub.conf files or make SELinux mode adjustment by - setting the line "SELINUX=permissive" in your /etc/sysconfig/selinux file or ask your system administrator to make SELinux mode adjustment. You may need to reboot your system after changing the system parameters. More information about SELinux can be found at <http://www.nsa.gov/selinux/>

- **The tool may not be able to parse correctly certain characters in an application's command arguments passed through a shell script (200155871)**
  - Using quotes and double quotes in the application's command arguments may not be parsed correctly. To work around the problem, use double quotes and backslashes to screen double quotes inside.
  - Incorrect: 'this "style" text'
  - Correct: "this \"style\" text"
  
- **VTune™ Amplifier XE does not show collected results if installed into the directory with non-English characters (200185779)**
  - When you install the product on a system with language localization, make sure the path to the installation directory does not contain non-English characters.
  
- **Event-based sampling collection cannot start if the result directory path contains non-English characters (200185851)**
  - When you install the product on a system with language localization, make sure the path to the result directory does not contain non-English characters.
  
- **On Ubuntu\* 10.10 systems, Standalone GUI silently disappears when opening the results. (200197559)**
  - Recommendation: Need to switch visual theme to "New wave" or switch to another window manager (e.g. KDE).
  
- **VTune™ Amplifier XE may be killed while opening results on Ubuntu 10.10 or later if no license is provided (200197888)**

- This happens due to checking a license with enabled trusted storage. Possible workaround is disabling the ptrace protection in OS by using the command: `echo 0 | tee /proc/sys/kernel/yama/ptrace_scope`
  - However, normally it's expected that a license is provided for the product before using it.
- **VTune Amplifier XE collectors may crash or produce corrupted data while profiling stripped binaries.** (200165647)
    - VTune Amplifier XE may fail to collect data for Hotspots, Concurrency, and Locks and Waits analysis types if the main executable of an analysis target statically links some symbols from `libc.so` or `libpthread.so` (for example, `pthread_create`). To avoid this, do not strip the main executable. Use the `-E` linker switch to export the statically linked symbols to the dynamic symbol table of the main executable. For the list of symbols required for correct profiling, see the Analyzing Statically Linked Libraries topic in the online help.
- **VTune™ Amplifier XE GUI may crash when browsing files on MeeGo\* 1.2 OS** (200166696)
    - Using scroll bars while browsing files in the “File Open” dialog may lead to crash caused by bug in theme engine (see <https://bugs.launchpad.net/ubuntu/+source/light-themes/+bug/538499>). To avoid the crash you may enter full path to desired file into edit field of the dialog to open it.
- **Hotspots, Concurrency and Locks and Waits analysis types may not work on executables that do not depend on the `libpthread.so.0` library.** (200208975)
    - There is currently a limitation in the product regarding profiling application targets where the executable does not depend on the `libpthread.so.0` library. The message
    - Link `libpthread.so` to the application statically and restart profiling
    - appears when profiling an application where program image does not depend on `libpthread.so.0` but then it `dlopen()`-s a shared library which does depend on `libpthread.so.0`. The collector is not able to follow the program execution and module load/unload so the collection results are likely to be misleading.

- A workaround is to set "LD\_PRELOAD=libpthread.so.0" before running the collection.

## 7 Attributions

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Libxml2

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Libunwind

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```
/* zlib.h -- interface of the 'zlib' general purpose compression library
   version 1.2.3, July 18th, 2005
```

```
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```

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